



Trinitek Services, Inc.

***Nuclear and Environmental
Safety Consultants***
<http://www.3tks.com/>



Technical Proposal

Presented to:

Commonwealth of Virginia

Department of Health

April 3, 2012



Uranium Study:

Mining and Milling Issues

RFP #1200001-999

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Trinitek Services, Inc.

Nuclear and Environmental Safety Consultants

<http://www.3tks.com/>

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(505) 286-4387
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gec@3tks.com

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REQUEST FOR PROPOSALS (RFP)

RFP # 1200001-999

Issue Date: March 5, 2012

Title: Uranium Study

Commodity Code: 91843

Issuing Agency: Commonwealth of Virginia
Department of Health
Office of Purchasing & General Services
Attn: Daniel Wilborn, Contract Officer
109 Governor Street, Room 1214
Richmond, VA 23219

Using Agency And/Or Location: Department of Health
Where Work Will Be Performed:

Initial Period of Contract: From Date of Award through **November 30, 2012.**

Sealed Proposals Will Be Received Until 2:00 p.m. on April 4, 2012 For Furnishing The Services Described Herein.

All Inquiries for Information Should Be Directed To: Daniel Wilborn, Contract Officer, Phone: (804) 864-7519 or E-mail: daniel.wilborn@vdh.virginia.gov. **Questions will be accepted until close of business on March 14, 2012.**

IF PROPOSALS ARE MAILED, SEND DIRECTLY TO THE ISSUING AGENCY SHOWN ABOVE. IF PROPOSALS ARE DELIVERED BY COURIER OR HAND DELIVERED, DELIVER TO: THE ISSUING AGENCY SHOWN ABOVE, Attn: Daniel Wilborn, Contract Officer.

In Compliance With This Request For Proposals And To All The Conditions Imposed Therein And Hereby Incorporated By Reference, The Undersigned Offers And Agrees To Furnish The Services In Accordance With The Attached Signed Proposal Or As Mutually Agreed Upon By Subsequent Negotiation.

State Corporation Commission ID Number: _____
(See Special Terms and Conditions)

Name and Address Of Firm:

Trinitek Services, Inc. Date: April 2, 2012

PO BOX 1608 By: _____

Sandia Park Name: Gloria E chavez, Ph.D. (Signature in Ink)

New Mexico (Please Print)

Zip Code: 87047 Title: President

eVA Vendor ID or DUNS # VS0000087437 Phone: (505) 220-5552

E-mail: gec@3tks.com Fax: (505) 242-8201

PREPROPOSAL CONFERENCE: A mandatory pre-proposal conference will be held at 2:00 p.m. on March 16, 2012 at the Department of Health, 109 Governor Street Room 1218, Richmond, VA, 23219. Reference: Section VII herein. NO ONE WILL BE ADMITTED AFTER 2:10 p.m. If special ADA accommodations are needed, please contact Daniel Wilborn at 804-864-7519 by March 13, 2012.

Note: This public body does not discriminate against faith-based organizations in accordance with the Code of Virginia, § 2.2-4343.1 or against an offeror because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment.

**VIRGINIA DEPARTMENT OF HEALTH
OFFICE OF PURCHASING AND GENERAL SERVICES (OPGS)
109 GOVERNOR STREET
RICHMOND, VIRGINIA 23219**

March 8, 2012

ADDENDUM NUMBER 1 TO ALL BIDDERS/OFFERORS:

Reference: RFP 1200001-999

Commodity: 91843

Dated: March 5, 2012

For Delivery To: Commonwealth of Virginia Department of Health
Office of Purchasing and General Services (OPGS)
Attn: Daniel Wilborn, Contract Officer
109 Governor Street 12th Floor, Room 1214
Richmond, VA 23219-0331

Bid/Proposal Due: April 4, 2012

Pre-bid/proposal Conference: March 16, 2012

The above is hereby changed to read:

1. Page 1 and Section VII. Mandatory Pre-proposal Conference: Has been changed to include the following:
Mandatory Pre-proposal conference scheduled for 2:00 p.m. on March 16, 2012 at the Department of Health, 109 Governor Street Room 1218, Richmond, VA, 23219. Vendors/companies may elect to attend via conference call. Instructions for conference call are as follows:

Participants must call in to (661) 673-8600 and enter access code 681706# when promoted.
Participants will be able to call-in starting five (5) minute prior to conference start time.

Vendors/companies should email the following information to Daniel Wilborn at daniel.wilborn@vdh.virginia.gov by 4:00 pm March 15, 2012.

Company Name: Trinitek Services, Inc.

Person Representing Company: Stanley Fitch or Gloria Chavez

Street Address of Company: 2501 Rio Grande NW, Suite B

City, State and Zip: Albuquerque, NM 87047

Phone Number: 505-242-8200 Fax Number: 505-242-8201

**VIRGINIA DEPARTMENT OF HEALTH
OFFICE OF PURCHASING AND GENERAL SERVICES (OPGS)
109 GOVERNOR STREET
RICHMOND, VIRGINIA 23219**

Note: A signed acknowledgment of this addendum must be received at the location indicated on the IFB/RFP either prior to the bid/proposal due date and time or attached to your bid/proposal. Signature on this addendum does not substitute for your signature on the original bid/proposal document. The original bid/proposal document must be signed.

Sincerely,

Daniel Wilborn, CPPO, VCCO, VCO
Procurement Manager, OP GS
Phone: (804) 864-7519

Name of Firm: Trinitek Services, Inc

Signature/Title President

Date

**VIRGINIA DEPARTMENT OF HEALTH
OFFICE OF PURCHASING AND GENERAL SERVICES (OPGS)
109 GOVERNOR STREET
RICHMOND, VIRGINIA 23219**

March 16, 2012

ADDENDUM NUMBER (2) TO ALL BIDDERS/OFFERORS:

Reference: RFP 1200001-999

Commodity: 91843

Dated: March 5, 2012

For Delivery To: Commonwealth of Virginia Department of Health
Office of Purchasing and General Services (OPGS)
Attn: Daniel Wilborn, Contract Officer
109 Governor Street 12th Floor, Room 1214
Richmond, VA 23219-0331

Bid/Proposal Due: April 4, 2012

Pre-bid/proposal Conference: March 16, 2012

The above is hereby changed to read:

1. Questions: Question concerning this RFP will be accepted until 4:00 p.m. March 20, 2012. Questions must be submitted by e-mail to Daniel Wilborn daniel.wilborn@vdh.virginia.gov and Linda Bumgarner linda.bumgarner@vdh.virginia.gov including questions asked during the pre-proposal conference.

Note: A signed acknowledgment of this addendum must be received at the location indicated on the IFB/RFP either prior to the bid/proposal due date and time or attached to your bid/proposal. Signature on this addendum does not substitute for your signature on the original bid/proposal document. The original bid/proposal document must be signed.

Sincerely,

Daniel Wilborn, CPPO, VCCO, VCO
Procurement Manager, OP GS
Phone: (804) 864-7519

Name of Firm: Trinitek Services, Inc

Signature/Title

Date

**VIRGINIA DEPARTMENT OF HEALTH
OFFICE OF PURCHASING AND GENERAL SERVICES (OPGS)
109 GOVERNOR STREET
RICHMOND, VIRGINIA 23219**

March 26, 2012

ADDENDUM NUMBER (3) TO ALL BIDDERS/OFFERORS:

Reference: RFP 1200001-999

Commodity: 91843

Dated: March 5, 2012

For Delivery To: Commonwealth of Virginia Department of Health
Office of Purchasing and General Services (OPGS)
Attn: Daniel Wilborn, Contract Officer
109 Governor Street 12th Floor, Room 1214
Richmond, VA 23219-0331

Bid/Proposal Due: April 4, 2012

Pre-bid/proposal Conference: March 16, 2012

The above is hereby changed to read:

1. Questions and Answers: Questions that were submitted are answered is the Question and Answers document attached.
2. Attendance lists for vendors that attended the pre-proposal are attached.
3. Bid/Proposal Due Date: Has been changed to April 5, 2012 at 2:00 pm.

Note: A signed acknowledgment of this addendum must be received at the location indicated on the IFB/RFP either prior to the bid/proposal due date and time or attached to your bid/proposal. Signature on this addendum does not substitute for your signature on the original bid/proposal document. The original bid/proposal document must be signed.

Sincerely,

Daniel Wilborn, CPPO, VCCO, VCO
Procurement Manager, OPGS
Phone: (804) 864-7519

Name of Firm: Trinitek Services, Inc.

Signature/Title

Date

President

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Trinitek Services, Inc.
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April 3, 2012

Daniel Wilborn, Contract Officer
Commonwealth of Virginia
Department of Health
109 Governor Street, VA 23219
Richmond, VA

Response to: Request for Proposals, RFP #1200001-999, Uranium Study
Issue Date: March 5, 2012, Commodity Code: 91843

Dear Mr. Wilborn,

Trinitek Services, Inc. (Trinitek) is pleased to respond to the Commonwealth of Virginia's Request for Proposal referenced above. Attached is our response including price proposal, with assumptions. One (1) original; six (6) hard copies; and one (1) complete electronic copy will be mailed as requested. We have no redacted copies since the Virginia Vendor Guide does not allow for redaction of pricing. The electronic copies are in Microsoft Word or Excel or comparable format. Feel free to contact me if you have any questions. As required in the RFP, the Trinitek Services, Inc. staff and Uranium Study Project Manager (Stanley A. Fitch) participated in the mandatory preproposal conference on March 16, 2012 hosted by the Commonwealth's Department of Health for interested vendors. The Trinitek response to RFP includes the following as required in RFP Section IV:

- Contacts
- Introduction
- Section I. Specific Plans for Providing Services
 - Overview and General Approach
 - Management Plan
- Section II. Written Narrative Statement
 - Experience in Providing Services
 - Names, Qualifications of Personnel
 - Resumes of staff
- Section III. Proposed Price
 - Pricing Schedule, Section XI of RFP
 - Travel
 - Labor
- Section IV. Appendices
 - A. Offerer Data Sheet, RFP Attachment A
 - B. Small Business Contracting Plan, RFP Attachment B
 - C. State Corporation Commission, RFP Attachment C
 - D. RFP Task Matrix
 - E. Resumes
 - F. Statements of Qualifications for Trinitek Services and subcontractor companies

The Response details are attached as summarized above. Thank you for the opportunity to respond.

Sincerely,

Gloria E. Chavez, Ph.D.
Attachments (as listed above)



Trinitek Services, Inc.
Nuclear and Environmental Safety Consultants
<http://www.3tks.com/>

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RESPONSE TO: Request for Proposals, RFP #120001-999, Uranium Study

Issue Date: March 5, 2012, Commodity Code: 91843

Proposal Scope of Work: Perform, as an Independent Contractor, services summarized in RFP#1200001-999, Uranium Study:

- Provide contractor services to conduct a study or uranium mining and milling issues in Virginia relevant to the statutory jurisdiction Virginia Department of Health
- Furnish labor and resources necessary to accomplish the work tasks stipulated in RFP Section III

Period of Performance: to November 2012, or as stipulated by contract.

Trinitek Contacts, including Project Manager (RFP Section IX, I) relating to this project are:

Project Manager

Stanley A. Fitch, CHP, MSE
Vice-President
505-249-3995 (c)
505-242-8200 (w)
saf@3tks.com

Alternate Project Manager

Gloria E. Chavez, Ph.D.
President
505-220-5552 (c)
505-242-8200 (w)
gec@3tks.com

Business Mailing Address & General Contact Information

Trinitek Services, Inc.
PO BOX 1608
Sandia Park, NM 87047

Phone: 505-286-4387 (Sandia Park Office) 505-242-8200 (Albuquerque office)
FAX: 505-242-8201 Email: 3tks.3tks.com

Introduction**About Trinitek**

Trinitek Services, Inc. ("Trinitek") is a small, minority-owned, disadvantaged woman-owned business (WOSB, WOSDB) registered with the SBA and in CCR as an S-corporation (DUNS: 80-452-5058). We have provided technical consulting services in environmental and nuclear safety areas since 2006. Our principals (Gloria E. Chavez, Stanley A. Fitch) have over 60-years combined experience working in a wide range of projects relevant to the Virginia Uranium Study including environmental monitoring, radiation safety, international programs, uranium mining, milling and remediation, regulations development, Nuclear Regulatory Commission (NRC) and Agreement State oversight and inspections, development of national regulations on nuclear material security with the NRC, NORM regulations development, training, NRC and Department of Energy UMTRA (Uranium Mill Tailings Remediation Action) projects, radioactive waste operations, transportation, nuclear quality assurance, medical radiation regulations development, emergency response to radiation events. We have both operations experience, programmatic and management experience and technical credentials directly supporting the Virginia Department of Health (VDH) RFP. We are registered experts with the IAEA (International Atomic Energy Agency). We are listed vendors with the Virginia eVA and ARiba (Commodity Code 91843), and are in the process of applying as an MBE business in Virginia.

Our experience and expertise is in:

- Nuclear safety and safeguards. Many of our staff our former regulators and program directors from NRC, Agreement States, and Department of Energy with vast experience in the Atomic Energy Act (AEA) and the National Environmental Policy Act (NEPA).
- Uranium mining and milling, with persons directly involved in operations and who were responsible for implementing programs to comply with the AEA and NEPA and the associated regulations.
- Nuclear and radiation engineering, with designing, constructing, and implementing containments and other systems to control radioactivity and chemicals for the protection of the public and environment.
- Radiation chemistry, with operational experience, in-depth understanding , and peer-reviewed publications in radiation detection.
- Radiation risk assessment with strong focus of radioactive waste management and radioactive waste repository design.
- Transport of uranium and uranium progeny and associated reagent chemicals in the environment, with calculation of epidemiological risk using national and internationally-approved software.

We partner with qualified expert companies and individuals with substantiated and recognized credentials and expertise to provide our clients cost effective, credible and exceptional technical support. We have a Virginia small business partner (Resource International) and others recognized for their expertise in uranium regulatory and operational issues for this RFP. We are registered as vendors with the Virginia eVA and ARiba, and are in the process of applying as an MBE business in Virginia. We have the RFP Commodity Code of 91843.

About Our Team for This Proposal

Trinitek partners with qualified expert companies and individuals with substantiated credentials and expertise to provide our clients cost effective, credible and exceptional technical support. Trinitek will be subcontracting to *Oakridge Associated Universities (ORAU)* and *Resource International, Ltd.* for this proposal:

Oak Ridge Associated Universities (ORAU)

ORAU provides extensive and internationally recognized epidemiological and toxicological expertise and health monitoring experience. They are recognized as the world's preeminent expert in the field of analyzing and responding to uranium fuel cycle exposures to radioactive and chemical constituents.

Resource International, Ltd.

Resource International (Resource) is an engineering firm (SWaM business) located in Ashland, Virginia with hydrogeological experience and talents in non-uranium mining. They have over 33 years experience in Virginia in engineering designs, community planning and environmental assessments. Because of their hydrogeological credentials, their long history of service to the people of Virginia, and their intimate knowledge of the concerns over uranium mining and milling in the Commonwealth, they are uniquely qualified to consult VDH on this project.

The following is a partial list of the disciplines possessed by the team members on this project. A more complete explanation is provided in Section II of this response.

LIST OF TEAM DISCIPLINES AND CREDENTIALS

Trinitek http://www.3tks.com/	ORAU Center for Epidemiological Research http://www.ornl.gov/	Resource International http://www.resourceintl.com/
▪ Nuclear and environmental project management ▪ Facilitation of public meetings dealing with environmental and public health ▪ Worker and public safety and health related to uranium fuel cycle facilities ▪ Animal health evaluations related to radioactive and chemical constituents ▪ Bioaccumulation and corresponding effects of radioactive and chemical constituents in aquatic, estuarine, and marine environments ▪ Human health effects from consuming radioactively contaminated fish ▪ Atomic Energy Act (AEA) experts who are former NRC and Agreement State regulators, who have highly extensive experience in developing statutes and regulations under the AEA ▪ National Environmental Policy Act (NEPA) experts, NPDES and RCRA permitting ▪ Radiation chemistry ▪ Hydrogeology and radionuclide transport modeling ▪ Environmental impact analysis (EIA)	▪ Human epidemiology ▪ Human toxicology ▪ Very extensive research in the causation of human diseases related to exposures to radioactive and chemical constituents related to the nuclear industries ▪ Health physics ▪ Maintenance of national disease registries related to radioactive and chemical exposures ▪ Radiation and chemical dose estimates and health effects evaluations ▪ Health consequences to workers and the public from exposure to radon ▪ Health standards promulgation	▪ Hydrology and geology ▪ Wetlands science and protection ▪ Environmental engineering ▪ Surface water safety and assessments ▪ Groundwater safety and assessments ▪ Hydrogeologic sciences ▪ Waterborne and airborne and transport modeling ▪ Air quality ▪ Graphic design ▪ Solid waste engineering ▪ Civil engineering ▪ Municipal engineering ▪ Solid Waste Act and Resource Conservation Recovery Act (RCRA) permits ▪ Virginia Pollutant Discharge Elimination System permits ▪ Threatened and Endangered Species Studies (ESA) ▪ Environmental impact analysis (EIA) ▪ Wetland Creation/Restoration ▪ Wetland Siting and Design ▪ Stream Restoration and Design

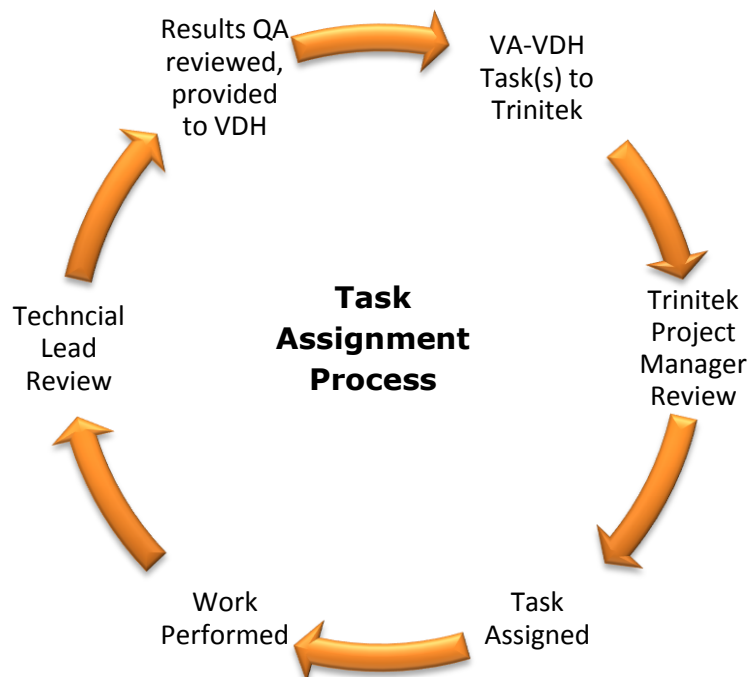
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Section I. Specific Plans for Providing Services**Overview and General Approach:**

Trinitek has reviewed the Uranium Study RFP, along with our subcontractors. The Uranium Study has the potential for intense public scrutiny, and is already a matter of concern for the citizens of the Commonwealth of Virginia and it must therefore be defensible. We are proposing individuals (and companies) who are acknowledged experts with impeccable credentials in their respective areas to provide a quality technical product for the Commonwealth. Potential Health Impacts associated with uranium mining and milling are of particular sensitivity to members of the public.

In addition to technical credentials and expertise, our staffs have extensive experience in communicating risk to the public, understanding public health concerns and issues, and have experience as facilitators and communicators at public meetings and in a public forum. We have experience in high visibility projects such as WIPP and Yucca Mountain as well as in the uranium fuel cycle industries. We have experienced regulators working at senior levels in Agreement states, NRC as well as DOE and private industry.

We have made a best assessment of qualifications and labor hours needed to support the Commonwealth of Virginia in this study. The RFP Scope is broad and level of effort not defined, so our proposal will provide a total number of labor hours, with rates detailed per category, based on estimated labor hours per topic specified in the RFP. The individuals and companies we are proposing all have excellent credentials in their subject areas, as documented in the Section B Capabilities statement. We have also prepared a table identifying individuals proposed to address each item listed in the RFP. As specific tasks are provided by the Commonwealth VDH, the Project Manager will determine the best technical resources to address the task. The following schematic illustrates our technical approach to the Uranium Study:



Management Plan

We have selected a Technical Project Manager (PM), Stanley A. Fitch, who has extensive experience in uranium mining/milling operations and environmental and health effects. He is a certified health physicist (CHP) and nuclear engineer with over 25 years experience in this area. He has managed a wide range of projects in areas named in the Uranium Study RFP.

Trinitek will also have an alternate PM, Gloria E Chavez, Ph.D. Dr. Chavez has over 35 years experience in managing multidisciplinary, international engineering and scientific projects. She will provide management and technical support, as needed.

Mr. Fitch and Dr. Chavez have over 70 years of combined experience in radiation protection programs, NRC and Agreement States issues, and uranium mining/milling as well as environmental impacts in a national and international setting.

Mr. Fitch will be assisted by the following Technical Leads who will assist Mr. Fitch in coordinating work in the stated categories:

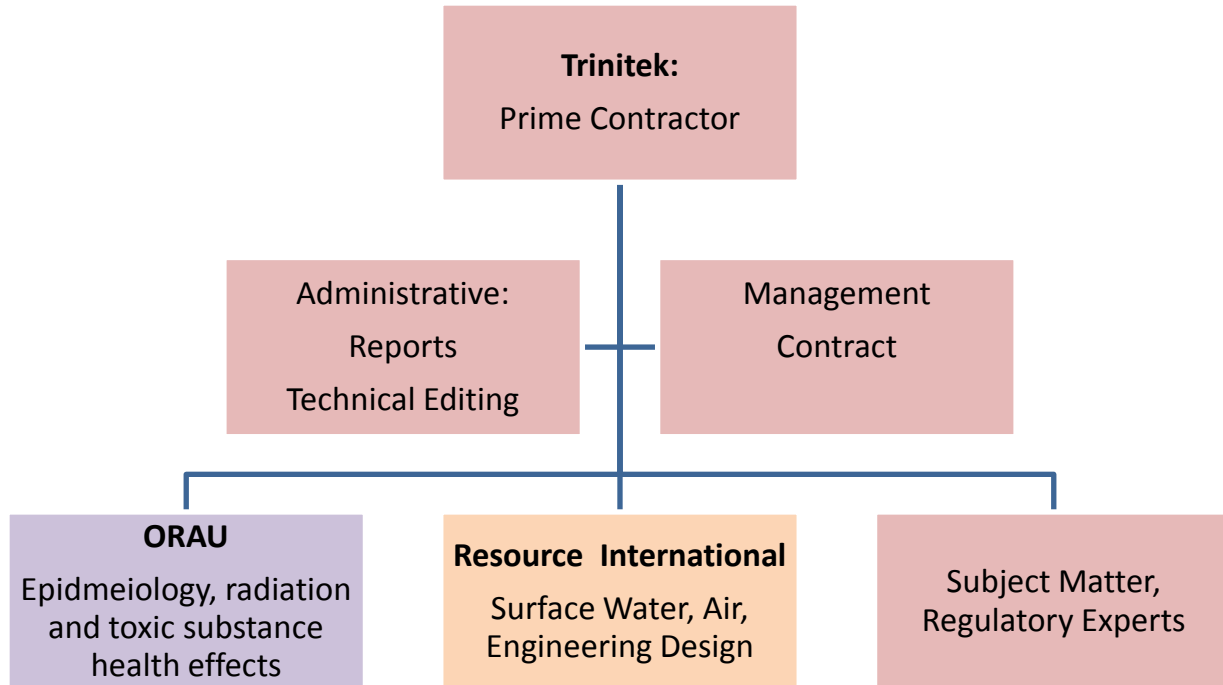
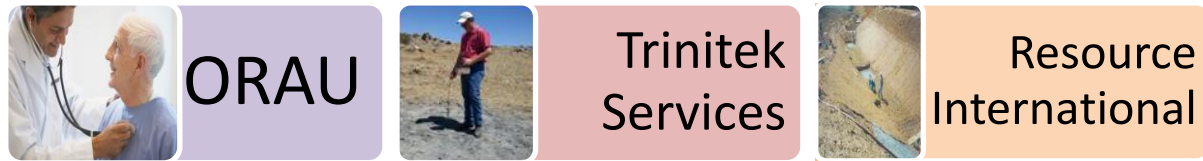
- Gloria Chavez, Ph.D. – ES&H and Quality Assurance Lead
- Francis X. "Chip" Cameron, Esq. – NEPA and Facilitation Lead
- Sheldon Landsberger, Ph.D. – Radiochemistry Lead
- Daniel McCarn, MS, Mining and Hydrogeology Lead

Leo Gomez, Ph.D. will serve as Trinitek's technical editor. Dr. Gomez has served as editor on national and international science publications.

We will provide Subject Matter Experts (SMEs), in addition to two main subcontracting companies (ORAU, and Resources International) whose credentials are summarized in Section B. They will support the PM as needed, based on technical skills required for a specific task. We have ensured that we have some overlap and redundancy in capabilities.

Our experience is in radiation safety, uranium mining and milling, nuclear engineering, radiation chemistry and radiation risk assessment. ORAU has the world's leading experts on health effects and epidemiological assessments from exposures to radiation sources including uranium, and radon and its daughters. They serve on NRCP and various international health guidance organizations and have an extensive publication list in this area. They have performed studies for the National Institute for Occupational Safety and Health Dose Reconstruction Project for Claimants under the Energy Employees Occupational Illness Compensation Program Act, and for nationwide Former Beryllium Worker Medical Surveillance Program. Resources International is an engineering firm located in the Ashland, Virginia with hydrogeological experience and talents in non-uranium mining. They have over 33 years experience in Virginia in engineering designs, community planning and environmental assessments.

The schematic on the next page provides a high level summary of relationships and capabilities for subcontractor companies.

SUMMARY OF RELATIONSHIPS AND CAPABILITIES

The following matrix (on pages 8-11) delineates our staffing plan to address specify RFP requirements. Please refer also to the Task Assignments Matrix in Appendix D, which outlines tasks by company.

Staffing Plan for Uranium Study, Page 1

Virginia VDH Uranium Study Requirement		Trinitek	S Fitch	G Chavez	F Cameron	Landsberger	D McCarn	N Fisher	R Haaker	N Savignac	T Cardwell	L Gomez	T Wolff	R Hansen	J Hart	S Djordjevic	A Hasan	N Patel	W Floyd	P O'Kelley	Resource	A Creech	M Willinger	J Brooks	J Rudnick	E Hollos	S Church	T Kraska	C Wilson	C Riedlinger	M Fiore	J Combs	ORAU	B Ellis	Holdsworth	P Wallace	P Whitson
III.A.	Initial Literature Analysis, Recommendations. Conduct Research & write report on:																																				
1.	Virginia and Other Relevant Studies Make summary recommendations		X	X		X	X	X	X	X		X			X	X	X					X		X		X					X						
a)	Review scientific literature on:																																				
1)	Epidemiological studies on long-term exposure to radiological & toxic substances in mining operations		X	X																															X	X	X
2)	limitations of studies		X	X																															X	X	X
b)	Assist VDH w/ development of surveillance & epidemiologic studies to evaluate long/short term health effects associated with mining. Consider baseline sources of concern		X	X																															X	X	X
2.	Existing Reg. Program: compare U mining/milling, NRC, Agreement States		X	X		X	X			X	X	X			X	X		X		X																	
3.	International emerging standards		X	X		X	X					X			X	X	X																				
III.B.	Ongoing Technical Advice & Assistance to Commonwealth of VA staff																																				
1.	Coordinate and Meet With VDH Staff		X	X		X	X																														
a)	Compare Commonwealth's statutes & regulations to recommend in initial rpt.		X	X						X	X	X			X	X		X	X	X		X									X						
b)	Identify areas where VDH's existing regulations need to be modified or expanded to ensure protection of public health & environment.		X	X						X	X	X			X	X		X	X	X		X									X						
c)	Recommend changes (including statutory changes) to meet needs.		X	X						X	X	X			X	X		X	X	X		X									X						
d)	Evaluation to include:																																				
1)	Waterworks Regs,12VAC5-590 seq		X	X					X		X	X			X	X	X	X				X		X			X			X							
2)	Disease Reporting & Control Regs (Requirements for reporting by healthcare providers & labs).		X	X								X																							X		
3)	Private Well Regulations (12VAC5-630). Dev. Concept. Framework /initial project costs for impact on quantity & quality of water in private wells & springs & recommend. procedures for replacing - remediating supplies. Framework for characterizing impacted wells, springs, rec. waters, cisterns.		X	X			X		X		X				X	X	X	X		X		X					X			X							

Staffing Plan for Uranium Study, Page 2

Virginia VDH Uranium Study Requirement		Trinitek	S Fitch	G Chavez	F Cameron	Landsberger	D McCarn	N Fisher	R Haaker	N Savignac	T Cardwell	L Gomez	T Wolff	R Hansen	J Hart	S Djordsevic	A Hasan	N Patel	W Floyd	P O'kelley	Resource	A Creech	M Willinger	J Brooks	J Rudnick	E Hollos	S Church	T Kraska	C Wilson	C Riedlinger	M Fiore	J Combs	ORAU	B Ellis	Holdsworth	P Wallace	P Whitson	
4)	Facilitate the stakeholder process, including any potentially inspected regulated community (at least 5 statewide meetings with separate final report) to gauge concerns and identify possible solutions concerning regulation of public water supplies and private wells as to water quality and quantity.		X	X	X		X																															
5)	Regulations concerning recreational use of waters - campgrounds, summer campgrounds, etc.		X	X			X		X		X	X			X	X	X			X		X					X		X									
e)	Determines and characterizes data (including national and Virginia-specific data) on potential health outcomes related to exposures of concern.		X	X					X	X		X																							X	X		
	Determine if current reporting requirements & laboratory testing cover chemicals to be encountered in mining operations under consideration.		X	X					X			X																										
	Determine if current tobacco use surveillance is adequate for establishing baseline data for rates of lung cancer, silicosis, and radon-associated health problems using standard epidemiological, analytical methods.		X	X																																X	X	
	Determine- whether other available data is sufficient to establish baseline rates for conditions of concern (e.g. current silicosis reporting data) or if retrospective or other studies are indicated to determine baseline rates		X	X																															X	X		
	Evaluate and propose changes to cancer, congenital malformation reporting, if necessary		X	X								X																							X	X		
f)	Develop and test case report investigation worksheets, and other documents for local Health Dept. and Central Office use in necessary investing. for relevant health outcomes.		X	X					X	X																								X			X	
g)	Determine locus of responsibility for the long-term monitoring for adverse health effects ensuring worker health and safety, as well as additional recommended monitoring.		X	X								X																							X			

Staffing Plan for Uranium Study, Page 3

Virginia VDH Uranium Study Requirement		Trinitek	S Fitch	G Chavez	F Cameron	Landsberger	D McCarn	N Fisher	R Haaker	N Savignac	T Cardwell	L Gomez	T Wolff	R Hansen	J Hart	S Djordjevic	A Hasan	N Patel	W Floyd	P O'Kelley	Resource	A Creech	M Willinger	J Brooks	J Rudnick	E Hollos	S Church	T Kraska	C Wilson	C Riedlinger	M Fiore	J Combs	ORAU	B Ellis	Holdsworth	P Wallace	P Whitson
h)	Evaluate, monitor work spaces, monitor. exposures - mine workers, track. worker cum. exp., adequacy exist. MSHA regulations compare international. standards-radon/progeny		X	X					X	X		X							X																		
i)	Recommend framework for environmental, human health & animal health monitoring so data can be maintained in compatible systems-analyzing health effects, include. long term monitoring.		X	X				X	X	X		X												X				X				X			X	X	X
j)	Determines potential impacts - cisterns & onsite sewage systems.		X	X		X	X										X						X							X							
2.	Address VDH-Related Issues necessary & relevant for effective life cycle regulation of uranium mining and milling in Virginia																																				
a)	Water Quality Monitoring Plan for Surface Waters		X	X		X	X		X	X							X							X	X							X					
1)	Human health risks associated with chemical toxicity;		X	X					X	X																											
2)	Human health risks associated with radiological toxicity; and,		X	X					X	X																											
3)	Human health risks associated with the consumption of affected animal, and marine populations		X	X				X				X																									
b)	Water Quality Monitoring Plan for Groundwaters		X	X		X	X		X	X		X					X					X	X						X	X							
1)	Human health risks associated with chemical toxicity;		X	X					X																												
2)	Human health risks associated with radiological toxicity;		X	X						X																											
3)	Human health risks associated with consumption of affected animal and marine populations; and,		X	X				X				X																									
4)	Potential impact on groundwater quality and quantity as these affect public wells, private wells and springs.		X	X			X		X	X												X	X						X	X							
c)	Adequacy of Virginia's Water Quality Standards for Groundwater and Surface Waters, and Virginia's Waterworks Regulations, as they relate to human health outcomes:		X	X		X	X		X	X						X	X	X	X																		
1)	Address water-soluble radionuclides, or absorbed chemicals;		X	X					X	X																											

Staffing Plan for Uranium Study, Page 4

Virginia VDH Uranium Study Requirement		Trinitek	S Fitch	G Chavez	F Cameron	Landsberger	D McCarn	N Fisher	R Haaker	N Savignac	T Cardwell	L Gomez	T Wolff	R Hansen	J Hart	S Djordsevic	A Hasan	N Patel	W Floyd	P O'Kelley	Resource	A Creech	M Willinger	J Brooks	J Rudnick	E Hollos	S Church	T Kraska	C Wilson	C Riedlinger	M Fiore	J Combs	ORAU	B Ellis	G Holdsworth	P Wallace	P Whitson	
2)	Address undiluted tailings liquids to exceed Safe Drinking Water Act standards for uranium; and,		X	X						X							X																					
3)	Address rev. Public Drinking Water System monitoring Schedule for rad. contamination & hazardous. substances in impact areas.		X	X																		X	X				X		X									
d)	Evaluate existing standards-safe disposal of mine waste as pertains to human health.		X	X			X		X	X																X			X		X							
e)	Evaluate necessary components of full environmental impact analysis.		X	X	X								X	X	X											X			X		X							
f)	Methods to Incorporating "As Low As Reasonably Achievable" (ALARA) Standards into Commonwealth regs, like those for rad. protection.		X	X					X	X	X									X																		
g)	Recommend. for compl. period financial assurance mechanisms- minimize. long-term impacts to water resources & necessary. remediation		X	X							X									X						X			X		X							
h)	Recommendations: Environmental monitoring, including:		X	X		X	X			X	X	X								X																		
1)	Required components of an environmental monitoring plan;		X	X		X			X	X	X									X		X	X	X			X		X									
2)	Recommended goals to include in environmental monitoring plan;		X	X						X	X									X		X	X	X			X		X									
3)	Recommend. baseline and characterization data needed.		X	X		X	X			X												X	X	X	X		X		X									
i)	Eval. of NRC regs for milling & tailings management in state-specific climate (e.g., rainfall) & hydrologic considerations.		X	X			X			X	X								X	X	X	X	X	X	X	X	X	X	X	X	X	X						
III.C.	Assist VDH Prep. & Presenting Reports		X	X	X	X	X		X	X	X	X						X				X	X	X	X	X	X	X	X	X	X	X		X	X			
III.D.	Assist VDH - Draft Conceptual Regulatory Framework																																					
	Discuss reports, recommendations. w/VDH		X	X		X	X		X	X	X	X							X	X	X														X	X		
	Assist staff- implement findings/ recommend. in draft concept. reg. framework, address VDH-issues for life-cycle compl. period of milling in Virginia, & impact.. Virginia regs.		X	X		X	X		X	X	X	X						X	X	X															X	X		

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Section II. Written Narrative Statement**Experience in Providing Services**

Trinitek has had clients in industry and government. Relevant projects have included a uranium decontamination and decommissioning project for the US Navy at the New Mexico Tech Testing Facilities, uranium mining baseline radiation assessments, proposed uranium mining/milling operations planning and monitoring, regulatory compliance assessments for in-situ leaching facilities, environmental permits support for uranium fuel cycle operations, consultant to the Egyptian Atomic Energy Authority (EAEA) on uranium mining/milling issues, Comprehensive training for Egyptian EAEA on radiation emergency response and international radiation safety regulations, including NORM. We have experience in consultation, technical document preparation, regulatory analysis, public meeting participation and facilitation, regulations development at a state and federal level and preparing peer review publications. We also have experience in emergency management, international consultation/research and publications, risk communication to the public, and national policy development in areas relevant to this RFP. We have health physicists, industrial hygienists, former regulators, nuclear engineers, scientists, environmental attorneys and other specialists with international reputations.

A summary of each company's capabilities, contributions, experience and credentials is provided, followed by staffing details and resumes.

Trinitek Services, Inc

Trinitek is the prime contractor for this study. It is a woman-owned small disadvantaged business (WOSB, WOSDB), minority-owned small business, registered in CCR as an S-corporation (DUNS: 80-452-5058; EIN 26-1151720). We have been in business since 2006 performing technical consulting, auditing and training in nuclear and environmental safety areas. A summary SOQ is attached. We have a primary NAICS code of 541620. We can provide additional information, as needed.

Trinitek Experience Summary:**Rio Grande Resources, San Mateo, NM**

Mt Taylor Uranium Mining/Milling Start-up Planning

Trinitek has supported Rio Grande Resources since 2006 in preparations for uranium mine/mill start-up. We have provided: health physics/radiation safety (CHP and Radiation Safety Officer) support; environmental permits for NPDES discharges; radon air monitoring; developing compliance program. A contact is provided in Attachment A (Offeror Data Sheet). The approximate total contract value is \$300,000.

Neutron Energy Incorporated

Cebolleta, NM. Uranium mining planning and radiation baseline surveys.

Trinitek has supported Neutron in planning and performing baseline radiation baseline surveys at a proposed uranium mining operation. We have also provided radiation safety training and radiation health effects consultation to Laguna Pueblo at public meetings in association with this contract. A contact is provided in Attachment A (Offeror Data Sheet). The approximate total contract value is \$65,000, including an upcoming soil sampling and characterization of radionuclides as part of the baseline assessment.

Parametrix, Inc.

US-Army Corp. of Engineers funding: Cochiti Lake, NM Sediment Characterization for Radionuclides.

Trinitek developed the radionuclide portion of a larger scope metals and toxic substances characterization and risk assessment for sediments in Cochiti Lake and adjacent waterways. Over twenty radionuclides were analyzed and over 20,000 data points analyzed. WE performed the QA review and subcontracted to A QA lab to confirm prime lab laboratory analysis at low-levels of concentrations. The radionuclides were man-made and naturally occurring, including uranium isotopes. Confounding factors included the presence of an adjacent, remediated uranium mine (LA Bajada).

The resulting risk assessments was important to the Pueblo due to possible changes in lake management, and very low levels of detection were critical to compare to existing prior data, and to identify potential contaminants from US DOE Laboratory origin (LANL). Mis-reporting of uranium data, and laboratory errors were documented. A contact is provided in Attachment A (Offeror Data Sheet). The approximate total contract value was \$82,000.

Cavin and Ingram, PA.

Lee Ranch-Johnny M uranium mine consultation to legal staff in potential CERCLA (Superfund) action

Trinitek is providing consultation to a law firm and its clients regarding appreciate actions for potential CERCLA Actions. We are providing oversight, validation and review for work performed by other remediation contractors.

New Mexico Tech University

Comprehensive Radiation Safety Training to Egyptian Atomic Energy Authority staff. (US DOE funding)

Trinitek developed an intense six week course to train Egyptian Atomic Authority senior staff to appropriately respond to radiation source incidents, involving loss of control. The EAEA staff had fatalities in 2003 due to exposure of a farmer and his family to a lost medical source. They were not confident they could respond appropriately to other such events. The students were very pleased with their training and have since had chances to use their training effectively. As a result of this successful international training effort, we now have a collaboration with new Mexico Tech University to provide future such training. (<http://nuclear.iera.nmt.edu/>) The total contract value was \$133,000.

Depleted Uranium Navy Project at EMRTC

New Mexico Tech University, Socorro, NM

Trinitek prepared a decommissioning plan for a former US Navy depleted uranium testing range. The plan had to include financial surety and incorporate federal and state requirements. The total value of the project to Trinitek was about \$72,000.

Inhalation Toxicology Laboratory Remediation (DOE Project)

Albuquerque, NM

Trinitek provided radiological and technical support, radiation monitoring, and oversight to a complex remediation project involving biological, medical, radioactive and hazardous waste. The radioactive waste was high activity and included TRU. The waste was packed, shipped and disposed in a Doe facility. The project was completed on schedule. The total value to Trinitek was about \$100,000.

Unitech Corporation Nuclear Laundry

Santa Fe, NM and Boston, MA

Trinitek provided regulatory consulting to a licensed radioactive clothing laundry supporting radio-pharmacies, and DOE Labs. Contract was \$54,000.

Mesteña Uranium

Corpus Cristi, TX. – Audits

Trinitek has provided independent compliance audits for the in-situ uranium recovery facility and made operation improvement recommendations.

UMTRA Titles 1, 2

Department of Energy and Nuclear Regulatory Commission

Trinitek staff worked on Uranium mill tailings remediation projects in Colorado and New Mexico in clean up, monitoring and determining action levels.

Atlantic Richfield Company

Conventional Uranium Mill Operations

Trinitek staff worked in uranium mill operations as mill operators, RSO and radiation chemists. Work included all aspects of mill operations and associated health and safety.

Regulations

Trinitek staff have worked as former Agreement state regulators, performing inspections, developing nuclear materials security regulations, adapting and verifying compliance with NRC and other regulations. They have developed NORM regulations, have extensive experience with public meetings and public concerns and issues related to public safety and radiation risk.

Security and Safety

Trinitek staff have worked on developing nuclear material security regulations at a national level (now federal law), and in operations at USDOE facilities involving maintaining operational security for classified and accountable nuclear materials, including radioactive waste.

ORAU (Oakridge Associated Universities) Staff

One of our subcontractor is ORAU, headquartered in Oakridge, TN provides broad-scope epidemiology and health screenings/surveillance studies to beryllium sensitivity testing and radiation dose reconstruction. Dr. Elizabeth Ellis is Associate Director and Leader, Epidemiology Support Section, Center for Epidemiological Research, at Oak Ridge Associated Universities (ORAU), and Associate Director, Occupational Exposure and Worker Health at ORISE. Dr. E Ellis' relevant publications include: "External radiation exposure and mortality in a cohort of uranium processing workers", American Journal of Epidemiology 152(1):91-95, 2000; "Mortality among radiation workers at Rocketdyne (Atomics International)", 1948-1999, Radiation Research 166(1 Pt 1):98-115; erratum 166(3):566, 2006; "Cancer risk in nuclear workers occupationally exposed to uranium—emphasis on internal exposure", Health Physics 94(1):1-17, 2007; "Assessment and control of lung cancer risk from radon", Annals of the ICRP (accepted for publication), 2010. She works with the DOE the Illness and Injury Surveillance Program (IISP). Epidemiologic surveillance

assesses the overall health of the current DOE workforce at 14 DOE sites and facilities. The goal is to identify groups of workers that may be at increased risk for occupation-related injury and illness.

ORAU Experience Summary

<http://www.oraui.org/occupational-exposure-worker-health-studies/default.aspx>
<http://www.oraui.org/documents/factsheets/OEWH-fact-sheet.pdf>

DOE Illness and Injury Surveillance Program

DR. Ellis is Program Director for the DOE Illness and Injury Surveillance Program. The program assesses the overall health of contractor workers employed at DOE sites. Epidemiologic surveillance assesses the overall health of the *current* DOE workforce at 14 DOE sites and facilities. The goal is to identify groups of workers that may be at increased risk for occupation-related injury and illness. In response to indications of excess risk, program staff can assess the need for additional investigations. Surveillance is based on continuous collection, analysis, and interpretation of selected morbidity, demographic, and occupational exposure data.

The program is a corporate resource providing our customers with timely health information. We also provide epidemiologic and public health expertise in the evaluation of worker health concerns. Reports summarizing the results of epidemiologic surveillance are published annually and are available below. Implementation of epidemiologic surveillance has advanced the automation of health data management systems at sites such as the INEEL, fostering the development of state-of-the-art medical information management.

International Commission on Radiation Protection (ICRP)

Dr. Ellis is member of International Commission on Radiation Protection (ICRP), Committee 2, Task Group 64 to review knowledge and make recommendations on further study of the health effects of occupational radiation exposure to alpha emitters (such as radon). She is one of two US members of this prestigious international standard setting organization (since 2006).

U.S. EPA Integrated Risk Information System (IRIS)

Dr. Holdsworth provides technical support to the U.S. EPA Integrated Risk Information System (IRIS) program office for • the preparation of toxicological reviews and IRIS summary sheets, • peer review, and • meeting support. IRIS is a human health assessment program that evaluates risk information on effects that may result from exposure to environmental contaminants. Through the IRIS Program, EPA provides the highest quality science-based human health assessments to support the Agency's regulatory activities. The IRIS database is web accessible and contains information for more than 550 chemical substances. Member of the writing team for toxicological reviews of n-hexane and 1,2,3-trichloropropane, among others.

Dr. Holdsworth provided write-ups of experimental studies and overall technical support for the Agency's *Toxicological Review and Risk Characterization of Formaldehyde*, currently in preparation. He prepared monographs on the impact of environmental stressors on human health for the U.S. Centers for Disease Control and Prevention (CDC) and is currently

providing technical support to NIOSH on criteria documents, skin notation profiles, and immediately dangerous to life and health (IDLH values).

U.S. EPA's Superfund Technical Support Center (STSC)

Dr. Holdsworth researched and authored issue papers for the US EPA on potential human health impacts of chemicals of environmental concern, for example, in support of U.S. EPA's Superfund Technical Support Center (STSC). Prepared monographs to assess the human health impacts of drinking water disinfectants and their by-products.

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM)

Dr. Holdsworth , In a multi-year program for the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), developed Toxicity Profiles of environmentally and militarily important chemicals, in support of an inter-Agency initiative to develop Toxicity Reference Values protective of wildlife.

Information Technology for Occupational Exposure and Worker Health (OEWH) program

Mr. Phillip Wallace, serves as Manager of Information Technology for Occupational Exposure and Worker Health (OEWH) program. Responsibilities include ensuring compliance to Federal government cyber security requirements, overseeing activities of software developers, and maintain integrity of data holdings within OEWH.

Systems for Storage and Retrieval of Epidemiological Research Documents

Ms. Whitson has several years experience as an information management coordinator in support of epidemiologic research. Her responsibilities include developing and implementing systems for storage and retrieval of research documents; abstracting and coding of morbidity data for use in epidemiologic research; and providing writing and editorial support for epidemiologic surveillance reporting projects.

Her experiences include project management, developing coding quality standards, developing health data abstraction tools and procedures, and providing medical record and cancer registry technical support. She is a Certified Tumor Registrar from the National Cancer Registrars Association and a Registered Health Information Administrator from the American Health Information Management Association.

RESOURCE INTERNATIONAL, LTD ASHLAND, VIRGINIA

The second subcontracting company is Resource International LTD, a Virginia small business, providing engineering and technical services including natural resource professionals (biologists, ecologists, geologists, hydrologists, hydrogeologists, and engineers) who are fully knowledgeable of all phases of environmental science, surface water quality, air quality, and impoundment designs for non-radioactive mining applications. Resource also provides valuable capability in understanding the Virginia regulatory framework and processes.

Resource offers a wealth of experience in Virginia's Environmental and Mineral Exploration Programs suitable to support the Uranium Study workgroup's efforts. Our experience includes:

Surface and Groundwater Quality

- VPDES Permitting (statewide)
- Groundwater Monitoring
- Water Use Auditing
- Quarries
- Correctional Facilities
- Groundwater/surface water interface
- Stream Relocation
- Groundwater Withdrawal Permitting

Wellhead Protection

Environmental Corrective Actions

Air Quality

- Department of Corrections
- Quarries (Fugitive Dust Monitoring and Control)
- Industrial Permitting Title V

Waste Disposal

(including Mine Waste Disposal)

- Quarries
- Power Stations (Flyash, Bottom Ash, Flowable Fill)
- Landfills

Design and Best Management Practices

- Storm Water
- Waste

Environmental Impact Analysis

- Military Installations
- Correctional Facilities
- Quarries

Catastrophic Risk Evaluation

- 100, 500, 1000 year storms
- Seismic
- Traffic Study
- Oil Storage (OPA '90)

Financial Assurance

- Waste Disposal
- Corrective Action

Mineral Exploration

- Exploratory Permits
- Water Withdrawal Permits

Resource International Experience Summary:

Virginia Uranium, Inc. – Exploratory Drilling Permit

Resource assisted VUI to obtain a Uranium Exploratory Drilling Permit. Our scope of services included literature research, regulatory review and site specific investigation to support our client's efforts.

Woodstream Neighborhood Methane Investigation, Stafford County, Virginia

On February 8, 2011, Stafford County Fire and Rescue (SCFR) responded to a report of a methane release in the Woodstream neighborhood near the intersection of Woodstream and Short Branch Roads. During the previous evening, Columbia Gas of Virginia had responded to a customer call-in reporting an odor. Columbia confirmed that its buried

distribution lines were intact and also conducted on-site testing of soils for gas. Its field testing identified methane in the soil. Even though laboratory analysis confirmed that the methane in the soil was unrelated to the gas utility, Columbia notified SCFR.

Resource and SCFR, in coordination with the Virginia Department of Emergency Services; the Virginia Division of Mines, Minerals, and Energy; the United States EPA; and the Virginia DEQ, designed a field and laboratory investigation that identified the source of the methane to be natural occurrence in the soils. The soils consist of weathered rock of the Quantico Formation, a mix of slate, graphite schist, and phyllite. Where undisturbed, the formation has not been found to release methane. Where the soils have been disturbed – for example, for excavation of a trench then backfill with the cuttings – the disturbed soils released methane in concentrations averaging between 10 and 50 percent. Preliminary investigation suggested that the disturbed soils return to equilibrium (stop releasing methane) over time (months, possibly over a year). This information allowed SCFR to allow occupancy of the evacuated dwellings. Resource followed up with a full report, including recommendations relative to future development in the area.

Anderson Creek Relocation – Goochland County, Virginia

In order to expand its Anderson Creek Quarry to access additional rock reserves, a national mining company hired Resource to relocate approximately 1,700 feet of Anderson Creek. The project required obtaining permits from the U.S. Army Corps of Engineers (Corps) and the Virginia Department of Environmental Quality (DEQ) to relocate the creek 300 feet closer to the property boundary. The project was reviewed and approved with conditions by the Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (FWS), Virginia Department of Conservation and Recreation (DCR), Virginia Department of Game and Inland Fisheries (DGIF) and the Virginia Department of Mining, Minerals, and Energy (DMME).

The project took 24 months to design and permit. It provided the quarry with approximately 20 to 50 more years of life. The environmental team has completed a 5 year environmental monitoring program that has demonstrated the effectiveness of the relocation stability of design, construction methods, and habitat produced. The monitoring was able to document the success of the project. Resource and our Client were awarded accolades by industry organizations and journals.

Environmental Assessment at Fort Pickett Military Reservation – Blackstone, Virginia

Resource conducted an Environmental Assessment under the National Environmental Policy Act (NEPA) for the development, construction, and operation of a Multi-Purpose Range Complex (MPRC) located at Fort Pickett Military Reservation. A MPRC is an advanced tank gunnery range used for training and qualifying individuals, crews, and units in multi-vehicle warfare measures and weapons systems. Two alternative sites were under consideration for the MPRC, which encompasses approximately 12 square miles of the 42,000-acre base. Resource evaluated the physical, natural, cultural, social, and economic resources including wetlands, protected species and natural heritage areas, soils, hydrologic characteristics, and plant communities to determine possible impacts of the MPRC on selected alternatives under consideration. Cumulative impacts were also considered.

Coordination with agencies such as the Virginia Department of Conservation and Recreation, Virginia Department of Environmental Quality, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and Virginia Department of Agriculture and Consumer Services, among others, is a part of the services Resource provided on this project.

Resource also coordinated public meetings to present information on the proposed MPRC and addressed questions from the community.

Names and Qualifications of Personnel

The names and qualifications of our personnel are summarized in a table on the page.

Experience and Credentials Relevant to the Commonwealth of Virginia Uranium Study

Company	Staff Name	Role	Experience Summary	Qualifications Summary
Trinitek Services, Inc.	Environmental, Nuclear, Safety, Security, Consulting	Prime	Uranium mining/milling, permits, audits, surveys, compliance, water rad analysis and assessments, uranium mining, milling, environment, risk	Regulations, Agreement States, NRC, D&D, radiation safety, measurements, ALARA, NORM, epidemiology, engineers, scientists, health and safety professionals, regulators
Albuquerque, and Sandia Park, NM (Staff in Texas, S Carolina) www.3tks.com	Stanley Fitch	Proj. Manager	Regs, uranium, HealthPhys	MSE-Nuclear Engineering, CHP
	Gloria Chavez	Alternate PM	Env, Regs, HealthPhys, QA	Ph.D. Rad. Eco; MS hlth physics
	Chip Cameron	NEPA Lead	NEPA, NRC, Facilitator	JD
	Sheldon Landsberger	Radiochemistry lead	Rad meas, uranium, internat	Ph.D Radiation Chemistry
	Dan McCarn	Mining-hydrogeol Lead	Uranium, internat, hydro	Ph.D (ABD)
	Nicholas Fisher	SME-aquatic animal	Rad –toxic bioaccumulation	PhD Marine Biology
	Rick Haaker	H&S Lead	Health and Safety,	MS Health Physics, CHP, CIH
	Noel Savignac	SME	Uranium, HP, env, 30+yrs	Ph.D Radiation Ecology
	Thomas Cardwell	SME	Regulatory framework	B.S. Env Sciences
	Leo S Gomez	SME	Rad Biologist, tech edit, QA	Ph.D. Radiation Bio Effects
	Ted Wolff	SME	NEPA, Rad Regs, 30+ yrs	Ph. D. Biology
	Roger Hansen	SME	Env-NEPA, WIPP EIS, 30+ yrs	JD, Environmental Law
	John Hart	SME	NEPA, RCRA-Env Regs, QA	M.S. Environmental Science
	Sinisa Djordjevic	SME	Risk Assess, QA, modeling	Ph.D. Studies–Eng., MS Chem. E.
	Ahmed Hasan	SME	Rad chem., modeling	Ph.D. Radiation Chemistry
	Nat Patel	SME	U mining/milling, regulatory	MS Chemistry
	Bill Floyd	SME	Regulatory	M.S. Biology
	Pearce O’Kelley	SME	Regs, agreement states	M.S. Public Health
Resource International, LTD	Engineers , Scientists, Surveyors, Planners	Subcontractor	State of Virginia regulatory processes, mining impoundments, engineering designs, water quality	Engineering and technical, natural resource professionals (biologists, ecologists, geologists, hydrologists, hydrogeologists, and engineers
Ashland, VA www.resourceintl.com	Anthony Creech	SME	VA regs, SW/GW regs	B.S. Geology; P.G.
	Mike Willinger	SME	G-W monit	B.S, Engineering Geology; P.G.
	John Brooks	SME	SW, stds,EIS	M.S. Biology; B.S. Biology; PWD
	Jim Rudnick	SME	SW, stds, EIS	M.S, Forestry, B.S, Forestry
	Ed Hollos	SME	G-W monit, stds-disp mine	B.S, Civil Eng.; P.E.; BCEE
	Steve Church	SME	SW, stds, eng design	M.S. Civil Eng.; B.S. ME;
	Thaddeus Kraska	SME	EIS, water qual	M.S. Res Manag. B.A, Zool; PWD
	Robert Hundley	SME	SW, GW, Air Qual	B.S. Civil Eng; P.E.
	Charles Wilson	SME	SW, stds, mine waste	B.S. Civil Eng; P.E.
	B. Meredith Winn	SME	SW, Air qual, water qual stds	M.B.A., B.S. Chem. Engin.; P.E.
	Charlie Riedlinger	SME	Sw, GW,eng design	B.S. Civil Eng.; P.E.
	Mike Fiore	SME	SW, GW, mine waste	M.S Civil Eng.,B.S. Civil Eng; P.E.
	John Combs	SME	Sw, GW, mine wastes	M.E. Civil Eng
ORAU	Epidemiology			
Oakridge, TN http://www.ornl.gov/occupational-exposure-worker-health-studies	Elizabeth D. Ellis	SME	epidemiology	Ph.D. epidemiology
	George Holdsworth	SME	Epidemiology, toxicology	Ph.D. Biochemistry
	Phillip Wallace	SME	Health screening	M.B.A. Management, Be registry
	Pamela Whitson	SME	Research for epidemiolgy	MS Libray-Health Science

Resumes Summary of Selected Staff (Appendix D has inclusive resumes)

Bio-Sketch for Project Manager and Technical Leads and Selected SMEs	
Uranium Study Project Manager	Stanley A Fitch, CHP, MSE, RRPT

Vice-President of Trinitek Services, Inc., nuclear & environmental safety consulting

MSE-Nuclear Engineering, BS Health Physics, CHP (Certified Health Physicist)

Stanley A Fitch is an SME on radiation regulations, Agreement States and NRC, nuclear material, nuclear materials security, risk assessment. He is a former regulator specializing in managing radiation and environmental protection programs and personnel. He has been practicing in the radiation health physics profession for over 25 years as a manager, technical staff member and technician in occupational, environmental, and regulatory aspects of radiation protection, uranium mining/milling (regulatory and operational experiences), radiation measurements and risk assessment, in defense and research applications including reactor operations as well as facilities operations; and at Title 1 and 2 uranium mill tailings reclamation projects (UMTRA), including work as a former uranium mill operator. He is the former Chair of the OAS (Organization of Agreement States) and worked closely with the USNRC and heads of Agreement States Radiation Protection Programs in determining appropriate regulatory options for states.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study Alternate Project Manager, Technical Lead-ES&H, QA	Gloria E Chavez, Ph.D.

President of Trinitek Services, Inc., a nuclear and environmental safety consulting company.

Ph.D. Environmental Health Physics, MS Health Physics,

Gloria E Chavez, Ph.D. is an SME with over 40 years experience in radiation safety and environmental programs working in industry, USDOE National Laboratories (Sandia National Laboratories, Idaho National Laboratory), uranium mill tailings remediation, education and training. Experience in a broad range of health physics and nuclear work areas including: nuclear materials management, transportation, radioactive waste operations, radiation safety and related environmental health and safety compliance programs, nuclear quality assurance, emergency response, program/project management, international programs, systems analysis, nuclear regulatory development, security assessments, education and training. Work for industrial clients, NRC Agreement State, Department of Energy, Department of State, Department of Interior, Department of Justice. Work experience at Uranium Mill Tailings Remediation Action (UMTRA) projects (1973-1974), the Idaho National Engineering Laboratory, the Nevada Test Site (NTS), Tonopah Teat Range, NV and Sandia National Laboratories, Albuquerque, and commercial clients, various locations. Experience: managing technical, complex, multidisciplinary, multimillion dollar projects/ programs and teams, program developer, educator and trainer; finding solutions to complex technical and management problems; public speaking media relations, and public hearings and testimony.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study Technical Lead: NEPA and Facilitation	Francis X. Cameron, J.D.

Senior Consultant: Trinitex Services, Inc, Nuclear & Environmental Safety Consultants

J. D.; M.M.A., Natural Resources

Chip Cameron, J.D.. is an expert on NEPA, environmental law, uranium fuel cycle regulatory issues, facilitation public regulatory hearings/meetings, public out-reach, rulemaking, US NRC rule-making, Agreement States issues, with over 40 years experience with senior NRC and other federal, state and tribal agencies. Some of his work includes: Consultant to the International Atomic Energy Agency on the development of the Draft Safety Guide on Transparency, Openness, and Public involvement (2011); The nature and scope of the performance assessment for the disposal of depleted uranium in Utah (Department of Environmental Quality, State of Utah, 2010); The development of the technical basis for the NRC rulemaking on the licensing and oversight of reprocessing facilities (U.S. Nuclear Regulatory Commission, 2010 - 2011); The development of the criteria for site-specific performance assessments for the disposal of depleted uranium (U.S. Nuclear Regulatory Commission, 2009); The development of NRC policy on the blending of low-level radioactive waste (U.S. Nuclear Regulatory Commission, 2010).

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study Technical Lead: Radiation Chemistry	Sheldon Landsberger, Ph.D.

Senior Scientist: Trinitex Services, Inc, Nuclear & Environmental Safety Consultants

PhD, Chemical Engineering

Sheldon Landsberger, Ph.D. is Coordinator of the Nuclear and Radiation Engineering Program, UTA. His expertise includes: Radiation measurements, uranium and trace metals analysis, health physics, international environmental and radiation studies, uranium fuel cycle, in-situ leaching environmental impacts. He consults world-wide. Dr. Landsberger has more than 180 published papers and 120 conference proceedings. He has been involved in a wide variety of environmental projects for over 40-yrs including analysis of various media for heavy metals and radioactivity. His work has included: The Determination of Heavy Metals (Al, Mn, Fe, Ni, Cu, Zn, Cd and Pb) in Urban Snow Using an Atomic Absorption Graphite Furnace; Rapid Determination of Selenium in Various Marine Organisms by Instrumental Neutron Activation Analysis; Sulphur and Heavy Metals in Urban Snow: Multi-Elemental Techniques and Analytical Interpretation; Non-Destructive Determination of Arsenic in Urine; Studies of Radioactivity and Heavy Metals in Phosphate Fertilizer; Determination of Heavy Metals in the Rock River (Illinois) Through the Analysis of Sediments; Arsenic, Chromium and Nickel Determination in Human Samples; Low-Level Radioactive Waste Stream Analysis in a Neutron Activation Analysis Laboratory; Heavy Metals in Urban Soils of East St. Louis; The Determination of Uranium in Food Samples; sampling of soils for heavy metal contamination; and also has oversight to sophisticated low-level gamma-ray counting for naturally occurring radioactive material and fission product identification.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study Technical Lead: Mining and Hydrogeology	Dan McCarn, Doctoral Candidate

Senior Geologist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants

PhD, Geology; AIPG Certified Prof. Geologist CPG-10245; European Fed. of Geologists: Title #462; Wyoming Professional Geologist PG-3031

Dan McCarn is an expert on Minerals, Mining, Petroleum, Hydrogeology, Project Licensing, Risk Assessment with over 30 years experience in the nuclear, environmental, petroleum, minerals areas with focus on project management of hydrogeological and water-quality investigations; Numerical Modeling; uranium mine and mill licensing & decommissioning; Performance Assessment of nuclear waste repositories; Pollution prevention; Risk assessment; Superfund, significant experience in geostatistics, inorganic geochemistry, hydrogeology and numerical modeling as well as litigative experience as an expert witness. He has a strong focus on uranium project licensing, economic assessment of mining feasibility, geological modeling, basin studies, seismic data analysis, environmental sampling, design of monitoring well systems, geochemistry, mineral chemistry, geostatistics, geophysical log interpretation. He performs scientific programming with focus on geostatistical, geochemical, hydrological model development. Application languages include Visual Basic (6.0 & VBA), Fortran, C. Linear and non-linear methods of solution (Gauss Elimination, LU Decomposition, Adjunct identity element matrix inversion, Newton-Raphson, quadrature including Gauss Point method, analysis of ill-conditioned systems, and minimization methods. He was overseas for 15 years in Europe, Asia, and Latin America.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Uranium health physics & environment	Noel Savignac, Ph.D.

Senior Health Physicist: Trinitek Services, Inc

PhD, Health Physics, MS Health Physics

Noel Savignac has more than 20 years experience as a consultant in radiation protection. He has worked with over 50 new and returning clients for whom he has provided radiation dose modeling, policy statements, procedure manuals, technical investigations, training programs, and audits. His audits are designed to correct deficiencies prior to noncompliance citations. He creates and presents training programs that are practical and comprehensible. Previously he has served as a manager of environmental services for a uranium mining and milling firm, a health physicist at a nuclear power plant, and a university radiation safety officer and instructor. He has extensive experience in uranium mining and milling support and training as well as in health, safety and environmental impacts associated with uranium mining and milling operations in the western states. He was Past Chairman of the Uranium Environmental Subcommittee for the "American Mining Congress" and a member of the "National Commission of Radiological Protection and Measurements" (NCRP) - "Effluent Monitoring and Environmental Surveillance in the Mineral Extraction Industry" (NCRP Report 118).

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Toxins in Marine and fresh-water ecosystems	Nicholas S. Fisher, Ph.D.

Senior Aquatic Scientist: Trinitek Services, Inc

Ph.D. Marine Biology

Dr. Nicholas Fisher, Distinguished Professor School of Marine and Atmospheric Sciences (SoMAS), Stony Brook University, NY. He is internationally recognized for his expertise in metal and radionuclide interactions with aquatic biota, addressing bioaccumulation in marine as well as freshwater and estuarine ecosystems, considering the trophic transfer of metals/radionuclides in aquatic food chains (including fish), the influence of the organisms on the geochemical cycling (including residence times) of the contaminants in aquatic systems, and the influence of the metals on the organisms themselves. He has looked at a wide range of metals and radionuclides, including naturally occurring radionuclides, fission and activation products, has worked extensively with select transuranic elements (especially plutonium and americium). Much of this work has involved experimental studies to evaluate the kinetics of metal/radionuclide uptake and loss into and out of animals (including fish); has incorporated a metal/radionuclide bioaccumulation model that successfully predicts their concentrations in fish under steady-state conditions; has studied the influence of a wide variety of environmental factors on metal/radionuclide bioaccumulation in fish, and has assessed the relative importance of aqueous and dietary sources of metals/radionuclides for fish; has published hundreds of peer-reviewed papers in his 40-year tenure evaluating the bioavailability and fate of metals, including important long-lived radionuclides associated with nuclear wastes, in marine organisms and fresh water ecosystems and estuaries. He most recently authored articles on the uptake and distribution of radionuclides in fish from the Fukushima disaster. He has served as a consultant for the IAEA, the US EPA, for the nuclear power industry, for a US Federal Court in Maine dealing with metal bioaccumulation and effects in aquatic ecosystems.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Uranium, health physics & environment	Leo S. Gomez, Ph.D.

Radiation Biologist: Trinitek Services, Inc

PhD, Radiation Biology, MS Health Physics

He has worked at several US DDO Laboratories (Los Alamos, Sandia, Oak Ridge) in his 40-year career. Including: Worked in nuclear waste management at Sandia; Was the biological research project manager for four (4) international ocean disposal projects and worked in the Performance Assessment Department for the Waste Isolation Pilot Plant, a transuranic waste repository in southeastern New Mexico; collaborated for ten (10) years with the University of New Mexico Institute for Public Policy studying national public perceptions of risk from nuclear technologies. At Los Alamos he conducted experiments studying the comparative radiation sensitivity of normal mammalian tissues to x-rays and negative pi mesons in collaboration with the University of New Mexico Cancer Center. He worked with the LANL Health Physics group evaluating health and safety of uranium & plutonium facilities and calculating radionuclide body burdens in LANL workers; performed a safety evaluation of a nuclear power reactor in California; Managed the whole body counting facility to detect low levels of transuranic elements in workers at Oak Ridge National Laboratory in Tennessee; evaluated worker radiation exposures at ORNL and other nuclear facilities.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Epidemiology	Elizabeth Duprees Ellis, Ph.D.

Principal Scientist: ORAU; Ph. D. Epidemiology

Dr. Ellis has worked in the field of epidemiology, associated with toxic metals and radionuclides for over 35 years. She is currently Associate Director for the Center for Epidemiologic Research which conducts and supports quality epidemiologic research with primary emphasis on occupational health studies. From broad-scope epidemiology and health screenings/surveillance studies to beryllium sensitivity testing and radiation dose reconstruction. Epidemiologic surveillance assesses the overall health of the *current* DOE workforce at 14 DOE sites and facilities. The goal is to identify groups of workers that may be at increased risk for occupation-related injury and illness. In response to indications of excess risk, program staff can assess the need for additional investigations. Surveillance is based on continuous collection, analysis, and interpretation of selected morbidity, demographic, and occupational exposure data. The program is a corporate resource providing our customers with timely health information. We also provide epidemiologic and public health expertise in the evaluation of worker health concerns. Reports summarizing the results of epidemiologic surveillance are published annually and are available below. Implementation of epidemiologic surveillance has advanced the automation of health data management systems at sites such as the INEEL, fostering the development of state-of-the-art medical information management. She has also worked as: Associate Director, Center for Epidemiologic Research, ORAU; Leader, Epidemiology Support Section, Center for Epidemiologic Research; Epidemiologist, Center for Epidemiologic Research and at The Johns Hopkins University, Baltimore, MD, Department of Epidemiology as a Research Assistant. She has published a number of relevant papers related to epidemiological studies for workers in uranium mining/milling and related industries.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Epidemiology, toxicology	George Holdsworth, Ph.D.

Principal Scientist: ORAU; Ph. D. Biochemistry

Dr. Holdsworth is an experienced scientist specializing in toxicology and human health risk assessments. He is currently Senior Toxicologist at ORAU providing technical support to the U.S. EPA IRIS program office for • the preparation of toxicological reviews and IRIS summary sheets, • peer review: Provided write-ups of experimental studies and overall technical support for the Agency's *Toxicological Review and Risk Characterization of Formaldehyde*; Prepared monographs on the impact of environmental stressors on human health for U.S. Centers for Disease Control and Prevention (CDC); providing technical support to NIOSH on criteria documents, skin notation profiles, and immediately dangerous to life and health (IDLH values. Extensive experience in support of government programs in the human health sciences; researched (EPA) and authored issue papers on potential human health impacts of chemicals of environmental concern; Prepared monographs to assess human health impacts of drinking water disinfectants/their by-products ; Researched and wrote toxicological reviews/summary sheets for compounds nominated for inclusion in U.S. EPA's IRIS database; Assessed mutagenic potential of trace inorganic /organic contaminants in finished drinking water; (U.S. Army) Center for Health Promotion and Preventive Medicine (USACHPPM), developed Toxicity Profiles of environmentally and militarily important chemicals, in support initiative to develop Toxicity Reference Values protective of wildlife.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Health Screening Database	Phillip W. Wallace M.B.A.

Manager of Information Technology for Occupational Exposure and Worker Health program:
ORAU

B.S., Industrial Management, M.B.A., Management

Mr. Wallace serves as Manager of Information Technology for Occupational Exposure and Worker Health (OEWH) program. Responsibilities include ensuring compliance to Federal government cyber security requirements, overseeing activities of software developers, and maintain integrity of data holdings within OEWH. Oversaw the design and implementation of the DOE Beryllium Registry (10 CFR 850) and currently oversee the routine operation, work with DOE HQ staff on requirements, work with DOE sites to provide guidance on data submissions, and provide analyses of the data to DOE HQ; Oversee the daily operation of the DOE Illness and Injury Surveillance program; interact with DOE HQ staff to review program status and plan future directions; oversee the functions of receiving data and returning errors to the submitting site, creating special reports as required, and working with sites to assess health situations as specified by the site Occupational Medicine Director; Hands-on experience supporting epidemiologic studies through software development and data manipulation; Maintain validity and integrity of data on over 400,000 DOE workers; Create tables containing over 4,000,000 dosimetry records, ensuring quality for use in health studies.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Epidemiology	Pamela S. Whitson

Scientific Programmer/Analyst: ORAU

M.S. Library and Information Science

Ms. Whitson is a: Certified Tumor Registrar, National Cancer Registrars Association, 1995; Registered Health Information Technician, American Health Information Management Association, 1999; Registered Health Information Administrator, American Health Information Management Association, 2000. She supports the Center for Epidemiologic Research to: Develop, maintain, and execute software to produce timely and accurate analysis data for the Illness and Injury Surveillance Program; develop queries to research ad-hoc requests; Maintain bibliographic function and data integrity in the Comprehensive Epidemiologic Data Resource; Research, develop, design, and implement electronic methods for scanning and retrieval of archived information.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Hydrology, Engineering Applications	Anthony Creech P.G.

Section Manager Groundwater & Geology: Resource International, LTD, Virginia

B.S. Geology

Mr. Creech has over 23 years of progressive experience in geology, hydrogeology, due diligence, solid waste, health and safety, and environmental compliance management, research, and evaluation. Mr. Creech supervises all geology efforts in the company. His areas of expertise include geologic and hydrogeologic studies (e.g., water supply investigation, landfill siting and monitoring), site characterization, risk assessment, corrective action plans, environmental site assessments, and environmental compliance auditing. He acts as program manager for all groundwater related activities performed by the company, including monitoring programs (landfills, petroleum storage facilities, wastewater treatment facilities, etc.). Mr. Creech developed and maintains written protocols for QA/QC, statistical analyses, and training of field personnel. He has provided expert witness testimony involving real and/or alleged contamination of property. He also represented clients to county boards, planning commissions, public hearings, and various regulatory entities, including the VDEQ, VDH, and EPA.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Hydrology, Engineering Applications	Michael E. Fiore, P.E.

Section Manager Groundwater & Geology: Resource International, LTD, Virginia

B.S., Civil Engineering, Notre Dame, 1965; M.S., Civil Engineering,

Mr. Fiore has over 44 years of management and engineering experience. Since 1979, Mr. Fiore, co-founder and President of Resource International, Ltd., has served as Principal-in-Charge of engineering and environmental engineering projects, ensuring both dedicated resources of the firm and quality assurance of deliverables. Mr. Fiore's areas of expertise include civil engineering; solid waste facility design; design of over 50 sanitary landfills; solid waste facility permitting; leachate and landfill gas treatment; landfill gas flaring and gas energy recovery systems; transfer station design and operation; resource/energy recovery; recycling; groundwater monitoring; landfill closure and post closure; regulatory liaison; compliance and enforcement negotiation; commercial and industrial development; water supply; wastewater systems; storm water management; environmental impact; industrial waste treatment and disposal; regional planning and resource management; and financial and technical feasibility analysis.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs**Uranium Study SME:**

Hydrology, Engineering Applications

John L. Combs, P.E.

Executive Vice-President: Resource International, LTD, Virginia

B.S., U.S. Military Academy, 1967; M.E., University of Virginia (Civil Engineering)

Mr. Combs has over 39 years of management and engineering experience. Since 1979, Mr. Combs, co-founder and Executive Vice-President of Resource International, Ltd., has served as Principal-in-Charge of engineering and environmental engineering projects Principal planner for the preparation of the conceptual development plan for many large projects in Virginia. Resource provides professional consulting services to private individuals and companies, Fortune 500 companies, and to local, state and federal government. The firm's services include civil and environmental engineering, land planning, land surveying, environmental compliance and permitting, construction administration, construction claims analysis and expert witness testimony. Mr. Combs' areas of expertise include the engineering design and construction of municipal and industrial wastewater treatment and water supply facilities, public utility water and wastewater lines, roads and infrastructure. Also, environmental compliance and permitting; environmental impact assessments and statements (EIA/EIS); environmental contamination assessments and remediation; land use planning; comprehensive municipal planning; design and development; and construction claims analysis and expert witness testimony

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Section III. Proposed Price

The Grand Total Price (required in Section XI of the RFP) for conducting the Uranium Study in accordance with Section III, Statement of Needs, will be will be **\$844,329.00**, as outlined below:

Company	Labor	Travel, Per Diem, Hotel	Misc. Costs	Totals
Trinitek	\$551,512.00	\$19,850.00	\$1,000.00	\$572,362.00
Resource International	\$85,736.00	\$1,500.00	\$603.00	\$87,839.00
ORAU	\$174,516.00	\$7,930.00	\$1,682.00	\$184,128.00
Totals	\$811,764.00	\$29,280.00	\$3,285.00	\$844,329.00

The projected hours of labor are as follows:

- Trinitek – 3,189
- Resource International – 596
- ORAU – 854

Cost Estimating Challenges and Assumptions

Trinitek notes the somewhat unpredictable scope in RFP Section III, Statement of Needs. Therefore, some additional labor hours were added to the time estimates to compensate for this unpredictability. For example, no guidance is provided on how much time will be required to attend the facilitation meetings and other public meetings.

The actual number of required trips to and appearances in Richmond is a unpredictable. However, it is anticipated that travel and appearances will be required as follows:

- Trinitek Project Manager (PM) – kick-off meeting, 4 monthly meetings with VDH staff, and 5 facilitation meetings
- Trinitek Alternate PM – kick-off meeting and 1 facilitation meeting
- Trinitek Facilitator – 5 facilitation meetings
- Trinitek Geohydrology Lead – 2 facilitation meetings
- Resource International Manager – kick-off meeting and 2 facilitation meetings
- ORAU Epidemiologist– 5 facilitation meetings

These people will appear at the stated events to gain information from the Commonwealth and its stakeholders and to provide them information and conclusions about the study. Each person is in-depth experience in the environmental and health challenges related to uranium mining and milling, and can provide insights about possible concerns that might need to be addressed by the Commonwealth.

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Section IV. Appendices

- A. Offeror Data Sheet (RFP Attachment A)
- B. Small Business Contracting Plan (RFP Attachment B)
- C. State Corporation Commission (RFP Attachment C)
- D. RFP Task Matrix
- E. Resumes
- F. Statements of Qualifications for Trinitek Services and Subcontractor Companies

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Appendix A. Offeror Data Sheet (RFP Attachment A)

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ATTACHMENT A
OFFEROR DATA SHEET

Note: The following information is required as part of your response to this solicitation. Failure to complete and provide this sheet may result in your proposal being scored lower.

1. Qualification: The vendor must have the capability and capacity in all respects to satisfy fully all of the contractual requirements.

2. Vendor's Primary Contact:

Name: Gloria E Chavez Phone: 505-220-5552

3. Years in Business: Indicate the length of time you have been in business providing this type of good or service:

6 Years Months

4. Vendor Information:

eVA Vendor ID or DUNS Number: eVA VS0000087437

5. Indicate below a listing of at least four (4) current or recent accounts, either commercial or governmental, that your company is servicing, has serviced, or has provided similar goods. Include the length of service and the name, address, and telephone number of the point of contact.

A. Company: Rio Grande Resources Contact: Joe Lister

Phone: (505) 287-7971 Fax: (505) 281-7971

Project: Mt. Taylor Uranium Mine/Mill Radiation Safety, planning permits

Dates of Service: since 2006 \$ Value: \$300,000 past-current

B. Company: Parametrix, Inc Contact: Jim Good

Phone: (505) 821-4700 Fax: (505) 821-7131

Project: Cochiti Lake Sediment Characterization (Radionuclides)

Dates of Service: 2010-2011 \$ Value: 82,179

C. Company: SWCA/Neutron Energy Contact: Mike Neuman

Phone: (303) 0492 Fax: (303) 531-0519

Project: Cebolleta Radiation Baseline surveys and assessments for new Uranium mine

Dates of Service: 2012-2013 \$ Value: 65,000

D. Company: Cavin and Ingram, PA Contact: Sealy Cavin, PA

Phone: (505) 243-5400 Fax: (505) 243-1700

Project: Lee Ranch-Johnny M Uranium Mine consultation to legal staff for potential CERCLA action

Dates of Service: January 2012 to 2013 \$ Value: 25,000-50,000

I certify the accuracy of this information.

Signed: _____ Title: President Date: 4/3/2012

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Appendix B. Small Business Contracting Plan (RFP Attachment B)

ATTACHMENT B

Small Business Subcontracting Plan

Definitions

Small Business: "Small business " means a business, independently owned or operated by one or more persons who are citizens of the United States or non-citizens who are in full compliance with United States immigration law, which, together with affiliates, has 250 or fewer employees, or average annual gross receipts of \$10 million or less averaged over the previous three years.

Women-Owned Business: Women-owned business means a business concern that is at least 51% owned by one or more women who are citizens of the United States or non-citizens who are in full compliance with United States immigration law, or in the case of a corporation, partnership or limited liability company or other entity, at least 51% of the equity ownership interest is owned by one or more women who are citizens of the United States or non-citizens who are in full compliance with United States immigration law, and both the management and daily business operations are controlled by one or more women who are citizens of the United States or non-citizens who are in full compliance with the United States immigration law.

Minority-Owned Business: Minority-owned business means a business concern that is at least 51% owned by one or more minority individuals or in the case of a corporation, partnership or limited liability company or other entity, at least 51% of the equity ownership interest in the corporation, partnership, or limited liability company or other entity is owned by one or more minority individuals and both the management and daily business operations are controlled by one or more minority individuals.

All small businesses must be certified by the Commonwealth of Virginia, Department of Minority Business Enterprise (DMBE) by the due date of the solicitation to participate in the SWAM program. Certification applications are available through DMBE online at www.dmbv.virginia.gov (Customer Service).

Offeror Name: Trinitek Services, Inc.

Preparer Name: Gloria E. Chavez Date: 4/3/2012

Instructions

- A. If you are certified by the Department of Minority Business Enterprise (DMBE) as a small business, complete only Section A of this form. This shall not exclude DMBE-certified women-owned and minority-owned businesses when they have received DMBE small business certification.
- B. If you are not a DMBE-certified small business, complete Section B of this form. For the proposal to be considered and the offeror to be declared responsive, the offeror shall identify the portions of the contract that will be subcontracted to DMBE-certified small business in Section B.

Section A

If your firm is certified by the Department of Minority Business Enterprise (DMBE), are you certified as a (check only one below):

☐ Small Business

☐ Small and Women-owned Business

☐ Small and Minority-owned Business

Certification number: _____ Certification Date: _____

Section B

Populate the table below to show your firm's plans for utilization of DMBE-certified small businesses in the performance of this contract. This shall not exclude DMBE-certified women-owned and minority-owned businesses that have received the DMBE small business certification. Include plans to utilize small businesses as part of joint ventures, partnerships, subcontractors, suppliers, etc.

B. Plans for Utilization of DMBE-Certified Small Businesses for this Procurement

Small Business Name & Address DMBE Certificate #	Status if Small Business is also: Women (W), Minority (M)	Contact Person, Telephone & Email	Type of Goods and/or Services	Planned Involvement During Initial Period of the Contract	Planned Contract Dollars During Initial Period of the Contract
Resource International LTD. SWaM S 684640		Anthony Creech 804-550-9200 acreech@resourceintl.com	engineering services	planning, consulting	\$87,839.00
Totals \$					\$87,839.00

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Appendix C. State Corporation Commission (RFP Attachment C)

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ATTACHMENT C

STATE CORPORATION COMMISSION FORM

Virginia State Corporation Commission (SCC) registration information. The offeror:

☐ is a corporation or other business entity with the following SCC identification number: _____ **-OR-**

☐ is not a corporation, limited liability company, limited partnership, registered limited liability partnership, or business trust **-OR-**

☒ is an out-of-state business entity that does not regularly and continuously maintain as part of its ordinary and customary business any employees, agents, offices, facilities, or inventories in Virginia (not counting any employees or agents in Virginia who merely solicit orders that require acceptance outside Virginia before they become contracts, and not counting any incidental presence of the offeror in Virginia that is needed in order to assemble, maintain, and repair goods in accordance with the contracts by which such goods were sold and shipped into Virginia from offeror's out-of-state location) **-OR-**

☐ is an out-of-state business entity that is including with this offer an opinion of legal counsel which accurately and completely discloses the undersigned offeror's current contacts with Virginia and describes why those contacts do not constitute the transaction of business in Virginia within the meaning of § 13.1-757 or other similar provisions in Titles 13.1 or 50 of the Code of Virginia.

****NOTE**** >> Check the following box if you have not completed any of the foregoing options but currently have pending before the SCC an application for authority to transact business in the Commonwealth of Virginia and wish to be considered for a waiver to allow you to submit the SCC identification number after the due date for offers (the Commonwealth reserves the right to determine in its sole discretion whether to allow such waiver): ☐

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Appendix D. RFP Task Matrix

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APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

III.A. Initial Literature Analysis and Recommendations

Number	Description	Task Assignment
1.	Virginia and Other Relevant Studies Utilize summary information prepared by the Uranium Working Group agencies from the existing Virginia uranium mining studies (that is, National Academy of Sciences/National Academies Press [NAS/NAP], Virginia Beach, Roanoke River Basin, Chmura, as well as other relevant studies), and make recommendations relevant to the Board of Health's mission to protect public health and the environment. The summary should include, but not be limited to: uranium milling and mining, public drinking water systems, private wells, cisterns, springs, and recreational water issues, human and animal health (including occupational and reproductive health; teratogenesis; mutagenesis; carcinogenesis; unintentional injury; chronic disease; and toxic exposures (both acute and chronic), silicosis, and other unusual occurrences of diseases of public health concern with special attention to vulnerable populations such as infants and children). a) Review available scientific literature on: 1) epidemiologic studies measuring long-term effects of exposures to radioactive materials and toxic substances as might be encountered in mining operations of the type proposed for Virginia; 2) limitations of available studies and recommendations of public health experts on design of relevant studies. b) Assist VDH with development of surveillance and epidemiologic studies to evaluate short and long term health effects associated with mining. Studies must include consideration of sources for accurate, valid baseline levels of materials of concern in the environment and in animals and humans.	Trinitex: • All except topics set aside for Resource and ORAU. • Animal health • Evaluate findings Resource International: • Review Virginia-based studies pertaining to water quality Oak Ridge Associated Universities (ORAU): • Facets related to toxicology and epidemiology (excluding animal health)

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APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS
III.A. Initial Literature Analysis and Recommendations ... continued

Number	Description	Task Assignment
2.	Existing Regulatory Programs Compares existing uranium mining and milling regulatory programs including Nuclear Regulatory Commission (NRC), any Agreement State programs, and international programs (such as Canada and France) and recommends provisions from within those regulatory programs that are relevant to the Board of Health's mission as described above. Identify where additional requirements may be appropriate to accommodate Virginia-specific population density, rainfall, climate, water table levels, and unique geography.	Trinitek: • All Resource International: • Evaluate findings from a Virginia perspective Oak Ridge Associated Universities (ORAU): • N/A
3.	International Emerging Standards Summarizes pertinent information and studies from such groups as the International Atomic Energy Agency, the World Nuclear Association, etc. and provides recommendations based on this review that are relevant to the Board of Health's mission as described above, including modern best international practices and other emerging standards and technologies. Identify internationally accepted best practices that can be implemented to mitigate the risk of radioactive releases, discussing technologies available to reduce emissions and maintain a focus on pollution prevention and reduction, including strategies for emergency hazards enumerated in the Commonwealth of Virginia Emergency Operations Plan.	Trinitek: • IAEA, WNA, etc. • Nuclear/radiation controls and containments • Strategies for Virginia Emergency Operations Plan Resource International: • Hydrogeology • Pollution Prevention Oak Ridge Associated Universities (ORAU): • N/A

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APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS
III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff

Subsection 1. – Coordinate With VDH Staff

Trinitek will coordinate with VDH staff and be available to attend at least monthly progress meetings to develop analyses of the following items and to develop and provide a final report. The Trinitek project manager will be available to meet with VDH staff, either face-to-face or via conference calls, as needed to develop interim deliverables and the final report.

Number	Description	Task Assignment
a)	Existing Statutes and Regulations Compare the Commonwealth's existing statutes and regulations to recommendations in the initial report.	Trinitek: - Health statutes and regulations - Evaluate findings
b)	Modification or Expansion of Existing Regulations Identify areas where VDH's existing regulations might need to be modified or expanded to ensure protection of public health and the environment.	Resource International: - Environmental quality statutes and regulations Oak Ridge Associated Universities (ORAU): - N/A
c)	Recommended Changes Recommend changes (including statutory changes) to meet these needs.	
d1)	Waterworks Regulations Perform an evaluation that includes a review of the Waterworks Regulations (12VAC5-590 et seq.).	Trinitek: - Evaluate findings Resource International: - All Oak Ridge Associated Universities (ORAU): - N/A
d2)	Disease Reporting and Control Regulations An evaluation that includes a review of the Disease Reporting and Control Regulations (12VAC5-90-90 et seq.) (requirements for reporting by healthcare providers and laboratories).	Trinitek: - Evaluate findings Resource International: - N/A Oak Ridge Associated Universities (ORAU): - All

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff ... continued

Number	Description	Task Assignment
d3)	Private Well Regulations Perform an evaluation that includes a review of the Private Well Regulations (12VAC5-630 et seq.). Develop conceptual framework and initial project costs to determine the impact on quantity and quality of water in private wells and springs and recommended procedures for replacing or remediating affected supplies. Framework should be capable of characterizing an inventory of impacted wells, springs, recreational waters and cisterns.	Trinitek: - Evaluate health impacts - Evaluate findings Resource International: - All except evaluation of health impacts Oak Ridge Associated Universities (ORAU): - N/A
d4)	Facilitate the Stakeholder Process Facilitate the stakeholder process, including any potentially inspected regulated community (at least 5 statewide meetings with separate final report) to gauge concerns and identify possible solutions concerning regulation of public water supplies and private wells as to water quality and quantity.	Trinitek: - All Resource International: - N/A Oak Ridge Associated Universities (ORAU): - N/A
d5)	Recreational Uses of Waters Perform an evaluation that includes a review of the regulations concerning recreational use of waters (campgrounds, summer camps, etc.).	Trinitek: - Evaluate findings Resource International: - All Oak Ridge Associated Universities (ORAU): - N/A

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS
III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff ... continued

Number	Description	Task Assignment
e)	Health Outcomes Data Determine and characterize available data (including national and Virginia-specific data) on potential health outcomes related to exposures of concern. Determine if current reporting requirements and laboratory testing capability cover chemicals likely to be encountered in mining operations under consideration. Determine if current tobacco use surveillance is adequate for establishing baseline data for rates of lung cancer, silicosis, and radon-associated health problems using standard epidemiological analytic methods. Determine whether other available data is sufficient to establish baseline rates for conditions of concern (e.g., current silicosis reporting data) or if retrospective or other studies are indicated to determine baseline rates. Evaluate and propose changes to cancer, congenital malformation reporting if necessary.	Trinitek: - Evaluate findings Resource International: - N/A Oak Ridge Associated Universities (ORAU): - All
f)	Test Case Report Investigation Worksheets and Documents Develop and test case report investigation worksheets and other documents for local Health Department and Central Office use in any necessary investigations for relevant health outcomes.	Trinitek: - Evaluate findings Resource International: - N/A Oak Ridge Associated Universities (ORAU): - All
g)	Locus of Long-Term Health Monitoring Determine locus of responsibility for the long-term monitoring of adverse health effects ensuring worker health and safety as well as additional recommended monitoring.	Trinitek: - Evaluate findings Resource International: - N/A Oak Ridge Associated Universities (ORAU): - All

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff ... continued

Number	Description	Task Assignment
h)	Worker Safety Evaluate monitoring of work spaces, monitoring of exposures for mine workers, tracking of worker cumulative exposures, adequacy of existing MSHA regulations and comparisons with international standards for radon and radon daughters.	Trinitek: • All Resource International: • N/A Oak Ridge Associated Universities (ORAU): • N/A
i)	Environmental and Health Framework Recommend a framework for environmental, human health and animal health monitoring so that data can be maintained in compatible systems for analyzing health effects, including long term monitoring.	Trinitek: • Environmental monitoring except water • Animal health • Evaluate findings Resource International: • Water monitoring Oak Ridge Associated Universities (ORAU): • Facets related to toxicology and epidemiology (excluding animal health)
j)	Impacts to Cisterns and Onsite Sewage Systems Determines potential impacts (if any) on cisterns and onsite sewage systems.	Trinitek: • Evaluation of health impacts • Evaluate findings Resource International: • All except evaluation of health impacts Oak Ridge Associated Universities (ORAU): • N/A

(Continued next page)

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

Subsection 2 – Address VDH-Related Issues

Trinitek recommendations should address VDH-related issues, including those listed below, as well as any other issues identified by Trinitek as being necessary and relevant for effective life cycle regulation of uranium mining and milling in Virginia.

Number	Description	Task Assignment
a)	Water Quality Monitoring Plan for Surface Waters Including but not limited to: 1) Human health risks associated with chemical toxicity; 2) Human health risks associated with radiological toxicity; and, 3) Human health risks associated with consumption of affected animal and marine populations.	Trinitek: • Health risk evaluations • Evaluate findings Resource International: • Preparation of plans Oak Ridge Associated Universities (ORAU): • N/A
b)	Water Quality Monitoring Plan for Groundwaters Including but not limited to: 1) Human health risks associated with chemical toxicity; 2) Human health risks associated with radiological toxicity; 3) Human health risks associated with consumption of affected animal and marine populations; and, 4) The potential impact on groundwater quality and quantity as these affect public wells, private wells and springs.	Trinitek: • Health risk evaluations • Evaluate findings Resource International: • Preparation of plans Oak Ridge Associated Universities (ORAU): • N/A
c)	Adequacy of Virginia’s Water Quality Standards for Groundwater and Surface Waters, and Virginia’s Waterworks Regulations As the above regulations relate to human health outcomes: 1) To address water-soluble radionuclides or absorbed chemicals; 2) To address the potential for undiluted tailings liquids to exceed existing Safe Drinking Water Act standards for uranium; and, 3) To address the potential for revised Public Drinking Water System’s monitoring schedules for radiological contaminants and other hazardous substances within potentially impacted areas.	Trinitek: • Water-soluble radionuclides and absorbed chemicals • Undiluted tailings liquids exceeding SDWA standards • Evaluate findings Resource International: • Address potential revisions to Public Drinking Water System’s monitoring schedules Oak Ridge Associated Universities (ORAU): • N/A

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff ... continued

Number	Description	Task Assignment
d)	Safe Disposal of Mine Waste Evaluate the existing standards for the safe disposal of mine waste as it pertains to human health.	Trinitek: • All Resource International: • Evaluate findings from a Virginia perspective Oak Ridge Associated Universities (ORAU): • N/A
e)	Environmental Impact Analysis Evaluate necessary components of full environmental impact analysis.	Trinitek: • All Resource International: • Evaluate findings from a Virginia perspective Oak Ridge Associated Universities (ORAU): • N/A
f)	Methods for Incorporating "As Low As Reasonably Achievable" (ALARA) Standards To be incorporated into Commonwealth regulations, like those that exist for radiological protection.	Trinitek: • All Resource International: • N/A Oak Ridge Associated Universities (ORAU): • N/A
g)	Financial Assurance Recommendations for compliance period financial assurance mechanisms providing for minimization of long-term impacts to water resources and necessary remediation.	Trinitek: • Evaluate the adequacy of existing NRC requirements for milling • Evaluate findings Resource International: • Evaluate the adequacy of all other pertinent existing requirements and recommend changes Oak Ridge Associated Universities (ORAU): • N/A

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS
III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff ... continued

Number	Description	Task Assignment
h)	Environmental Monitoring Recommendations for environmental monitoring, including but not limited to: 1) Required components of an environmental monitoring plan; 2) Recommended goals to include in an environmental monitoring plan; and, 3) Recommended baseline and characterization data needed.	Trinitek: - Air quality, soil, and biota monitoring portion of plan and baseline/characterization data - Evaluate findings Resource International: - Water quality monitoring portion of plan and baseline/characterization data Oak Ridge Associated Universities (ORAU): - N/A
i)	Evaluate NRC Regulations Evaluation of NRC regulations for milling and tailings management given state-specific climate (e.g., rainfall) and hydrologic considerations.	Trinitek: - All Resource International: - Evaluate findings from a Virginia perspective relevant to state-specific climate (e.g., rainfall) and hydrologic considerations Oak Ridge Associated Universities (ORAU): - N/A

III.C. Assist VDH in Preparing and Presenting Reports

Number	Description	Task Assignment
N/A	Assist VDH in preparing and presenting information and assist in VDH staff's presentations.	Trinitek will lead this portion of the project but will be assisted by Resource International and ORAU as appropriate to complete the task.

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

III.D. Assist VDH in Formulating a Draft Conceptual Regulatory Framework

Number	Description	Task Assignment
N/A	Discuss the reports and recommendations enumerated above with VDH and assist staff in implementing findings/recommendations into a draft conceptual regulatory framework that would address VDH-issues for the entire life-cycle compliance period of milling projects in Virginia, as well as other impacted Commonwealth of Virginia regulations.	Trinitek will lead this portion of the project but will be assisted by Resource International and ORAU as appropriate to complete the task.

Appendix E. Résumés

Trinitek Services, Inc

Oak Ridge Associated Universities (ORAU)

Resource International, Ltd.

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Uranium Study Project Manager	Stanley A Fitch, MSE, CHP, RRPT
SME: radiation regulations, Agreement States-NRC, nuclear material, risk Current Employment: Vice-President, Trinitek Services Capabilities: Practicing in the radiation health physics profession for over 25 years as a manager, technical staff member and technician in occupational, environmental, and regulatory aspects of radiation protection, uranium mining/milling regulatory and operational experiences, radiation measurements and risk assessment, in defense and research applications including reactor operations as well as facilities operations; and at Title 1 and 2 uranium mill tailings reclamation projects (UMTRA), nuclear materials security.	Vice-President: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials MSE-Nuclear and Radiation Engineering ❖ University of Texas At Austin BS Radiation Protection ❖ Thomas Edison State College, New Jersey CHP- Certified by the American Board of Health Physics RRPT - Certified by the National Registry of Radiation Protection Technologists Additional training: RCRA, DOT, Radioactive waste, NRC Inspections, radioactive waste, safety, nuclear material security

Management and Technical Qualifications – Former regulator specializing in managing radiation and environmental protection programs and personnel for 24 years, with budgets in excess of \$1M/year. Primary focus is in the safety of nuclear materials and radiation safety and safeguards.

Radiation/Nuclear Safety Assessments – Extensive experiences and credentials performing radiation surveys, monitoring, radiation detection techniques and processes, assessments and characterization of radiation and radioactivity. Managed and planned projects requiring decontamination, remediation, radiation shielding calculations and design, operational controls and facility controls and processes to control radiation environments, performance assessments audits. Experience in USDOE facilities, USNRC and state regulated facilities, and industry. Worked with nuclear material, classified material and radiation sources in high radiation environments as well as performing baseline and operations surveys.

Radiation Safety Officer (RSO) for Nuclear Fuel Cycle, Industrial And Research Facilities. Extensive experience developing Radiation Protection and Worker Safety Programs, preparing implementing procedures, managing day-to-day operations to ensure compliance with applicable regulations in complex research facilities, uranium industry operations, commercial client operations and facilities.

Radiation Regulatory Framework – Frequent interactions with NRC Commissioners, Region and Headquarters staff, and with the state radiation control program directors. Extensive understanding of the operational framework and internal practices of NRC, Agreement States, DOE, and IAEA.

Teamed with NRC's Office of Nuclear Material Safety and Safeguards (NMSS), OAS, CRCPD, and FDA in promulgation of effective national regulations for public and environmental

health. Also teamed with NRC's Office of Nuclear Security and Incident Response (NSIR) in promulgation of standards for the common defense and security. Chaired the Organization of Agreement States, Inc. (OAS) frequently interacting with USNRC Commissioners and Program Heads.

National Security and Antiterrorism – Co-chaired NRC's Materials Security Working Group (MSWG), which was charged with devising appropriate laws and regulations for safeguarding radioactive materials from malevolent exploitation. The works of the MSWG are now USA federal law and were adopted by the International Atomic Energy Agency (IAEA) and adopted by other nations pursuant to IAEA Code of Conduct.

Incident Response – Worked in close assistance to the National Nuclear Security Administration (NNSA), Department of Homeland Security, Federal Bureau of Investigation, National Guard, and state radiation control agencies in exercising and otherwise preparing for response to radiation incidences and radiological terrorism.

Environmental – Health physics and regulatory oversight of numerous projects (from small to vast) at NRC, DOE, and EPA regulated facilities. NEPA consulting on NPDES, NESHAPS, CWA, and RCRA. Constituents included radioactive, mixed, hazardous, and biological wastes. Research laboratories, D&D of uranium mills and mines. Radiation Safety Officer and health physicist for regulatory oversight and public outreach.

Department of Energy – Radiation protection in the DOE research and weapons framework.

Training – Has taught numerous courses on radiation protection, environmental protection, security of radiation sources, and national and international rules to users of radiation, the public, and regulators.

EMPLOYMENT SUMMARY

Trinitek Services, Inc.

Albuquerque, New Mexico. Vice-President; 2006 to present. Health physics and environmental consulting for customers in the nuclear fuel cycle, uranium production, radioactive waste management, government, industry, medicine, and academia involving uses of radioactive materials, x-ray machines, and particle accelerators.

New Mexico Environment Department, Radiation Control Bureau

Albuquerque office manager and health physicist; 1998 to 2006. Responsible for licensing and regulating radioactive material and radiation machines. Trained by the Nuclear Regulatory Commission and the Conference of Radiation Control Program Directors (CRCPD).

Sandia National Laboratories, Radiation Protection Program

Albuquerque, New Mexico. Project Coordinator and Health Physicist – Facilities Environment Safety and Health (ES&H) Program; Contractor; "Q" cleared; 1993–1998. Responsible for radiation protection oversight of radioactive materials and x-ray machine usage, and construction and maintenance projects across Sandia Labs.

Atlantic Richfield Company, Bluewater Uranium Mill

Grants, New Mexico. Health Physicist and lead technician on this extensive UMTRA Title 2 project; 1988–1993. Managed the counting laboratory and clean-up verification protocols.

Chem-Nuclear Systems, Inc., DOE UMTRA Project

Ambrosia Lake, New Mexico. HP supervisor, lead technician; 1987–1988. Large UMTRA Title 1 uranium mill and tailings remediation project.

PROFESSIONAL AFFILIATIONS

American Academy of Health Physics, member and diplomate (2004–present)

National Registry of Radiation Protection Technologists, member and diplomate (1995–present)

Organization of Agreement States, Inc. (OAS)

Past Chair (2004–2005); Chair (2003–2004); Chair-Elect (2002–2003)

Secretary (2001–2002)

Chairman, OAS Incorporation Working Group (2001–2002)

Health Physics Society (HPS), member (1990–present); member of the Governmental and Societal Relations Committee (2007–present)

HPS Rio Grande Chapter, member (1996–present); President (2007–2008)

Conference of Radiation Control Program Directors, Inc. (1998–present) Past Member, Part U Working Group (for the development of national uranium mill regulations)

International Radiation Protection Association (IRPA)

Attendee of the IRPA-10 and 11 conferences, held in Hiroshima and Madrid, respectively. Speaker at the IRPA-11 conference in 2004, on materials security efforts in the United States of America.

NOTEWORTHY PRESENTATIONS, PAPERS, AND PUBLICATIONS

- *Albuquerque Particle Accelerator Incident*; Annual Meeting of the Health Physics Society; Denver, Colorado; June 2000.
- *Radiological Control and Response to a Terrorist Attack*; Antiterrorism Conference, sponsored by Sandia National Laboratories; Albuquerque, New Mexico; October 2002.
- *Security of Radioactive Materials in the United States of America*; IRPA-11 Congress; International Radiation Protection Association; Madrid, Spain; May 2004.
- *Instrument Sensitivities for Gamma Radiation Surveys*; Midyear Meeting of the Health Physics Society, Scottsdale, Arizona; January 2006.
- *Proposed 1999 Amendment Of The 1990 Radiation Exposure Compensation Act*; Thomas Edison State College; June 1999.
- *Regulatory Requirements Pertinent to Portable Nuclear Gauges, New Mexico Edition*; Copyright © 2006, Trinitek Services, LC; Sandia Park, New Mexico.

- *New Mexico Register*, publication of amendments to Chapter 3 entitled *Radiation Protection*, of Title 20 entitled *Environmental Protection*, of the New Mexico Administrative Code (NMAC); Santa Fe, New Mexico; June 1999, April 2002, March 2004.
- *Topical Report – Options for Disposal and Reapplication of Depleted Uranium Hexafluoride*, 3TKS-TR-08/2008; Copyright © 2008, Trinitek Services, Inc.; Sandia Park, New Mexico.
- *2008 Distinguished Public Service Award — Pete V. Domenici*, Health Physics Society Journal, Volume 95, Number 6, December 2008.
- *Options for Disposal and Reapplication of Depleted Uranium Hexafluoride*; Waste Management Symposium; Phoenix, Arizona; March, 2009.
- Landsberger, S., S. Fitch and K. Dayman, "An Assay of Uranium Ore with Compton-Suppressed Gamma Spectroscopy", Trans. ANS, 102, 181-182 (2010).

TRAINING

Following is a partial list of pertinent courses related to NRC and DOE that Mr. Fitch has completed pursuant to his career:

<u>Year</u>	<u>Course Name and Topic(s)</u>
1988	Department of Energy (DOE) Radiological Control Technician (160 hours college equivalent)
1995	DOE Radiological Control Technician (200 hours college equivalent) Sandia National Laboratories
1998	Gamma Irradiator Radiation Safety (8 hours) MDS Nordion, Inc., sponsored by Ethicon Endo-Surgery Albuquerque, New Mexico
1998	Advanced Transportation of Radioactive Materials (40 hours) [Equivalent to NRC course H-308] United States Department of Energy Albuquerque Training Center
1998	Inspection Techniques for Radioactive Material Regulators (40 hours) ProTechnics Incorporated (vendor) Sponsored by New Mexico Environment Department Albuquerque, New Mexico
1999	Diagnostic and Therapeutic Nuclear Medicine Course H-304 (40 hours) United States Nuclear Regulatory Commission Houston, Texas
1999	Industrial Radiography H-305 (40 hours) United States Nuclear Regulatory Commission Niantic, Connecticut
1999	Well Logging H-314 (40 hours) United States Nuclear Regulatory Commission Houston, Texas

- 2000 Inspection Procedures G-108 (40 hours)
 United States Nuclear Regulatory Commission
 Chattanooga, Tennessee
- 2000 Inspecting for Performance – Materials Version
 G-304 (40 hours)
 United States Nuclear Regulatory Commission
 Orlando, Florida
- 2006 Increased Controls S-201 (40 hours)
 United States Nuclear Regulatory Commission
 Taught at Sandia National Laboratories
 Albuquerque, New Mexico

Alternate Project Manager
Trinitek management support
Gloria E Chavez, Ph.D.
Technical Lead: Environmental Monitoring, Rad Waste

Current Employment: President, Trinitek Services

Capabilities: Practicing in the radiation health physics profession for 40 years as a researcher, manager, technical staff member. International Programs, Radiation Safety, Risk Assessment, Regulations: NRC, Agreement States, DOE, environmental programs and monitoring, emergency management, radioactive waste, nuclear material management, security VA & systems analysis, nuclear quality assurance

President: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants

Education / Credentials

Ph.D. Environmental Health Physics

❖ Colorado State U, Dept of Radiology & Radiation Biology

MS Health Physics

❖ Colorado State U, Dept of Radiology & Radiation Biology

BS Biology /Chemistry

❖ University of NM

Additional training: RCRA, NQA-1, DOT, Radioactive waste, International Program management, radioactive waste, safety, environmental laws, statistics, nuclear QA

Experience Summary: Over 40 years experience in radiation safety and environmental programs working in industry, USDOE National Laboratories (Sandia National Laboratories, Idaho National Laboratory), uranium mill tailings remediation, education and training. Experience in a broad range of health physics and nuclear work areas including: nuclear materials management, transportation, radioactive waste operations, radiation safety and related environmental health and safety compliance programs, nuclear quality assurance, emergency response, program/project management, international programs, systems analysis, nuclear regulatory development, security assessments, education and training. Work for industrial clients, NRC Agreement State, Department of Energy, Department of State, Department of Interior, Department of Justice.

Work experience at Uranium Mill Tailings Remediation Action (UMTRA) projects (1973-1974), the Idaho National Engineering Laboratory, the Nevada Test Site (NTS), Tonopah Test Range, NV and Sandia National Laboratories, Albuquerque, and commercial clients, various locations.

Experience in managing technical, complex, multidisciplinary, multimillion dollar projects/programs and teams, program developer, educator and trainer. Experience in finding solutions to complex technical and management problems. Experience in public speaking media relations, and public hearings and testimony.

- Employed as a scientist for 29 years at Sandia National Laboratories (1979-2008)
- 20-years Radiation Technical Advisor on the New Mexico Radiation Technical Advisory Council (1983 to 2003)
- Adjunct Professor at the University of New Mexico (nuclear engineering department: taught "radiation protection engineering" graduate course; helped set up health physics program)
- Adjunct Professor at the University of New Mexico (civil engineering department: developed and taught "radioactive and mixed waste management" course series) DOE distance learning program)
- Southwest Indian Polytechnic Institute, volunteer professor: "Biology and scientific methodology" for three years.
- Participant on DOE health physics and radioactive waste grant and fellowship selection committees for several years late 1980s to mid-'90's

- Appointed by five NM Governors to the NM Radiation Technical Advisory (1983–2003)
- AEC Fellowship (converted to ERDA, then DOE): Ph.D. Program
- US Public Health Service Training grant: MS in Health Physics, 1973

Management – Current experience “growing” and managing a small woman-owned business as well as extensive prior experience managing small to large and complex international multidisciplinary technical and business teams.

Regulatory- Currently manage a regulatory compliance company focusing on environmental and nuclear areas. Worked at Sandia National Labs (SNL) as an ES&H Coordinator for the ES&H, security, logistics, and facilities VP ensuring regulatory requirements were transmitted, implemented, and compliance assessed for the division of 1000 people. As a New Mexico Governor(s) appointee for 20 years (5-year appointments) to the Radiation Protection Advisory Council (RTAC) participated in numerous public meetings to review radiation protection regulations and ensure compatibility with NRC regulations. Helped write and promulgate regulations on NORM and medical radiation. Participated in enforcement meetings related to NRC Agreement State regulatory compliance. Provided testimony at public meetings on radiation safety issues. Participated in public meetings as Vice-Chair of the RTAC to review WIPP transportation route discussions, public concerns and issues, listening to public testimony and making recommendations. Provided technical support in emergency response to the state of New Mexico in the Co-60 rebar incident.

Nuclear Facility Supervisor – Responsible for nuclear material accountability and control for up to special nuclear material (SNM), and Classified (various levels) for a USDOE SNL non-reactor nuclear facility used for storage of radioactive waste materials. Preparation of USDOE Nuclear Facility Risk Assessment Documents (SAR, FSAR), annual updates, USQs (unreviewed safety questions), Formality of Operations, and all other documents necessary for a compliant nuclear facility per DOE STD 3009-94 and DOE ORDER 420.1, DOE Guide 414.1-2, responding to USDOE review comments and ensuring operational readiness. Member of USDOE EFCOG, Safety Analysis subgroup.

Senior Science Advisor – To the U.S. Department of State (one of five advisors in the USA) on non-proliferation programs (ISTC, STCU, special assignments) in the Former Soviet Union states. Travel to Russia, Kazakhstan, Ukraine.

USDOE Initiatives for Proliferation Prevention (IPP) Program Manager – Over 20 complex, multi-million dollar technical projects involving many Russian nuclear cities, Russian senior technical staff, US senior technical staff, US industry partners; travel to Moscow, Siberia, Troitsk, Ekatarinburg and nuclear facilities. Successes included receiving an R&D 100 Award in 2006 and the establishment of successful commercialization joint ventures between US companies and Russian institutes creating a medical device manufacturing facility in Snezhinsk, an optical laser complex near Troitsk, and a high temperature battery manufacturing capability near Moscow to the mutual benefit of the US companies and Russian former weapon scientists.

Emergency Response Environmental Duty Officer – While at Sandia National Laboratories, responsible for decisions and actions related to environment, safety and health on behalf of Sandia in emergencies.

Radioactive Waste – Worked in Radioactive Waste operations at SNL from 1979 as project leader, later technical manager, and returning as a Waste certification Official over a 20-year time frame. Was on DOE LLW teams to develop policy. Taught university classes on radioactive, LLW and mixed waste. Wrote NORM regulations for New Mexico. Also worked in

TSCA, RCRA and other areas. Sandia National Laboratories Mixed Waste and TSCA Program manager

Research – Radiologic characterization of a radioactive/mixed waste disposal site at SNL. Modeling the atmospheric releases (submicron radioactive aerosols) from a fuel processing facility in Idaho (National Reactor Testing Station, now the INEEL).

Environment, Safety and Health (ES&H) – Worked in environmental programs at Sandia National Laboratories (SNL) for over 20 years including. As Environmental Program Manager developed, managed and expanded SNLs environmental programs, performed environmental remediation assessments for radioactive waste disposal sites. Worked as TSCA (PCBs)Project Leader, Technical Manager for radioactive and mixed waste facilities and Radioactive waste operations: designed, developed, implemented radioactive waste operations program, Radiation Measurements Project Leader (Dosimetry manager); set up environmental Dosimetry program; managed personnel Dosimetry program and supported underground testing radiation measurements. As Environmental , Safety And Health Division Technical Manager and coordinator reporting to the Vice-President for ES&H, responsible for ensuring SNL ES&H operations were complete and effective, implementing new requirements lab-wide, Conducting management compliance assessments for all ES&H programs including RCRA, OSHA, CWA, CAA,

Nuclear Facility Training Manager – Responsible for development and implementation of a training and qualification program for nuclear facility supervisors, material handlers and staff including development of scenarios for emergency response evaluations in the event of a criticality or other incident, meeting USDOE Order requirements.

Nuclear QA Program Manager – Responsible for setting up and implementing nuclear quality assurance (QA) program for critical processes, supporting nuclear facilities, radioactive waste certification. 10CFR 830.120, subpart A.

NQA-1 Certified Lead Auditor – Conducted numerous audits of radioactive/mixed waste treatment and disposal facilities, radioactive waste container suppliers; developed supplier qualification program, later implemented by SNL's supplier program. Ensured SNL waste certification program met requirements for NTS (Nevada Test Site) WAC (Waste acceptance Criteria). Selected as NTS Waste-Certification Official (WCO) Working Group Chair.

Project Leader and Systems Analyst – For SNL and U.S. Department of Justice, a successful Community Security Systems Assessment Methodology (CVAM), in use throughout USA. Developed a "Train-the-Trainer" curriculum. Managed this multidisciplinary team consisting of senior technical staff, weapons experts (former Navy Seals, special forces, state police, security forces) resulting in a copyrighted training program producing royalties. Developed and implemented a training program for the methodology. Conducted security systems assessments for Department of Interior (Water systems, dams), National Park Service (icons including Washington monument, Mount Rushmore, St Louis Arch), communities, U.S. Marshall, and State of New Mexico.

Security Systems Assessments Team Leader – For US Department of Justice and U.S. Department of Interior, evaluations of critical infrastructure systems including dams, water systems, facilities.

Project/Program Manager – Experience managing multidisciplinary technical, international, complex teams on multimillion dollar projects and programs.

Security Clearance – Held Q-Clearance (W) from 1979 to 2007.

Trainer/Educator – Curriculum development and instructor on radiation safety, integrated safety analysis, hazard assessments, radioactive waste, QA, supplier qualifications, and security systems analysis.

EMPLOYMENT SUMMARY

Trinitek Services, Inc. Experience (2007 to Present)

- President, Trinitek Services, Inc., a woman-owned small business offering environmental and nuclear safety consulting. Responsible for management of day-to-day operations, marketing and business development.
- Technical contributor to client projects including uranium ion exchange processes.
- Development of Environmental Report structure for uranium deconversion facility as part of permitting process.
- Sampling and Analysis Plan for radionuclide characterization in sediments
- Radiological characterization of Sediments in rivers and tributaries
- Radiation Health Effects listener for public meetings with tribes
- Comprehensive Radiation Safety Training for EAEA (Egyptian Atomic Energy Authority) under MOU with New Mexico Tech U, US DOE funding.

Sandia National Laboratory Experience (1979 to 2008)

International Programs: 2003-2008

- Senior Science Advisor to the Department of State (one of five in the USA) on non-proliferation programs (ISTC, STCU, special assignments) in the Former Soviet Union States (travel to Russia, Ukraine, Kazakhstan institutes including Stepnogorsk).
- USDOE Initiatives for Proliferation Prevention (IPP) Program Manager (Over 20 complex, multi-million dollar technical projects involving many Russian nuclear cities, Russian senior technical staff, US senior technical staff, US industry partners; travel to Moscow, Siberia, Troitsk, Ekatarinburg and nuclear facilities).
- Successes included receiving an R&D 100 Award in 2006 and the establishment of successful commercialization joint ventures between US companies and Russian institutes creating a medical device manufacturing facility in Snezhinsk, an optical laser complex near Troitsk, and a high temperature battery manufacturing capability near Moscow to the mutual benefit of the US companies and Russian former weapon scientists.

Security Systems and Consequence Analysis: 2002-2003

- Project Leader and Systems Analyst for Successful Department of Justice funded Community Security Systems Assessment Methodology, in use throughout USA, multidisciplinary team consisting of senior technical staff, weapons experts (former Navy Seals, special forces, state police, security forces) resulting in a copyrighted training program producing royalties. Developed and Implemented training program for methodology.
- Department of Interior Security Systems Assessments for critical Infrastructure Systems analyst team member.
- Project member for High level waste tanks clean-up process at Hanford supporting CH2M Hill efforts.

Nuclear Facilities: 2000-2002

- Nuclear facility supervisor responsible for nuclear material accountability and control for up to SNM, and Classified (various levels)
- Nuclear facility training manager responsible for development and implementation of training and qualification program for nuclear facility supervisors and staff including development of scenarios for emergency response evaluations in the event of a criticality or other incident.
- Preparation of Nuclear Facility Risk Assessment Documents (SAR, FSAR)
- Nuclear QA program manager set up QA program for critical processes
- Member of EFCOG Working Group on Safety systems

Radioactive Waste Certification, Nuclear Quality Assurance: 1986-1991

- NQA-1 certified lead auditor: conducted numerous audits of radioactive/mixed waste treatment and disposal facilities, radioactive waste container suppliers; developed supplier qualification program later implemented by SNL's supplier program
- DOT shipper for radioactive and hazardous materials (DOE/NRC)
- Waste certification official for radioactive waste disposed at NTS, and elsewhere.
- Chair of DOE Waste Certification Official Working Group, NTS
- Member of DOE Packaging and Management Council

Environmental Safety and Health (ES&H): 1991-1996

- Environmental , Safety And Health Division Technical Manager and coordinator reporting to the Vice-President for ES&H, responsible for ensuring SNL ES&H operations were complete and effective, implementing new requirements lab-wide
- Conducting management compliance assessments

Environmental Programs, TSCA-RCRA, Radioactive Waste Operations, Emergency Response 1984-1991

- Environmental program manager: managed and expanded SNL's environmental programs
- Radioactive waste disposal site characterization
- TSCA (PCBs) Project Leader
- Emergency Response Environmental Duty Officer for SNL responsible for decisions and actions on behalf of Sandia in emergencies
- Technical Manager for radioactive and mixed waste facilities and Radioactive waste operations: designed, developed, implemented program
- Depositions for EPA remediation action
- Prepared SNI's environmental monitoring reports for Albuquerque, Livermore, Tonopah, Kauai for 10 years.

Radiation Dosimetry, Environmental Monitoring 1979-1984

- Radiation Measurements Project Leader (Dosimetry manager); set up environmental Dosimetry program; managed personnel Dosimetry program and supported underground testing radiation measurements
- Environmental program manager: developed SNLs environmental programs

- Performed environmental remediation assessments for radioactive waste disposal sites

Miscellaneous (1973 to 1979)

- Uranium Mill Tailings Remediation Action Project, Grand Junction: Working Level measurements
- Fort St. Vrain fuel loading radiological assistance
- Field Research modeling atmospheric releases from fuel reprocessing facilities at INEL
- Characterization and assessment of highly radioactive test reactor leaching ponds at INEL

TECHNICAL RECOGNITION AND ACCOMPLISHMENTS

- 2010. Sandia National Laboratories, Licensed copyright award for Community Vulnerability Assessments Methodology
- 2010. Emeritus Status, Health Physics Society
- 2008. Selected as Health Physics Society Fellow, Pittsburgh, PA.
- 2007: Selected as a Sandia National Laboratory "Women's Hall of Fame Winner"
- 2006 R&D 100 Award winner (Chicago), Program manager and team leader for international, multidisciplinary engineering team. The 100 most significant, newly introduced research and development advances in multiple disciplines. Winning one of the R&D 100 Awards provides a mark of excellence known to industry, government, and academia as proof that the product is one of the most innovative ideas of the year, nationally and internationally.
- Invited speaker to ANS Winter meeting in New Orleans, 2006: Russian Nuclear cities
- 2004-2007 Member (representing SNL) of DOE ILAB nonproliferation laboratories committee
- 2004-2006 Selected as US Department of State Senior Science advisor in nonproliferation programs in FSU countries primarily for radiological, chemical and biological WMD scientists, traveling to Russia, Kazakhstan and Ukraine
- 2003-2004 Royalty stream for successful Systems Analysis Community Security Assessment Methodology for Department of Justice considering multiple terrorist factors and consequence analysis
- 2002-2003 Selected as Chair for the DOE Nevada Test Site Waste Certification Official (WCO) radioactive waste disposal Working Group
- Selected by HPS Directors as a USA Delegate to the International Radiation Protection Association (IRPA) Congresses: the 1996 Congress (Vienna, Austria), 2000 congress (Hiroshima, Japan), 2004 Congress (Madrid, Spain). Attended by 1500 scientists from 60 countries. As delegate, vote for new officers, new policies, future meeting sites, negotiate with other country delegates on issues.
- Invited speaker to Los Alamos Emergency Responder Symposium, 2003
- Member of the HPS Strategic Planning Committee, 2002 -2004
- Member of HPS International Committee 1997 to 2001.
- Elected to Board of Directors National Health Physics Society (1993 - 1996).
- Selected as Participant on DOE health physics and radioactive waste grant and fellowship selection committees for several years late 1980s to mid-'90's
- Member of HPS Publications Committee (1991 - 1993)
- Member and Chair of National Health Physics Society Technical Program Committee (1988 - 1991),
- Member and Chair of National Health Physics Society Technical Program Committee (1988 - 1991), Responsible for technical programs at Anaheim 1988 HPS meeting

(350 international, technical presenters and 2500 attendees), Albuquerque 1989 HPS annual meeting (2000+ attendees).

- City of Albuquerque Award for bringing in large convention, presented by Mayor
- WYCA Woman of the Year (Woman on the Move) in Science and Technology for New Mexico, 1989
- Appointed by several Governors of New Mexico as Member of Radiation Technical Advisory Council (RTAC) (1985 - 1990; 1992 - 1996, and 1997 to 2002. Reappointed in 2003. Vice-Chairman of RTAC - 1990 - 1991.
- Member of Rio Grande Chapter HPS Public Information Committee (1983-1986), planned/assembled State Fair Booth, participated in various speaking activities
- 1989 Local Arrangements Committee Member Mid-Year HPS, Publicity Chair-Media.
- Publicity Chair for Albuquerque Mid-Year symposium 1983, hosted by the Rio Grande Chapter HPS President and Board Member for Rio Grande Chapter Health Physics Society (HPS) (1981 - 1983).
- Winner of Best Student Presentation, Health Physics Society Annual Meeting, Minneapolis, MN, 1978
- US DOE Fellowship 1976 - 1978
- US ERDA: Fellowship 1975-1976
- US AEC Fellowship 1974 -1975 at National Realtor Testing Station (NRTS, now INEEL)
- US Public Health Service Training Grant, 1973
- 1970 Nominated to Sigma Xi
- 1968 Several Scholarships to the University of New Mexico
- 1968 Awards for 4.0/4.0 Math in HS
- National Honor Society 1964-1968

PUBLIC SERVICE / VOLUNTEER

- 2011 –present Member of Hug-Li's: make dolls for children with terminal illnesses in hospice
- 2009-2011 Member of the National Adoption Exchange Board of Directors
- 2009-2011 Chairman of the New Mexico Adoption Exchange Advisory Board
- 2007-2011 Member of the New Mexico Adoption Exchange Advisory Board, a non-profit national organization finding adoptive homes for hard-to-place kids (teens, sibling groups, medical)
- 2006- present Adoption Spokesman for the Adoption Exchange and New Mexico Children Youth and Family Department (NM CYFD)
- 2006-2007 Women in Philanthropy
- 2004-2005 Treatment Foster Parent
- 2000-2002 Founding Member of East Mountain Charter High School Governing Board, groundbreaking, fundraising, selection of new principal for highly acclaimed new H.S.
- Three-year volunteer instructor at SIPI (Southwest Indian Polytechnic Institute)
- Volunteer for MANOS teaching minority HS kids radiation physics in workshops
- Long-term member of the Sandia Labs Hispanic Council and minority organizations 1997 -1998. Member of Women's Art Group.
- Planned and implemented Sandia's 1996 Hispanic Heritage Month Activities.
- 1990 - 1997. Member of Sandia National Labs' Hispanic Leadership and Outreach committee. Volunteer speaker, mentor, career fairs etc., for numerous minority education and public science education programs.

- 1995 - 1998. Elected to Board of Directors of the Friends of the Rio Grande Botanic Garden, the newest Botanic Garden in the USA, fundraising and design input, Secretary and Publicity Chair.
- 1989-1996 Member of Albuquerque Council for International Visitors, greeting/ hosting in home visits State Department Dignitaries (and translator) as requested, including: Minister of Justice from Turkey, Past-President of Ban's Birth from Chile, South America, President of the Montenegro-Helsinki Peace Accord from Montenegro, Educator from South Africa in charge of developing new integrated school system since the cessation of apartheid
- Selected as member of women's art group: public art focus 1994
- 1984 - 1994. Member of Sandia's Volunteers in Action Committee
- 1988 - 1995. Docent for New Mexico Natural History Museum
- 1988-1995 Docent for Rio Grande Nature Center V leading interpretive walks and providing training for other docents in ecological/environmental areas
- 1985-1988 Secretary for the Ranchos de Placitas Architectural Committee, review and approve designs of new homes in the community to ensure covenants adhered to, water supplies adequate, design consistent with passive solar design for homes from \$250K +
- 1983-1989 Member of Rio Grande Chapter of the Health Physics Society: public information committee (planned/assembled State Fair Booth, participated in various speaking activities), past president and board member
- 1984 - 1994. Member of Sandia's Volunteers in Action Committee

Other Experience

Designed and built a very effective passive solar home (4000 SF area), plus extensive landscaping and courtyard design to fit into environment, efficiently collect and store solar energy for heat. Design included complex curves and varying, complex roof and wall lines, greenhouse additions, clerestory windows, insulation specifications. Tasks included designing and writing specifications, doing preliminary architectural renderings, calculating beam loading and roofing specifications, cost estimating, scheduling, conducting property survey for drainage and foundation, purchasing construction materials, laying and pouring foundation, building adobe walls, sheet-rocking, interior finishing, laying and cutting flagstone floors and walls, laying complex brick floors, welding gate (over 400 welds), selecting and daily oversight of subcontractors for electrical, plumbing, and framing to specifications meeting designated codes. Completed house stayed at no less than 60 degrees F for two winters until supplemental heating was installed. Design was copied by many contractors due to attractive design.

Designed radioactive and mixed waste packaging, management, storage facility at Sandia National Labs for Low-level, mixed waste including nuclear material and classified waste. Project oversight for construction with AE.

PUBLICATIONS, PRESENTATIONS, AND TRAINING

- Publications, presentations, training in numerous areas including health physics, environmental health physics radioactive waste management, nuclear quality assurance, radioactive material packaging, international programs, Russian decontamination technologies for high level waste, emergency management, systems analysis methodologies for critical infrastructure protection.

- Presentations at HPS, DOE National Packing Council (QA – 2001 Seattle, WA), ANS invited speaker (2005, New Orleans – radioactive waste decontamination technologies partnering with Russians at MCC, Zheleznogorsk, Siberia)
- IRPA-Madrid, Spain (2004), international radioactive waste technologies.
- Invited Co-speaker with Senator Domenici on non-proliferation programs (2006) at the National Atomic Museum, Albuquerque, NM.
- 2003, National Response team presentations at LANL and at SNL on systems analysis and consequence assessments.

Additional Experience as an Educator/Trainer

- 2011. Radiation Safety Basics. Private client
- 2010. Developed and conducted an extensive Comprehensive Radiation Safety and Source Recovery Training for 15 Egyptian Atomic Energy Authority Staff, under contract to New Mexico Tech U, funded by US DOE
- 2009 and 2010. Developed a series of course curriculums for radiation safety professionals, Trinitek Services, Inc. under an MOU with New Mexico Tech (New Mexico Institute of Mining and Technology).
- 2003. Project Leader and Course Developer for community vulnerability assessment methodology and train-the-trainer course, Sandia National Laboratories (funded by the Department of Justice).
- 2001 through 2003. As Nuclear Facility Training Supervisor at Sandia National Laboratories, developed and implemented the training curriculum and qualification process for nuclear facility management, operations staff and material handlers.
- 1994. Technical Advisor and Lead Presenter for University of New Mexico College of Engineering Waste Energy Research Consortium (WERC), Mixed Waste Program Series, a graduate distance learning program for university credit. Developed Concept for the six-week program covering regulations, sources, waste management options for radioactive mixed waste, Selected Program Leaders, speakers and coordinated series. Televised to 170 receptor sites from Alaska to Washington, DC. Translated into Spanish and Russian.
- 1993. WERC Teleconference Presentation, on Mixed Waste (part of Low Level Waste series), 70 receptor sites in USA.
- 1993. Guest Lecturer on Mixed Waste, UNM Graduate Hazardous Waste Seminar, Civil Engineering Seminar Series.
- 1992. Adjunct Professor UNM, Nuclear Engineering Dept. "Radiation Safety Engineering", Graduate Course. Televised to University locations across USA as part of distance learning programs.
- 1991 and 1993. Trainer on Radiation Safety, International Safeguards, for International Safeguards Agencies, sponsored by Sandia National Laboratories.
- 1990 and 1991. Faculty for Executive Enterprises Mixed Waste Seminars, Presentation and Publication at Seattle, WA; Washington, D.C.; and Albuquerque, NM.
- 1989-1991 and 1997-1998. Instructor at the Southwest Polytechnic Indian Institute, Albuquerque, NM.
- 1982-1987. Faculty for Radiation Protection Technologists.
- 1982. Instructor for SNL Legal Staff, Radiation Effects, Pleasanton, CA.

PROFESSIONAL AFFILIATIONS

Current

Health Physics Society; Fellow; Emeritus Member, Plenary member since 1979

Rio Grande Chapter membership
The Institute of Nuclear Material Management (INMM)
Local chapter Membership
American Society of Safety Engineers
Professional and the Latino Workforce
Local chapter membership

Former

- International Radiation Protection Association (IRPA) Congress, selected as USA Delegate to the 1996 Congress (Vienna, Austria)
- IRPA Delegate to 2000 Congress (Hiroshima, Japan),
- IRPA Delegate 2004 Congress (Madrid, Spain).
- Past Member of the American Nuclear Society
- SACNAS Spanish American Chicano Native American Society for Engineers and Scientists
- WES Women in Engineering Society
- MAES Mexican American Engineering Society
- Eastern Idaho Chapter of HPS (1975–1978)

BUSINESS MEMBERSHIPS

- Member of the Albuquerque Hispano Chamber of Commerce (AHCC) International Committee
- Albuquerque Hispano Chamber Of Commerce (AHCC) Member (Trinitek Services)
- Better Business Bureau Member (Trinitek Services)
- Procurements Technical Assistance Program (PTAP)

Uranium Study Technical Lead	Francis X. Cameron, J.D.
Technical Lead: NEPA, facilitation Current Employment: principal with the Zero Gravity Group Capabilities: NEPA, environmental law, uranium fuel cycle regulatory issues, facilitation public regulatory hearings/meetings, public out-reach, rulemaking, US NRC rule-making, Agreement States issues, over 40 years experience with senior NRC and other federal, state and tribal agencies	Senior Consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials J.D. ❖ University of Pittsburgh M.M.A., Natural Resources ❖ University of Rhode Island B.A., Political Science & International Affairs ❖ University of Pittsburgh Additional training: environmental law

SUMMARY OF PROFESSIONAL EXPERIENCE

REPRESENTATIVE PROJECTS

Convening And Facilitation Of Collaborative And Consensus Building Processes

Consultant to the International Atomic Energy Agency on the development of the Draft Safety Guide on Transparency, Openness, and Public involvement (2011).

The nature and scope of the performance assessment for the disposal of depleted uranium in Utah (Department of Environmental Quality, State of Utah, 2010)

The development of the technical basis for the NRC rulemaking on the licensing and oversight of reprocessing facilities (U.S. Nuclear Regulatory Commission, 2010 - 2011)

Negotiated rulemaking on program integrity issues (Department of Education, 2010)

The development of the criteria for site-specific performance assessments for the disposal of depleted uranium (U.S. Nuclear Regulatory Commission, 2009)

Negotiated rulemaking on the federal student loans programs, TRIO and GEAR UP (Department of Education, 2009)

The development of NRC policy on the blending of low-level radioactive waste (U.S. Nuclear Regulatory Commission, 2010)

Development of the 2009 research agenda, National Invasive Species Advisory Committee (DOI, 2008)

Workshop for Tribal leaders on radioactive waste transportation and disposal (U.S. Nuclear Regulatory Commission, 2006)

Facilitation of workshops to develop a client-based research strategy for the Water Environment Research Foundation (2006)

Facilitation of the development of the vision and guiding principles for the design of a new science and engineering complex (George Washington University, 2008)

Facilitation of the meetings of the Interagency Task Force on the Security of Radioactive Devices (Interagency Task Force, 2006 -2010)

Public Outreach

Facilitation of public meetings on the environmental review for all proposed new reactor sites (U.S.Nuclear Regulatory Commission, 2004 through 2010)

Facilitation of the public meeting on the environmental review on the license renewal for the Diablo Canyon nuclear power plant in San Luis Obispo, CA (NRC, 2010)

Facilitation of the public meetings on the Generic Environmental Impact Statement on the licensing of uranium recovery facilities (NRC, 2009)

Design and facilitation of small group stakeholders meeting on the proposed new reactor for the North Anna site, North Anna VA (NRC, 2007)

Facilitation of the public outreach meeting for the Nuclear Fuels Service site in Erwin, TN public outreach meeting (NRC, Region II, 2009)

Facilitation Of Management Retreats

Chairman Jaczko and NRC office directors on teamwork and communication (NRC, Office of the Chairman, 2010)

Strategic planning session for the Board of Directors and Advisory Committee of Waste Management Symposia on the program tracks and leadership succession (2010)

Senior Leadership Meeting for NRC office directors on establishing an open and collaborative work environment (Executive Director for Operations, NRC, 2009)

Members and staff of the NRC Advisory Committee on Reactor Safeguards on revisions to program reviews (Advisory Committee on Reactor Safeguards, 2009)

Communications workshop for the staff of the Department of Energy and the New York State Energy and Development Administration (DOE, 2006)

Training

Instructor, Facilitation Training Program (U.S. Nuclear Regulatory Commission, 2011)

Instructor, "Implications for Agency Project Managers from Recent Judicial Decisions" Duke University, Environmental Leadership Program, Nicholas School of the Environment (2011)

Curriculum design and Instructor, "Public Participation Strategies for the NEPA Process", for environmental project managers, Duke University, Environmental Leadership Program, Nicholas School of the Environment (2010)

Curriculum design and Instructor, "The Law of the National Environmental Policy Act" for NRC project managers, Duke University, Nicholas School of the Environment (2009)

Instructor, "Cumulative Impacts Analysis, Climate Change", for environmental project managers, Duke University, Nicholas School of the Environment (2010)

EMPLOYMENT HISTORY

President, The Zero Gravity Group LLC (2008 to present)

Assistant General Counsel, Office of the General Counsel, U. S Nuclear Regulatory Commission, Senior Executive Service (2006 to 2008)

Alternative Dispute Resolution Specialist and Special Counsel for Public Liaison, U. S. Nuclear Regulatory Commission (1991 to 2008)

Associate Professor (tenured), University of Rhode Island, environmental law and policy; Chair, University Curriculum Committee (1972 to 1980)

Uranium Study SME	Thomas Cardwell
SME: Agreement State-NRC Regulations for Radiation Protection	Regulatory Specialist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants
Current Employment: Trinitek Services, Inc.	Education / Credentials
Capabilities: Radiation Programs, uranium licensing, emergency management, compliance inspections	BS, Biology ❖ University of Texas

1981 - 1989 - Uranium Inspector- Texas Bureau of Radiation Control

In 1981 Texas signed the Low Level Waste and Uranium Mining and Milling Agreement with the Nuclear Regulatory Commission (NRC). I was assigned to a working group to draft the Texas Regulations for Uranium Mining and Milling. Our task was to review the NRC uranium regulations and draft the Texas uranium regulations. We reviewed the Texas Statutes and drafted the first Texas uranium regulations with consideration for the various NRC compatibility issues. The regulations were approved by NRC and adopted into the Texas Regulations for Control of Radiation.

My responsibilities as an inspector were to inspect conventional strip mines, heap leach operations, and in-situ mines for compliance with regulations and license conditions. This included worker safety requirements, general public safety, environmental monitoring requirements, and tailings impoundment monitoring requirements. I was responsible for responding to incidents such as spills and remediation of spills.

I was assigned to committees to review all new uranium mining licenses and major amendments. This included reviewing requirements for monitoring internal and external exposures to workers, establishing environmental monitoring locations for air, water and soil samples and intervals of sampling, monitoring of tailings impoundments and waste water retention ponds at in-situ facilities. We also reviewed facility plans and made recommendations for plant processes for controlling contamination in and around the facilities. I was responsible for reviewing requests for releasing buildings, land and equipment for unrestricted use and uranium license termination. This included review of licensees' survey results, planning agency confirmatory surveys, supervising survey teams, and recommending license termination.

1989 - 1997 -- Incident Investigator - Texas Bureau of Radiation Control

My duties included investigating incidents involving radioactive materials and radiation machines, including incidents from uranium operations. I investigated incidents at uranium facilities such as high bioassay results for workers and reports of spills of lixiviates from the mining processes. The investigations included performing timeline and root cause analyses. I reviewed licensees' reports and the procedures to prevent recurrences of the incidents. Many of the spills were in unrestricted areas and the responsibilities included overseeing the clean-up and release of the affected areas.

1997 - 2009 - supervisor- Texas Radiation Control Program

My duties during this time period were as supervisor of the X-ray Inspection Branch from 1997 - 2004. The responsibilities included setting staffing patterns, setting workloads, setting and monitoring budget, monitoring work performance, hiring, and disciplinary actions.

During 2004 - 2009, my duties were as Inspection Program Supervisor. These duties included supervision of the Radioactive Material Inspections Program, Incident Investigation Program, Mammography Inspection Program and the X-ray Inspection Program. The responsibilities included supervising four first level managers, reviewing workload and staffing patterns, resolving employee issues, finalizing budgets for the various programs, monitoring workloads, and setting policies.

Uranium Study SME	Nicholas S. Fisher, Ph.D.
SME: Senior Aquatic Scientist Current Employment Distinguished Professor, Marine Sciences Research Center State University of New York, Stony Brook, NY; & Director, Consortium for Inter-Disciplinary Environmental Research Stony Brook University Capabilities: Marine, estuaries, freshwater, toxicity, radionuclide uptake, biogeochemistry of metals in aquatic systems; contaminant-biota interactions; aquatic radioecology; aquatic pollution management strategies; aquatic toxicology.	Uranium Regulations consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials Ph.D. Marine Biology ❖ State University of New York, Stony Brook B.A. Biology, Brandeis University ❖ Waltham, Massachusetts
Positions Held: 2011 Visiting Scientist, Harvard University 2006 - present Director, Consortium for Inter-Disciplinary Environmental Research, Stony Brook University 2005 - present Distinguished Professor, Marine Sciences Research Center, Stony Brook University 1991 - 2005 Professor, Marine Sciences Research Center, Stony Brook University 1998 - 2003 Associate Dean, Marine Sciences Research Center, Stony Brook University 1988 - 1991 Associate Professor, Marine Sciences Research Center, Stony Brook University 1985 - 1987 Oceanographer, Brookhaven National Laboratory, Upton, New York. 1980 - 1985 Research Scientist, International Laboratory of Marine Radioactivity, International Atomic Energy Agency, Monaco. 1977 - 1980 Senior Research Scientist, Marine Studies Group, Ministry for Conservation, Melbourne, Australia. 1974 - 1977 Postdoctoral Investigator, Chemistry Department, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts. Awards/Distinctions: 1985 - Appointed as Marine Ecologist, Ecology Institute (Honorary Institute) Oldendorf-Luhe, Germany 1992 - Who's Who in America; Who's Who in the East, Who's Who in the World 2001 - 2007 Elected Chair, Marine Biogeochemistry Committee, International Commission for the Scientific Exploration of the Mediterranean (CIESM) 2004 - 2005 John Simon Guggenheim Memorial Fellowship 2005 Awarded State University of New York Distinguished Professorship 2006 Graduate School Dean's Award for Excellence in Graduate Mentoring Member: 1983 - present American Men and Women in Science 1975 - present American Society of Limnology and Oceanography 1974 - 1995 American Phycological Society 1996 - present Society of Environmental Toxicology and Chemistry Advisory Activities: 1976 Advisory Panel to New York State Attorney General on PCBs in the environment 1983 - 1985 GESAMP Working Group on the Interchange of Pollutants between the Atmosphere and the Oceans 1984 - present Editorial Advisory Board, Marine Ecology Progress Series 1988 NSF Ocean Chemistry Review Panel 1989 New York State Sea Grant Review Panel	

1990 NOAA National Status & Trends Review Panel
1990 NOAA Coastal Oceans Program Toxic Substances Review Panel
1991 New York Bight and Hudson Estuary Programs Toxic Substances Review Panel
1992 - 2000 International Union of Pure and Applied Chemistry Commission on Environmental Analytical Chemistry
1993 - present Editorial Board, Marine Environmental Research
1997 - 1998 COASTES Advisory Panel
2003 New Hampshire Sea Grant Review Panel
2003 - present IAEA Coordinated Research Group on the Bioaccumulation of Radionuclides
2003 - present Expert Advisor for US Arctic Monitoring and Assessment Program
2005 - present External Advisory Committee, Center for Environmental Health Sciences, Dartmouth College
2007 - present Steering Committee, University of Haifa's School of Marine Sciences, Haifa, Israel
*External Advisory Committee review of Dartmouth College's Center for Environmental Health Sciences. Hanover, NH, October, 2011.

Consultant for numerous organizations including:

U.S. Environmental Protection Agency; Brookhaven National Laboratory; International Atomic Energy Agency; National Association of Photographic Manufacturers; New York City Office of Management and Budget; Risø National Laboratory, Roskilde, Denmark; National Environmental Law Center; New York State Department of State; Fisher Island Conservancy; Applied Biomathematics; Hong Kong University of Science and Technology; Northeast Utilities; US District Court Maine (appointed Special Master of the Court) University and departmental service (select activities): Director, Stony Brook University's Consortium for Inter-Disciplinary Environmental Research (CIDER, 2006-); MSRC Colloquium coordinator (3 years); Distinguished Visiting Scholar Committee (chair, 4 years); Radiation Safety Officer;

Convenor of workshops (recent, and relevant)

*University of Wisconsin, Milwaukee. Presented a seminar on "Finding patterns of metal-biota interactions in the sea." Milwaukee, November, 2011.

Society of Environmental Toxicology and Chemistry, 32nd Annual Meeting. Presented "Geochemical and biological factors allow better understanding of sedimentary As, Cd and uptake in a deposit-feeding polychaete *Nereis succinea*" (with Z. Baumann). Boston, November, 2011.

*Harvard University School of Public Health. Presented a seminar on "The application of a model to assess the bioaccumulation of metals in aquatic animals and their trophic transfer in aquatic ecosystems." Boston, December 2011.

*Workshop on Fukushima radioactivity in the Pacific. Presented a paper on "Fukushima-derived radionuclides in Pacific biota." Salt Lake City, February, 2012.

ASLO 2012. Presented "Bioaccumulation by zooplankton and micronektonic fish of Fukushima released cesium and silver radioisotopes in Japanese coastal waters" (with Z. Baumann);

"Impacts of the Fukushima Dai-ichi nuclear power plants on the ocean" (with K. Buesseler);

"Trends in community structure of zooplankton and micronekton from waters nearby Fukushima and their relation to bioaccumulated cesium radionuclide" (with J. Nishikawa). Salt Lake City, February, 2012.

*NOAA Headquarters. Presented "Fukushima-derived radionuclides in Pacific biota." Silver Spring, MD, March, 2012.

*SERDP & ESTCP Workshop on Research and Development Needs for Understanding and Assessing the Bioavailability of Contaminants in Soils and Sediments. Presented

"Bioaccumulation of metals in sediment-dwelling animals." Annapolis, August, 2008.

Society of Environmental Toxicology and Chemistry, 29th Annual Meeting. Presented "Assessing the bioaccumulation of metals in killifish (*Fundulus heteroclitus*), a bioindicator

organism.” (with J. Dutton). Tampa, November, 2008.

*SERDP & ESTCP's Partners in Environmental Technology Technical Symposium & Workshop. Presented “Factors affecting metal bioaccumulation in marine organisms,” and *SETAC Workshop on Ecological Assessment of Selenium in the Aquatic Environment. Pensacola, FL, February 2009.

*Interdisciplinary Progress in Environmental Science and Management. Presented keynote speech on “Interdisciplinary approaches for addressing marine contamination issues.” Newcastle-upon-Tyne, UK, July, 2011.

10th International Conference on Mercury as a Global Pollutant. Presented a seminar on “Dissolved organic matter, regardless of origin, limits algal accumulation of methylmercury” (with A. Luengen), and “Trends in mercury concentrations in US commercial fish, a research synthesis” (with R. Karimi). Halifax, Nova Scotia, July 2011.

Extensive additional workshops, invited speaker internationally and nationally

PUBLICATIONS (examples of recent, relevant)

Dutton, J., and N.S. Fisher. 2011. Salinity effects on the bioavailability of aqueous metals for the estuarine killifish *Fundulus heteroclitus*. **Environmental Toxicology and Chemistry** 30: 2107-2114.

Fisher, N.S., and K.O. Buesseler. 2011. Tracking Fukushima radionuclides: a research cruise in Japanese waters. **Bulletin of Atomic Scientists**
<http://www.thebulletin.org/web-edition/roundtables/fukushima-what-dont-we-know> .

Environmental Toxicology and Chemistry

Dutton, J., and N.S. Fisher. In press. Bioavailability of sediment-bound and algal metals to killifish (*Fundulus heteroclitus*). **Aquatic Biology**

Wang, W.-X., and N.S. Fisher. 1999. Delineating metal accumulation pathways for aquatic invertebrates. **Science of the Total Environment** 237/238: 459-472.

Cochran, J.K., S.B. Moran, N.S. Fisher, T.M. Beasley, and J.M. Kelley. 2000. Sources and transport of anthropogenic radionuclides in the Ob River system, Siberia. **Earth and Planetary Science Letters** 179: 125-137.

Fisher, N.S., and S.E. Hook. 2002. Toxicology tests with aquatic animals need to consider the trophic transfer of metals. **Toxicology** 181/182: 531-536.

Fisher, N.S. 2002. Considerations for a mussel-based monitoring program for radioactive contaminants in the Mediterranean Sea. In: Mediterranean Mussel Watch. Designing a Regional Program for Detecting Radionuclides and Trace Contaminants, F. Briand and N.S. Fisher (Eds.), CIESM Workshop Monograph No. 15, Monaco, pp. 59-62.

Fisher, N.S. 2002. Editor. Bioaccumulation of Metals and Radionuclides in Marine Organisms. CIESM Workshop Monograph No. 19, Monaco, 120 pp.

Wong, W.H., J.S. Levinton, B.S. Twining, and N.S. Fisher. 2003. Assimilation of micro- and mesozooplankton by zebra mussels: A demonstration of the food web link between zooplankton and benthic suspension feeders. **Limnology and Oceanography** 48: 308-312.

Stewart, G.M., and N.S. Fisher. 2003. Experimental studies on the accumulation of polonium-210 by marine phytoplankton. **Limnology and Oceanography** 48: 1193-1201.

Mylon, S.E., B.S. Twining, N.S. Fisher, and G. Benoit. 2003. Relating the speciation of Cd, Cu, and Pb in two Connecticut rivers with their uptake in algae. **Environmental Science and Technology** 37: 1261-1267.

Stewart, G.M., and N.S. Fisher. 2003. Bioaccumulation of polonium-210 in marine copepods. **Limnology and Oceanography** 48: 2011-2019.

Fowler, M. Peterson, and N.S. Fisher. 2004. 210Po and 210Pb concentrations, fluxes, particle settling velocities, and organic carbon at the DYFAMED site, Northwestern Mediterranean.

Griscom, S.B., and N.S. Fisher. 2004. Bioavailability of sediment-bound metals to marine bivalve molluscs: an overview. **Estuaries** 27: 826-838.

Fowler, S.W., and N.S. Fisher. 2004. Radionuclides in the biosphere. In: Radioactivity in the

- Environment, Vol. 6, Marine Radioactivity, H.D. Livingston (Ed.), Elsevier Science, Amsterdam, pp. 167-203.
- Rose, P.S., and N.S. Fisher. 2004. Medical radioisotopes entering the marine environment. In: Novel Chemical Contaminants and Pathogens In Coastal Waters, N.S. Fisher (Ed.), CIESM Workshop Monograph No. 26, Monaco, pp. 73-77.
- Campbell, P.G.C., S.J. Clearwater, P.B. Brown, N.S. Fisher, C. Hogstrand, G.R. Lopez, L.M. Mayer and J.S. Meyer. 2005. Digestive physiology, chemistry, and nutrition. In: Toxicity of Dietborne Metals to Aquatic Biota, J.S. Meyer, W.J. Adams, K.V. Brix, S.N. Luoma, D.R. Mount, W.A. Stubblefield, and C.M. Wood (Eds.), SETAC Press, Pensacola, FL, pp. 13-57.
- Fisher, N.S. 2007. Editor. Marine Sciences and Public Health—Some Major Issues. CIESM Workshop Monograph No. 31, Monaco, 128 pp.
- Mathews, T., and N.S. Fisher. 2007. Metal concentrations in Mediterranean fish tissues: exploring biomagnification patterns. **Rapp. Comm. Int. Mer Medit.** 38: 290.
- Stewart, G.M., S.W. Fowler, and N.S. Fisher. 2008. The bioaccumulation of U- and Th-series radionuclides in marine organisms. In: U-Th Series Nuclides in Aquatic Systems, S. Krishnaswami and J.K. Cochran (Eds.), Elsevier Science, Amsterdam, pp. 269-305.
- Baines, S.B., and N.S. Fisher. 2008. Modeling the effect of temperature on bioaccumulation of metals by a marine bioindicator organism, *Mytilus edulis*. **Environmental Science and Technology** 42: 3277-3282.
- Mathews, T., and N.S. Fisher. 2008. Evaluating the trophic transfer of cadmium, polonium, and methylmercury in an estuarine food chain. **Environmental Toxicology and Chemistry** 27: 1093-1101.
- Mathews, T., N.S. Fisher, R.A. Jeffree, and J.-L. Teyssié. 2008. Assimilation and retention of metals in teleost and elasmobranch fishes following dietary exposure. **Marine Ecology Progress Series** 360: 1-12.
- Mathews, T., and N.S. Fisher. 2008. Trophic transfer of seven trace metals in a four-step marine food chain. **Marine Ecology Progress Series** 367: 23-33.
- Chen, C., A. Amirbahman, N.S. Fisher, G. Harding, C. Lamborg, and D. Taylor. 2008. Methylmercury in marine ecosystems: spatial patterns and processes of production, bioaccumulation, and biomagnification. **EcoHealth** 5: 399-408.
- Stewart, A.R., M. Grosell, D. Buchwalter, N.S. Fisher, S.N. Luoma, T. Mathews, P. Orr, and W.-X. Wang. 2010. Bioaccumulation and trophic transfer of selenium. In: Ecological Assessment of Selenium in the Aquatic Environment, P.M. Chapman, W.J. Adams, M.L. Brooks, C.G. Delos, S.N. Luoma, W.A. Maher, H.M. Ohlendorf, T.S. Presser, and D.P. Shaw (Eds.), SETAC Press, Pensacola, FL, 93-139.
- Fisher, N.S., T. Mathews, and J. Dutton. 2010. Dietary sources dominate metal uptake in marine fish. **Rapp. Comm. Int. Mer Medit.** 39: 251.
- Karimi, R., N.S. Fisher, and C.L. Folt. 2010. Multielement stoichiometry in aquatic invertebrates: when growth dilution matters. **American Naturalist** 176: 699-709.
- Fisher, N.S., and C.Y. Chen. 2011. Interdisciplinary approaches for addressing marine contamination issues. **Environmental Conservation** 38: 187-198.

Uranium Study SME	William M. Floyd
SME: Regulations-NRC, Agreement States, Current Employment: Trinitek Services, Inc Capabilities: Program management-Agreement state	Regulatory consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials M.S. (Biology/Chemistry) ❖ Northern Illinois University B.S. (Biology) 1965 ❖ Northern Illinois University <u>Additional Training</u> In excess of twenty weeks of radiation-related training sponsored by the U.S. Nuclear Regulatory Commission, U.S. Department of Energy, U.S. Environmental Protection Agency, Department of Transportation, Department of Defense and Federal Emergency Management Agency

EMPLOYMENT: 2006-2008

Radiation Protection Consultant, EWA Services, Herndon, Virginia. Contractural participant in the decommissioning of U-238 ballistic test ranges at New Mexico Institute of Mining and Technology, Socorro, New Mexico.

1990-2003

Manager, Radiation Protection Program, New Mexico Environment Department. Supervised seven technical staff members in all Program activities, including the licensing and inspection of more than 200 radioactive material licensees, and the registration and inspection of more than 1400 radiation generating devices (x-ray machines and particle accelerators) in the State. Served as point of contact for all

inquiries pertaining to radiation issues from other State and Federal agencies and members of the public.

1979-1990

Environmental Scientist, New Mexico Radiation Protection Bureau. Duties included the licensing and inspection of radioactive material licensees, and the registration and inspection of x-ray registrants. Assisted in the training of Program staff.

1976-1979

Environmental Scientist, New Mexico Environmental Improvement Division, Food Quality Unit. Duties included the review and endorsement of all bakery, beverage plant and food warehouse inspection reports submitted by Food and Drug Administration cost reimbursement contract inspectors within the State.

1974-1976

Public Health Sanitarian, Indiana Board of Health, Water Pollution Control Division, Indianapolis, Indiana. Duties included water quality surveys of various river drainage areas, sampling of municipal and industrial dischargers, and lake classification studies. I

supervised one of the two survey teams responsible for classifying all natural and man-made lakes within the State as to level of pollution.

1973-1974

Biology teacher, Manzano High School, Albuquerque, New Mexico.

1968-1972

Active duty, U.S. Air Force, Kirtland AFB, New Mexico. Duties included space survivability studies involving radiation-related activities and the mitigation of avian hazards at various military installations in the United States and the Panama Canal Zone.

Uranium Study SME	Leo Gomez, Ph.D.
SME: Radiation Biologist and Technical Editor Current Employment: Trinitek Services, Inc Capabilities: Over 30 years of professional experience in applying the principles, theories, and practices of radiological health and safety in the performance evaluation and analysis of radiological health hazards in terrestrial, aquatic, and marine environments, international research in radiation bio-effects in aquatic systems.	Senior Radiaiton Biologist: Trinitek Services, Inc, Nuclear & Environmtal Safety Consultants Education / Credentials Ph.D. Radiation Biology ❖ Colorado State University M.S.,, Health Physics ❖ Colorado State University B.S. Biology (microbiology) ❖ University of New Mexico

- Worked in nuclear waste management from 1977-2000 at Sandia National Laboratories in Albuquerque, New Mexico. Was the biological research project manager for four (4) international ocean disposal projects and worked in the Performance Assessment Department for the Waste Isolation Pilot Plant, a transuranic waste repository in southeastern New Mexico. Also collaborated for ten (10) years with the University of New Mexico Institute for Public Policy studying national public perceptions of risk from nuclear technologies.
- In 2006 organized and co-chaired the "*Ultra Low-Level Radiation Effects (ULLRE) Summit*" in Carlsbad, NM. Focus of the summit was to identify the steps needed to conduct research at near zero radiation levels, and to lay the groundwork for scientifically-based radiation protection standards at ultra-low levels of radiation exposure.
- At Los Alamos National Laboratory in New Mexico was responsible for conducting experiments studying the comparative radiation sensitivity of normal mammalian tissues to x-rays and negative pi mesons in collaboration with the University of New Mexico Cancer Center. Worked with the LANL Health Physics group evaluating health and safety of uranium & plutonium facilities and calculating radionuclide body burdens in LANL workers. Also performed a safety evaluation of a nuclear power reactor in California. (1974-1977)
- Managed the whole body counting facility to detect low levels of transuranic elements in workers at Oak Ridge National Laboratory in Tennessee. Also evaluated worker radiation exposures at ORNL and other nuclear facilities. (1973-1974)
- Director of Research at TCI Medical in Albuquerque, NM, (2002-2003) conducting research on medical and nuclear innovations between scientific institutions in the Former Soviet Union and scientific institutions in the U.S. Also Lead Internal Auditor for ISO 9001-2000, Quality Management Systems.
- Served as a US representative on three international ocean pollution commissions.

- Past editor of the international scientific journal, *Radioactive Waste Management and Environmental Restoration*. (1991-2000).
- Conducted Radiation Safety Officer training for employees at Rio Algom uranium mine in New Mexico. (2009-2011).
- In collaboration with NM Tech and Trinitek Services, Inc., conducted a 6-week radiation safety program for 15 Ph.D. Fellows from Egypt. (2010)
- Served as a field agent for the USDOE Environmental Justice program ensuring that public concerns relating to technical projects were considered. (1990-2000).

Leo S. Gomez Consulting, Principal

Radiobiology / Radioecology / Health Physics / Nuclear Waste Management

ORION International Technologies, Inc. Principal Scientist, (Part Time), *Low-Level Radiobiology*

Experience:

2002 - 2003: **TCI Medical**, *Director of Research*

Coordinated research on medical and nuclear innovations between scientific institutions in the former Soviet Union and scientific institutions in the US.

Lead Internal Auditor: ISO 9001-2000 Quality Management Systems.

2000 - 2002: **Sandia National Laboratories (SNL)**, Albuquerque, NM: *Consultant*

1977 - 2000: **Sandia National Laboratories**, Albuquerque, NM (Retired: August 25, 2000)

Seabed Programs Division - Biology Program Coordinator for five U.S. Nuclear Waste Disposal Programs:

Subseabed Disposal Program - SDP

Study feasibility of subseabed disposal of high-level radioactive waste.

Formerly Utilized Sites Remedial Action Program - FUSRAP

Study feasibility of ocean disposal of FUSRAP soil and rubble containing traces of natural radioactive materials.

Low Level Waste Ocean Disposal Project - LLWODP

Study feasibility of ocean disposal of naval nuclear reactor plants.

Waste Isolation Pilot Plant - WIPP (World's first nuclear waste repository)

Demonstration of disposal of defense transuranic waste.

Arctic Nuclear Waste Assessment Program - ANWAP

Study radionuclide contamination of Northern Oceans from the Former Soviet Union.

- Project manager for biological oceanography programs; designed and conducted radiobiology experiments using deep-sea organisms and participated in design of marine radiobiology experiments with staff from Scripps Institution of Oceanography, La Jolla, CA, and Woods Hole Oceanographic Institution, Woods Hole, MA.
- Organizer and co-chair, *International Biological Oceanography Workshop* held in Jackson Hole, Wyoming, January 1981.
- Conference organizer/Chair/Presenter, *Conference on Waste Management*, San Juan, Puerto Rico (3 Conferences).
- Advisor (Radiobiology) to the *International Atomic Energy Agency Marine Radioactivity Laboratory* in Monaco.
- Task group leader for biosphere transport group attempting to predict potential radiation dose from the WIPP environment to man.
- Collaborator with *University of New Mexico Institute for Public Policy* on studies of national and regional public perceptions of nuclear waste disposal.
- Member, New Business Development Team of SNL's Energy and Environment Division.
- Member, Radiological Assessment Task Group evaluating radiological impacts on the Alaskan Arctic from radioactivity released from the Former Soviet Union.
- Editor: *Radioactive Waste Management & Environmental Restoration, A Multinational Journal*, Taylor & Francis, London (1991-2002).
- On Review Panels for U.S. Department of Energy: a) Environmental Restoration and Waste Management Graduate Fellowships; b) Graduate Health Physics Fellowships; c) Global Climate Change Programs; d) Nuclear Engineering University Programs; e) Low Dose Radiation Research Program.
- Sandia Labs liaison: *NM Waste Management Education/Research Consortium (WERC)*; Board member, WERC Industrial Advisory Board.
- On selection panel for *Young Science Scholars Program*.
- Panelist on National Science Foundation Education Review Panels for a) Comprehensive Regional Centers for Minorities; b) Summer Science Camps; c) Urban Systemic Initiative; d) Rural Systemic Initiative; and e) Committee of Visitors / Informal Science Education.
- Committee member on National Selection Committees for the *Presidential Awards for Excellence in Science & Mathematics Teaching* (three years).
- * Field agent: U.S. Department of Energy, Environmental Justice Strategy Development.
- * Board member on Science Advisory Board, National Hispanic Radio Network.
- Planning Committee member, Chair, and Presenter: *Symposium on Marine Radioecology, 9th International Congress of Radiation Research*, July 1999, Dublin, Ireland.
- Chair, Local Arrangements Committee, *47th Annual Meeting*, Radiation Research Society, April 2000, Albuquerque, NM.
- Vice-Chair, Fund Raising Committee, Radiation Research Society, 1999-2001.

Planning Committee member, *Mexican American Engineers & Scientists*,
26th International Symposium and Career Fair, Albuquerque, NM, October 6-11, 2000

- Organizer & Co-chair: *Low Level Radiation Effects Summit* held in Carlsbad, NM, January 16-18, 2006.
- Reviewer: National Institutes of Health *Project Bioshield Program*, 2005.
- Reviewer: National Institutes of Health *Radiation Combined Injury Program*, 2008.

Fuel Cycle Risk Analysis Division

- Co-developer of trophic transport model applied to radionuclide transport through aquatic environment to man from postulated light-water reactor core melt-through accidents.

Constructed equivalence classes of metabolically similar radionuclides to be used in predicting nuclide trophic transport.
Calculated internal dose to man and other biota from exposure to radionuclides in the aquatic environment.

1974 - 1977 **Los Alamos National Laboratory** , University of California, Los Alamos, NM.

Preclinical Studies for Pion Radiotherapy

- Studied comparative effects of negative pi mesons and x-rays on normal tissues and tumors in animals in collaboration with *Cancer Research and Treatment Center*, University of New Mexico School of Medicine.

Radiological Engineering

- Evaluated health and safety aspects of plutonium facilities under Nuclear Regulatory Commission license reviews; calculated plutonium body burdens in Los Alamos National Laboratory workers.

1973 - 1974 **Oak Ridge National Laboratory**, Oak Ridge, Tennessee

Human Whole-Body Counting

Improved capability of detecting low levels of transuranic elements in contaminated workers; evaluated exposure of workers exposed at Oak Ridge National Laboratory and other related nuclear facilities.

1968 - 1973 **Colorado State University**, Fort Collins, Colorado

Ph.D. Dissertation: Lymphatic Transport of ²³⁹PuO₂ in Dogs

- U.S. Public Health Service predoctoral trainee; studied lymphatic transport of high-fired ²³⁹PuO₂ particles in dogs from simulated wounds using production plutonium from the Rocky Flats Division, Dow Chemical Co.

1966 - 1969 **Veterans Administration Hospital**, Albuquerque, New Mexico

Nuclear Medicine

- Performed diagnostic and therapeutic procedures in Nuclear Medicine Department; responsible for radiological safety of laboratory; instructed technicians and medical students in nuclear medicine laboratory techniques.

1963 - 1965 **Lovelace Foundation for Medical Research**, Albuquerque, New Mexico

Radioactive Aerosol Inhalation Studies

- Conducted inhalation exposures of dogs to radioactive aerosols and performed necropsies of exposed dogs.

1962 - 1963 **U.S. Department of Agriculture**, Albuquerque, New Mexico

Livestock Disease Control

- Conducted diagnostic tests for brucellosis and leptospirosis in livestock; performed viability tests on vaccines used in livestock; tested for sheep and cattle scabies.

Membership in Professional Societies

- **American Association for the Advancement of Science**
Committee on Opportunities in Science, 1980-83
- **Health Physics Society, and the International Radiation Protection Association**
Affirmative Action Committee, 1980-83

Membership Committee, 1992-95; Membership Committee Chair, 1993-95
- **International Commission for the Scientific Exploration of the Mediterranean Sea**
Marine Radioactivity Committee and Marine Chemistry Committee
- **International Union of Radioecologists**
- **New York Academy of Sciences**
- **Radiation Research Society**
Vice-Chair, Fund Raising Committee, 1999-2001

Chair, Local Arrangements Committee for 47th Annual Meeting, Albuquerque, NM, April, 2000
- **Radiochemistry Society**
- **Sigma Xi – The Scientific Honorary Society**
- **Society for Advancement of Chicanos and Native Americans in Science**
Co-Founder; Board of Directors, 1975-78

Local Arrangements Committee, 2003 Annual Meeting in Albuquerque, NM

Publications

L.S. Gomez and G. Cravens. 2008. "Why We Need to Know More About Low Dose Radiation Exposure", in *Hot Topics*, Biosphere Systems International Foundation website, (<http://www.biospheresystems.com/index.html>), September 2008.

- L.S. Gomez, J.J. Cousins, C.J. Dorian, S.M. Gomez. 2008. "New Non-Invasive Technology for the Early Detection of Cancer at the Cellular Level", in *Abstracts 2008 AAAS-SWARM Annual Meeting*, University of New Mexico, Albuquerque, NM, April 9-12, 2008.
- L.S. Gomez, D. J. Brenner, O.G. Raabe. 2007. "A Proposed Ultra-Low Level Radiation Biology Research Facility at the Carlsbad, New Mexico, Waste Isolation Pilot Plant (WIPP)", in *Abstracts 2007 Health Physics Society Annual Meeting*, Portland, OR, July 2007.
- N.F. Savignac, L.S. Gomez and B.P. Warner. 2007. "A 'Litmus Paper Dosimeter'", in *Abstracts 2007 Health Physics Society Annual Meeting*, Portland, OR, July 2007.
- L.S. Gomez, D.J. Brenner and O.G. Raabe. 2006. "Final Report: Ultra-Low Level Radiation Effects Summit", held at Carlsbad, NM, January 15-18, 2006, ORION International Technologies, Inc. Albuquerque, NM.
- S.M. Gomez, P.I. Pohl, S.A. Jackson, J.N. Nishio, A. Reeb, D. Cox, F. M. Torres, L.S. Gomez. 2005. "Biofuel Production on an Integrated Farm", presented at the *2005 Annual Iberoamerican Research and Development Summit: Creating Sustainability Through Innovation*, October 4-6, 2005, Albuquerque, NM.
- L.S. Gomez. 2003. "Technical Collaborations between a Small American Business and Leading Research Institutions in the Former Soviet Union", presented at the *International Workshop on Radiological Sciences and Applications, June 16-18, 2003*, Albuquerque, NM; and at the *Annual Meeting of the Radiochemistry Society, July 14-17, 2003*, Carlsbad, NM.
- L.S. Gomez. 2002. Book review: "Quantities, Units and Terms in Radioecology", ICRU Report 65, *Journal of the ICRU*, Vol 1, No. 2, 2001, 48pp, Nuclear Technology Publishing, in *Radiation Research*, Volume 158, p. 250.
- M.A. Champ, L.S. Gomez, V.M. Makeyev, J.M. Brooks, H.D. Palmer, and F. Betz. 2001. "Ocean Storage of Nuclear Wastes? Experience from the Russian Arctic", in *Marine Pollution Bulletin, Special Volume, "Arctic III"*, Volume 43, Issue 1-6, Jan.-June, 2001, 142pp., Elsevier Science B. V.
- L.S. Gomez. 2000. "Emplacement of Mercury Wastes in the Sediments of the Deep-Ocean?", SAND2000-0616C, Sandia National Laboratories, Albuquerque, NM, presented at the *EPA Workshop on Mercury in Products, Processes, Waste and the Environment: Eliminating, Reducing and Managing Risks from Non-Combustion Sources*, Baltimore, MD, March, 2000.
- L.S. Gomez, 1998. "Contamination of the Northern Oceans from Releases of Radioactivity from the Former Soviet Union", SAND98-1920A, Sandia National Laboratories, Albuquerque, NM, in *Proceedings of the 11th International Congress of Radiation Research*, Dublin, Ireland, July 1999, pp. 303-305.
- D. Layton, B. Napier, L. Gomez, J. Knezovich, and M. Varela, 1997. "Introduction to ANWAP", in *Radionuclides in the Arctic Seas from the Former Soviet Union: Potential Health and Ecological Risks*, Arctic Nuclear Waste Assessment Program (ANWAP), Office of Naval Research (ONR), Washington, DC.

D.R. Anderson, M.E. Fewell, L.S. Gomez, M.G. Marietta, P.N. Swift, K.M. Trauth, P. Vaughn, and R. J. MacKinnon, 1997. "Performance Assessment for Environmental Decision Making", SAND97-0723, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, M.G. Marietta, and D.W. Jackson, 1996. "Compilation of Selected Marine Radioecological Data for the Formerly Utilized Sites Remedial Action Program", in *Concentration Factors of Radionuclides in the Marine Organisms*, RWMC-96-P-18, Environmental Parameter Series 6, Radioactive Waste Management Center, Japan.

H.C. Jenkins-Smith, C.L. Silva, and L.S. Gomez, 1995. "Understanding Public Reception of Scientific Information About the Risks of Nuclear Waste Storage", SAND95-0327A, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, 1994. "Marine Environment", in *Environmental Assessment for the Purchase of Russian Low Enriched Uranium Derived From the Dismantlement of Nuclear Weapons in the Countries of the Former Soviet Union*, U.S. Enrichment Corporation, Bethesda, MD.

J.E. Johnson and L.S. Gomez, 1993. "Risk /Benefit Analysis of the Disposal of Mixed Waste", Technical Completion Report, Project Number WERC-01-4-23218, New Mexico Waste-Management Education and Research Consortium, in cooperation with the U.S. Department of Energy, pp. 1074-1084.

L.S. Gomez, M.G. Marietta, and A.R. DuCharme, 1993. "Assessing the Effects of Russian Contamination on the Northern Oceans", SAND92-2864A, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, H.C. Jenkins-Smith, and K.W. Miller, 1992. "Changes in Risk Perception Over Time", SAND91-2266C, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, M.G. Marietta, and D.W. Jackson, 1990. "Compilation of Selected Marine Radioecological Data for the Formerly Utilized Sites Remedial Action Program (FUSRAP): Summaries of Available Radioecological Concentration Factors and Biological Half-Lives", SAND89-1585, Sandia National Laboratories, Albuquerque, NM.

S.G. Bertram-Howery, M.G. Marietta, D.R. Anderson, K.F. Brinster, L.S. Gomez, R.V. Guzowski, and R.P. Rechard, 1989. "Draft Forecast of the Final Report for the Comparison to 40 CFR 191, Subpart B for the Waste Isolation Pilot Plant", SAND88-1452, Sandia National Laboratories, Albuquerque, NM.

A.R. Lappin, R.L. Hunter, D.P. Garber, P.B. Davies, R.L. Beauheim, D.J. Borns, L.H. Brush, B.M. Butcher, T. Cauffman, M.S.Y. Chu, L.S. Gomez, R.V. Guzowski, H.J. Iuzzolino, V. Kelley, S.J. Lambert, M.G. Marietta, J.W. Mercer, E.J. Nowak, J. Pickens, R.P. Rechard, M. Reeves, K.L. Robinson, and M.D. Siegel, 1989. "Systems Analysis, Long-Term Radionuclide Transport, and Dose Assessments, Waste Isolation Pilot Plant (WIPP), Southeastern New Mexico; March 1989", SAND89-0462, Sandia National Laboratories, Albuquerque, NM

L.S. Gomez, D.W. Jackson, and A.A. Yayanos, 1987. "Subseabed Disposal of High-Level Nuclear Waste", in *Advances in Radiation Biology*, Volume 13, J.T. Lett, Ed., Academic Press, Inc. New York, pp. 355-402.

L.S. Gomez, M.G. Marietta, and D.W. Jackson, 1987. "Compilation of Selected Marine Radioecological Data for the U.S. Subseabed Disposal Program: Summaries of Available Radioecological Concentration Factors and Biological Half-Lives", SAND86-2674, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, M.G. Marietta, and D.W. Jackson, 1987. "Compilation of Selected Deep-Sea Biological Data for the U.S. Subseabed Disposal Project", SAND86-2673, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, M.G. Marietta, and D.W. Jackson, 1986. "Compilation of Selected Marine Radioecological Data for the U.S. Subseabed Disposal Project: Summaries of Available Radioecological Concentration Factors and Biological Half-Lives", SAND85-2631, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, 1986. "Subseabed Disposal of High-Level Radioactive Waste", in *Radioactive Waste: Proceedings of the National Council on Radiation Protection and Measurements*, Twenty-First Annual Meeting, April 1985, Washington, D.C., pp. 122-132.

L.S. Gomez, S.L. Kupferman, and M.G. Marietta, 1986. "Subseabed Disposal Project Annual Report: Environmental Studies, October 1981 through September 1983", SAND85-1037, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, D.W. Jackson, and M.G. Marietta, 1985. "U.S. Subseabed Disposal Program Radioecological Data Base: Summaries of Available Radionuclide Concentration Factors and Biological Half-Lives" in *Proceedings of VIIIth Workshop on Marine Pollution of Mediterranean, "Rapports et Proces-Verbaux des Reunions"*, Lucerne, Switzerland, October 10-19, 1984,

International Commission for the Scientific Exploration of the Mediterranean Sea, 29, (7), pp. 185-188.

C.L. Ingram, L.S. Gomez, K.R. Hinga, 1985. "An Overview of the Biological Research for the United States Subseabed Disposal Program", in *Proceedings of the 4th Symposium on Deep-Sea Biology*, Hamburg, Germany.

L.S. Gomez, M.G. Marietta, and D.W. Jackson, 1984. "Compilation of Selected Marine Radioecological Data for the U.S. Subseabed Program: Summaries of Available Radionuclide Concentration Factors and Biological Half-Lives", SAND84-2087, Sandia National Laboratories, Albuquerque, NM.

A.A. Yayanos, R. Van Boxtel, A.S. Dietz, and L.S. Gomez, 1984. "Studies on the Radiosensitivity of Deep-Sea Bacteria", in *Abstracts of the Fourth International Ocean Disposal Symposium*, Plymouth, Devon, England, April 11-15, 1983.

D.W. Jackson, L.S. Gomez, and M.G. Marietta, 1983. "Compilation of Selected Marine Radioecological Data for the U.S. Subseabed Program", SAND83-1725, Sandia National Laboratories, Albuquerque, NM.

R.E. Hillman, J.W. Williams, F.I. Saksa, R.A. McGrath and L.S. Gomez, 1983. "Aquatic Bioassays of FUSRAP Soils", in *Proceedings, Oceans '83, "Effective Use of the Sea; An Update*, The Institute of Electrical and Electronic Engineers and the Marine Technology Society, pp. 911-916.

A.A. Yayanos and L.S. Gomez, 1983. "Gamma-Ray Inactivation of Deep-Sea Bacteria from Ocean Depths of 1,900 to 10,500 Meters", *Radiation Research*, 94, pp. 665-666.

L.S. Gomez, R.R. Hessler, D.W. Jackson, M.G. Marietta, K.L. Smith, Jr., D.M. Talbert, and A.A. Yayanos, 1983. "Biological Ramifications of the Subseabed Disposal of High-Level Nuclear Waste", in *Wastes in the Ocean, Volume III: Radioactive Wastes and the Ocean*, Eds. P.K. Park, D.R. Kester, I.W. Duedall, and B.H. Ketchum; John Wiley and Sons, Inc., New York, London, Sydney, Toronto, pp. 411-430.

S.L. Kupferman, D.R. Anderson, L.H. Brush, L.S. Gomez, L.E. Shephard, 1982. "Survey of Ocean FUSRAP, March 1 - September 30, 1981", SAND82-0292, Sandia National Laboratories, Albuquerque, NM.

D.R. Anderson, L.H. Brush, S.L. Kupferman, L.E. Shephard, L.S. Gomez, 1982. "Status of Trace Natural Radioisotope Ocean Disposal Feasibility Study", in *Transactions of American Nuclear Society*, September 1982, San Diego, CA.

S.L. Kupferman, D.R. Anderson, L.H. Brush, L.S. Gomez, L.E. Shephard, 1982. "Ocean Disposal Feasibility Study: Candidate DOE (FUSRAP) Soil Characterization", in *Transactions of the 1982 Winter Meeting of the American Nuclear Society*, November 14-19, 1982, Washington, DC.

L.H. Brush, D.R. Anderson, L.S. Gomez, S.L. Kupferman, L.E. Shephard, J.C. Laul, 1982. "Characterization of Trace Contaminants at the Middlesex, New Jersey, Formerly Utilized Sites Remedial Action Program (FUSRAP) Site", invited paper at American Statistical Association/ Environmental Protection Agency Conference on Environmental Sampling and Analysis of Sampling Data, Coolfont, WV, July 12-16, 1982.

S.L. Kupferman, D.R. Anderson, L.H. Brush, L.S. Gomez, J.C. Laul, and L.E. Shephard, 1982. "Ocean FUSRAP: Feasibility of Remedial Action Program (FUSRAP)", in *Proceedings of Waste Management '82 Symposium, Waste Isolation in the U.S. and Elsewhere*, Technical Programs and Public Communications, Vol. 2, March 8-11, 1982, Tucson, AZ, pp. 471-485.

M.M. Mullin, and L.S. Gomez, 1981. "Biological and Related Chemical Research Concerning Subseabed Disposal of High-Level Nuclear Waste: Report of a Workshop at Jackson Hole, Wyoming, January 12-16, 1981", SAND81-0012, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, 1981. "Environmental Studies: U.S. Subseabed Disposal Program.", in *Proceedings of the XXVIIIth Congress of the International Commission for the Scientific Exploration of the Mediterranean Sea, "Rapports et Proces-Verbaux des Reunions"*, 27, Part 3, October 9-18, 1980, Cagliari, Sardinia, pp. 125-126.

L.S. Gomez, R.R. Hessler, D.W. Jackson, M.G. Marietta, K.L. Smith, Jr., A.A. Yayanos, 1981. "Environmental Studies Data Base Development and Data Synthesis Activities of the U.S.

Subseabed Disposal Program", in *Impacts of Radionuclide Releases into the Marine Environment*, Vienna, October 6-10, 1980, IAEA-SM-248/142, pp. 607-628.

L.S. Gomez, R.R. Hessler, D.W. Jackson, M.G. Marietta, K.L. Smith, Jr., D.M. Talbert, and A.A. Yayanos, 1980. "Biological Studies of the U.S. Subseabed Disposal Program", in *Proceedings of the Third NEA Seminar of Marine Radioecology*, October 1-5, 1979, Tokyo, Japan, pp. 35-46.

W.C. Black, L.S. Gomez, J.M. Yuhas, and M.M. Kligerman, 1980. "Quantitation of the Late Effects of X-Irradiation on the Large Intestine", *Cancer*, 45, pp. 444-451.

S.W. Jordan, C.R. Key, L.S. Gomez, J. Agnew, and S. Barton, 1978. "Late Effects of Radiation on the Mouse Kidney", *Journal of Experimental and Molecular Pathology*, 29, pp. 115-129.

J.F. Dicello, M. Zaider and L.S. Gomez, 1978. "Charge Dispositions as a Function of Depth for π^- and π^+ Beams", *Radiation Research*, 74, p. 84 (Abstract).

A.E. Dross, A.M. Gage, J.M. Graf, F.A. Guevara, L.S. Gomez, J.J. Koelling, R. Mullin, D.G. Rose, J.E. Ayer, W. Burkhardt, R.T. Kratzke, 1977. "Environmental Assessment, Babcock and Wilcox Company, Parks Township Site, SNM-414, Docket No. 70-364."

L.S. Gomez, D.M. Smith, J.F. Dicello and H.I. Amols, 1977. "Effects of Negative Pions and X-Rays on Testes Weight Loss and Spermatogenic Stem Cell Renewal in Mice", *Radiation Research*, 20, pp. 672-673 (Abstract).

W.C. Black, L.S. Gomez, and M.M. Kligerman, 1976. "Late Effects of Radiation on the Rat Rectum", *Radiation Research*, 67, p. 541, (Abstract).

J.L. Lebel, R.L. Bistline, J. Schallberger, G.E. Dagle and L.S. Gomez, 1976. "Studies of Plutonium and the Lymphatic System: Six Years of Progress at Colorado State University", in *Radiation and the Lymphatic System*, Proceedings of the Fourteenth Annual Hanford Biology Symposium, Conf-740930, pp. 2-9.

M.M. Kligerman, J.F. Dicello, H.T. Davis, R.G. Thomas, C.J. Sternhagen, L.S. Gomez, and D.F. Peterson, 1975. "Initial Comparative Response of Experimental Tumors to Peak Pions and X-Rays", *Radiology*, 116, pp. 181-182.

G.E. Dagle, J.L. Lebel, R.D. Phemister, R.L. Watters, and L.S. Gomez, 1975. "Translocation Kinetics of PuO_2 from the Popliteal Lymph Node of Beagles", *Health Physics*, 28, pp. 395-398.

L.S. Gomez, J.L. Lebel, R.L. Watters, R.W. Bistline, and G.E. Dagle, 1974. "Effects of Delayed Lymphadenectomy on $^{239}\text{PuO}_2$ Translocation in Dogs", *Health Physics*, 27, 213 ff.

L.S. Gomez, 1973. "Lymph Transport of $^{239}\text{PuO}_2$ in Dogs", USAEC Document COO-1787-17 (Ph.D. Dissertation).

L.S. Gomez, J.L. Lebel, and R.L. Watters, 1972. "The Effects of Lymph Node Removal on PuO_2 Translocation", *Health Physics*, 22, 883 ff.

J.L. Lebel, R.L. Watters, R.W. Bistline, G.E. Dagle, and L.S. Gomez, 1972. "A Study of the Translocation of Plutonium and Americium from Puncture Wounds", USAEC Document COO-1787-16.

R.L. Watters, J.L. Lebel, R.W. Bistline, G.E. Dagle, and L.S. Gomez, 1971. "A Study of the Translocation of Plutonium and Americium from Puncture Wounds", USAEC Document COO-1787-11.

Uranium Study SME	Richard F. Haaker, CHP, CIH
SME: Industrial Hygiene, Health Physics, Safety Current Employment: Trinitek Services, Inc. Capabilities: Industrial hygiene, safety, industrial accident investigation, respiratory protection fit-testing and training, regulatory compliance assessment and program development; health physics, radiological simulation and modeling, radiation protection, licensing support. Software QA support and software testing. Over 37 years experience.	Senior Health and Safety Consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials B.S. Biochemistry ❖ Texas A&M University M.S. Chemistry ❖ Texas A&M University Registration: CIH- American Board of Industrial Hygiene, 1989, Comprehensive Practice (currently certified through 2017) CHP- American Board of Health Physics, 1991, Comprehensive Practice (currently certified through 2012) New Mexico Environment Department certificate of registration as Qualified Expert in Health Physics (through 2012) Additional training: epidemiology, Hazwoper, NORM

Scientific Committees and Memberships

Chairman, American Board of Health Physics – Part 1 Examination Panel, 1999
 Vice-chairman, American Board of Health Physics - Part 1 Examination Panel, 1998
 American Board of Health Physics - Part 1 Panel of Examiners, 1995-2000
 American Industrial Hygiene Association - Ionizing Radiation Committee, 1992-1995

American Conference of Governmental Industrial Hygienists (ACGIH), 2008-
 Health Physics Society, 1991 –
 American Industrial Hygiene Association, Rio Grande Chapter 1991 -
 Health Physics Society, Rio Grande Chapter, 1991-

Training Classes and Short Courses

ArcGIS Desktop: Tools and Functionality, 24 hours (2012)
 Introduction to Cartography, 16 hours (2012)
 Lead Based Paint Inspector/Risk Assessor, 40 hours (2011)
 Biological Monitoring, AIHCE, 8 hours (2010)
 Basics of Epidemiology, AIHCE, 8 hours (2009)
 Naturally Occurring Radioactive Material and Technologically Enhanced Naturally Occurring Radioactive Material (NORM/ TENORM), Health Physics Society (2009)
 ChNE 529 UNM Internal Radiation Dosimetry graduate course audit (2007)
 Internal Dosimetry Applications, (1995), 40 hours.
 VBA Programming for Microsoft Access, UNM Community College, 24 hours (2008)
 Introduction to Structured Query Language, UNM Community College 12 hours (2006)

Mathematica Training, Wolfram Research, 24 hours (2003)
Microsoft Access training, introductory, intermediate and "advanced", UNM Community College, ~60 classroom hours, (1997 – 2008).
Wolfram Mathematica Training, Wolfram Research, 24 hours (2003).
Training for Trainers, AIHCE, 8 hours (2010)
OSHA 7505 Accident Investigation, Red Rock Community College (2009)
Beryllium Particulates and Their Detection, International Symposium (2008)
Beryllium Training, AIHCE, 8 hours, 2003
Heat Stress Prevention, AIHCE, 8 hours, 2003
Radioactive Materials DOT Training, RSA, 2002
Monte Carlo N-Particle Computer Code Training (MCNP4C), 36 hours, LANL, 2000.
Level A PPE Training, 32 hours, Roy F. Weston, Inc., 2000
Unreviewed Safety Question Determination for DOE Nuclear Facilities, Westinghouse, 1998
RCRA Fundamentals, McCoy Associates, Inc., 1997
Auditing Health and Safety Programs, 1995.
Operation & Selection of Direct Reading Combustible Gas & Organic Vapor Monitors, 1995.
Assessment of Occupational Noise Exposure and Risk of Hearing Loss, 1994.
Selection and Use of Protective Equipment, 1994.
Regulatory Issues and the Environmental Health Physicist, 1993.
Environmental Characterization: From Observations to Inferences, 1993.
Technology Transfer Between Industrial Hygiene and Radiation Disciplines, 1993.
Radiation Detection and Measurement, 1990.
Advanced Toxicology: Risk Assessment of Industrial Chemicals, 1989 (OSHA short course)
Supervisor/Contractor Asbestos Training (AHERA), 1989.
HAZWOPER Supervisor training
HAZWOPER Training, 1986, Classroom hours: 24. Current refresher training.
Construction Safety Training Course, presented by OSHA, 1985, Classroom hours: 40.

Employment History

1998-present AQ Safety, Inc., Albuquerque, NM
1997-1997 Radian, Albuquerque, NM
1997-1998. Ecology and Environment, Inc., Albuquerque, NM
1996-1998 ERM /Program Management Company, Los Alamos, NM
1992-1996 Environmental Dimensions Inc., Albuquerque, NM
1988-1992 TMA/Eberline, Albuquerque, NM
1987-1988 Advanced Sciences, Inc., Albuquerque, NM
1986-1987 Roy F. Weston, Inc., Albuquerque, NM
1985-1986 Jacobs Engineering Group, Albuquerque, NM
1983-1984 Hahn-Meitner Institute for Nuclear Science, Berlin, FRG
1978-1983 Research Associate, Department of Geology, University of New Mexico, Albuquerque, NM

Litigation Support in the Last Five Years

Matherne et al vs Kellogg, Brown and Root et al Litigation Support. Testified as an expert witness for plaintiffs in a lawsuit involving exposure of subcontractors to harmful substances at a chemical plant (2008-2009).

Wagner and Appleton et al. vs. Tammany Holding Company, LLC et al. Docket # 2012-453. Civil District Court, Parish of Orleans, Louisiana. Expert report and testimony concerning air and water emissions from a concrete crushing operation located adjacent to a residential neighborhood (2012).

TEXACO Exploration and Production Inc., Bridgeline Gas and Distribution, L.L.C. v. Hilcorp Energy Company, Div. F, Docket #83406, Radiological Contamination at the Henry Gas Plant and Erath Field, Vermilion Parish, Louisiana. Expert report concerning property damage from technologically enhanced naturally occurring radioactive material (2011-date).

Malvin Benoit et al. v. Intracoastal Tubular Services, et al., James Bailey, et al. v. Exxon Mobil Corporation, et al., Eugene Castell, Deceased vs. Exxon Mobil Corporation, et al. Orleans Parish, Louisiana. Expert Report: Occupational Exposure to Radioactive Scale During Oil Pipe Cleaning Operations at Brown and Root and ITCO, Preliminary Report. (2010-2011).

Key Projects -

Software QA Support for DandD Software Package to Sandia National

Laboratories. Wrote test cases for testing of the DandD version 2.1 software package for determining radiation dose from residual radioactivity (2001). Performed the testing for DandD. This involved performing independent calculations in Wolfram Mathematica notebooks and comparing results to those calculated by DandD.

Employee Chemical and Beryllium Exposure Database Support for Los Alamos

Material Disposal Area B (MDA B). Designed and currently maintain a small database for a Los Alamos environmental contractor who is responsible for the remediation of Material Disposal Area B. The database encompasses employee chemical exposure data, as well as data that may be submitted to the Beryllium Registry to satisfy the requirements of 10 CFR 850, Chronic Beryllium Disease Prevention Program. Wrote a data specification for an analytical chemistry laboratory's electronic data deliverable to ensure that new data can be readily imported into the database.

Health and Safety Planning for Excavation and Remediation of Material Disposal Area B, Los Alamos National Laboratory.

Currently serving as a consultant involved in planning for the excavation and remediation of a landfill that contains radioactive waste (including plutonium), chemical waste (possibly including beryllium, heavy metals, shock-sensitive materials, solvents, acids, and incompatible chemicals). The landfill was closed in 1948, after catching on fire on more than one occasion. The landfill is considered a nuclear environmental site. Remediation operations at the site are subject to EPA hazardous waste, Department of Energy nuclear safety, and OSHA health and safety regulations. The excavation and remediation will proceed within an engineered enclosure designed to protect members of the public from emissions. Much of the work will involve heavy equipment that has been reinforced with blast shields. Workers will be required to wear chemical protective suits and be protected by atmosphere-supplying airline respirators (2008 to present).

Support to NRC for Nuclear Power Plant License Termination through Sandia National Laboratories. Reviewed portions of the license termination plans for Maine

Yankee Atomic and Saxton Nuclear Experimental Reactors on behalf of the Nuclear Regulatory Commission (2000).

Support to NRC for Source Material License Termination Review through Sandia National Laboratories. Reviewed source material license termination plans on behalf of the Nuclear Regulatory Commission submitted by the Cabot Corporation for termination of their source material licenses for facilities in Reading and Revere Pennsylvania (1999).

Source Material License Renewal and General License Support for a Source Material Licensee in Boyertown, PA. Wrote bioassay and air sampling program basis documents. Contributed to Decommissioning Funding Plan and Decommissioning Cost Estimate. Performed a dose assessment and ALARA analysis to justify cleanup limits and off-site disposal of waste water treatment sludge at a sanitary landfill. Designed a final status radiation survey for the site and contributed to a decommissioning funding plan cost estimate (2002-2009).

LANL Omega West Reactor Decontamination & Demolition Site-Specific Health and Safety Plan Development. Wrote site specific Health and Safety Plan for D&D of the Omega West Reactor. (2002).

Health and Safety Planning for Excavation and Remediation of Material Disposal Area B, Los Alamos National Laboratory. Currently serving as a consultant involved in planning for the excavation and remediation of a landfill that contains radioactive waste (including plutonium), chemical waste (possibly including beryllium, heavy metals, shock-sensitive materials, solvents, acids, and incompatible chemicals). The landfill was closed in 1948, after catching on fire on more than one occasion. The landfill is considered a nuclear environmental site. Remediation operations at the site are subject to EPA hazardous waste, Department of Energy nuclear safety, and OSHA health and safety regulations. The excavation and remediation will proceed within an engineered enclosure designed to protect members of the public from emissions. Much of the work will involve heavy equipment that has been reinforced with blast shields. Workers will be required to wear chemical protective suits and be protected by atmosphere-supplying airline respirators (2008 to present).

Sherwood Building Decontamination & Demolition (D&D) Support, Los Alamos National Laboratory. Drafted the health and safety plan for demolishing the four-story Sherwood Building. The project involved occupational exposure to noise, heat stress, removal of asbestos containing materials from the building, and the use cutting torches to cut structural steel that was coated with lead paint, and physical hazards such as the use of scaffolding and heavy equipment. Provided industrial hygiene support for implementation of the OSHA lead standard (29 CFR 1926.62) and the OSHA occupational noise exposure standard (29 CFR 1910.95) for the Washington Group, Inc. during the demolition of the structure (2001).

SNL Environmental Risk and Decision Analysis Dept (6416) Conducted a pathway-by-pathway comparison of the models underlying RESRAD, RESRAD-Build, and DandD computer codes for the Nuclear Regulatory Commission. The comparison was published as NUREG/CR-5512 volume 4. It is concerned with suitability of the models for determining that risk-based criteria for termination radioactive materials licenses have been satisfied (~1999).

SNL Radioactive and Mixed Waste Dept (7577) Provided program support to the Waste Characterization Team Leader; working on issues related to management of naturally occurring radioactive material and developing a generic sampling and analysis plan guidance (~1996). Drafted a position paper on RCRA status of equipment containing circuit boards. Performed an analysis of disposal options for building 870 tritiated wastewater. Working with Waste Management, Inc. to get NMED approval of a proposed waste acceptance criteria for non-oil field NORM for their Subtitle D landfills in New Mexico. Participated in drafting an authorized limit request pursuant to DOE/EH guidance for septic tank mixed waste. Drafted procedures related to on-site transport and characterization of radioactive and mixed waste samples.

SNL Environmental Restoration Technology (6131) Mixed waste management consultation regarding wastes expected from a ground water remediation study.

SNL Accident Analysis/Consequence Assessment (6413) 10 CFR 61 modeling support to Hanford HLW Tank Closure EIS.

SNL Environmental Risk and Decision Analysis (6416) -- Dosimetry model support to NTS Greater Confinement Disposal Performance Assessment for TRU waste. Modeled residential structure shielding factors to provide justification of the selection of the default residential structure shielding factors for the NRC's DandD computer code.

Sludge removal from Los Alamos Neutron Scattering Center, Los Alamos National Laboratory. Provided on-site field industrial hygiene and safety support for pumping radioactive sludge from a industrial waste water holding system and from radioactive liquid waste tanks at the Los Alamos Neutron Scattering Center (LANSCE); this task involved a series of permit-required confined space entries regulated managed under 29 CFR 1910.146 and preparation of a Site-Specific Health and Safety Plan. Responsible for monitoring the confined spaces for oxygen, combustible gases and toxic constituents including mercury vapor. Served the role of attendant or "hole watch".

Feed Materials Production Center Remedial Investigation, Fernald, Ohio . Served as the site health and safety officer for a field investigation that involved using a drilling rig to collect sub-surface samples from landfills, and sludge impoundments that contained radioactive and chemical waste. Most of the sub-surface sampling required the use of chemical protective suits and supplied-air respirators because more than 100 different chemicals were suspected of being present in the landfills and the quantities were unknown (1986-1987).

Cerro Grande Fire Recovery Operations, Los Alamos National Laboratory. Developed site-specific health and safety plans for post-Cerro Grande Wildfire recovery activities (2000).

Indoor Air Quality Investigation of a Santa Fe Shopping Center. Conducted air sampling for organic vapors and formaldehyde on two occasions. Identified the problem as insufficient amounts of outdoor (fresh) air being brought in through the ventilation system (1994-1995).

Health and Safety Support for Recovery of a DOE Materials Storage Area, Paducah Gaseous Diffusion Plant. Site Safety Officer for a series of high profile Level A / Level B

entries into a DOE Materials Storage Area to stabilize a decrepit drum of hydrofluoric acid. There were concerns that a nuclear criticality could occur during the activity because of the potential presence of enriched uranium. This prevented the entry team from disturbing the configuration or position of other containers in the area. The highly toxic and corrosive nature of hydrofluoric acid combined with the unfavorable ventilation of the area required that workers wear fully encapsulating chemical protective "Level A" suits. The drum contents were transferred to a new drum that could be safely moved (2000). Site Safety Officer for remediation of a ~1000 gallon tank storage containing greater-than class C radioactive waste (2000). The tank demolition was performed inside an enclosure designed to prevent the spread of contamination. The tank demolition required the use of Level B personal protective equipment.

General Industrial Hygiene and Safety Support to Various Contractors, Los Alamos National Laboratory. OSHA compliance support, 10 CFR 851 environment safety and health program development and support, job hazard analyses, site specific health and safety plan development, audits, technical reviews, etc. for various LANL ER, drilling and D&D projects (1993 to 2011).

Respirator Fit Testing and Training. Routinely provide commercial quantitative respirator fit testing services and respirator training.

NIOSH Dose Reconstruction Technical Basis Document for Mound Site. Worked with another health physicist to contribute to a draft of the internal dosimetry section of the technical basis document for the Mound site dose reconstruction. (2003-2004).

NIOSH Dose Reconstruction Site Profile Review for LANL Site. Worked briefly on the review of the LANL site profile review (2009).

Uranium Mill Tailings Project Health and Safety Support. Functioned as construction safety inspector on DOE surveillance teams on the Uranium Mill Tailings Remedial Action Project. Provided field health and safety support to drilling activities and field investigations. Wrote a Hazard Communication Plan and site-specific health and safety plans (1985-1986).

Hahn-Meitner Institute for Nuclear Science, Berlin, FRG, Guest Scientist. Studied the reaction of simulated borosilicate radioactive waste glasses with salt brines at elevated temperatures. This work resulted in the characterization or identification of a number of phases that precipitated on the surface of the glasses (1983-1984).

Software Support for TurboFRMAC to Sandia National Laboratories. Wrote test cases and contributed to software specifications for new modules added to the TurboFRMAC radiation release assessment software package (2003 to 2009). Constructed an *ad hoc* database of dose coefficients from DCFPAK 1.4 that was used to test perform independent software testing of Sandia's Radionuclide Viewer software and for use in developing test cases for TurboFRMAC.

Software QA Support for MACCS2 to Sandia National Laboratories. Wrote test cases, tested new modules added to the Nuclear Regulatory Commission's MACCS2 software package and related reactor accident consequence computer codes. Designed, populated and manipulated a large database of EPA Federal Guidance Report 12 and 13 dose

coefficients using Microsoft Access and Wolfram Mathematica to construct standard radiation dosimetry data files of acute and annual equivalent dose factors for distribution with the MACCS2 computer code. This involved interpolating, integrating and parsings millions of lines of raw data. Constructed a census database for the SecPop computer code using MySQL 5.0 and Wolfram Mathematica. This task involved extracting data from the published data of the 2000 economic census, the population census and the agricultural census. Various records had to be reconciled among the data sources; then some simple quantities were calculated, and consolidated tables for use in the SECPOP code were constructed. The product was delivered to Sandia as a set of tables in Microsoft Access format that was distributed with MACCS2 (2003 to present).

Selected Relevant Publications and Presentations

Comparison of the Models and Assumptions used in the DandD 1.0 RESRAD 5.61 and RESRAD-Build 1.50 Computer Codes with Respect to the Residential Farmer and Industrial Occupant Scenarios Provided in NUREG/CR-5512. Draft NUREG/CR-5512, volume 4 (1999).

Compliance Assessment Document for the Transuranic Wastes in the Greater Confinement Disposal Boreholes at the Nevada Test Site, Sandia Report SAND-XX-XXX, Volume 2: Performance Assessment Version 1.0 (2000).

Proposal to Dispose of Remediation Waste Generated during the Cleanup of the LANL Solid Waste Management Unit 73-002 Incinerator Ash Pile at the CSI Landfill in Adams County, Colorado, April 1999. Prepared for LANL EM/SWO.

Request for Approval to Transfer Hazardous Waste Containing Residual Radioactive Material for Disposal at the Chemical Waste Management, Inc. RCRA TSD Facility in Model City, NY, November 1998. Prepared for LANL EM/SWO.

The Role of Data Analysis in Sampling Design of Environmental Monitoring, SAND98-0612, March 1998.

A Prioritization and Analysis Strategy for Environmental Surveillance Results, Health Physics (1997), 73, p. 826.

Methods, Approaches and Uncertainties in Assessing NORM Exposures, Proceedings of the Health Physics Society's 29th Midyear Topical Meeting (1996) p.203.

Phase Formation during Corrosion Experiments with Two Simulated Borosilicate Nuclear Waste Glasses, HMI - B 424. Hahn-Meitner Institute for Nuclear Science Berlin GmbH (1985).

Naturally Occurring Glasses: Analogues for Radioactive Waste Forms, PNL-2776, (1979).

Uranium and Thorium Minerals: Natural Analogues for Radioactive Waste Forms, in *Scientific Basis for Nuclear Waste Management* (1980) p. 281, Vol. 2.

Natural Analogues for Crystalline Radioactive Waste Forms, Part II: Non-actinide Phases, in *Scientific Basis for Nuclear Waste Management,* (1981) p. 299, Vol. 3.

Uranium Study SME	Roger Hansen, J.D.
SME: NEPA, Environmental Laws Current Employment: ROGER P. HANSEN, J.D., AICP Capabilities: Mr. Hansen's experience over 40 years encompasses a wide diversity of environmental regulatory compliance requirements including those pertaining to water quality, air quality, safe drinking water, toxic substances, endangered species, historic preservation, and public lands. His permitting experience has ranged widely and has included such diverse projects as surface coal mines, ski resorts, gold mines, airfields, hazardous waste cleanup, radioactive waste transportation, highways, and even a spaceport. He has taught environmental law at the University of Denver College of Law (DU) and the Colorado School of Mines (CSM). He has also taught political science at Pacific Lutheran University (Tacoma, WA) and environmental ethics and NEPA at the University of Denver.	Senior NEPA Consultant: Trinitex Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials J.D. ❖ University of North Carolina School of Law, Chapel Hill, North Carolina B.S., Journalism, ❖ University of Illinois, Urbana, Illinois Registrations/Certifications: Registered Colorado Attorney (No. 5365) Member, American Institute of Certified Planners (AICP) Member, American Planning Association (APA)

Summary

Mr. Hansen has a multidisciplinary background in environmental and natural resources law, regional planning, and communications. He has worked, mostly in the western states, across a broad spectrum of environmental management and compliance activities at the federal, state, and local levels including those associated with public lands, hazardous and radioactive waste, mining, energy development, transportation, and outdoor recreation. He is an expert in the legal and technical dimensions of National Environmental Policy Act (NEPA) implementation and has supervised or supported preparation of numerous environmental impact statements (EISs), environmental assessments (EAs), and other NEPA documents. He is a former member of the President's Council on Environmental Quality (CEQ) Legal Advisory Committee on NEPA compliance.

Mr. Hansen has provided environmental compliance and/or NEPA support services to nine U.S. Department of Energy (DOE) facilities or laboratories including: Sandia National Laboratories (NM and HI), Waste Isolation Pilot Plant, Hanford, Las Alamos National Laboratory, Idaho National Engineering and Environmental Laboratory, and the Nevada Test Site (NV).

Experience Highlights

NEPA Compliance and Impact Analyses

- **Overall Experience.** Supervised or supported preparation of an estimated 20-30 EISs, EAs, CEs, and other NEPA documents to comply with the requirements of such agencies as the U.S. Department of Energy, U.S. Forest Service, Bureau of Land Management, Federal Aviation Administration, National Aeronautics and Space Administration (NASA), U.S. Air Force, U.S. Navy, and Federal Highway Administration (FHWA). Also worked with "little NEPAs" in California, Hawaii, Washington State, and Montana. Dealt with such issues as: air and water quality, hazardous and radioactive waste, visual resources, cultural resources, endangered species, risk assessment, socioeconomics, transportation, and land use. Conducted training seminars and prepared numerous professional conference papers on NEPA compliance. (See list of publications.)
- **Sandia National Laboratories.** Provided major support and training to Sandia NEPA compliance effort including six EAs and the 1999 site-wide EIS. Authored the *NEPA Compliance Guide* for use by Sandia operations in New Mexico, California, and Hawaii. Conducted several NEPA compliance training workshops for Sandia and other DOE contractor personnel. Authored the *NEPA/CERCLA/RCRA Integration Strategy for the Environmental Restoration Program*.
- **Waste Isolation Pilot Plant (WIPP).** Served as a consultant and regulatory compliance advisor to DOE and Westinghouse Electric Corporation on NEPA compliance for over 20 years. Provided major support for preparation of the WIPP EISs, a Supplement EIS, and other NEPA documents. (WIPP is a DOE geologic transuranic (TRU) waste repository located near Carlsbad, NM.)
- **Northwest Corridor EIS.** Served as a senior consultant and peer reviewer for a Draft EIS (DEIS) on the final link in the "beltway" around Metropolitan Denver being prepared by Felsbrug Holt & Ullevig for the Colorado Department of Transportation (CDOT) and the Federal Highway Administration (FHWA). The EIS addresses freeways, toll roads, and mass transit.
- **City of Mercer Island.** Prepared an EIS for a wireless communication facility (WCF) consisting of a 130-foot monopole with six antenna arrays. Examined the environmental impacts of six alternatives to comply with the Mercer Island, WA Environmental Procedures Code and the Washington State Environmental Policy Act (SEPA).
- **Southwest Regional Spaceport (SRS).** Provided major support to New Mexico State University (NMSU), Physical Science Laboratory (PSL) for preparation of an EIS on a proposed commercial spaceport in southwest New Mexico with the Federal Aviation Administration (FAA) and the New Mexico Office of Space Commercialization (NMOSC) as joint "lead" agencies.

- **U.S. Air Force (USAF) Academy.** Supervised preparation of an EA for an auxiliary training airfield near Colorado Springs which included a comparative environmental analysis of 16 alternative sites.
- **Public Participation.** Organized, implemented, and supported such public participation devices as public meetings, public hearings, workshops, and citizen advisory committees to comply with CEQ and various federal agency requirements.

CERCLA, RCRA, Hazardous and Radioactive Waste Management

- **RCRA "Part B" Permitting.** Provided extensive support to preparation of RCRA Part B permit applications for Rocky Mountain Arsenal (Denver), Pueblo (Colorado) Army Depot, WIPP, LANL, and several private industry clients.
- **Rocky Flats Plant (RFP).** Supervised preparation of work plans for CERCLA ecological risk assessments at a DOE facility near Denver. Interfaced with biological scientists to develop a complex methodology consistent with U.S. Environmental Protection Agency (EPA) guidance. Focused on both terrestrial and aquatic ecosystems.
- **Rocky Mountain Arsenal.** Provided regulatory strategy support for various on-site ground water, soils, geological, and remediation investigations for a DoD facility near Denver, CO.
- **Waste Isolation Pilot Plant (WIPP) DOE Geologic Repository.** Extensively involved with WIPP regulatory compliance issues for many years including NEPA-related environmental impact assessment, air quality, water quality, endangered species, historic/archaeological resources, RCRA, and other EPA requirements. Worked with DOE and Westinghouse on resolving concerns/issues of the State of New Mexico and citizen environmental groups. Authored numerous "white papers" and legal memoranda dealing with RCRA compliance problems and strategies. Served as a member of the WIPP Engineered Alternatives Task Force (EATF) in evaluating engineered alternatives for compliance with EPA requirements in 40 CFR Part 191 and RCRA land disposal restrictions. Supported preparation of the WIPP "no migration" variance petition under 40 CFR § 268.6 which was approved by EPA. Prepared detailed regulatory analyses of oil and gas well drilling, plugging, and abandonment requirements as related to WIPP "human intrusion" scenarios.
- **Nevada Test Site (NTS).** One of five managers designated by IT Corporation to perform tasks associated with a major contract with DOE for consulting services at NTS. Served as the Project Manager for initial strategy development for preparation of a site-wide EIS. Conducted a comprehensive

analysis of federal and state regulatory issues pertaining to the DOE NTS Groundwater Characterization Project (GCP). Analyzed problems and strategies for compliance with requirements contained in NEPA, RCRA, CERCLA, CWA, CAA, SDWA, ESA, related Nevada laws and regulations, and various DOE Orders.

- **Idaho National Engineering and Environmental Laboratory (INEEL).** Prepared a detailed analysis of radioactive, mixed, and hazardous waste regulatory requirements, comparing DOE Order 5820.2A with 10 CFR Parts 60 and 61 and 40 CFR Parts 191, 192, and 260-270. Purpose was to provide background for possible revisions of DOE Order 5820.2A.

Professional Offices and Affiliations (Past and Present)

- **American Bar Association (ABA).** Member, ABA Special Committee on Environmental Law; Chair, Environmental Quality Committee, ABA Section of Environment, Energy, and Resources (EER); Member of EER Section Council (Board of Directors); co-founder, ABA Annual Keystone Conference on Environmental Law.
- **National Association of Environmental Professionals (NAEP).** Member and co-author of professional papers presented at annual conferences in 1993, 1994, 1996, 1997, 1998, 2000, and 2006. Current member, NEPA Working Group.
- **U.S. Environmental Protection Agency (EPA).** Member, National Advisory Committee on Hazardous Materials.
- **Council on Environmental Quality (CEQ), Executive Office of the President.** Member of 11-member Legal Advisory Committee.
- **American Institute of Certified Planners (AICP).** Member and certified land use planner. Also, member of the American Planning Association (APA).

Employment History

- **Principal, Hansen Environmental Consultants, Denver and Aurora, CO (1992-Present).** Providing a broad range of environmental regulatory and NEPA support services to government agencies and consulting firms. Currently consulting on the Northwest Corridor EIS in Metropolitan Denver.
- **Senior Regulatory Specialist and Program Director, IT Corporation, Denver, CO (1978-1992).** Responsible for environmental regulatory analyses, permitting documentation, NEPA compliance services, and technical and legal support for permitting and operation of mining, mineral processing, and energy development projects as well as hazardous, radioactive, and mixed waste management facilities.

- **Project Officer, National Coal Technology Assessment, U.S. Environmental Protection Agency, Research Triangle Park, NC (1976-1978).** Provided project management of a national-level "technology assessment" focusing on the environmental, legal, social, economic, and policy aspects of the development and deployment of advanced coal technologies. (Temporary assignment.)
- **President, Hansen & O'Connor, P.C., Denver, CO (1974-1976).** Organized and headed a small law firm specializing in environmental legal aspects of mining, energy development, and recreation resorts.
- **Executive Director, Rocky Mountain Center on Environment (ROMCOE), Denver, CO (1967-1974).** Founded ROMCOE to serve as an environmental service center and a "forum" for business, government, academia, and the environmental community in the eight Rocky Mountain states (CO, UT, NM, AZ, NV, ID, MT, and WY).

Selected Publications

Hansen, R.P., T.A. Wolff, and A.G. Melcher, 2007, "NEPA and Environmental Streamlining: Benefits and Risks," *Environmental Practice*, Journal of the National Association of Environmental Professionals, Vol. 9, No. 2, June 2007, pp. 83-95.

Hansen, R.P., and T.A. Wolff, 2000, "Making NEPA More Effective and Economical for the New Millennium," *Federal Facilities Environmental Journal* Vol. 11, No. 3, Autumn 2000, pp. 61-70.

Hansen, R.P., and T.A. Wolff, 1998, "Streamlining the Process: A Strategy for Making NEPA Work Better and Cost Less," *Proceedings of the 23rd Annual Conference of the National Association of Environmental Professionals*, San Diego, CA (June 20-26, 1998).

Hansen, R.P., T.A. Wolff, and L.A. McCold, 1997, "The Conflict of Interest Problem in EIS Preparation," *Proceedings of the 22nd Annual Conference of the National Association of Environmental Professionals*, Orlando, FL (May 19-22, 1997).

Hansen, R.P., and T.A. Wolff, 1996, "Tools for NEPA Compliance: Baseline Reports and Compliance Guides," *Proceedings of the 21st Annual Conference of the National Association of Environmental Professionals*, Houston, TX (June 2-6, 1996).

Hansen, R.P., 1995, *National Environmental Policy Act (NEPA) Compliance Guide* Sandia National Laboratories, SAND95-1648, Sandia National Laboratories, Albuquerque, NM (August 1995). (Available from National Technical Information Service, U.S. Department of Commerce.)

Wolff, T.A., and R.P. Hansen, 1994, "Use of Comprehensive NEPA Documents to Reduce Program Risk," *Proceedings of the 19th Annual Conference of the National Association of Environmental Professionals*, New Orleans, LA (June 12-15, 1994).

Hansen, R.P., and T.A. Wolff, 1993, "NEPA/CERCLA/RCRA Integration: Policy vs. Practice," *Proceedings of the 18th Annual Conference of the National Association of Environmental Professionals*, Raleigh, NC (May 24-26, 1993).

Wolff, T.A., and R.P. Hansen, 1993, "The NEPA Threshold Question Revisited: Proposed Actions and Continuing Activities," *Proceedings of the 18th Annual Conference of the National Association of Environmental Professionals*, Raleigh, NC (May 24-26, 1993).

Hansen, R.P., 1992, *NEPA/CERCLA/RCRA Integration Strategy for Environmental Restoration Program Sandia National Laboratories*, SAND92-7312, Sandia National

Laboratories, Albuquerque, NM (October 1992). (Available from National Technical Information Service, U.S. Department of Commerce.)

Hansen, R.P., 1992, "Environmental Law: Looking Back 25 Years," *Proceedings Technology Exchange Symposium*, International Technology Corporation (June 1992).

Hansen, R.P., 1991, "Regulation of Radioactive Mixed Waste Under RCRA," *Proceedings of Haztech International Eighth Annual Conference and Exhibition*, pp. 1A-9 to 1A-21 (1991).

Hansen, R.P., 1989, "Application of RCRA to Radioactive Mixed Waste," *Proceedings of 1989 Third Annual Conference and Exhibitions*, Colorado Hazardous Waste Management Society (1989).

Hansen, R.P., and J.S. Hart, 1988, "Regulation of Radioactive Mixed Waste at the Waste Isolation Pilot Plant (WIPP) Under the Resource Conservation and Recovery Act (RCRA)," *Proceedings of Waste Management '88*, Tucson, AZ, Vol I, pp. 929-934 (1988).

Fedrickson, C.L., R.P. Hansen, and J.S. Hart, 1987, "Issues and Viewpoints Concerning the Application of RCRA to Radioactive Waste Management Facilities," *Proceedings of Waste Management '87*, Tucson, AZ, Vol. 3, pp. 711-716, AZ (1987).

Hansen, R.P., 1986, "Managing the Liability of Responsible Parties at Superfund Sites," *Hazardous Substances*, pp. 11-19 (December 1986).

Hansen, R.P., 1981, "Technology Assessment: A Social Impact Perspective on Alternative Energy Technologies," *Social and Political Perspectives on Energy Policy*, K.M. Gentemann, Ed., Praeger Publishers, New York, NY, pp. 18-33 (1981).

Hansen, R.P., 1981, "Environmental Siting of a Major Coal Syfuels Facility in the Northern Great Plains," *Proceedings of Fourth Annual Coal Utilization Exhibition and Conference, Coal Technology '81*, Houston, TX, pp. 197-232 (1981).

Hansen, R.P., 1976, "Historic and Landmark Preservation: A Creative Trusteeship," *Proceedings of Southwestern Legal Foundation Institute on Planning, Zoning, and Eminent Domain*, Houston, TX, Matthew Bender & Co., pp. 69-118, (1976).

Uranium Study SME	John Hart
SME: Regulatory Compliance Specialist, NEPA, RCRA, Environmental Laws, QA Current Employment: John Hart and Associates Capabilities: Mr. Hart has over 32 years experience in environmental regulatory compliance, primarily for U.S. Department of Energy (DOE) and commercial nuclear facilities. He has technical and management experience under a variety of federal and state environmental laws and regulatory programs, including the Nuclear Waste Policy Act, the National Environmental Policy Act (NEPA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), the Clean Air Act, the Clean Water Act, and the Endangered Species Act. He has experience in obtaining environmental permits and approvals for uranium milling operations in New Mexico.	Senior Regulatory Consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials MS Environmental Science, ❖ Indiana University School of Public and Environmental Affairs, Bloomington, Indiana, B.A., Geography and Environmental Studies, ❖ Indiana University, Bloomington, Indiana, Additional Training: Hazardous Materials Health and Safety Training Courses Advanced Project Management Professional Development Courses

Mr. Hart has been the owner and operator of an environmental consulting group since 1989. He has supported regulatory programs at multiple DOE nuclear facilities including the Waste Isolation Pilot Plant, the Yucca Mountain Project, the Feed Materials Production Center, the Nevada Test Site, the Hanford Reservation, the Oak Ridge National Laboratory, and the Los Alamos National Laboratory. Mr. Hart specializes in helping clients find cost-effective compliance approaches for a variety of environmental protection regulatory programs.

He has experience with planned-facility start up regulatory assessments and environmental permitting including the development of airborne pollutants emissions inventories, notices of intent to discharge waterborne contaminants, archaeological resources protection planning, and threatened and endangered species impact evaluations. Much of his experience pertains to regulatory analyses, including multi-program regulatory and standards comparisons. He has authored and co-authored many documents focused on communicating the results of complex nuclear-facility risk evaluations in clear terms, easily understood by the general public.

In addition to his management duties, Mr. Hart provides environmental consulting services to DOE contractors and laboratories, other government clients, and commercial clients. Much of his work is in support of the DOE's Waste Isolation Pilot Plant (WIPP), a geologic repository for radioactive mixed waste, located near Carlsbad, New Mexico. He supported the preparation of a Compliance Recertification Application (CRA) which was submitted by the DOE to the EPA to obtain EPA's

concurrence that the WIPP may continue to operate in compliance with the requirements of 40 CFR Parts 191 and 194, EPA's environmental performance standard. He was a principal author of the WIPP Experimental Program Plan, a document submitted by the DOE to the EPA, in accordance with the WIPP Land Withdrawal Act. Mr. Hart has also supported the development of regulatory-compliance strategy documents for the WIPP, assisted in evaluating compliance.

Project Manager/Section Chief - Assisted the Westinghouse Electric Corporation in complying with RCRA requirements for the disposal of radioactive mixed waste in the WIPP. Directed the preparation of the draft No-Migration Variance Petition pursuant to the 40 CFR Part 268 land disposal restrictions. This work required the development of regulatory-compliance strategies, preparation of numerous background papers, and frequent negotiation with the EPA reviewers of the petition.

Project Manager - Under contract to the Reynolds Electrical and Engineering Company, Inc. (REEC), managed the preparation of multiple RCRA-compliance documents for radioactive mixed waste management units at the DOE's Nevada Test Site, including closure plans, ground water monitoring waiver requests, Health and Safety Plans and Quality Assurance Program Plans.

Project Scientist - Supported the development of license applications for uranium milling operations at United Nuclear Churchrock, near Gallup, NM, and Homestake Mining, near Grants, NM.

Project Scientist - Evaluated technical and regulatory issues pertaining to the characterization and disposal of radioactive mixed wastes stored in underground tanks at the Hanford Reservation. Included analysis of the implications of relevant DOE Orders and federal and State hazardous waste laws and regulations.

Project Coordinator - Responsible for the preparation of RCRA permit applications addressing hazardous and radioactive mixed waste units at the Hanford Reservation, SNLA, and the Los Alamos National Laboratory (LANL).

Project Manager - Coordinated the preparation of 18 closure plans at a RCRA/CERCLA site operated by a Colorado aerospace industries client. The project involved the assimilation of information on the units to be closed, site environmental characteristics, and the development of detailed site investigation and closure/remediation plans. Assisted the client in negotiations with the Colorado Department of Health (CDH) and EPA Region VIII concerning soil and ground water decontamination criteria to be applied to the sites. Each closure plan has been approved by the CDH.

Project Scientist - Contributed to the completion of a hazardous waste site investigation at SNLA. The site is an inactive chemical waste landfill where a variety of hazardous materials, including organic compounds and radioactive wastes, were disposed of over many years. The project included exploratory

drilling, trenching, sampling, and both on- and off-site laboratory analyses. Also contributed to the development of a facility-wide waste volume reduction plan and a laboratory-wide Spill Prevention, Control and Countermeasures (SPCC) Plan, and the installation of ground water monitoring wells in compliance with RCRA requirements.

Indiana University

Bloomington, Indiana

1977 - 1979

Research Assistant - Served as a research assistant supporting an inventory and ecological analysis of Great Lakes coastal wetlands for the U.S. Fish and Wildlife Service.

Southwestern Indiana and

Kentucky Regional Council of Governments

Evansville, Indiana

1975 - 1976

Planner - Supported comprehensive planning activities including land use surveys, demographic studies, neighborhood analyses and transportation studies for a regional planning agency encompassing six counties in southern Indiana and western Kentucky.

Publications and Technical Presentations

Mr. Hart has authored and presented a number of technical publications at national and regional professional meetings. He has been an invited speaker at environmental regulatory compliance training seminars. Technical and regulatory-compliance aspects of various project activities and research programs, and provided support to the development of compliance applications. He coauthored management plans for programs to comply with 40 CFR Part 191 and RCRA requirements for passive institutional controls and long-term monitoring. He assisted Sandia National Laboratories in the development of quality assurance procedures to control Sandia's scientific and engineering research programs related to the WIPP Project. Mr. Hart supported a DOE system-wide study of benefits and detriments associated with the implementation of various optional engineering alternatives for the disposal of waste in the WIPP repository.

He supported scoping assessments for the Yucca Mountain repository environmental impact statement. Mr. Hart supported the resolution of issues related to the emplacement of radioactive mixed waste in the repository.

Mr. Hart co-founded Benchmark Environmental Corporation in 1989, serving as Vice President, Treasurer, and Project Manager. In addition to his administrative duties, Mr. Hart provided technical support to clients, as described below:

Project Manager - Provided environmental support services to the Westinghouse Electric Corporation, the Management and Operations Contractor at the WIPP.

Tasks performed include preparation of a RCRA Compliance Plan, a regulatory compliance tracking database, and a No-Migration Variance Petition for the WIPP.

Also supported the development of a detailed plan to monitor volatile organic compound (VOC) emissions from the WIPP. VOC emissions monitoring was required by the EPA to support DOE's demonstration of "no-migration" of hazardous wastes from the repository.

Mr. Hart served on a six-member DOE task force developing an overall regulatory compliance criteria document for the WIPP. This document defines criteria for DOE's demonstration of compliance with requirements of 40 CFR Parts 191, 268 and 264.

Project Manager - Provided environmental regulatory compliance services to Sandia National Laboratories (SNL). Support focused on implications to the WIPP of compliance with 40 CFR Part 191, Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Waste.

Project Manager - As a subcontractor to the IT Corporation, provided support to the development of the RCRA permit application for the Test Phase of the WIPP project. International Technology Corporation . **Project Manager/Project Scientist** - Prepared NEPA documentation for the WIPP, SNLA and the DOE's Feed Materials Production Center, located near Fernald, Ohio. This work included the preparation of portions of the WIPP Final Environmental Impact Statement (EIS), management of the assessment of risks posed by hazardous constituents and radiation for the Supplemental EIS, and participation in numerous environmental evaluations of project modif

Uranium Study SME	Ahmed Hasan, Ph.D.
SME: Radiation chemist, geohydrological modeling Current Employment: Institute for Engineering Research and Applications New Mexico Tech University Capabilities: Past research experience and interests focused on Low- and high-level radioactive waste disposal, conditioning of radioactive waste, radiation protection, and subsurface contaminant transport. I gained experience in the interaction of inorganic contaminants with mineral surfaces, physicochemical characterization of soil and mineral surfaces, development of geochemical codes, mass transfer limited trace element sorption in porous adsorbents, and radionuclide migration. Past research has included investigation of some radionuclides of environmental interests with different types of soils and rocks. Other research program includes hazardous and mixed waste; and colloidal transport of radioactive and metal contaminants and their applications to remediation, performance assessment of the high-level radioactive waste repositories, colloidal transport of contaminants and, disposal of Greater-than-Class C radioactive waste.	Scientist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials Ph.D. Chemistry ❖ Ain Shams University, Egypt MS Chemistry ❖ Ain Shams University, Egypt B.S. Geochemistry ❖ Ain Shams University, Egypt

Appointments

- 2009 – Present: Adjunct Professor, Chemical Engineering Department, New Mexico Institute of Mining and Technology
- 2005 – Present: Senior Research Scientist, New Mexico Institute for Engineering Research and Applications, New Mexico Tech University (IERA-NMIMT)
- 2002 – 2005: Limited term Employee, Sandia National Laboratories, Albuquerque, New Mexico
- 1999 – 2002: Senior Research Scientist II, New Mexico Engineering Research Institute NMERI), University of New Mexico (UNM)
- 1995-1999: Research Scientist I, Institute for Space and Nuclear Power Studies (ISNPS), University of New Mexico
- 1994-1995: IAEA Fellow, Sandia National Laboratories, Albuquerque, NM
- 1987-1994: Research Scientist ()—Egyptian Atomic Energy Authority's Hot Laboratories and Waste Management Center (EAEA-HLWMC)

Synergistic Activities

- Session Chair in the "Entrepreneurs in the Shade of Global Trade) Conference, 2-4th of November, 2009, Jeddah, Saudi Arabia.
- Organized and Chaired a workshop on "Economic Viability of Biofuels for the State of New Mexico", Albuquerque, New Mexico, August 17-18, 2009.
- Organized and chaired an international workshop on sustainable Development of Desert Areas, Cairo, Egypt, February 13-15, 2004.
- Investigated the environmental conflict around the Black Sea and what are the different alternatives to solve these problems.
- Co-organizing the International Conference on Hazardous Waste: Sources, Effects, and Management, 12-16 December 1998, Cairo, Egypt.
- Contributed to the understanding of the groundwater budget at the South valley, Albuquerque, NM using the Groundwater Modeling System (GMS) code.
- Managed the Integrated Management Program for Radioactive Sealed Sources in Egypt. Cradle-to-Grave management of sources that includes Tracking, Awareness, Security, Regulations, Recovery, Transportation, Storage, Recycling, Conditioning, Disposal, and Emergency Response. A five million dollar program funded by the USAID.
- Developed Research Collaborative Agreement between NMT and EAEA and developed two agreements between NMT and Sinai University in academic and research cooperation.
- Developed Memorandum Of Understanding (MOU) between Sandia National Laboratories (SNL) and the Egyptian Atomic Energy Authority (EAEA) in 1996.
- Managed the technical interactions between Los Alamos National Laboratory (LANL) and EAEA through the DOE sister laboratory agreement 1994-2003.
- Supervised and trained 15 IAEA fellows at SNL and NMT since 1996.
- Supervised and hosted about 30 Egyptian students and visitors at NMT and SNL
- Participated in Track II efforts for the Multilateral Peace negotiation in the Middle East in 1996.
- Professional and technical accomplishments includes: Building and running of Analytical Laboratories; Physicochemical characteristics of subsurface contaminants; Performance Assessment of Radioactive Waste Disposal Facilities; and Water Shed and Water Budget

Collaborators and Other Affiliations

Advisors:

1. Professor Mohamed El-Genk: Director Institute for Space and Nuclear Power Studies, University of New Mexico.
2. Professor Hisham F. Aly, Egyptian Atomic Energy Authority, Cairo, Egypt
3. Professor Sohir El-Reefy, Egyptian Atomic Energy Authority, Cairo, Egypt
4. Professor Saad El-Said, Chemistry Department, Ain Shams University, Cairo, Egypt

Sample of Collaborators and Co-Editors:

5. Professor, Erik Nuttal, Chemical and Nuclear Engineering Department, University of New Mexico

6. Professor Bruce Thompson, Civil Engineering Department, University of New Mexico
7. Professor Misra Manoranjan, Metallurgical and Materials Engineering, University of Reno, Nevada
8. Dr. Barbara Smith, Los Alamos National Laboratory, Los Alamos, New Mexico
9. Dr. Robert C. Moore, Sandia National Laboratories, Albuquerque, New Mexico
10. Mr. Johan Cochran, Sandia National Laboratories, Albuquerque, New Mexico
11. Dr. Karim El-Adham, National Center for Nuclear Regulatory Control, Cairo, Egypt
12. Dr. Kent Biringer, Sandia National Laboratories
13. Dr. Amir Mohagegy, Sandia National Laboratories
14. Dr. Kenneth Apt, Los Alamos National Laboratories
15. Dr. Said El-Nashaie, Dean, College of Engineering, Sinai University
16. Dr. Gautam Priyadarshan, Metallurgical and Materials Engineering, University of Reno, Nevada
17. Professor Ken Czerwinski, Department of Chemistry, University of Nevada, Las Vegas

Sample of students and Trainees:

Dr. Cleodia Cassia, Dr. Perez Guerrero, Jesus Salvador, Dr. Mahmoud Ali (EAEA); Dr. Yasser Tawfik (EAEA), Dr. Tarek Mohamadden (Nuclear Material Authority (NMA), Egypt; Dr. Khalid Fouad, (NMA), Dr. Hisham Kadry (NMA), Dr. Mona Gasser (EAEA), Dr. Nasser Awwad (EAEA), Dr. Mona EL-Hazek (NMA), Dr. Mohsen Ali (NMA), Dr. Aisha Al-Dakroury (EAEA), Dr. Mohamed Zaid (EAEA); Dr. Hamdy Gad (EAEA); Dr. Rehab Hassan (EAEA); Mr. Dannel Maquiz (NMT).

Research and Technical Areas of Specialization

Current experience is related to developing an Integrated Model for sustainable development. The IMSD is an innovative approach that will have a broader impact on the economic development by enabling technology integration that help remote communities, optimize the sustainability of resources for existing communities, and promote further housing and communities' development in desert environment. A partnership between the private sector and universities in the U.S. to develop an IMSD will help employ students to facilitate the knowledge transfer and provide them with the necessary skills to support the private sector upon their graduation. Additionally, the IMSD would enable the private sector and universities in the U.S. to assist the regulators to develop the laws that protect the environment and sustain the energy and water resources while promote economic development.

Recent experience includes Integrated Management of Radioactive Sealed Sources (IMPRSS). Cradle-to-Grave management of radioactive sources ensures the safety and security of sources during its life cycle. I managed 13 tasks under the IMPRSS project such as Tracking, Awareness, Security, Regulation, Recovery, Storage, Transportation, Recycling, Conditioning, Disposal, QA/QC and Emergency response. experienced in many technical issues related to safety and security of radioactive sealed sources.

I supervised more than 23 fellows from the International Atomic Energy Agency (IAEA) who received their training in many areas such as disposal of low- and high-level radioactive waste, decommissioning and decontamination, and water and

wastewater treatment. Since 1996, I support various actions sheets between U.S. DOE/ LANL and Egypt under the sister laboratory program in areas of radioactive waste management and environmental monitoring.

Past research experience and interests focused on Low- and high-level radioactive waste disposal, conditioning of radioactive waste, radiation protection, and subsurface contaminant transport. I gained experience in the interaction of inorganic contaminants with mineral surfaces, physicochemical characterization of soil and mineral surfaces, development of geochemical codes, mass transfer limited trace element sorption in porous adsorbents, and radionuclide migration. Past research has included investigation of some radionuclides of environmental interests with different types of soils and rocks.

Other research program includes hazardous and mixed waste; and colloidal transport of radioactive and metal contaminants and their applications to remediation, performance assessment of the high-level radioactive waste repositories, colloidal transport of contaminants and, disposal of Greater-than-Class C radioactive waste.

The research area of Contaminant Transport encompassed the physics and chemistry of the fate and transport of contaminants in aquifers; the application of geophysical techniques to detection of contaminants. The research area of Integrated Watershed Systems encompassed land use practices and resource management; modeling of stream flow; flash flood analysis; measurement and modeling of surface water/ground-water interactions; modeling the impacts of mining; and modeling of environmental remediation practices.

Professional and Technical Accomplishments

Building and running of Analytical Laboratories

Constructed and equipped three analytical laboratories at the Egyptian Atomic Energy Authority, and on laboratory at the University of New Mexico. At EAEA, one of the labs was specialized in characterization of chemical and radiological characteristics of various radionuclides. The labs were equipped with several analytical instrumentation such as UV, IR, Multichannel Analyzers, High-performance liquid chromatograph (HPLC), Potentiometric titration, and Inductive Coupled Plasma-Mass Spectroscopy (ICP-MS). Operated and maintained three COULTER instruments for colloids characterization, DELSA 440, LS 230, and Multisizer, at UNM. Developed a laboratory technique for testing online filters for removal of colloidal and soluble contaminants.

Physicochemical characteristics of subsurface contaminants

Contributed to the understanding of the distribution coefficients of different radionuclides onto various minerals and rocks in the Egyptian soil under different chemical conditions. Identified the geochemical needs and parameters for potential low-level radioactive waste disposal facility in Egypt. Converted one of the major geochemical codes used for the Waste Isolation Pilot Plant (WIPP) from Unix platform to PC user friendly platform. Contributed to the understanding of uranium adsorption/desorption onto colloidal materials such as Iron Oxide and Silica colloids.

Performance Assessment of Radioactive Waste Disposal Facilities

Contributed with SNL in developing performance assessment methodologies for the low-level radioactive waste disposal, waste Isolation Pilot Plant (WIPP), Radioactive Sealed Sources (RSS) and Yucca Mountain Project (YMP). Reviewed and edited all the IAEA and NRC regulations to provide a goal for the performance assessment of low-level radioactive waste facilities. Converted the geochemical code FMT2.0 from Unix to PC platform and ran several test cases for WIPP performance assessment. Conducted some experimental work to study the adsorption/desorption of various radioactive elements onto different substrates. Played a major role for assessing the potential colloid formation at YM drift and their potential for enhancing the migration of radionuclides. Reviewed and edited the IAEA, South Africa, and Russia programs for the borehole disposal of radioactive sealed sources.

Water Shed and Water Budget

I contributed to the understanding of the groundwater budget at the South valley, Albuquerque, NM using the Groundwater Modeling System (GMS) code, which was developed by the US corp. of Engineering. I also, investigated the environmental conflict around the Black Sea and what are the different alternatives to solve these problems. I reviewed several models and international agreements on water budget and water quality. I am helping SNL to expand its water surety program to the Middle East and solve water-related problems such as Mountain Aquifer between Jordan and Israel, and the Nile Basin Initiative.

International

- Developed two Academic and Research agreements with Sinai University, Egypt.
- Developed Memorandum Of Understanding (MOU) between SNL and EAEA in 1996.
- Facilitate technical interactions between Los Alamos National Laboratory (LANL) and EAEA through the Doe sister laboratory agreement since 1994.
- Facilitate technical interactions between NMT and EAEA through the research collaborative agreement since 1995.
- Supervised and trained 15 IAEA fellows to SNL and NMT since 1996.
- Hosted 30 foreign nationals at SNL and NMT
- Participated in Track II efforts for the Multilateral Peace negotiation as part of the Egyptian Delegation in 1996.
- Participated in organizing the International Conference on Hazardous Waste: Sources, Effects, and Management, 12-16 December 1998, Cairo, Egypt.
- Managed the Integrated Management Program for Radioactive Sealed Sources in Egypt. Cradle-to-Grave management of sources that includes Tracking, Awareness, Security, Regulations, Recovery, Transportation, Storage, Recycling, Conditioning, Disposal, and Emergency Response.

HONORS AND AWARDS

US-Egypt S&T Junior Scientist Award: August 2008

Excellence Performance Award: Ain Shams University, 1984, 1985 and 1986.

IAEA Award: Training fellowship at SNL for 12 months, 1994.

MEMBERSHIP AND ACTIVITIES AT PROFESSIONAL SOCIETIES

- **American Nuclear Society, Trinity Section:** Member since 1996
- **American Chemical Society:** Member since 1999.
- **Member of the Organizing Committee of the International Conference on Hazardous Waste: Sources, Effects, and Management, Cairo, Egypt.**

SAMPLE PUBLICATIONS

1. Cooperative Monitoring and Its Role in Regional Security, Kent Biringer, John Olsen, Richard Lincoln, Fred Wehling, Wayne Einfeld, Pauline Spaulding, Ahmed Hasan, and David Betsil, SAND97-0523, 1997.
2. Interaction of Uranium with Silica Colloids, Ahmed A. Hasan and Mohamed S. El-Genk, WERC/WRHSRC/NMHWMS Joint Conference on Environment, Albuquerque, NM, March 31-April 1, 1998.
3. In Situ Biological Denitrification of Groundwater, Lijun Deng, H. Eric Nuttal, Abdesselam Abdelouas, Yongming Lu, Werner Lutze, and Ahmed Hasan, WERC/WRHSRC/NMHWMS Joint Conference on Environment, Albuquerque, NM, March 31-April 1, 1998.
4. An investigation of Uranium Interactions in Batch and Column Techniques, Ahmed Hasan and Mohamed El-Genk, WERC/WRHSRC/NMHWMS Joint Conference on Environment, Albuquerque, NM, March 31-April 1, 1998.
5. Egyptian Nuclear Program: Radioactive Waste Management, Ahmed Hasan, Paul Davis, and John Cochran, 219 ACS National Meeting, San Francisco, California, March 26-30, 2000.
6. Colloids Formation, Stability, Interactions and Transport at Yucca Mountain Drift, A.A. Hasan, S. Alcorn, and B. MacKinnon, 219 ACS National Meeting, San Francisco, California, March 26-30, 2000.
7. Egyptian Radioactive Waste Management Program, Ahmed Hasan, and John Cochran, GlobeEx 2000 International Energy Conference Las Vegas, Nevada USA July 23-28, 2000.
8. Containment of Uranium in the Proposed Egyptian Geologic Repository for Radioactive Waste Using Hydroxy Apatite: A comparison of Synthetic and Animal Bone Derived Hydroxy Apatite for Sorption of Uranium. Mahmoud A. Hasan, Robert C. Moore, Ahmed Hasan, Kathleen Holt, Fred Salas. 9th International Conference on Chemistry and Migration Behavior of Actinides and Fission Products in the Geosphere, Gyeongju, Korea, September 21-26, 2003.
9. Formation of Calcium Apatite in Soils Using Calcium Citrate and Sodium Phosphate for Control of Strontium Migration. Robert C. Moore, Ahmed Hasan, Mahmoud Mohamed, Kathleen Holt and Fred Salas. 9th International Conference on Chemistry and Migration Behavior of Actinides and Fission Products in the Geosphere, Gyeongju, Korea, September 21-26, 2003.
10. Protecting the Human Health and the Environment from Sealed Sources. K. El-Adham, A.A. Hasan, M. R. El-Sorougy, International Conference on National Infrastructures for Radiation Safety: Towards Effective and Sustainable Systems. Rabat, Morocco, 1-5 September 2003. IAEA-CN-107.
11. Integrated Management Program for Radioactive Sealed Sources in Egypt. Ahmed Hasan, John Cochran, Karim El-Adham and Rashad El-Sorougy, WM'03, February 23-27, 2003, Tucson Arizona.
12. Containment of Uranium in the Proposed Egyptian Geologic Repository for Radioactive Waste Using Hydroxy Apatite: A comparison of Synthetic and Animal Bone Derived Hydroxy Apatite for Sorption of Uranium. Mahmoud A. Hasan, Robert C. Moore, Ahmed Hasan, Kathleen Holt, Tom Headley, Hongting Zhao and Fred Salas Sandia Report SAND2004-1243.

13. Sorption of Plutonium (VI) by Hydroxyapatite. R.C. Moore, M. Gasser, N. Awwad, K.C. Holt, F.M. Salas, A. Hasan. Journal of Radio analytical and Nuclear Chemistry, Vol. 263, No. 1 (2005) 97-101
14. Integrated Management Program for Radioactive Sealed Sources in Egypt. Ahmed Hasan, Karim El-Adham. ANES/SENA 2004 Symposium, Miami Beach, Florida, October 3-6, 2004.
15. Waste Generated from LMT-AMTEC Reactor Concept. A. Hasan. T.F. Mohammaden, Y.T. Mohamed. Waste Management 1003 Symposium, February 23-27, 2003. Tucson, Arizona.
16. Integrated Management Program for Radioactive Sealed Sources in Egypt. A. Hasan, J.R. Cochran, El-Adham, R. El-Sorougy. Waste Management 1003 Symposium, February 23-27, 2003. Tucson, Arizona.
17. Overview on Backfill Materials and Permeable Reactive Barriers for Nuclear Waste Disposal Facilities. Mahmoud A. Hasan, Robert C. Moore, Kathleen C. Holt, and Ahmed A. Hasan. SAND2003-2101. Printed October 2003
18. Anionic Sorbents for Arsenic and Technetium Species. Robert C. Moore, Kathleen C. Holt, Hongting Zhao, Ahmed Hasan, Mahmoud Hasan, Ranko Bontchev, Fred Salas, and Daniel Lucero. SAND2003-3360. Printed September 2003
19. Integrated Management Program for Radioactive Sealed Sources in Egypt. Ahmed Hasan and Karim El-Adham. The 227th ACS National Meeting, Anaheim, CA, March 28- April 1, 2004.
20. Development of Intermediate-Depth Borehole Disposal for Unwanted Radioactive Sources in Egypt. J. R. Cochran, A. Hasan, K-El-Adham, M.A.H. Abdel Aziz, and Y.T. Mohamed. WM'05, February 27-March 3, 2005, Tucson, Arizona.
21. Greater Confinement Disposal of Radioactive Waste in Borehole Facilities. J. Cochran, Ahmed Hasan. International Symposium on Disposal of Low Activity Radioactive Waste, Cordoba, Spain, 13-17 December 2004.
22. Sorption of Selenium by Bovine Derived Hydroxyapatite
Mona Gasser⁽¹⁾, Nasser Awwad⁽¹⁾, Robert C. Moore⁽²⁾, Kathleen Holt⁽²⁾, Charles Sanchez⁽³⁾, Hongting Zhao⁽²⁾, and Ahmed Hasan⁽¹⁾. Journal of Chemical and Engineering Data (in press)
23. "In Situ Formation of Apatite in Soil and Groundwater for Containment of Radionuclides and Heavy Metals" R.C. Moore, K. Holt, C. Sanchez, H. Zhao, F. Salas, A. Hasan, and D. Lucero. SAND Report, SAND2002-3642.
24. "Sorption of Arsenic from Drinking Water to Mg(OH)₂, Sorrel's Cements, and Zirconium Doped Materials" R.C. Moore, K. Holt, H. Zhao, F. Salas, A. Hasan, and D. Lucero. SAND Report, SAND2002-3641.
25. Sorption of Np(V) by Hydroxyapatite. Robert C. Moore, Kathleen Holt, Nasser Awwad, Mona Gasser, Charles Sanchez, Hongting Zhao, and Ahmed Hasan. Radiochimica Acta, 2003, v.91(12), p. 721-727
26. Formation of Hydroxyapatite in Soils Using Calcium Citrate and Sodium Phosphate for Control of Strontium Migration. Robert C. Moore, Charles Sanchez, Kathleen Holt, Ahmed Hasan, Mahmoud A. Hasan, Hongting Zhao, and Fred Salas. In press J. Contaminant Hydrology.

Uranium Study Technical Lead	Sheldon Landsberger, Ph.D.
Technical Lead: Radiochemistry Current Employment: Professor and Coordinator of Nuclear and Radiation Engineering Program, UTA Capabilities: Radiation measurements, uranium and trace metals analysis, health physics, international environmental and radiation studies, uranium fuel cycle, in-situ leaching environmental impacts, Over 40-years experience.	Senior Scientist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials PhD, Chemical Engineering ❖ University of Toronto MS, Physics ❖ Concordia University MS, Nuclear Chemistry ❖ Salford University BS, Chemistry/Mathematics ❖ Sir George Williams Univ.

Dr. Landsberger has more than 180 published papers and 120 conference proceedings. For the past 30 years he has been involved in a wide variety of environmental projects including analysis of various media for heavy metals and radioactivity. Some of his work has included: 1. Abestos Pollution Assessment in River Water by PIXE Methods, 2. The Determination of Heavy Metals (Al, Mn, Fe, Ni, Cu, Zn, Cd and Pb) in Urban Snow Using an Atomic Absorption Graphite Furnace, 3. Rapid Determination of Selenium in Various Marine Organisms by Instrumental Neutron Activation Analysis, 4. Sulphur and Heavy Metals in Urban Snow: Multi-Elemental Techniques and Analytical Interpretation, 5. Non-Destructive Determination of Arsenic in Urine, 6. Studies of Radioactivity and Heavy Metals in Phosphate Fertilizer, 7. Determination of Heavy Metals in the Rock River (Illinois) Through the Analysis of Sediments, 8. Arsenic, Chromium and Nickel Determination in Human Samples, 9. Low-Level Radioactive Waste Stream Analysis in a Neutron Activation Analysis Laboratory, 10. Heavy Metals in Urban Soils of East St. Louis, and 11. The Determination of Uranium in Food Samples.

Dr. Landsberger has also been involved in sampling of soils for heavy metal contamination. He also has oversight to sophisticated low-level gamma-ray counting for naturally occurring radioactive material and fission product identification. He continually involved in the determination of heavy metals using neutron activation analysis.

ACADEMIC POSITIONS

UNIVERSITY OF TEXAS

Professor and Coordinator of Nuclear and Radiation Engineering Program, 1997- present

Mechanical Engineering, Energy Thrust Coordinator for Clean and Efficient Energy Technologies, 2007-2009

Director Nuclear Engineering Teaching Lab 2002-2007

UNIVERSITY OF ILLINOIS

Assistant Professor - 1987 - 1990

Affiliate Faculty in Institute for Environmental Studies - 1987-1997.

Associate Professor - 1990-1995

Affiliate Faculty in Computer Science - 1991-1995

Director, Neutron Activation Analysis Laboratory - 1993-1995

Sabbatical Leave - 1995 - Environment Canada/Atmospheric Environment Service

Professor - 1995-1997

Director of Research, TRIGA Reactor 1996-1997

PROFESSIONAL EMPLOYMENT

Supervisor, Center for Neutron Activation Analysis, McMaster University,

Hamilton, Canada, 1983-1986

Faculty Appointment, Argonne National Laboratory, Divisions of Educational Programs and Chemical Technology, 1990-1996

PRESTIGIOUS AWARDS

- Physics Postdoctoral Fellow, National Research Council, Ottawa, Canada, 1982-1983.
- Outstanding Undergraduate Advisor Award, Engineering Council Award - 1994
University of Illinois
- Outstanding Undergraduate Advisor Award, Engineering Council Award - 1995
University of Illinois
- Hayden Head Centennial Endowed Professorship, 2005 – present
College of Engineering, University of Texas
- American Society of Engineering Education Glenn Murphy Award
Nuclear and Radiological Division – 2005
- American Nuclear Society, Arthur Holly Compton Award – 2007

MEMBERSHIPS IN PROFESSIONAL SOCIETIES

- American Nuclear Society
- American Chemical Society
- American Society for Engineering Education
- Nuclear Engineering Departmental Heads Organization

PUBLICATIONS (OUT OF 185)

Books Written

Tsoufanidis, N. and S. Landsberger Measurement and Detection of Radiation, Third Edition, Tsoufanidis and Landsberger, CRC Press (2010).

Books Edited

1. Landsberger, S. and M. Creatchman, Editors "Elemental Analysis of Airborne Particles" Gordon and Breach (1999).

RELEVANT ARTICLES IN JOURNALS

1. Desaulniers, G., A. P'an, M. Trudeau, R. Lecomte, S. Landsberger, P. Paradis and S. Monaro, "On the Use of PIXE as Methodology for Measuring Asbestos in River Water," Int. J. of Appl. Rad. and Isotopes, 32, 122-125 (1981).
2. Landsberger, S., R. E. Jervis, R. Lecomte, P. Paradis, and S. Monaro, "Determination of Sulphur in Snow by Proton-Induced X-ray Emission (PIXE) Method," Environ. Pollut. Series B, 3, 215-233 (1982).
3. Landsberger, S., R. E. Jervis, G. Kajrys and S. Monaro, "Characterization of Trace Elemental Pollutants in Urban Snow Using Proton-Induced X-ray Emission and Instrumental Neutron Activation Analysis," Int. J. Environ. Anal. Chem., 16, 91-130 (1983).
4. Abrahams, P. W., M. Tranter, T. D. Davies, I. L. Blackwood, and S. Landsberger, "Trace-Element Studies in a Remote Scottish Upland Catchment," Water, Air and Soil Pollut., 37, 255-271 (1988).
5. Jickells, T. D., T. D. Davies, M. Tranter, S. Landsberger, K. Jarvis and P. Abrahams, "Trace Elements in Snow Samples from the Scottish Highlands: Sources and Dissolved/Particulate Distributions," Atmos. Environ., 26A, 393-401 (1992).
6. Hamamo, H., S. Landsberger, G. Harbottle and S. Panno, "Studies of Radioactivity and Heavy Metals in Phosphate Fertilizer," J. Radioanal. Nucl. Chem., 194, 331-336 (1995).
7. Buchholz, B. A., and S. Landsberger, "Leaching Dynamic Studies of Municipal Solid Waste Incineration Ash," J. Air and Waste Management Association, 45, 579-590 (1995).
8. Chichester, D. L. and S. Landsberger, "Determination of the Leaching Dynamics of Metals from Municipal Solid Waste Incineration Fly Ash Using a Column Test," J. Air and Waste Management Association, 46, 643-649 (1996).
9. Kaminski, M. D. and S. Landsberger, " Heavy Metals in Urban Soils of East St. Louis, Illinois, Part I: Total Concentration of Heavy Metals in Soils", J. Air and Waste Management Association, 60, 1667-1679 (2000).

10. Kaminski, M. D. and S. Landsberger, "Heavy Metals in Urban Soils of East St. Louis, Illinois, Part II: Leaching Characteristics and Modeling", J. Air and Waste Management Association, 60, 1680-1687 (2000).
11. Iskander, F., S. Landsberger and S. D. Warren, "Determination of ¹³⁷Cs in Soil Samples by Low Level Compton Suppression Gamma Counting", J. Radioanal. Nucl. Chem., 244, 159-163 (2000)
12. Basunia, S. and S. Landsberger, "Contents and Leachability of Heavy Metals (Pb,Cu, Sb, Zn, As) at the Pantex Firing Range, Amarillo, Texas", J. Air and Waste Management, 51, 174-185, (2001).
13. Reguigui, N. and S. Landsberger, "Determination of Soil Depth Profiles for ¹³⁷Cs and ²¹⁰Pb Using Gamma Ray Spectrometry with Compton Suppression", J. Radioanal. Nuc. Chem., 264, 469-476_(2005)
14. Panno, S. V., K. C. Hackley, H. H. Wang, S. Greenberg, I. G. Krapac, S. Landsberger and D. J. O'Kelly." Characterization and Identification of Sources of Na-Cl in Ground Water and Surface Water, with Emphasis on Illinois, Ground Water, 44, 176-187 (2006).
15. Kapsimalis, R., S. Landsberger, and N. Reguigui, "Measurement of Uranium in Small Quantities in Phosphates by Use of γ -Ray Spectroscopy and the 1001 keV Peak of ^{234m}Pa . J. Radioanal. Nuc. Chem., 280, 293-298 (2009).
16. Kapsimalis, R., S. Landsberger and Y. A. Ahmed, "The Determination of Uranium in Food Samples by Compton Suppression Epithermal Neutron Activation Analysis", App. Rad. Isotop., 67, 2097-2099 (2009).
17. Landsberger S., G. George, R. Lara, D.Tamalis' J. Louis-Jean and K. Dayman, "Analysis Of Naturally Occurring Radioactive Material Using Neutron Activation Analysis and Passive Compton Suppression Gamma-Ray Spectrometry", Nukleonika, in press (2012.)
18. Kapsimalis, R. and S. Landsberger. "Various Neutron Activation Analysis and Passive Gamma-Ray Counting Methods for the Determination of Uranium Concentrations in Geological and Environmental Samples" in press Environmental Radioactivity (2012)
19. Landsberger, S. D. Hearnberger, D. Tamalis, T. Meadows and B. Clanton, "Characterization of a Uranium Contaminated Soil Site", (sent for publication)

RELEVANT CONFERENCE PROCEEDINGS (OUT OF 135)

1. Kapsimalis, R. and S. Landsberger, "Determination of Uranium in Phosphate Samples Using Compton-Suppressed Gamma-Ray Spectroscopy", Trans. ANS, 99, 42-44 (2008).

2. Landsberger, S., R. Kapsimalis, P. Doumerc, A. Malato, "Neutron Activation Analysis and Passive Gamma-Ray Counting for the Determination of Uranium Concentrations in Geological and Environmental Samples" Trans. ANS, 101, 109-110, (2009).
3. Landsberger, S., S. Fitch and K. Dayman, "[An Assay of Uranium Ore with Compton-Suppressed Gamma Spectroscopy](#)", Trans. ANS, 102, 181-182 (2010).

Uranium Study Technical Lead**DAN W. McCARN, CPG****Technical Lead:** Mining and Hydrogeology**Current Employment:** Trinitek Services, Inc.

Capabilities: Minerals, Mining, Petroleum, Hydrogeology, Project Licensing, Risk Assessment, over 30 years experience in the nuclear, environmental, petroleum, minerals and environmental with focus on project management of hydrogeological and water-quality investigations; Numerical Modeling; uranium mine and mill licensing & decommissioning; Performance Assessment of nuclear waste repositories; Pollution prevention; Risk assessment; Superfund.

Senior Geologist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants**Education / Credentials**

Doctoral Candidate (Geology)

❖ Leoben Mining University

B.Sc. Geology

❖ Birmingham-Southern College, Birmingham, Alabama

AIPG Certified Prof. Geologist CPG-10245

European Fed. of Geologists: Title #462

Wyoming Professional Geologist PG-3031

PROFESSIONAL AFFILIATIONS

Member of the Society for Mining, Metallurgy, and Exploration (SME)

PROFESSIONAL SUMMARY

He was overseas for 15 years in Europe, Asia, and Latin America.

Strong focus on uranium project licensing, economic assessment of mining feasibility. Capabilities include geological modeling, basin studies, seismic data analysis, environmental sampling, design of monitoring well systems, geochemistry, mineral chemistry, geostatistics, geophysical log interpretation.

Performs scientific programming with focus on geostatistical, geochemical, hydrological model development. Application languages include Visual Basic (6.0 & VBA), Fortran, C. Linear and non-linear methods of solution (Gauss Elimination, LU Decomposition, Adjunct identity element matrix inversion, Newton-Raphson, quadrature including Gauss Point method, analysis of ill-conditioned systems, and minimization methods.

Background includes significant experience in geostatistics, inorganic geochemistry, hydrogeology and numerical modeling as well as litigative experience as an expert witness.

Modified, debugged & documented mineral-solution equilibria and transport modeling codes (LEHGC and PHRQPITZ) applied to Performance Assessment (PA) of the **Waste Isolation Pilot Plant (WIPP)** transuranic waste repository.

Groundwater / geochemistry experience includes development of inverse groundwater models, coupled groundwater / geochemical models, PHREEQC and PHRQPITZ.

Work includes 3 years in Shell Oil's unconventional resource group focused on oil shale

in the Piceance Basin. My duties involved characterization of the thermally reactive inorganic components of the project as well as inorganic trace metal chemistry.

Additional focus areas are listed below:

- Licensing & environmental analysis of uranium in situ recovery (ISR) uranium mining projects;
- Decommissioning of uranium production facilities;
- RCRA & CERCLA project management, reporting and interface with regulators;
- Environmental Hydrogeology;
- Detailed knowledge of entire nuclear fuel cycle;
- Country assessment of nuclear fuel-cycle capability;
- Interpretation of geophysical logs;
- Analysis of core;
- Basin analysis and development of depositional environments for Alamos Basin, Anadarko Basin, Austrian Molasse Basin, Colorado - New Mexico Jurassic Basins, Delaware Basin, Denver Basin, Great Divide Basin, Kazakhstan Basins, Piceance Basin, Raton Basin, San Juan Basin;
- Well site geology;
- Engineering / Mineral economics;
- Uranium deposit geology;
- Developing ore deposit models focused on hydrogeological setting & depositional systems; geochemical & mineralization controls.

EMPLOYMENT SUMMARY

IPI Consulting (3/1995-Present)

Albuquerque, New Mexico

Certified Professional Geologist

- Licensing & environmental analysis of uranium in situ recovery (ISR) uranium mining projects, and decommissioning of uranium production facilities. Environmental Coordinator for Uranium Resources Inc. / Hydro Resources Inc. on the Crownpoint / Church Rock deposit license application Historical water rights issues in the San Juan Basin for Hydro Resources, Inc. (HRI) & Uranium Resources Inc. (URI). Development strategy for Strathmore for ISL uranium mining projects in New Mexico
- IAEA Uranium Geology Technical Committee. Lectures on economic analysis of ISL mining. Invited by Chinese government to review feasibility of newly discovered uranium districts in NW China and Inner Mongolia for ISL mining.
- Economic modeling of ISL mining projects in Kazakhstan (IAEA Projects KAZ/3/003 and RAW/0/007-06) including relational database design for data, ore-reserve estimation & analysis, and development of a computer model (Oracle / Access / VBA / Excel / FORTRAN).

Montanuniversität Leoben (1/2003-Present)

Institut für Geowissenschaften; Abt. für Ökosystemanalyse

Peter-Tunner-Strasse 5; A-8700 Leoben, Austria

Doctoral Candidate, Doktor montanistik. Currently completing requirements for Doctorate in Geology at the Leoben Mining University, Austria.

- Natural and anthropogenic multi-pathway risks associated with naturally occurring uranium mineralization in aquifers. Investigation of anthropogenic redistribution of regional redox-controlled, roll-front type deposits via high-volume irrigation pumping. Focus on Health Physics / risk analysis. Stochastic modeling of radiological exposure based on airborne radon releases and GENII. (ACCESS / EXCEL / VBA / FORTRAN).
- Lectures in Visual Basic, Relational Database Design, geostatistics, numerical modeling, geochemistry and natural water chemistry.

AREVA (9/2008-4/2009)

Exploration Manager, Central Asia

- Uranium projects in Kazakhstan focused on enhancing the geological returns from ongoing exploration and development drilling for acid in situ recovery of uranium in Central Kazakhstan.
- Modeled calcite mobilization and redeposition in proximity to roll-front and interaction with acid ISR mining processes.

Shell Oil (9/2005-2/2008)

Consulting Environmental Geologist

Commercial Oil Shale project in NW Colorado

- Focus on geology, inorganic geochemistry, and regulatory issues for Shell. Management of environmental data, sampling protocols and methods including conversion to EQUIS.
- Reclamation team member. Participation in the Technology Strategy group.

Santa Fe College (4/2004-9/2005)

Adjunct Professor of Computer Science

- Taught course in Visual Basic and physics, lecturing in environmental chemistry, database design, and other topics in computer science, mathematical programming & numerical analysis.

Tactical Staffing Resources, LLC (1/1998-8/1998)

Albuquerque, NM

Hydrologist Under Contract to Sandia National Laboratories

- Staff augmentation contract to modify, debug & document mineral-solution equilibria and transport modeling codes (LEHGC and PHRQPITZ) applied to Performance Assessment (PA) of the **Waste Isolation Pilot Plant (WIPP)** transuranic waste repository.

The LEHGC (Lagrangian-Eulerian HydroGeoChemistry) code is a coupled finite-element groundwater code allowing geochemical models of advection and diffusion to be developed. PHRQPITZ, a chemical equilibria code using a Pitzer correction for brine environments, was modified, and documented along with the preparation of QA/QC documentation.

INTERA, Inc. (11/1992-3/1995)

Albuquerque, NM

Senior Staff Consultant

- As a member of the **WIPP PA Group**, developed geostatistical elements for inverse groundwater modeling (GRASPINV). This code employed a synthetic "pilot point" technique to calibrate transient heads with transmissivities. Applied methods to the groundwater modeling of the Culebra dolomite.
- Support for the U.S. Department of Defense, Defense Nuclear Agency (DNA) collateral effects database of nuclear fuel cycle facilities. Provided coordination between the DNA and the IAEA for exchange of information.

P.E. LaMoreaux and Assoc. (1/1991-11/1992)

Tuscaloosa, Alabama

Project Manager

- Project management of Phase I and II environmental hydrogeological site assessments for large industrial clients (Chrysler) and negotiation with regulators.
- Support for litigations including the collection, preparation, and presentation of evidence for hydrogeological and environmental issues as well as reviewing opposition depositions, preparing lawyers for direct and indirect examination of witnesses, and preparing other expert witnesses for testimony. Gave legal depositions and courtroom testimony.

TECHNICAL RECOGNITION AND ACCOMPLISHMENTS

- 2002 Certificate of Appreciation from TVI Community College for volunteer service.
- New Mexico "Green Zia" Environmental Excellence Advisory Council & Pollution Prevention
- Environmental Program Advisory Board, TVI Community College

SELECTED PUBLICATIONS AND PRESENTATIONS

1. McCarn, Dan W. (2005): Natural Attenuation processes in Cenomanian sediments following acid in situ leach mining of uranium, Stráž pod Ralskem, Northern Bohemia, Czech Republic,

IAEA-TECDOC-1425, 15-18 June 1999.

2. McCarn, Dan W. (2004): Scoping Calculations: Natural and anthropogenic multi-pathway risks associated with naturally occurring uranium mineralization in aquifers; IAEA-TECDOC-1396, pp.289-315.
3. Pelizza, Mark and McCarn, Dan W., (2004): Licensing of In Situ Leach Recovery Operations for the Crownpoint and Church Rock Uranium Deposits, New Mexico: A Case Study, IAEA-TECDOC-1396, pp. 153-173.
4. McCarn, D.W., (2001): The Crownpoint and Churchrock Uranium Deposits, San Juan Basin, New Mexico: An ISL Mining Perspective, IAEA TECDOC 1258, pp. 171-183, Dec. 2001.
5. McCarn, Dan W. (2000): Scalable Economic Analysis of ISL Mineable Ore Deposits, Poster Session, Moscow Conference on Uranium Production, Supply, & Demand, All-Russian Institute for Mineral Resources, December 2000.
6. Dan W. McCarn, Ermek A. Akhmetov, Alexander V. Belykh, Victor P. Zhelnov, Vladimir A. Barmasov, Alexander F. Vershkov, & Pavlin G. Kayukov (1999) Part 1: Executive Summary and Mission Overview, Management of Uranium Reserves: Creation of Computer System for Management of Uranium Reserves in Kazakhstan, IAEA Expert Mission KAZ/3/003, 3-22 July 1999, Almaty, Kazakhstan, International Atomic Energy Agency. (Plus 4 other report sections).
7. DOE/SNF/REP-0033 Rev 0, (1998): Nuclear Dynamics, Consequence Analysis (NDCA) for the Disposal of Spent Nuclear Fuel in an Underground Geologic Repository (Chapter 7, Volume 2 – Summary of Results, Page 7-2) – Contributing Author.
8. McCarn, Dan W. (1998): LEHGC 1.2 Modifications and Sample Problems, Sandia National Laboratories Internal Report, July 5, 1998.
9. McCarn, Dan W. (1998): Brine Mixing Scoping Calculations for the E1 Brine Intrusion Scenario in the Culebra Dolomite, Appendix 1, Waste Isolation Pilot Plant (WIPP), WBS1.1.10.3.5, Effective Date: June 22, 1998.
10. McCarn, Dan W. (1997): Evaluation of proposed strategies for mill tailings wastewater disposal at Stráž, Northeast Bohemia, and Rožná, Southern Moravia, DIAMO Uranium Production Facilities, Czech Republic: Final Report of Mission for the International Atomic Energy Agency, Technical Cooperation Project CZR/3/002-01, September 26 - October 6, 1997, IPI Consulting, Albuquerque, New Mexico, October 24, 1997, (Confidential).
11. McCarn, D., Dubovik, L., Iakoushev, A., and Grebenkov, A. (1996): The Ecological-Commerce (ECO-COM) Zone Concept for Developing Biomass Energy from Contaminated Resources: A New Demonstration Zone for the Republic of Belarus, in International Topical Meeting on Nuclear and Hazardous Waste Management, Seattle, Washington, August 18-23, 1996, pp. 1417-1424.
12. Grebenkov, A. and McCarn, D.W. (1996): The US-Belarus Joint Projects Associated with Remediation of the Chernobyl Contaminated Sites, Environmental Opportunities in Central and Eastern Europe and the Newly Independent States, in Partnerships for Solutions Forum, Colorado School of Mines, Golden, Colorado, p. 19-35.
13. McCarn, D.W. (1994): Current Trends in the Uranium Market: The Issue of Uncommitted Demand, Presentation to the Waste-Management Education & Research Consortium, Las Cruces, New Mexico, Advisory Group Meeting, November 10-11, 1994.

14. LaVenue, M. and McCarn, D.W. (1993): Analysis of 1992 Conditionally Simulated Culebra Transmissivity Fields, Report to the WIPP Geostatistics Committee (GXG) on March 23, 1993 by INTERA, Inc.
15. McCarn, D.W. and Carr, J.R. (1992): Influence of Numerical Precision and Equation Solution Algorithm on Computation of Kriging Weights, Computers & Geosciences, V. 18, No. 9, pp.1127-1167.
16. McCarn, D.W. (1992): IAEA Technical Cooperation Project MEX/9/035-2: Nuclear Waste Management: Permanent Repository for Low- and Intermediate-Level Waste, Report of Mission Laguna Verde (Veracruz) and Mexico City, October 5-17, 1992. Contracted through P.E. LaMoreaux and Associates. Report approved and transmitted to Mexico in 1993.
17. Wolfbauer, J. & Others (1991): Qualitätsmeßstellennetz Tullner Feld Auswertung, BMLF, GZ 41.032/20-IV 1/89, Endbericht, Leoben, Im Juni 1991, Forschungsinstitut für Geo-Datenerfassung und -Systemanalyse, Montanuniversität Leoben.
18. McCarn, D.W. (1989): The River of Lost Souls, in Western Horse: Zucht, Haltung, Westernreiten, Heft 11, November 1989, Ute Kierdorf Verlag, 5272 Wippenfuerth, FRG, p. 12-26. (An article published in a German riding magazine about personal experiences mapping geology and punching cows around the beautiful Purgatoire River canyon, southeastern Colorado.)
19. McCarn, D. (1989): Development of an Austrian Data Management System for the Cleanup of Contaminated Areas Caused by Chemical or Industrial Accidents, in Policy Responses to Large Accidents – International Institute of Applied Systems Analysis, Proceedings of a IIASA meeting, Laxenburg, Austria, p. 17-35.
20. McCarn, D.W. (1989): Modification and Updating the RAPP3C Computer Program (Resource and Production Projection), Consultant's Report, 6-10 November, 1989, IAEA Internal Report, International Atomic Energy Agency, Vienna, Austria.
21. Dahlkamp, F., McCammon, R. and McCarn, D. (1988): Recommendations for a Revised Uranium Deposit Classification System and the Development of Related Deposit Recognition Criteria, IAEA Internal Report, Vienna.
22. DeVergie, P. and McCarn, D. (1988): User's guide for the uranium ore reserve calculation system (URAD), IAEA-TECDOC-484, Vienna.
23. McCarn, D. (Editor) (1988): Geological Data Integration Techniques, Proceedings of an IAEA Technical Committee, IAEA-TECDOC-472, Vienna.
24. Ajuria, S. and McCarn, D. (1988): The Nuclear Fuel Cycle Information System: A Directory of Nuclear Fuel Cycle Facilities, STI/PUB/794, IAEA, Vienna, 144 p.
25. McCarn, D.W. et al (1988): INTURGEO: The International Uranium Geology Information System – A World Atlas of Uranium Occurrences and Deposits, IAEA-TECDOC-471, Vienna, 493 p.
26. Ajuria, S., and McCarn, D. (1987): The Nuclear Fuel Cycle Information System, IAEA TECDOC-408, Vienna, 123 p.
27. McCarn, D. and Mueller-Kahle, E. (1986): Long-Term Uranium Supply-Demand Analysis, IAEA-TECDOC-395, 91 p., Vienna.
28. Paterson and others (1984): World Speculative Uranium Resources - Revised IUREP

Estimates 1983, Internal Report, International Atomic Energy Agency, Vienna, November 1984.

29. DeVergie, P. and McCarn, D. (1985): The RAPP3B Resource and Production Projection Modeling Systems User's Guide, IAEA Internal Report, Vienna.
30. Johnson, V.C., McCarn, D.W., Kocis, D. (1982): National Uranium Resource Evaluation, Trinidad Quadrangle, Colorado, U.S. Department of Energy, PGJ/F-034 (82), Grand Junction, Colorado.
31. McCarn, D.W., Johnson, V.C. and Theiss, N.T. (1982): National Uranium Resource Evaluation, La Junta Quadrangle, Colorado and Kansas, U.S. Department of Energy, PGJ/F-100 (82), Grand Junction, Colorado.
32. McCarn, D.W. and Freeman, R.W. (1976): Chemical Analyses of Ground and Surface Water Samples from Parts of the United States 1956-1975, U.S. Energy Research and Development Administration, GJBX-51 (75), 541p. Grand Junction, Colorado.

Uranium Study SME	Pearce O'Kelley
SME: Agreement States / NRC regulations Current Employment: Trinitex Services, Inc Capabilities: Agreement State Regulations, NRC, Disposal facility licensing and regulatory issues, IAEA consultant, senior positions with NRC, other regulatory agencies.	Uranium Regulations consultant: Trinitex Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials M. S. Public Health ❖ U of South Carolina B. S. Biology/Chemistry, ❖ U of South Carolina Training and Certifications: Extensive additional, see below

Continuing Education

- *Health Physics and Radiation Protection, 200 hours- Oak Ridge Associated Universities*
- *Medical Uses of Radionuclides, 40 hours - Oak Ridge Associated Universities*
- *Inspection Procedures, 40 hours - U.S. Nuclear Regulatory Commission*
- *Security Systems and Principles, Sandia National Labs, 80 hours*
- *Licensing Practices and Procedures, 40 hours - U.S. Nuclear Regulatory Commission*
- *Irradiator Radiation Safety Workshop, 25 hours - U.S. Nuclear Regulatory Commission*
- *Incineration of Low Level and Mixed Wastes: 1986 Conference - 24 hours*
- *Radiation Protection Engineering, 40 hours - Oak Ridge Associated Universities*
- *Industrial Radiography, 40 hours - U.S. Nuclear Regulatory Commission*
- *Uranium Hexafluoride - Safe Handling, Processing, Transport-24 hours-Martin Marietta*
- *Introduction to Radiological Emergency Preparedness Exercise Evaluation, IS-331, Federal Emergency Management Agency, November 2007*
- *Radiological Emergency Preparedness Program Exercise and Evaluation Methodology, E-304, December 2007*
- *Radiological Emergency Preparedness Planning, E-340, Federal Emergency Management Agency, August 2008*
- *Radiological Emergency Response Operations (RERO), Federal Emergency Management Agency, Las Vegas, May 1987*
- *National Incident Management System (NIMS), IS-700, Federal Emergency Management Agency, August 2005*
- *Introduction to the Incident Command System, IS-100, Federal Emergency Management Agency, June 2007*
- *ICS for Single Resources and Initial Action Incidents, IS-200, Federal Emergency Management Agency, June 2007*
- *National Response Plan (NRP), An Introduction, IS-800, Federal Emergency Management Agency, June 2007*
- *Incident Command System for Expanding Incidents, IS-300, Federal Emergency Management Agency, July 2007*
- *Mitigation Course for Radiological Transportation Emergencies, US Dept. of Energy, October 1989*
- *Introduction to Supervision*
- *Elements of Leadership-Management Development Program*
- *Kepner-Tregoe Problem Solving-Decision Making*
- *Participatory Management, Employee Performance Management System*
- *Fourth Generation Management*
- *Cultural Competence*

- *Change Management*
- *Train the Trainer*
- *Coaching the Team*

Employment Experience

9/06 – 1/09 South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, Columbia, South Carolina. Position: Program Manager II

Management consultant responsible for radiation regulation development and revision, Emergency response planning and review

09/98 – 9/06 South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, Columbia, South Carolina. Position: Bureau Chief

Manage, direct, administer, and supervise the activities and personnel of the Bureau of Radiological Health. The Bureau is responsible for the protection of the public from the adverse effects of ionizing and non-ionizing radiation through a comprehensive regulatory program which includes the activities of licensing, registration, inspections, enforcement, emergency response, fee collection, and regulation development. Responsible for budget, program management and development, planning, quality control, and personnel actions of the Bureau. Consult with Federal officials and national organizations to set and develop radiation protection standards nationwide. Respond to emergencies involving sources of radiation. Participate in all roles of fixed nuclear facility radiological emergency response.

10/88 - 1998 South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, Columbia, South Carolina. Position: Director of the Division of Electronic Products.

Direct and supervise division responsible for registration and inspection of facilities utilizing sources of electronically produced ionizing radiation and nonionizing radiation. Activities of the division also include review of architectural shielding plans, certification of x-ray operators, nonionizing radiation evaluations, emergency response, and survey instrument calibrations. Responsible for supervision, administration, budget, program management and development planning, quality control, and personnel actions of the division. Responsible for development and implementation of regulations pertaining to the safe usage of radiation. Serve as duty officer on the Emergency Radiological Assistance Team. Participate in all roles of fixed nuclear facility radiological emergency response.

12/85 - 10/88 South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, Columbia, South Carolina. Position: Health Physicist III Section Leader of the Radioactive Waste, Compliance and Engineering Section.

Responsible for the licensing and compliance activities of the Barnwell Low-Level Radioactive Waste Disposal Facility, including inspection, environmental surveillance, health physics, burial operations, trench construction, and quality control. Manage high integrity container and solidification media certification programs; prior notification and waste shipment programs, and waste tracking, allocation, and surcharge programs. Responsible for development and maintenance of computer programs for support of above listed programs. Responsible for licensing and compliance inspections of major licensees involving complex uses of radioactive materials. Serve as duty officer on the Emergency Radiological Assistance Team. Participate in all roles of fixed nuclear facility radiological emergency response. Respond to any emergency situation involving radioactive material in the state of South Carolina. Supervise 5 persons including Engineers, Health Physicists, and Secretaries.

2/84 - 12/85 South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, Columbia, South Carolina. Position: Health Physicist Responsible for licensing radioactive material users in the state of South Carolina. Conduct routine and investigational inspections of facilities using radioactive materials. Respond to any emergency situation involving radioactive material in the state of South Carolina. Participate in all roles of fixed nuclear facility radiological emergency response. Assist licensees in areas of problem solving and health physics

2/78 - 1/84 South Carolina Department of Health and Environmental Control. Richland County Health Department, Columbia, South Carolina Position: Environmentalist

Responsible for environmental sanitation inspections, routine and requested, day care facilities, foster homes, motels, hotels, residential care facilities, and school premises in Richland County as well as the supervisory and administrative duties which accompany these programs. Responsible for environmental sanitation inspections of individual waste disposal systems, water supplies and related programs in Richland County, including preliminary site work and final disposition. Assist in subdivision development programs for Richland County. Radiological Defense Officer for Richland County Health Department. Responsible for Asbestos Detection and Abatement Programs in Richland County.

PROFESSIONAL MEMBERSHIPS

- *Organization of Agreement States (OAS)*
- *Health Physics Society (HPS)*
- *Conference of Radiation Control Program Directors (CRCPD)*
- *South Carolina Public Health Association*

OFFICES HELD

OAS Executive Board 2001-2004

OAS Chair 2002-2003

CRCPD – Executive Board 2005-2008

CRCPD – Chair 2006-2007

HPS – Treasurer – Government Section 2005-2006

As Chair of two national state radiological regulatory associations, the Conference of Radiation Control Program Directors (CRCPD) and the Organization of Agreement States (OAS), I was frequently involved with several federal agencies (US Nuclear Regulatory Commission (NRC), Department of Homeland Security (DHS), FEMA, Department of Energy (DOE), Department of State, Environmental Protection Agency (EPA) and others) in helping set policy and standards in the areas radioactive materials regulation and security, radiation protection, and response to Radiological Dispersal Devices. Participated on DHS' Domestic Nuclear Detection Office's Surge Committee, NRC's Chairman's Radiation Source Protection and Security Task Force, and NRC's Radioactive Source Security Steering committee. Served as chair of CRCPD's Homeland Security/Emergency Response Council. During tenure at CRCPD, oversaw development of First Responder's Guide and Handbook for Responding to a Radiological Dispersal Device Incident along with development of RDD exercise scenarios. Served on the International Atomic Energy Agency's (IAEA) Raissa Team that evaluates radiation

AWARDS/APPOINTMENTS

- *Organization of Agreement States Hall of Fame Award*
- *Fellow – Health Physics Society*
- *Michael D. Jarrett Customer Service Award (for Division)*

- Agency facilitator for Kepner-Tregoe Process

COMMITTEES/WORKING GROUPS/TEAMS

INTERNATIONAL:

Served on International Atomic Energy Agency Raissa Evaluation Team responsible for evaluating member country's radiation control program and making recommendations for improvement. 2005- Present

NATIONAL:

- *Conference of Radiation Control Program Directors Liaison to the National Health Physics Society 1995-1998*
- *Conference of Radiation Control Program Directors*
- *Homeland Security/Emergency Response Emerging Issues Committee, Chair, 2006-present*
- *Conference of Radiation Control Program Directors*
- *International Relations Committee, 2005-present*
- *Conference of Radiation Control Program Directors*
- *E-37 Committee, Naval Nuclear Propulsion, 1999-Present.*
- *Conference of Radiation Control Program Directors*
- *S-6 Ad Hoc Committee on Reorganization of Executive Director's Office. Advisor 2000*
- *Organization of Agreement States*
- *Annual Meeting Planning Committee, 1999-2000.*
- *U.S. Nuclear Regulatory Commission's*
- *Management Review Board for Integrated Materials Performance Evaluation Program, 1998-Present.*
- *US Nuclear Regulatory Commission's*
- *Material Security Steering Committee- Co-Chair 2002-2007*
- *US NRC Chairman's Radiation Source Protection and Security Task Force 2005-present*
- *US NRC Chairman's Radiation Source Protection and Security Task Force, Public Education Subgroup 2006-present*
- *US NRC Management Directive 5.3 Revision Working Group 2005-2007*
- *US Nuclear Regulatory Commission's*
- *Decommission Guidance Review Committee, 2002*
- *US Dept. of Homeland Security*
- *Domestic Nuclear Detection Office*
- *Surge Committee, 2005-2007*
- *Health Physics Society Rules and Legislation Committee of the National 1995-2002*
- *Health Physics Society Human Capital Crisis Committee 2001-2002*

STATE:

- *Certification of X-Ray Operators Compromise Committee 1997-1999.*
- *South Carolina Radiation Quality Standards Association Ex-Officio member 1999-2004.*

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL:

DHEC Mentoring Program Development Committee

- *DHEC (Health Services) Continuous Quality Improvement Committee*
- *DHEC (EQC) Employee of the Month Guideline Development Committee*
- *DHEC (Health Services) Strategic Planning Group*
- *DHEC Christmas Party Committee 1988-1997*
- *S.C. Public Health Association Entertainment Committee*
- *S.C. Public Health Association Resolutions Committee.*

Uranium Study Technical Lead	Natver M Patel
SME: uranium operations and environmental compliance: Radiochemistry Current Employment: AVM Environmental Services, Inc. Capabilities: Mr. Natver Patel has 35 years of experience in the industry with over 25 years of experience in radiological and environmental remediation and regulatory compliance. He was an U.S. Nuclear Regulatory Commission (USNRC) and New Mexico Environment Department (NMED) approved Radiation Safety Officer for the Bluewater Uranium Mill Site responsible for licensing activities, radiation protection and environmental compliance from 1987 to 1998 when the Bluewater Mill Site license was successfully terminated. He has managed the Environment and Radiation Protection Program at the Bluewater Uranium Mill Site project. The project included a 6000 tpd uranium mill decommissioning, 24 million ton tailings remediation, and groundwater remediation.	Uranium Regulations consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials M. S. in Chemistry, ❖ New Mexico Tech, Socorro, NM B. S. in Chemistry, 1971, ❖ Gujarat University, India Training and Certifications: 360 hours of training in radiation protection, radiation detection and measurements and environmental surveillance; Groundwater hydrology; Management and supervisor training; 40 hr. and annual 8 hr. refresher HAZWOPER training; 8 hr. HAZWOPER supervisor training; 40hr. Hazardous Chemical Safety.

Background Summary:

He has considerable experience in environmental remediation, including management and supervision of radiological and environmental staff, regulatory and environmental compliance, contamination characterization, radiological source term studies and remedial design, contamination cleanup and remedial activities; verification of contamination cleanup; groundwater corrective actions and monitoring; management of process and quality control laboratory.

Mr. Patel also designed and performed radiological characterization, assessment, remedial support surveys, post remediation status surveys in accordance with MARSSIM at various uranium mine sites. Mr. Patel has performed environmental services consisting of characterization, assessment and investigation for over 15 projects for U. S. Army Corps of Engineers Albuquerque District. Mr. Patel has significant experience in interacting and negotiating with regulatory agencies. USEPA approved Project Manager at a Superfund site. He has also managed and performed Remedial Investigation (RI), Feasibility Study (FS), Remedial Design (RD), and Remedial Action (RA) work at superfund sites. The work included characterization and remediation of surface soils, NAPL in the subsurface formation, and groundwater contamination.

Professional Experience:

Uranium Mill Decommissioning, Tailings Remediation and Mine Contamination Characterization:

Developed and implemented environmental and radiation protection programs and procedures in compliance with USNRC, USEPA, and New Mexico State regulations, USNRC Material License requirements, and Bluewater Mill decommissioning and tailings reclamation plans. Maintained these programs in full compliance without any violations or deficiency throughout the entire life of the Bluewater Uranium Mill Site Project.

Developed environmental and radiological aspects of the decommissioning and reclamation plan for Bluewater Uranium Mill Site addressing decommissioning of 6000 tpd mill and reclamation of tailings piles consisting of over 24 million tons.

Supervised radiological and environmental staff, consultants and contractors performing Site occupational health physics, radiological, and environmental monitoring; and mill decommissioning and tailings remedial activities at the Bluewater Uranium Mill Site.

Conducted revision to various remedial designs, including radon barrier thickness design using site specific calibration of USNRC approved computer code which reduced barrier thickness while complying with USNRC's emission standard and resulting in significant remedial cost reduction.

Conducted radiological source term and contamination characterization studies of tailings piles, over 300 acre evaporation ponds area, and over 700 acres of tailings contaminated area at the Bluewater Mill Site.

Developed and implemented excavation control program for cleanup of over 1100 acres of windblown tailings and evaporation ponds residue contaminated areas up to several feet deep at the Bluewater Uranium Mill Site. The excavation control included real time field gamma radiation level measurements and quick sampling and analysis techniques to facilitate continuous excavation for a cost effective remediation.

Developed and implemented cleanup verification program consisting of about 8,000 on site soil sample analysis and over 25,000 radiation level measurements to demonstrate compliance with cleanup criteria for all excavated areas. Developed site specific correlation studies for gamma radiation levels to soil Ra-226 concentrations for soil clean up verification. The USNRC permitted determination of action levels using correlation and gamma radiation measurements to demonstrate compliance with the clean up criteria.

Supervised the design and licensing of an onsite disposal cell at the ARCO's Bluewater Mill. This disposal cell was constructed adjacent to the existing tailings pile for disposal of 11(e)(2), byproduct material which was contaminated with PCBs.

Performed radiological characterization consistent with approach and guidance provided in MARSSIM at United Nuclear Corporation's Northeast Church Rock Mine (NECR) Site for Removal Site Evaluation under CERCLA of the areas contaminated with uranium ore during 2006 to 2011. The characterization for RSE at the NECR included direct scan and static gamma radiation surveys using 2x2 NaI scintillators coupled with scaler/ratemeters and DGPS, field subsurface soil screening using 3X3 NaI Scintillator and SCA for vertical extent of contamination characterization,

exposure rate measurements, site-specific correlation of direct gamma radiation levels to Ra-226 soil concentrations, and soil sampling. Also designed and performed excavation control surveys to direct removal of contaminated soils during remediation of land areas at NECR Mine Site in 2009 and 2011. Conducted cleanup verification surveys in accordance with MARSSIM for cleanup status at the NECR during 2009-2011.

Developed plans and procedures, and performed radiological characterization, cleanup excavation control and verification surveys at United Nuclear Corporation's Section 27 Uranium Mine Site near Ambrosia Lake during 2010 and 2011. Performed occupational health physics monitoring during cleanup activities during 2010. Performed RESRAD modeling to determine radiation dose and risk levels for various land use and cleanup scenarios.

Developed plans and procedures, and performed radiological characterization and assessment consistent with MARSSIM for remedial design at San Mateo Uranium Mine Site during 2011-2012. The Mine Site is being remediation as required by USFS using CERCLA process using MARSSIM approach.

Regulatory Negotiations, Permitting and Compliance.

Conducted environmental and radiological permitting, licensing, approval, and compliance activities with the USNRC, USEPA, and NMED for the Bluewater Uranium Mill Site project. Currently, conducting license termination activities and negotiations for Bluewater Mill Site with USNRC, DOE, and NMED. Managed and negotiated all CERCLA activities with USEPA, state, and regulatory oversight contractors for the Prewitt Refinery Superfund Site.

Prepared and submitted various environmental and remedial action completion reports; including mill decommissioning report, reclamation completion report, windblown cleanup reports, environmental monitoring and effluent data reports, New Mexico groundwater discharge plan reports, superfund progress reports, and USEPA's NESHAPs compliance reports.

Developed various successful petitions to USNRC for exemption from cleanup criteria for contaminated soil areas, modification to the decommissioning and reclamation plans, and alternate procedures based on risk assessment and cost and benefit analysis which resulted in significant remedial cost savings at the Bluewater Uranium Mill Site.

Conducted waste management and disposal permitting with USEPA, USNRC, and NMED, including successful permitting and on-site disposal of mixed waste [11(e)(2) uranium byproduct material containing PCBs].

Coordinated development of Long Term Surveillance Plan (LTSP) for the Bluewater Mill Site with DOE and its contractor personnel. Successful coordination and negotiations for all radiological and groundwater requirements with USNRC, USEPA and NMED for termination of USNRC's Bluewater Mill license.

Environmental Projects for Government

Retained sediment characterization at Galisteo Reservoir for USACE Albuquerque District to determine any impact from historical mining activities upstream of the reservoir.

Investigation of the surface water and lake-bottom sediments at Cochiti Lake was performed for USACE Albuquerque District to determine baseline radionuclide concentrations. The Cerro Grande fire burned in and around the LANL area in May – June 2000. The resulting burn area is unstable and can easily erode. This has caused concern regarding storm runoff and deposit of sediment and possible contaminants in the Cochiti Lake. The USACE expected that the Cochiti Lake will be impacted by runoff from the LANL area.

Monitoring of release water from the Santa Rosa Reservoir to determine any impact of the reservoir drawdown on the released water quality for USACE Albuquerque District.

Investigation of mercury contamination at 17 stream gaging stations near dams in New Mexico and Colorado for USACE Albuquerque District.

Performed surface and subsurface soil sampling and investigation for USACE Albuquerque District to assess the nature and extent of surface soil contamination related to railroad and other historical activities at the Santa Fe Rail Yard Property in Santa Fe, New Mexico. The sampling was performed to provide the first level screening of potentially contaminated areas and contaminants on-site.

Various environmental tasks for both operable units at Cimarron Mining Company Superfund Site in Carrizozo, New Mexico, including ground water monitoring, modification and operation of ground water remedy, prepared various plans and ground water monitoring operation and compliance reports, including performance assessment reports, five-year review reports, and close out reports for USACE Albuquerque District and USEPA.

Prepared Proposed Plan and Record of Decision for OU-2 at Brown and Bryant Superfund Site in Arvin, California for USEPA Region 9 under contract with USACE Albuquerque District. Also prepared a Remedial Action Completion Report consistent with the "Close Out Procedures for National Priorities List Sites" OSWER Directive 9320.2-09A-P, January 2000.

Sampling and characterizations at various FAA sites in New Mexico for PCBs contamination for USACE Albuquerque District.

Superfund Activities

Conducting Operation and Maintenance (O&M) of NAPL extraction system and groundwater remediation, which includes groundwater pump and treat, nutrient injection for enhanced in situ bioremediation, and containment system at the Prewitt Superfund site. The O&M includes performance monitoring and system modifications, routine operation and maintenance and troubleshooting, groundwater monitoring, remediation progress evaluation and groundwater containment evaluation, reporting to agencies, and project oversight.

Managed RI/FS activities for Prewitt Superfund Site consisting of surface soils contamination, NAPL in subsurface formations, and groundwater contamination.

Directed development and implementation of RI work plans and Feasibility Study reports.

Directed contamination characterization studies, treatability studies, and NAPL extraction pilot program at the Prewitt Superfund Site.

Managed remedial design activities for surface soils cleanup involving excavation, treatment, off site disposal, and on site treatment by land farming; NAPL extraction; and groundwater contamination containment and remediation.

Supervised remedial action construction activities including; lead, asbestos, and hydrocarbon contaminated soil remediation; well abandonment; and NAPL extraction and groundwater containment system construction.

Engineered RFPs, managed the contracting process, and developed scope of work for characterization, design, and remedial action activities. Negotiated cost and work requirements with the contractors.

Groundwater Corrective Actions and ACLs

Managed groundwater protection program at the Bluewater Mill Site. Engineered and implemented groundwater detection and compliance monitoring programs. Implemented and managed groundwater corrective action programs. Directed development of groundwater ACLs petition for the Bluewater Mill Site. Performed negotiations and responses to USNRC, NMED and DOE's issues and comments during regulatory review and approval process. This was the first ACLs petition developed consistent with the regulatory technical requirements, which was approved by the USNRC.

Engineered and developed the New Mexico Discharge Plan termination petition for the Bluewater Mill Site. Performed negotiations and responses to the NMED and DOE's issues and comments during regulatory review and approval process. The discharge plan for the site was terminated by the State of New Mexico.

Performed groundwater data review and ACLs feasibility report for Quivira Mining Company's Ambrosia Lake Facility. Performed groundwater CAP evaluation, and prepared groundwater ACLs petition. The ACLs petition work included groundwater CAP assessment, determination of extent of groundwater contamination, groundwater fate and transport, human health and the environment hazard and risk assessment from radiological and non radiological contaminants, ALARA analysis, and groundwater corrective action alternative evaluation.

Environmental Monitoring, Laboratory Management, and QA/QC

Developed and implemented environmental monitoring program for groundwater, air, soil and vegetation as required by USNRC, USEPA, and State of New Mexico.

Managed quality and process control laboratory during operation of the Bluewater Uranium Mill Site.

Performed sampling and chemical and radiological analyses for operations and environmental monitoring.

Developed various job specific analytical methods for chemical and radiological parameters, including Gas Chromatography for BTEX and organic mill reagent analysis.

Uranium Study SME	Noel Savignac, Ph.D.
SME: Uranium, health physics, and environment Current Employment: Trinitek Services, Inc Capabilities: more than 20 years experience as a consultant in radiation protection, radiation dose modeling, policy statements, procedure manuals, technical investigations, training programs, and audits, manager of environmental services for a uranium mining and milling firm, a health physicist at a nuclear power plant, and a university radiation safety officer and instructor.	Senior Health Physicist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials Ph.D. Health Physics ❖ Colorado State University M.S., Health Physics ❖ Colorado State University M.S., Physiology ❖ University of New Mexico B.S. Biology ❖ Wake Forest College

PROFESSIONAL EXPERIENCE in radiation protection includes:

Uranium Project Experience

1) New Mexico Operations:

- Conoco Oil Company, Crown Point, NM - Radiological assessment of a proposed uranium mill site.
- Homestake Mining Company, Grants, NM - Radiological and environmental monitoring procedures for mill decommissioning, radiological assessment for the uranium mill license renewal, radiological evaluations of mill operations using the MILDOS computer code, radiation protection annual retraining, and mill audits.
- Mobil Oil Company, Crown Point, NM - MILDOS computer evaluation of radiological impacts of an in-situ uranium extraction facility, and a quality control evaluation of a laboratory that processes radiological samples.
- Sohio, Laguna, NM - Assessment of residual contamination after mill decommissioning, Radiation Safety Officer, and radiation protection annual retraining, and site audits.
- United Nuclear Corporation, Gallup, NM - Church Rock Mill license application, hiring and training of radiation and environmental protection staff, mining plans for Dalton Pass Mine and Canyon Mines, radiation protection annual retraining, and mill audits.

2) Colorado Operations:

- Energy Fuels Resources, Denver, CO - Testimony at public hearings, radiological exposures pathways assessment, radiological and environmental procedures for uranium mills.
- Power Tech, Denver, CO - radiological and environmental procedures for an in-situ uranium extraction facility.
- Cotter Corporation, Cañon City, CO - Testimony at public hearings, audits of the radiation protection program, respirator protection procedures, bioassay procedures, and responses to notice of violations.

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- Homestake Mining Company, Gunnison, CO - Environmental baseline monitoring program for the proposed Pitch Uranium Mill, participation in the Colorado Department of Health public hearings on the project.
 - Umetco, Craig, CO - Audit of the radiological and environmental monitoring programs, and radiation and environmental monitoring procedures.
 - Umetco, Uravan, CO - Radiological assessments for the Uravan and Spring Creek Mesa tailings disposal facility license applications, participation in public hearings on both applications, audits of the radiological and environmental monitoring programs, and radiation and environmental monitoring procedures.
 - Umetco, Grand Junction, CO - Radiation protection annual retraining.

3) Texas Operations

- Energy Minerals Corporation, La Palangana Project, TX – MILDOS assessment of the radiological dose from uranium in-situ leach operations.
- Cogema, Bruni, TX - Audits of the radiological and environmental monitoring programs.

4) Wyoming Operations

- Federal American Partners, Riverton, WY - Radiological and environmental monitoring programs for the uranium mill, license amendments, and license amendments.
- Pathfinder Mining Company, Riverton, WY - Radiological and environmental audits, and a Ra-226 exposure assessment.
- Cameco (Power Resources, Inc.), Casper, Cheyenne, WY – MILDOS assessments of radiation doses from four uranium in-situ leaching operations.
- Umetco, Riverton, WY - Audits of radiological and environmental monitoring programs, and radiation and environmental monitoring procedures.
- United Nuclear Corporation, Casper, WY - Radiological and environmental assessment for the proposed Morton Ranch Uranium Mill application.

5) Utah Operations:

- Atlas Minerals Corporation, Moab, UT - Radiological assessment for mill license renewal, radiological and environmental audits, and radiological and environmental monitoring procedures.
- Energy Fuels Nuclear, Inc., Blanding, UT - Radiological and environmental audits.
- Plateau Resources Limited, Ticaboo, UT - Mill license renewal and several license amendments, radiological and environmental monitoring procedures, mill and tailings decommissioning and reclamation plans, groundwater monitoring program, Radiation Safety Officer, and mill audits.
- Rio Algom Corp., Moab, UT - Uranium mill license application and license amendments, radiological and environmental audits, radiological and environmental monitoring procedures, and groundwater flow patterns.

6) Virginia Operations

- Marline Uranium Corporation, Danville, VA - Surface water impacts and radiological impacts for the proposed Swanson Uranium Mill. Participated in public hearings on mill license application.

7) USA

- American Mining Congress – Past Chairman of the Uranium Environmental Subcommittee.
- National Commission of Radiological Protection and Measurements (NCRP) - "Effluent Monitoring and Environmental Surveillance in the Mineral Extraction Industry" (NCRP Report 118).

Environmental and Radiological Compliance

- Assessments of the radiation doses and risks to the public from airborne emissions and radiation generating machines for compliance with the National Environmental Policy Act.
- Assessments of the Los Alamos National Laboratories' performance objectives and their occupational and environmental radiation protection programs for compliance with DOE Orders.
- Radiological protection program (835) implementation plan, technical basis documents, and a site specific RadCon Manual for the Lovelace Respiratory Research Institute (LRRI)
- Environmental monitoring plan for LRRI.
- Application to ship low-level radioactive waste to the DOE Nevada Test Site.
- Sandia National Laboratory compliance with environmental, safety, and health regulations in preparation for DOE "Tiger Team" audits.
- Evaluations of alpha-track detectors for the measurement of radon in compliance with the EPA National Emission Standards for Hazardous Air Pollutants (NESHAPS) regulations.
- Radiological doses from airborne emissions for compliance with the NESHAPS regulations.
- Policy statements, program designs, technical specifications, program documents, action plans and operational procedures in applied health physics and environmental monitoring.
- Peer review panel assessments for the DOE Uranium Mill Tailings Remedial Action Project to assess radiological measurement procedures and compliance with regulations.
- Audits of the radiation and environmental protection programs at uranium mills, and uranium liquid extraction facilities.
- Assessments of the Department of Transportation shipping regulations and the EPA "Reportable Quantities" regulations for transport of radioactive materials.
- Leak tests of nuclear level gauges using a procedure that tests hundreds of sources in ~25% of the time required for leak tests using classical methods.

Hazard Assessments

- Environmental exposures from mercury released to a creek flowing through Oak Ridge, TN.
- Environmental documentation on high-level nuclear waste repositories as part of a Peer Review Panel.
- Remedial radiological actions required at the Fernald Feed Materials Production Center.
- Radiological doses from a leaking radium source and safe storage of the source for disposal.
- Radiological doses from uranium during asbestos removal at a uranium mill.
- Hazards of a thorium oxide spill.
- Environmental and radiological liabilities of a uranium mill prior to sales offering.
- Occupational doses from U-238 and Th-232 in SO₂ scrubber sludge from a copper smelter.
- Occupational doses and environmental hazards from Re-187 from a copper smelter.
- Occupational doses from Th-232 in a metal casting facility.
- Occupational doses and environmental contamination from Po-210 in kerosene-diesel fuel.
- Potential environmental doses from U-238 and Tc-99 in a disposal pond.

Radiological Training Courses

- Annual Refresher Training for Radiation Protection.
- Atmospheric Dispersion Calculations using CAP88-PC.
- Basic Radiation Protection.
- Economic Benefits of Radioactive Materials and Radiation.
- Environmental Monitoring Procedures.
- Internal Dosimetry for the Uranium Milling Industry.
- Implementation of 10 CFR 20.1001-20.2401.
- National Emission Standards for Hazardous Air Pollutants.
- New Employee Radiation Protection Orientation.
- Radiation Exposure Calculations for Uranium Milling.
- Radiation Protection Annual Retraining
- Radiation Protection for the Uranium Milling Industry.
- Radiation Safety Officer Training.
- Radon Exposures and Radon Mitigation Measures.
- Regulatory Guides for Uranium Milling.
- Sampling Procedures.
- Standards for Release of Equipment for Unrestricted Use.

Licensing and Registration

- Registration of a 13.5 MeV linear accelerator.
- Radioactive materials license for an 8,000 Ci Co-60 gamma irradiator.
- Registration of two high voltage microwave machines.

EMPLOYMENT HISTORY:

Noel Savignac Consultants 1980 - Present. Radiation Protection Consultant to DOE, states, and corporations.

United Nuclear Corporation Manager of Environmental Services. Obtained radioactive materials licenses for uranium mills, trained environmental and occupational monitoring personnel, calculated radiological exposures and prepared environmental reports.

University of Wyoming Radiation Safety Officer. Managed the Radiation Safety Office and taught radiation safety courses.

ASSOCIATIONS (current and past):

American Institute of Mining Engineers

American Mining Congress, Uranium Environmental Subcommittee former chairman

American Nuclear Society

Beta Beta Beta

Health Physics Society

Rio Grande Chapter Health Physics Society former chairman

National Council of Radiation Protection and Measurements, contributing author to NCRP Report 118 "Radiation Protection in the Mineral Extraction Industry"

New Mexico Mining Association, Uranium Environmental Subcommittee

Ronald McDonald House Board of Directors

Sigma Xi

Wyoming Mining Association, Uranium Environmental Subcommittee.

CLIENT LIST:

All-Tec Inc.
ARA (Mission Research) Corp.
Assagai Analytical Labs
Atlas Minerals Corp.
Aware, Inc.
BDM Corp.
Black Law Firm
Bogle & Gates Law Firm
Chem-Nuclear Systems, Inc.
Cameco Resources
Cogema Mining, Inc.
Cotter Corporation
Cyprus Miami Mining Corp.
Dawn Mining Company
Duke Engineering & Services
Energy Fuels Nuclear, Inc.

Los Alamos National Laboratory
(through subcontractors)
Lovelace Respiratory Research Institute
Marline Uranium Corp.
McGowen Working Partners
Montgomery & Andrews
NM Environment Department
Pathfinder Mines Corp.
Plains Electric
Plateau Resources Ltd.
Power Resources, Inc.
PRC Env. Management, Inc.
Power Resources Inc.
Power Tech
Precision Castparts Corp.
Public Service Company of NM

Energy Laboratories, Inc.
Energy Metals Corporation
Envir. Sci. & Engr., Inc.
Federal American Partners
Ferret-Nebraska, Inc.
Franchini Law Firm
Giant Industries Inc.
Hecla Mining Company
Hollington Law Firm
Holmes, Roberts & Owen, Inc.
Homestake Mining Company
HRI, Inc.
ICF Kaiser Engineers, Inc.
Intera, Inc.
IT Corporation/D'Appolonia
Jacobs Engineering, Inc.
Ktech Corporation
Kleinfelder Corp.

Quivera Mining Company
Remote Sensing Systems
Rio Algom Corp.
Sandia National Labs
(through subcontractors)
Science and Engineering Associates
Sinclair Oil Company
Simmons Law Firm
Thunderbird/Red Lion Inns
Titan/Spectron Dev. Labs
Tomin Corp.
U.S. Energy/Crested Corp.
USX
Umetco
United Nuclear Corp.
Western Nuclear, Inc.
Weston, Roy F., Inc.

Uranium Study SME

SME: Risk Assessment, modeling, chemical engineering QA

Current Employment: John Hart and Associates

Capabilities: Mr. Djordjevic has over 16 years of environmental management experience mainly supporting the U.S. Department of Energy (DOE). This experience encompasses analysis of performance, risk, safety and design issues related to the generation, storage, characterization, transportation, and disposal of radioactive and mixed transuranic (TRU), low-level, and high-level radioactive wastes..

Sinisa Djordjevic

Scientist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants

Education / Credentials

Ph.D. Studies Engineering

❖ University of New Mexico,

Master of Chemical Engineering

❖ Illinois Institute of Technology, Chicago, IL,

B.S., Chemical Engineering

❖ Northwestern University, Evanston, IL

Certifications and Affiliations

Engineer in Training (State of New Mexico)

Registrar Accreditation Board (RAB) - Environmental Management Systems Provisional Auditor (Certificate No. E051661)

American Institute of Chemical Engineers, Member

Association of Energy Engineers, Senior Member
New Mexico Hazardous Waste Management Society, Member

ANSI-RAB & EARA Approved ISO 14000 Lead Auditor Training, QSD, 1997

Radiation Safety Training Certificate, University of New Mexico, 1992

OSHA Site Remediation and Hazards and Protection Training, IT Corp., 1991

Professional Qualifications

He has specialized experience and skills in the following areas:

- TRU and Mixed Waste Management and Transportation
- Risk and Performance Assessment
- Development and Application of Computer Simulation Models
- Waste Characterization and Certification
- Regulatory Compliance
- Remedial Systems Design and Analysis
- Systems Analysis and Engineering
- Environmental Data Management
- ISO 14000 Environmental Management Systems (Planning, Implementation, Gap Analysis, Auditing, and Training)
- Energy Management
- Information Systems Architecture, Research, and Brokering
- Innovative and Emerging Environmental Technology Modeling and Analysis
- Industrial Ecology and Sustainable Development
- Computer Software Services, Programming, Graphical User Interface Development

- Quality Assurance and ISO 9000 Quality Management Systems
- Educational Systems and Training

Experience

John Hart and Associates, P.A.

Albuquerque, New Mexico

1998-present

Mr. Djordjevic is currently providing software quality assurance support to the National Aeronautics and Space Administration (NASA) Mars exploration program. He has served on a John Hart and Associates, P.A. (JHA) team that developed and is currently implementing an NQA-1 compliant program for safety analyses of mission launches. He has also supported work JHA performed for Washington TRU Solutions, LLC, and Sandia National Laboratories (SNL) at the WIPP. He has performed internal audits of SNL's compliance with quality assurance program requirements. He compiled a data base of RCRA requirements applicable to the project and developed comparative checklists of interim status and draft permit requirements. He also supported SNL in the development of software to compile waste inventory information for updates to the WIPP Baseline Inventory Report.

Benchmark Environmental Corporation

Albuquerque, New Mexico

1988-1994

Mr. Djordjevic conceptualized and participated in the implementation of several National Transuranic Program Office initiatives. These initiatives will significantly increase the amount and rate of TRU waste shipments while substantially reducing the costs and risks associated with repackaging, testing and treating the wastes. These initiatives include: the TRUPACT-II Matrix Depletion Program; the Flammability Assessment Methodology; an Alternative Method of Certifying TRU Waste Containers; Hydrogen Gas Getters; Mixing of TRUPACT-II Shipping Categories Program; RH TRU Waste Canister Sampling; and, Development of a Unified Flammable Gas Testing Procedure.

Mr. Djordjevic analyzed Rocky Flats Environmental Technology Site (RFETS) hydrogeologic data and screened both conventional and innovative treatment technologies for use in environmental restoration efforts at the RFETS. He then assembled technologies into alternatives and then screened alternatives based on cost, feasibility, and effectiveness to select the baseline remediation strategy. He prepared cost and schedule estimates for the baseline remedial alternative and documented the assessment methodology.

IT Corporation

Albuquerque, New Mexico

Mr. Djordjevic managed the development, application, and documentation of the pathways analysis and aggregation models as part of the Systems Analysis Methodology for the DOE-HQ Mixed Low Level Waste (MLLW) Management Program. The Methodology is an analytical tool that aids decision-makers in evaluating the feasibility and effectiveness of various, mixed-waste management options. The purpose of the pathways analysis model is to evaluate site hydrogeologic properties, various waste forms and disposal facility technologies with respect to compliance with the performance objectives in the U.S. Nuclear Regulatory Commission (NRC) regulation 10 CFR Part 61, DOE orders and other regulations. Mr. Djordjevic also managed the development, application, and documentation of the aggregation model of the methodology. The aggregation (multi-criteria decision-making) model aggregated the results of the pathways analysis, risk, cost, schedule, and regulatory models of the methodology. He interfaced with DOE Performance Assessment Task Team and the DOE Peer Review Panel during the development of the Methodology. In addition, he provided computational support to the probabilistic risk assessment task and assisted in the collection and estimation of accident probabilities associated with mixed waste treatment processes. Sensitivity and uncertainty analyses were an integral part of the Methodology.

As a primary technical lead of the Waste Isolation Pilot Plant (WIPP) Engineered Alternatives Task Force, which was established by the DOE, Mr. Djordjevic developed, applied, and documented the Design Analysis Model and provided computational support to the probabilistic risk assessment task. The purpose of this performance assessment (PA) model was to evaluate engineered alternatives to the TRU waste forms and the WIPP facility to enhance repository performance. This work included evaluation of the WIPP site hydrogeologic properties and estimation of hydrogeologic properties of various waste forms and backfills. Mr. Djordjevic enhanced the model with improved gas generation and mechanical room closure models. He linked the model with the Lawrence Berkeley multiphase hydrologic flow model TOUGH2. As part of this effort he also developed methodologies for use in WIPP regulatory compliance evaluations.

Developed a methodology and an integrated computational model to simulate the release of hazardous chemicals from leaking underground storage tanks. The model simulated volatilization of the organic chemicals leaking from the tanks and transport of the vapors upward through the soil to the ground surface. The model simulated air dispersion of the chemicals at the ground surface to receptors downwind using Gaussian plume models. The model also simulated the migration of chemicals downward through the vadose zone to the groundwater surface and subsequent migration in the groundwater to receptor wells. The model internally calculated all physico-chemical parameter values (e.g., diffusivities, dispersivities, half-lives and partition coefficients) required to perform transport calculations. The model was used in a risk assessment of leaking tanks at the Idaho National Engineering Laboratory.

Mr. Djordjevic has provided support to various other DOE site programs. He verified the RISKCHEM code developed by SNL to evaluate environmental restoration strategies for SNL operable units. The code is an extension of the DOE RESRAD code. He performed system energy and mass balances and cost estimates as part of the Systems Design Study (SDS) for the INEL Buried Waste Remediation project. He quantified the physico-chemical processes (e.g., evaporation, thermal expansion) as part of safety analyses of the HLW tank wastes at the INEL that are required for tank certification. Mr. Djordjevic evaluated operations of the Waste Receiving and Processing (WRAP) Module 1 facility at the Hanford Site and the Waste Handling and Packaging Plant (WHPP) at the Oak Ridge National Laboratory, with respect to safety issues and compliance with the WIPP Waste Acceptance Criteria. Mr. Djordjevic wrote the TRAMPAC section of the Los Alamos National Laboratory TRU Waste Certification Plan and the TRUtech Team Certification and Characterization Procedure. Mr. Djordjevic prepared and documented WIPP closure and post-closure cost estimates for the RCRA permit application to the State of New Mexico.

Mr. Djordjevic was a primary technical resource and author of the Safety Analysis Report for the TRUPACT-II shipping package (for shipments of contact-handled TRU waste) and the 72-B cask (for shipments of remote-handled TRU wastes). His analyses established payload characteristics, which would ensure safe transport of TRU wastes in these shipping packages. He prepared the TRUPACT-II Gas Generation Test Program Work Plan and served as an alternate member of the Interface Working Group for the program.

As a project engineer, Mr. Djordjevic developed, adapted, and applied mathematical models of groundwater flow and contaminant transport on high performance work stations and microcomputers for the Swakopmund uranium mill tailings disposal site in Namibia, Africa. He adapted and applied graphics post processing packages and participated in presentations and discussions with clients.

Mr. Djordjevic was an author of the WIPP Test Phase No-Migration Variance Petition. He estimated the concentrations of RCRA regulated constituents in waste containers and performed source emission calculations as well as air dispersion and contaminant transport modeling for the NMVP. He was a principal technical resource and author of numerous other WIPP related documents, including the WIPP Waste Acceptance Criteria, the Experimental-Waste Characterization Quality Assurance Program Plan, the Final Safety Analysis Report, and the Waste Characterization Program Plan. Specifically, Mr. Djordjevic provided technical expertise in the areas of environmental assessment, safety analysis, and TRU waste management operations.

He used waste characterization data in the Mixed Waste Inventory Report to derive representative concentrations of RCRA-regulated constituents and radionuclides in untreated mixed low level wastes at major DOE sites. He collected and hydrogeologic data at the major DOE sites and various disposal facility technologies and designs and prepared input

data sets for the pathways analysis model of the Systems Analysis Methodology of the DOE-HQ MLLW Management Program. The results were used to rank DOE systemwide and site-specific waste management options. He also provided peer review of the disposal facility performance modeling methodology for the DOE HQ Programmatic Environmental Impact Statement.

He led the development, application and documentation of a methodology, conceptual model and associated computer code to perform PA evaluations of potential final waste forms for alpha LLW and alpha mixed LLW at the Idaho National Engineering Laboratory (INEL). The evaluations consisted of analyzing site hydrogeologic data at three potential disposal sites and PA modeling of both untreated wastes and six potential final waste forms to assess compliance with applicable DOE orders (5820.2A and 5400.5) and other regulations (NRC regulations in 10 CFR Part 20, 10 CFR Part 60, 10 CFR Part 61 and EPA regulations in 40 CFR Part 61 and in 40 CFR Part 141).

Mr. Djordjevic reviewed existing and proposed engineered barriers that minimize contact between infiltrating water and waste in commercial LLW disposal facilities as required in 10 CFR Part 61. He then developed a model, and barrier material hydrogeologic properties to evaluate the ability of the barriers to enhance the long-term performance of these facilities. Engineered barriers included concrete overpacks, vaults, backfills, engineered soil covers as well as state-of-the art barriers, including an engineered sorptive layer underlying the facility and an advanced cap design incorporating a double capillary layer. Designs were compared on the basis of a dose reduction factor using activity-to-dose conversion factors listed in 10 CFR Part 20.

Principia Mathematica

Evergreen, Colorado

Developed and applied a linked groundwater flow and surface water flow model to evaluate historical and proposed water usage along the Arkansas River Basin, Colorado-Kansas to support interstate litigation. Presented findings of the analyses and explained complex technical issues to the Colorado State Engineers Office and the State's counsel.

Publications

NuPac. 1989. "Safety Analysis Report for the TRUPACT-II Shipping Package," Rev. 10. Federal Way, Washington, Nuclear Packaging, Inc.

DOE. 1990. "Waste Isolation Pilot Plant No-Migration Variance Petition." DOE/WIPP 89-003. Carlsbad, New Mexico, U.S. Department of Energy-Waste Isolation Pilot Plant Project Office.

DOE. 1991. "Evaluation of the Effectiveness and Feasibility of the Waste Isolation Pilot Plant Engineered Alternatives: Final Report of the Engineered Alternatives Task Force." DOE/WIPP 91-007, Rev. 0. Carlsbad, New Mexico, U.S. Department of Energy.

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IT Corporation. 1992. "An Evaluation of the Remote-Handled Transuranic Waste Forms at the Oak Ridge National Laboratory for Acceptance at the Waste Isolation Pilot Plant," Albuquerque, New Mexico.

IT Corporation. 1992. "Hanford Waste Receiving and Processing Facility Title I Design Review: Comparison of WRAP 1 Design With WIPP Criteria and Requirements." Richland, Washington, Westinghouse Hanford Company.

Abashian, M.S., M. Carageorges, S. Chakraborti, M. Devarakonda, and S.M. Djordjevic. 1993. "An Integrated Approach for Evaluating DOE Mixed Low-Level Waste Management Options," Proceedings of the 1993 IT Symposium, Scottsdale, Arizona.

Booher, W., and S.M. Djordjevic. 1993. "Electrokinetics and its Potential Application in the Remediation of Uranium-Contaminated Soils," Proceedings of the 1993 IT Symposium, Scottsdale, Arizona.

Case, J.B., R. Spangler, and S.M. Djordjevic. 1993. "A RCRA Tank Assessment of Eleven Stainless Steel Tanks Containing High-Level Radioactive Waste at the INEL Chemical Processing Plant," Proceedings of the 1993 IT Symposium, Scottsdale Arizona.

DOE. 1993. "Mixed Low-Level Waste Systems Analysis Methodology and Applications Report, Draft." DOE/LLW-194. Washington, D.C., Office of Environmental Restoration and Waste Management.

Djordjevic, S.M., L.R. Spangler, R. Sobocinski, and M.S. Abashian. 1993. "Pathways Analysis Model to Evaluate DOE Mixed Low-Level Waste Disposal Facilities," Proceedings of the Symposium on Waste Management I. Tucson, Arizona, Arizona Board of Regents, Waste Management '93.

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Smith, T.H., J. Myers, S.M. Djordjevic, T.A. DeBiase, D. DeWitt, and M. Goodrich. 1994. "Preliminary Parametric Performance Assessment of Potential Final Waste Forms for Alpha Low Level Wastes at the Idaho National Engineering Laboratory." EGG-WM-11415. Idaho Falls, Idaho, EG&G Idaho, Inc.

Connolly, M.J., S.M. Djordjevic, C.A. Loehr, and L.R. Spangler. 1996. "Assessment of Gas Flammability in Transuranic Waste Containers," Proceedings of the Symposium on Waste Management. Tucson, Arizona, Arizona Board of Regents, Waste Management '96.

Connolly, M.J., S.M. Djordjevic, C.A. Loehr, K.J. Liekhus, and L.R. Spangler. 1996. "Position for Determining Gas Phase Volatile Organic Compound Concentrations in Transuranic Waste Containers," Proceedings of the Symposium on Waste Management. Tucson, Arizona, Arizona Board of Regents, Waste Management '96.

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Djordjevic, S.M., L.R. Spangler, and M.J. Connolly. 1996. "Certifying Containers For TRUPACT-II Shipment Using Flammable Gas Headspace Measurements." Accepted for

presentation at Waste Management '97. Tucson, Arizona, Arizona Board of Regents, Waste Management '97.

Djordjevic, S.M., L.R. Spangler, and M.J. Connolly. 1996. "Development and Implementation of a Mixing of TRUPACT-II Shipping Categories Methodology." Accepted for presentation at Waste Management '97. Tucson, Arizona, Arizona Board of Regents, Waste Management '97.

LANL. 1996. "Los Alamos National Laboratory Transuranic Waste Certification Plan." PLAN-CSTDO-004,R.0. Los

Uranium Study SME	Theodore A. Wolff, Ph.D.
SME: NEPA Current Employment: Trinitex Services, Inc. Capabilities: NEPA, Radiation Programs, uranium licensing, emergency management, compliance inspections. Ted has a broad background in institutional issues and government relations both with the State of New Mexico and at Sandia Labs in 40years. His experience includes working as a manager in the State of New Mexico Radiation Control Bureau, prior to coming to Sandia. He was responsible for helping the State of New Mexico conduct strategic planning and interacted with a variety of agencies and officials at the federal, state, county, local and tribal governments.	Scientist: Trinitex Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials Ph.D. Biology ❖ University of Utah, Salt Lake City, Utah, MS Public Health ❖ University of North Carolina, Chapel Hill B.S. Biology ❖ New Mexico Highlands University Additional Training: Qualified evaluator by Federal Emergency Management Agency training for emergency response activities.

2009-2012 Ted Wolff was an internal environmental and safety auditor and led a number of successful audits at Sandia National Laboratories (SNL). Prior to joining the auditing Department, at SNL, he supported risk assessments, emergency response activities, and improvement opportunities for the annual emergency response exercise. Ted also assisted in National Environmental Policy Act (NEPA) analysis and coordination for inactive uranium mill tailing sites. As part of interdisciplinary teams he prepared NEPA documents for Department of Energy (DOE). As the task leader for NEPA compliance at SNL, he developed a strategy for compliance with NEPA for the Kauai Test Facility (KTF). This facility was operated by SNL for the DOE. Completed documentation provided the KTF with a competitive advantage over other rocket launching facilities. The work was documented in a paper co-authored and published in the Environmental Practice by Cambridge University Press. Ted also helped plan, write, and produce a number of Environmental Assessments and Environmental Impact Statements for various proposed actions. This included being part of a interdisciplinary team that drafted the Environmental Assessment for the conversion of highly enriched uranium (HEU) to low enriched uranium (LEU) and the transportation of the LEU to the U.S. from Russia. This work was completed for the DOE.

Special Projects, Public Relations and Communication

He supported the SNL Center Director with risk assessments, emergency response activities, and improvement opportunities for the annual emergency response exercise for the labs, and served on the Integrated Laboratory Management System Core Team, promote mission success through operational excellence, and support

the Center Director in preparing for the Audits and related ES&H compliance activities.

Institutional Issues and International Experience

I have a broad background in institutional issues and government relations both with the State of New Mexico and at SNL. His experience includes working as a manager in the State of New Mexico Radiation Control Bureau, prior to coming to Sandia. He was responsible for helping the State of New Mexico conduct strategic planning and interacted with a variety of agencies and officials at the federal, state, county, local and tribal governments. He responded to requests from Congressional staff for the Governor, reviewed state and federal legislation, and testified before state legislative committees, and served the Governor of NM and his Environmental Secretary as the staff person for the President's State Planning Council. This activity required trips to Washington, D.C. and elsewhere. He managed the NM Radiation Protection Bureau and oversaw radiation protection practices across the state. Concurrent with duties as head of that program, he served as the Governor's state liaison officer to the U.S. Nuclear Regulatory Commission, and represented New Mexico on radiation issues at meetings of the Western Interstate Energy Board, the National Governor's Association, and the Conference of Radiation Control Program Directors.

While at Sandia, he was appointed by the governor to the State's Radiation Technical Advisory Council and served on this Council for a number of years. Because of his institutional issues experience at Sandia with the transportation of radioactive materials, the DOE head of the WIPP Pilot project requested and facilitated his loan to the Joint Integration Office for the WIPP for a yearlong assignment. In 2002, DOE excerpted an article that he co-authored and published it in a headquarters' publication. Ted supported the DOE/NNSA for several months in the Russian Federation where he conducted transparency monitoring for the conversion of highly enriched uranium to low enriched uranium. Both activities required exceptional performance and a high degree of cultural sensitivity.

As a member of Sandia National Laboratories' technical staff, he assisted in the National Environmental Policy Act (NEPA) analysis and coordination for inactive uranium mill tailing sites for which DOE had assessment and environmental restoration responsibilities. He analyzed radioactive material transportation issues, took part in interdisciplinary teams that wrote NEPA documents for DOE and was the task leader for an institutional issues analysis program conducted for the DOE's Defense Programs and Civilian Programs. He was the key person who developed a strategy for compliance with NEPA for the Kauai Test Facility (KTF). The completed documentation provided the KTF with a competitive advantage over other rocket launching facilities. This work included in a paper he co-

authored that was published in Environmental Practice in 2007 by Cambridge University Press.

Ted was part of an interdisciplinary team that helped prepare the Environmental Assessment for the Conversion of highly enriched uranium (HEU) to low enriched uranium (LEU) and the LEU Transportation to the U.S. from Russia. This work was completed for the DOE/NNSA. He also helped plan and produce a number of Environmental Assessments and Environmental Impact Statements for various projects. Ted worked in Sandia's Environmental Safety and Health program and worked on various environmental protection issues (PCB management, air permitting, hazardous material release reporting, etc.). As the team leader, he developed a Sandia-wide NEPA program. His prompt and responsive support of data collection needed by DOE Headquarters for the preparation of a programmatic Environmental Impact Statement for the Reconfiguration of the Nuclear Weapon's Complex led to an "Award for Excellence."

Community Involvement and Issues Management Department:

In this position, I was involved in a number of environmental issues and educational outreach activities and public involvement activities which included chairing, facilitating, and coordinating committees. I served on the Board of Directors of Shared Vision, a community non-profit whose mission included convening and facilitating public deliberation and taking action on major issues that are crucial to the future of the Albuquerque metropolitan area.

Mid-Region Council of Governments (MRCOG) of New Mexico Urban Transportation Planning Policy Board's Public Involvement Committee (PIC): MRCOG conducts area-wide cooperative and comprehensive planning on transportation issues. I serve as Sandia's representative of the PIC, which is the Council's outreach effort for public input on transportation issues. The Council uses input from the PIC to conduct area-wide cooperative and comprehensive planning.

Greater Chamber of Commerce: serve on the Transportation Planning Council

Judge co-chair 2007 Intel International Science and Engineering Fair. Host Committee Board Member and Intel International Science and Engineering Fair-Judge co-chair with responsibility for recruiting, training, and managing ~1,000 judges for 1,500 student projects.

Judge Chairman for Annual Northwestern New Mexico Regional Science and Engineering Fair: I organize and assist science fair judges with Senior and Junior Science Fair Exhibits, award prizes, and advance worthy exhibitors to state and national science fairs.

New Mexico Environmental Health Conference Planning Committee: I serve on the planning committee for this annual conference that has attracted up to 600 attendees. Sandia is a Conference planning partner. I am working to propel the Conference into a position as the premier Environmental Health Conference in this region.

Adventures in Science and Knowledge (ASK): I worked with Sandia volunteers to produce a pilot on-line "textbook" to promote on-line teaching via an Internet Home page for 5th grade children.

School to World: I organized and managed the Health and Medicine Cluster for this very successful careers awareness event.

Miscellaneous Volunteer Activities: I participated in the annual Peace Corps Day activities, Habitat for Humanity, School to World, US Savings Bond Drive, was a loaned executive to the Central NM United and participated on Way United Way Fund Review Panels.

Peace Corps Volunteer, U.S. Department of State- I completed 12-week Intensive training program that included teaching methodology, Malay language, Malaysian and Asian area studies and health science at Northern Illinois University and the University of Hawaii at Hilo, Hawaii. My principal assignment was as a Health Science and Biology teacher at the Sultan Abdul Aziz School, Kuala Selangor, Malaysia. I prepared students for the Senior Cambridge School Certificate examinations, both set and marked in England. I also advised the science society, organized a science fair, and participated in various Asian community activities.

I have made a number of presentations at conferences, training sessions and at DOE Headquarters.

REPRESENTATIVE PUBLICATIONS & PRESENTATIONS

Reviewing NEPA's Past: Promoting NEPA's Future Roger P. Hansen, J.D., AICP, Aurora, CO

Theodore A. Wolff, Ph.D., Albuquerque, NM, published December 2012 in Environmental Practice, Cambridge University Press.

Wolff, T. A. and Lewis T. Nielsen "The Mosquitoes of New Mexico" 128 pages, June 2007 UNM Press, 2008 New Mexico Book Awards Finalist

Hansen, R. P., T. A Wolff and Albert G. Melcher NEPA and Environmental Streamlining: Benefits and Risks. Proceedings of the Conference of the National Association of Environmental Professionals April 23-26, 1996 Albuquerque, New Mexico, published June 2007 in "Environmental Practice" Cambridge University Press.

Hansen, R. P., and T. A. Wolff. "Making NEPA More Effective and Economical for the New Millennium," Federal Facilities Environmental Journal/Autumn 2000.

Wolff, T. A. and R. P. Hansen. "National Environmental Policy Act (NEPA) Compliance at Sandia National Laboratories/New Mexico (SNL/NM)," SAND98-1691, Sandia National Laboratories, Albuquerque, New Mexico

Hansen, R. P., and T. A Wolff. "Streamlining the Process: A Strategy for Making NEPA Work Better and Cost Less" Proceedings of the Conference of the National Association of Environmental Professionals, Environmental Management: Linking NEPA, ISO 14000 and Sustainable Development June 20-26, 1998 San Diego, California

Hansen, R. P., T. A Wolff and Lance N McCold "The Conflict of Interest Problem in EIS Preparation" Proceedings of the Conference of the National Association of Environmental Professionals May 19-22, 1997 Orlando, Florida

Wolff, T. A. and R. P. Hansen. "Tools for NEPA Compliance: Baseline Reports and Compliance Guides" Proceedings of the Conference of the National Association of Environmental Professionals, Practical Environmental Directions: A Changing Agenda, June 2-6, 1996.

Wolff, T. A. and R. P. Hansen. "Use of Comprehensive NEPA Documents to Reduce Program Risk" Proceedings of the 1994 Conference of the National Association of Environmental Professionals, Global Strategies for Environmental Issues, New Orleans, Louisiana, June 12-15, 1994.

Wolff, T. A. and R. P. Hansen. "The NEPA Threshold Question Revisited: Proposed "Actions and Continuing Activities" Proceedings of the 1993 Conference of the National Association of Environmental Professionals, Current and Future Priorities for Environmental Management, Raleigh, North Carolina, May 24-26, 1993.

R. P. Hansen and T. Wolff. "NEPA/CERCLA/RCRA Integration: Policy Vs Practice" Proceedings of the 1993 Conference of the National Association of Environmental Professionals, Current and Future Priorities for Environmental Management, May 24-26, 1993.

Will Keener, Stephen S. Baca, Maureen Baca, Al Stotts, Tami Toops, and Ted Wolff, Sandia National Laboratories and Department of Energy "New Model for Public Participation at Sandia National Laboratories: What Comes After Environmental Restoration?" Waste Management 00, Tucson, AZ.

Wolff, T. A. 1989. "Survey of States for Existence of Large Truck Accident Rates and Databases That Could Be Analyzed To Obtain Large Truck Accident Rates." SAND880626. TTC0790. Albuquerque, NM: Sandia National Laboratories.

Wolff, T. A. and J. D. McClure. 1987. "Institutional Issues Analysis of the Transportation Technology Center." SAND861899. TTC680. Albuquerque, NM: Sandia National Laboratories.

Wolff, T. A. "Development and Use of Generic Documents for Assessing the Impacts of Transporting Nuclear Materials." Waste Management '86, Tucson, AZ.

Wolff, T. A. and J. D. McClure. "The Transportation Technology Center Institutional Issues Program and Emergency Preparedness, Waste Management '85, Tucson, AZ.

Wolff, T. A. 1984. "The Transportation of Nuclear Materials" SAND840062. TTC0471. Albuquerque, NM: Sandia National Laboratories.

Elizabeth A. Dupree Ellis, Ph.D.
Oak Ridge Associated Universities

Education

B.A., Zoology, Duke University, 1973
Sc.M., Epidemiology, Johns Hopkins University, 1978
Ph.D., Epidemiology, University of North Carolina, Chapel Hill, 1989

Positions

Oak Ridge Associated Universities
Occupational Exposure and Worker Health
Associate Director, Center for Epidemiologic Research **2007-present**

Oak Ridge Associated Universities
Basic and Applied Research
Associate Director, Center for Epidemiologic Research **1998-2007**
Serves as Associate Director for the Center for Epidemiologic Research which conducts and supports quality epidemiologic research with primary emphasis on occupational health studies. The program has offices in Oak Ridge, TN and Arvada, CO.

Associate Director, Center for Epidemiologic Research, ORAU **1991-1998**
Leader, Epidemiology Support Section, Center for Epidemiologic Research, **1987-1991**
Epidemiologist, Center for Epidemiologic Research, ORAU **1983-1987**
Associate Epidemiologist, Center for Epidemiologic Research, ORAU **1978-1981**

The Johns Hopkins University, Baltimore, MD
Department of Epidemiology
Research Assistant **1977-1978**

Energy Research and Development Administration
Office of Environmental Research, Human Health Studies Program
Intern **1977**

Publications

Dupree, EA. 1980. Mortality among workers at a uranium refining and processing plant. American Journal of Epidemiology 112:446 (abstract).

Hudson DR, EL Frome, EA Dupree, MS Hansard, WL Beck, and CC Lushbaugh. 1981. Exploratory analysis of mortality in a cohort of nuclear material workers. American Journal of Epidemiology

114:446 (poster session).

- Lushbaugh CC, WL Beck, EA Dupree, EL Frome, SA Fry, MS Hansard, DR Hudson, and AP Polednak. 1981. Health and mortality of DOE workers. *Trans. Am. Nuclear Soc.* 38:81.
- Fry SA, CC Lushbaugh, CM Shy, DL Cragle, H Checkoway, S Blum, AV Carpenter, EA Dupree, EL Frome, PG Groer, and J Wilson. 1985. The U.S. Department of Energy Health and Mortality Study: The Oak Ridge studies. In: *Epidemiological studies of some populations exposed to ionizing radiation*, (Weeks JL, compiler), pp. 18-40, Pinawa, Manitoba: Atomic Energy of Canada Limited, (AECL publication no. 8360).
- Dupree EA, DL Cragle, RW McLain, DJ Crawford-Brown, and MJ Teta. 1987. Mortality among workers at a uranium processing facility: Linde Air Products Ceramics Plant, 1943-49. *Scandinavian Journal of Work, Environment and Health* 13:100-107.
- Fry SA, AV Carpenter, DL Cragle, EA Dupree, PG Groer, CC Lushbaugh, H Checkoway, DJ Crawford-Brown, CM Shy, JE Watson, and EL Frome. 1988. Studies of mortality among populations of U.S. nuclear industry workers. In: *Proceedings of the International Conference, Health Effects of Low Dose Ionizing Radiation--Recent Advances and Their Implications*. London, England: British Nuclear Energy Society, pp. 77-80.
- Dupree EA. 1989. Doctoral dissertation, University of North Carolina, School of Public Health, Department of Epidemiology, Chapel Hill, NC. An epidemiologic investigation of mortality among workers occupationally exposed to uranium compounds at a uranium processing plant.
- Dupree EA, J Watkins, J Ingle, P Wallace, C West, and W Tankersley. 1993. Risk of lung cancer among uranium processing workers. *American Journal of Epidemiology* 138:640 (abstract).
- Dupree EA, J Watkins, JN Ingle, PW Wallace, CM West, and WG Tankersley. 1995. Uranium dust exposure and lung cancer risk in four uranium processing operations. *Epidemiology* 6:370-375.
- Fry SA, DL Cragle, DJ Crawford-Brown, EA Dupree, EL Frome, ES Gilbert, GR Petersen, CM Shy, WG Tankersley, GL Voelz, PW Wallace, JP Watkins, JE Watson, and LD Wiggs. 1995. Health and Mortality among Contractor Employees at U.S. Department of Energy Facilities. In: *Radiation and Public Perception: Benefits and Risks* (Young JP, Yalow RS, editors). Developed from the symposium *Radiation and Society*, held at the April 1992 national meeting of the American Chemical Society, San Francisco, pp. 239-258.
- Fry SA, EA Dupree, AH Sipe, DL Seiler, and PW Wallace. A study of mortality and morbidity among persons occupationally exposed to > 5 rem (> 50 mSv) in a year. Phase I: Mortality, through 1984. *Applied Occupational and Environmental Hygiene* suppl. March 1996.
- Ellis ED, Watkins J, Ingle J, Phillips J. 2000. External radiation exposure and mortality among a cohort of uranium processing workers. *American Journal of Epidemiology* 152:91-95.
- Boice JD, RW Leggett, ED Ellis, PW Wallace, M Mumma, SS Cohen, AB Brill, BB Boecker, JG Barnes, RC Yoder, and KF Eckerman. 2006. A comprehensive dose reconstruction methodology for former Rocketdyne/Atomics International radiation workers. *Health Physics* 90(5):409-430.

Boice JD, SS Cohen, MT Mummaw, ED Ellis, KF Eckerman, RW Legett, BB Boecker, AB Brill, and B Henderson. 2006. Mortality among radiation workers at Rocketdyne (Atomics International), 1948-1999. *Radiation Research* 166:98-115.

Guseva IC, Ellis ED Tirmarche M. 2007. Cancer risk in nuclear workers occupationally exposed to uranium – emphasis on internal exposure. *Health Physics* 94(1):1-17.

Ellis ED, Watkins J, Tankersley W, Phillips J, Girardi D. 2010. Mortality among titanium dioxide workers at three DuPont plants. *Journal of Occupational and Environmental Medicine. Journal of Occupational and Environmental Medicine* 52(3):303-309.

Boice JD, SS Cohen, MT Mummaw, ED Ellis, KF Eckerman, RW Legett, BB Boecker, AB Brill, and B Henderson. 2011. Updated mortality analysis of radiation workers at Rocketdyne (Atomics International), 1948-2008. *Radiation Research* 176:244-258.

Tirmarche M, Harrison JD, Pacquet F, Blettner M, Laurier D, Shilnikova N, Blanchondon E, Lecomte JF, Sokolnikov M, Ellis E, and Marsh JW. Assessment and control of lung cancer risk from radon. *Annals of the ICRP* (accepted for publication)

Ellis ED, Watkins JD, Tankersley W, Phillips J, Girardi D. Occupational exposure and mortality among workers at three titanium dioxide plants. *American Journal of Industrial Medicine* (submitted)

Synergistic Activities

2006 – present. Member, International Commission on Radiation Protection, Committee 2, Task Group 64 to review knowledge and make recommendations on further study of the health effects of occupational radiation exposure to alpha emitters.

1994 – present. Program Director for the DOE Illness and Injury Surveillance Program. The program assesses the overall health of contractor workers employed at 13 DOE sites.

2000 – present. Chair of the Oak Ridge Site-wide Institutional Review Board (IRB) and member of the DOE Central IRB.

George Holdsworth Ph.D.
Oak Ridge Associated Universities

An experienced scientist specializing in toxicology and human health risk assessments.

Senior Toxicologist: Oak Ridge Associated Universities (2003-present)

Technical support to the U.S. EPA IRIS program office for • the preparation of toxicological reviews and IRIS summary sheets, • peer review, and • meeting support. Member of the writing team for toxicological reviews of n-hexane and 1,2,3-trichloropropane, among others. Provided write-ups of experimental studies and overall technical support for the Agency's *Toxicological Review and Risk Characterization of Formaldehyde*, currently in preparation. Prepared monographs on the impact of environmental stressors on human health for the U.S. Centers for Disease Control and Prevention (CDC). Currently providing technical support to NIOSH on criteria documents, skin notation profiles, and immediately dangerous to life and health (IDLH values).

Senior Toxicologist: T N & Associates (1996-2003)

Extensive experience in support of government programs in the human health sciences. For the U.S. EPA, researched and authored issue papers on potential human health impacts of chemicals of environmental concern, for example, in support of U.S. EPA's Superfund Technical Support Center (STSC). Prepared monographs to assess the human health impacts of drinking water disinfectants and their by-products. In a collaborative study, developed a decision analysis methodology for choosing among alternative drinking water disinfection strategies. Researched and wrote toxicological reviews and summary sheets for compounds nominated for inclusion in the U.S. EPA's IRIS database. Assessed the mutagenic potential of trace inorganic and organic contaminants in finished drinking water. For the U.S. EPA's NCEA-Washington, DC office, collaborated in the development of a monograph on the bioaccumulation of dioxins in aquatic life. For the U.S. EPA's IRIS Office, carried out a Congress-mandated Needs Assessment. In a multi-year program for the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), developed Toxicity Profiles of environmentally and militarily important chemicals, in support of an inter-Agency initiative to develop Toxicity Reference Values protective of wildlife. During a three year period (1999-2002), participated in 13 risk assessments in support of environmental remediation at governmental sites.

Senior Scientist: Integrated Computer Systems (1992-1995)

For the U.S. DOE's ERWM program through HAZWRAP, reviewed baseline risk assessments for technical adequacy. Other tasks included reviews of RFI/RI work plans, RCRA Part B permit applications (with ACL demonstration), and RI reports for regulatory compliance and technical adequacy. Prepared issue papers on such subjects as: *The application of quantitative uncertainty analysis to human health evaluations in the baseline risk assessment*; *A modified slope factor for soil-borne plutonium*; *The relevance of the CERFA amendments to CERCLA for cleanup at DOE sites*, among many others.

Senior Scientist: Integrated Laboratory Systems (1991-1992)

For the U.S. EPA Environmental Criteria and Assessment Office (ECAO-Cincinnati), researched and wrote toxicological assessments of chemicals of environmental concern (RQ documents). Revised and updated Health and Environmental Effects Documents (HEEDs). Wrote issue

papers on the following topics: *The assessment of health risk from dermal exposure to polycyclic aromatic hydrocarbons (PAHs); A compilation of dermal, oral, and inhalation absorption factors for Superfund chemicals; The development of a simple and directly applicable mathematical model for route-to-route extrapolations using dermal, oral, and inhalation absorption factors;* and contributed to a review of an assessment of the health effects of mixtures of environmentally important pollutants. Developed quantitative toxicity values (slope factors, RfDs and RfCs) for chemicals of environmental concern. For the NIEHS, researched and wrote issue papers ("Executive Summaries") on the genotoxicity and mutagenicity of selected chemicals.

Scientist: Oak Ridge Research Institute (1983-1991)

For the U.S. EPA, assessed the human health risk from pesticides in drinking water supplies and investigated the occurrence of organohalide byproducts in drinking water disinfection and their role in hyperlipoproteinemia.. For the U.S. DOE, investigated the distribution of chemical species of mercury in soil in support of the East Fork Popular Creek project. Supervised development of an enzyme-linked immunoassay (EIA) for chemolithotrophic bacteria (*Thiobacillus* spp.) at acid mine drainage sites.

Assistant Visiting Professor: University of Cincinnati and St. Bartholomew's Hospital. (1976-1982)

Researched the kinetics of plasma lipoprotein breakdown. Designed a substrate partition assay to determine the binding efficiency of abnormal triglyceride-rich lipoproteins to the enzyme, lipoprotein lipase.

Research Fellow: University of Birmingham/Research Associate: Unilever, Inc. (1964-1976)

Researched the structure and molecular architecture of the liver cell (bile canalicular) plasma membrane. Participated in electron microscopy/freeze fracture studies of natural and artificial membranes.

Education and Training

U.S. EPA Risk Assessment Guidance for Superfund, Cincinnati, OH. (1998)

Ph.D. Biochemistry. University of Birmingham, U.K. (1973)

M.I. Biol. Biochemistry. Barking Coll. Tech, U.K. (1970)

H.N.C. Applied Biology. Luton Coll. Tech, U.K. (1968)

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Publications

Henson, A.F., G. Holdsworth and R.C. Chandon. 1971. Physicochemical analyses of the bovine milk fat globule membrane: Electron microscopy. *J. Dairy Sci.* 54: 1752-1763.

Holdsworth, G. and J.B. Finean. 1972. A structural study of the low-density lipoprotein component of hens eggs and of an isolated surface component. *Chem. Phys. Lipids* 9: 217-229.

Holdsworth, G. 1973. Studies of the structure and origins of the low-density lipoprotein fraction of hens eggs. Ph.D. Thesis. University of Birmingham, UK.

Holdsworth, G., R.H. Michell and J.B. Finean. 1974. Transfer of very low density lipoproteins from hen plasma into egg yolk. *FEBS. Lett.* 39: 275-277.

Holdsworth, G., R.H. Michell and J.B. Finean. 1974. Transfer of very low density lipoproteins from hen plasma into egg yolk. *Biochem. Soc. Trans.* 2: 486-487.

Holdsworth, G. and R. Coleman. 1975. Enzyme profiles of mammalian bile. *Biochim. Biophys. Acta* 389: 47-50.

Holdsworth, G. and R. Coleman. 1975. Presence of plasma membrane enzymes in bile and their partial purification by affinity chromatography with concanavalin A. *Biochem. Soc. Trans.* 3: 746-747.

Coleman, R. and G. Holdsworth. 1975. Effects of detergents upon erythrocytes: Different patterns of solubilization of membrane proteins by dihydroxy and trihydroxy bile salts. *Biochem. Soc. Trans.* 3: 747-748.

Coleman, R. and G. Holdsworth. 1976. The release of membrane components prior to hemolysis during extraction of intact erythrocytes with bile salts. *Biochim. Biophys. Acta* 426: 776-780.

Coleman, R., O.S. Vyvoda and G. Holdsworth. 1976. Glycocholate can remove lipid and protein components from the outer leaflet of the plasma membrane without lysis. *Biochem. Soc. Trans.* 4: 224.

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Taylor, K.G., G. Holdsworth and D.J. Galton. 1980. Lipoprotein lipase in adipose tissue and plasma triglyceride clearance in patients with primary hypertriglyceridemia. *Eur. J. Clin. Invest.* 10: 133-138.

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Holdsworth, G., M.S. Johnson and M.S. Hawkins. 2001. Wildlife Toxicity Assessment for HMX. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ113801E. Aberdeen Proving Ground, MD. November, 2001.

Holdsworth, G., M.S. Johnson and M.J. McAtee. 2001. Wildlife Toxicity Assessment for Pentaerythritol Tetranitrate (PETN). U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 37-EJ113801G. Aberdeen Proving Ground, MD. November, 2001.

Salice, C.J., G. Holdsworth and E. Janus. 2002. Wildlife Toxicity Assessment for 1,3,5-Trinitrohexahydro-1,3,5-triazine (RDX). U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01B. Aberdeen Proving Ground, MD.

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Salice, C.J., G. Holdsworth, H.L. Ilg and M.J. Quinn. 2004. Wildlife Toxicity Assessment for Ethylene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 37-EJ1138-01Q. Aberdeen Proving Ground, MD.

Salice, C.J., G. Holdsworth and M.J. Quinn. 2005. Wildlife Toxicity Assessment for Aldrin. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01J. Aberdeen Proving Ground, MD.

Muneer, A., C.J. Salice, G. Holdsworth, M.S. Johnson and M.J. Quinn. 2005. Wildlife Toxicity Assessment for Benzo(a)pyrene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01P. Aberdeen Proving Ground, MD.

Salice, C.J., H. Paulus, G. Holdsworth, M.S. Johnson and M.J. Quinn. 2005. Wildlife Toxicity Assessment for Chlordane. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 87-MA02T6-05A. Aberdeen Proving Ground, MD.

G. Holdsworth, H.L. Ilg and M.J. Quinn. 2006. Wildlife Toxicity Assessment for Acetylene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01L. Aberdeen Proving Ground, MD.

G. Holdsworth, H.L. Ilg and H.T. Bausum. 2006. Wildlife Toxicity Assessment for Phenanthrene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01K. Aberdeen Proving Ground, MD.

Muneer, A., C.J. Salice, G. Holdsworth and M.J. Quinn. 2007. Wildlife Toxicity Assessment for Thallium. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01O. Aberdeen Proving Ground, MD.

Pamela S. Whitson
Scientific Programmer/Analyst
Oak Ridge Associated Universities

Education

B.S. Degree Communications, major in Advertising, The University of Tennessee, 1972
M.S. Library and Information Science, The University of Tennessee, 1993
A.S. Health Information Technology, Roane State Community College, 1999

Certifications

Certified Tumor Registrar, National Cancer Registrars Association, 1995
Registered Health Information Technician, American Health Information Management Association, 1999
Registered Health Information Administrator, American Health Information Management Association, 2000

Positions

Oak Ridge Associated Universities **2012-present**
Scientific Programmer/Analyst, Center for Epidemiologic Research

Develop, maintain, and execute software to produce timely and accurate analysis data for the Illness and Injury Surveillance Program; develop queries to research ad-hoc requests
Maintain bibliographic function and data integrity in the Comprehensive Epidemiologic Data Resource
Research, develop, design, and implement electronic methods for scanning and retrieval of archived information

Oak Ridge Associated Universities **1989-2012**
Research Associate, Center for Epidemiologic Research

Provided editorial and research support to epidemiologic surveillance project, including data analysis and verification and writing and editorial review of technical site reports
Provided information support to research staff, including developing and implementing document control systems for both hard copy and digital records

Oak Ridge Associated Universities **1986-1989**
Administrative Program Specialist

Provided program support in processing contracts, travel, and work assignments for safety experts

East Tennessee Children's Hospital **1984-1986**
Medical Record Technician/Medical Transcriptionist

Analyzed medical records for completeness and maintained patient and diagnostic indexes.
Produced medical and administrative reports and established procedures for tracking and locating reports.

**The University of Tennessee, Energy, Environment, and Resources Center
Research Assistant**

1982-1984

Analyzed and coded information for inclusion in the Research In Progress Data Base for the U.S. Department of Energy
Served as liaison with the computer programmer for fine refinements
Coordinated the analysis and coding of research records for production of computer-generated publications.

**Tennessee Valley Authority
Editorial Assistant**

1974-1982

Prepared text and tabular material for employee publications and technical manuals
Performed layout and paste-up of text and graphics in preparation for offset printing of publications
Responsible for writing and editing division policy statements

Synergistic Activities

Ms. Whitson has several years experience as an information management coordinator in support of epidemiologic research. Her responsibilities include developing and implementing systems for storage and retrieval of research documents; abstracting and coding of morbidity data for use in epidemiologic research; and providing writing and editorial support for epidemiologic surveillance reporting projects. These projects utilize Microsoft Office, 3M Codefinder, ProCite, and SAS software. Her experiences include project management, developing coding quality standards, developing health data abstraction tools and procedures, and providing medical record and cancer registry technical support. She is a Certified Tumor Registrar from the National Cancer Registrars Association and a Registered Health Information Administrator from the American Health Information Management Association.

Phillip W. Wallace
Manager, Information Technologies
Oak Ridge Associated Universities

Education

B.S., Industrial Management, University of Tennessee, 1974

M.B.A., Management, University of Tennessee, 1975

Positions

Oak Ridge Associated Universities
Center for Epidemiologic Research
Manager, Information Technologies

1984-present

Serve as Manager of Information Technology for Occupational Exposure and Worker Health program. Responsibilities include ensuring compliance to Federal government cyber security requirements, overseeing activities of software developers, and maintain integrity of data holdings within OEWH.

Served as Manager of Information Technology for project network supporting and performing dose reconstructions as part of EEOICPA compensation efforts. Currently provide advice to subordinate manager who oversees this operation.

Oversaw the design and implementation of the DOE Beryllium Registry (10 CFR 850) and currently oversee the routine operation, work with DOE HQ staff on requirements, work with DOE sites to provide guidance on data submissions, and provide analyses of the data to DOE HQ.

Oversee the daily operation of the DOE Illness and Injury Surveillance program; interact with DOE HQ staff to review program status and plan future directions; oversee the functions of receiving data and returning errors to the submitting site, creating special reports as required, and working with sites to assess health situations as specified by the site Occupational Medicine Director.

Hands-on experience supporting epidemiologic studies through software development and data manipulation

Maintain validity and integrity of data on over 400,000 DOE workers.

Create tables containing over 4,000,000 dosimetry records, ensuring quality for use in health studies.

Lockheed Missiles and Spacecraft Corporation **1983-1984**

Manager, Space Telescope Management Information System Project

Directed computer science efforts on project for building NASA space telescope.

Systems Development Corporation **1980-1983**

Manager, Computer Systems

Directed programming efforts on project management for DOE's Gas Centrifuge Enrichment project.

Union Carbide Corporation, Nuclear Division **1978-1980**

Programmer/Analyst

Responsible for software that tracked nuclear material shipments across DOE and NRC facilities

Burroughs Corporation **1975-1978**

Programmer/Analysts and Software/Technical Representative

Provided technical assistance to sales force

Selected Publications

Wallace PW. Project management using information systems. Presented at the American Society for Engineering Management 4th Annual Meeting, October 1983.

Dupree EA, J Watkins, JN Ingle, P Wallace, and C West. Risk of lung cancer among uranium processing workers. American Journal of Epidemiology 1993; 138:640 (abstract).

Groer PG, CA Pereira, and PW Wallace. 1989. Weight of evidence analysis of lung cancer in Colorado Plateau uranium miners. In: Proceedings of the 14th L. H. Gray Conference on Low Dose Radiation: Biological Bases of Risk Assessment.

Payne D, J Reagan, and P Wallace. Data Modeling of Scientific Data. In: Proceedings of the 1991 International Oracle Users Group Conference.

Fry SA, EA Dupree, AH Sipe, DL Seiler, and PW Wallace. 1992. A study of mortality and morbidity among persons occupationally exposed to >5 rem (>50 mSv) in a Year. Phase I: Mortality, through 1984. Applied Occupational and Environmental Hygiene suppl.; March 1996.

Dupree EA, JP Watkins, JN Ingle, PW Wallace, CM West, and WG Tankersley. 1995. Uranium Dust Exposure and Lung Cancer Risk in Four Uranium Processing Operations. Epidemiology; 6:370-375.

Synergistic Activities

Extensive direct experience in working with epidemiologists, biostatisticians, and health physicists in the area of health studies and dosimetry data assessments, writing software routines, developing algorithms, and documentation.



Managing the Computer Science section of the ORAU Center for Epidemiologic Research for 27 years.

Advising the IT effort of the NIOSH Dose Reconstruction project for ORAU since project startup

Ensuring data quality and integrity in all facets of IT tasks for CER

Applying experience with related activities and DOE to achieve optimally designed application systems that fit program needs

ANTHONY W. CREECH, P.G.
Section Manager, Groundwater & Geology**EDUCATION**

B.S., Geology, College of William and Mary, 1982

Post-Graduate Study, Geology, Old Dominion University, 1982-1984

PROFESSIONAL REGISTRATION

Professional Geologist: Virginia-No. 0943,

PROFESSIONAL AFFILIATIONS

Solid Waste Association of North America (Board Member)

SUMMARY OF EXPERIENCE

Mr. Creech has over 23 years of progressive experience in geology, hydrogeology, due diligence, solid waste, health and safety, and environmental compliance management, research, and evaluation. Mr. Creech supervises all geology efforts in the company.

His areas of expertise include geologic and hydrogeologic studies (e.g., water supply investigation, landfill siting and monitoring), site characterization, risk assessment, corrective action plans, environmental site assessments, and environmental compliance auditing. He acts as program manager for all groundwater related activities performed by the company, including monitoring programs (landfills, petroleum storage facilities, wastewater treatment facilities, etc.). Mr. Creech developed and maintains written protocols for QA/QC, statistical analyses, and training of field personnel. He has provided expert witness testimony involving real and/or alleged contamination of property. He also represented clients to county boards, planning commissions, public hearings, and various regulatory entities, including the VDEQ, VDH, and EPA.

DETAILED EXPERIENCE**Water Resource Management**

Mr Creech leads Resource's efforts to work with water users in encouraging, promoting, and protecting water resources. These efforts



include the evaluation and development of incentives for alternative water sources such as reuse water; water supply inventory and future planning, source protection, and regional cooperation.

Environmental

Project manager on water resource investigation and resource protection projects for local governments throughout Virginia, including groundwater withdrawal permitting and recharge area delineation.

Project manager on various environmental investigations conducted at commercial/ industrial sites throughout Virginia.

Project Manager for ongoing groundwater and gas monitoring programs at more than 25 landfill sites throughout Virginia. Responsibilities include development of and personnel training for monitoring protocols; design standards for monitoring wells; confirmation procedures upon detection of decomposition gases; and corrective action measures.

Project Manager for Environmental Compliance Audits conducted at commercial/industrial facilities throughout the United States. Mr. Creech has conducted audits in over ten states at facilities including printers, bakeries, textile plants, power stations, and correctional centers.

Project Manager for open-end master contract for underground storage tank response for

Virginia Department of Environmental Quality. Responsible for all aspects of UST projects including alternate water supply studies, site characterizations, remediation assessments, and corrective action plans.

Manager of all UST projects for commercial and private clients. Responsible for administration of sub-contractors, health and safety and environmental quality assurance/quality control. Mr. Creech insures that all petroleum contaminated soils are handled consistent with RCRA guidelines, and that appropriate permits (e.g., NPDES, Air Emissions) are maintained for on-site remedial activities.

Manager of environmental site assessment program. has performed or supervised hundreds of ESAs throughout the Commonwealth of Virginia. Responsibilities have included site characterization (Phase II) and remediation design and implementation.

Provided soil and hydrology expertise on wetland delineation and similar projects throughout Virginia and North Carolina, including planned highway routes and an 1800-acre power plant site. He is familiar with the varied soil taxonomy protocols of the USDA, USCOE, USGS and ASTM, and can field identify hydric and other soils accordingly. In addition, Mr. Creech has installed or supervised installation of hundreds of observation wells and piezometers, including wells on wetland investigation sites.

While director of a division of a national testing laboratory, conducted all aspects of laboratory management, including hiring and training, QA/QC, profitability, and field sampling procedures.

North Carolina

For projects for the North Carolina Department of Transportation, conducted geologic evaluations. He provided services such as installation of monitoring wells and piezometers, permeability studies, wetland soils identification, and hydrogeologic profiles associated with potential wetland mitigation sites.

Managed several environmental studies at Jockey International's former facility in Cedar Falls, North Carolina. These projects included Phase I environmental site assessment, oversight of the removal of a 10,000 gallon aboveground storage tank, installation of monitoring wells, and collection/evaluation of soil and groundwater samples related to a potential transformer release and to a former chemical storage area.

Project Manager for several environmental investigations performed for Dominion North Carolina Power at power stations and district offices throughout North Carolina.

Solid Waste

Project Manager for ongoing groundwater and gas monitoring programs at more than 25 landfill sites throughout Virginia. Responsibilities include development of and personnel training for monitoring protocols; design standards for monitoring wells; confirmation procedures upon detection of decomposition gases; and corrective action measures.

Has provided Part A Applications and Notice of Intent for several sanitary landfills.

As a member of the Solid Waste Association of North America, has provided training to landfill operators in groundwater monitoring programs.

Has presented several papers on landfill groundwater statistical evaluation, release monitoring, and surface water evaluations to the Ground Water Protection Council.

Petroleum Storage

Project Manager for UST projects for commercial and private clients, including UST closure, site characterization, risk assessment, alternate water supply studies, and corrective action. Responsible for the administration of sub-contractors, health and safety and environmental quality assurance/quality control.



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Insures that all petroleum contaminated soils and waters are handled consistent with RCRA guidelines, and that appropriate permits (e.g., NPDES, Air Emissions) are maintained for on-site remedial activities.

Project Manager for open-end master contract for underground storage tank response for Virginia Department of Environmental Quality. Responsible for all aspects of UST projects including alternate water supply studies, site characterizations, remediation assessments, and corrective action plans.

Project Manager for OPA '90 plan for bulk storage and pipeline system in central Texas.

Prepared SPCC and ODC Plans for petroleum storage facilities throughout Virginia.

Groundwater Withdrawal

Project Manager for multiple municipal Groundwater Withdrawal Permit Applications for County's in Virginia Coastal Plain (including King William and New Kent Counties, in which water supply planning and aquifer protection has become critical).

Project Manager for Ground Water Withdrawal Permit application, and subsequent renewal for clay quarry in King William County, Virginia.

Project Manager for Ground Water Withdrawal Permit application for golf course in York County, Virginia.

Project Manager for Ground Water Withdrawal Permit application for landfill gas to energy facility in Charles City County, Virginia.

Provided detailed geologic assessment of potential risk of impact to groundwater well located in a Superfund remediation site in Westmoreland County, Virginia.

Environmental Compliance Auditing

Conducted industrial environmental compliance audits at facilities in Washington, Texas, South Dakota, Tennessee, South Carolina, New

Jersey, West Virginia, North Carolina, Virginia, the District of Columbia, Delaware, Maryland, and Jamaica.

Project Manager of a detailed environmental compliance audit program of over 20 correctional facilities for the Virginia Department of Corrections.

Provided Environmental Compliance Audits for Jockey International, Weston Foods, Dominion Generation, the Virginia Department of Corrections, and several other industrial clients.

JOHN L. COMBS, P.E.
Executive Vice President**EDUCATION**

B.S., U.S. Military Academy, 1967
M.E., University of Virginia (Civil Engineering), 1973
MBA Program, University of Richmond, 1975-1979
MA Program Liberty University, (2011-2013)
Graduate, Virginia Certified Planning Commissioners' Program

APPOINTMENTS***Commonwealth of Virginia***

Appointed by the Governor
Board for Architects, Professional Engineers, Land Surveyors, Certified Interior Designers and Landscape Architects (2010-2014 term)

Hanover County, Virginia

Former Member & Chair of Planning Commission

PROFESSIONAL REGISTRATION

Professional Engineer: Virginia, Maryland
Member, American Society of Civil Engineers

SUMMARY OF EXPERIENCE

Mr. Combs has been a registered professional engineer in Virginia since 1973 and in Maryland since 1975. He has been providing professional planning and engineering services since 1973 to the present.

In 1979, Mr. Combs co-founded and continues to serve as a managing principal of Resource International, Ltd. ("Resource"). Resource provides professional consulting services to private individuals and companies, Fortune 500 companies, and to local, state and federal government. The firm's services include civil and environmental engineering, land planning, land surveying, environmental compliance and permitting, construction administration, construction claims analysis and expert witness testimony.

Mr. Combs' areas of expertise include the **engineering design** and construction of municipal and industrial wastewater treatment and water supply facilities, public utility water and wastewater lines, roads and infrastructure. Also, **environmental** compliance and permitting; environmental impact assessments and statements (EIA/EIS); environmental contamination assessments and remediation; **land use planning; comprehensive municipal planning**; design and development; and construction claims analysis and **expert witness** testimony.

**FEATURED EXPERIENCE****Land Use Planning**

Principal planner for the preparation of the conceptual development plan for the 350 acre Kings Charter PUD, Hanover County. The mixed use project consisted of approximately 250,000 square feet of commercial retail and office space; and approximately 1,100 single and multifamily housing units.

Principal planner for the preparation of the conceptual development plan for the 190 acre Lewistown Commerce Center (now called Winding Brook), Hanover County. The project is commercial retail and destination use, e.g., Bass Pro.

Principal planner for the preparation of the conceptual development plan for the 240 acre Bell Creek Development. The project included a 128+ acre cut out parcel for the Totopotomoy Creek Battlefield at Rural Plains (donated to the National Park Service); 170 acres of commercial retail, office and light industrial; 3,900 single and multifamily housing units.

Principal planner for the preparation of the conceptual development plan for the 3,500 acre New Kent PUD. The project included a 344 acre cut out parcel for the Colonial Downs Horse Race Track complex (for which planning services were also provided), 400,000 square feet of commercial industrial development, and 3,900 single and multifamily housing units.

Principal planner for the preparation of the conceptual development plan for the 2,400 acre New Kent Vineyards PUD. The project included a 50 acre winery and vineyards complex, 2,000,000 square feet of commercial



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retail and office development, and 2,400 single and multifamily housing units.

Comprehensive Municipal Planning

As a past Chairman of the Hanover County, Virginia, Planning Commission, conducted over 30 public hearings and public information meetings on controversial issues. Topics included rezonings, comprehensive land use plan changes, road corridor locations, land use ordinance changes, and growth management plans.

Routinely assist counties and towns on planning issues such as small area plans, corridor plans, and revisions to zoning and subdivision ordinances.

Engineering Design, Permitting and Construction

Principal-in-Charge for the firm's annual contract with the Virginia Department of Environmental Quality. Services provided included the identification, containment, modeling and remediation of ground and surface water contamination.

Principal-in-Charge and Project Manager for the civil engineering and surveying services for the 344 acre Colonial Downs pari-mutuel horse race track complex in New Kent County, Virginia. Services included site plan preparation, environmental studies, storm water management, and the design and permitting of the County's Chickahominy Wastewater Treatment Plant.

Project Manager and Principal Design Engineer for the Hanover County, Virginia, Doswell Water Treatment Plant and associated intake, transmission and storage facilities.

Project Manager and Principal Design Engineer for the Hanover County, Virginia, Doswell Wastewater Treatment Plant and associated collection and discharge facilities.

Principal-in-Charge and Project Manager for the civil engineering and environmental feasibility studies for the 6,500 acre Del Webb planned retirement community in New Kent County, Virginia.

Principal-in-Charge and Project Manager for the preparation of the master utilities infrastructure plan, design and construction administration for the 3,000 acre New Kent Planned Unit Development in New Kent County, Virginia.

Principal-in-Charge and lead consultant for the Environmental & Civil Engineering Feasibility Study for a 5,900+ acre planned residential community to be located in Virginia. Upon its ultimate completion, the project will require the delineation of over 240,000 linear feet of wetlands, the permitting and construction of almost \$2 million of wetlands mitigation, Phase IA archeological studies, and threatened and endangered species surveys. Also, approximately \$195 million in roads, water and sewer utilities, and stormwater management facilities will be required.

Principal-in-Charge for the North Carolina Department of Transportation open end environmental contract. This contract is for the selection, planning and permitting of wetland mitigation sites required by unavoidable wetlands impacts during road construction. Since 1995, Resource has successfully planned and permitted over 10,000 wetland mitigation acres, ranging from coastal marsh to Piedmont upland hardwood forest.

Construction Claims Analysis & Expert Witness Testimony

U. S. Department of the Air Force Langley Air Force Base, Virginia.

Principal construction claims investigator and expert witness for the Air Force on construction change order claim for unsuitable material removal and replacement.

Hanover County, Virginia

Principal expert for the County concerning private group legal suite against the County for wastewater treatment plant discharge permit violations.

Hanover Group, LLC and Hanover County, Virginia

Expert witness for plaintiffs in private group legal suit against the plaintiffs for extension of wastewater collection lines to serve new development consistent with the County's Comprehensive Plan. *Federal Court.*

Town of Orange, Virginia

Expert witness for the Town in private development legal suit against the Town for alleged violations in administering the Town's site plan ordinance.

Colonial Downs Holdings, Inc.

Expert witness for the plaintiff in arbitration to settle construction claims of general contractor.

MICHAEL E. FIORE, P.E.
President**EDUCATION**

B.S., Civil Engineering, Notre Dame, 1965

M.S., Civil Engineering, Notre Dame, 1967

Graduate Studies, Virginia Commonwealth University, 1979-1980

PROFESSIONAL REGISTRATION

Professional Engineer: Virginia, Pennsylvania, South Carolina, North Carolina, Michigan, Illinois, New Jersey, Kentucky, Georgia, Florida, Mississippi, Ohio, Indiana

PROFESSIONAL AFFILIATIONS

*National Society of Professional Engineers
American Water Works Association
Water Environment Federation
Virginia Society of Professional Engineers*

SUMMARY OF EXPERIENCE

Mr. Fiore has over 44 years of management and engineering experience. Since 1979, Mr. Fiore, co-founder and President of Resource International, Ltd., has served as Principal-in-Charge of engineering and environmental engineering projects, ensuring both dedicated resources of the firm and quality assurance of deliverables. Mr. Fiore's areas of expertise include civil engineering; solid waste facility design; design of over 50 sanitary landfills; solid waste facility permitting; leachate and landfill gas treatment; landfill gas flaring and gas energy recovery systems; transfer station design and operation; resource/energy recovery; recycling; groundwater monitoring; landfill closure and post closure; regulatory liaison; compliance and enforcement negotiation; commercial and industrial development; water supply; wastewater systems; storm water management; environmental impact; industrial waste treatment and disposal; regional planning and resource management; and financial and technical feasibility analysis.

**DETAILED EXPERIENCE****Solid Waste Management/Energy Recovery**

Principal-in-Charge of over 100 solid waste facility planning, design and permitting projects including landfills, energy recovery, recycling and materials recovery, waste transfer and waste processing.

Principal-in-Charge of Sub-title "D" landfill projects. Projects for municipal, regional and private clients range in size from 40 to 2,000 tons per day for more than 25 separate landfills.

Project experience includes; waste-to-energy, waste tire processing and disposal, medical waste systems, landfill gas to energy system design and construction, containment plume migration, groundwater monitoring, industrial and special waste handling and regulatory liaison.

Solid waste management experience includes waste collection and transfer, transfer station permitting and design, recycling program development financial analysis, disposal alternative studies, revenue stream analysis, waste characterization, and operations support.

Served on the Virginia State Advisory Committee for Solid Waste Regulations.

Served on the Virginia Solid Waste Facility Operator Certification Board as a test advisor.

Past instructor of Virginia Solid Waste Facility Operator Training Course.

Federal

Project Manager for Air Force Headquarters - Environmental control handbook prepared for base commanders and environmental personnel dealing with air, water, solid waste, recycling, waste minimization.

Principal-in-Charge of industrial and municipal water and wastewater facility planning design and operation projects. Industries served include fertilizer, food, metal finishing, tobacco, paper and petroleum. Governmental clients include regional authorities, local government, state government and federal government.

Project Manager for the Department of Energy - Savannah River Plant - Landfill evaluation to define regulatory compliance and operational studies for non - hazardous waste.

Principal-in-Charge of environmental planning projects including industrial plant siting, environmental compliance analyses, air permitting, regional solid waste and water quality planning.

Project manager for Air Combat Command, Langley Air Force Base - Presentation to environmental committee regarding solid waste recycling and waste minimization issues.

Project Engineer for USEPA - effluent guideline study for Carbon Black Industry.

Industrial/Commercial

Principal-in-Charge of industrial waste facility planning design and operation projects. Industries served include fertilizer, food, metal finishing, waste management, tobacco, paper manufacturing, pharmaceutical, building materials, and petroleum.

Principal-in-Charge of industrial solid waste facility planning, design and permitting projects including landfills, energy recovery, recycling and materials recovery.

Industrial solid waste management includes: waste characterization and minimization;

industrial landfill permitting, design, and construction; fly ash disposal; waste reuse and recycling.

Industrial site engineering includes: storm water management, drainage design, wetlands permitting and mitigation; master site planning and local permitting.

Industrial water supply to include well supply, water storage fire flow, water reuse, and permitting.

Governmental clients include regional authorities, local government, state government and federal government.

Wastewater

Principal-in-Charge for 38,000 gallon per day spray irrigation wastewater treatment facility in operation since 1992.

Principal-in-Charge of wastewater collection system, wastewater pumping facilities, and water distribution and storage system for four (4) Industrial Parks.

Principal-in-Charge of wastewater collection and treatment feasibility analysis and Farmers Home Administration Grant for 2 ½ mile sewerage collection system and 100,000 gpd SBR Treatment plant.

Principal-in-Charge for wastewater collection treatment and water distribution feasibility study for King William County's Central Garage area.

Principal-in-charge for Master Sewer Plan for Westmoreland County and rehabilitation engineering for 50,000 gallon elevated water storage tank.

JAMES L. RUDNICKY
Project Scientist**EDUCATION**

M.S., Forestry, University of Massachusetts, 1984

B.S., Forestry, University of Massachusetts, 1981

Post-Graduate Studies, Forest Ecology, University of Maine, 1992

PROFESSIONAL REGISTRATION

Completed: Stream School and Save Our Streams Methodology, Virginia Save Our Streams, 2005

Completed: Perennial Stream Identification Workshop, Virginia's Chesapeake Bay Local Assistance Department, 2004

Completed: Erosion Control for Coastal Environments, International Erosion Control Association, 2002

Completed: Basic Plan Review, Virginia Department of Conservation and Recreation, 2001

Completed: Basic Erosion and Sediment Control, Virginia Department of Conservation and Recreation, 2001

Completed: Local Storm Water Management and Erosion Control, International Erosion Control Association, 2001

Completed: Stream Restoration, Virginia Department of Forestry, 2001

Completed: Management Planning, Virginia Department of Conservation and Recreation, 2001

Completed: Revised Universal Soil Loss Equation (RUSLE), USDA Natural Resources Conservation Service, 2000

SUMMARY OF EXPERIENCE

Mr. Rudnický has over 25 years of experience in natural resource studies and management, primarily in urbanized areas in the Mid-Atlantic and Northeast. During this time, he has worked for local, state and federal government agencies. Mr. Rudnický was a Research Assistant at The Institute of Ecosystem Studies, which is an internationally prominent research organization of The New York Botanical Garden. In this position, he assisted on studies



on the long-term effects of human use and management on urban forests in New York City. Mr. Rudnický was also a Visiting Lecturer at the University of Massachusetts where he co-taught Advanced Forest Ecology and conducted a research project examining management options for preserving habitat for threatened bird species for the National Park Service. In Virginia, Mr. Rudnický developed management plans for rare wetland communities for Virginia's Division of Natural Heritage. He also served as a District Manager for a Soil and Water Conservation District that promoted and provided financial assistance for the installation of land practices to prevent water pollution. As a Project Scientist, Mr. Rudnický works with government agencies, landowners and developers on environmental regulations pertaining to land development.

DETAILED EXPERIENCE**Wetland Monitoring and Restoration**

- Has successfully obtained local, state and federal permits for developments on single family lots, industrial facilities and large subdivisions that impacted environmental features.
- At the 1,200-acre Farms of New Kent subdivision and golf course, obtained state and federal permits to impact wetlands. The compensation plan utilized a combination of preservation and wetland bank purchases to reduce mitigation costs by half.

- Prepared wetland remediation and monitoring plans for a residential and golf course development. The plans were developed in co-ordination with state and federal agencies. Activities included a stream channel restoration that required vegetation, biological and stream channel monitoring to reach success criteria. Prepared a joint permit application (JPA) to obtain federal permit for conducting stream restoration work.
- Assisted with the development of an innovated compensation plan for a mixed-use commercial development in Hanover County, Virginia. The plan utilized a combination of an innovated Low Impact Development facility and preservation that reduced mitigation costs over \$100,000.
- Has monitored construction activities on multiple sites to ensure compliance with environmental regulations. Prepared construction monitoring reports for state agencies as required by environmental regulations.
- Has designed monitoring and restoration studies in swamps, bogs, barrier islands, fens, pocosins and other unique wetland habitats throughout Virginia, New York, Massachusetts and Maine. Some of these projects have included groundwater monitoring.
- Has assisted with developing management activities, including monitoring, for state and nationally threatened and endangered plant, animal and bird species.
- Has assisted the U.S. Army Corps of Engineers and the Virginia Department of Environmental Quality on identifying wetland violations and the restoration of the impacted areas.
- Has assisted James City County with creating and restoring wetlands around stormwater ponds through bank stabilization, plantings and debris removal.
- Has delineated wetlands on multiple sites throughout Virginia.
- Has prepared and reviewed Joint Permit Applications for projects proposing to impact wetland and waters.
- Reviewed a commercial plan to enlarge an existing dam, install a roadway and expand a downstream wetland for an improvement of the Stafford County Airport.

Wetland Mitigation Banking

- Prepared and given presentations to the Interagency Review Team (IRT) that led to the approval of potential mitigation banks.
- Prepared Mitigation Banking Instruments (MBI) that led to approval of mitigation banks by the IRT. Prepared JPAs for federal permits to allow work at the banks.

Stream Assessment and Restoration

- Has attended perennial stream assessment workshops conducted by Virginia's Chesapeake Bay Local Assistance Board and Virginia's Department of Conservation and Recreation. Has conducted numerous perennial stream assessments throughout Virginia since the year 2000.
- Has attended stream restoration workshop conducted by Virginia's Department of Forestry.
- Has conducted the latest version of Stream Impact and Compensation Assessment (SICAM) for proposed developments.
- Has training for biological and chemical monitoring of stream water quality.

Chesapeake Bay Preservation Act Activities

- Inspected developments within James City County to ensure compliance with the Chesapeake Bay Preservation Ordinance.
- Has reviewed Resource Protection Area restoration plans and inspected sites for compliance with approved plans.
- Field delineated Resource Protection Area boundaries and confirmed accuracy of boundaries identified by others.
- Managed a nutrient and sedimentation reduction program in the Fredericksburg area. This work included developing and providing educational activities.
- Was a member of the Stafford County Stormwater Management Technical Review Committee and has participated on working

groups for the Rappahannock and York River Watershed Management groups.

- Assisted in developing workshops for local- and state-level government staff on land disturbing programs and Low Impact Development.

Government Agency Activities

- Has been employed by local, state and federal agencies, including the U.S. Forest Service, National Park Service, Virginia's Department of Conservation and Recreation, Tri-County/City Soil and Water Conservation District and James City County.
- Has managed projects requiring coordination between multiple agencies, non-profit groups and private citizens.
- Has negotiated co-operative agreements between government agencies and private citizens.
- Has assisted federal and state agencies with processing wetlands, Chesapeake Bay Preservation and landfill violations.
- Has reviewed development plans and conducted field inspections for compliance.
- Has prepared and presented applications to multiple Wetlands Boards.
- Has prepared and presented projects at Board of Supervisor and City Council meetings.
- As a District Manager, worked directly under a citizen-elected Board of Directors. Successfully prepared grants to support District activities. Annually managed funds in excess of \$200,000 that supported District's operations, including a cost-share program to assist local landowners with land conservation practices.



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STEVEN F. CHURCH

Staff Engineer

EDUCATION

B.S., Mechanical Engineering, Norwich University, 1983

M.S., Civil Environmental Engineering, Virginia Polytechnic Institute and State University, 2001

SUMMARY OF EXPERIENCE

Mr. Church has experience in Civil/Environmental Engineering fieldwork, design, construction administration, inspection, and review for municipal and state clients in Virginia and West Virginia. He has directly contributed to the successful completion of major projects by: providing field investigations and site inspections; water and sewer system data collection, conceptualization and design; authoring technical studies, system characterizations, and project reports; and coordinating the needs and requirements of municipalities, private companies, and private citizens.

Also, he has over 18 years of experience completing major analytic studies and technical writing projects for the U.S. Department of Defense (DoD) and U.S. Congress, and completing the technical, financial, and administrative program management tasks associated with those projects.

DETAILED EXPERIENCE

Water Supply Systems

Utilities Design Engineer on a company team supporting a 345-acre site development in New Kent County, Virginia that included a 975,000 gpd water demand, two water supply wells, a 1,000,000 gallon water storage tank, and 24-inch distribution mains. Designed the water supply and distribution system using distribution system modeling software. Contributed designs for the wastewater collection and transport system which included gravity sewer system, pump station, and force main modeling. Completed a Master Utility Plan for developer and county evaluation and approval. Managed CAD personnel for the production of all

construction plans. Managed contract bid document production and bid solicitation.

Design Engineer of municipal water supply improvements for the Berkeley Beach and Ebb Tide Beach areas in Westmoreland County, Virginia. Water distribution system computer modeling was completed to support the local water supply company's upgrade and expansion goals. The modeling effort incorporated the system's three water wells, 20,000 gallon atmospheric storage tank, three hydropneumatic tanks, and approximately 44,000 linear feet of distribution pipe to assess the benefit of installing an additional 20,000 gallon storage tank. The modeling environment was validated against field tests of the operating system.

Lead Design Engineer of alternative water supply systems to serve a proposed 570 acre intermodal transportation facility in Isle of Wight County, Virginia. A water distribution model was configured that evaluated the demands, water pressures, and fire flow requirements imposed by the existing and proposed system connections. Multiple existing water supply tanks were modeled iteratively with proposed water supply tank capacities and locations. Viable solutions that satisfied complex hydraulic grade and flow criteria were presented.

Lead Design Engineer of new municipal water supply and wastewater collection systems for Mount Olive, Virginia. The water supply system included a new 10,000 gallon storage tank, a hydropneumatic tank, two booster pumps, and 17,000 feet of distribution pipe. The sanitary sewer collection system included individual septic tank effluent pumps and 5,500-feet of force main piping. Engineered the water distribution system and sanitary force main routing and sizing using computer modeling tools. Wrote the system technical specifications and coordinated with state agencies and municipal utilities for design review and acceptance. Managed CAD personnel for the production of all construction plans. Managed contract bid document production and bid solicitation.

Lead Design Engineer for an 800-foot long 8-inch water line extension in Ashland, Virginia.

Work included tying into an existing water line and coordinating with state and local officials, utility companies, and property owners regarding easements, existing utilities, and system alignment and depth. Managed CAD personnel for the production of all construction plans.

Lead Design Engineer of municipal water and wastewater system capital improvements (through extensions) to the existing utilities in the Town of LaCrosse, Virginia. Completed a quality assurance review of the plans depicting the existing water and wastewater systems. Reviewed, evaluated and rationalized historical engineering data, and managed CAD personnel to produce comprehensive and up-to-date system plans. Engineered incremental, phased extensions of the existing water and wastewater networks using municipal pipe system computer modeling software.

Review Engineer for a water supply project in Westmoreland County, Virginia. The system included a new water supply well, well house, and 6,000 feet of small-diameter distribution piping. Work included modifying and improving previously completed construction plans and technical specifications in response to prior state agency reviews. Managed CAD personnel for construction plan revisions. Managed contract bid document production and solicitation.



EDWARD J. HOLLOS, P.E., BCEE
Group Manager, Solid Waste**EDUCATION**

B.S. - Civil Engineering, Northeastern University, 1968

PROFESSIONAL REGISTRATION

Professional Engineer – Virginia #024258, Delaware #7002, Pennsylvania #20750E, and MD #17127

PROFESSIONAL AFFILIATIONS

American Academy of Environmental Engineers

VA DPOR Board for Waste Management Facility Operators - Writer for Class I & II Tests

PUBLICATIONS AND PRESENTATIONS

SWANA VA Chapter Landfill Gas Management Training Session; Portsmouth, VA; February, 1998; "Overview of Landfill Gas Management".

EIA. W.A.S.T.E. Conference 1996 Washington, DC, October 1996; "What's New in Landfilling".

VMI, Virginia Conference on the Environmental, Lexington, VA; April 1995; "Alternative Daily Covers".

"Should You Consider an Alternative Daily Cover," Virginia Review, 1994.

Association of Engineering Geologists, Carolina Section, Conference on Landfill Issues and New Technologies; Raleigh, NC; May 1991; "Update on Sub-Title D and DSWA Case Studies"

SUMMARY OF EXPERIENCE

Mr. Hollos has over 35 years experience on civil and environmental engineering projects primarily related to the sound and economical management of municipal and industrial solid wastes. His experience includes the development of solid waste management plans; estimating remaining life and/or capacities of solid waste facilities; facility siting studies; Part A and Part B permitting; design of "Greenfield" sites and existing facility expansions



preparation of permit amendments; permit-by-rule (PBR) facilities; and landfill closures; preparation of bidding documents and provision of bid phase services; construction management activities; certification of facility construction; and development of program costs for financial assurance of facilities. In the Commonwealth of Virginia, Mr. Hollos has worked on over 40 municipal waste, CDD, or industrial landfills involving facility permitting, new cell construction, site expansion, closure, post-closure care, environmental monitoring, and operations consulting. These services also included the development of Site Plans for facilities to obtain the necessary local zoning approvals for landfills, recycling facilities, and landfill gas to energy facilities.

DETAILED EXPERIENCE**Municipal Waste Management**

Prince Edward County, Virginia – As Project Manager provides general operations consulting for the County's Subtitle D Landfill. Prepared Contract Documents, Technical Specifications, and Construction Drawings for Cells C and D and the Phase 1 Closure and assisted the County in the public bidding of these projects. Provided construction management services for Cells C and D the Phae 1 Closure and compiled the CQA documentation reports for submittal to DEQ. Prepared minor permit amendment to update technical specifications for geosynthetics used



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in liner and cap construction. Assists the county in updating of Closure/Post-Closure Costs for annual updating of their financial assurance statements; provide information for annual budgeting; review and evaluate requests for disposal of “special wastes” (asbestos containing materials); prepared greenhouse gas (GHG) report demonstrating that the County’s facility does not meet the emissions threshold for reporting to the USEPA under the USEPA Mandatory Reporting Rule.

BFI Waste Industries of Virginia, LLC (Old Dominion Landfill, Henrico County, VA) – As Project Manager provided general consulting services including the preparation of technical specifications and construction drawings for Disposal Cells (Phases 7 and 8) and initial partial closure (Phase 1 Closure). Updated and revised Closure/Post-Closure Costs using actual bid prices for recent construction activities to allow the facility to update its Financial Assurance. Assisted in the preparation of a Part A Permit Amendment application for the expansion of the Old Dominion Landfill.

BFI Waste Industries of Virginia, LLC (King & Queen Landfill, King & Queen County, VA) – As Project Manager provided general consulting services including the preparation of technical specifications and construction drawings for Disposal Cell 2E-5. Prepared two major permit amendments: One for a revised closure cap for the entire landfill and one for an alternate bottom liner for phases that have yet to be constructed. Updated and revised Closure/Post-Closure Costs to allow facility to update its Financial Assurance.

Westmoreland County, Virginia – As Project Manager assists the County in updating its Post-Closure Costs for the annual financial assurance required of this closed landfill; prepared a greenhouse gas (GHG) report demonstrating that the County’s landfill did not exceed the tonnage threshold for reporting to the USEPA. Evaluating “leachate” production rates from the closed facility to include televising and / or smoke testing leachate lines

and storm drain lines to determine nature and source of flows.

Fluvanna County, VA - Project Manager-provided general operations consulting for the County's HB 1205 Landfill including preparation of closure plan; landfill gas monitoring plan; permit amendment for use of alternative daily covers; a Part A Permit Amendment for landfill gas management issues; periodic site inspections; and updating closure/post-closure costs for financial assurance.

Chesterfield County, VA, Shoosmith Brothers Landfill - Provided internal QC review of proposed landfill expansion plans for the Lewis Road Landfill. Involved in the preparation of a minor Part B permit amendment to allow the usage of tire shreds in lieu of stone aggregate for landfill gas recovery wells and leachate recirculation devices; provided training to site operators for recognizing and managing unauthorized wastes that occasionally may be brought to the landfill in collection vehicles.

Prince William County, VA - Project Manager, responsible for the preparation of a Part A Application for a 1000-acre expansion area adjacent to the existing County landfill. Prepared submittal to the DEQ of Part B Permit Application for expansion of the existing county landfill. The design was for a Subtitle D lined facility featuring leachate recirculation capability. The project included meetings with the citizen's oversight committee to discuss the proposed design and response to questions or concerns raised by members of this committee. Also developed preliminary designs and the final design for the upgrade of the public use area at the County's Landfill.

Lynchburg, Virginia – Assisted City personnel in development of its landfill gas (LFG) management program and development of its SSM Plan for its LFG control system.

Montgomery County, Virginia – Assisted County in preparation of construction documents and specifications and construction of an active landfill gas interception system that was



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situated between the County's closed landfill and an adjacent county recycling center.

Sussex County, VA, Atlantic Waste Disposal Inc. – Quality Assurance Engineer for the internal review of drawings and specifications of the initial subtitle D lined municipal waste landfill prior to release of documents for bidding and construction. Project Manager for the internal quality control review of the Part B Permit Amendment Application for the reconfiguration and expansion of the disposal facility and submittal of the Part B Permit Amendment Application to the DEQ for review and approval.

Fairfax County, VA -Quality Control Engineer, provided internal QC review of the design and construction plans for the first section of the Area Three Lined Landfill (ATLL), a double composite lined ash monofill for the I-95 Waste-to-Energy Facility.

Orange Regional Landfill, Chapel Hill, NC: Designed two Subtitle D Lined Disposal Cells, the most recent being an alternate liner design approved by the DNREC. Prepared plans and specifications for a 7-acre Subtitle D disposal cell; construction management oversight, permit amendment application for alternative liner design; and general consulting such as budgeting; updating closure/post-closure costs.

King George County, VA: Provided independent technical review on behalf of the County for the planned waste exhumation project to relocate municipal wastes to the new King George Landfill and Recycling Center.

Petersburg, VA: Provided operations consulting for the City's municipal waste landfill.

City of Salem, VA - Quality Assurance Engineer for the internal review of the Part B Application for a landfill expansion. Project Manager for the preparation of the closure plan and preparation of associated bidding documents and design drawings.

Burke County, NC: QC review of drawings for lateral expansion of County's Sanitary Landfill.

Campbell County, VA: Completed Part B permit application documents for expansion of the County landfill. Prepared bidding documents and construction drawings for the initial two Subtitle D disposal cells in Phase III and provided construction management services for these two cells.

Carroll County, VA: QC review of annual Groundwater Monitoring Report and QC review of drawings for lateral expansion of County's sanitary landfill.

City of Martinsville, VA: QC review of Annual Groundwater Reports.

Greensville County, VA: QC review of proposed Part B permit application documents for expansion of the existing County landfill. QC review of Annual Groundwater Report.

Hanover County, VA: QC review of expansion plans for lined landfill segment between two existing disposal areas and proposed closure plan. QC review of Annual Groundwater Report.

Henry County, VA: QC review of Annual Groundwater Reports.

Louisa County, VA: QC review of Annual Groundwater Reports.

Mecklenburg County, VA: QC review of Annual Groundwater Report.

Orange County, VA: Provided operations consulting services to the County in the operation of its municipal waste landfill.

Rappahanock County, VA: QC review of bidding documents and construction drawings. Operations consulting.

Russell County, VA: QC review of Annual Groundwater Reports.



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Rivanna Solid Waste Authority, Albemarle County, VA: QC review of Master Site Plan, closure plans, bidding documents and construction drawings. Provided general operation consulting. Prepared Part A Application in conjunction with geotechnical firm for expansion of the landfill to adjacent areas of the site.

Delaware Solid Waste Authority (Northern Solid Waste Facility), Kent County, DE: Performed a siting study for the location of a new municipal waste landfill in New Castle County. After a site was selected through a public participation process, prepared permit application package for submittal to DNREC. Since the most politically acceptable site was an active U.S. Army Corps of Engineers (COE) dredge spoil disposal area, became involved in negotiations with the COE. Prepared bidding documents and construction drawings for dewatering of site and construction of separation dike. Prepared bidding documents and construction drawings for the Phase I disposal area which included a maintenance facility, leachate pump station, and tap-in to an 84' sewer force main. Provided construction management.

Delaware Solid Waste Authority (Central Solid Waste Facility), New Castle County, DE: Performed site evaluation study. Prepared permit application package for submittal to DNREC. Prepared bidding documents and construction drawings for the first lined municipal waste landfill in the state of Delaware for areas A and B. Provided construction management services for construction of the disposal area, leachate lagoon, scale and weigh station, maintenance building, access road and upgraded public convenience area.

Delaware Solid Waste Authority (Southern Solid Waste Facility), Sussex County, DE: Prepared permit application package for submittal to DNREC for Cell 2. After receipt of approval from DNREC prepared bidding documents and construction drawings for double-lined disposal cell, two leachate pump stations, and four aboveground leachate storage tanks with lined secondary containment lagoons. Upgraded

entrance road and public convenience area. Provided construction management services.

Sugarloaf Landfill, Luzerne County, PA: Prepared Phase I and Phase II permit applications for submittal to DER. Provided expert witness testimony on behalf of client before Environmental Hearing Board in effort to obtain permit.

Sycamore Landfill, Charleston, WV: Provided QC review of construction drawings and specifications for lateral expansion of this private municipal waste landfill. Researched acceptability of industrial residual waste streams for disposal.

Town of South Boston, VA: Preparation of closure plan for the Town's landfill. Negotiated Letter of Agreement with the DEQ Enforcement Section. QC review of landfill gas management plan. Provided operations consulting.

Western Berks Refuse Authority, Berks County, PA: Design and permitting of three separate disposal cells one of which was a dedicated industrial waste facility. Preparation of bidding documents and construction drawings. Construction management activities. General operations consulting including monthly attendance at Authority Board meetings. Assistance in determining tipping fee adjustments.

York County, PA: Design and permitting activities for County landfill. Operations consulting.

Isle of Wight County, VA: Prepared greenhouse gas (GHG) report for the County demonstrating that their closed landfill facility does not meet the tonnage threshold for reporting to the USEPA.

Industrial and CDD Waste Management

City of Portsmouth, VA: Operations consultation to the City for its CDD landfill. Assisted in preparation of an Environmental Assessment as part of property transfer with the US Navy.



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Assisted in negotiations with the Navy regarding the property transfer. QC review of Annual Groundwater Reports. Preparation of closure plan.

Lynchburg, VA, Internet Foundry – Assisted in the preparation of a Part A permit Application Package for a 50+ acre “Greenfield” landfill site in Campbell County, VA.

Pittsylvania County, VA First Piedmont Corporation – In a quality control capacity, assisted in obtaining major permit amendment for the Phase III disposal area and the preparation of construction drawings and specifications – also provided operations consulting for Phase I Area.

Taylor Road Landfill, Chesterfield County, VA: Preparation of Part A and Part B Applications of the expansion of this CDD facility. QC review of construction drawings and specifications. QC review of Annual Groundwater Reports.

Darbytown Road CDD Landfill, Henrico County, VA: Provided operations consulting services to this privately owned facility. QC review of Annual Groundwater Reports. Development of landfill closure plan.

Charles City Road CDD Landfill, Henrico County, VA: Provided operational consulting services to this privately owned facility. QC review of Annual Groundwater Reports. Development of Landfill Closure Plan.

Incendere Incorporated, Chesterfield County, VA: Assisted client in obtaining "Permit-by-Rule" for a medical waste transfer facility.

Virginia Recycling Corporation, New Kent County, Project Manager for the development of Permit-By-Rule application for a tire shredding and recycling facility.

623 Landfill, Henrico County, VA: Independent consultant review of Part B permit application for this CDD landfill.

Brown-Boveri Corporation, Bucks County, PA: Final closure plan for phase out of industrial

wastewater treatment plant and monitoring of plant demolition and closure.

Franklin County, VA: Franklin County, VA, Shredded Products Corporation – Project manager for the preparation of Part A and Part B landfill permit applications for a “Greenfield” captive industrial waste landfill. (The Part A was prepared in conjunction with a subcontracted geological/hydro geological consulting firm). Also was Project Manager for the preparation of bidding documents and construction drawings for first disposal area (Cell A) and the adjacent automobile shredder plant site and provided construction management services. Also provided internal QC review of bidding document for Cell B constructions.

General Battery Corporation, Berks County, PA: Evaluation of existing industrial waste landfill site.

Carpenter Technology Corporation, Berks County, PA: Assisted with design of industrial waste landfill.

Process Recovery Corporation, Berks County, PA: Peer review of design engineer's Phase II permit application package for this industrial waste facility for foundry wastes.

Ashcake Road Landfill, Ashland, VA; Provide QC review of all landfill related documents associated with construction and operation of the facility.

INGENCO Distributed Energy, Richmond, VA Assisted and assisting INGENCO in obtaining local government approvals (Site Plans and CUPs) for eight different landfill gas to energy (LFGTE) projects in Henrico County, VA; Brunswick Co., VA; Dinwiddie Co., VA; King & Queen County, VA (2); Pulaski County, VA; Wake County, NC; and Pine Grove, PA.

Transfer Stations, Recycling Facilities and Public Use Areas



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Peer Review Consultation

Culpeper County, VA - Project Manager for a solid waste management planning study that included an economic comparison of transfer/out of county disposal of solid waste versus in-county disposal in a county-owned Subtitle D Landfill.

Transylvania County, NC: QC review of proposed upgrade of public convenience center.

City of Virginia Beach, VA: Transfer station study, which included evaluation of compacting versus non-compacting facilities including the number and types of equipment and general layout of the facility.

City of Portland, ME: Preliminary design of a solid waste baling facility and preliminary design of a clay-lined balefill.

Fayette Reclamation, Inc., Fayette County, WV: Evaluation and layout of proposed plant site for the location of a solid waste composting facility.

Warren County, VA: Operations consulting. Preparation of "Permit-By-Rule" application for transfer station, design of transfer station, and preparation of bid documents and construction drawings. Preparation of closure plan and development of bid documents and construction drawings for the landfill closure. Construction management activities related to both the transfer station and the closure. QC review of Annual Groundwater Reports.

Lee County, VA: Performed independent consultant review of an economic study of landfill and transfer station alternatives.

Virginia Recycling Corporation, New Kent County, VA. Obtained permit-by-rule (PBR) from VDEQ for a tire recycling facility.

Proco Company (Tire Recyclers, Inc.), Charles City County, VA. Assisted TRI in obtaining local government approval and VDEQ approval (PBR) for a state-of-the-art used tire processing facility for the shredding and grinding of automobile and truck tires.

Dorrance Township, Luzerne County, PA: Independent consultant evaluation of proposed County landfill site located in the Township.

Douglas Township, Berks County, PA: Independent consultant review of a privately owned municipal landfill on behalf of the Township, which used grant monies for the cost of the review.

Pen Argyl, PA: Independent consultant review on behalf of the Borough of the proposed landfill expansion of the Grand Central Landfill. This work included obtaining state grant monies to pay for a portion of the cost of the review and meeting with DER (now DEP) officials to discuss comments.

Studies and Solid Waste Planning

Cumberland County and Prince Edward County, Virginia – Project Manager for development of the Counties' July 1, 2004 Solid Waste Management Plan and submittal of the Plan to the VA DEQ. Currently involved in updating of the plan.

Northampton County, Virginia – Prepared a study for county officials to assist them in decision making for the future management of solid waste generated within the County. The study provided an overview of systems that were deemed inappropriate for consideration because of excessive capital and infrastructure costs relative to the low waste stream generated within the County. The study focused on continued landfilling of county wastes versus the transfer of wastes to a disposal facility outside the County.

Blair County, PA: Preparation of the County Solid Waste Plan including waste generation surveys, evaluation of potential refuse-derived fuel (RDF) or steam users, evaluation of potential landfill sites, and participation in public meeting and hearings.



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Central Nagatuck Valley Region Council of Governments, Waterbury, CT: Evaluation of municipally and privately owned and operated landfills within the COG region. Prepared solid waste management planning study for the region.

Exeter Township, Berks County, PA: Performed recycling study for the Township. Performed independent consultant review of proposed landfill gas management plans for the Pioneer Crossing Landfill, a private municipal waste landfill located within the township.

Guilford County, NC: Assisted in the performance of a waste transport and hauling survey and the development of a follow-up solid waste collection study.

Maryland Environmental Services: Performed landfill evaluations, waste stream surveys and waste characterization surveys of three eastern shore counties to determine feasibility of a regional waste-to-energy facility.

Morris County, NJ: Evaluation of potential landfill sites and assistance in preparation of the County's landfill siting study.

Southern Schuylkill Council of Governments, Schuylkill County, PA: Preparation of Solid Waste Management Plan. Preparation of Phase I landfill site application for a SSCOG owned and operated landfill.

Water/Wastewater

City of Baltimore, MD: Design, permitting and construction management assistance for two lined sludge storage basins. The basins were lined with a dense graded hydraulic asphalt to sustain truck and heavy equipment traffic during sludge removal operations.

Valley Forge Sewer Authority, Montgomery County, PA: Design of dense graded hydraulic asphalt lined sludge storage facility.

Montrose Sewer Authority, Susquehanna County, PA: Study to determine feasibility of

sewering South Montrose, Pennsylvania, the viability of pumping sewage to the existing Montrose Plant or treating to discharge standards with aerated lagoon.

Town of Orange, VA. Prepared bidding and construction drawings for the construction of a earthen and HDPE lined raw water storage reservoir used as a drought alleviation measure for the Town's water supply; also provided construction management oversight for the facility.

JOHN H. BROOKS, III, PWD
VICE PRESIDENT - ENVIRONMENTAL

EDUCATION

M.S., Biology, University of Richmond, 1997

B.S., Biology with minor in Chemistry, Old Dominion University, 1994

PROFESSIONAL REGISTRATIONS

Virginia Certified Professional Wetland Delineator, No. 3

Certified in Wetland Delineation, the Wetland Program and Office of Continuing Education University College, Ohio State University, 1997

Certified in Intermittent and Perennial Stream Identification for Riparian Buffer Rules – Wetlands/401 Unit North Carolina Division of Water Quality, 1999/2000

Certified in Habitat Evaluation Procedures, Virginia Polytechnic Institute and University (VA Tech), 1999

Certified in Freshwater Wetland Construction, Institute for Wetland & Environmental Education & Research, Leverette, MA, 2001

Certified in Basic Processes of Hydric Soils, Advanced Problems in Hydric Soil Evaluations, and Intensive Field Study of Hydric Soils, North Carolina State University, 2002

Certified in Stream Restoration, Environmental Concern, Inc., St. Michaels, MD, 2003

Certified in Intermittent and Perennial Stream Identification for Riparian Buffer Rules – North Carolina and Virginia, North Carolina State University, Department of Forestry and Wetlands/401 Unit North Carolina Division of Water Quality, 2004

24-hour HAZWOPER Training, 2005

Certified in Rosgen's Applied Fluvial Geomorphology (Level I), Wildland Hydrology, Inc., Watershed Conservation Resource Center Fayetteville, AR, 2007



Certified in Rosgen's Applied River Morphology and Applications (Level II), Wildland Hydrology, Inc., Watershed Conservation Resource Center Fayetteville, AR, 2007.

Certified in Rosgen's River Assessment & Monitoring (Level III), Wildland Hydrology, Inc., Pilot View Resource Conservation and Development, Inc., Dobson, NC, 2009.

PROFESSIONAL AFFILIATIONS

Virginia Association of Wetland Professionals

SUMMARY OF EXPERIENCE

Mr. Brooks has over fourteen years of experience in environmental industry. His technical areas of expertise include wetland delineations, permitting, mitigation banking planning, and design, stream restoration, botany, ecology, limnology, threatened and endangered species studies, **National Environmental Policy Act (NEPA) Documents: Environmental Impact Statements (EIS), Environmental Assessments (EA), Categorical Exclusions**, storm water, water withdrawal permitting, as well as, a working knowledge of Part A and B application for landfill permits, UST removal and remediation, ground and surface water contamination.

He has performed 100s of wetland determinations, delineation, and assessments throughout North Carolina, West Virginia, Georgia, Wisconsin, Kentucky, and Virginia.



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Mr. Brooks has prepared many Joint Permit Applications for temporary and permanent impacts to non-tidal and tidal wetlands, for residential, municipal, commercial, professional, and industrial clients. He has also conducted hundreds of Phase I and Phase II Environmental Site Assessments (ESAs) and is listed on the Virginia Field Office's list of surveyors for the federally-listed sensitive joint-vetch (*Aeschynomene virginica*) and small whorled pogonia (*Isotria medeoloides*).

DETAILED EXPERIENCE

National Environmental Policy Act (NEPA)

Documents: Environmental Impact Statements (EIS), Environmental Assessments (EA), Categorical Exclusions, Etc.

He has completed many NEPA documents such as EAs and CEs for municipalities and counties for Rural Utility Services under RUS Bulletin 1794A-602 for both water supply and waste water treatment projects. Several examples of RUS projects are the Town of Orange Water Storage Facility, several localized water supply and waste water systems for Northumberland County, Town of Washington water supply and waste water systems, and several localized water supply and waste water systems for Westmoreland County. These EAs and CEs were conducted for publicly funded projects, in order to identify potential impacts to environmental and historical resources, as well as, socio-economic impacts in order to determine the preferred alternative and obtain a Finding of no significant Impact (FONSI) for the proposed project.

Managed and completed 30 EAs for the Virginia State Police as part of the STARS program and updating of radio/cell tower equipment across Central Virginia.

Wetland Delineation and Permitting

Mr. Brooks has prepared numerous Joint Permit Applications (JPA) for temporary and permanent impacts to non-tidal and tidal wetlands, and streams for residential,

municipal, commercial, professional, and industrial clients in Virginia.

Managed and participated on numerous wetland delineations either individually or as a member of a team of active scientists on 100s of projects in the Piedmont and Coastal Plain regions of Virginia, according to methodologies prescribed by the U.S. Army Corps of Engineers 1987 Manual for Identifying and Delineating Wetlands, to include the 2009 Coastal Plain Wetland Delineation Supplement. Also, has conducted wetland delineations in the following states, North Carolina, West Virginia, Maryland, and Georgia.

Completed numerous wetland delineations and wetland permits for rock quarries and sand & gravel facilities located throughout Virginia, North Carolina, and West Virginia.

Wetland delineations and jurisdictional determinations for Bluegreen Properties of Virginia at the Meadows at Dahlgren, Fasmart at Elko, Westmoreland Industrial Park, Winterpock Village, Isle of Wight Industrial Park and Virginia Power CT sites in Caroline and Fauquier Counties.

Wetland Compensation Design/Monitoring

Integral in the conceptual/final designs and planning of wetland creation sites located in the Highland Springs, Varina, Sandston, and Lakeside Areas of Henrico County, Lawrenceville, Westmoreland County, King and Queen County, Colonial Heights, Fredericksburg, Goochland County, New Kent County, Stafford County, Isle of Wight County, Green County and Prince George County, Virginia, as well as, four sites located in the coastal plain of North Carolina. Activities included development of conceptual mitigation/compensation plans that include site-specific water budgets, monitoring well location, design, construction plans, and onsite construction management, as well as, both hydrologic and vegetative sampling plans and monitoring required as a part of the permit.

Conducted both hydrological and vegetative sampling and monitoring at various active and



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completed created wetland sites located in the Piedmont and Coastal Plain regions of Virginia.

Prepared invasive species management plans for broad-leaved cattail (*Typha latifolia*), Chinese privet (*Ligustrum sinense*), Japanese stilt grass (*Microstegium vimineum*), and phragmites (*Phragmites communis*).

Mitigation Banking

Evaluated many sites in North Carolina and Virginia for the purposes of stream restoration, wetland creation, wetland restoration and ecological restoration.

Proposed and prepared several Mitigation Banking Prospectuses, which are currently under the review of the Mitigation Banking Review Team.

Designed and implemented several wetland/stream restoration and compensation sites through out the coastal plain and piedmont areas of Virginia and North Carolina.

Stream Restoration and Design

Coordinated, Designed and Implemented the relocation and restoration of multiple streams and stream systems.

Managed shoreline stabilization projects along eroding segments of the York River in Yorktown, Virginia and the James River located in Richmond, Virginia. Work included a wetland delineation of approximately 3000 linear feet of shoreline and preparation of wetland permits from the Corps of Engineers and Local Wetlands Board for 600 square feet of non-vegetated wetland impacts.

Designed and implemented the restoration/relocation of 1,700 linear feet of Anderson Creek, a perennial stream in Rockville, Virginia.

Completed the assessment and preliminary design of the restoration/relocation of 3,500 linear feet of Fontaine Creek and 7,500 linear

feet of an unnamed perennial stream flowing to Fontaine Creek in Skippers, Virginia.

Completed the assessment and preliminary design of the restoration of approximately 7,000 linear feet of perennial stream in Green County, Virginia.

Completed the assessment and design for the restoration of approximately 8,000 linear feet of perennial stream in Prince George County, Virginia.

Completed and implemented a restoration and planting plan for re-establishment of approximately 5 acres of Resource Protection Area along Almond Creek and the James River in Henrico County, Virginia.

Completed the assessment and design for the restoration of approximately 18,000 linear feet of intermittent/perennial stream in Henrico County, Virginia.

Completed and implemented a conservation plan for approximately 100 acres of stream side buffer in New Kent County, Virginia.

Completed the assessment and design for the restoration of approximately 9,000 linear feet of intermittent/perennial stream in Goochland County, Virginia.

All of the above stream restoration projects included coordination with local, state and federal agencies, permitting, as well as, the use of Rosgen Natural Stream Channel Design Methodologies. The current status of these projects change regularly, most if not all are nearing construction; are currently under construction or recently completed; or are in the post construction assessment/monitoring phase.

Stream Perenniality and Stream Attribute Analysis Methodology (SAAMS)

Qualified to assess streams and wetlands as part of Resource Protection Area (RPA) determinations conducted in accordance with



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the Chesapeake Bay Preservation Act utilizing the North Carolina Department of Water Quality (NCDWQ) Perennial Stream Evaluation Methodology. He has also conducted stream potentiality studies as a part of the Neuse/Tar Pamlico/Catawba Riparian Buffer Rules for North Carolina.

Practiced in the utilization and application of both the Virginia Department of Environmental Quality's "Stream Impact Compensation Assessment Manual" (SICAM) method, and the Army Corps of Engineer's "Stream Attribute Assessment Methodology" (SAAM), which is for determining the necessary compensatory mitigation requirement for impact to streams. Streams were rated for both compensation for impacts and lift potential as related to mitigation banking.

Phase I and II Environmental Site Assessments

Project scientist for hundreds of Phase I Environmental Site Assessments (ESAs) and Phase II ESAs on agricultural, residential, commercial, and industrial sites throughout Virginia and West Virginia. These Phase I ESAs are part of the due diligence process and innocent landowner defense.

Phase I Environmental Site Assessments completed for Link-Belt Construction Equipment, Dekalb Poultry, Nations Bank, Bluegreen Properties of Virginia, Kings Charter Office Park, Commerce Bank, Farmer Machine Co., Lawhorn, Atlantic Development & Acquisition, LLC, NCDOT, and Virginia Power's CT sites in Caroline and Fauquier counties. Work has included data research, site evaluations and regulatory review and report writing.

Phase II Environmental Site Assessments for McCray Oil Company, Kings Charter Office Park, Link Belt Construction Equipment Co., Commerce Bank, and Rudlin Torah Academy.

Environmental Assessments for the Virginia Department of Military Affairs, the counties of

Hanover, Richmond, and Westmoreland, and the NCDOT.

Environmental Audits

Field project scientist as part of Environmental Compliance Audits conducted at 30 Virginia Department of Correction Correctional Facilities, as well, as many other industrial and mining facilities.

Threatened/Endangered Species Surveys

Managed and participated in surveys for multiple federal and state threatened and endangered species in Virginia, North Carolina, and West Virginia.

Threatened and endangered species surveys for small whorled pogonia, and the dwarf wedge mussel in King William County, and sensitive joint-vetch in King George County. Section 7 consultation with regulatory agencies regarding bald eagle, swamp pink, small whorled pogonia, Indiana bat, Loggerhead shrike, and Northeastern beech tiger beetles.

Mr. Brooks is listed on the Virginia Field Office's list of surveyors for the federally-listed sensitive joint-vetch (*Aeschynomene virginica*), small whorled pogonia (*Isotria medeoloides*), and swamp pink (*Helonias bullata*).

UST Removal and Remediation

Completed UST investigations for Mary Washington College and McCray Oil Company, both of which received reimbursement from the Virginia Petroleum Storage Tank Fund. Also conducted UST investigation for Virginia Power's Ladysmith and Septa Substations.

Conducted petroleum release modeling for McCray Oil Company in Hanover County, VA, with which the VDEQ files on the site were closed.

Regulatory and Legislative

Mr. Brooks has served as a member of the Virginia Department of Environmental Quality's (VDEQ) Technical Advisory Committees for the



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State Programmatic General Permit (SPGP) Regulations and the Surface Water Withdrawal Regulations. As a member of both technical advisory committees (TAC), he had the responsibility to review the current regulations and the proposed regulations in order to compare the proposed changes, make suggestions on changes to the proposed regulations, discuss all changes suggested by the TAC, as well as review pertinent scientific studies in order to properly craft the new regulations.

Mr. Brooks is currently serving as a member of the Attorney General's Regulatory Reform Task Force (Task Force) charged with reviewing Virginia Regulations, (e.g. environmental regulations) to reduce redundancies, in efficiencies, and remove out dated sections. As such he has reviewed all state environmental laws, code, and regulations for the following agencies: Virginia the Virginia Marine Resource (VMRC), Virginia Department of Conservation and Recreation (VDCR), Virginia Department of Agriculture and Consumer Services (VDACS), and Virginia Department of Environmental Quality (VDEQ). As the charge of the Task Force suggests, Mr. Brooks is working closely with the Attorney General's Office (AGO) to identify, address changes, remove redundancies, and even suggest changes to regulatory guidance in order to promote more efficient and streamlined environmental regulatory and governmental process.

Other

Consultation with the Virginia Department of Historic Resources regarding archaeological and archaeological sites associated Section 106 review due to local, state, or federal permits or funding for sites across the Commonwealth of Virginia.

Completed and had approved a FEMA Floodplain map revision for Virginia Power's Fauquier CT site and Stafford County's Government Island Project, which included computer modeling of Marsh Run, Aquia Creek and several of their unnamed tributaries.

Extensive research in water quality in order to assess the health of aquatic systems in Chesapeake and Virginia Beach, Virginia.

Authored Environmental Impact Statements for projects associates with proposed U.S. Army Corps projects.

Mr. Brooks has acted as an expert witness in several legal proceedings.

THADDEUS J. KRASKA, P.W.D.
Project Scientist

EDUCATION

B.A., Zoology, University of New Hampshire,
1998

M.S., Resource Management & Administration,
Antioch University, 2000

PROFESSIONAL REGISTRATIONS

**Virginia Certified Professional Wetland
Delineator, No. 4**

*Certified in Wetland Delineation, the Wetland
Program and Office of Continuing Education
University College, Ohio State University, 2000*

*Certified in Wetland Creation and Restoration,
the Wetland Program and Office of Continuing
Education University College, Ohio State
University, 2003*

*Certified in Field Indicators for Hydric Soils,
Advanced Hydric Soil Identification, Virginia
Institute of Marine Sciences, 2003*

*Certified in Intermittent and Perennial Stream
Identification for Riparian Buffer Rules – North
Carolina and Virginia, North Carolina State
University, Department of Forestry and
Wetlands/401 Unit North Carolina Division of
Water Quality, 2005*

24-Hour HAZWOPER training, December, 2005

*Certified in Rosgen's Applied Fluvial
Geomorphology (Level I), Wildland Hydrology,
Inc., Watershed Conservation Resource Center
Fayetteville, AR, 2009*

*Certified for Visible Emissions Evaluations by
EPA Method 9 (MAN090928-740)*

PROFESSIONAL AFFILIATIONS

Virginia Association of Wetland Professionals

SUMMARY OF EXPERIENCE

Mr. Kraska has over ten years of environmental
experience. His expertise is in the identification



and delineation of Waters of the U.S., including
wetlands. He has performed 100's of wetland
determinations, delineation, and assessments
throughout New Hampshire, West Virginia, and
the Commonwealth of Virginia. Mr. Kraska has
prepared numerous Joint Permit Applications
for temporary and permanent impacts to
nontidal and tidal wetlands, for residential,
municipal, commercial, professional, and
industrial clients in Virginia.

He has experience in wetland
creation/restoration design and planning,
vegetative, and hydrological analysis,
monitoring, and performing functional value
assessments. He has also conducted nearly 50
Phase I and Phase II Environmental Site
Assessments (ESA) and has completed
groundwater and soil sampling for investigating
suspected contamination as part of Phase II
ESAs conducted in both Virginia and West
Virginia and is listed on the Virginia Field
Office's list of surveyors for the federally-listed
small whorled pogonia (*Isotria medeoloides*)
and swamp pink (*Helonias bullata*). Mr. Kraska
has also completed over 100 visible emissions
evaluations for sites regulated by the Non-
metallic source pollution standards (NSPS)
requirements and the EPA Method 9 criteria.

DETAILED EXPERIENCE

Wetland Delineation and Permitting

Mr. Kraska has prepared numerous Joint
Permit Applications (JPA) for temporary and
permanent impacts to non-tidal and tidal
wetlands, and streams for residential,



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municipal, commercial, professional, and industrial clients in Virginia.

Managed and participated on numerous wetland delineations either individually or as a member of a team of active scientists on 100s of projects in the Piedmont and Coastal Plain regions of Virginia, according to methodologies prescribed by the *U.S. Army Corps of Engineers 1987 Manual for Identifying and Delineating Wetlands*. He is also trained in the application of the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region*. He has conducted wetland delineations in the following states, North Carolina, West Virginia, and New Hampshire.

Completed numerous wetland delineations and wetland permits for rock quarries and sand & gravel facilities located throughout Virginia, and North Carolina.

Mr. Kraska has completed Wetland delineations and jurisdictional determinations for Hanover Presbyterian Church, Kenwood United Methodist Church, Hanover County, Stafford County, Virginia Department of Corrections, Roslyn Farms Corporation, and the Isle of Wight Industrial Park, as well as for numerous private developers and industrial clients.

Wetland Compensation Design/Monitoring

Integral participant in the conceptual design and planning of wetland creation sites located in Stafford County, as well as, the Highland Springs, Varina, and Lakeside Areas of Henrico County. Activities included development of conceptual mitigation plans that include site-specific water budgets, monitoring well location, construction, and installation, as well as, both hydrologic and vegetative sampling plans.

Conducted both hydrological and vegetative sampling and monitoring at various active and completed created wetland sites located in the Piedmont region of Virginia.

Assisted with the development of Environmental Bank Prospectus' for wetland banking sites, including restoration,

enhancement, creation, and preservation of wetlands, streams, or other aquatic resource areas, for the submission to the Mitigation Bank Review Team (MBRT).

Developed conceptual and final wetland and stream restoration plans and designs including the establishment of vegetation, stabilization of grades, etc.

Prepared invasive species management plans for broad-leaved cattail (*Typha latifolia*), and reed grass (*Phragmites communis*).

Wetland Assessments

Assesses streams and wetlands as part of Resource Protection Area (RPA) determinations conducted in accordance with the Chesapeake Bay Preservation Act utilizing the North Carolina Department of Water Quality (NCDWQ) Perennial Stream Evaluation Methodology – Version 3.1.

Practiced in the utilization and application of the joint Virginia Department of Environmental Quality's and Army Corps of Engineer's "Unified Stream Methodology" (USM) for determining the necessary compensatory mitigation requirement for impact to streams.

Completed a comprehensive wetland assessment utilizing The New Hampshire Comparative Methodology. This study consisted of approximately 3,000 total acres and 7 wetlands for the Town of Hopkinton, New Hampshire. Fourteen functional values were analyzed for each wetland located within the Hardy Springs Brook Watershed. The results of the assessment are currently being used in conjunction with the town's revision of their Master Plan.

Phase I and II Environmental Site Assessments

Project scientist for over 50 Phase I Environmental Site Assessments (ESA) on agricultural, residential, commercial, and industrial sites throughout Virginia and West Virginia. These Phase I ESAs are part of the



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due diligence process and innocent landowner defense.

Project scientist for a Phase I Environmental Site Assessment at the Hanover Presbyterian Church in Hanover County.

Environmental Audits

Field project scientist as part of Environmental Compliance Audits conducted at 10 Virginia Department of Correction Correctional Facilities.

Environmental Assessments and NEPA Categorical Exclusions

Completed many Environmental Assessments (EAs) for municipalities, counties, state governmental agencies, such as for the Town of Orange, Northumberland County, Town of Washington, New Kent County, Hanover County, and Westmoreland County. These EAs were conducted for publicly funded projects, in order to identify potential impacts to environmental and historical resources, as well as, socio-economic impacts in order to determine the preferred alternative and obtain a Finding of no significant Impact (FONSI) for the proposed project.

Co-managed and completed 30 EAs for the Virginia State Police as part of the STARS program and updating of radio/cell tower equipment across Central Virginia.

Threatened/ Endangered Species Surveys

Responsible for identifying the first known occurrence of the federally and state threatened small whorled pogonia (*Isotria medeoloides*) in Pittsylvania County, Virginia in May 2005 and is listed on the Virginia Field Office's list of surveyors for the federally-listed small whorled pogonia (*Isotria medeoloides*). Also listed as an approved surveyor for the federally threatened/state endangered swamp pink (*Helonias bullata*). He has participated as a member of a team of scientists on numerous surveys for these species in Caroline, Hanover,

Henrico, New Kent, Pittsylvania, Stafford County, and Spotsylvania Counties.

Section 7 consultation with regulatory agencies regarding bald eagle, swamp pink, small whorled pogonia, Indiana bat, Loggerhead shrike, and Northeastern beech tiger beetles.

Section 106 consultations

Consultation with the Virginia Department of Historic Resources regarding archaeological and archaeological sites associated Section 106 review due to local, state, or federal permits or funding for sites across the Commonwealth of Virginia.

CHARLES WILSON, P.E.
Project Engineer**EDUCATION**

*B.S., Civil Engineering, University of Kentucky,
1997*

PROFESSIONAL REGISTRATIONS

Professional Engineer – Virginia
Professional Engineer - Kentucky

PROFESSIONAL AFFILIATIONS

*Order of the Engineer
Solid Waste Association of North America*

SUMMARY OF EXPERIENCE

Mr. Wilson has 14 years of progressive experience that includes assistance in landfill development and closures of over 22 facilities encompassing site planning, design, permit application preparation, cost analyses, construction drawings, technical specifications, construction monitoring and construction documentation. These duties include HELP modeling (computer modeling for hydrologic/hydraulic investigation and leachate production/control), site grading and drainage plans, and sediment pond design. He is well versed in documentation of all aspects of the liner and cap installation process and conducting the required field tests. Other experience in solid waste includes landfill gas system construction monitoring and conducting required field tests.

DETAILED EXPERIENCE

King William School Board, King William, VA - Assisted in the preparation of the site plan and specifications for the renovation of the High School Football field.

Ashcake Road Landfill – provided construction quality assurance for Phase 3 cell construction. Prepared site volume calculations from aerial surveys.

Ingenco

- Dinwiddie Facility – prepared construction drawings for tank farm loading pad.



- King and Queen Facility – prepared site plan for landfill gas to energy facility.
- Brunswick Facility – prepared site plan for landfill gas to energy facility.

Doswell Limited Partnership – prepared site plan amendment for the facility for the purpose of SPCC site upgrades.

R-Board Sanitary Landfill, Stafford County, Virginia

- Revised the Part B Permit Amendment 3 Addendum 1 Application and Permit Drawings to address comment made by VDEQ.
- Revised the Solid Waste Management Plan to address comments made by VDEQ.

King & Queen Sanitary Landfill (BFI), King & Queen County, Virginia

- Updated the Storm Water Pollution Prevention Plan (SWPPP) and the Spill Prevention, Control and Countermeasure Plan (SPCC).

Allied/BFI Waste Services

- Updated the Storm Water Pollution Prevention Plan (SWPPP) and the Spill Prevention, Control and Countermeasure Plan (SPCC) for BFI-Roanoke Facility.
- Updated the Storm Water Pollution Prevention Plan (SWPPP) and the Spill Prevention, Control and Countermeasure Plan (SPCC) for BFI-Charlottesville Facility.
- Updated the Storm Water Pollution Prevention Plan (SWPPP) and the Spill



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- Prevention, Control and Countermeasure Plan (SPCC) for BFI-Grafton Facility.
- Updated the Storm Water Pollution Prevention Plan (SWPPP) and the Spill Prevention, Control and Countermeasure Plan (SPCC) for BFI-Lynchburg Facility.
- Update the Storm Water Pollution Prevention Plan (SWPPP) for BFI-Fluvanna Transfer Station.

Landfill liner system design and construction CQA monitoring (Kentucky) which includes conducting weekly progress meetings and daily meetings with contractors. Provide on-site observation of geosynthetics deployment, documented all placements and testing of membrane. In addition, reviewing contractor's submittals and consulting daily with contractors on design and specification issues. Also responsible for answering Department of Environmental Quality comments on site issues and to prepare all field data for CQA reports.

Blue Ridge Recycling & Disposal Facility, Estill County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management.

Prince Edward County Sanitary Landfill - Provided Project Management and Construction Quality Assurance for Phase 1 Closure Cap Construction. Prepared permit drawings and application for the Part B Minor Permit Amendment Application.

Chesapeake Energy Center, Chesapeake, Virginia -Prepared construction documents and drawings for the New Metals Pond Construction and the Old Metals Pond Closure. Providing Project Management and Construction Quality Assurance for the geosynthetics portion of the construction and closure projects.

King & Queen Sanitary Landfill (BFI)- Prepared permit drawings , revised HELP model runs, developed equipment/manpower table, developed practical working face dimensions, and application for the Part B Major Permit

Amendment application for closure cap profile revisions.

R-Board Sanitary Landfill, Stafford County, Virginia - Provided Project Management and Construction Quality Assurance for Cell E Construction. Currently, working on the Part B Major Permit Amendment Application and associated drawings and calculations to horizontally expand the facility's waste boundary.

Old Dominion Sanitary Landfill (BFI), Henrico County, Virginia - Prepared permit drawings for the Part A Permit Application to horizontally expand the facilities waste boundary.

Ashcake Road Landfill, Hanover County, Virginia. Prepared permit drawings, technical specifications, and revised calculations for the Part B Major Permit Amendment application for the liner system design revisions.

Old Dominion Sanitary Landfill (BFI), Henrico County, Virginia Prepared permit drawings for the Part A Permit Application to horizontally expand the facilities waste boundary

Town of Orange Raw Water Storage Basin-Provided Project Management and Construction Quality Assurance for the geosynthetics portion of the raw water storage basin construction.

Benson Valley Area Landfill (BFI Waste Systems): Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Assisted in the permit application and drawings for a Horizontal Expansion. Provide CQA monitoring and Documentation of Gas Well Installation and Gas Header Line installation. Provided CQA monitoring and Documentation for over 14 acres of Primary Liner System. Provided CQA monitoring and Documentation for 8 acres Closure Cap Area.

Epperson Waste Disposal, Grant County, Kentucky: Completed the State Annual Survey



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Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Final Cap Construction. Assisted in preparation of a Permit Modification which consisted of Relocating a Non-Waste Fill Area within the given permitted footprint. Provided CQA monitoring and Documentation for Repairs conducted on the Primary Liner System. Provided CQA monitoring and Documentation for over 21 acres of Primary Liner System.

West Kentucky Landfill, Graves County, Kentucky: Assisted in the preparation of the Permit Application and Drawings for a Horizontal Expansion.

Green Valley Environmental Corporation Landfill, Greenup County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Worked on the Design of the Proposed Horizontal Expansion. Provide CQA monitoring and Documentation of Gas Well Installation. Provided CQA monitoring and Documentation for over 12 acres of Primary Liner System.

Laurel Ridge Landfill, Laurel County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Prepared a Permit Modification Application and Drawings to Re-grade the Bottom Contours of the Landfill. Assisted in the permit application and drawings for a Horizontal Expansion. Provided CQA monitoring and Documentation for over 18 acres of Primary Liner System.

Tri-K Landfill Inc., Lincoln County, Kentucky:

Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Final Cap Construction. Assisted in preparation of Horizontal Expansion Application and Permit Drawings. Assisted in preparation of Surface Mining Permit Application and Drawings. Provided CQA monitoring and Documentation for Repairs conducted on the Primary Liner System. Provided CQA monitoring and Documentation for over 22 acres of Primary Liner System.

Southern Sanitation Landfill, Logan County, Kentucky: Worked on the design of a Proposed Horizontal Expansion. Prepared Construction Drawing.

Ohio County Balefill, Ohio County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Assisted in preparation of Horizontal Expansion Application and Permit Drawings. Provided CQA monitoring and Documentation for over 29 acres of Primary Liner System. Provided CQA Documentation for Final Cap Construction.

Local Sanitation of Rowan County, Rowan County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Provided CQA monitoring and Documentation for over 4 acres of Primary Liner System.

Valley View Landfill, Trimble County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the



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Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Final Cap Construction. Assisted in preparation of Unit 6 Relocation Application and Permit Drawings. Assisted in preparation of a Vertical Expansion Application and Permit Drawings. Assisted in preparation of a Horizontal Expansion Application and Permit Drawings. Provided CQA monitoring and Documentation for Repairs conducted on the Primary Liner System. Provided CQA monitoring and Documentation for over 34 acres of Primary Liner System. Assisted in preparation of Surface Mining Permit Application and Drawings.

Dozit Company Inc. Landfill, Union County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Provided CQA monitoring and Documentation for Repairs conducted on the Primary Liner System. Provided CQA monitoring and Documentation for over 10 acres of Primary Liner System.

Tri-County Sanitary Landfill, Whitley County, Kentucky: Assisted in preparation of a Final Closure Plan and Drawings. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Final Cap Construction. Provided CQA monitoring and Documentation for over 6 acres of Final Cap.

Eastern Kentucky Power, Spurlock Power Station, Mason County, Kentucky: Assisted in preparation of Special Waste Application and Permit Drawings.

Weyerhaeuser Hawesville Plant, Hancock County, Kentucky: Assisted in preparation of Permit Application and Permit Drawings.

B&J Landfill, Fulton County, Kentucky: Provided CQA monitoring and Documentation for over 9 acres of Final Cap.

Prichard Landfill, Wayne County, West Virginia: Provided CQA monitoring and Documentation for over 22 acres of Final Cap.

Dafter Landfill, Chippewa County, Michigan: Provided QA monitoring and Documentation for over 3 acres of Geosynthetic Installation.

C+C Landfill, Calhoun County, Michigan: Provided QA monitoring and Documentation for over 6 acres of Geosynthetic Installation.

Outerloop Landfill, Jefferson County, Kentucky: Provided QA monitoring and documentation for over 10 acres of Geosynthetic Installation.

CHARLES D. RIEDLINGER, P.E.
Senior Vice President**EDUCATION**

B.S. Civil Engineering Technology, Old Dominion University, 1974.

PROFESSIONAL REGISTRATION

Professional Engineer: Virginia-No.12510, West Virginia- No.8437, North Carolina-No. 13979

PROFESSIONAL AFFILIATIONS

American Water Works Association

SUMMARY OF EXPERIENCE

Mr. Riedlinger has 37 years of progressive experience in Civil/Environmental Engineering with municipal, state, commercial/industrial and federal clients. Mr. Riedlinger has responsibility for leading all engineering efforts in the company.

His area of expertise is in engineering planning, design, and construction for water and wastewater projects. Mr. Riedlinger has conducted client rate studies and prepared financial reports for water utilities and sewer utilities. He has been responsible for designing water treatment plants, water storage tanks, booster stations, pressure reducing stations, sewage pump stations, collection systems and wastewater treatment plants. Mr. Riedlinger has been involved in comprehensive reports, equipment review, preliminary layout, cost estimates and financial studies.

DETAILED EXPERIENCE**Water/Wastewater**

Principal-in-Charge of the design, bidding, and construction services for expansion of a .125-mgd lagoon to a .405-mgd wastewater treatment plant by utilization of SBR process. Plant meets stringent discharge limits.

Project Manager for a substantial number of water treatment plants, water lines, booster stations, and tanks for numerous clients throughout West Virginia.



Principal-in-Charge of a county-wide master sewer plan for Westmoreland County, Virginia.

Project Manager of the rehabilitation of a 250,000- gallon elevated water storage tank for Westmoreland County, Virginia.

Principal Engineer for a 345-acre site development in New Kent County that included a 250,000-gallon water storage tank, 14,000 feet of water line, 126,000-gpd wastewater plant, three pump stations, force main and gravity collection system, and over 15,000 feet of roads

Principal Engineer for various projects in King William County, including new water supply and sewer treatment system for the Courthouse Complex, Route 360 area sewer evaluation and master plan, and Central Garage water system including a new 150,000-gallon elevated water storage tank.

Principal Engineer for new water system and sewer extension for County of Richmond/Town of Warsaw, Virginia. Work included a new 500,000-gallon elevated water storage tank, various lengths of 16" and 12" water transmission mains, new sewer collection lines, pump station and force main.

Environmental/Landfill

Principal Engineer for numerous Environmental Assessments, UST studies and removals, and environmental studies.

During his career, Mr. Riedlinger has been responsible for meeting with regulatory agencies, assisting with certification and reporting forms. He has coordinated the site investigations which include soil vapor surveying, and groundwater monitoring. In addition, Mr. Riedlinger supervised UST design, tank removal and remediation. Representative clients for which Mr. Riedlinger has performed UST projects include the following:

- Dominion Generation
- State of Delaware - General Services
- Charles E. Smith Company
- Marriot Hotels, Maryland
- Virginia Department of Military Affairs
- Hilton Hotels, Washington, DC
- Mary Washington College, Virginia

Responsible for Phase I and Phase II Site Assessments associated with Due Diligence. Representative clients include Equitable Insurance, Prudential Insurance, Nations Bank, Virginia Department of Corrections, and numerous commercial and industrial clients.

Program Manager for a contract with the U.S. Army Corps of Engineers for environmental related work at Fort Meade, Maryland. Initial work was to negotiate task orders and general client management as well as managing engineering for the various tasks. Task orders were for asbestos surveys, PCB investigations, underground storage tank upgrades, solid waste management programs, oil water separator investigations/design, Title V air studies, and waste minimization studies.

Principal Engineer for a 345-acre site development in New Kent County that included a 250,000-gallon water storage tank, 14,000 feet of water line, 126,000-gpd wastewater plant, three pump stations, force main and

gravity collection system, and over 15,000 feet of roads.

Principal Engineer for new water system and sewer extension for County of Richmond/Town of Warsaw, Virginia. Work included a new 500,000-gallon elevated water storage tank, various lengths of 16" and 12" transmission mains, new sewer collection lines, pump station and force main.

Project Manager for a substantial number of water treatment plants, water lines, booster stations, and tanks for numerous clients throughout West Virginia.

Responsible for meeting with regulatory agencies, assisting with certification and reporting forms, and designing underground storage tank management programs. He coordinates the site investigations which include soil vapor surveying, soil sampling, geophysical surveying, and groundwater monitoring. In addition, Mr. Riedlinger supervises tank design, piping design, instrument and control design, and the preparation of installation specifications.

Mr. Riedlinger managed the determination of PCB-containing power transformers on the city property, the identification of materials or wastes present which could have posed an environmental hazard. He was responsible for the review past activities or operations on the site, and the history of site ownership and use.

Principal-in-charge of gas monitoring and groundwater monitoring at numerous landfills throughout Virginia.

Principal-in-charge for the development of permit amendment documents, bidding documents and construction documents for BFI facilities in Henrico (Old Dominion Facility) and King and Queen counties.

Principal engineer for transfer station modifications in Goochland County. Work

included permit revisions as well as design, bidding and construction documents.

Principal engineer for transfer station modifications in New Kent County. Work included design, bidding and construction administration.

Principal engineer for landfill cell construction in Prince Edward County. Work included permit amendment documents, bidding documents and construction documents.

Principal Engineer for a 345-acre site development in New Kent County that included a 250,000-gallon water storage tank, 14,000 feet of water line, 126,000-gpd wastewater plant, three pump stations, force main and gravity collection system, and over 15,000 feet of roads.

Industrial Parks

Principal Engineer of the Westmoreland Industrial Park. Work included site study, environmental site assessment, wetland delineation, funding assistance, site design, road design, water service design, sewer service design, stormwater design, and bidding assistance of construction administration.

Principal Engineer for Industrial Park project for Richmond County. Work included site survey, conceptual layouts and stormwater management.

Principal Engineer for Industrial Park project in Lancaster County. Work included site evaluation, environmental site assessment, preliminary layout, utility studies and public hearings.

Principal-in-Charge of a county-wide master sewer plan for Westmoreland County, Virginia.

Project Manager of the rehabilitation of a 250,000- gallon elevated water storage tank for Westmoreland County, Virginia.

Construction Administration

Principal-in-Charge for coordinating all field work and reports for inspection of over 13,000,000 square feet of building space for the Department of the Navy's LANDIV facilities.

Project Manager for a substantial number of rural water treatment plants, water lines, booster stations, and tanks for numerous clients throughout West Virginia.

Principal-in-Charge of the design, bidding and construction administration of a combined conventional gravity system and grinder pump system in Allegany County, Maryland.

Principal-in-Charge of the design, bidding, and construction service of a 40,000 linear feet of 8" to 36" interceptor sewers and force mains and three pumping stations for client in Fauquier County, Virginia.

Project Manager for bidding and construction services of a 3.4 MGP total barrier oxidation ditch, pump stations, force mains, and collections system for the City of Rehoboth Beach, Delaware.

Project Manager for construction, administration and resident project representation of new wastewater pumping station, 600 linear feet of 18" force main and 13,000 linear feet of 18" to 30" diameter interceptor for the City of Dover, Delaware.

Principal-in-Charge of engineering sewers for 18,000 linear feet of 10" to 20" water transmission mains for client in Delaware. Work included surveying, alignment selection, hydraulic analyses, preparation of plans and specifications as well as construction administration.

Wells

Project Manager for the design and construction of five (5) 24" water supply wells for the City of Dover, Delaware.

Project Manager for the design and construction of one (1) 24" water supply well for the City of Rehoboth Beach, Delaware.

Project Manager for the construction of five (5) 16" water supply wells at Point Pleasant, West Virginia.

Principal-in-Charge of the design, bidding and construction administration of a combined conventional gravity system and grinder pump system in Allegany County, Maryland.

Project Manager for construction, administration and resident project representation of new wastewater pumping station, 600 linear feet of 18" force main and 13,000 linear feet of 18" to 30" diameter interceptor for the City of Dover, Delaware.

Principal-in-Charge of 1,740 linear feet of 18" ductile iron water transmission main for the Town of Leesburg. Scope of services included surveying, soil corrosivity analysis, location of existing utilities and a geotechnical study.

Principal-in-Charge of engineering sewers for 18,000 linear feet of 10" to 20" water transmission mains for client in Delaware. Work included surveying, alignment selection, hydraulic analyses, preparation of plans and specifications as well as construction administration.

Dams

Principal-In-Charge of the design, bidding and construction administration of a combined conventional gravity system and grinder pump system in Allegany County, Maryland.

Project Manager for bidding and construction services of a 3.4 MGP total barrier oxidation ditch, pump stations, force mains, and collections system for the City of Rehoboth Beach, Delaware.

Project Manager for construction, administration and resident project representation of new

wastewater pumping station, 600 linear feet of 18" force main and 13,000 linear feet of 18" to 30" diameter interceptor for the City of Dover, Delaware.

Principal-in-Charge of project involving scheduling field activities including inspections, data collection sampling, data analysis and reporting for Washington, DC project. Project included over 13,000,000 square feet of building space and over 1200 housing units.

Principal-in-Charge for the State of Delaware project. Project included over 12,000,000 square feet of build space at over 1500 buildings.

Principal-in-Charge for the Department of the Navy. Project included over 13,000,000 of building space and over 1500 facilities.

Principal-in-Charge of two (2) Virginia Community College System open-end contracts for environmental and civil work. Work included projects with Northern Virginia Community College Campus, Lord Fairfax Community College, J. Sergeant Reynolds Community College, and Blue Ridge Community College. Projects have included: asbestos abatement, indoor air and facility renovations

Department of Military Affairs

Project Manager for engineering contract with the Virginia Department of Military Affairs. Work included site work, pavement replacement, UST removal, and UST replacement.

Principal-in-Charge of the design, bidding, and construction service of a 40,000 linear feet of 8" to 36" interceptor sewers and force mains and three pumping stations for client in Fauquier County, Virginia.

Program Manager for a contract with the U. S Army Corps of Engineers for environmental related work at Fort Meade, Maryland. Initial work was negotiate task orders and general

client management as well as managing engineering for the various tasks. Task orders were for asbestos surveys, PCB investigations, underground storage tank upgrades, solid waste management programs, oil water separator investigations/and design, Title V air studies, and waste minimization studies. Contract was renewed for the maximum time allowed by the contract. Task orders have amounted to over \$700,000 each year.

Project Manager for a \$645,000 contract to perform asbestos surveys at the Department of the Navy facilities in Norfolk, Cranney Island and Yorktown. Project included over 12,000,000 square feet of building space and over 1,500 facilities.

Project Manager for a contract to perform inspections, prepare abatement plans and specification for at the Department of the Navy facilities under jurisdiction of LANTDIV.

Principal-in-Charge of project with major transportation maintenance facility where engineering and geologic services were performed. Investigation identified areas of contaminated soils, investigated the integrity of the groundwater, developed a remedial action plan and monitored remedial action. Project developed into a design/construction project for remediation of soil and the construction of an industrial wastewater treatment facility for separation of oil and treatment of contaminated storm water. Total project cost was approximately \$4,000,000.

Stormwater

Principal-in-Charge of all stormwater on an entire community of approximately 1,000 homes surrounding a golf course on 1,000 acres in New Kent County, Virginia for Bluegreen Properties, Inc. Work included five stormwater management basins.

Principal-in-Charge for Westmoreland County in the site selection, concept design, and preparation of funding application for the

development of an 80-acre site as an industrial park. Design included three storm water management basins. Mr. Riedlinger also provided the design and construction services for Phase I development.

Principal-in-Charge for Richmond County for its industrial park located adjacent to the Town of Warsaw. Mr. Riedlinger designed a stormwater management basin to service the entire property and provided site engineering for initial site grading. In addition, he has worked with the County in developing initial concepts and layouts. He also prepared opinions of cost to assist in funding applications.

Principal Engineer for a 345-acre site development in New Kent County that included a 250,000-gallon water storage tank, 14,000 feet of water line, 126,000-gpd wastewater plant, three pump stations, force main and gravity collection system, and over 15,000 feet of roads.

Federal

Program Manager for a contract with the U. S Army Corps of Engineers for environmental related work at Fort Meade, Maryland. Initial work was negotiate task orders and general client management as well as managing engineering for the various tasks. Task orders were for asbestos surveys, PCB investigations, underground storage tank upgrades, solid waste management programs, oil water separator investigations/and design, Title V air studies, and waste minimization studies. Contract was renewed for the maximum time allowed by the contract. Task orders have amounted to over \$700,000 each year.

Project Manager for a \$645,000 contract to perform asbestos surveys at the Department of the Navy facilities in Norfolk, Cranney Island and Yorktown. Project included over 12,000,000 square feet of building space and over 1,500 facilities.

Project Manager for a contract to perform inspections, prepare abatement plans and

specification for at the Department of the Navy facilities under jurisdiction of LANTDIV.

Project manager and instructor for training at the Washington Navy Yard (formally CHESDIV) involving courses for asbestos inspection, asbestos abatement design and underground storage tank removal.

Project Manager of National Bureau of Standards Inspection and Asbestos Abatement Projects. Included survey of facilities as well as preparation of abatement plans and specifications.

Principal-in-Charge of project with major transportation maintenance facility where engineering and geologic services were performed. Investigation identified areas of contaminated soils, investigated the integrity of the groundwater, developed a remedial action plan and monitored remedial action. Project developed into a design/construction project for remediation of soil and the construction of an industrial wastewater treatment facility for separation of oil and treatment of contaminated storm water. Total project cost was approximately \$4,000,000.

MICHAEL R. WILLINGER, P.G.
Project Geologist II

EDUCATION

B.S., Geology, concentration in Engineering Geology, James Madison University, 1999

40-Hour Hazardous Waste Operations and Emergency Response-Confined Space Training

Certified for Visible Emissions Evaluation by EPA Method 9

PROFESSIONAL REGISTRATION

Professional Geologist: Virginia-No. 1605

PROFESSIONAL AFFILIATIONS

American Institute of Professional Geologists (AIPG), Virginias Section; Former Membership Directory Editor, Registered Member

Solid Waste Association of North America (SWANA), Virginia Chapter; Member

Virginia Association of Professional Soil Scientists (VAPSS), Member

CONTINUING EDUCATION

The Waterloo Training Course Series – Water Quality Data Management & Modeling, September 21-23, 2005

Virginia Tech Outreach and International Affairs – Basic Soil Science Short Course, March 9-10, 2006

ASTM International Technical and Professional Training – Environmental Site Assessments for Commercial Real Estate, April 25-26, 2006

VAPSS Spring 2006 Technical Session – Acid Sulfate Soils: Their Recognition and Remediation, May 22-23, 2006

The Nielsen Environmental Field School - The Complete Ground-Water Monitoring Field Course, March 19-23, 2007.

Sanitas Technologies – Applied Groundwater Statistics Short Course, March 13-14, 2008

Princeton Groundwater, Inc. – The Groundwater Pollution and Hydrology Course, March 15-19, 2010.

Princeton Groundwater, Inc. – The Remediation Course, October 25-29, 2010.



SUMMARY OF EXPERIENCE

Mr. Willinger has twelve years of progressive geologic, hydrogeologic, and geotechnical engineering experience with municipal, commercial/industrial and federal clients.

His areas of expertise include geologic and hydrogeologic studies, solid waste facility groundwater monitoring programs, and environmental site assessments. He is also experienced in all aspects of planning, implementation, and managing services related to underground storage tank (UST) and aboveground storage tank (AST) closures, release detection and abatement, site characterizations, and remediation.

DETAILED EXPERIENCE

Environmental

Responsible for revamping the groundwater monitoring system at a regional poultry-processing plant in Talmo, Georgia. The project included the abandonment of the existing monitoring well system, the design and



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installation of a new system that meets Georgia Environmental Protection Division (GAEPD) criteria for groundwater monitoring, and quarterly monitoring reports to GAEPD. Also provided a Groundwater Monitoring Program and Land Application System Evaluation, which included groundwater-monitoring instruction for plant personnel, and recommendations for an erosion and sediment control plan that was necessary to maintain compliance with GAEPD land application permit regulations.

Executes groundwater and landfill gas monitoring programs at a number of solid waste facilities throughout the Commonwealth of Virginia. Duties include field operations, statistical analysis of collected data, and reporting to state regulatory agencies.

Performed two successful Alternate Source Demonstrations at a regional municipal landfill that allowed the facility to remain in the detection monitoring phase. This saved the facility thousands of dollars annually in sampling and laboratory costs alone.

Performed numerous Phase I and Phase II Environmental Site Assessments (ESA) at a variety of commercial, residential, and industrial sites throughout Virginia, and in Pennsylvania, West Virginia, Maryland, Georgia, and Kentucky. Clients for ESAs have included banks, commercial lenders, developers, real estate investment trusts, church organizations, and manufacturers. Specific sites include: Waterside Festival Marketplace in Norfolk, Virginia; The Arboretum, an office park in Midlothian, Virginia; Colonial Beach Yacht Center in Colonial Beach Virginia; Mundet, Inc. manufacturing facilities in Colonial Heights and Buena Vista, Virginia; Interbake Foods Richmond Division bakery facility, several Jockey International plants in Kentucky and Georgia, and many others.

Qualified as an Environmental Professional as defined in ASTM Practice E1527-05.

As ESA Program Manager prepares scope of services and budgets for ESA projects, assigns

ESAs to appropriate personnel, acts as project manager, and peer reviews reports for approval by Resource principals.

Performed Environmental Assessments (EAs) throughout Virginia for the Commonwealth's Statewide Agencies Radio System (STARS) program. These EAs were performed in compliance with National Environmental Policy Act (NEPA) requirements for the installation of new cellular/radio towers.

Assisted in the implementation of a Hazardous Chemicals Reporting database program that allowed the client, Smurfit Stone Container Corporation, to maintain compliance with OSHA and EPA regulatory tracking and reporting requirements.

Served on a two-man team in a nationwide lead-based paint assessment project designed to obtain Department of Housing and Urban Development (HUD) lead-free certification for apartment complexes owned by AIMCO, a national real estate investment management firm.

Hydrogeology

Completed a Water Supply Study for Philip Morris USA that allowed the company to evaluate scenarios and options for the use of groundwater to supply their Richmond manufacturing facility in the event of restrictions on the use of the public water supply by the City of Richmond or the Commonwealth of Virginia.

Performed Groundwater Characterization Studies at a number of United States Navy fueling stations and tank farms, including the Norfolk Naval Base, Craney Island Fueling Terminal, and Naval Air Station Oceana.

Petroleum Storage

Project Manager on initial abatement, UST closures, and site characterizations for several regional petroleum corporations including Rennie Petroleum Corporation and FasMart/Shore Stop. Project tasks included



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performing fieldwork, receptor surveys, drilling supervision, data analysis, and preparation of final reports for presentation to clients and the Virginia Department of Environmental Quality (DEQ).

Project Manager on initial abatement, site characterization, and UST closure at a municipal facility in The Town of Orange, Virginia.

Performed extensive field activities for remediation of UST releases including mobilization and operation of a mobile high-vacuum, dual-phase extraction system, monitoring and data collection, and compilation and analysis of data for reports to DEQ.

Assisted in the initial abatement and remediation of a release from a 500,000-gallon AST including removal of free product from site, and operation of subsurface exploration equipment during the site characterization phase of the remediation.

**Appendix F. Statements of Qualifications for Trinitek Services
and Subcontractor Companies**

Trinitek Services, Inc

Oak Ridge Associated Universities (ORAU)

Resource International, Ltd.

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Trinitek Services, Inc.

Nuclear and Environmental Safety Consultants

Trinitek Services, Inc.
2501 Rio Grande Blvd., NW, Suite B
Albuquerque, NM 87104
(505) 242-8200 Phone
(505) 242-8201 FAX
(866)-990-4387 toll-free
www.3tks.com

Summary Statement of Qualifications

Trinitek Services is a small, woman-owned (WOSB), disadvantaged small business (SDB) incorporated in the state of New Mexico (USA). We provide expert regulatory consulting, technical, engineering and scientific services including training and audits focusing on environmental compliance, nuclear engineering, radiation safety, NEPA permitting, environmental assessments, compliance assessments, security systems, nuclear materials licensing, quality assurance, transport-management of nuclear / hazardous wastes. We work in the USA and internationally.

Qualifications and Experience

- Environmental Permitting
- Environmental Remediation
- Licensing Actions for NRC and Agreement States
- Radiation Protection Programs
- Nuclear Materials Protection
- Emergency Response Actions
- Training
- Compliance Audits
- Nuclear Quality Assurance
- Radioactive Waste Consulting
- Environmental Assessments
- Uranium recovery, In-Situ and Conventional Mills
- Hazmat/Rad Transport Consult
- Security Assessments

- Registered Small Disadvantaged Minority Business, WOSB
- Economically Disadvantaged Woman-Owned Small Business (EDWOSB)
- Minority-Owned Business, SDB
- PTAP (Procurement Technical Assistance Program) Certification
- CCR Updated; ORCA current
- DUNS Registry: 80-452-5058
- Primary NAICS Code 541620: Environmental Consultants
- CAGE Code: 503D5
- SIC: 8748 (Environmental Consulting)

Staff Credentials

- Nuclear engineers, PhDs, CHPs (Certified Health Physicists), RCTs (Radiation Control Technicians), PEs, CIHs (Certified Industrial Hygienists), CHMMs (Certified Hazardous Materials Managers), CSPs (Certified Safety Professionals, trainers, and university educators).
- Security Systems specialists and trainers with extensive experience in local, federal and international law enforcement
- Staff and associates come directly from the regulatory framework of NRC, Agreement States, and DOE. We maintain our relationships with senior regulatory decision-makers at these agencies. This allows us to provide clients with assurance that their nuclear safety and environmental actions will be comprehensive and complete.
- Work experience in the regional, national and international arena. Our staff and associates are the best qualified experts in their fields and well experienced with permitting/licensing, developing, and managing related health, safety and environmental compliance programs.
- Staff with USDOE "Q" Clearances.

Affiliations:

- Procurement Technical Assistance Program (PTAP)
- NM Small Business Development Center
- Albuquerque Hispano Chamber of Commerce
- Better Business Bureau (Good Standing)
- Health Physics Society (HPS)
- HPS Fellow Emeritus
- American Academy of Health Physics
- INMM: Institute of Nuclear Material Management
- ASSE: American Society of Safety Engineers
- ASIS: Security International

NAICS Services Focus: Radiation, Environment, Health, Safety

- **Environmental, Scientific, Engineering Consulting Services:** 541620; 541690; 541712; 541330; 541990; 924110; 562910; 562998
- **Administrative and Management Consulting Services:** 541611; 541618
- **Technical Training and Education Services:** 611430; 611519; 611699; 611710; 923110
- **Radiation/Uranium Consulting, Training And Measurements:** 212291; 541380; 621512
- **Security Systems Analysis:** 561621
- **Emergency Management Consulting And Training:** 624230
- **Regulatory-Environmental and Radiation:** 921120; 921190; 922190
- **International Nonproliferation Consulting And Training:** 928110; 928120

Recent Clients: Government and Commercial

- **AVM Environmental**
- **AMEC** (Phoenix, Arizona)
- **Brainard Animal Health Center**, NM
- **Cavanagh Services Group**, Utah
- **Energetic Materials Research and Training Center**, New Mexico Tech, Socorro, NM
- **Federal Aviation Administration**, Albuquerque, NM
- **Lovelace Respiratory Research Institute (LRRI)**, Kirtland Air Force Base, NM – USDOE Project
- **Mesteña Uranium, LLC**, Corpus Christi, TX
- **Neutron Energy, Inc**, Englewood, CO
- **New Mexico Tech University** (Albuquerque, NM)/ USDOE Global Threat Reduction Initiative (GTRI) Source Recovery program/ Egyptian Atomic Energy Authority (EAEA)/ SNL contract
- **Parametrix, Inc** / Cochiti Pueblo, NM, US Army Corps of Engineers fund
- **Rio Grande Resources Corporation – General Atomics**, San Mateo, NM
- **SWCA, Environmental Consultants**, Albuquerque, Phoenix
- **UniTech Services Group**, Santa Fe, NM and Springfield, MA
- **URS Washington Group**, Carlsbad, NM
- **Cavin and Ingram, PC**, Lee Ranch, NM
- **Pajarito Scientific Corporation**, Santa Fe, NM and international



Worker and Public Health Studies

When people are exposed to hazardous substances at work or in their communities, ORAU helps provide accurate, timely answers to health concerns. Combining more than 30 years of experience in occupational exposure research and established partnerships with leading universities and medical centers, we conduct health studies with the highest levels of quality and integrity.



Worker and Public Health Screenings

Whether you need a rapid health screening or an in-depth epidemiologic study, ORAU works with you to customize a solution to meet your needs and budget. Through our comprehensive approach, we provide support to collect, manage, interpret, analyze and publish public exposure and worker health data. Our team of experts includes:

- Epidemiologists
- Statisticians
- Technical writers
- Information and database managers
- Health communication specialists
- Public health professionals
- Health physicists

Occupational Illness and Injury Surveillance

Identifying groups of workers that may be at increased risk for occupational-related injury or illness facilitates rapid response to worker health concerns. ORAU can assess the overall health of your workforce, regardless of the number of sites and facilities. If the study indicates excessive risk, we work with you to decide if additional investigations are needed.

Beryllium Exposure Studies and Testing

ORAU operates one of only four laboratories in the United States certified to perform the beryllium lymphocyte proliferation test, which determines if a person has developed a sensitization to beryllium. Our lab consistently achieves a near-zero-percent error rate in tests performed and is accredited by the College of American Pathologists. ORAU maintains a registry of beryllium test data for more than 28,000 current and former employees from 21 U.S. Department of Energy sites.

Research and Medical Database Management

ORAU combines medical study expertise with database design and epidemiologic information systems experience to help our customers conduct reliable studies, track results and analyze population trends. ORAU manages DOE's worker health data center, which aggregates data from five illness and injury databases and the Nuclear Regulatory Commission Radiation Exposure Information Reporting System. Together these systems contain millions of worker health records that are being used by medical professionals worldwide to ensure the continued health of workers in the nuclear, aerospace and defense fields.

Radiation Dose Reconstruction

ORAU's team of health physicists and radiation records specialists excels in analyzing worker and facility data to support dose reconstruction. When data isn't available for an unmonitored worker, we have developed statistical methods to analyze co-worker data to estimate doses to their unmonitored colleagues.



Customer Highlight: Toxic Exposure Hits Home

After the 2008 coal fly ash spill at its Kingston Fossil Plant, the Tennessee Valley Authority sought ORAU's expertise to manage public health concerns. We partnered with Vanderbilt Medical Center to conduct an independent medical screening program at no cost to the 214 area residents who chose to participate. An extensive outreach effort helped answer questions and calm fears, and the study found no immediate adverse health effects caused by the spill.

Working with ORAU

We have a variety of contract vehicles in place to make it easy to work with us, including GSA MOBIS and the DOE ORISE Work for Others program. Visit www.orau.org/contracts for details.

Key Customers

- Defense Threat Reduction Agency
- National Institute for Occupational Safety and Health
- U.S. Department of Energy
- U.S. Nuclear Regulatory Commission



For more information:

865-576-3115

occ.health@orau.org

www.orau.org/occupational-exposure-worker-health-studies



For program information:

DOE National Supplemental
Screening Program
866-812-6703

DOE Beryllium Vendors Medical
Screening Program
866-219-3442

NIOSH Dose Reconstruction Project
800-322-0111

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OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

Managed by ORAU for the U.S. Department of Energy

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ENGINEERS ● SCIENTISTS ● SURVEYORS ● PLANNERS



9560 Kings Charter Drive
Ashland, VA 23005
(804) 550-9200 * FAX (804) 550-9259

www.resourceintl.com



MISSION STATEMENT

**“We challenge ourselves to rethink the traditional,
To apply innovative and sustainable technology,
And to identify creative engineering and
environmental solutions,
In order to earn our clients for life.”**

Our Corporate Challenge

“Be the Best, Make it Personal, NOW.”

READY TO SERVE YOU:

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GENERAL OVERVIEW

Resource International, LTD., a SWaM certified Small Business (License#684640), provides engineering & consulting services to small businesses, large commercial & industrial corporations, & all levels of government. Started in 1979, the company is headquartered in Ashland, Virginia.

Resource's experienced team of engineering and scientific professionals provides complete planning to assist the economic development needs of our clients. Our commitment to quality service is exemplified through the following blend of assets:

- Experienced urban & suburban planners.
- Innovative water & wastewater system designers.
- 30 years of commercial & industrial design.
- Environmental planners & designers protecting water & wetland resources.
- Professionals using technology to achieve sustainable development.
- Engineers experienced solid waste management field.



We employ a broad, experienced team of professionals including:

- Civil Engineers
- Land Surveyors
- Municipal Engineers
- Wetland Scientists
- Environmental Engineers
- Solid Waste Engineers
- Groundwater Specialists
- Municipal Planners
- Land Planners
- Landscape Architects
- Transportation Engineers
- Geologists
- Hydrologists
- Computer Modelers
- Graphic Designers

These professionals provide services to industrial, commercial, and government clients in the areas of:

- Land Development Planning & Engineering
- Municipal Planning & Ordinances
- Economic Development
- Water Supply & Wastewater Treatment
- Solid Waste - Planning, Permitting, Design, & Closure
- Wetlands Delineation & Permitting
- Environmental Assessments & Impact Analysis
- Financial Feasibility Studies
- Industrial Permitting
- Industrial Site Development

READY TO SERVE YOU:

9560 Kings Charter Drive
P.O. Box 6160
Ashland, VA 23005-6160
(804) 550-9200

www.resourceintl.com



LAND PLANNING SERVICES

Resource International, LTD. offers comprehensive land planning, landscape, and design services through our in-house certified planners and technical staff in a variety of commercial, industrial, governmental, residential, and recreational developments.

Planning gives the direction for growth to the community while landscape services improves the quality of life within it. Our team provides comprehensive land planning, design, land use, and zoning services for private and public clients within the state of Virginia, North Carolina, and West Virginia. We believe very strongly in working together as a team. Collaboration enables us to provide a complete service by assisting clients from the design concept to final construction of their project.

Land Planning Services:

- Site Planning
- Conceptual Design
- Landscape Services
- Rezoning Applications
- Public Presentation
- Permitting Assistance
- Fatal Flaw Analysis & Due Diligence Studies
- Environmental Overview
- Site Research and Feasibility
- Site/Facility Expansion Plan
- Renderings



READY TO SERVE YOU:

9560 Kings Charter Drive
P.O. Box 6160
Ashland, VA 23005-6160
(804) 550-9200

www.resourceintl.com

LAND DEVELOPMENT SERVICES

Resource International, LTD. offers a full range of engineering and technical services to support commercial, residential, and industrial property developers. These services include site plan preparation, public hearings and presentations, development layout and feasibility studies, site and project engineering, commercial building design, recreational facility planning, on-site and off-site utilities, parking lot design, and project management.



Farms of New Kent
New Kent County, VA



JDA Building
Isle of Wight, VA



Soccer Field



King Charter
Hanover County, VA

SUBDIVISIONS & PLANNED COMMUNITIES

Types of Projects

- Age Restricted Development
- Golf Course Communities
- Mixed-Use Development
- Multifamily Complexes
- Neo-Traditional Communities
- Planned Unit Development
- Traditional Subdivisions

COMMERCIAL DEVELOPMENT

Types of Projects

- Banks
- Convenience Centers
- Day Care Centers
- Flex Space
- Gas Stations
- Mini-Storages
- Office Buildings
- Office Parks
- Quick Serve Restaurants
- Service Centers
- Shopping Centers



Atlee Station
Hanover County, VA

INDUSTRIAL DEVELOPMENT

Types of Projects

- Brick/Paver Plants
- Distribution Centers
- Economic Development

- Manufacturing Facilities
- Import Centers
- Industrial Parks
- Warehouses

OTHER DEVELOPMENT

Types of Projects

- Dam Rehabilitation
- Fairgrounds
- Parks
- Trails
- Utilities



The Bluffs at Bell Creek,
Hanover County, VA

SERVICES OFFERED

- Feasibility Studies
- Concept Plans
- Opinions of Probable Costs
- Early Land Disturbance Plans
- Erosion Control Plans
- Geotechnical Investigation Coordination
- Lot Grading Plans
- Master Plans
- Plans of Development
- Rezoning, CUP, & Special Exceptions
- Storm Water Management Basin Design
- Site Observations
- Traffic Impact Studies
- As Reported Drawings

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COMMERCIAL SERVICES

Resource International, LTD. offers a full range of engineering and technical services to support commercial and industrial property developers. These services include development layout and feasibility studies, site and project engineering, commercial building design, on-site and off-site utilities, parking lot design, project management, site plan preparation, and public hearings and presentations.

Development Services

- Site Planning and Development
- Site Investigation Report
- Conceptual Plan
- Subdivisions
- Master Plans
- Industrial Parks
- Site Feasibility Studies
- Rezoning - Local Permitting
- Public Hearing
- Earthwork Computations
- Environmental Site Assessments
- Wetland Permitting
- Boundary Survey
- Construction Phase Services
- Up-to-Date Computer Software for Storm Water Analysis and Design
- Budget Cost Estimates



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ENVIRONMENTAL SERVICES

Resource International, LTD. has a staff of natural resource professionals which includes biologists, ecologists, geologists, hydrologists, hydrogeologists, and engineers who are fully knowledgeable of all phases of environmental science.



**Small Whorled Pogonia
(Endangered Species)**



Wetland Delineation



Dock Permitting (RP19)

Environmental

- ESA's Phase I and II
- Environmental Impact Assessments
- Threatened and Endangered Species Studies

Permitting

- NPDES
- VPA
- Waters of the U.S./Wetland
- Solid Waste
- Storm Water
- Air Pollution

Wetlands and Streams

- Wetland Determinations & Delineations
- Stream & Perenity Assessments
- Wetland Functional Value Assessments
- RPA Determinations
- Permitting
- Wetland Creation/Restoration Siting & Design
- Stream Restoration & Design

Groundwater

- Groundwater Studies
- Groundwater Withdrawal Permits
- Groundwater Contamination Assessment
- Groundwater Monitoring & Modeling
- Risk Assessment
- Corrective Action Plans

Facility

- UST Removal, Reimbursement
- Above Ground Storage Tanks
- Spill Prevention Plans
- Waste Minimizations
- ISO - 14000 consultation
- Landfill Gas Monitoring



Waters of the US Delineation

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SURVEYING SERVICES

Resource International, LTD. surveying department is managed by a licensed surveyor and includes field crews and associated office support personnel who are responsible for obtaining field data and converting it to plat, design and/or construction information for projects. Over the past five years, Resource staff has completed over 350 surveying projects. Resource uses both conventional surveying practices and technically advanced methods involving the use of satellite-based GPS (Global Positioning System). The horizontal and vertical control from these surveys are the very data bases from which GIS (Geographic Information Systems) evolve. Resource routinely provides surveys conforming to ALTA/ACSM standards. Strip surveys for utility designs, topographic surveys for site plans and wetland boundary surveys have been performed for engineering, environmental, electrical, mechanical, structural, geotechnical, and architectural design projects. We offer the following surveying services:

- Ground Control
- ALTA/ACSM
- Boundary Surveys
- Utility Design Survey
- Topographic Survey
- Record Drawing Surveys
- Easement Plats
- Wetland Surveys
- Environmental Surveys
- Construction Verification Surveys



READY TO SERVE YOU:

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Ashland, VA 23005-6160
(804) 550-9200

www.resourceintl.com



WATER/WASTEWATER SERVICES

Resource International, LTD. has provided a full range of engineering services for governmental and industrial clients which have included problem definition, engineering feasibility, design, construction surveillance, and operations consultation.

WATER

Resource has been providing quality engineering and scientific services to ensure safe, dependable sources of drinking water. Water engineering encompasses the full range of treatment, pumping, storage, collection, and distribution facilities.

Resource has planned and designed water supply systems ranging from small developments to major county facilities as well as designed water transmission lines, pumping stations, and storage systems to meet operating, emergency, and fire protection requirements. Resource uses innovative and cost-effective methods to develop efficient and reliable solutions. For example, computer modeling of system networks allows us to test various development alternatives within a water system. Resource uses network modeling to size pipes, locate storage tanks, optimize system operations and develop water supply plans.

Resource's construction management team has assisted clients in bidding projects, awarding contracts and administering the contract during construction. In addition, Resource provides representatives to observe construction for conformance with the contract documents.

WASTEWATER

Resource has been providing quality engineering and scientific services to ensure effective and dependable infrastructure for wastewater collection, transport, treatment, and disposal. Resource's innovation has produced more cost-effective wastewater facility alternatives than normally available through conventional methods. Resource has planned and designed wastewater systems ranging from small developments to major county facilities. Resource has designed collection systems, pumping stations, and treatment plants. Computer modeling of system networks allows us to test various development alternatives within a community's wastewater system. Resource has provided timely and quality engineering services to ensure effective

and dependable wastewater collection, pumping and treatment.

- Collection Systems
- Pumping Systems
- Feasibility Studies
- Process Design
- Process Evaluation
- Treatment Plant Designs
- Treatability Studies
- Construction Management
- Start-up Services
- Force Main Design
- Discharge Permitting
- Funding Applications
- Master Plans
- Pre-treatment Facility
- Bidding Assistance
- I & I Studies
- Construction Surveillance

INDUSTRIAL

- Facility Site and Building Design
- Process System Design
- Equipment Layout Design
- Dam and Reservoir Design
- Permitting (Air, water, etc.)
- Endangered Species Determinations
- Wetlands Delineation
- Geological Studies
- Water Supply Design
- Hazardous Waste Surveys
- Wastewater Treatment Plant Design
- Oil Spill Plans
- Stormwater Plans
- Waste Minimization Studies
- Pollution Prevention Plans
- Odor Control Plans
- Air Emission Testing

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SOLID WASTE SERVICES

Resource International, LTD. has over 30 years of solid waste experience and a team on professional engineers, scientists, and technical professionals to meet your needs.



**Lining Subgrade
King & Queen Landfill**



**Liner Installation
Ashcake Road Landfill**



**Landfill Gas to Energy
Stafford County, VA**



**Active Gas Extraction System
Fredericksburg, VA**

LANDFILL FACILITIES

- Part A & Part B Permitting & Design
- Cost Opinions for Financial Assurance
- Landfill Gas Control & Management
- Air Permitting
- Environmental Monitoring & Modeling
- Storm Water Pollution Prevention Plans
- VPDES Permits & Outfall Monitoring
- Operations Review & Evaluations
- Construction Phase Services
- QA/QC & CQA Documentation
- Surveying

WASTE TRANSFER

- Permit-by-Rule Submittals
- Transfer Stations
- Material Recovery Facilities
- Drop-off Centers / Public Use Areas
- Spill Prevention, Control, & Countermeasures Plans
- Construction Phase Services

PLANS & STUDIES

- Site Selection Evaluations & Studies
- Site Plans & Local Zoning & Approvals
- Solid Waste Management Plans
- Waste Characterization Studies
- Financial Analyses
- Site Life Evaluations
- Rate (Tipping Fee) Studies
- Privatization Studies (Public vs. Private Operations)
- Transportation Studies



**Membrane Liner Installation
King William County, VA**



**Landfill Closure
Prince Edward County, VA**



**Leachate Pond
Prince Edward County, VA**



**Convenience Center
New Kent County, VA**

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TRANSPORTATION SERVICES

Resource International, LTD. incorporates transportation studies and design services in many of our projects. The transportation staff interacts with all Resource departments frequently to assist with questions of access, geometric standards, entrance permits, traffic operations, traffic generation, street design, and pavement design.



Route 106 - Roundabout



Traffic Signal



Road Design

Land Development

- Traffic Impact Studies
- Entrance Design
- Traffic Circulation
- Roundabouts
- Pavement Design
- Utility Coordination
- Pedestrian and Bicycle Facilities

Road Design

- Preliminary Plans
- Coordination with Controlling Agencies
- Construction Plans
- Maintenance of Traffic Plans
- Public Hearings
- Construction Administration



Interchange Modification

Traffic Operations

- Traffic Signal Design
- Capacity Studies
- Accident Analyses
- Intersection Analyses
- Traffic Volume Counts
- Sign Layout
- Traffic Calming



Road Layout Plan

READY TO SERVE YOU:

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INDUSTRIAL SERVICES

Resource International, LTD. has over 30 years of experience in assisting with permitting industrial projects. Project services include permits and compliance applications for:



Regional Jail Facility

- Air Pollution Permits
- Wastewater Discharge Permits
- Solid Waste Facility Permits
- Site Plan Design & Permitting
- Environmental Permitting & Compliance



Landfill Gas to Energy



Distribution Center

Selected industries that Resource has provided site and environmental permitting services for include:

- Electrical Utilities
- Chemical
- Paper
- Fertilizer
- Aggregate
- Food
- Apparel
- Waste Management



Agronomics Facility



Paper Company

Services provided to our industrial clients include:

- Feasibility Studies
- Compliance Oversight & Review
- Environmental Permitting
- Engineering Design & Construction Plans
- Regulatory Permitting & Negotiations
- Construction Administration



Power Station



Landfill Gas to Energy



Co-Generation Plant

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GRANTS/FUNDING

Resource International, LTD. (Resource) understands the problems related to funding, finding the best alternatives available and evaluating options for defining a cost effective and viable project. Resource has helped local communities obtain over **\$133, 936,733** million dollars in grant and loan funding. Resource has assisted communities with various aspects of projects that include the following:

- Defining projects and opinions of costs through a Preliminary Engineering Report (PER).
- Prepare financial analysis of project including rates.
- Prepare Rural Utilities Services (RUS) funding application and assist in other funding source applications.
- Prepare the Environmental Assessment required by most funding sources.
- Prepare Plans and Specifications in accordance with funding agency requirements.
- Prepare Contract Documents in accordance with funding agency requirements.
- Assist in bidding and prepare documents of the bid results for the funding agencies.
- Administer the project during construction and provide documentation to funding agencies for close-out.

The following clients and projects are examples of Resource's experience with funding sources for projects such as low interest loans and grants.

- Westmoreland County
 - o Route 3 Industrial Park
EDA Grant \$ 521,160
 - o Route 3 Wastewater System
RUS Loan \$ 308,200
RUS Grant \$ 350,000
 - o Coles Point Phase 1
RUS Loan \$1,814,923
RUS Grant \$3,750,194
 - o Coles Point Phase 2
RUS Loan \$ 670,756
RUS Grant \$ 638,650
 - o Washington District Phase 1
RUS Loan \$2,461,210
RUS Grant \$4,251,500
CDBG \$ 280,000
 - o Washington District Phase 2
RUS Loan \$4,500,000
RUS Grant \$2,513,800
- Richmond County/Town of Warsaw
 - o Water and Wastewater
EDA Grant \$1,000,000
CDBG Grant \$ 700,000
- Northumberland County
 - o Fleeton/Chesapeake System
RUS Loan \$1,241,580
RUS Grant \$2,338,590
 - o Callao System
RUS Loan \$ 935,770
RUS Grant \$1,445,000
- King William County
 - o Mount Olive Community and Utility Systems
CDBG Grant \$1,400,000
RUS Grant \$ 94,400
- Bell Creek Community Development Authority, Hanover County, VA
 - o Special Assessment Bonds \$15, 980,000
- The Farms of New Kent Community Development Authority, New Kent County, VA
 - o Special Assessment Bonds \$85, 666,000
- Town of Orange
 - o Raw Water Storage Basin
EPA Grant \$ 315,000
RUS Grant \$ 500,000
State Grant \$ 260,000

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LOCAL GOVERNMENT SUPPLEMENTAL STAFF SUPPORT

Resource International, LTD. (Resource), a multi-disciplinary engineering and environmental consulting firm, assists Virginia's Cities, Towns, and Counties with engineers, scientists, and planners to supplement their short term or long term staff needs. Resource understands the problems related to staff turnover or having the budget to fund full time positions and can provide you with experts for the following positions:

- Director of Community Development
- Traffic Engineer
- Public Works Engineer
- Certified Erosion and Sediment Control Inspectors
- Director of Economic Development
- County Utilities Engineer
- Certified Site Plan Reviewer
- Certified Erosion and Sediment Control Plan Reviewer
- Certified Utility Plan Reviewer

Below are examples of the type of technical services Resource has provided local governments to supplement their staffing needs:

- **Westmoreland County** – Supplemental staffing for utility plan review, site plan review and civil engineering (Public Works). Support services for master sewer planning, utility design, assistance in loan and grant applications, and environmental services.
- **King William County** – Supplemental staffing for site plan review, erosion and sediment control plan review, utility rate evaluation, utility standards, assistance in grant applications, utility plan review of developer's projects and utility master plans. Support services for park facilities master plan, utility design, assistance in loan and grant applications, and environmental services.
- **Town of Orange** – Supplemental staffing for site plan review and erosion and sediment control plan review. Support services for Utility design, roads design, public works facility design, grant applications and environmental services
- **Town of Dumfries** - Supplemental staffing for Interim Director of Community Development; also Traffic Engineer to review special traffic studies
- **Northumberland County** – Support services for review of utility plans of developer's projects and support services for design of wastewater projects.
- **Lancaster County** – Supplemental staffing for Comprehensive Plan update and support services for industrial parks and zoning assistance.
- **New Kent County** – Support services for water and wastewater projects, small area plan and solid waste transfer station.
- **Hanover County** – Support services consisting of design services for Utilities Department, Public Works Department and the Parks and Recreation Department
- **Essex County** - Support services for site plan review, erosion and sediment control plan review, and erosion and sediment control site inspections.

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ENGINEERS ● SCIENTISTS ● SURVEYORS ● PLANNERS



9560 Kings Charter Drive
Ashland, VA 23005
(804) 550-9200 * FAX (804) 550-9259

www.resourceintl.com

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Trinitek Services, Inc.

Nuclear and Environmental Safety Consultants

<http://www.3tks.com/>

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Sandia Park, NM 87047
(505) 286-4387
(505) 242-8201 FAX
(866)286-4387 Toll Free
gec@3tks.com

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April 3, 2012

Daniel Wilborn, Contract Officer
Commonwealth of Virginia
Department of Health
109 Governor Street, VA 23219
Richmond, VA

Response to: Request for Proposals, RFP #1200001-999, Uranium Study
Issue Date: March 5, 2012, Commodity Code: 91843

Dear Mr. Wilborn,

Trinitek Services, Inc. (Trinitek) is pleased to respond to the Commonwealth of Virginia's Request for Proposal referenced above. Attached is our response including price proposal, with assumptions. One (1) original; six (6) hard copies; and one (1) complete electronic copy will be mailed as requested. We have no redacted copies since the Virginia Vendor Guide does not allow for redaction of pricing. The electronic copies are in Microsoft Word or Excel or comparable format. Feel free to contact me if you have any questions. As required in the RFP, the Trinitek Services, Inc. staff and Uranium Study Project Manager (Stanley A. Fitch) participated in the mandatory preproposal conference on March 16, 2012 hosted by the Commonwealth's Department of Health for interested vendors. The Trinitek response to RFP includes the following as required in RFP Section IV:

Contacts

Introduction

Section I. Specific Plans for Providing Services

Overview and General Approach

Management Plan

Section II. Written Narrative Statement

Experience in Providing Services

Names, Qualifications of Personnel

Resumes of staff

Section III. Proposed Price

Pricing Schedule, Section XI of RFP

Travel

Labor

Section IV. Appendices

A. Offerer Data Sheet, RFP Attachment A

B. Small Business Contracting Plan, RFP Attachment B

C. State Corporation Commission, RFP Attachment C

D. RFP Task Matrix

E. Resumes

F. Statements of Qualifications for Trinitek Services and subcontractor companies

The Response details are attached as summarized above. Thank you for the opportunity to respond.

Sincerely,

Gloria E. Chavez, Ph.D.
Attachments (as listed above)



Trinitek Services, Inc.

Nuclear and Environmental Safety Consultants

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RESPONSE TO: Request for Proposals, RFP #120001-999, Uranium Study

Issue Date: March 5, 2012, Commodity Code: 91843

Proposal Scope of Work: Perform, as an Independent Contractor, services summarized in RFP#1200001-999, Uranium Study:

- Provide contractor services to conduct a study or uranium mining and milling issues in Virginia relevant to the statutory jurisdiction Virginia Department of Health
- Furnish labor and resources necessary to accomplish the work tasks stipulated in RFP Section III

Period of Performance: to November 2012, or as stipulated by contract.

Trinitek Contacts, including Project Manager (RFP Section IX, I) relating to this project are:

Project Manager

Stanley A. Fitch, CHP, MSE
Vice-President
505-249-3995 (c)
505-242-8200 (w)
saf@3tks.com

Alternate Project Manager

Gloria E. Chavez, Ph.D.
President
505-220-5552 (c)
505-242-8200 (w)
gec@3tks.com

Business Mailing Address & General Contact Information

Trinitek Services, Inc.
PO BOX 1608
Sandia Park, NM 87047

Phone: 505-286-4387 (Sandia Park Office) 505-242-8200 (Albuquerque office)
FAX: 505-242-8201 Email: 3tks.3tks.com

Introduction**About Trinitek**

Trinitek Services, Inc. ("Trinitek") is a small, minority-owned, disadvantaged woman-owned business (WOSB, WOSDB) registered with the SBA and in CCR as an S-corporation (DUNS: 80-452-5058). We have provided technical consulting services in environmental and nuclear safety areas since 2006. Our principals (Gloria E. Chavez, Stanley A. Fitch) have over 60-years combined experience working in a wide range of projects relevant to the Virginia Uranium Study including environmental monitoring, radiation safety, international programs, uranium mining, milling and remediation, regulations development, Nuclear Regulatory Commission (NRC) and Agreement State oversight and inspections, development of national regulations on nuclear material security with the NRC, NORM regulations development, training, NRC and Department of Energy UMTRA (Uranium Mill Tailings Remediation Action) projects, radioactive waste operations, transportation, nuclear quality assurance, medical radiation regulations development, emergency response to radiation events. We have both operations experience, programmatic and management experience and technical credentials directly supporting the Virginia Department of Health (VDH) RFP. We are registered experts with the IAEA (International Atomic Energy Agency). We are listed vendors with the Virginia eVA and ARiba (Commodity Code 91843), and are in the process of applying as an MBE business in Virginia.

Our experience and expertise is in:

- Nuclear safety and safeguards. Many of our staff our former regulators and program directors from NRC, Agreement States, and Department of Energy with vast experience in the Atomic Energy Act (AEA) and the National Environmental Policy Act (NEPA).
- Uranium mining and milling, with persons directly involved in operations and who were responsible for implementing programs to comply with the AEA and NEPA and the associated regulations.
- Nuclear and radiation engineering, with designing, constructing, and implementing containments and other systems to control radioactivity and chemicals for the protection of the public and environment.
- Radiation chemistry, with operational experience, in-depth understanding , and peer-reviewed publications in radiation detection.
- Radiation risk assessment with strong focus of radioactive waste management and radioactive waste repository design.
- Transport of uranium and uranium progeny and associated reagent chemicals in the environment, with calculation of epidemiological risk using national and internationally-approved software.

We partner with qualified expert companies and individuals with substantiated and recognized credentials and expertise to provide our clients cost effective, credible and exceptional technical support. We have a Virginia small business partner (Resource International) and others recognized for their expertise in uranium regulatory and operational issues for this RFP. We are registered as vendors with the Virginia eVA and ARiba, and are in the process of applying as an MBE business in Virginia. We have the RFP Commodity Code of 91843.

About Our Team for This Proposal

Trinitek partners with qualified expert companies and individuals with substantiated credentials and expertise to provide our clients cost effective, credible and exceptional technical support. Trinitek will be subcontracting to *Oakridge Associated Universities (ORAU)* and *Resource International, Ltd.* for this proposal:

Oak Ridge Associated Universities (ORAU)

ORAU provides extensive and internationally recognized epidemiological and toxicological expertise and health monitoring experience. They are recognized as the world's preeminent expert in the field of analyzing and responding to uranium fuel cycle exposures to radioactive and chemical constituents.

Resource International, Ltd.

Resource International (Resource) is an engineering firm (SWaM business) located in Ashland, Virginia with hydrogeological experience and talents in non-uranium mining. They have over 33 years experience in Virginia in engineering designs, community planning and environmental assessments. Because of their hydrogeological credentials, their long history of service to the people of Virginia, and their intimate knowledge of the concerns over uranium mining and milling in the Commonwealth, they are uniquely qualified to consult VDH on this project.

The following is a partial list of the disciplines possessed by the team members on this project. A more complete explanation is provided in Section II of this response.

LIST OF TEAM DISCIPLINES AND CREDENTIALS

Trinitek http://www.3tks.com/	ORAU Center for Epidemiological Research http://www.orau.org/	Resource International http://www.resourceintl.com/
▪ Nuclear and environmental project management ▪ Facilitation of public meetings dealing with environmental and public health ▪ Worker and public safety and health related to uranium fuel cycle facilities ▪ Animal health evaluations related to radioactive and chemical constituents ▪ Bioaccumulation and corresponding effects of radioactive and chemical constituents in aquatic, estuarine, and marine environments ▪ Human health effects from consuming radioactively contaminated fish ▪ Atomic Energy Act (AEA) experts who are former NRC and Agreement State regulators, who have highly extensive experience in developing statutes and regulations under the AEA ▪ National Environmental Policy Act (NEPA) experts, NPDES and RCRA permitting ▪ Radiation chemistry ▪ Hydrogeology and radionuclide transport modeling ▪ Environmental impact analysis (EIA)	▪ Human epidemiology ▪ Human toxicology ▪ Very extensive research in the causation of human diseases related to exposures to radioactive and chemical constituents related to the nuclear industries ▪ Health physics ▪ Maintenance of national disease registries related to radioactive and chemical exposures ▪ Radiation and chemical dose estimates and health effects evaluations ▪ Health consequences to workers and the public from exposure to radon ▪ Health standards promulgation	▪ Hydrology and geology ▪ Wetlands science and protection ▪ Environmental engineering ▪ Surface water safety and assessments ▪ Groundwater safety and assessments ▪ Hydrogeologic sciences ▪ Waterborne and airborne and transport modeling ▪ Air quality ▪ Graphic design ▪ Solid waste engineering ▪ Civil engineering ▪ Municipal engineering ▪ Solid Waste Act and Resource Conservation Recovery Act (RCRA) permits ▪ Virginia Pollutant Discharge Elimination System permits ▪ Threatened and Endangered Species Studies (ESA) ▪ Environmental impact analysis (EIA) ▪ Wetland Creation/Restoration ▪ Wetland Siting and Design ▪ Stream Restoration and Design

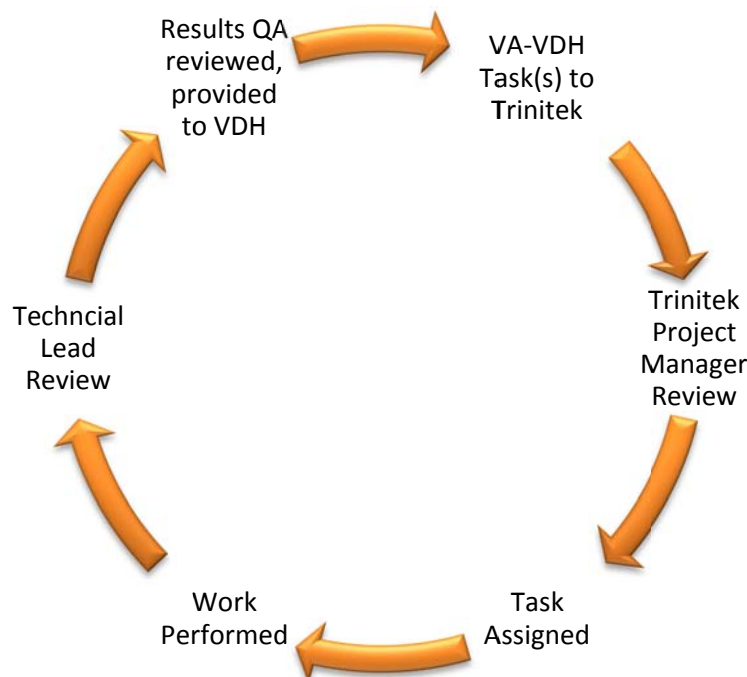
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Section I. Specific Plans for Providing Services**Overview and General Approach:**

Trinitek has reviewed the Uranium Study RFP, along with our subcontractors. The Uranium Study has the potential for intense public scrutiny, and is already a matter of concern for the citizens of the Commonwealth of Virginia and it must therefore be defensible. We are proposing individuals (and companies) who are acknowledged experts with impeccable credentials in their respective areas to provide a quality technical product for the Commonwealth. Potential Health Impacts associated with uranium mining and milling are of particular sensitivity to members of the public.

In addition to technical credentials and expertise, our staffs have extensive experience in communicating risk to the public, understanding public health concerns and issues, and have experience as facilitators and communicators at public meetings and in a public forum. We have experience in high visibility projects such as WIPP and Yucca Mountain as well as in the uranium fuel cycle industries. We have experienced regulators working at senior levels in Agreement states, NRC as well as DOE and private industry.

We have made a best assessment of qualifications and labor hours needed to support the Commonwealth of Virginia in this study. The RFP Scope is broad and level of effort not defined, so our proposal will provide a total number of labor hours, with rates detailed per category, based on estimated labor hours per topic specified in the RFP. The individuals and companies we are proposing all have excellent credentials in their subject areas, as documented in the Section B Capabilities statement. We have also prepared a table identifying individuals proposed to address each item listed in the RFP. As specific tasks are provided by the Commonwealth VDH, the Project Manager will determine the best technical resources to address the task. The following schematic illustrates our technical approach to the Uranium Study:



Management Plan

We have selected a Technical Project Manager (PM), Stanley A. Fitch, who has extensive experience in uranium mining/milling operations and environmental and health effects. He is a certified health physicist (CHP) and nuclear engineer with over 25 years experience in this area. He has managed a wide range of projects in areas named in the Uranium Study RFP.

Trinitek will also have an alternate PM, Gloria E Chavez, Ph.D. Dr. Chavez has over 35 years experience in managing multidisciplinary, international engineering and scientific projects. She will provide management and technical support, as needed.

Mr. Fitch and Dr. Chavez have over 70 years of combined experience in radiation protection programs, NRC and Agreement States issues, and uranium mining/milling as well as environmental impacts in a national and international setting.

Mr. Fitch will be assisted by the following Technical Leads who will assist Mr. Fitch in coordinating work in the stated categories:

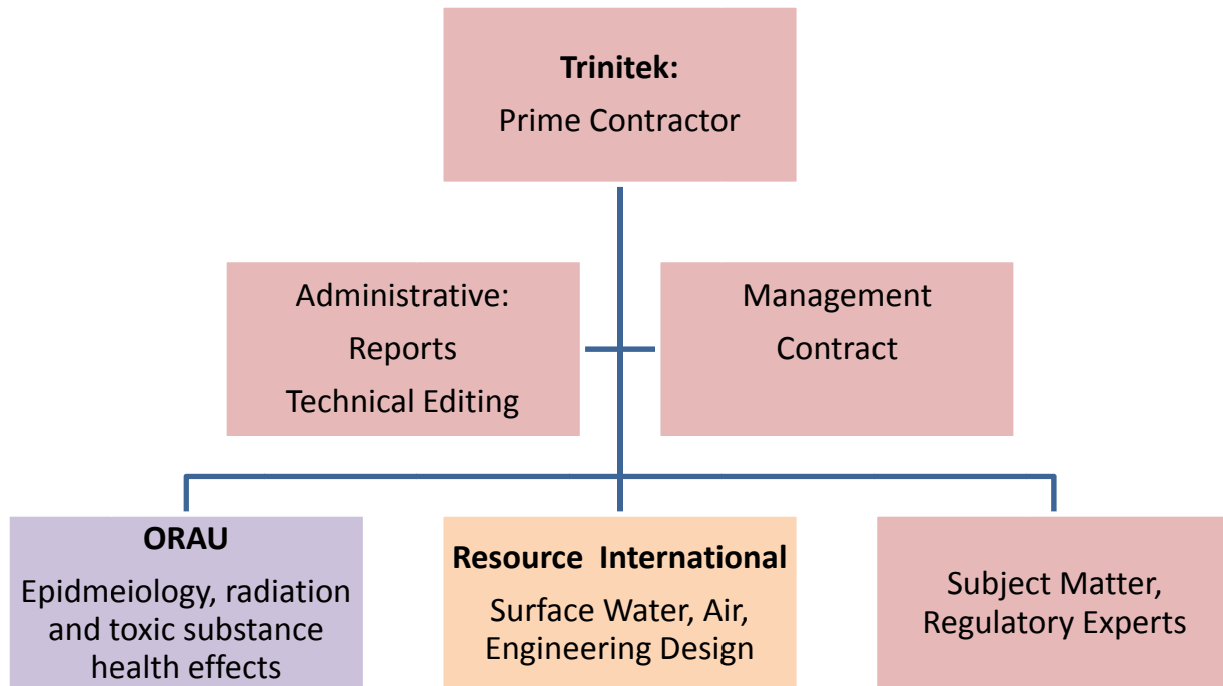
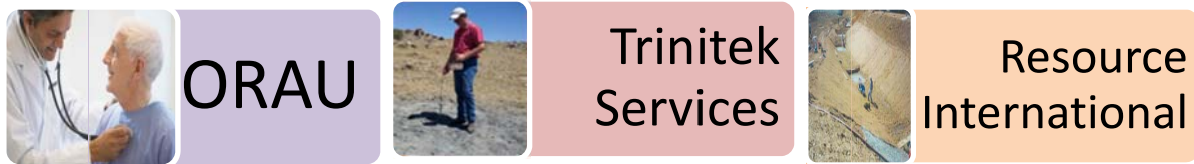
- Gloria Chavez, Ph.D. – ES&H and Quality Assurance Lead
- Francis X. “Chip” Cameron, Esq. – NEPA and Facilitation Lead
- Sheldon Landsberger, Ph.D. – Radiochemistry Lead
- Daniel McCarn, MS, Mining and Hydrogeology Lead

Leo Gomez, Ph.D. will serve as Trinitek’s technical editor. Dr. Gomez has served as editor on national and international science publications.

We will provide Subject Matter Experts (SMEs), in addition to two main subcontracting companies (ORAU, and Resources International) whose credentials are summarized in Section B. They will support the PM as needed, based on technical skills required for a specific task. We have ensured that we have some overlap and redundancy in capabilities.

Our experience is in radiation safety, uranium mining and milling, nuclear engineering, radiation chemistry and radiation risk assessment. ORAU has the world’s leading experts on health effects and epidemiological assessments from exposures to radiation sources including uranium, and radon and its daughters. They serve on NRCP and various international health guidance organizations and have an extensive publication list in this area. They have performed studies for the National Institute for Occupational Safety and Health Dose Reconstruction Project for Claimants under the Energy Employees Occupational Illness Compensation Program Act, and for nationwide Former Beryllium Worker Medical Surveillance Program. Resources International is an engineering firm located in the Ashland, Virginia with hydrogeological experience and talents in non-uranium mining. They have over 33 years experience in Virginia in engineering designs, community planning and environmental assessments.

The schematic on the next page provides a high level summary of relationships and capabilities for subcontractor companies.

SUMMARY OF RELATIONSHIPS AND CAPABILITIES

The following matrix (on pages 8-11) delineates our staffing plan to address specify RFP requirements. Please refer also to the Task Assignments Matrix in Appendix D, which outlines tasks by company.

Staffing Plan for Uranium Study, Page 1

Virginia VDH Uranium Study Requirement		Trinitek	S Fitch	G Chavez	F Cameron	Landsberger	D McCarn	N Fisher	R Haaker	N Savignac	T Cardwell	L Gomez	T Wolff	R Hansen	J Hart	S Djordjevic	A Hasan	N Patel	W Floyd	P O'Kelley	Resource	A Creech	M Willinger	J Brooks	J Rudnick	E Hollos	S Church	T Kraska	C Wilson	C Riedlinger	M Fiore	J Combs	ORAU	B Ellis	Holdsworth	P Wallace	P Whitson
III.A.	Initial Literature Analysis, Recommendations. Conduct Research & write report on:																																				
1.	Virginia and Other Relevant Studies Make summary recommendations		X	X		X	X	X	X	X		X			X	X	X					X		X		X				X							
a)	Review scientific literature on:																																				
1)	Epidemiological studies on long-term exposure to radiological & toxic substances in mining operations		X	X																															X	X	X
2)	limitations of studies		X	X																															X	X	X
b)	Assist VDH w/ development of surveillance & epidemiologic studies to evaluate long/short term health effects associated with mining. Consider baseline sources of concern		X	X																															X	X	X
2.	Existing Reg. Program: compare U mining/milling, NRC, Agreement States		X	X		X	X			X	X	X			X	X		X		X																	
3.	International emerging standards		X	X		X	X					X			X	X	X																				
III.B.	Ongoing Technical Advice & Assistance to Commonwealth of VA staff																																				
1.	Coordinate and Meet With VDH Staff		X	X		X	X																														
a)	Compare Commonwealth's statutes & regulations to recommend in initial rpt.		X	X						X	X	X			X	X		X	X	X		X								X							
b)	Identify areas where VDH's existing regulations need to be modified or expanded to ensure protection of public health & environment.		X	X						X	X	X			X	X		X	X	X		X								X							
c)	Recommend changes (including statutory changes) to meet needs.		X	X						X	X	X			X	X		X	X	X		X								X							
d)	Evaluation to include:																																				
1)	Waterworks Regs,12VAC5-590 seq		X	X					X		X	X			X	X	X	X	X			X		X			X			X							
2)	Disease Reporting & Control Regs (Requirements for reporting by healthcare providers & labs).		X	X								X																							X		
3)	Private Well Regulations (12VAC5-630). Dev. Concept. Framework /initial project costs for impact on quantity & quality of water in private wells & springs & recommend. procedures for replacing - remediating supplies. Framework for characterizing impacted wells, springs, rec. waters, cisterns.		X	X			X		X		X				X	X	X	X	X		X						X		X								

Staffing Plan for Uranium Study, Page 2

Virginia VDH Uranium Study Requirement		Trinitek	S Fitch	G Chavez	F Cameron	Landsberger	D McCarn	N Fisher	R Haaker	N Savignac	T Cardwell	L Gomez	T Wolff	R Hansen	J Hart	S Djordjevic	A Hasan	N Patel	W Floyd	P O'kelley	Resource	A Creech	M Willinger	J Brooks	J Rudnicki	E Hollos	S Church	T Kraska	C Wilson	C Riedlinger	M Fiore	J Combs	ORAU	B Ellis	Holdsworth	P Wallace	P Whitson	
4)	Facilitate the stakeholder process, including any potentially inspected regulated community (at least 5 statewide meetings with separate final report) to gauge concerns and identify possible solutions concerning regulation of public water supplies and private wells as to water quality and quantity.		X	X	X		X																															
5)	Regulations concerning recreational use of waters - campgrounds, summer campgrounds, etc.		X	X			X		X		X	X			X	X	X			X		X						X		X								
e)	Determines and characterizes data (including national and Virginia-specific data) on potential health outcomes related to exposures of concern.		X	X					X	X		X																							X	X		
	Determine if current reporting requirements & laboratory testing cover chemicals to be encountered in mining operations under consideration.		X	X					X			X																										
	Determine if current tobacco use surveillance is adequate for establishing baseline data for rates of lung cancer, silicosis, and radon-associated health problems using standard epidemiological, analytical methods.		X	X																																X	X	
	Determine- whether other available data is sufficient to establish baseline rates for conditions of concern (e.g. current silicosis reporting data) or if retrospective or other studies are indicated to determine baseline rates		X	X																																X	X	
	Evaluate and propose changes to cancer, congenital malformation reporting, if necessary		X	X								X																								X	X	
f)	Develop and test case report investigation worksheets, and other documents for local Health Dept. and Central Office use in necessary investing. for relevant health outcomes.		X	X					X	X																									X		X	
g)	Determine locus of responsibility for the long-term monitoring for adverse health effects ensuring worker health and safety, as well as additional recommended monitoring.		X	X								X																							X			

Staffing Plan for Uranium Study, Page 3

Virginia VDH Uranium Study Requirement		Trinitek	S Fitch	G Chavez	F Cameron	Landsberger	D McCarn	N Fisher	R Haaker	N Savignac	T Cardwell	L Gomez	T Wolff	R Hansen	J Hart	S Djordsevic	A Hasan	N Patel	W Floyd	P O'kelley	Resource	A Creech	M Willinger	J Brooks	J Rudnicki	E Hollos	S Church	T Kraska	C Wilson	C Riedlinger	M Fiore	J Combs	ORAU	B Ellis	Holdsworth	P Wallace	P Whitson
h)	Evaluate, monitor work spaces, monitor. exposures - mine workers, track. worker cum. exp., adequacy exist. MSHA regulations compare international. standards-radon/progeny		X	X					X	X		X						X																			
i)	Recommend framework for environmental, human health & animal health monitoring so data can be maintained in compatible systems-analyzing health effects, include. long term monitoring.		X	X				X	X	X		X												X				X				X			X	X	X
j)	Determines potential impacts - cisterns & onsite sewage systems.		X	X		X	X										X						X						X								
2.	Address VDH-Related Issues necessary & relevant for effective life cycle regulation of uranium mining and milling in Virginia																																				
a)	Water Quality Monitoring Plan for Surface Waters		X	X		X	X		X	X							X							X	X							X					
1)	Human health risks associated with chemical toxicity;		X	X					X	X																											
2)	Human health risks associated with radiological toxicity; and,		X	X					X	X																											
3)	Human health risks associated with the consumption of affected animal, and marine populations		X	X				X				X																									
b)	Water Quality Monitoring Plan for Groundwaters		X	X		X	X		X	X		X					X					X	X						X	X							
1)	Human health risks associated with chemical toxicity;		X	X					X																												
2)	Human health risks associated with radiological toxicity;		X	X						X																											
3)	Human health risks associated with consumption of affected animal and marine populations; and,		X	X				X				X																									
4)	Potential impact on groundwater quality and quantity as these affect public wells, private wells and springs.		X	X			X		X	X												X	X						X	X							
c)	Adequacy of Virginia's Water Quality Standards for Groundwater and Surface Waters, and Virginia's Waterworks Regulations, as they relate to human health outcomes:		X	X		X	X		X	X						X	X	X	X																		
1)	Address water-soluble radionuclides, or absorbed chemicals;		X	X					X	X																											

Staffing Plan for Uranium Study, Page 4

Virginia VDH Uranium Study Requirement		Trinitek	S Fitch	G Chavez	F Cameron	Landsberger	D McCarn	N Fisher	R Haaker	N Savignac	T Cardwell	L Gomez	T Wolff	R Hansen	J Hart	S Djordsevic	A Hasan	N Patel	W Floyd	P O'Kelley	Resource	A Creech	M Willinger	J Brooks	J Rudnick	E Hollos	S Church	T Kraska	C Wilson	C Riedlinger	M Fiore	J Combs	ORAU	B Ellis	G Holdsworth	P Wallace	P Whitson
2)	Address undiluted tailings liquids to exceed Safe Drinking Water Act standards for uranium; and,		X	X						X							X																				
3)	Address rev. Public Drinking Water System monitoring Schedule for rad. contamination & hazardous. substances in impact areas.		X	X																		X	X				X			X							
d)	Evaluate existing standards-safe disposal of mine waste as pertains to human health.		X	X			X		X	X																X			X		X						
e)	Evaluate necessary components of full environmental impact analysis.		X	X	X								X	X	X											X			X		X						
f)	Methods to Incorporating "As Low As Reasonably Achievable" (ALARA) Standards into Commonwealth regs, like those for rad. protection.		X	X					X	X	X									X																	
g)	Recommend. for compl. period financial assurance mechanisms- minimize. long-term impacts to water resources & necessary. remediation		X	X							X									X					X				X		X						
h)	Recommendations: Environmental monitoring, including:		X	X		X	X			X	X	X								X																	
1)	Required components of an environmental monitoring plan;		X	X		X			X	X	X									X		X	X	X			X		X								
2)	Recommended goals to include in environmental monitoring plan;		X	X						X	X									X		X	X	X			X		X								
3)	Recommend. baseline and characterization data needed.		X	X		X	X			X												X	X	X	X		X		X								
i)	Eval. of NRC regs for milling & tailings management in state-specific climate (e.g., rainfall) & hydrologic considerations.		X	X			X			X	X								X	X	X	X	X	X	X	X	X	X	X	X	X	X					
III.C.	Assist VDH Prep. & Presenting Reports		X	X	X	X	X		X	X	X	X						X				X	X	X	X	X	X	X	X	X	X	X			X	X	
III.D.	Assist VDH - Draft Conceptual Regulatory Framework																																				
	Discuss reports, recommendations. w/VDH		X	X		X	X		X	X	X	X							X	X	X														X	X	
	Assist staff- implement findings/ recommend. in draft concept. reg. framework, address VDH-issues for life-cycle compl. period of milling in Virginia, & impact., Virginia regs.		X	X		X	X		X	X	X	X						X	X	X															X	X	

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Section II. Written Narrative Statement**Experience in Providing Services**

Trinitek has had clients in industry and government. Relevant projects have included a uranium decontamination and decommissioning project for the US Navy at the New Mexico Tech Testing Facilities, uranium mining baseline radiation assessments, proposed uranium mining/milling operations planning and monitoring, regulatory compliance assessments for in-situ leaching facilities, environmental permits support for uranium fuel cycle operations, consultant to the Egyptian Atomic Energy Authority (EAEA) on uranium mining/milling issues, Comprehensive training for Egyptian EAEA on radiation emergency response and international radiation safety regulations, including NORM. We have experience in consultation, technical document preparation, regulatory analysis, public meeting participation and facilitation, regulations development at a state and federal level and preparing peer review publications. We also have experience in emergency management, international consultation/research and publications, risk communication to the public, and national policy development in areas relevant to this RFP. We have health physicists, industrial hygienists, former regulators, nuclear engineers, scientists, environmental attorneys and other specialists with international reputations.

A summary of each company's capabilities, contributions, experience and credentials is provided, followed by staffing details and resumes.

Trinitek Services, Inc

Trinitek is the prime contractor for this study. It is a woman-owned small disadvantaged business (WOSB, WOSDB), minority-owned small business, registered in CCR as an S-corporation (DUNS: 80-452-5058; EIN 26-1151720). We have been in business since 2006 performing technical consulting, auditing and training in nuclear and environmental safety areas. A summary SOQ is attached. We have a primary NAICS code of 541620. We can provide additional information, as needed.

Trinitek Experience Summary:**Rio Grande Resources, San Mateo, NM**

Mt Taylor Uranium Mining/Milling Start-up Planning

Trinitek has supported Rio Grande Resources since 2006 in preparations for uranium mine/mill start-up. We have provided: health physics/radiation safety (CHP and Radiation Safety Officer) support; environmental permits for NPDES discharges; radon air monitoring; developing compliance program. A contact is provided in Attachment A (Offeror Data Sheet). The approximate total contract value is \$300,000.

Neutron Energy Incorporated

Cebolleta, NM. Uranium mining planning and radiation baseline surveys.

Trinitek has supported Neutron in planning and performing baseline radiation baseline surveys at a proposed uranium mining operation. We have also provided radiation safety training and radiation health effects consultation to Laguna Pueblo at public meetings in association with this contract. A contact is provided in Attachment A (Offeror Data Sheet). The approximate total contract value is \$65,000, including an upcoming soil sampling and characterization of radionuclides as part of the baseline assessment.

Parametrix, Inc.

US-Army Corp. of Engineers funding: Cochiti Lake, NM Sediment Characterization for Radionuclides.

Trinitek developed the radionuclide portion of a larger scope metals and toxic substances characterization and risk assessment for sediments in Cochiti Lake and adjacent waterways. Over twenty radionuclides were analyzed and over 20,000 data points analyzed. WE performed the QA review and subcontracted to a QA lab to confirm prime lab laboratory analysis at low-levels of concentrations. The radionuclides were man-made and naturally occurring, including uranium isotopes. Confounding factors included the presence of an adjacent, remediated uranium mine (LA Bajada).

The resulting risk assessments was important to the Pueblo due to possible changes in lake management, and very low levels of detection were critical to compare to existing prior data, and to identify potential contaminants from US DOE Laboratory origin (LANL). Mis-reporting of uranium data, and laboratory errors were documented. A contact is provided in Attachment A (Offeror Data Sheet). The approximate total contract value was \$82,000.

Cavin and Ingram, PA.

Lee Ranch-Johnny M uranium mine consultation to legal staff in potential CERCLA (Superfund) action

Trinitek is providing consultation to a law firm and its clients regarding appreciate actions for potential CERCLA Actions. We are providing oversight, validation and review for work performed by other remediation contractors.

New Mexico Tech University

Comprehensive Radiation Safety Training to Egyptian Atomic Energy Authority staff. (US DOE funding)

Trinitek developed an intense six week course to train Egyptian Atomic Authority senior staff to appropriately respond to radiation source incidents, involving loss of control. The EAEA staff had fatalities in 2003 due to exposure of a farmer and his family to a lost medical source. They were not confident they could respond appropriately to other such events. The students were very pleased with their training and have since had chances to use their training effectively. As a result of this successful international training effort, we now have a collaboration with New Mexico Tech University to provide future such training. (<http://nuclear.iera.nmt.edu/>) The total contract value was \$133,000.

Depleted Uranium Navy Project at EMRTC

New Mexico Tech University, Socorro, NM

Trinitek prepared a decommissioning plan for a former US Navy depleted uranium testing range. The plan had to include financial surety and incorporate federal and state requirements. The total value of the project to Trinitek was about \$72,000.

Inhalation Toxicology Laboratory Remediation (DOE Project)

Albuquerque, NM

Trinitek provided radiological and technical support, radiation monitoring, and oversight to a complex remediation project involving biological, medical, radioactive and hazardous waste. The radioactive waste was high activity and included TRU. The waste was packed, shipped and disposed in a DOE facility. The project was completed on schedule. The total value to Trinitek was about \$100,000.

Unitech Corporation Nuclear Laundry

Santa Fe, NM and Boston, MA

Trinitek provided regulatory consulting to a licensed radioactive clothing laundry supporting radio-pharmacies, and DOE Labs. Contract was \$54,000.

Mestefia Uranium

Corpus Cristi, TX. – Audits

Trinitek has provided independent compliance audits for the in-situ uranium recovery facility and made operation improvement recommendations.

UMTRA Titles 1, 2

Department of Energy and Nuclear Regulatory Commission

Trinitek staff worked on Uranium mill tailings remediation projects in Colorado and New Mexico in clean up, monitoring and determining action levels.

Atlantic Richfield Company

Conventional Uranium Mill Operations

Trinitek staff worked in uranium mill operations as mill operators, RSO and radiation chemists. Work included all aspects of mill operations and associated health and safety.

Regulations

Trinitek staff have worked as former Agreement state regulators, performing inspections, developing nuclear materials security regulations, adapting and verifying compliance with NRC and other regulations. They have developed NORM regulations, have extensive experience with public meetings and public concerns and issues related to public safety and radiation risk.

Security and Safety

Trinitek staff have worked on developing nuclear material security regulations at a national level (now federal law), and in operations at USDOE facilities involving maintaining operational security for classified and accountable nuclear materials, including radioactive waste.

ORAU (Oakridge Associated Universities) Staff

One of our subcontractor is ORAU, headquartered in Oakridge, TN provides broad-scope epidemiology and health screenings/surveillance studies to beryllium sensitivity testing and radiation dose reconstruction. Dr. Elizabeth Ellis is Associate Director and Leader, Epidemiology Support Section, Center for Epidemiological Research, at Oak Ridge Associated Universities (ORAU), and Associate Director, Occupational Exposure and Worker Health at ORISE. Dr. E Ellis' relevant publications include: "External radiation exposure and mortality in a cohort of uranium processing workers", American Journal of Epidemiology 152(1):91-95, 2000; "Mortality among radiation workers at Rocketdyne (Atomics International)", 1948-1999, Radiation Research 166(1 Pt 1):98-115; erratum 166(3):566, 2006; "Cancer risk in nuclear workers occupationally exposed to uranium—emphasis on internal exposure", Health Physics 94(1):1-17, 2007; "Assessment and control of lung cancer risk from radon", Annals of the ICRP (accepted for publication), 2010. She works with the DOE the Illness and Injury Surveillance Program (IIISP). Epidemiologic surveillance

assesses the overall health of the current DOE workforce at 14 DOE sites and facilities. The goal is to identify groups of workers that may be at increased risk for occupation-related injury and illness.

ORAU Experience Summary

<http://www.oraui.org/occupational-exposure-worker-health-studies/default.aspx>
<http://www.oraui.org/documents/factsheets/OEWH-fact-sheet.pdf>

DOE Illness and Injury Surveillance Program

DR. Ellis is Program Director for the DOE Illness and Injury Surveillance Program. The program assesses the overall health of contractor workers employed at DOE sites. Epidemiologic surveillance assesses the overall health of the *current* DOE workforce at 14 DOE sites and facilities. The goal is to identify groups of workers that may be at increased risk for occupation-related injury and illness. In response to indications of excess risk, program staff can assess the need for additional investigations. Surveillance is based on continuous collection, analysis, and interpretation of selected morbidity, demographic, and occupational exposure data.

The program is a corporate resource providing our customers with timely health information. We also provide epidemiologic and public health expertise in the evaluation of worker health concerns. Reports summarizing the results of epidemiologic surveillance are published annually and are available below. Implementation of epidemiologic surveillance has advanced the automation of health data management systems at sites such as the INEEL, fostering the development of state-of-the-art medical information management.

International Commission on Radiation Protection (ICRP)

Dr. Ellis is member of International Commission on Radiation Protection (ICRP), Committee 2, Task Group 64 to review knowledge and make recommendations on further study of the health effects of occupational radiation exposure to alpha emitters (such as radon). She is one of two US members of this prestigious international standard setting organization (since 2006).

U.S. EPA Integrated Risk Information System (IRIS)

Dr. Holdsworth provides technical support to the U.S. EPA Integrated Risk Information System (IRIS) program office for • the preparation of toxicological reviews and IRIS summary sheets, • peer review, and • meeting support. IRIS is a human health assessment program that evaluates risk information on effects that may result from exposure to environmental contaminants. Through the IRIS Program, EPA provides the highest quality science-based human health assessments to support the Agency's regulatory activities. The IRIS database is web accessible and contains information for more than 550 chemical substances. Member of the writing team for toxicological reviews of n-hexane and 1,2,3-trichloropropane, among others.

Dr. Holdsworth provided write-ups of experimental studies and overall technical support for the Agency's *Toxicological Review and Risk Characterization of Formaldehyde*, currently in preparation. He prepared monographs on the impact of environmental stressors on human health for the U.S. Centers for Disease Control and Prevention (CDC) and is currently

providing technical support to NIOSH on criteria documents, skin notation profiles, and immediately dangerous to life and health (IDLH values).

U.S. EPA's Superfund Technical Support Center (STSC)

Dr. Holdsworth researched and authored issue papers for the US EPA on potential human health impacts of chemicals of environmental concern, for example, in support of U.S. EPA's Superfund Technical Support Center (STSC). Prepared monographs to assess the human health impacts of drinking water disinfectants and their by-products.

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM)

Dr. Holdsworth , In a multi-year program for the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), developed Toxicity Profiles of environmentally and militarily important chemicals, in support of an inter-Agency initiative to develop Toxicity Reference Values protective of wildlife.

Information Technology for Occupational Exposure and Worker Health (OEWH) program

Mr. Phillip Wallace, serves as Manager of Information Technology for Occupational Exposure and Worker Health (OEWH) program. Responsibilities include ensuring compliance to Federal government cyber security requirements, overseeing activities of software developers, and maintain integrity of data holdings within OEWH.

Systems for Storage and Retrieval of Epidemiological Research Documents

Ms. Whitson has several years experience as an information management coordinator in support of epidemiologic research. Her responsibilities include developing and implementing systems for storage and retrieval of research documents; abstracting and coding of morbidity data for use in epidemiologic research; and providing writing and editorial support for epidemiologic surveillance reporting projects.

Her experiences include project management, developing coding quality standards, developing health data abstraction tools and procedures, and providing medical record and cancer registry technical support. She is a Certified Tumor Registrar from the National Cancer Registrars Association and a Registered Health Information Administrator from the American Health Information Management Association.

RESOURCE INTERNATIONAL, LTD ASHLAND, VIRGINIA

The second subcontracting company is Resource International LTD, a Virginia small business, providing engineering and technical services including natural resource professionals (biologists, ecologists, geologists, hydrologists, hydrogeologists, and engineers) who are fully knowledgeable of all phases of environmental science, surface water quality, air quality, and impoundment designs for non-radioactive mining applications. Resource also provides valuable capability in understanding the Virginia regulatory framework and processes.

Resource offers a wealth of experience in Virginia's Environmental and Mineral Exploration Programs suitable to support the Uranium Study workgroup's efforts. Our experience includes:

Surface and Groundwater Quality

- VPDES Permitting (statewide)
- Groundwater Monitoring
- Water Use Auditing
- Quarries
- Correctional Facilities
- Groundwater/surface water interface
- Stream Relocation
- Groundwater Withdrawal Permitting

Wellhead Protection

Environmental Corrective Actions

Air Quality

- Department of Corrections
- Quarries (Fugitive Dust Monitoring and Control)
- Industrial Permitting Title V

Waste Disposal

(including Mine Waste Disposal)

- Quarries
- Power Stations (Flyash, Bottom Ash, Flowable Fill)
- Landfills

Design and Best Management Practices

- Storm Water
- Waste

Environmental Impact Analysis

- Military Installations
- Correctional Facilities
- Quarries

Catastrophic Risk Evaluation

- 100, 500, 1000 year storms
- Seismic
- Traffic Study
- Oil Storage (OPA '90)

Financial Assurance

- Waste Disposal
- Corrective Action

Mineral Exploration

- Exploratory Permits
- Water Withdrawal Permits

Resource International Experience Summary:

Virginia Uranium, Inc. – Exploratory Drilling Permit

Resource assisted VUI to obtain a Uranium Exploratory Drilling Permit. Our scope of services included literature research, regulatory review and site specific investigation to support our client's efforts.

Woodstream Neighborhood Methane Investigation, Stafford County, Virginia

On February 8, 2011, Stafford County Fire and Rescue (SCFR) responded to a report of a methane release in the Woodstream neighborhood near the intersection of Woodstream and Short Branch Roads. During the previous evening, Columbia Gas of Virginia had responded to a customer call-in reporting an odor. Columbia confirmed that its buried

distribution lines were intact and also conducted on-site testing of soils for gas. Its field testing identified methane in the soil. Even though laboratory analysis confirmed that the methane in the soil was unrelated to the gas utility, Columbia notified SCFR.

Resource and SCFR, in coordination with the Virginia Department of Emergency Services; the Virginia Division of Mines, Minerals, and Energy; the United States EPA; and the Virginia DEQ, designed a field and laboratory investigation that identified the source of the methane to be natural occurrence in the soils. The soils consist of weathered rock of the Quantico Formation, a mix of slate, graphite schist, and phyllite. Where undisturbed, the formation has not been found to release methane. Where the soils have been disturbed – for example, for excavation of a trench then backfill with the cuttings – the disturbed soils released methane in concentrations averaging between 10 and 50 percent. Preliminary investigation suggested that the disturbed soils return to equilibrium (stop releasing methane) over time (months, possibly over a year). This information allowed SCFR to allow occupancy of the evacuated dwellings. Resource followed up with a full report, including recommendations relative to future development in the area.

Anderson Creek Relocation – Goochland County, Virginia

In order to expand its Anderson Creek Quarry to access additional rock reserves, a national mining company hired Resource to relocate approximately 1,700 feet of Anderson Creek. The project required obtaining permits from the U.S. Army Corps of Engineers (Corps) and the Virginia Department of Environmental Quality (DEQ) to relocate the creek 300 feet closer to the property boundary. The project was reviewed and approved with conditions by the Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (FWS), Virginia Department of Conservation and Recreation (DCR), Virginia Department of Game and Inland Fisheries (DGIF) and the Virginia Department of Mining, Minerals, and Energy (DMME).

The project took 24 months to design and permit. It provided the quarry with approximately 20 to 50 more years of life. The environmental team has completed a 5 year environmental monitoring program that has demonstrated the effectiveness of the relocation stability of design, construction methods, and habitat produced. The monitoring was able to document the success of the project. Resource and our Client were awarded accolades by industry organizations and journals.

Environmental Assessment at Fort Pickett Military Reservation – Blackstone, Virginia

Resource conducted an Environmental Assessment under the National Environmental Policy Act (NEPA) for the development, construction, and operation of a Multi-Purpose Range Complex (MPRC) located at Fort Pickett Military Reservation. A MPRC is an advanced tank gunnery range used for training and qualifying individuals, crews, and units in multi-vehicle warfare measures and weapons systems. Two alternative sites were under consideration for the MPRC, which encompasses approximately 12 square miles of the 42,000-acre base. Resource evaluated the physical, natural, cultural, social, and economic resources including wetlands, protected species and natural heritage areas, soils, hydrologic characteristics, and plant communities to determine possible impacts of the MPRC on selected alternatives under consideration. Cumulative impacts were also considered.

Coordination with agencies such as the Virginia Department of Conservation and Recreation, Virginia Department of Environmental Quality, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and Virginia Department of Agriculture and Consumer Services, among others, is a part of the services Resource provided on this project.

Resource also coordinated public meetings to present information on the proposed MPRC and addressed questions from the community.

Names and Qualifications of Personnel

The names and qualifications of our personnel are summarized in a table on the page.

Experience and Credentials Relevant to the Commonwealth of Virginia Uranium Study

Company	Staff Name	Role	Experience Summary	Qualifications Summary
Trinitek Services, Inc.	Environmental, Nuclear, Safety, Security, Consulting	Prime	Uranium mining/milling, permits, audits, surveys, compliance, water rad analysis and assessments, uranium mining, milling, environment, risk	Regulations, Agreement States, NRC, D&D, radiation safety, measurements, ALARA, NORM, epidemiology, engineers, scientists, health and safety professionals, regulators
Albuquerque, and Sandia Park, NM (Staff in Texas, S Carolina) www.3tks.com	Stanley Fitch	Proj. Manager	Regs, uranium, HealthPhys	MSE-Nuclear Engineering, CHP
	Gloria Chavez	Alternate PM	Env, Regs, HealthPhys, QA	Ph.D. Rad. Eco; MS hlth physics
	Chip Cameron	NEPA Lead	NEPA, NRC, Facilitator	JD
	Sheldon Landsberger	Radiochemistry lead	Rad meas, uranium, internat	Ph.D Radiation Chemistry
	Dan McCarn	Mining-hydrogeol Lead	Uranium, internat, hydro	Ph.D (ABD)
	Nicholas Fisher	SME-aquatic animal	Rad –toxic bioaccumulation	PhD Marine Biology
	Rick Haaker	H&S Lead	Health and Safety,	MS Health Physics, CHP, CIH
	Noel Savignac	SME	Uranium, HP, env, 30+yrs	Ph.D Radiation Ecology
	Thomas Cardwell	SME	Regulatory framework	B.S. Env Sciences
	Leo S Gomez	SME	Rad Biologist, tech edit, QA	Ph.D. Radiation Bio Effects
	Ted Wolff	SME	NEPA, Rad Regs, 30+ yrs	Ph. D. Biology
	Roger Hansen	SME	Env-NEPA, WIPP EIS, 30+ yrs	JD, Environmental Law
	John Hart	SME	NEPA, RCRA-Env Regs, QA	M.S. Environmental Science
	Sinisa Djordjevic	SME	Risk Assess, QA, modeling	Ph.D. Studies–Eng., MS Chem. E.
	Ahmed Hasan	SME	Rad chem., modeling	Ph.D. Radiation Chemistry
	Nat Patel	SME	U mining/milling, regulatory	MS Chemistry
	Bill Floyd	SME	Regulatory	M.S. Biology
	Pearce O’Kelley	SME	Regs, agreement states	M.S. Public Health
Resource International, LTD	Engineers , Scientists, Surveyors, Planners	Subcontractor	State of Virginia regulatory processes, mining impoundments, engineering designs, water quality	Engineering and technical, natural resource professionals (biologists, ecologists, geologists, hydrologists, hydrogeologists, and engineers
Ashland, VA www.resourceintl.com	Anthony Creech	SME	VA regs, SW/GW regs	B.S. Geology; P.G.
	Mike Willinger	SME	G-W monit	B.S, Engineering Geology; P.G.
	John Brooks	SME	SW, stds,EIS	M.S. Biology; B.S. Biology; PWD
	Jim Rudnick	SME	SW, stds, EIS	M.S, Forestry, B.S, Forestry
	Ed Hollos	SME	G-W monit, stds-disp mine	B.S, Civil Eng.; P.E.; BCEE
	Steve Church	SME	SW, stds, eng design	M.S. Civil Eng.; B.S. ME;
	Thaddeus Kraska	SME	EIS, water qual	M.S. Res Manag. B.A, Zool; PWD
	Robert Hundley	SME	SW, GW, Air Qual	B.S. Civil Eng; P.E.
	Charles Wilson	SME	SW, stds, mine waste	B.S. Civil Eng; P.E.
	B. Meredith Winn	SME	SW, Air qual, water qual stds	M.B.A., B.S. Chem. Engin.; P.E.
	Charlie Riedlinger	SME	Sw, GW,eng design	B.S. Civil Eng.; P.E.
	Mike Fiore	SME	SW, GW, mine waste	M.S Civil Eng.,B.S. Civil Eng; P.E.
	John Combs	SME	Sw, GW, mine wastes	M.E. Civil Eng
ORAU	Epidemiology			
Oakridge, TN http://www.ornl.gov/occupational-exposure-worker-health-studies	Elizabeth D. Ellis	SME	epidemiology	Ph.D. epidemiology
	George Holdsworth	SME	Epidemiology, toxicology	Ph.D. Biochemistry
	Phillip Wallace	SME	Health screening	M.B.A. Management, Be registry
	Pamela Whitson	SME	Research for epidemiolgy	MS Libray-Health Science

Resumes Summary of Selected Staff (Appendix D has inclusive resumes)**Bio-Sketch for Project Manager and Technical Leads and Selected SMEs****Uranium Study Project Manager****Stanley A Fitch, CHP, MSE, RRPT**

Vice-President of Trinitek Services, Inc., nuclear & environmental safety consulting

MSE-Nuclear Engineering, BS Health Physics, CHP (Certified Health Physicist)

Stanley A Fitch is an SME on radiation regulations, Agreement States and NRC, nuclear material, nuclear materials security, risk assessment. He is a former regulator specializing in managing radiation and environmental protection programs and personnel. He has been practicing in the radiation health physics profession for over 25 years as a manager, technical staff member and technician in occupational, environmental, and regulatory aspects of radiation protection, uranium mining/milling (regulatory and operational experiences), radiation measurements and risk assessment, in defense and research applications including reactor operations as well as facilities operations; and at Title 1 and 2 uranium mill tailings reclamation projects (UMTRA), including work as a former uranium mill operator. He is the former Chair of the OAS (Organization of Agreement States) and worked closely with the USNRC and heads of Agreement States Radiation Protection Programs in determining appropriate regulatory options for states.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs**Uranium Study Alternate Project Manager,
Technical Lead-ES&H, QA****Gloria E Chavez, Ph.D.**

President of Trinitek Services, Inc., a nuclear and environmental safety consulting company.

Ph.D. Environmental Health Physics, MS Health Physics,

Gloria E Chavez, Ph.D. is an SME with over 40 years experience in radiation safety and environmental programs working in industry, USDOE National Laboratories (Sandia National Laboratories, Idaho National Laboratory), uranium mill tailings remediation, education and training. Experience in a broad range of health physics and nuclear work areas including: nuclear materials management, transportation, radioactive waste operations, radiation safety and related environmental health and safety compliance programs, nuclear quality assurance, emergency response, program/project management, international programs, systems analysis, nuclear regulatory development, security assessments, education and training. Work for industrial clients, NRC Agreement State, Department of Energy, Department of State, Department of Interior, Department of Justice. Work experience at Uranium Mill Tailings Remediation Action (UMTRA) projects (1973-1974), the Idaho National Engineering Laboratory, the Nevada Test Site (NTS), Tonopah Teat Range, NV and Sandia National Laboratories, Albuquerque, and commercial clients, various locations. Experience: managing technical, complex, multidisciplinary, multimillion dollar projects/ programs and teams, program developer, educator and trainer; finding solutions to complex technical and management problems; public speaking media relations, and public hearings and testimony.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study Technical Lead: NEPA and Facilitation	Francis X. Cameron, J.D.

Senior Consultant: Trinitex Services, Inc, Nuclear & Environmental Safety Consultants

J. D.; M.M.A., Natural Resources

Chip Cameron, J.D.. is an expert on NEPA, environmental law, uranium fuel cycle regulatory issues, facilitation public regulatory hearings/meetings, public out-reach, rulemaking, US NRC rule-making, Agreement States issues, with over 40 years experience with senior NRC and other federal, state and tribal agencies. Some of his work includes: Consultant to the International Atomic Energy Agency on the development of the Draft Safety Guide on Transparency, Openness, and Public involvement (2011); The nature and scope of the performance assessment for the disposal of depleted uranium in Utah (Department of Environmental Quality, State of Utah, 2010); The development of the technical basis for the NRC rulemaking on the licensing and oversight of reprocessing facilities (U.S. Nuclear Regulatory Commission, 2010 - 2011); The development of the criteria for site-specific performance assessments for the disposal of depleted uranium (U.S. Nuclear Regulatory Commission, 2009); The development of NRC policy on the blending of low-level radioactive waste (U.S. Nuclear Regulatory Commission, 2010).

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study Technical Lead: Radiation Chemistry	Sheldon Landsberger, Ph.D.

Senior Scientist: Trinitex Services, Inc, Nuclear & Environmental Safety Consultants

PhD, Chemical Engineering

Sheldon Landsberger, Ph.D. is Coordinator of the Nuclear and Radiation Engineering Program, UTA. His expertise includes: Radiation measurements, uranium and trace metals analysis, health physics, international environmental and radiation studies, uranium fuel cycle, in-situ leaching environmental impacts. He consults world-wide. Dr. Landsberger has more than 180 published papers and 120 conference proceedings. He has been involved in a wide variety of environmental projects for over 40-yrs including analysis of various media for heavy metals and radioactivity. His work has included: The Determination of Heavy Metals (Al, Mn, Fe, Ni, Cu, Zn, Cd and Pb) in Urban Snow Using an Atomic Absorption Graphite Furnace; Rapid Determination of Selenium in Various Marine Organisms by Instrumental Neutron Activation Analysis; Sulphur and Heavy Metals in Urban Snow: Multi-Elemental Techniques and Analytical Interpretation; Non-Destructive Determination of Arsenic in Urine; Studies of Radioactivity and Heavy Metals in Phosphate Fertilizer; Determination of Heavy Metals in the Rock River (Illinois) Through the Analysis of Sediments; Arsenic, Chromium and Nickel Determination in Human Samples; Low-Level Radioactive Waste Stream Analysis in a Neutron Activation Analysis Laboratory; Heavy Metals in Urban Soils of East St. Louis; The Determination of Uranium in Food Samples; sampling of soils for heavy metal contamination; and also has oversight to sophisticated low-level gamma-ray counting for naturally occurring radioactive material and fission product identification.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study Technical Lead: Mining and Hydrogeology	Dan McCarn, Doctoral Candidate

Senior Geologist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants

PhD, Geology; AIPG Certified Prof. Geologist CPG-10245; European Fed. of Geologists: Title #462; Wyoming Professional Geologist PG-3031

Dan McCarn is an expert on Minerals, Mining, Petroleum, Hydrogeology, Project Licensing, Risk Assessment with over 30 years experience in the nuclear, environmental, petroleum, minerals areas with focus on project management of hydrogeological and water-quality investigations; Numerical Modeling; uranium mine and mill licensing & decommissioning; Performance Assessment of nuclear waste repositories; Pollution prevention; Risk assessment; Superfund, significant experience in geostatistics, inorganic geochemistry, hydrogeology and numerical modeling as well as litigative experience as an expert witness. He has a strong focus on uranium project licensing, economic assessment of mining feasibility, geological modeling, basin studies, seismic data analysis, environmental sampling, design of monitoring well systems, geochemistry, mineral chemistry, geostatistics, geophysical log interpretation. He performs scientific programming with focus on geostatistical, geochemical, hydrological model development. Application languages include Visual Basic (6.0 & VBA), Fortran, C. Linear and non-linear methods of solution (Gauss Elimination, LU Decomposition, Adjunct identity element matrix inversion, Newton-Raphson, quadrature including Gauss Point method, analysis of ill-conditioned systems, and minimization methods. He was overseas for 15 years in Europe, Asia, and Latin America.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Uranium health physics & environment	Noel Savignac, Ph.D.

Senior Health Physicist: Trinitek Services, Inc

PhD, Health Physics, MS Health Physics

Noel Savignac has more than 20 years experience as a consultant in radiation protection. He has worked with over 50 new and returning clients for whom he has provided radiation dose modeling, policy statements, procedure manuals, technical investigations, training programs, and audits. His audits are designed to correct deficiencies prior to noncompliance citations. He creates and presents training programs that are practical and comprehensible. Previously he has served as a manager of environmental services for a uranium mining and milling firm, a health physicist at a nuclear power plant, and a university radiation safety officer and instructor. He has extensive experience in uranium mining and milling support and training as well as in health, safety and environmental impacts associated with uranium mining and milling operations in the western states. He was Past Chairman of the Uranium Environmental Subcommittee for the "American Mining Congress" and a member of the "National Commission of Radiological Protection and Measurements" (NCRP) - "Effluent Monitoring and Environmental Surveillance in the Mineral Extraction Industry" (NCRP Report 118).

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Toxins in Marine and fresh-water ecosystems	Nicholas S. Fisher, Ph.D.

Senior Aquatic Scientist: Trinitex Services, Inc

Ph.D. Marine Biology

Dr. Nicholas Fisher, Distinguished Professor School of Marine and Atmospheric Sciences (SoMAS), Stony Brook University, NY. He is internationally recognized for his expertise in metal and radionuclide interactions with aquatic biota, addressing bioaccumulation in marine as well as freshwater and estuarine ecosystems, considering the trophic transfer of metals/radionuclides in aquatic food chains (including fish), the influence of the organisms on the geochemical cycling (including residence times) of the contaminants in aquatic systems, and the influence of the metals on the organisms themselves. He has looked at a wide range of metals and radionuclides, including naturally occurring radionuclides, fission and activation products, has worked extensively with select transuranic elements (especially plutonium and americium). Much of this work has involved experimental studies to evaluate the kinetics of metal/radionuclide uptake and loss into and out of animals (including fish); has incorporated a metal/radionuclide bioaccumulation model that successfully predicts their concentrations in fish under steady-state conditions; has studied the influence of a wide variety of environmental factors on metal/radionuclide bioaccumulation in fish, and has assessed the relative importance of aqueous and dietary sources of metals/radionuclides for fish; has published hundreds of peer-reviewed papers in his 40-year tenure evaluating the bioavailability and fate of metals, including important long-lived radionuclides associated with nuclear wastes, in marine organisms and fresh water ecosystems and estuaries. He most recently authored articles on the uptake and distribution of radionuclides in fish from the Fukushima disaster. He has served as a consultant for the IAEA, the US EPA, for the nuclear power industry, for a US Federal Court in Maine dealing with metal bioaccumulation and effects in aquatic ecosystems.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Uranium, health physics & environment	Leo S. Gomez, Ph.D.

Radiation Biologist: Trinitex Services, Inc

PhD, Radiation Biology, MS Health Physics

He has worked at several US DDO Laboratories (Los Alamos, Sandia, Oak Ridge) in his 40-year career. Including: Worked in nuclear waste management at Sandia; Was the biological research project manager for four (4) international ocean disposal projects and worked in the Performance Assessment Department for the Waste Isolation Pilot Plant, a transuranic waste repository in southeastern New Mexico; collaborated for ten (10) years with the University of New Mexico Institute for Public Policy studying national public perceptions of risk from nuclear technologies. At Los Alamos he conducted experiments studying the comparative radiation sensitivity of normal mammalian tissues to x-rays and negative pi mesons in collaboration with the University of New Mexico Cancer Center. He worked with the LANL Health Physics group evaluating health and safety of uranium & plutonium facilities and calculating radionuclide body burdens in LANL workers; performed a safety evaluation of a nuclear power reactor in California; Managed the whole body counting facility to detect low levels of transuranic elements in workers at Oak Ridge National Laboratory in Tennessee; evaluated worker radiation exposures at ORNL and other nuclear facilities.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Epidemiology	Elizabeth Duprees Ellis, Ph.D.

Principal Scientist: ORAU; Ph. D. Epidemiology

Dr. Ellis has worked in the field of epidemiology, associated with toxic metals and radionuclides for over 35 years. She is currently Associate Director for the Center for Epidemiologic Research which conducts and supports quality epidemiologic research with primary emphasis on occupational health studies. From broad-scope epidemiology and health screenings/surveillance studies to beryllium sensitivity testing and radiation dose reconstruction. Epidemiologic surveillance assesses the overall health of the *current* DOE workforce at 14 DOE sites and facilities. The goal is to identify groups of workers that may be at increased risk for occupation-related injury and illness. In response to indications of excess risk, program staff can assess the need for additional investigations. Surveillance is based on continuous collection, analysis, and interpretation of selected morbidity, demographic, and occupational exposure data. The program is a corporate resource providing our customers with timely health information. We also provide epidemiologic and public health expertise in the evaluation of worker health concerns. Reports summarizing the results of epidemiologic surveillance are published annually and are available below. Implementation of epidemiologic surveillance has advanced the automation of health data management systems at sites such as the INEEL, fostering the development of state-of-the-art medical information management. She has also worked as: Associate Director, Center for Epidemiologic Research, ORAU; Leader, Epidemiology Support Section, Center for Epidemiologic Research; Epidemiologist, Center for Epidemiologic Research and at The Johns Hopkins University, Baltimore, MD, Department of Epidemiology as a Research Assistant. She has published a number of relevant papers related to epidemiological studies for workers in uranium mining/milling and related industries.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Epidemiology, toxicology	George Holdsworth, Ph.D.

Principal Scientist: ORAU; Ph. D. Biochemistry

Dr. Holdsworth is an experienced scientist specializing in toxicology and human health risk assessments. He is currently Senior Toxicologist at ORAU providing technical support to the U.S. EPA IRIS program office for • the preparation of toxicological reviews and IRIS summary sheets, • peer review: Provided write-ups of experimental studies and overall technical support for the Agency's *Toxicological Review and Risk Characterization of Formaldehyde*; Prepared monographs on the impact of environmental stressors on human health for U.S. Centers for Disease Control and Prevention (CDC); providing technical support to NIOSH on criteria documents, skin notation profiles, and immediately dangerous to life and health (IDLH values. Extensive experience in support of government programs in the human health sciences; researched (EPA) and authored issue papers on potential human health impacts of chemicals of environmental concern; Prepared monographs to assess human health impacts of drinking water disinfectants/their by-products; Researched and wrote toxicological reviews/summary sheets for compounds nominated for inclusion in U.S. EPA's IRIS database; Assessed mutagenic potential of trace inorganic /organic contaminants in finished drinking water; (U.S. Army) Center for Health Promotion and Preventive Medicine (USACHPPM), developed Toxicity Profiles of environmentally and militarily important chemicals, in support initiative to develop Toxicity Reference Values protective of wildlife.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Health Screening Database	Phillip W. Wallace M.B.A.

Manager of Information Technology for Occupational Exposure and Worker Health program:
ORAU

B.S., Industrial Management, M.B.A., Management

Mr. Wallace serves as Manager of Information Technology for Occupational Exposure and Worker Health (OEWL) program. Responsibilities include ensuring compliance to Federal government cyber security requirements, overseeing activities of software developers, and maintain integrity of data holdings within OEWL. Oversaw the design and implementation of the DOE Beryllium Registry (10 CFR 850) and currently oversee the routine operation, work with DOE HQ staff on requirements, work with DOE sites to provide guidance on data submissions, and provide analyses of the data to DOE HQ; Oversee the daily operation of the DOE Illness and Injury Surveillance program; interact with DOE HQ staff to review program status and plan future directions; oversee the functions of receiving data and returning errors to the submitting site, creating special reports as required, and working with sites to assess health situations as specified by the site Occupational Medicine Director; Hands-on experience supporting epidemiologic studies through software development and data manipulation; Maintain validity and integrity of data on over 400,000 DOE workers; Create tables containing over 4,000,000 dosimetry records, ensuring quality for use in health studies.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Epidemiology	Pamela S. Whitson

Scientific Programmer/Analyst: ORAU

M.S. Library and Information Science

Ms. Whitson is a: Certified Tumor Registrar, National Cancer Registrars Association, 1995; Registered Health Information Technician, American Health Information Management Association, 1999; Registered Health Information Administrator, American Health Information Management Association, 2000. She supports the Center for Epidemiologic Research to: Develop, maintain, and execute software to produce timely and accurate analysis data for the Illness and Injury Surveillance Program; develop queries to research ad-hoc requests; Maintain bibliographic function and data integrity in the Comprehensive Epidemiologic Data Resource; Research, develop, design, and implement electronic methods for scanning and retrieval of archived information.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Hydrology, Engineering Applications	Anthony Creech P.G.

Section Manager Groundwater & Geology: Resource International, LTD, Virginia

B.S. Geology

Mr. Creech has over 23 years of progressive experience in geology, hydrogeology, due diligence, solid waste, health and safety, and environmental compliance management, research, and evaluation. Mr. Creech supervises all geology efforts in the company. His areas of expertise include geologic and hydrogeologic studies (e.g., water supply investigation, landfill siting and monitoring), site characterization, risk assessment, corrective action plans, environmental site assessments, and environmental compliance auditing. He acts as program manager for all groundwater related activities performed by the company, including monitoring programs (landfills, petroleum storage facilities, wastewater treatment facilities, etc.). Mr. Creech developed and maintains written protocols for QA/QC, statistical analyses, and training of field personnel. He has provided expert witness testimony involving real and/or alleged contamination of property. He also represented clients to county boards, planning commissions, public hearings, and various regulatory entities, including the VDEQ, VDH, and EPA.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs	
Uranium Study SME: Hydrology, Engineering Applications	Michael E. Fiore, P.E.

Section Manager Groundwater & Geology: Resource International, LTD, Virginia

B.S., Civil Engineering, Notre Dame, 1965; M.S., Civil Engineering,

Mr. Fiore has over 44 years of management and engineering experience. Since 1979, Mr. Fiore, co-founder and President of Resource International, Ltd., has served as Principal-in-Charge of engineering and environmental engineering projects, ensuring both dedicated resources of the firm and quality assurance of deliverables. Mr. Fiore's areas of expertise include civil engineering; solid waste facility design; design of over 50 sanitary landfills; solid waste facility permitting; leachate and landfill gas treatment; landfill gas flaring and gas energy recovery systems; transfer station design and operation; resource/energy recovery; recycling; groundwater monitoring; landfill closure and post closure; regulatory liaison; compliance and enforcement negotiation; commercial and industrial development; water supply; wastewater systems; storm water management; environmental impact; industrial waste treatment and disposal; regional planning and resource management; and financial and technical feasibility analysis.

Bio-Sketch for Project Manager, Technical Leads and Selected SMEs**Uranium Study SME:**

Hydrology, Engineering Applications

John L. Combs, P.E.

Executive Vice-President: Resource International, LTD, Virginia

B.S., U.S. Military Academy, 1967; M.E., University of Virginia (Civil Engineering)

Mr. Combs has over 39 years of management and engineering experience. Since 1979, Mr. Combs, co-founder and Executive Vice-President of Resource International, Ltd., has served as Principal-in-Charge of engineering and environmental engineering projects Principal planner for the preparation of the conceptual development plan for many large projects in Virginia. Resource provides professional consulting services to private individuals and companies, Fortune 500 companies, and to local, state and federal government. The firm's services include civil and environmental engineering, land planning, land surveying, environmental compliance and permitting, construction administration, construction claims analysis and expert witness testimony. Mr. Combs' areas of expertise include the engineering design and construction of municipal and industrial wastewater treatment and water supply facilities, public utility water and wastewater lines, roads and infrastructure. Also, environmental compliance and permitting; environmental impact assessments and statements (EIA/EIS); environmental contamination assessments and remediation; land use planning; comprehensive municipal planning; design and development; and construction claims analysis and expert witness testimony

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Section III. Proposed Price

The Grand Total Price (required in Section XI of the RFP) for conducting the Uranium Study in accordance with Section III, Statement of Needs, will be will be **\$844,329.00**, as outlined below:

Company	Labor	Travel, Per Diem, Hotel	Misc. Costs	Totals
Trinitek	\$551,512.00	\$19,850.00	\$1,000.00	\$572,362.00
Resource International	\$85,736.00	\$1,500.00	\$603.00	\$87,839.00
ORAU	\$174,516.00	\$7,930.00	\$1,682.00	\$184,128.00
Totals	\$811,764.00	\$29,280.00	\$3,285.00	\$844,329.00

The projected hours of labor are as follows:

- Trinitek – 3,189
- Resource International – 596
- ORAU – 854

Cost Estimating Challenges and Assumptions

Trinitek notes the somewhat unpredictable scope in RFP Section III, Statement of Needs. Therefore, some additional labor hours were added to the time estimates to compensate for this unpredictability. For example, no guidance is provided on how much time will be required to attend the facilitation meetings and other public meetings.

The actual number of required trips to and appearances in Richmond is a unpredictable. However, it is anticipated that travel and appearances will be required as follows:

- Trinitek Project Manager (PM) – kick-off meeting, 4 monthly meetings with VDH staff, and 5 facilitation meetings
- Trinitek Alternate PM – kick-off meeting and 1 facilitation meeting
- Trinitek Facilitator – 5 facilitation meetings
- Trinitek Geohydrology Lead – 2 facilitation meetings
- Resource International Manager – kick-off meeting and 2 facilitation meetings
- ORAU Epidemiologist– 5 facilitation meetings

These people will appear at the stated events to gain information from the Commonwealth and its stakeholders and to provide them information and conclusions about the study. Each person is in-depth experience in the environmental and health challenges related to uranium mining and milling, and can provide insights about possible concerns that might need to be addressed by the Commonwealth.

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Section IV. Appendices

- A. Offeror Data Sheet (RFP Attachment A)
- B. Small Business Contracting Plan (RFP Attachment B)
- C. State Corporation Commission (RFP Attachment C)
- D. RFP Task Matrix
- E. Resumes
- F. Statements of Qualifications for Trinitek Services and Subcontractor Companies

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**VIRGINIA DEPARTMENT OF HEALTH
OFFICE OF PURCHASING AND GENERAL SERVICES (OPGS)
109 GOVERNOR STREET
RICHMOND, VIRGINIA 23219**

March 8, 2012

ADDENDUM NUMBER 1 TO ALL BIDDERS/OFFERORS:

Reference: RFP 1200001-999

Commodity: 91843

Dated: March 5, 2012

For Delivery To: Commonwealth of Virginia Department of Health
Office of Purchasing and General Services (OPGS)
Attn: Daniel Wilborn, Contract Officer
109 Governor Street 12th Floor, Room 1214
Richmond, VA 23219-0331

Bid/Proposal Due: April 4, 2012

Pre-bid/proposal Conference: March 16, 2012

The above is hereby changed to read:

1. Page 1 and Section VII. Mandatory Pre-proposal Conference: Has been changed to include the following:
Mandatory Pre-proposal conference scheduled for 2:00 p.m. on March 16, 2012 at the Department of Health, 109 Governor Street Room 1218, Richmond, VA, 23219. Vendors/companies may elect to attend via conference call. Instructions for conference call are as follows:

Participants must call in to (661) 673-8600 and enter access code 681706# when promoted.
Participants will be able to call-in starting five (5) minute prior to conference start time.

Vendors/companies should email the following information to Daniel Wilborn at daniel.wilborn@vdh.virginia.gov by 4:00 pm March 15, 2012.

Company Name: Trinitek Services, Inc.

Person Representing Company: Stanley Fitch or Gloria Chavez

Street Address of Company: 2501 Rio Grande NW, Suite B

City, State and Zip: Albuquerque, NM 87047

Phone Number: 505-242-8200 Fax Number: 505-242-8201

**VIRGINIA DEPARTMENT OF HEALTH
OFFICE OF PURCHASING AND GENERAL SERVICES (OPGS)
109 GOVERNOR STREET
RICHMOND, VIRGINIA 23219**

Note: A signed acknowledgment of this addendum must be received at the location indicated on the IFB/RFP either prior to the bid/proposal due date and time or attached to your bid/proposal. Signature on this addendum does not substitute for your signature on the original bid/proposal document. The original bid/proposal document must be signed.

Sincerely,

Daniel Wilborn, CPPO, VCCO, VCO
Procurement Manager, OPGS
Phone: (804) 864-7519

Name of Firm: Trinitek Services, Inc

Signature/Title President

Date

**VIRGINIA DEPARTMENT OF HEALTH
OFFICE OF PURCHASING AND GENERAL SERVICES (OPGS)
109 GOVERNOR STREET
RICHMOND, VIRGINIA 23219**

March 16, 2012

ADDENDUM NUMBER (2) TO ALL BIDDERS/OFFERORS:

Reference: RFP 1200001-999

Commodity: 91843

Dated: March 5, 2012

For Delivery To: Commonwealth of Virginia Department of Health
Office of Purchasing and General Services (OPGS)
Attn: Daniel Wilborn, Contract Officer
109 Governor Street 12th Floor, Room 1214
Richmond, VA 23219-0331

Bid/Proposal Due: April 4, 2012

Pre-bid/proposal Conference: March 16, 2012

The above is hereby changed to read:

1. Questions: Question concerning this RFP will be accepted until 4:00 p.m. March 20, 2012. Questions must be submitted by e-mail to Daniel Wilborn daniel.wilborn@vdh.virginia.gov and Linda Bumgarner linda.bumgarner@vdh.virginia.gov including questions asked during the pre-proposal conference.

Note: A signed acknowledgment of this addendum must be received at the location indicated on the IFB/RFP either prior to the bid/proposal due date and time or attached to your bid/proposal. Signature on this addendum does not substitute for your signature on the original bid/proposal document. The original bid/proposal document must be signed.

Sincerely,

Daniel Wilborn, CPPO, VCCO, VCO
Procurement Manager, OP GS
Phone: (804) 864-7519

Name of Firm: Trinitek Services, Inc

Signature/Title

Date

**VIRGINIA DEPARTMENT OF HEALTH
OFFICE OF PURCHASING AND GENERAL SERVICES (OPGS)
109 GOVERNOR STREET
RICHMOND, VIRGINIA 23219**

March 26, 2012

ADDENDUM NUMBER (3) TO ALL BIDDERS/OFFERORS:

Reference: RFP 1200001-999

Commodity: 91843

Dated: March 5, 2012

For Delivery To: Commonwealth of Virginia Department of Health
Office of Purchasing and General Services (OPGS)
Attn: Daniel Wilborn, Contract Officer
109 Governor Street 12th Floor, Room 1214
Richmond, VA 23219-0331

Bid/Proposal Due: April 4, 2012

Pre-bid/proposal Conference: March 16, 2012

The above is hereby changed to read:

1. Questions and Answers: Questions that were submitted are answered is the Question and Answers document attached.
2. Attendance lists for vendors that attended the pre-proposal are attached.
3. Bid/Proposal Due Date: Has been changed to April 5, 2012 at 2:00 pm.

Note: A signed acknowledgment of this addendum must be received at the location indicated on the IFB/RFP either prior to the bid/proposal due date and time or attached to your bid/proposal. Signature on this addendum does not substitute for your signature on the original bid/proposal document. The original bid/proposal document must be signed.

Sincerely,

Daniel Wilborn, CPPO, VCCO, VCO
Procurement Manager, OPGS
Phone: (804) 864-7519

Name of Firm: Trinitek Services, Inc.

Signature/Title

Date

President

REQUEST FOR PROPOSALS (RFP)

RFP # 1200001-999

Issue Date: March 5, 2012

Title: Uranium Study

Commodity Code: 91843

Issuing Agency: Commonwealth of Virginia
Department of Health
Office of Purchasing & General Services
Attn: Daniel Wilborn, Contract Officer
109 Governor Street, Room 1214
Richmond, VA 23219

Using Agency And/Or Location: Department of Health
Where Work Will Be Performed:

Initial Period of Contract: From Date of Award through **November 30, 2012.**

Sealed Proposals Will Be Received Until 2:00 p.m. on April 4, 2012 For Furnishing The Services Described Herein.

All Inquiries for Information Should Be Directed To: Daniel Wilborn, Contract Officer, Phone: (804) 864-7519 or E-mail: daniel.wilborn@vdh.virginia.gov. **Questions will be accepted until close of business on March 14, 2012.**

IF PROPOSALS ARE MAILED, SEND DIRECTLY TO THE ISSUING AGENCY SHOWN ABOVE. IF PROPOSALS ARE DELIVERED BY COURIER OR HAND DELIVERED, DELIVER TO: THE ISSUING AGENCY SHOWN ABOVE, Attn: Daniel Wilborn, Contract Officer.

In Compliance With This Request For Proposals And To All The Conditions Imposed Therein And Hereby Incorporated By Reference, The Undersigned Offers And Agrees To Furnish The Services In Accordance With The Attached Signed Proposal Or As Mutually Agreed Upon By Subsequent Negotiation.

State Corporation Commission ID Number: _____
(See Special Terms and Conditions)

Name and Address Of Firm:

Trinitek Services, Inc. Date: April 2, 2012

PO BOX 1608 By: _____

Sandia Park Name: Gloria E chavez, Ph.D.
(Signature in Ink)

New Mexico Zip Code: 87047 Title: President
(Please Print)

eVA Vendor ID or DUNS # VS0000087437 Phone: (505) 220-5552

E-mail: gec@3tks.com Fax: (505) 242-8201

PREPROPOSAL CONFERENCE: A mandatory pre-proposal conference will be held at 2:00 p.m. on March 16, 2012 at the Department of Health, 109 Governor Street Room 1218, Richmond, VA, 23219. Reference: Section VII herein. NO ONE WILL BE ADMITTED AFTER 2:10 p.m. If special ADA accommodations are needed, please contact Daniel Wilborn at 804-864-7519 by March 13, 2012.

Note: This public body does not discriminate against faith-based organizations in accordance with the Code of Virginia, § 2.2-4343.1 or against an offeror because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment.



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Worker and Public Health Studies

When people are exposed to hazardous substances at work or in their communities, ORAU helps provide accurate, timely answers to health concerns. Combining more than 30 years of experience in occupational exposure research and established partnerships with leading universities and medical centers, we conduct health studies with the highest levels of quality and integrity.



Worker and Public Health Screenings

Whether you need a rapid health screening or an in-depth epidemiologic study, ORAU works with you to customize a solution to meet your needs and budget. Through our comprehensive approach, we provide support to collect, manage, interpret, analyze and publish public exposure and worker health data. Our team of experts includes:

- Epidemiologists
- Statisticians
- Technical writers
- Information and database managers
- Health communication specialists
- Public health professionals
- Health physicists

Occupational Illness and Injury Surveillance

Identifying groups of workers that may be at increased risk for occupational-related injury or illness facilitates rapid response to worker health concerns. ORAU can assess the overall health of your workforce, regardless of the number of sites and facilities. If the study indicates excessive risk, we work with you to decide if additional investigations are needed.

Beryllium Exposure Studies and Testing

ORAU operates one of only four laboratories in the United States certified to perform the beryllium lymphocyte proliferation test, which determines if a person has developed a sensitization to beryllium. Our lab consistently achieves a near-zero-percent error rate in tests performed and is accredited by the College of American Pathologists. ORAU maintains a registry of beryllium test data for more than 28,000 current and former employees from 21 U.S. Department of Energy sites.

Research and Medical Database Management

ORAU combines medical study expertise with database design and epidemiologic information systems experience to help our customers conduct reliable studies, track results and analyze population trends. ORAU manages DOE's worker health data center, which aggregates data from five illness and injury databases and the Nuclear Regulatory Commission Radiation Exposure Information Reporting System. Together these systems contain millions of worker health records that are being used by medical professionals worldwide to ensure the continued health of workers in the nuclear, aerospace and defense fields.

Radiation Dose Reconstruction

ORAU's team of health physicists and radiation records specialists excels in analyzing worker and facility data to support dose reconstruction. When data isn't available for an unmonitored worker, we have developed statistical methods to analyze co-worker data to estimate doses to their unmonitored colleagues.



Customer Highlight: Toxic Exposure Hits Home

After the 2008 coal fly ash spill at its Kingston Fossil Plant, the Tennessee Valley Authority sought ORAU's expertise to manage public health concerns. We partnered with Vanderbilt Medical Center to conduct an independent medical screening program at no cost to the 214 area residents who chose to participate. An extensive outreach effort helped answer questions and calm fears, and the study found no immediate adverse health effects caused by the spill.

Working with ORAU

We have a variety of contract vehicles in place to make it easy to work with us, including GSA MOBIS and the DOE ORISE Work for Others program. Visit www.orau.org/contracts for details.

Key Customers

- Defense Threat Reduction Agency
- National Institute for Occupational Safety and Health
- U.S. Department of Energy
- U.S. Nuclear Regulatory Commission



For more information:

865-576-3115

occ.health@orau.org

www.orau.org/occupational-exposure-worker-health-studies



For program information:

DOE National Supplemental
Screening Program
866-812-6703

DOE Beryllium Vendors Medical
Screening Program
866-219-3442

NIOSH Dose Reconstruction Project
800-322-0111

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Managed by ORAU for the U.S. Department of Energy

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ENGINEERS • SCIENTISTS • SURVEYORS • PLANNERS



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(804) 550-9200 * FAX (804) 550-9259

www.resourceintl.com



MISSION STATEMENT

**“We challenge ourselves to rethink the traditional,
To apply innovative and sustainable technology,
And to identify creative engineering and
environmental solutions,
In order to earn our clients for life.”**

Our Corporate Challenge

“Be the Best, Make it Personal, NOW.”

READY TO SERVE YOU:

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- 8. Solid Waste Services**
- 9. Transportation Services**
- 10. Industrial Services**
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- 12. Local Government Supplemental Staff Support**

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GENERAL OVERVIEW

Resource International, LTD., a SWaM certified Small Business (License#684640), provides engineering & consulting services to small businesses, large commercial & industrial corporations, & all levels of government. Started in 1979, the company is headquartered in Ashland, Virginia.

Resource's experienced team of engineering and scientific professionals provides complete planning to assist the economic development needs of our clients. Our commitment to quality service is exemplified through the following blend of assets:

- Experienced urban & suburban planners.
- Innovative water & wastewater system designers.
- 30 years of commercial & industrial design.
- Environmental planners & designers protecting water & wetland resources.
- Professionals using technology to achieve sustainable development.
- Engineers experienced solid waste management field.



We employ a broad, experienced team of professionals including:

- Civil Engineers
- Land Surveyors
- Municipal Engineers
- Wetland Scientists
- Environmental Engineers
- Solid Waste Engineers
- Groundwater Specialists
- Municipal Planners
- Land Planners
- Landscape Architects
- Transportation Engineers
- Geologists
- Hydrologists
- Computer Modelers
- Graphic Designers

These professionals provide services to industrial, commercial, and government clients in the areas of:

- Land Development Planning & Engineering
- Municipal Planning & Ordinances
- Economic Development
- Water Supply & Wastewater Treatment
- Solid Waste - Planning, Permitting, Design, & Closure
- Wetlands Delineation & Permitting
- Environmental Assessments & Impact Analysis
- Financial Feasibility Studies
- Industrial Permitting
- Industrial Site Development

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LAND PLANNING SERVICES

Resource International, LTD. offers comprehensive land planning, landscape, and design services through our in-house certified planners and technical staff in a variety of commercial, industrial, governmental, residential, and recreational developments.

Planning gives the direction for growth to the community while landscape services improves the quality of life within it. Our team provides comprehensive land planning, design, land use, and zoning services for private and public clients within the state of Virginia, North Carolina, and West Virginia. We believe very strongly in working together as a team. Collaboration enables us to provide a complete service by assisting clients from the design concept to final construction of their project.

Land Planning Services:

- Site Planning
- Conceptual Design
- Landscape Services
- Rezoning Applications
- Public Presentation
- Permitting Assistance
- Fatal Flaw Analysis & Due Diligence Studies
- Environmental Overview
- Site Research and Feasibility
- Site/Facility Expansion Plan
- Renderings



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LAND DEVELOPMENT SERVICES

Resource International, LTD. offers a full range of engineering and technical services to support commercial, residential, and industrial property developers. These services include site plan preparation, public hearings and presentations, development layout and feasibility studies, site and project engineering, commercial building design, recreational facility planning, on-site and off-site utilities, parking lot design, and project management.



Farms of New Kent
New Kent County, VA



JDA Building
Isle of Wight, VA



Soccer Field



King Charter
Hanover County, VA

SUBDIVISIONS & PLANNED COMMUNITIES

Types of Projects

- Age Restricted Development
- Golf Course Communities
- Mixed-Use Development
- Multifamily Complexes
- Neo-Traditional Communities
- Planned Unit Development
- Traditional Subdivisions

COMMERCIAL DEVELOPMENT

Types of Projects

- Banks
- Convenience Centers
- Day Care Centers
- Flex Space
- Gas Stations
- Mini-Storages
- Office Buildings
- Office Parks
- Quick Serve Restaurants
- Service Centers
- Shopping Centers



Atlee Station
Hanover County, VA

INDUSTRIAL DEVELOPMENT

Types of Projects

- Brick/Paver Plants
- Distribution Centers
- Economic Development

- Manufacturing Facilities
- Import Centers
- Industrial Parks
- Warehouses

OTHER DEVELOPMENT

Types of Projects

- Dam Rehabilitation
- Fairgrounds
- Parks
- Trails
- Utilities



The Bluffs at Bell Creek,
Hanover County, VA

SERVICES OFFERED

- Feasibility Studies
- Concept Plans
- Opinions of Probable Costs
- Early Land Disturbance Plans
- Erosion Control Plans
- Geotechnical Investigation Coordination
- Lot Grading Plans
- Master Plans
- Plans of Development
- Rezoning, CUP, & Special Exceptions
- Storm Water Management Basin Design
- Site Observations
- Traffic Impact Studies
- As Reported Drawings

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COMMERCIAL SERVICES

Resource International, LTD. offers a full range of engineering and technical services to support commercial and industrial property developers. These services include development layout and feasibility studies, site and project engineering, commercial building design, on-site and off-site utilities, parking lot design, project management, site plan preparation, and public hearings and presentations.

Development Services

- Site Planning and Development
- Site Investigation Report
- Conceptual Plan
- Subdivisions
- Master Plans
- Industrial Parks
- Site Feasibility Studies
- Rezoning - Local Permitting
- Public Hearing
- Earthwork Computations
- Environmental Site Assessments
- Wetland Permitting
- Boundary Survey
- Construction Phase Services
- Up-to-Date Computer Software for Storm Water Analysis and Design
- Budget Cost Estimates



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ENVIRONMENTAL SERVICES

Resource International, LTD. has a staff of natural resource professionals which includes biologists, ecologists, geologists, hydrologists, hydrogeologists, and engineers who are fully knowledgeable of all phases of environmental science.



**Small Whorled Pogonia
(Endangered Species)**



Wetland Delineation



Dock Permitting (RP19)

Environmental

- ESA's Phase I and II
- Environmental Impact Assessments
- Threatened and Endangered Species Studies

Permitting

- NPDES
- VPA
- Waters of the U.S./Wetland
- Solid Waste
- Storm Water
- Air Pollution

Wetlands and Streams

- Wetland Determinations & Delineations
- Stream & Perenity Assessments
- Wetland Functional Value Assessments
- RPA Determinations
- Permitting
- Wetland Creation/Restoration Siting & Design
- Stream Restoration & Design

Groundwater

- Groundwater Studies
- Groundwater Withdrawal Permits
- Groundwater Contamination Assessment
- Groundwater Monitoring & Modeling
- Risk Assessment
- Corrective Action Plans

Facility

- UST Removal, Reimbursement
- Above Ground Storage Tanks
- Spill Prevention Plans
- Waste Minimizations
- ISO - 14000 consultation
- Landfill Gas Monitoring



Waters of the US Delineation

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SURVEYING SERVICES

Resource International, LTD. surveying department is managed by a licensed surveyor and includes field crews and associated office support personnel who are responsible for obtaining field data and converting it to plat, design and/or construction information for projects. Over the past five years, Resource staff has completed over 350 surveying projects. Resource uses both conventional surveying practices and technically advanced methods involving the use of satellite-based GPS (Global Positioning System). The horizontal and vertical control from these surveys are the very data bases from which GIS (Geographic Information Systems) evolve. Resource routinely provides surveys conforming to ALTA/ACSM standards. Strip surveys for utility designs, topographic surveys for site plans and wetland boundary surveys have been performed for engineering, environmental, electrical, mechanical, structural, geotechnical, and architectural design projects. We offer the following surveying services:

- Ground Control
- ALTA/ACSM
- Boundary Surveys
- Utility Design Survey
- Topographic Survey
- Record Drawing Surveys
- Easement Plats
- Wetland Surveys
- Environmental Surveys
- Construction Verification Surveys



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WATER/WASTEWATER SERVICES

Resource International, LTD. has provided a full range of engineering services for governmental and industrial clients which have included problem definition, engineering feasibility, design, construction surveillance, and operations consultation.

WATER

Resource has been providing quality engineering and scientific services to ensure safe, dependable sources of drinking water. Water engineering encompasses the full range of treatment, pumping, storage, collection, and distribution facilities.

Resource has planned and designed water supply systems ranging from small developments to major county facilities as well as designed water transmission lines, pumping stations, and storage systems to meet operating, emergency, and fire protection requirements. Resource uses innovative and cost-effective methods to develop efficient and reliable solutions. For example, computer modeling of system networks allows us to test various development alternatives within a water system. Resource uses network modeling to size pipes, locate storage tanks, optimize system operations and develop water supply plans.

Resource's construction management team has assisted clients in bidding projects, awarding contracts and administering the contract during construction. In addition, Resource provides representatives to observe construction for conformance with the contract documents.

WASTEWATER

Resource has been providing quality engineering and scientific services to ensure effective and dependable infrastructure for wastewater collection, transport, treatment, and disposal. Resource's innovation has produced more cost-effective wastewater facility alternatives than normally available through conventional methods. Resource has planned and designed wastewater systems ranging from small developments to major county facilities. Resource has designed collection systems, pumping stations, and treatment plants. Computer modeling of system networks allows us to test various development alternatives within a community's wastewater system. Resource has provided timely and quality engineering services to ensure effective

and dependable wastewater collection, pumping and treatment.

- Collection Systems
- Pumping Systems
- Feasibility Studies
- Process Design
- Process Evaluation
- Treatment Plant Designs
- Treatability Studies
- Construction Management
- Start-up Services
- Force Main Design
- Discharge Permitting
- Funding Applications
- Master Plans
- Pre-treatment Facility
- Bidding Assistance
- I & I Studies
- Construction Surveillance

INDUSTRIAL

- Facility Site and Building Design
- Process System Design
- Equipment Layout Design
- Dam and Reservoir Design
- Permitting (Air, water, etc.)
- Endangered Species Determinations
- Wetlands Delineation
- Geological Studies
- Water Supply Design
- Hazardous Waste Surveys
- Wastewater Treatment Plant Design
- Oil Spill Plans
- Stormwater Plans
- Waste Minimization Studies
- Pollution Prevention Plans
- Odor Control Plans
- Air Emission Testing

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SOLID WASTE SERVICES

Resource International, LTD. has over 30 years of solid waste experience and a team on professional engineers, scientists, and technical professionals to meet your needs.



**Lining Subgrade
King & Queen Landfill**



**Liner Installation
Ashcake Road Landfill**



**Landfill Gas to Energy
Stafford County, VA**



**Active Gas Extraction System
Fredericksburg, VA**

LANDFILL FACILITIES

- Part A & Part B Permitting & Design
- Cost Opinions for Financial Assurance
- Landfill Gas Control & Management
- Air Permitting
- Environmental Monitoring & Modeling
- Storm Water Pollution Prevention Plans
- VPDES Permits & Outfall Monitoring
- Operations Review & Evaluations
- Construction Phase Services
- QA/QC & CQA Documentation
- Surveying

WASTE TRANSFER

- Permit-by-Rule Submittals
- Transfer Stations
- Material Recovery Facilities
- Drop-off Centers / Public Use Areas
- Spill Prevention, Control, & Countermeasures Plans
- Construction Phase Services

PLANS & STUDIES

- Site Selection Evaluations & Studies
- Site Plans & Local Zoning & Approvals
- Solid Waste Management Plans
- Waste Characterization Studies
- Financial Analyses
- Site Life Evaluations
- Rate (Tipping Fee) Studies
- Privatization Studies (Public vs. Private Operations)
- Transportation Studies



**Membrane Liner Installation
King William County, VA**



**Landfill Closure
Prince Edward County, VA**



**Leachate Pond
Prince Edward County, VA**



**Convenience Center
New Kent County, VA**

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TRANSPORTATION SERVICES

Resource International, LTD. incorporates transportation studies and design services in many of our projects. The transportation staff interacts with all Resource departments frequently to assist with questions of access, geometric standards, entrance permits, traffic operations, traffic generation, street design, and pavement design.



Route 106 - Roundabout



Traffic Signal



Road Design

Land Development

- Traffic Impact Studies
- Entrance Design
- Traffic Circulation
- Roundabouts
- Pavement Design
- Utility Coordination
- Pedestrian and Bicycle Facilities

Road Design

- Preliminary Plans
- Coordination with Controlling Agencies
- Construction Plans
- Maintenance of Traffic Plans
- Public Hearings
- Construction Administration



Interchange Modification

Traffic Operations

- Traffic Signal Design
- Capacity Studies
- Accident Analyses
- Intersection Analyses
- Traffic Volume Counts
- Sign Layout
- Traffic Calming



Road Layout Plan

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INDUSTRIAL SERVICES

Resource International, LTD. has over 30 years of experience in assisting with permitting industrial projects. Project services include permits and compliance applications for:



Regional Jail Facility

- Air Pollution Permits
- Wastewater Discharge Permits
- Solid Waste Facility Permits
- Site Plan Design & Permitting
- Environmental Permitting & Compliance



Landfill Gas to Energy



Distribution Center

Selected industries that Resource has provided site and environmental permitting services for include:

- Electrical Utilities
- Chemical
- Paper
- Fertilizer
- Aggregate
- Food
- Apparel
- Waste Management



Agronomics Facility



Paper Company

Services provided to our industrial clients include:

- Feasibility Studies
- Compliance Oversight & Review
- Environmental Permitting
- Engineering Design & Construction Plans
- Regulatory Permitting & Negotiations
- Construction Administration



Power Station



Landfill Gas to Energy



Co-Generation Plant

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GRANTS/FUNDING

Resource International, LTD. (Resource) understands the problems related to funding, finding the best alternatives available and evaluating options for defining a cost effective and viable project. Resource has helped local communities obtain over **\$133, 936,733** million dollars in grant and loan funding. Resource has assisted communities with various aspects of projects that include the following:

- Defining projects and opinions of costs through a Preliminary Engineering Report (PER).
- Prepare financial analysis of project including rates.
- Prepare Rural Utilities Services (RUS) funding application and assist in other funding source applications.
- Prepare the Environmental Assessment required by most funding sources.
- Prepare Plans and Specifications in accordance with funding agency requirements.
- Prepare Contract Documents in accordance with funding agency requirements.
- Assist in bidding and prepare documents of the bid results for the funding agencies.
- Administer the project during construction and provide documentation to funding agencies for close-out.

The following clients and projects are examples of Resource's experience with funding sources for projects such as low interest loans and grants.

- Westmoreland County
 - o Route 3 Industrial Park
EDA Grant \$ 521,160
 - o Route 3 Wastewater System
RUS Loan \$ 308,200
RUS Grant \$ 350,000
 - o Coles Point Phase 1
RUS Loan \$1,814,923
RUS Grant \$3,750,194
 - o Coles Point Phase 2
RUS Loan \$ 670,756
RUS Grant \$ 638,650
 - o Washington District Phase 1
RUS Loan \$2,461,210
RUS Grant \$4,251,500
CDBG \$ 280,000
 - o Washington District Phase 2
RUS Loan \$4,500,000
RUS Grant \$2,513,800
- Richmond County/Town of Warsaw
 - o Water and Wastewater
EDA Grant \$1,000,000
CDBG Grant \$ 700,000
- Northumberland County
 - o Fleeton/Chesapeake System
RUS Loan \$1,241,580
RUS Grant \$2,338,590
 - o Callao System
RUS Loan \$ 935,770
RUS Grant \$1,445,000
- King William County
 - o Mount Olive Community and Utility Systems
CDBG Grant \$1,400,000
RUS Grant \$ 94,400
- Bell Creek Community Development Authority, Hanover County, VA
 - o Special Assessment Bonds \$15, 980,000
- The Farms of New Kent Community Development Authority, New Kent County, VA
 - o Special Assessment Bonds \$85, 666,000
- Town of Orange
 - o Raw Water Storage Basin
EPA Grant \$ 315,000
RUS Grant \$ 500,000
State Grant \$ 260,000

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LOCAL GOVERNMENT SUPPLEMENTAL STAFF SUPPORT

Resource International, LTD. (Resource), a multi-disciplinary engineering and environmental consulting firm, assists Virginia's Cities, Towns, and Counties with engineers, scientists, and planners to supplement their short term or long term staff needs. Resource understands the problems related to staff turnover or having the budget to fund full time positions and can provide you with experts for the following positions:

- Director of Community Development
- Traffic Engineer
- Public Works Engineer
- Certified Erosion and Sediment Control Inspectors
- Director of Economic Development
- County Utilities Engineer
- Certified Site Plan Reviewer
- Certified Erosion and Sediment Control Plan Reviewer
- Certified Utility Plan Reviewer

Below are examples of the type of technical services Resource has provided local governments to supplement their staffing needs:

- **Westmoreland County** – Supplemental staffing for utility plan review, site plan review and civil engineering (Public Works). Support services for master sewer planning, utility design, assistance in loan and grant applications, and environmental services.
- **King William County** – Supplemental staffing for site plan review, erosion and sediment control plan review, utility rate evaluation, utility standards, assistance in grant applications, utility plan review of developer's projects and utility master plans. Support services for park facilities master plan, utility design, assistance in loan and grant applications, and environmental services.
- **Town of Orange** – Supplemental staffing for site plan review and erosion and sediment control plan review. Support services for Utility design, roads design, public works facility design, grant applications and environmental services
- **Town of Dumfries** - Supplemental staffing for Interim Director of Community Development; also Traffic Engineer to review special traffic studies
- **Northumberland County** – Support services for review of utility plans of developer's projects and support services for design of wastewater projects.
- **Lancaster County** – Supplemental staffing for Comprehensive Plan update and support services for industrial parks and zoning assistance.
- **New Kent County** – Support services for water and wastewater projects, small area plan and solid waste transfer station.
- **Hanover County** – Support services consisting of design services for Utilities Department, Public Works Department and the Parks and Recreation Department
- **Essex County** - Support services for site plan review, erosion and sediment control plan review, and erosion and sediment control site inspections.

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Trinitek Services, Inc.

Nuclear and Environmental Safety Consultants

Trinitek Services, Inc.
2501 Rio Grande Blvd., NW, Suite B
Albuquerque, NM 87104
(505) 242-8200 Phone
(505) 242-8201 FAX
(866)-990-4387 toll-free
www.3tks.com

Summary Statement of Qualifications

Trinitek Services is a small, woman-owned (WOSB), disadvantaged small business (SDB) incorporated in the state of New Mexico (USA). We provide expert regulatory consulting, technical, engineering and scientific services including training and audits focusing on environmental compliance, nuclear engineering, radiation safety, NEPA permitting, environmental assessments, compliance assessments, security systems, nuclear materials licensing, quality assurance, transport-management of nuclear / hazardous wastes. We work in the USA and internationally.

Qualifications and Experience

- Environmental Permitting
- Environmental Remediation
- Licensing Actions for NRC and Agreement States
- Radiation Protection Programs
- Nuclear Materials Protection
- Emergency Response Actions
- Training
- Compliance Audits
- Nuclear Quality Assurance
- Radioactive Waste Consulting
- Environmental Assessments
- Uranium recovery, In-Situ and Conventional Mills
- Hazmat/Rad Transport Consult
- Security Assessments

- Registered Small Disadvantaged Minority Business, WOSB
- Economically Disadvantaged Woman-Owned Small Business (EDWOSB)
- Minority-Owned Business, SDB
- PTAP (Procurement Technical Assistance Program) Certification
- CCR Updated; ORCA current
- DUNS Registry: 80-452-5058
- Primary NAICS Code 541620: Environmental Consultants
- CAGE Code: 503D5
- SIC: 8748 (Environmental Consulting)

Staff Credentials

- Nuclear engineers, PhDs, CHPs (Certified Health Physicists), RCTs (Radiation Control Technicians), PEs, CIHs (Certified Industrial Hygienists), CHMMs (Certified Hazardous Materials Managers), CSPs (Certified Safety Professionals, trainers, and university educators).
- Security Systems specialists and trainers with extensive experience in local, federal and international law enforcement
- Staff and associates come directly from the regulatory framework of NRC, Agreement States, and DOE. We maintain our relationships with senior regulatory decision-makers at these agencies. This allows us to provide clients with assurance that their nuclear safety and environmental actions will be comprehensive and complete.
- Work experience in the regional, national and international arena. Our staff and associates are the best qualified experts in their fields and well experienced with permitting/licensing, developing, and managing related health, safety and environmental compliance programs.
- Staff with USDOE "Q" Clearances.

Affiliations:

- Procurement Technical Assistance Program (PTAP)
- NM Small Business Development Center
- Albuquerque Hispano Chamber of Commerce
- Better Business Bureau (Good Standing)
- Health Physics Society (HPS)
- HPS Fellow Emeritus
- American Academy of Health Physics
- INMM: Institute of Nuclear Material Management
- ASSE: American Society of Safety Engineers
- ASIS: Security International

NAICS Services Focus: Radiation, Environment, Health, Safety

- **Environmental, Scientific, Engineering Consulting Services:** 541620; 541690; 541712; 541330; 541990; 924110; 562910; 562998
- **Administrative and Management Consulting Services:** 541611; 541618
- **Technical Training and Education Services:** 611430; 611519; 611699; 611710; 923110
- **Radiation/Uranium Consulting, Training And Measurements:** 212291; 541380; 621512
- **Security Systems Analysis:** 561621
- **Emergency Management Consulting And Training:** 624230
- **Regulatory-Environmental and Radiation:** 921120; 921190; 922190
- **International Nonproliferation Consulting And Training:** 928110; 928120

Recent Clients: Government and Commercial

- **AVM Environmental**
- **AMEC** (Phoenix, Arizona)
- **Brainard Animal Health Center**, NM
- **Cavanagh Services Group**, Utah
- **Energetic Materials Research and Training Center**, New Mexico Tech, Socorro, NM
- **Federal Aviation Administration**, Albuquerque, NM
- **Lovelace Respiratory Research Institute (LRRI)**, Kirtland Air Force Base, NM – USDOE Project
- **Mesteña Uranium, LLC**, Corpus Christi, TX
- **Neutron Energy, Inc**, Englewood, CO
- **New Mexico Tech University** (Albuquerque, NM)/ USDOE Global Threat Reduction Initiative (GTRI) Source Recovery program/ Egyptian Atomic Energy Authority (EAEA)/ SNL contract
- **Parametrix, Inc /** Cochiti Pueblo, NM, US Army Corps of Engineers fund
- **Rio Grande Resources Corporation – General Atomics**, San Mateo, NM
- **SWCA, Environmental Consultants**, Albuquerque, Phoenix
- **UniTech Services Group**, Santa Fe, NM and Springfield, MA
- **URS Washington Group**, Carlsbad, NM
- **Cavin and Ingram, PC**, Lee Ranch, NM
- **Pajarito Scientific Corporation**, Santa Fe, NM and international

Appendix A. Offeror Data Sheet (RFP Attachment A)

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ATTACHMENT A
OFFEROR DATA SHEET

Note: The following information is required as part of your response to this solicitation. Failure to complete and provide this sheet may result in your proposal being scored lower.

1. **Qualification:** The vendor must have the capability and capacity in all respects to satisfy fully all of the contractual requirements.

2. **Vendor's Primary Contact:**

Name: Gloria E Chavez Phone: 505-220-5552

3. **Years in Business:** Indicate the length of time you have been in business providing this type of good or service:

6 Years Months

4. **Vendor Information:**

eVA Vendor ID or DUNS Number: eVA VS0000087437

5. Indicate below a listing of at least four (4) current or recent accounts, either commercial or governmental, that your company is servicing, has serviced, or has provided similar goods. Include the length of service and the name, address, and telephone number of the point of contact.

A. Company: Rio Grande Resources Contact: Joe Lister

Phone: (505) 287-7971 Fax: (505) 281-7971

Project: Mt. Taylor Uranium Mine/Mill Radiation Safety, planning permits

Dates of Service: since 2006 \$ Value: \$300,000 past-current

B. Company: Parametrix, Inc Contact: Jim Good

Phone: (505) 821-4700 Fax: (505) 821-7131

Project: Cochiti Lake Sediment Characterization (Radionuclides)

Dates of Service: 2010-2011 \$ Value: 82,179

C. Company: SWCA/Neutron Energy Contact: Mike Neuman

Phone: (303) 0492 Fax: (303) 531-0519

Project: Cebolleta Radiation Baseline surveys and assessments for new Uranium mine

Dates of Service: 2012-2013 \$ Value: 65,000

D. Company: Cavin and Ingram, PA Contact: Sealy Cavin, PA

Phone: (505) 243-5400 Fax: (505) 243-1700

Project: Lee Ranch-Johnny M Uranium Mine consultation to legal staff for potential CERCLA action

Dates of Service: January 2012 to 2013 \$ Value: 25,000-50,000

I certify the accuracy of this information.

Signed: _____ Title: President Date: 4/3/2012

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Appendix B. Small Business Contracting Plan (RFP Attachment B)

ATTACHMENT B

Small Business Subcontracting Plan

Definitions

Small Business: "Small business " means a business, independently owned or operated by one or more persons who are citizens of the United States or non-citizens who are in full compliance with United States immigration law, which, together with affiliates, has 250 or fewer employees, or average annual gross receipts of \$10 million or less averaged over the previous three years.

Women-Owned Business: Women-owned business means a business concern that is at least 51% owned by one or more women who are citizens of the United States or non-citizens who are in full compliance with United States immigration law, or in the case of a corporation, partnership or limited liability company or other entity, at least 51% of the equity ownership interest is owned by one or more women who are citizens of the United States or non-citizens who are in full compliance with United States immigration law, and both the management and daily business operations are controlled by one or more women who are citizens of the United States or non-citizens who are in full compliance with the United States immigration law.

Minority-Owned Business: Minority-owned business means a business concern that is at least 51% owned by one or more minority individuals or in the case of a corporation, partnership or limited liability company or other entity, at least 51% of the equity ownership interest in the corporation, partnership, or limited liability company or other entity is owned by one or more minority individuals and both the management and daily business operations are controlled by one or more minority individuals.

All small businesses must be certified by the Commonwealth of Virginia, Department of Minority Business Enterprise (DMBE) by the due date of the solicitation to participate in the SWAM program. Certification applications are available through DMBE online at www.dmbv.virginia.gov (Customer Service).

Offeror Name: Trinitek Services, Inc.

Preparer Name: Gloria E. Chavez Date: 4/3/2012

Instructions

- A. If you are certified by the Department of Minority Business Enterprise (DMBE) as a small business, complete only Section A of this form. This shall not exclude DMBE-certified women-owned and minority-owned businesses when they have received DMBE small business certification.
- B. If you are not a DMBE-certified small business, complete Section B of this form. For the proposal to be considered and the offeror to be declared responsive, the offeror shall identify the portions of the contract that will be subcontracted to DMBE-certified small business in Section B.

Section A

If your firm is certified by the Department of Minority Business Enterprise (DMBE), are you certified as a (check only one below):

☐ Small Business

☐ Small and Women-owned Business

☐ Small and Minority-owned Business

Certification number: _____ Certification Date: _____

Section B

Populate the table below to show your firm's plans for utilization of DMBE-certified small businesses in the performance of this contract. This shall not exclude DMBE-certified women-owned and minority-owned businesses that have received the DMBE small business certification. Include plans to utilize small businesses as part of joint ventures, partnerships, subcontractors, suppliers, etc.

B. Plans for Utilization of DMBE-Certified Small Businesses for this Procurement

Small Business Name & Address DMBE Certificate #	Status if Small Business is also: Women (W), Minority (M)	Contact Person, Telephone & Email	Type of Goods and/or Services	Planned Involvement During Initial Period of the Contract	Planned Contract Dollars During Initial Period of the Contract
Resource International LTD. SWaM S 684640		Anthony Creech 804-550-9200 acreech@resourceintl.com	engineering services	planning, consulting	\$87,839.00
Totals \$					\$87,839.00

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Appendix C. State Corporation Commission (RFP Attachment C)

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ATTACHMENT C

STATE CORPORATION COMMISSION FORM

Virginia State Corporation Commission (SCC) registration information. The offeror:

☐ is a corporation or other business entity with the following SCC identification number: _____ **-OR-**

☐ is not a corporation, limited liability company, limited partnership, registered limited liability partnership, or business trust **-OR-**

☒ is an out-of-state business entity that does not regularly and continuously maintain as part of its ordinary and customary business any employees, agents, offices, facilities, or inventories in Virginia (not counting any employees or agents in Virginia who merely solicit orders that require acceptance outside Virginia before they become contracts, and not counting any incidental presence of the offeror in Virginia that is needed in order to assemble, maintain, and repair goods in accordance with the contracts by which such goods were sold and shipped into Virginia from offeror's out-of-state location) **-OR-**

☐ is an out-of-state business entity that is including with this offer an opinion of legal counsel which accurately and completely discloses the undersigned offeror's current contacts with Virginia and describes why those contacts do not constitute the transaction of business in Virginia within the meaning of § 13.1-757 or other similar provisions in Titles 13.1 or 50 of the Code of Virginia.

****NOTE**** >> Check the following box if you have not completed any of the foregoing options but currently have pending before the SCC an application for authority to transact business in the Commonwealth of Virginia and wish to be considered for a waiver to allow you to submit the SCC identification number after the due date for offers (the Commonwealth reserves the right to determine in its sole discretion whether to allow such waiver): ☐

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Appendix D. RFP Task Matrix

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APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

III.A. Initial Literature Analysis and Recommendations

Number	Description	Task Assignment
1.	Virginia and Other Relevant Studies Utilize summary information prepared by the Uranium Working Group agencies from the existing Virginia uranium mining studies (that is, National Academy of Sciences/National Academies Press [NAS/NAP], Virginia Beach, Roanoke River Basin, Chmura, as well as other relevant studies), and make recommendations relevant to the Board of Health's mission to protect public health and the environment. The summary should include, but not be limited to: uranium milling and mining, public drinking water systems, private wells, cisterns, springs, and recreational water issues, human and animal health (including occupational and reproductive health; teratogenesis; mutagenesis; carcinogenesis; unintentional injury; chronic disease; and toxic exposures (both acute and chronic), silicosis, and other unusual occurrences of diseases of public health concern with special attention to vulnerable populations such as infants and children). a) Review available scientific literature on: 1) epidemiologic studies measuring long-term effects of exposures to radioactive materials and toxic substances as might be encountered in mining operations of the type proposed for Virginia; 2) limitations of available studies and recommendations of public health experts on design of relevant studies. b) Assist VDH with development of surveillance and epidemiologic studies to evaluate short and long term health effects associated with mining. Studies must include consideration of sources for accurate, valid baseline levels of materials of concern in the environment and in animals and humans.	Trinitek: • All except topics set aside for Resource and ORAU. • Animal health • Evaluate findings Resource International: • Review Virginia-based studies pertaining to water quality Oak Ridge Associated Universities (ORAU): • Facets related to toxicology and epidemiology (excluding animal health)

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APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS
III.A. Initial Literature Analysis and Recommendations ... continued

Number	Description	Task Assignment
2.	Existing Regulatory Programs Compares existing uranium mining and milling regulatory programs including Nuclear Regulatory Commission (NRC), any Agreement State programs, and international programs (such as Canada and France) and recommends provisions from within those regulatory programs that are relevant to the Board of Health's mission as described above. Identify where additional requirements may be appropriate to accommodate Virginia-specific population density, rainfall, climate, water table levels, and unique geography.	Trinitek: • All Resource International: • Evaluate findings from a Virginia perspective Oak Ridge Associated Universities (ORAU): • N/A
3.	International Emerging Standards Summarizes pertinent information and studies from such groups as the International Atomic Energy Agency, the World Nuclear Association, etc. and provides recommendations based on this review that are relevant to the Board of Health's mission as described above, including modern best international practices and other emerging standards and technologies. Identify internationally accepted best practices that can be implemented to mitigate the risk of radioactive releases, discussing technologies available to reduce emissions and maintain a focus on pollution prevention and reduction, including strategies for emergency hazards enumerated in the Commonwealth of Virginia Emergency Operations Plan.	Trinitek: • IAEA, WNA, etc. • Nuclear/radiation controls and containments • Strategies for Virginia Emergency Operations Plan Resource International: • Hydrogeology • Pollution Prevention Oak Ridge Associated Universities (ORAU): • N/A

(Continued next page)

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS
III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff

Subsection 1. – Coordinate With VDH Staff

Trinitek will coordinate with VDH staff and be available to attend at least monthly progress meetings to develop analyses of the following items and to develop and provide a final report. The Trinitek project manager will be available to meet with VDH staff, either face-to-face or via conference calls, as needed to develop interim deliverables and the final report.

Number	Description	Task Assignment
a)	Existing Statutes and Regulations Compare the Commonwealth's existing statutes and regulations to recommendations in the initial report.	Trinitek: - Health statutes and regulations - Evaluate findings
b)	Modification or Expansion of Existing Regulations Identify areas where VDH's existing regulations might need to be modified or expanded to ensure protection of public health and the environment.	Resource International: - Environmental quality statutes and regulations Oak Ridge Associated Universities (ORAU): - N/A
c)	Recommended Changes Recommend changes (including statutory changes) to meet these needs.	
d1)	Waterworks Regulations Perform an evaluation that includes a review of the Waterworks Regulations (12VAC5-590 et seq.).	Trinitek: - Evaluate findings Resource International: - All Oak Ridge Associated Universities (ORAU): - N/A
d2)	Disease Reporting and Control Regulations An evaluation that includes a review of the Disease Reporting and Control Regulations (12VAC5-90-90 et seq.) (requirements for reporting by healthcare providers and laboratories).	Trinitek: - Evaluate findings Resource International: - N/A Oak Ridge Associated Universities (ORAU): - All

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff ... continued

Number	Description	Task Assignment
d3)	Private Well Regulations Perform an evaluation that includes a review of the Private Well Regulations (12VAC5-630 et seq.). Develop conceptual framework and initial project costs to determine the impact on quantity and quality of water in private wells and springs and recommended procedures for replacing or remediating affected supplies. Framework should be capable of characterizing an inventory of impacted wells, springs, recreational waters and cisterns.	Trinitek: - Evaluate health impacts - Evaluate findings Resource International: - All except evaluation of health impacts Oak Ridge Associated Universities (ORAU): - N/A
d4)	Facilitate the Stakeholder Process Facilitate the stakeholder process, including any potentially inspected regulated community (at least 5 statewide meetings with separate final report) to gauge concerns and identify possible solutions concerning regulation of public water supplies and private wells as to water quality and quantity.	Trinitek: - All Resource International: - N/A Oak Ridge Associated Universities (ORAU): - N/A
d5)	Recreational Uses of Waters Perform an evaluation that includes a review of the regulations concerning recreational use of waters (campgrounds, summer camps, etc.).	Trinitek: - Evaluate findings Resource International: - All Oak Ridge Associated Universities (ORAU): - N/A

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS
III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff ... continued

Number	Description	Task Assignment
e)	Health Outcomes Data Determine and characterize available data (including national and Virginia-specific data) on potential health outcomes related to exposures of concern. Determine if current reporting requirements and laboratory testing capability cover chemicals likely to be encountered in mining operations under consideration. Determine if current tobacco use surveillance is adequate for establishing baseline data for rates of lung cancer, silicosis, and radon-associated health problems using standard epidemiological analytic methods. Determine whether other available data is sufficient to establish baseline rates for conditions of concern (e.g., current silicosis reporting data) or if retrospective or other studies are indicated to determine baseline rates. Evaluate and propose changes to cancer, congenital malformation reporting if necessary.	Trinitek: - Evaluate findings Resource International: - N/A Oak Ridge Associated Universities (ORAU): - All
f)	Test Case Report Investigation Worksheets and Documents Develop and test case report investigation worksheets and other documents for local Health Department and Central Office use in any necessary investigations for relevant health outcomes.	Trinitek: - Evaluate findings Resource International: - N/A Oak Ridge Associated Universities (ORAU): - All
g)	Locus of Long-Term Health Monitoring Determine locus of responsibility for the long-term monitoring of adverse health effects ensuring worker health and safety as well as additional recommended monitoring.	Trinitek: - Evaluate findings Resource International: - N/A Oak Ridge Associated Universities (ORAU): - All

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff ... continued

Number	Description	Task Assignment
h)	Worker Safety Evaluate monitoring of work spaces, monitoring of exposures for mine workers, tracking of worker cumulative exposures, adequacy of existing MSHA regulations and comparisons with international standards for radon and radon daughters.	Trinitek: • All Resource International: • N/A Oak Ridge Associated Universities (ORAU): • N/A
i)	Environmental and Health Framework Recommend a framework for environmental, human health and animal health monitoring so that data can be maintained in compatible systems for analyzing health effects, including long term monitoring.	Trinitek: • Environmental monitoring except water • Animal health • Evaluate findings Resource International: • Water monitoring Oak Ridge Associated Universities (ORAU): • Facets related to toxicology and epidemiology (excluding animal health)
j)	Impacts to Cisterns and Onsite Sewage Systems Determines potential impacts (if any) on cisterns and onsite sewage systems.	Trinitek: • Evaluation of health impacts • Evaluate findings Resource International: • All except evaluation of health impacts Oak Ridge Associated Universities (ORAU): • N/A

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APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

Subsection 2 – Address VDH-Related Issues

Trinitek recommendations should address VDH-related issues, including those listed below, as well as any other issues identified by Trinitek as being necessary and relevant for effective life cycle regulation of uranium mining and milling in Virginia.

Number	Description	Task Assignment
a)	Water Quality Monitoring Plan for Surface Waters Including but not limited to: 1) Human health risks associated with chemical toxicity; 2) Human health risks associated with radiological toxicity; and, 3) Human health risks associated with consumption of affected animal and marine populations.	Trinitek: • Health risk evaluations • Evaluate findings Resource International: • Preparation of plans Oak Ridge Associated Universities (ORAU): • N/A
b)	Water Quality Monitoring Plan for Groundwaters Including but not limited to: 1) Human health risks associated with chemical toxicity; 2) Human health risks associated with radiological toxicity; 3) Human health risks associated with consumption of affected animal and marine populations; and, 4) The potential impact on groundwater quality and quantity as these affect public wells, private wells and springs.	Trinitek: • Health risk evaluations • Evaluate findings Resource International: • Preparation of plans Oak Ridge Associated Universities (ORAU): • N/A
c)	Adequacy of Virginia’s Water Quality Standards for Groundwater and Surface Waters, and Virginia’s Waterworks Regulations As the above regulations relate to human health outcomes: 1) To address water-soluble radionuclides or absorbed chemicals; 2) To address the potential for undiluted tailings liquids to exceed existing Safe Drinking Water Act standards for uranium; and, 3) To address the potential for revised Public Drinking Water System’s monitoring schedules for radiological contaminants and other hazardous substances within potentially impacted areas.	Trinitek: • Water-soluble radionuclides and absorbed chemicals • Undiluted tailings liquids exceeding SDWA standards • Evaluate findings Resource International: • Address potential revisions to Public Drinking Water System’s monitoring schedules Oak Ridge Associated Universities (ORAU): • N/A

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff ... continued

Number	Description	Task Assignment
d)	Safe Disposal of Mine Waste Evaluate the existing standards for the safe disposal of mine waste as it pertains to human health.	Trinitek: • All Resource International: • Evaluate findings from a Virginia perspective Oak Ridge Associated Universities (ORAU): • N/A
e)	Environmental Impact Analysis Evaluate necessary components of full environmental impact analysis.	Trinitek: • All Resource International: • Evaluate findings from a Virginia perspective Oak Ridge Associated Universities (ORAU): • N/A
f)	Methods for Incorporating "As Low As Reasonably Achievable" (ALARA) Standards To be incorporated into Commonwealth regulations, like those that exist for radiological protection.	Trinitek: • All Resource International: • N/A Oak Ridge Associated Universities (ORAU): • N/A
g)	Financial Assurance Recommendations for compliance period financial assurance mechanisms providing for minimization of long-term impacts to water resources and necessary remediation.	Trinitek: • Evaluate the adequacy of existing NRC requirements for milling • Evaluate findings Resource International: • Evaluate the adequacy of all other pertinent existing requirements and recommend changes Oak Ridge Associated Universities (ORAU): • N/A

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS
III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff ... continued

Number	Description	Task Assignment
h)	Environmental Monitoring Recommendations for environmental monitoring, including but not limited to: 1) Required components of an environmental monitoring plan; 2) Recommended goals to include in an environmental monitoring plan; and, 3) Recommended baseline and characterization data needed.	Trinitek: - Air quality, soil, and biota monitoring portion of plan and baseline/characterization data - Evaluate findings Resource International: - Water quality monitoring portion of plan and baseline/characterization data Oak Ridge Associated Universities (ORAU): - N/A
i)	Evaluate NRC Regulations Evaluation of NRC regulations for milling and tailings management given state-specific climate (e.g., rainfall) and hydrologic considerations.	Trinitek: - All Resource International: - Evaluate findings from a Virginia perspective relevant to state-specific climate (e.g., rainfall) and hydrologic considerations Oak Ridge Associated Universities (ORAU): - N/A

III.C. Assist VDH in Preparing and Presenting Reports

Number	Description	Task Assignment
N/A	Assist VDH in preparing and presenting information and assist in VDH staff's presentations.	Trinitek will lead this portion of the project but will be assisted by Resource International and ORAU as appropriate to complete the task.

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

III.D. Assist VDH in Formulating a Draft Conceptual Regulatory Framework

Number	Description	Task Assignment
N/A	Discuss the reports and recommendations enumerated above with VDH and assist staff in implementing findings/recommendations into a draft conceptual regulatory framework that would address VDH-issues for the entire life-cycle compliance period of milling projects in Virginia, as well as other impacted Commonwealth of Virginia regulations.	Trinitek will lead this portion of the project but will be assisted by Resource International and ORAU as appropriate to complete the task.

Appendix E. Résumés

Trinitek Services, Inc

Oak Ridge Associated Universities (ORAU)

Resource International, Ltd.

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Uranium Study Project Manager	Stanley A Fitch, MSE, CHP, RRPT
SME: radiation regulations, Agreement States-NRC, nuclear material, risk Current Employment: Vice-President, Trinitek Services Capabilities: Practicing in the radiation health physics profession for over 25 years as a manager, technical staff member and technician in occupational, environmental, and regulatory aspects of radiation protection, uranium mining/milling regulatory and operational experiences, radiation measurements and risk assessment, in defense and research applications including reactor operations as well as facilities operations; and at Title 1 and 2 uranium mill tailings reclamation projects (UMTRA), nuclear materials security.	Vice-President: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials MSE-Nuclear and Radiation Engineering ❖ University of Texas At Austin BS Radiation Protection ❖ Thomas Edison State College, New Jersey CHP- Certified by the American Board of Health Physics RRPT - Certified by the National Registry of Radiation Protection Technologists Additional training: RCRA, DOT, Radioactive waste, NRC Inspections, radioactive waste, safety, nuclear material security

Management and Technical Qualifications – Former regulator specializing in managing radiation and environmental protection programs and personnel for 24 years, with budgets in excess of \$1M/year. Primary focus is in the safety of nuclear materials and radiation safety and safeguards.

Radiation/Nuclear Safety Assessments – Extensive experiences and credentials performing radiation surveys, monitoring, radiation detection techniques and processes, assessments and characterization of radiation and radioactivity. Managed and planned projects requiring decontamination, remediation, radiation shielding calculations and design, operational controls and facility controls and processes to control radiation environments, performance assessments audits. Experience in USDOE facilities, USNRC and state regulated facilities, and industry. Worked with nuclear material, classified material and radiation sources in high radiation environments as well as performing baseline and operations surveys.

Radiation Safety Officer (RSO) for Nuclear Fuel Cycle, Industrial And Research Facilities. Extensive experience developing Radiation Protection and Worker Safety Programs, preparing implementing procedures, managing day-to-day operations to ensure compliance with applicable regulations in complex research facilities, uranium industry operations, commercial client operations and facilities.

Radiation Regulatory Framework – Frequent interactions with NRC Commissioners, Region and Headquarters staff, and with the state radiation control program directors. Extensive understanding of the operational framework and internal practices of NRC, Agreement States, DOE, and IAEA.

Teamed with NRC's Office of Nuclear Material Safety and Safeguards (NMSS), OAS, CRCPD, and FDA in promulgation of effective national regulations for public and environmental

health. Also teamed with NRC's Office of Nuclear Security and Incident Response (NSIR) in promulgation of standards for the common defense and security. Chaired the Organization of Agreement States, Inc. (OAS) frequently interacting with USNRC Commissioners and Program Heads.

National Security and Antiterrorism – Co-chaired NRC's Materials Security Working Group (MSWG), which was charged with devising appropriate laws and regulations for safeguarding radioactive materials from malevolent exploitation. The works of the MSWG are now USA federal law and were adopted by the International Atomic Energy Agency (IAEA) and adopted by other nations pursuant to IAEA Code of Conduct.

Incident Response – Worked in close assistance to the National Nuclear Security Administration (NNSA), Department of Homeland Security, Federal Bureau of Investigation, National Guard, and state radiation control agencies in exercising and otherwise preparing for response to radiation incidences and radiological terrorism.

Environmental – Health physics and regulatory oversight of numerous projects (from small to vast) at NRC, DOE, and EPA regulated facilities. NEPA consulting on NPDES, NESHAPS, CWA, and RCRA. Constituents included radioactive, mixed, hazardous, and biological wastes. Research laboratories, D&D of uranium mills and mines. Radiation Safety Officer and health physicist for regulatory oversight and public outreach.

Department of Energy – Radiation protection in the DOE research and weapons framework.

Training – Has taught numerous courses on radiation protection, environmental protection, security of radiation sources, and national and international rules to users of radiation, the public, and regulators.

EMPLOYMENT SUMMARY

Trinitek Services, Inc.

Albuquerque, New Mexico. Vice-President; 2006 to present. Health physics and environmental consulting for customers in the nuclear fuel cycle, uranium production, radioactive waste management, government, industry, medicine, and academia involving uses of radioactive materials, x-ray machines, and particle accelerators.

New Mexico Environment Department, Radiation Control Bureau

Albuquerque office manager and health physicist; 1998 to 2006. Responsible for licensing and regulating radioactive material and radiation machines. Trained by the Nuclear Regulatory Commission and the Conference of Radiation Control Program Directors (CRCPD).

Sandia National Laboratories, Radiation Protection Program

Albuquerque, New Mexico. Project Coordinator and Health Physicist – Facilities Environment Safety and Health (ES&H) Program; Contractor; "Q" cleared; 1993–1998. Responsible for radiation protection oversight of radioactive materials and x-ray machine usage, and construction and maintenance projects across Sandia Labs.

Atlantic Richfield Company, Bluewater Uranium Mill

Grants, New Mexico. Health Physicist and lead technician on this extensive UMTRA Title 2 project; 1988–1993. Managed the counting laboratory and clean-up verification protocols.

Chem-Nuclear Systems, Inc., DOE UMTRA Project

Ambrosia Lake, New Mexico. HP supervisor, lead technician; 1987–1988. Large UMTRA Title 1 uranium mill and tailings remediation project.

PROFESSIONAL AFFILIATIONS

American Academy of Health Physics, member and diplomate (2004–present)

National Registry of Radiation Protection Technologists, member and diplomate (1995–present)

Organization of Agreement States, Inc. (OAS)

Past Chair (2004–2005); Chair (2003–2004); Chair-Elect (2002–2003)

Secretary (2001–2002)

Chairman, OAS Incorporation Working Group (2001–2002)

Health Physics Society (HPS), member (1990–present); member of the Governmental and Societal Relations Committee (2007–present)

HPS Rio Grande Chapter, member (1996–present); President (2007–2008)

Conference of Radiation Control Program Directors, Inc. (1998–present) Past Member, Part U Working Group (for the development of national uranium mill regulations)

International Radiation Protection Association (IRPA)

Attendee of the IRPA-10 and 11 conferences, held in Hiroshima and Madrid, respectively. Speaker at the IRPA-11 conference in 2004, on materials security efforts in the United States of America.

NOTEWORTHY PRESENTATIONS, PAPERS, AND PUBLICATIONS

- *Albuquerque Particle Accelerator Incident*; Annual Meeting of the Health Physics Society; Denver, Colorado; June 2000.
- *Radiological Control and Response to a Terrorist Attack*; Antiterrorism Conference, sponsored by Sandia National Laboratories; Albuquerque, New Mexico; October 2002.
- *Security of Radioactive Materials in the United States of America*; IRPA-11 Congress; International Radiation Protection Association; Madrid, Spain; May 2004.
- *Instrument Sensitivities for Gamma Radiation Surveys*; Midyear Meeting of the Health Physics Society, Scottsdale, Arizona; January 2006.
- *Proposed 1999 Amendment Of The 1990 Radiation Exposure Compensation Act*; Thomas Edison State College; June 1999.
- *Regulatory Requirements Pertinent to Portable Nuclear Gauges, New Mexico Edition*; Copyright © 2006, Trinitek Services, LC; Sandia Park, New Mexico.

- *New Mexico Register*, publication of amendments to Chapter 3 entitled *Radiation Protection*, of Title 20 entitled *Environmental Protection*, of the New Mexico Administrative Code (NMAC); Santa Fe, New Mexico; June 1999, April 2002, March 2004.
- *Topical Report – Options for Disposal and Reapplication of Depleted Uranium Hexafluoride*, 3TKS-TR-08/2008; Copyright © 2008, Trinitek Services, Inc.; Sandia Park, New Mexico.
- *2008 Distinguished Public Service Award — Pete V. Domenici*, Health Physics Society Journal, Volume 95, Number 6, December 2008.
- *Options for Disposal and Reapplication of Depleted Uranium Hexafluoride*; Waste Management Symposium; Phoenix, Arizona; March, 2009.
- Landsberger, S., S. Fitch and K. Dayman, "An Assay of Uranium Ore with Compton-Suppressed Gamma Spectroscopy", Trans. ANS, 102, 181-182 (2010).

TRAINING

Following is a partial list of pertinent courses related to NRC and DOE that Mr. Fitch has completed pursuant to his career:

<u>Year</u>	<u>Course Name and Topic(s)</u>
1988	Department of Energy (DOE) Radiological Control Technician (160 hours college equivalent)
1995	DOE Radiological Control Technician (200 hours college equivalent) Sandia National Laboratories
1998	Gamma Irradiator Radiation Safety (8 hours) MDS Nordion, Inc., sponsored by Ethicon Endo-Surgery Albuquerque, New Mexico
1998	Advanced Transportation of Radioactive Materials (40 hours) [Equivalent to NRC course H-308] United States Department of Energy Albuquerque Training Center
1998	Inspection Techniques for Radioactive Material Regulators (40 hours) ProTechnics Incorporated (vendor) Sponsored by New Mexico Environment Department Albuquerque, New Mexico
1999	Diagnostic and Therapeutic Nuclear Medicine Course H-304 (40 hours) United States Nuclear Regulatory Commission Houston, Texas
1999	Industrial Radiography H-305 (40 hours) United States Nuclear Regulatory Commission Niantic, Connecticut
1999	Well Logging H-314 (40 hours) United States Nuclear Regulatory Commission Houston, Texas

- 2000 Inspection Procedures G-108 (40 hours)
 United States Nuclear Regulatory Commission
 Chattanooga, Tennessee
- 2000 Inspecting for Performance – Materials Version
 G-304 (40 hours)
 United States Nuclear Regulatory Commission
 Orlando, Florida
- 2006 Increased Controls S-201 (40 hours)
 United States Nuclear Regulatory Commission
 Taught at Sandia National Laboratories
 Albuquerque, New Mexico

Alternate Project Manager
Trinitek management support
Gloria E Chavez, Ph.D.
Technical Lead: Environmental Monitoring, Rad Waste

Current Employment: President, Trinitek Services

Capabilities: Practicing in the radiation health physics profession for 40 years as a researcher, manager, technical staff member. International Programs, Radiation Safety, Risk Assessment, Regulations: NRC, Agreement States, DOE, environmental programs and monitoring, emergency management, radioactive waste, nuclear material management, security VA & systems analysis, nuclear quality assurance

President: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants

Education / Credentials

Ph.D. Environmental Health Physics

- ❖ Colorado State U, Dept of Radiology & Radiation Biology

MS Health Physics

- ❖ Colorado State U, Dept of Radiology & Radiation Biology

BS Biology /Chemistry

- ❖ University of NM

Additional training: RCRA, NQA-1, DOT, Radioactive waste, International Program management, radioactive waste, safety, environmental laws, statistics, nuclear QA

Experience Summary: Over 40 years experience in radiation safety and environmental programs working in industry, USDOE National Laboratories (Sandia National Laboratories, Idaho National Laboratory), uranium mill tailings remediation, education and training. Experience in a broad range of health physics and nuclear work areas including: nuclear materials management, transportation, radioactive waste operations, radiation safety and related environmental health and safety compliance programs, nuclear quality assurance, emergency response, program/project management, international programs, systems analysis, nuclear regulatory development, security assessments, education and training. Work for industrial clients, NRC Agreement State, Department of Energy, Department of State, Department of Interior, Department of Justice.

Work experience at Uranium Mill Tailings Remediation Action (UMTRA) projects (1973-1974), the Idaho National Engineering Laboratory, the Nevada Test Site (NTS), Tonopah Test Range, NV and Sandia National Laboratories, Albuquerque, and commercial clients, various locations.

Experience in managing technical, complex, multidisciplinary, multimillion dollar projects/programs and teams, program developer, educator and trainer. Experience in finding solutions to complex technical and management problems. Experience in public speaking media relations, and public hearings and testimony.

- Employed as a scientist for 29 years at Sandia National Laboratories (1979-2008)
- 20-years Radiation Technical Advisor on the New Mexico Radiation Technical Advisory Council (1983 to 2003)
- Adjunct Professor at the University of New Mexico (nuclear engineering department: taught "radiation protection engineering" graduate course; helped set up health physics program)
- Adjunct Professor at the University of New Mexico (civil engineering department: developed and taught "radioactive and mixed waste management" course series) DOE distance learning program)
- Southwest Indian Polytechnic Institute, volunteer professor: "Biology and scientific methodology" for three years.
- Participant on DOE health physics and radioactive waste grant and fellowship selection committees for several years late 1980s to mid-'90's

- Appointed by five NM Governors to the NM Radiation Technical Advisory (1983—2003)
- AEC Fellowship (converted to ERDA, then DOE): Ph.D. Program
- US Public Health Service Training grant: MS in Health Physics, 1973

Management – Current experience “growing” and managing a small woman-owned business as well as extensive prior experience managing small to large and complex international multidisciplinary technical and business teams.

Regulatory- Currently manage a regulatory compliance company focusing on environmental and nuclear areas. Worked at Sandia National Labs (SNL) as an ES&H Coordinator for the ES&H, security, logistics, and facilities VP ensuring regulatory requirements were transmitted, implemented, and compliance assessed for the division of 1000 people. As a New Mexico Governor(s) appointee for 20 years (5-year appointments) to the Radiation Protection Advisory Council (RTAC) participated in numerous public meetings to review radiation protection regulations and ensure compatibility with NRC regulations. Helped write and promulgate regulations on NORM and medical radiation. Participated in enforcement meetings related to NRC Agreement State regulatory compliance. Provided testimony at public meetings on radiation safety issues. Participated in public meetings as Vice-Chair of the RTAC to review WIPP transportation route discussions, public concerns and issues, listening to public testimony and making recommendations. Provided technical support in emergency response to the state of New Mexico in the Co-60 rebar incident.

Nuclear Facility Supervisor – Responsible for nuclear material accountability and control for up to special nuclear material (SNM), and Classified (various levels) for a USDOE SNL non-reactor nuclear facility used for storage of radioactive waste materials. Preparation of USDOE Nuclear Facility Risk Assessment Documents (SAR, FSAR), annual updates, USQs (unreviewed safety questions), Formality of Operations, and all other documents necessary for a compliant nuclear facility per DOE STD 3009-94 and DOE ORDER 420.1, DOE Guide 414.1-2, responding to USDOE review comments and ensuring operational readiness. Member of USDOE EFCOG, Safety Analysis subgroup.

Senior Science Advisor – To the U.S. Department of State (one of five advisors in the USA) on non-proliferation programs (ISTC, STCU, special assignments) in the Former Soviet Union states. Travel to Russia, Kazakhstan, Ukraine.

USDOE Initiatives for Proliferation Prevention (IPP) Program Manager – Over 20 complex, multi-million dollar technical projects involving many Russian nuclear cities, Russian senior technical staff, US senior technical staff, US industry partners; travel to Moscow, Siberia, Troitsk, Ekatarinburg and nuclear facilities. Successes included receiving an R&D 100 Award in 2006 and the establishment of successful commercialization joint ventures between US companies and Russian institutes creating a medical device manufacturing facility in Snezhinsk, an optical laser complex near Troitsk, and a high temperature battery manufacturing capability near Moscow to the mutual benefit of the US companies and Russian former weapon scientists.

Emergency Response Environmental Duty Officer – While at Sandia National Laboratories, responsible for decisions and actions related to environment, safety and health on behalf of Sandia in emergencies.

Radioactive Waste – Worked in Radioactive Waste operations at SNL from 1979 as project leader, later technical manager, and returning as a Waste certification Official over a 20year time frame. Was on DOE LLW teams to develop policy. Taught university classes on radioactive, LLW and mixed waste. Wrote NORM regulations for New Mexico. Also worked in

TSCA, RCRA and other areas. Sandia National Laboratories Mixed Waste and TSCA Program manager

Research – Radiologic characterization of a radioactive/mixed waste disposal site at SNL. Modeling the atmospheric releases (submicron radioactive aerosols) from a fuel processing facility in Idaho (National Reactor Testing Station, now the INEEL).

Environment, Safety and Health (ES&H) – Worked in environmental programs at Sandia National Laboratories (SNL) for over 20 years including. As Environmental Program Manager developed, managed and expanded SNLs environmental programs, performed environmental remediation assessments for radioactive waste disposal sites. Worked as TSCA (PCBs) Project Leader, Technical Manager for radioactive and mixed waste facilities and Radioactive waste operations: designed, developed, implemented radioactive waste operations program, Radiation Measurements Project Leader (Dosimetry manager); set up environmental Dosimetry program; managed personnel Dosimetry program and supported underground testing radiation measurements. As Environmental, Safety And Health Division Technical Manager and coordinator reporting to the Vice-President for ES&H, responsible for ensuring SNL ES&H operations were complete and effective, implementing new requirements lab-wide, Conducting management compliance assessments for all ES&H programs including RCRA, OSHA, CWA, CAA,

Nuclear Facility Training Manager – Responsible for development and implementation of a training and qualification program for nuclear facility supervisors, material handlers and staff including development of scenarios for emergency response evaluations in the event of a criticality or other incident, meeting USDOE Order requirements.

Nuclear QA Program Manager – Responsible for setting up and implementing nuclear quality assurance (QA) program for critical processes, supporting nuclear facilities, radioactive waste certification. 10CFR 830.120, subpart A.

NQA-1 Certified Lead Auditor – Conducted numerous audits of radioactive/mixed waste treatment and disposal facilities, radioactive waste container suppliers; developed supplier qualification program, later implemented by SNL's supplier program. Ensured SNL waste certification program met requirements for NTS (Nevada Test Site) WAC (Waste acceptance Criteria). Selected as NTS Waste-Certification Official (WCO) Working Group Chair.

Project Leader and Systems Analyst – For SNL and U.S. Department of Justice, a successful Community Security Systems Assessment Methodology (CVAM), in use throughout USA. Developed a "Train-the-Trainer" curriculum. Managed this multidisciplinary team consisting of senior technical staff, weapons experts (former Navy Seals, special forces, state police, security forces) resulting in a copyrighted training program producing royalties. Developed and implemented a training program for the methodology. Conducted security systems assessments for Department of Interior (Water systems, dams), National Park Service (icons including Washington monument, Mount Rushmore, St Louis Arch), communities, U.S. Marshall, and State of New Mexico.

Security Systems Assessments Team Leader – For US Department of Justice and U.S. Department of Interior, evaluations of critical infrastructure systems including dams, water systems, facilities.

Project/Program Manager – Experience managing multidisciplinary technical, international, complex teams on multimillion dollar projects and programs.

Security Clearance – Held Q-Clearance (W) from 1979 to 2007.

Trainer/Educator – Curriculum development and instructor on radiation safety, integrated safety analysis, hazard assessments, radioactive waste, QA, supplier qualifications, and security systems analysis.

EMPLOYMENT SUMMARY

Trinitek Services, Inc. Experience (2007 to Present)

- President, Trinitek Services, Inc., a woman-owned small business offering environmental and nuclear safety consulting. Responsible for management of day-to-day operations, marketing and business development.
- Technical contributor to client projects including uranium ion exchange processes.
- Development of Environmental Report structure for uranium deconversion facility as part of permitting process.
- Sampling and Analysis Plan for radionuclide characterization in sediments
- Radiological characterization of Sediments in rivers and tributaries
- Radiation Health Effects listener for public meetings with tribes
- Comprehensive Radiation Safety Training for EAEA (Egyptian Atomic Energy Authority) under MOU with New Mexico Tech U, US DOE funding.

Sandia National Laboratory Experience (1979 to 2008)

International Programs: 2003-2008

- Senior Science Advisor to the Department of State (one of five in the USA) on non-proliferation programs (ISTC, STCU, special assignments) in the Former Soviet Union States (travel to Russia, Ukraine, Kazakhstan institutes including Stepnogorsk).
- USDOE Initiatives for Proliferation Prevention (IPP) Program Manager (Over 20 complex, multi-million dollar technical projects involving many Russian nuclear cities, Russian senior technical staff, US senior technical staff, US industry partners; travel to Moscow, Siberia, Troitsk, Ekatarinburg and nuclear facilities).
- Successes included receiving an R&D 100 Award in 2006 and the establishment of successful commercialization joint ventures between US companies and Russian institutes creating a medical device manufacturing facility in Snezhinsk, an optical laser complex near Troitsk, and a high temperature battery manufacturing capability near Moscow to the mutual benefit of the US companies and Russian former weapon scientists.

Security Systems and Consequence Analysis: 2002-2003

- Project Leader and Systems Analyst for Successful Department of Justice funded Community Security Systems Assessment Methodology, in use throughout USA, multidisciplinary team consisting of senior technical staff, weapons experts (former Navy Seals, special forces, state police, security forces) resulting in a copyrighted training program producing royalties. Developed and Implemented training program for methodology.
- Department of Interior Security Systems Assessments for critical Infrastructure Systems analyst team member.
- Project member for High level waste tanks clean-up process at Hanford supporting CH2M Hill efforts.

Nuclear Facilities: 2000-2002

- Nuclear facility supervisor responsible for nuclear material accountability and control for up to SNM, and Classified (various levels)
- Nuclear facility training manager responsible for development and implementation of training and qualification program for nuclear facility supervisors and staff including development of scenarios for emergency response evaluations in the event of a criticality or other incident.
- Preparation of Nuclear Facility Risk Assessment Documents (SAR, FSAR)
- Nuclear QA program manager set up QA program for critical processes
- Member of EFCOG Working Group on Safety systems

Radioactive Waste Certification, Nuclear Quality Assurance: 1986-1991

- NQA-1 certified lead auditor: conducted numerous audits of radioactive/mixed waste treatment and disposal facilities, radioactive waste container suppliers; developed supplier qualification program later implemented by SNL's supplier program
- DOT shipper for radioactive and hazardous materials (DOE/NRC)
- Waste certification official for radioactive waste disposed at NTS, and elsewhere.
- Chair of DOE Waste Certification Official Working Group, NTS
- Member of DOE Packaging and Management Council

Environmental Safety and Health (ES&H): 1991-1996

- Environmental , Safety And Health Division Technical Manager and coordinator reporting to the Vice-President for ES&H, responsible for ensuring SNL ES&H operations were complete and effective, implementing new requirements lab-wide
- Conducting management compliance assessments

Environmental Programs, TSCA-RCRA, Radioactive Waste Operations, Emergency Response 1984-1991

- Environmental program manager: managed and expanded SNL's environmental programs
- Radioactive waste disposal site characterization
- TSCA (PCBs) Project Leader
- Emergency Response Environmental Duty Officer for SNL responsible for decisions and actions on behalf of Sandia in emergencies
- Technical Manager for radioactive and mixed waste facilities and Radioactive waste operations: designed, developed, implemented program
- Depositions for EPA remediation action
- Prepared SNI's environmental monitoring reports for Albuquerque, Livermore, Tonopah, Kauai for 10 years.

Radiation Dosimetry, Environmental Monitoring 1979-1984

- Radiation Measurements Project Leader (Dosimetry manager); set up environmental Dosimetry program; managed personnel Dosimetry program and supported underground testing radiation measurements
- Environmental program manager: developed SNLs environmental programs

- Performed environmental remediation assessments for radioactive waste disposal sites

Miscellaneous (1973 to 1979)

- Uranium Mill Tailings Remediation Action Project, Grand Junction: Working Level measurements
- Fort St. Vrain fuel loading radiological assistance
- Field Research modeling atmospheric releases from fuel reprocessing facilities at INEL
- Characterization and assessment of highly radioactive test reactor leaching ponds at INEL

TECHNICAL RECOGNITION AND ACCOMPLISHMENTS

- 2010. Sandia National Laboratories, Licensed copyright award for Community Vulnerability Assessments Methodology
- 2010. Emeritus Status, Health Physics Society
- 2008. Selected as Health Physics Society Fellow, Pittsburgh, PA.
- 2007: Selected as a Sandia National Laboratory "Women's Hall of Fame Winner"
- 2006 R&D 100 Award winner (Chicago), Program manager and team leader for international, multidisciplinary engineering team. The 100 most significant, newly introduced research and development advances in multiple disciplines. Winning one of the R&D 100 Awards provides a mark of excellence known to industry, government, and academia as proof that the product is one of the most innovative ideas of the year, nationally and internationally.
- Invited speaker to ANS Winter meeting in New Orleans, 2006: Russian Nuclear cities
- 2004-2007 Member (representing SNL) of DOE ILAB nonproliferation laboratories committee
- 2004-2006 Selected as US Department of State Senior Science advisor in nonproliferation programs in FSU countries primarily for radiological, chemical and biological WMD scientists, traveling to Russia, Kazakhstan and Ukraine
- 2003-2004 Royalty stream for successful Systems Analysis Community Security Assessment Methodology for Department of Justice considering multiple terrorist factors and consequence analysis
- 2002-2003 Selected as Chair for the DOE Nevada Test Site Waste Certification Official (WCO) radioactive waste disposal Working Group
- Selected by HPS Directors as a USA Delegate to the International Radiation Protection Association (IRPA) Congresses: the 1996 Congress (Vienna, Austria), 2000 congress (Hiroshima, Japan), 2004 Congress (Madrid, Spain). Attended by 1500 scientists from 60 countries. As delegate, vote for new officers, new policies, future meeting sites, negotiate with other country delegates on issues.
- Invited speaker to Los Alamos Emergency Responder Symposium, 2003
- Member of the HPS Strategic Planning Committee, 2002 -2004
- Member of HPS International Committee 1997 to 2001.
- Elected to Board of Directors National Health Physics Society (1993 - 1996).
- Selected as Participant on DOE health physics and radioactive waste grant and fellowship selection committees for several years late 1980s to mid-'90's
- Member of HPS Publications Committee (1991 - 1993)
- Member and Chair of National Health Physics Society Technical Program Committee (1988 - 1991),
- Member and Chair of National Health Physics Society Technical Program Committee (1988 - 1991), Responsible for technical programs at Anaheim 1988 HPS meeting

(350 international, technical presenters and 2500 attendees), Albuquerque 1989 HPS annual meeting (2000+ attendees).

- City of Albuquerque Award for bringing in large convention, presented by Mayor
- WYCA Woman of the Year (Woman on the Move) in Science and Technology for New Mexico, 1989
- Appointed by several Governors of New Mexico as Member of Radiation Technical Advisory Council (RTAC) (1985 - 1990; 1992 - 1996, and 1997 to 2002. Reappointed in 2003. Vice-Chairman of RTAC - 1990 - 1991.
- Member of Rio Grande Chapter HPS Public Information Committee (1983-1986), planned/assembled State Fair Booth, participated in various speaking activities
- 1989 Local Arrangements Committee Member Mid-Year HPS, Publicity Chair-Media.
- Publicity Chair for Albuquerque Mid-Year symposium 1983, hosted by the Rio Grande Chapter HPS President and Board Member for Rio Grande Chapter Health Physics Society (HPS) (1981 - 1983).
- Winner of Best Student Presentation, Health Physics Society Annual Meeting, Minneapolis, MN, 1978
- US DOE Fellowship 1976 - 1978
- US ERDA: Fellowship 1975-1976
- US AEC Fellowship 1974 -1975 at National Realtor Testing Station (NRTS, now INEEL)
- US Public Health Service Training Grant, 1973
- 1970 Nominated to Sigma Xi
- 1968 Several Scholarships to the University of New Mexico
- 1968 Awards for 4.0/4.0 Math in HS
- National Honor Society 1964-1968

PUBLIC SERVICE / VOLUNTEER

- 2011 –present Member of Hug-Li's: make dolls for children with terminal illnesses in hospice
- 2009-2011 Member of the National Adoption Exchange Board of Directors
- 2009-2011 Chairman of the New Mexico Adoption Exchange Advisory Board
- 2007-2011 Member of the New Mexico Adoption Exchange Advisory Board, a non-profit national organization finding adoptive homes for hard-to-place kids (teens, sibling groups, medical)
- 2006- present Adoption Spokesman for the Adoption Exchange and New Mexico Children Youth and Family Department (NM CYFD)
- 2006-2007 Women in Philanthropy
- 2004-2005 Treatment Foster Parent
- 2000-2002 Founding Member of East Mountain Charter High School Governing Board, groundbreaking, fundraising, selection of new principal for highly acclaimed new H.S.
- Three-year volunteer instructor at SIPI (Southwest Indian Polytechnic Institute)
- Volunteer for MANOS teaching minority HS kids radiation physics in workshops
- Long-term member of the Sandia Labs Hispanic Council and minority organizations 1997 –1998. Member of Women's Art Group.
- Planned and implemented Sandia's 1996 Hispanic Heritage Month Activities.
- 1990 - 1997. Member of Sandia National Labs' Hispanic Leadership and Outreach committee. Volunteer speaker, mentor, career fairs etc., for numerous minority education and public science education programs.

- 1995 - 1998. Elected to Board of Directors of the Friends of the Rio Grande Botanic Garden, the newest Botanic Garden in the USA, fundraising and design input, Secretary and Publicity Chair.
- 1989-1996 Member of Albuquerque Council for International Visitors, greeting/hosting in home visits State Department Dignitaries (and translator) as requested, including: Minister of Justice from Turkey, Past-President of Ban's Birth from Chile, South America, President of the Montenegro-Helsinki Peace Accord from Montenegro, Educator from South Africa in charge of developing new integrated school system since the cessation of apartheid
- Selected as member of women's art group: public art focus 1994
- 1984 - 1994. Member of Sandia's Volunteers in Action Committee
- 1988 - 1995. Docent for New Mexico Natural History Museum
- 1988-1995 Docent for Rio Grande Nature Center V leading interpretive walks and providing training for other docents in ecological/environmental areas
- 1985-1988 Secretary for the Ranchos de Placitas Architectural Committee, review and approve designs of new homes in the community to ensure covenants adhered to, water supplies adequate, design consistent with passive solar design for homes from \$250K +
- 1983-1989 Member of Rio Grande Chapter of the Health Physics Society: public information committee (planned/assembled State Fair Booth, participated in various speaking activities), past president and board member
- 1984 - 1994. Member of Sandia's Volunteers in Action Committee

Other Experience

Designed and built a very effective passive solar home (4000 SF area), plus extensive landscaping and courtyard design to fit into environment, efficiently collect and store solar energy for heat. Design included complex curves and varying, complex roof and wall lines, greenhouse additions, clerestory windows, insulation specifications. Tasks included designing and writing specifications, doing preliminary architectural renderings, calculating beam loading and roofing specifications, cost estimating, scheduling, conducting property survey for drainage and foundation, purchasing construction materials, laying and pouring foundation, building adobe walls, sheet-rocking, interior finishing, laying and cutting flagstone floors and walls, laying complex brick floors, welding gate (over 400 welds), selecting and daily oversight of subcontractors for electrical, plumbing, and framing to specifications meeting designated codes. Completed house stayed at no less than 60 degrees F for two winters until supplemental heating was installed. Design was copied by many contractors due to attractive design.

Designed radioactive and mixed waste packaging, management, storage facility at Sandia National Labs for Low-level, mixed waste including nuclear material and classified waste. Project oversight for construction with AE.

PUBLICATIONS, PRESENTATIONS, AND TRAINING

- Publications, presentations, training in numerous areas including health physics, environmental health physics radioactive waste management, nuclear quality assurance, radioactive material packaging, international programs, Russian decontamination technologies for high level waste, emergency management, systems analysis methodologies for critical infrastructure protection.

- Presentations at HPS, DOE National Packing Council (QA – 2001 Seattle, WA), ANS invited speaker (2005, New Orleans – radioactive waste decontamination technologies partnering with Russians at MCC, Zheleznogorsk, Siberia)
- IRPA-Madrid, Spain (2004), international radioactive waste technologies.
- Invited Co-speaker with Senator Domenici on non-proliferation programs (2006) at the National Atomic Museum, Albuquerque, NM.
- 2003, National Response team presentations at LANL and at SNL on systems analysis and consequence assessments.

Additional Experience as an Educator/Trainer

- 2011. Radiation Safety Basics. Private client
- 2010. Developed and conducted an extensive Comprehensive Radiation Safety and Source Recovery Training for 15 Egyptian Atomic Energy Authority Staff, under contract to New Mexico Tech U, funded by US DOE
- 2009 and 2010. Developed a series of course curriculums for radiation safety professionals, Trinitek Services, Inc. under an MOU with New Mexico Tech (New Mexico Institute of Mining and Technology).
- 2003. Project Leader and Course Developer for community vulnerability assessment methodology and train-the-trainer course, Sandia National Laboratories (funded by the Department of Justice).
- 2001 through 2003. As Nuclear Facility Training Supervisor at Sandia National Laboratories, developed and implemented the training curriculum and qualification process for nuclear facility management, operations staff and material handlers.
- 1994. Technical Advisor and Lead Presenter for University of New Mexico College of Engineering Waste Energy Research Consortium (WERC), Mixed Waste Program Series, a graduate distance learning program for university credit. Developed Concept for the six-week program covering regulations, sources, waste management options for radioactive mixed waste, Selected Program Leaders, speakers and coordinated series. Televised to 170 receptor sites from Alaska to Washington, DC. Translated into Spanish and Russian.
- 1993. WERC Teleconference Presentation, on Mixed Waste (part of Low Level Waste series), 70 receptor sites in USA.
- 1993. Guest Lecturer on Mixed Waste, UNM Graduate Hazardous Waste Seminar, Civil Engineering Seminar Series.
- 1992. Adjunct Professor UNM, Nuclear Engineering Dept. "Radiation Safety Engineering", Graduate Course. Televised to University locations across USA as part of distance learning programs.
- 1991 and 1993. Trainer on Radiation Safety, International Safeguards, for International Safeguards Agencies, sponsored by Sandia National Laboratories.
- 1990 and 1991. Faculty for Executive Enterprises Mixed Waste Seminars, Presentation and Publication at Seattle, WA; Washington, D.C.; and Albuquerque, NM.
- 1989-1991 and 1997-1998. Instructor at the Southwest Polytechnic Indian Institute, Albuquerque, NM.
- 1982-1987. Faculty for Radiation Protection Technologists.
- 1982. Instructor for SNL Legal Staff, Radiation Effects, Pleasanton, CA.

PROFESSIONAL AFFILIATIONS

Current

Health Physics Society; Fellow; Emeritus Member, Plenary member since 1979

Rio Grande Chapter membership
The Institute of Nuclear Material Management (INMM)
Local chapter Membership
American Society of Safety Engineers
Professional and the Latino Workforce
Local chapter membership

Former

- International Radiation Protection Association (IRPA) Congress, selected as USA Delegate to the 1996 Congress (Vienna, Austria)
- IRPA Delegate to 2000 Congress (Hiroshima, Japan),
- IRPA Delegate 2004 Congress (Madrid, Spain).
- Past Member of the American Nuclear Society
- SACNAS Spanish American Chicano Native American Society for Engineers and Scientists
- WES Women in Engineering Society
- MAES Mexican American Engineering Society
- Eastern Idaho Chapter of HPS (1975–1978)

BUSINESS MEMBERSHIPS

- Member of the Albuquerque Hispano Chamber of Commerce (AHCC) International Committee
- Albuquerque Hispano Chamber Of Commerce (AHCC) Member (Trinitek Services)
- Better Business Bureau Member (Trinitek Services)
- Procurements Technical Assistance Program (PTAP)

Uranium Study SME	Theodore A. Wolff, Ph.D.
SME: NEPA Current Employment: Trinitex Services, Inc. Capabilities: NEPA, Radiation Programs, uranium licensing, emergency management, compliance inspections. Ted has a broad background in institutional issues and government relations both with the State of New Mexico and at Sandia Labs in 40years. His experience includes working as a manager in the State of New Mexico Radiation Control Bureau, prior to coming to Sandia. He was responsible for helping the State of New Mexico conduct strategic planning and interacted with a variety of agencies and officials at the federal, state, county, local and tribal governments.	Scientist: Trinitex Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials Ph.D. Biology ❖ University of Utah, Salt Lake City, Utah, MS Public Health ❖ University of North Carolina, Chapel Hill B.S. Biology ❖ New Mexico Highlands University Additional Training: Qualified evaluator by Federal Emergency Management Agency training for emergency response activities.

2009-2012 Ted Wolff was an internal environmental and safety auditor and led a number of successful audits at Sandia National Laboratories (SNL). Prior to joining the auditing Department, at SNL, he supported risk assessments, emergency response activities, and improvement opportunities for the annual emergency response exercise. Ted also assisted in National Environmental Policy Act (NEPA) analysis and coordination for inactive uranium mill tailing sites. As part of interdisciplinary teams he prepared NEPA documents for Department of Energy (DOE). As the task leader for NEPA compliance at SNL, he developed a strategy for compliance with NEPA for the Kauai Test Facility (KTF). This facility was operated by SNL for the DOE. Completed documentation provided the KTF with a competitive advantage over other rocket launching facilities. The work was documented in a paper co-authored and published in the Environmental Practice by Cambridge University Press. Ted also helped plan, write, and produce a number of Environmental Assessments and Environmental Impact Statements for various proposed actions. This included being part of a interdisciplinary team that drafted the Environmental Assessment for the conversion of highly enriched uranium (HEU) to low enriched uranium (LEU) and the transportation of the LEU to the U.S. from Russia. This work was completed for the DOE.

Special Projects, Public Relations and Communication

He supported the SNL Center Director with risk assessments, emergency response activities, and improvement opportunities for the annual emergency response exercise for the labs, and served on the Integrated Laboratory Management System Core Team, promote mission success through operational excellence, and support

the Center Director in preparing for the Audits and related ES&H compliance activities.

Institutional Issues and International Experience

I have a broad background in institutional issues and government relations both with the State of New Mexico and at SNL. His experience includes working as a manager in the State of New Mexico Radiation Control Bureau, prior to coming to Sandia. He was responsible for helping the State of New Mexico conduct strategic planning and interacted with a variety of agencies and officials at the federal, state, county, local and tribal governments. He responded to requests from Congressional staff for the Governor, reviewed state and federal legislation, and testified before state legislative committees, and served the Governor of NM and his Environmental Secretary as the staff person for the President's State Planning Council. This activity required trips to Washington, D.C. and elsewhere. He managed the NM Radiation Protection Bureau and oversaw radiation protection practices across the state. Concurrent with duties as head of that program, he served as the Governor's state liaison officer to the U.S. Nuclear Regulatory Commission, and represented New Mexico on radiation issues at meetings of the Western Interstate Energy Board, the National Governor's Association, and the Conference of Radiation Control Program Directors.

While at Sandia, he was appointed by the governor to the State's Radiation Technical Advisory Council and served on this Council for a number of years. Because of his institutional issues experience at Sandia with the transportation of radioactive materials, the DOE head of the WIPP Pilot project requested and facilitated his loan to the Joint Integration Office for the WIPP for a yearlong assignment. In 2002, DOE excerpted an article that he co-authored and published it in a headquarters' publication. Ted supported the DOE/NNSA for several months in the Russian Federation where he conducted transparency monitoring for the conversion of highly enriched uranium to low enriched uranium. Both activities required exceptional performance and a high degree of cultural sensitivity.

As a member of Sandia National Laboratories' technical staff, he assisted in the National Environmental Policy Act (NEPA) analysis and coordination for inactive uranium mill tailing sites for which DOE had assessment and environmental restoration responsibilities. He analyzed radioactive material transportation issues, took part in interdisciplinary teams that wrote NEPA documents for DOE and was the task leader for an institutional issues analysis program conducted for the DOE's Defense Programs and Civilian Programs. He was the key person who developed a strategy for compliance with NEPA for the Kauai Test Facility (KTF). The completed documentation provided the KTF with a competitive advantage over other rocket launching facilities. This work included in a paper he co-

authored that was published in Environmental Practice in 2007 by Cambridge University Press.

Ted was part of an interdisciplinary team that helped prepare the Environmental Assessment for the Conversion of highly enriched uranium (HEU) to low enriched uranium (LEU) and the LEU Transportation to the U.S. from Russia. This work was completed for the DOE/NNSA. He also helped plan and produce a number of Environmental Assessments and Environmental Impact Statements for various projects. Ted worked in Sandia's Environmental Safety and Health program and worked on various environmental protection issues (PCB management, air permitting, hazardous material release reporting, etc.). As the team leader, he developed a Sandia-wide NEPA program. His prompt and responsive support of data collection needed by DOE Headquarters for the preparation of a programmatic Environmental Impact Statement for the Reconfiguration of the Nuclear Weapon's Complex led to an "Award for Excellence."

Community Involvement and Issues Management Department:

In this position, I was involved in a number of environmental issues and educational outreach activities and public involvement activities which included chairing, facilitating, and coordinating committees. I served on the Board of Directors of Shared Vision, a community non-profit whose mission included convening and facilitating public deliberation and taking action on major issues that are crucial to the future of the Albuquerque metropolitan area.

Mid-Region Council of Governments (MRCOG) of New Mexico Urban Transportation Planning Policy Board's Public Involvement Committee (PIC): MRCOG conducts area-wide cooperative and comprehensive planning on transportation issues. I serve as Sandia's representative of the PIC, which is the Council's outreach effort for public input on transportation issues. The Council uses input from the PIC to conduct area-wide cooperative and comprehensive planning.

Greater Chamber of Commerce: serve on the Transportation Planning Council

Judge co-chair 2007 Intel International Science and Engineering Fair. Host Committee Board Member and Intel International Science and Engineering Fair-Judge co-chair with responsibility for recruiting, training, and managing ~1,000 judges for 1,500 student projects.

Judge Chairman for Annual Northwestern New Mexico Regional Science and Engineering Fair: I organize and assist science fair judges with Senior and Junior Science Fair Exhibits, award prizes, and advance worthy exhibitors to state and national science fairs.

New Mexico Environmental Health Conference Planning Committee: I serve on the planning committee for this annual conference that has attracted up to 600 attendees. Sandia is a Conference planning partner. I am working to propel the Conference into a position as the premier Environmental Health Conference in this region.

Adventures in Science and Knowledge (ASK): I worked with Sandia volunteers to produce a pilot on-line "textbook" to promote on-line teaching via an Internet Home page for 5th grade children.

School to World: I organized and managed the Health and Medicine Cluster for this very successful careers awareness event.

Miscellaneous Volunteer Activities: I participated in the annual Peace Corps Day activities, Habitat for Humanity, School to World, US Savings Bond Drive, was a loaned executive to the Central NM United and participated on Way United Way Fund Review Panels.

Peace Corps Volunteer, U.S. Department of State- I completed 12-week Intensive training program that included teaching methodology, Malay language, Malaysian and Asian area studies and health science at Northern Illinois University and the University of Hawaii at Hilo, Hawaii. My principal assignment was as a Health Science and Biology teacher at the Sultan Abdul Aziz School, Kuala Selangor, Malaysia. I prepared students for the Senior Cambridge School Certificate examinations, both set and marked in England. I also advised the science society, organized a science fair, and participated in various Asian community activities.

I have made a number of presentations at conferences, training sessions and at DOE Headquarters.

REPRESENTATIVE PUBLICATIONS & PRESENTATIONS

Reviewing NEPA's Past: Promoting NEPA's Future Roger P. Hansen, J.D., AICP, Aurora, CO

Theodore A. Wolff, Ph.D., Albuquerque, NM, published December 2012 in Environmental Practice, Cambridge University Press.

Wolff, T. A. and Lewis T. Nielsen "The Mosquitoes of New Mexico" 128 pages, June 2007 UNM Press, 2008 New Mexico Book Awards Finalist

Hansen, R. P., T. A Wolff and Albert G. Melcher NEPA and Environmental Streamlining: Benefits and Risks. Proceedings of the Conference of the National Association of Environmental Professionals April 23-26, 1996 Albuquerque, New Mexico, published June 2007 in "Environmental Practice" Cambridge University Press.

Hansen, R. P., and T. A. Wolff. "Making NEPA More Effective and Economical for the New Millennium," Federal Facilities Environmental Journal/Autumn 2000.

Wolff, T. A. and R. P. Hansen. "National Environmental Policy Act (NEPA) Compliance at Sandia National Laboratories/New Mexico (SNL/NM)," SAND98-1691, Sandia National Laboratories, Albuquerque, New Mexico

Hansen, R. P., and T. A Wolff. "Streamlining the Process: A Strategy for Making NEPA Work Better and Cost Less" Proceedings of the Conference of the National Association of Environmental Professionals, Environmental Management: Linking NEPA, ISO 14000 and Sustainable Development June 20-26, 1998 San Diego, California

Hansen, R. P., T. A Wolff and Lance N McCold "The Conflict of Interest Problem in EIS Preparation" Proceedings of the Conference of the National Association of Environmental Professionals May 19-22, 1997 Orlando, Florida

Wolff, T. A. and R. P. Hansen. "Tools for NEPA Compliance: Baseline Reports and Compliance Guides" Proceedings of the Conference of the National Association of Environmental Professionals, Practical Environmental Directions: A Changing Agenda, June 2-6, 1996.

Wolff, T. A. and R. P. Hansen. "Use of Comprehensive NEPA Documents to Reduce Program Risk" Proceedings of the 1994 Conference of the National Association of Environmental Professionals, Global Strategies for Environmental Issues, New Orleans, Louisiana, June 12-15, 1994.

Wolff, T. A. and R. P. Hansen. "The NEPA Threshold Question Revisited: Proposed "Actions and Continuing Activities" Proceedings of the 1993 Conference of the National Association of Environmental Professionals, Current and Future Priorities for Environmental Management, Raleigh, North Carolina, May 24-26, 1993.

R. P. Hansen and T. Wolff. "NEPA/CERCLA/RCRA Integration: Policy Vs Practice" Proceedings of the 1993 Conference of the National Association of Environmental Professionals, Current and Future Priorities for Environmental Management, May 24-26, 1993.

Will Keener, Stephen S. Baca, Maureen Baca, Al Stotts, Tami Toops, and Ted Wolff, Sandia National Laboratories and Department of Energy "New Model for Public Participation at Sandia National Laboratories: What Comes After Environmental Restoration?" Waste Management 00, Tucson, AZ.

Wolff, T. A. 1989. "Survey of States for Existence of Large Truck Accident Rates and Databases That Could Be Analyzed To Obtain Large Truck Accident Rates." SAND880626. TTC0790. Albuquerque, NM: Sandia National Laboratories.

Wolff, T. A. and J. D. McClure. 1987. "Institutional Issues Analysis of the Transportation Technology Center." SAND861899. TTC680. Albuquerque, NM: Sandia National Laboratories.

Wolff, T. A. "Development and Use of Generic Documents for Assessing the Impacts of Transporting Nuclear Materials." Waste Management '86, Tucson, AZ.

Wolff, T. A. and J. D. McClure. "The Transportation Technology Center Institutional Issues Program and Emergency Preparedness, Waste Management '85, Tucson, AZ.

Wolff, T. A. 1984. "The Transportation of Nuclear Materials" SAND840062. TTC0471. Albuquerque, NM: Sandia National Laboratories.

Uranium Study SME

SME: Risk Assessment, modeling, chemical engineering QA

Current Employment: John Hart and Associates

Capabilities: Mr. Djordjevic has over 16 years of environmental management experience mainly supporting the U.S. Department of Energy (DOE). This experience encompasses analysis of performance, risk, safety and design issues related to the generation, storage, characterization, transportation, and disposal of radioactive and mixed transuranic (TRU), low-level, and high-level radioactive wastes..

Sinisa Djordjevic

Scientist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants

Education / Credentials

Ph.D. Studies Engineering

❖ University of New Mexico,

Master of Chemical Engineering

❖ Illinois Institute of Technology, Chicago, IL,

B.S., Chemical Engineering

❖ Northwestern University, Evanston, IL

Certifications and Affiliations

Engineer in Training (State of New Mexico)

Registrar Accreditation Board (RAB) - Environmental Management Systems Provisional Auditor (Certificate No. E051661)

American Institute of Chemical Engineers, Member

Association of Energy Engineers, Senior Member
New Mexico Hazardous Waste Management Society, Member

ANSI-RAB & EARA Approved ISO 14000 Lead Auditor Training, QSD, 1997

Radiation Safety Training Certificate, University of New Mexico, 1992

OSHA Site Remediation and Hazards and Protection Training, IT Corp., 1991

Professional Qualifications

He has specialized experience and skills in the following areas:

- TRU and Mixed Waste Management and Transportation
- Risk and Performance Assessment
- Development and Application of Computer Simulation Models
- Waste Characterization and Certification
- Regulatory Compliance
- Remedial Systems Design and Analysis
- Systems Analysis and Engineering
- Environmental Data Management
- ISO 14000 Environmental Management Systems (Planning, Implementation, Gap Analysis, Auditing, and Training)
- Energy Management
- Information Systems Architecture, Research, and Brokering
- Innovative and Emerging Environmental Technology Modeling and Analysis
- Industrial Ecology and Sustainable Development
- Computer Software Services, Programming, Graphical User Interface Development

- Quality Assurance and ISO 9000 Quality Management Systems
- Educational Systems and Training

Experience

John Hart and Associates, P.A.

Albuquerque, New Mexico

1998-present

Mr. Djordjevic is currently providing software quality assurance support to the National Aeronautics and Space Administration (NASA) Mars exploration program. He has served on a John Hart and Associates, P.A. (JHA) team that developed and is currently implementing an NQA-1 compliant program for safety analyses of mission launches. He has also supported work JHA performed for Washington TRU Solutions, LLC, and Sandia National Laboratories (SNL) at the WIPP. He has performed internal audits of SNL's compliance with quality assurance program requirements. He compiled a data base of RCRA requirements applicable to the project and developed comparative checklists of interim status and draft permit requirements. He also supported SNL in the development of software to compile waste inventory information for updates to the WIPP Baseline Inventory Report.

Benchmark Environmental Corporation

Albuquerque, New Mexico

1988-1994

Mr. Djordjevic conceptualized and participated in the implementation of several National Transuranic Program Office initiatives. These initiatives will significantly increase the amount and rate of TRU waste shipments while substantially reducing the costs and risks associated with repackaging, testing and treating the wastes. These initiatives include: the TRUPACT-II Matrix Depletion Program; the Flammability Assessment Methodology; an Alternative Method of Certifying TRU Waste Containers; Hydrogen Gas Getters; Mixing of TRUPACT-II Shipping Categories Program; RH TRU Waste Canister Sampling; and, Development of a Unified Flammable Gas Testing Procedure.

Mr. Djordjevic analyzed Rocky Flats Environmental Technology Site (RFETS) hydrogeologic data and screened both conventional and innovative treatment technologies for use in environmental restoration efforts at the RFETS. He then assembled technologies into alternatives and then screened alternatives based on cost, feasibility, and effectiveness to select the baseline remediation strategy. He prepared cost and schedule estimates for the baseline remedial alternative and documented the assessment methodology.

IT Corporation

Albuquerque, New Mexico

Mr. Djordjevic managed the development, application, and documentation of the pathways analysis and aggregation models as part of the Systems Analysis Methodology for the DOE-HQ Mixed Low Level Waste (MLLW) Management Program. The Methodology is an analytical tool that aids decision-makers in evaluating the feasibility and effectiveness of various, mixed-waste management options. The purpose of the pathways analysis model is to evaluate site hydrogeologic properties, various waste forms and disposal facility technologies with respect to compliance with the performance objectives in the U.S. Nuclear Regulatory Commission (NRC) regulation 10 CFR Part 61, DOE orders and other regulations. Mr. Djordjevic also managed the development, application, and documentation of the aggregation model of the methodology. The aggregation (multi-criteria decision-making) model aggregated the results of the pathways analysis, risk, cost, schedule, and regulatory models of the methodology. He interfaced with DOE Performance Assessment Task Team and the DOE Peer Review Panel during the development of the Methodology. In addition, he provided computational support to the probabilistic risk assessment task and assisted in the collection and estimation of accident probabilities associated with mixed waste treatment processes. Sensitivity and uncertainty analyses were an integral part of the Methodology.

As a primary technical lead of the Waste Isolation Pilot Plant (WIPP) Engineered Alternatives Task Force, which was established by the DOE, Mr. Djordjevic developed, applied, and documented the Design Analysis Model and provided computational support to the probabilistic risk assessment task. The purpose of this performance assessment (PA) model was to evaluate engineered alternatives to the TRU waste forms and the WIPP facility to enhance repository performance. This work included evaluation of the WIPP site hydrogeologic properties and estimation of hydrogeologic properties of various waste forms and backfills. Mr. Djordjevic enhanced the model with improved gas generation and mechanical room closure models. He linked the model with the Lawrence Berkeley multiphase hydrologic flow model TOUGH2. As part of this effort he also developed methodologies for use in WIPP regulatory compliance evaluations.

Developed a methodology and an integrated computational model to simulate the release of hazardous chemicals from leaking underground storage tanks. The model simulated volatilization of the organic chemicals leaking from the tanks and transport of the vapors upward through the soil to the ground surface. The model simulated air dispersion of the chemicals at the ground surface to receptors downwind using Gaussian plume models. The model also simulated the migration of chemicals downward through the vadose zone to the groundwater surface and subsequent migration in the groundwater to receptor wells. The model internally calculated all physico-chemical parameter values (e.g., diffusivities, dispersivities, half-lives and partition coefficients) required to perform transport calculations. The model was used in a risk assessment of leaking tanks at the Idaho National Engineering Laboratory.

Mr. Djordjevic has provided support to various other DOE site programs. He verified the RISKCHEM code developed by SNL to evaluate environmental restoration strategies for SNL operable units. The code is an extension of the DOE RESRAD code. He performed system energy and mass balances and cost estimates as part of the Systems Design Study (SDS) for the INEL Buried Waste Remediation project. He quantified the physico-chemical processes (e.g., evaporation, thermal expansion) as part of safety analyses of the HLW tank wastes at the INEL that are required for tank certification. Mr. Djordjevic evaluated operations of the Waste Receiving and Processing (WRAP) Module 1 facility at the Hanford Site and the Waste Handling and Packaging Plant (WHPP) at the Oak Ridge National Laboratory, with respect to safety issues and compliance with the WIPP Waste Acceptance Criteria. Mr. Djordjevic wrote the TRAMPAC section of the Los Alamos National Laboratory TRU Waste Certification Plan and the TRUtech Team Certification and Characterization Procedure. Mr. Djordjevic prepared and documented WIPP closure and post-closure cost estimates for the RCRA permit application to the State of New Mexico.

Mr. Djordjevic was a primary technical resource and author of the Safety Analysis Report for the TRUPACT-II shipping package (for shipments of contact-handled TRU waste) and the 72-B cask (for shipments of remote-handled TRU wastes). His analyses established payload characteristics, which would ensure safe transport of TRU wastes in these shipping packages. He prepared the TRUPACT-II Gas Generation Test Program Work Plan and served as an alternate member of the Interface Working Group for the program.

As a project engineer, Mr. Djordjevic developed, adapted, and applied mathematical models of groundwater flow and contaminant transport on high performance work stations and microcomputers for the Swakopmund uranium mill tailings disposal site in Namibia, Africa. He adapted and applied graphics post processing packages and participated in presentations and discussions with clients.

Mr. Djordjevic was an author of the WIPP Test Phase No-Migration Variance Petition. He estimated the concentrations of RCRA regulated constituents in waste containers and performed source emission calculations as well as air dispersion and contaminant transport modeling for the NMVP. He was a principal technical resource and author of numerous other WIPP related documents, including the WIPP Waste Acceptance Criteria, the Experimental-Waste Characterization Quality Assurance Program Plan, the Final Safety Analysis Report, and the Waste Characterization Program Plan. Specifically, Mr. Djordjevic provided technical expertise in the areas of environmental assessment, safety analysis, and TRU waste management operations.

He used waste characterization data in the Mixed Waste Inventory Report to derive representative concentrations of RCRA-regulated constituents and radionuclides in untreated mixed low level wastes at major DOE sites. He collected and hydrogeologic data at the major DOE sites and various disposal facility technologies and designs and prepared input

data sets for the pathways analysis model of the Systems Analysis Methodology of the DOE-HQ MLLW Management Program. The results were used to rank DOE systemwide and site-specific waste management options. He also provided peer review of the disposal facility performance modeling methodology for the DOE HQ Programmatic Environmental Impact Statement.

He led the development, application and documentation of a methodology, conceptual model and associated computer code to perform PA evaluations of potential final waste forms for alpha LLW and alpha mixed LLW at the Idaho National Engineering Laboratory (INEL). The evaluations consisted of analyzing site hydrogeologic data at three potential disposal sites and PA modeling of both untreated wastes and six potential final waste forms to assess compliance with applicable DOE orders (5820.2A and 5400.5) and other regulations (NRC regulations in 10 CFR Part 20, 10 CFR Part 60, 10 CFR Part 61 and EPA regulations in 40 CFR Part 61 and in 40 CFR Part 141).

Mr. Djordjevic reviewed existing and proposed engineered barriers that minimize contact between infiltrating water and waste in commercial LLW disposal facilities as required in 10 CFR Part 61. He then developed a model, and barrier material hydrogeologic properties to evaluate the ability of the barriers to enhance the long-term performance of these facilities. Engineered barriers included concrete overpacks, vaults, backfills, engineered soil covers as well as state-of-the art barriers, including an engineered sorptive layer underlying the facility and an advanced cap design incorporating a double capillary layer. Designs were compared on the basis of a dose reduction factor using activity-to-dose conversion factors listed in 10 CFR Part 20.

Principia Mathematica

Evergreen, Colorado

Developed and applied a linked groundwater flow and surface water flow model to evaluate historical and proposed water usage along the Arkansas River Basin, Colorado-Kansas to support interstate litigation. Presented findings of the analyses and explained complex technical issues to the Colorado State Engineers Office and the State's counsel.

Publications

NuPac. 1989. "Safety Analysis Report for the TRUPACT-II Shipping Package," Rev. 10. Federal Way, Washington, Nuclear Packaging, Inc.

DOE. 1990. "Waste Isolation Pilot Plant No-Migration Variance Petition." DOE/WIPP 89-003. Carlsbad, New Mexico, U.S. Department of Energy-Waste Isolation Pilot Plant Project Office.

DOE. 1991. "Evaluation of the Effectiveness and Feasibility of the Waste Isolation Pilot Plant Engineered Alternatives: Final Report of the Engineered Alternatives Task Force." DOE/WIPP 91-007, Rev. 0. Carlsbad, New Mexico, U.S. Department of Energy.

DOE. 1991. "Quality Assurance Program Plan for the Waste Isolation Pilot Plant Experimental-Waste Characterization Program." DOE/EM/48063-1, Rev. 1. Washington, D.C., U.S. Department of Energy, Office of Waste Operations.

DOE. 1991. "TRUPACT-II Content Codes (TRUCON)." DOE/WIPP 89-004, Rev. 5. Carlsbad, New Mexico, U.S. Department of Energy-WIPP Project Office.

DOE. 1991. "Waste Characterization Program Plan for Waste Isolation Pilot Plant Experimental Waste." DOE/WIPP 89-025, Rev. 1. Carlsbad, New Mexico, U.S. Department of Energy.

IT Corporation. 1991. "Position Paper on Flammability Concerns Associated With TRU Waste Destined for WIPP." Carlsbad, New Mexico, Westinghouse Electric Corporation, Waste Isolation Division.

IT Corporation. 1991. "Technical Requirements Document for Modified Waste Forms to be Included in the WIPP Experimental Program." Carlsbad, New Mexico, Westinghouse Electric Corporation.

Myers, J.S., S.M. Djordjevic, M. Adams, L.R. Spangler, J. Valdez, D. Vetter, and P. Drez. 1991. "Design Analysis of Engineered Alternatives for the Waste Isolation Pilot Plant," Proceedings of the Symposium on Waste Management. Tuscon, Arizona, Arizona Board of Regents, Waste Management '91.

Bassi, J., M.S. Abashian, S. Chakraborti, M. Devarakonda, and S.M. Djordjevic. 1992. "A Decision Methodology for the Evaluation of Mixed Low-Level Radioactive Waste Management Options for DOE Sites," Proceedings of the Fourteenth Annual U.S. Department of Energy Low-Level Radioactive Waste Management Conference, Phoenix, Arizona.

DOE. 1992. "TRU Waste Acceptance Criteria for the Waste Isolation Pilot Plant." WIPP-DOE-069, Rev. 4. Carlsbad, New Mexico, Westinghouse Electric Corp., Waste Isolation Division.

Djordjevic, S.M., and H.E. Nuttall. 1992. "A Coupled Geochemical and Solute Transport Model for Mixed-Waste Remediation in Groundwater." Presented at Minneapolis, Minnesota, AIChE 1992 Summer National Meeting.

IT Corporation. 1992. "An Evaluation of the Remote-Handled Transuranic Waste Forms at the Oak Ridge National Laboratory for Acceptance at the Waste Isolation Pilot Plant," Albuquerque, New Mexico.

IT Corporation. 1992. "Hanford Waste Receiving and Processing Facility Title I Design Review: Comparison of WRAP 1 Design With WIPP Criteria and Requirements." Richland, Washington, Westinghouse Hanford Company.

Abashian, M.S., M. Carageorges, S. Chakraborti, M. Devarakonda, and S.M. Djordjevic. 1993. "An Integrated Approach for Evaluating DOE Mixed Low-Level Waste Management Options," Proceedings of the 1993 IT Symposium, Scottsdale, Arizona.

Booher, W., and S.M. Djordjevic. 1993. "Electrokinetics and its Potential Application in the Remediation of Uranium-Contaminated Soils," Proceedings of the 1993 IT Symposium, Scottsdale, Arizona.

Case, J.B., R. Spangler, and S.M. Djordjevic. 1993. "A RCRA Tank Assessment of Eleven Stainless Steel Tanks Containing High-Level Radioactive Waste at the INEL Chemical Processing Plant," Proceedings of the 1993 IT Symposium, Scottsdale Arizona.

DOE. 1993. "Mixed Low-Level Waste Systems Analysis Methodology and Applications Report, Draft." DOE/LLW-194. Washington, D.C., Office of Environmental Restoration and Waste Management.

Djordjevic, S.M., L.R. Spangler, R. Sobocinski, and M.S. Abashian. 1993. "Pathways Analysis Model to Evaluate DOE Mixed Low-Level Waste Disposal Facilities," Proceedings of the Symposium on Waste ManagementI. Tucson, Arizona, Arizona Board of Regents, Waste Management '93.

IT Corporation. 1993. "Effects of Supercompacting Contact-Handled Transuranic Waste on the Performance of the Waste Isolation Pilot Plant (WIPP)." Carlsbad, New Mexico, Westinghouse Electric Corporation.

Benchmark Environmental Corporation. 1994. "Parameters for Performance Assessment Modeling of Chemicals at the Waste Isolation Pilot Plant." Carlsbad, New Mexico, Westinghouse Electric Corp., Waste Isolation Division, September.

IT Corporation. 1994. "Use of Engineered Soils and Other Site Modifications for Low-Level Waste Disposal." Idaho Falls, Idaho, EG&G Idaho, Inc.

Smith, T.H., J. Myers, S.M. Djordjevic, T.A. DeBiase, D. DeWitt, and M. Goodrich. 1994. "Preliminary Parametric Performance Assessment of Potential Final Waste Forms for Alpha Low Level Wastes at the Idaho National Engineering Laboratory." EGG-WM-11415. Idaho Falls, Idaho, EG&G Idaho, Inc.

Connolly, M.J., S.M. Djordjevic, C.A. Loehr, and L.R. Spangler. 1996. "Assessment of Gas Flammability in Transuranic Waste Containers," Proceedings of the Symposium on Waste Management. Tucson, Arizona, Arizona Board of Regents, Waste Management '96.

Connolly, M.J., S.M. Djordjevic, C.A. Loehr, K.J. Liekhus, and L.R. Spangler. 1996. "Position for Determining Gas Phase Volatile Organic Compound Concentrations in Transuranic Waste Containers," Proceedings of the Symposium on Waste Management. Tucson, Arizona, Arizona Board of Regents, Waste Management '96.

Connolly, M.J., S.M. Djordjevic, C.A. Loehr, M.C. Smith, V. Banjac, and W.F. Lyon. 1996. "The TRUPACT-II Matrix Depletion Program," Proceedings of the Symposium on Waste Management. Tucson, Arizona, Arizona Board of Regents, Waste Management '96.

Djordjevic, S.M., L.R. Spangler, and M.J. Connolly. 1996. "Certifying Containers For TRUPACT-II Shipment Using Flammable Gas Headspace Measurements." Accepted for

presentation at Waste Management '97. Tucson, Arizona, Arizona Board of Regents, Waste Management '97.

Djordjevic, S.M., L.R. Spangler, and M.J. Connolly. 1996. "Development and Implementation of a Mixing of TRUPACT-II Shipping Categories Methodology." Accepted for presentation at Waste Management '97. Tucson, Arizona, Arizona Board of Regents, Waste Management '97.

LANL. 1996. "Los Alamos National Laboratory Transuranic Waste Certification Plan." PLAN-CSTDO-004,R.0. Los

Uranium Study SME	Noel Savignac, Ph.D.
SME: Uranium, health physics, and environment Current Employment: Trinitek Services, Inc Capabilities: more than 20 years experience as a consultant in radiation protection, radiation dose modeling, policy statements, procedure manuals, technical investigations, training programs, and audits, manager of environmental services for a uranium mining and milling firm, a health physicist at a nuclear power plant, and a university radiation safety officer and instructor.	Senior Health Physicist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials Ph.D. Health Physics ❖ Colorado State University M.S., Health Physics ❖ Colorado State University M.S., Physiology ❖ University of New Mexico B.S. Biology ❖ Wake Forest College

PROFESSIONAL EXPERIENCE in radiation protection includes:

Uranium Project Experience

1) New Mexico Operations:

- Conoco Oil Company, Crown Point, NM - Radiological assessment of a proposed uranium mill site.
- Homestake Mining Company, Grants, NM - Radiological and environmental monitoring procedures for mill decommissioning, radiological assessment for the uranium mill license renewal, radiological evaluations of mill operations using the MILDOS computer code, radiation protection annual retraining, and mill audits.
- Mobil Oil Company, Crown Point, NM - MILDOS computer evaluation of radiological impacts of an in-situ uranium extraction facility, and a quality control evaluation of a laboratory that processes radiological samples.
- Sohio, Laguna, NM - Assessment of residual contamination after mill decommissioning, Radiation Safety Officer, and radiation protection annual retraining, and site audits.
- United Nuclear Corporation, Gallup, NM - Church Rock Mill license application, hiring and training of radiation and environmental protection staff, mining plans for Dalton Pass Mine and Canyon Mines, radiation protection annual retraining, and mill audits.

2) Colorado Operations:

- Energy Fuels Resources, Denver, CO - Testimony at public hearings, radiological exposures pathways assessment, radiological and environmental procedures for uranium mills.
- Power Tech, Denver, CO - radiological and environmental procedures for an in-situ uranium extraction facility.
- Cotter Corporation, Cañon City, CO - Testimony at public hearings, audits of the radiation protection program, respirator protection procedures, bioassay procedures, and responses to notice of violations.

-
- Homestake Mining Company, Gunnison, CO - Environmental baseline monitoring program for the proposed Pitch Uranium Mill, participation in the Colorado Department of Health public hearings on the project.
 - Umetco, Craig, CO - Audit of the radiological and environmental monitoring programs, and radiation and environmental monitoring procedures.
 - Umetco, Uravan, CO - Radiological assessments for the Uravan and Spring Creek Mesa tailings disposal facility license applications, participation in public hearings on both applications, audits of the radiological and environmental monitoring programs, and radiation and environmental monitoring procedures.
 - Umetco, Grand Junction, CO - Radiation protection annual retraining.

3) Texas Operations

- Energy Minerals Corporation, La Palangana Project, TX – MILDOS assessment of the radiological dose from uranium in-situ leach operations.
- Cogema, Bruni, TX - Audits of the radiological and environmental monitoring programs.

4) Wyoming Operations

- Federal American Partners, Riverton, WY - Radiological and environmental monitoring programs for the uranium mill, license amendments, and license amendments.
- Pathfinder Mining Company, Riverton, WY - Radiological and environmental audits, and a Ra-226 exposure assessment.
- Cameco (Power Resources, Inc.), Casper, Cheyenne, WY – MILDOS assessments of radiation doses from four uranium in-situ leaching operations.
- Umetco, Riverton, WY - Audits of radiological and environmental monitoring programs, and radiation and environmental monitoring procedures.
- United Nuclear Corporation, Casper, WY - Radiological and environmental assessment for the proposed Morton Ranch Uranium Mill application.

5) Utah Operations:

- Atlas Minerals Corporation, Moab, UT - Radiological assessment for mill license renewal, radiological and environmental audits, and radiological and environmental monitoring procedures.
- Energy Fuels Nuclear, Inc., Blanding, UT - Radiological and environmental audits.
- Plateau Resources Limited, Ticaboo, UT - Mill license renewal and several license amendments, radiological and environmental monitoring procedures, mill and tailings decommissioning and reclamation plans, groundwater monitoring program, Radiation Safety Officer, and mill audits.
- Rio Algom Corp., Moab, UT - Uranium mill license application and license amendments, radiological and environmental audits, radiological and environmental monitoring procedures, and groundwater flow patterns.

6) Virginia Operations

- Marline Uranium Corporation, Danville, VA - Surface water impacts and radiological impacts for the proposed Swanson Uranium Mill. Participated in public hearings on mill license application.

7) USA

- American Mining Congress – Past Chairman of the Uranium Environmental Subcommittee.
- National Commission of Radiological Protection and Measurements (NCRP) - "Effluent Monitoring and Environmental Surveillance in the Mineral Extraction Industry" (NCRP Report 118).

Environmental and Radiological Compliance

- Assessments of the radiation doses and risks to the public from airborne emissions and radiation generating machines for compliance with the National Environmental Policy Act.
- Assessments of the Los Alamos National Laboratories' performance objectives and their occupational and environmental radiation protection programs for compliance with DOE Orders.
- Radiological protection program (835) implementation plan, technical basis documents, and a site specific RadCon Manual for the Lovelace Respiratory Research Institute (LRRI)
- Environmental monitoring plan for LRRI.
- Application to ship low-level radioactive waste to the DOE Nevada Test Site.
- Sandia National Laboratory compliance with environmental, safety, and health regulations in preparation for DOE "Tiger Team" audits.
- Evaluations of alpha-track detectors for the measurement of radon in compliance with the EPA National Emission Standards for Hazardous Air Pollutants (NESHAPS) regulations.
- Radiological doses from airborne emissions for compliance with the NESHAPS regulations.
- Policy statements, program designs, technical specifications, program documents, action plans and operational procedures in applied health physics and environmental monitoring.
- Peer review panel assessments for the DOE Uranium Mill Tailings Remedial Action Project to assess radiological measurement procedures and compliance with regulations.
- Audits of the radiation and environmental protection programs at uranium mills, and uranium liquid extraction facilities.
- Assessments of the Department of Transportation shipping regulations and the EPA "Reportable Quantities" regulations for transport of radioactive materials.
- Leak tests of nuclear level gauges using a procedure that tests hundreds of sources in ~25% of the time required for leak tests using classical methods.

Hazard Assessments

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- Environmental exposures from mercury released to a creek flowing through Oak Ridge, TN.
 - Environmental documentation on high-level nuclear waste repositories as part of a Peer Review Panel.
 - Remedial radiological actions required at the Fernald Feed Materials Production Center.
 - Radiological doses from a leaking radium source and safe storage of the source for disposal.
 - Radiological doses from uranium during asbestos removal at a uranium mill.
 - Hazards of a thorium oxide spill.
 - Environmental and radiological liabilities of a uranium mill prior to sales offering.
 - Occupational doses from U-238 and Th-232 in SO₂ scrubber sludge from a copper smelter.
 - Occupational doses and environmental hazards from Re-187 from a copper smelter.
 - Occupational doses from Th-232 in a metal casting facility.
 - Occupational doses and environmental contamination from Po-210 in kerosene-diesel fuel.
 - Potential environmental doses from U-238 and Tc-99 in a disposal pond.

Radiological Training Courses

- Annual Refresher Training for Radiation Protection.
- Atmospheric Dispersion Calculations using CAP88-PC.
- Basic Radiation Protection.
- Economic Benefits of Radioactive Materials and Radiation.
- Environmental Monitoring Procedures.
- Internal Dosimetry for the Uranium Milling Industry.
- Implementation of 10 CFR 20.1001-20.2401.
- National Emission Standards for Hazardous Air Pollutants.
- New Employee Radiation Protection Orientation.
- Radiation Exposure Calculations for Uranium Milling.
- Radiation Protection Annual Retraining
- Radiation Protection for the Uranium Milling Industry.
- Radiation Safety Officer Training.
- Radon Exposures and Radon Mitigation Measures.
- Regulatory Guides for Uranium Milling.
- Sampling Procedures.
- Standards for Release of Equipment for Unrestricted Use.

Licensing and Registration

- Registration of a 13.5 MeV linear accelerator.
- Radioactive materials license for an 8,000 Ci Co-60 gamma irradiator.
- Registration of two high voltage microwave machines.

EMPLOYMENT HISTORY:

Noel Savignac Consultants 1980 - Present. Radiation Protection Consultant to DOE, states, and corporations.

United Nuclear Corporation Manager of Environmental Services. Obtained radioactive materials licenses for uranium mills, trained environmental and occupational monitoring personnel, calculated radiological exposures and prepared environmental reports.

University of Wyoming Radiation Safety Officer. Managed the Radiation Safety Office and taught radiation safety courses.

ASSOCIATIONS (current and past):

American Institute of Mining Engineers

American Mining Congress, Uranium Environmental Subcommittee former chairman

American Nuclear Society

Beta Beta Beta

Health Physics Society

Rio Grande Chapter Health Physics Society former chairman

National Council of Radiation Protection and Measurements, contributing author to NCRP Report 118 "Radiation Protection in the Mineral Extraction Industry"

New Mexico Mining Association, Uranium Environmental Subcommittee

Ronald McDonald House Board of Directors

Sigma Xi

Wyoming Mining Association, Uranium Environmental Subcommittee.

CLIENT LIST:

All-Tec Inc.
ARA (Mission Research) Corp.
Assagai Analytical Labs
Atlas Minerals Corp.
Aware, Inc.
BDM Corp.
Black Law Firm
Bogle & Gates Law Firm
Chem-Nuclear Systems, Inc.
Cameco Resources
Cogema Mining, Inc.
Cotter Corporation
Cyprus Miami Mining Corp.
Dawn Mining Company
Duke Engineering & Services
Energy Fuels Nuclear, Inc.

Los Alamos National Laboratory
(through subcontractors)
Lovelace Respiratory Research Institute
Marline Uranium Corp.
McGowen Working Partners
Montgomery & Andrews
NM Environment Department
Pathfinder Mines Corp.
Plains Electric
Plateau Resources Ltd.
Power Resources, Inc.
PRC Env. Management, Inc.
Power Resources Inc.
Power Tech
Precision Castparts Corp.
Public Service Company of NM

Energy Laboratories, Inc.
Energy Metals Corporation
Envir. Sci. & Engr., Inc.
Federal American Partners
Ferret-Nebraska, Inc.
Franchini Law Firm
Giant Industries Inc.
Hecla Mining Company
Hollington Law Firm
Holmes, Roberts & Owen, Inc.
Homestake Mining Company
HRI, Inc.
ICF Kaiser Engineers, Inc.
Intera, Inc.
IT Corporation/D'Appolonia
Jacobs Engineering, Inc.
Ktech Corporation
Kleinfelder Corp.

Quivera Mining Company
Remote Sensing Systems
Rio Algom Corp.
Sandia National Labs
(through subcontractors)
Science and Engineering Associates
Sinclair Oil Company
Simmons Law Firm
Thunderbird/Red Lion Inns
Titan/Spectron Dev. Labs
Tomin Corp.
U.S. Energy/Crested Corp.
USX
Umetco
United Nuclear Corp.
Western Nuclear, Inc.
Weston, Roy F., Inc.

Uranium Study Technical Lead**Natver M Patel**

SME: uranium operations and environmental compliance: Radiochemistry

Current Employment: AVM Environmental Services, Inc.

Capabilities: Mr. Natver Patel has 35 years of experience in the industry with over 25 years of experience in radiological and environmental remediation and regulatory compliance. He was an U.S. Nuclear Regulatory Commission (USNRC) and New Mexico Environment Department (NMED) approved Radiation Safety Officer for the Bluewater Uranium Mill Site responsible for licensing activities, radiation protection and environmental compliance from 1987 to 1998 when the Bluewater Mill Site license was successfully terminated. He has managed the Environment and Radiation Protection Program at the Bluewater Uranium Mill Site project. The project included a 6000 tpd uranium mill decommissioning, 24 million ton tailings remediation, and groundwater remediation.

Uranium Regulations consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants

Education / Credentials

M. S. in Chemistry,

❖ New Mexico Tech, Socorro, NM

B. S. in Chemistry, 1971,

❖ Gujarat University, India

Training and Certifications:

360 hours of training in radiation protection, radiation detection and measurements and environmental surveillance; Groundwater hydrology; Management and supervisor training; 40 hr. and annual 8 hr. refresher HAZWOPER training; 8 hr. HAZWOPER supervisor training; 40hr. Hazardous Chemical Safety.

Background Summary:

He has considerable experience in environmental remediation, including management and supervision of radiological and environmental staff, regulatory and environmental compliance, contamination characterization, radiological source term studies and remedial design, contamination cleanup and remedial activities; verification of contamination cleanup; groundwater corrective actions and monitoring; management of process and quality control laboratory.

Mr. Patel also designed and performed radiological characterization, assessment, remedial support surveys, post remediation status surveys in accordance with MARSSIM at various uranium mine sites. Mr. Patel has performed environmental services consisting of characterization, assessment and investigation for over 15 projects for U. S. Army Corps of Engineers Albuquerque District. Mr. Patel has significant experience in interacting and negotiating with regulatory agencies. USEPA approved Project Manager at a Superfund site. He has also managed and performed Remedial Investigation (RI), Feasibility Study (FS), Remedial Design (RD), and Remedial Action (RA) work at superfund sites. The work included characterization and remediation of surface soils, NAPL in the subsurface formation, and groundwater contamination.

Professional Experience:

Uranium Mill Decommissioning, Tailings Remediation and Mine Contamination Characterization:

Developed and implemented environmental and radiation protection programs and procedures in compliance with USNRC, USEPA, and New Mexico State regulations, USNRC Material License requirements, and Bluewater Mill decommissioning and tailings reclamation plans. Maintained these programs in full compliance without any violations or deficiency throughout the entire life of the Bluewater Uranium Mill Site Project.

Developed environmental and radiological aspects of the decommissioning and reclamation plan for Bluewater Uranium Mill Site addressing decommissioning of 6000 tpd mill and reclamation of tailings piles consisting of over 24 million tons.

Supervised radiological and environmental staff, consultants and contractors performing Site occupational health physics, radiological, and environmental monitoring; and mill decommissioning and tailings remedial activities at the Bluewater Uranium Mill Site.

Conducted revision to various remedial designs, including radon barrier thickness design using site specific calibration of USNRC approved computer code which reduced barrier thickness while complying with USNRC's emission standard and resulting in significant remedial cost reduction.

Conducted radiological source term and contamination characterization studies of tailings piles, over 300 acre evaporation ponds area, and over 700 acres of tailings contaminated area at the Bluewater Mill Site.

Developed and implemented excavation control program for cleanup of over 1100 acres of windblown tailings and evaporation ponds residue contaminated areas up to several feet deep at the Bluewater Uranium Mill Site. The excavation control included real time field gamma radiation level measurements and quick sampling and analysis techniques to facilitate continuous excavation for a cost effective remediation.

Developed and implemented cleanup verification program consisting of about 8,000 on site soil sample analysis and over 25,000 radiation level measurements to demonstrate compliance with cleanup criteria for all excavated areas. Developed site specific correlation studies for gamma radiation levels to soil Ra-226 concentrations for soil clean up verification. The USNRC permitted determination of action levels using correlation and gamma radiation measurements to demonstrate compliance with the clean up criteria.

Supervised the design and licensing of an onsite disposal cell at the ARCO's Bluewater Mill. This disposal cell was constructed adjacent to the existing tailings pile for disposal of 11(e)(2), byproduct material which was contaminated with PCBs.

Performed radiological characterization consistent with approach and guidance provided in MARSSIM at United Nuclear Corporation's Northeast Church Rock Mine (NECR) Site for Removal Site Evaluation under CERCLA of the areas contaminated with uranium ore during 2006 to 2011. The characterization for RSE at the NECR included direct scan and static gamma radiation surveys using 2x2 NaI scintillators coupled with scaler/ratemeters and DGPS, field subsurface soil screening using 3X3 NaI Scintillator and SCA for vertical extent of contamination characterization,

exposure rate measurements, site-specific correlation of direct gamma radiation levels to Ra-226 soil concentrations, and soil sampling. Also designed and performed excavation control surveys to direct removal of contaminated soils during remediation of land areas at NECR Mine Site in 2009 and 2011. Conducted cleanup verification surveys in accordance with MARSSIM for cleanup status at the NECR during 2009-2011.

Developed plans and procedures, and performed radiological characterization, cleanup excavation control and verification surveys at United Nuclear Corporation's Section 27 Uranium Mine Site near Ambrosia Lake during 2010 and 2011. Performed occupational health physics monitoring during cleanup activities during 2010. Performed RESRAD modeling to determine radiation dose and risk levels for various land use and cleanup scenarios.

Developed plans and procedures, and performed radiological characterization and assessment consistent with MARSSIM for remedial design at San Mateo Uranium Mine Site during 2011-2012. The Mine Site is being remediation as required by USFS using CERCLA process using MARSSIM approach.

Regulatory Negotiations, Permitting and Compliance.

Conducted environmental and radiological permitting, licensing, approval, and compliance activities with the USNRC, USEPA, and NMED for the Bluewater Uranium Mill Site project. Currently, conducting license termination activities and negotiations for Bluewater Mill Site with USNRC, DOE, and NMED. Managed and negotiated all CERCLA activities with USEPA, state, and regulatory oversight contractors for the Prewitt Refinery Superfund Site.

Prepared and submitted various environmental and remedial action completion reports; including mill decommissioning report, reclamation completion report, windblown cleanup reports, environmental monitoring and effluent data reports, New Mexico groundwater discharge plan reports, superfund progress reports, and USEPA's NESHAPs compliance reports.

Developed various successful petitions to USNRC for exemption from cleanup criteria for contaminated soil areas, modification to the decommissioning and reclamation plans, and alternate procedures based on risk assessment and cost and benefit analysis which resulted in significant remedial cost savings at the Bluewater Uranium Mill Site.

Conducted waste management and disposal permitting with USEPA, USNRC, and NMED, including successful permitting and on-site disposal of mixed waste [11(e)(2) uranium byproduct material containing PCBs].

Coordinated development of Long Term Surveillance Plan (LTSP) for the Bluewater Mill Site with DOE and its contractor personnel. Successful coordination and negotiations for all radiological and groundwater requirements with USNRC, USEPA and NMED for termination of USNRC's Bluewater Mill license.

Environmental Projects for Government

Retained sediment characterization at Galisteo Reservoir for USACE Albuquerque District to determine any impact from historical mining activities upstream of the reservoir.

Investigation of the surface water and lake-bottom sediments at Cochiti Lake was performed for USACE Albuquerque District to determine baseline radionuclide concentrations. The Cerro Grande fire burned in and around the LANL area in May – June 2000. The resulting burn area is unstable and can easily erode. This has caused concern regarding storm runoff and deposit of sediment and possible contaminants in the Cochiti Lake. The USACE expected that the Cochiti Lake will be impacted by runoff from the LANL area.

Monitoring of release water from the Santa Rosa Reservoir to determine any impact of the reservoir drawdown on the released water quality for USACE Albuquerque District.

Investigation of mercury contamination at 17 stream gaging stations near dams in New Mexico and Colorado for USACE Albuquerque District.

Performed surface and subsurface soil sampling and investigation for USACE Albuquerque District to assess the nature and extent of surface soil contamination related to railroad and other historical activities at the Santa Fe Rail Yard Property in Santa Fe, New Mexico. The sampling was performed to provide the first level screening of potentially contaminated areas and contaminants on-site.

Various environmental tasks for both operable units at Cimarron Mining Company Superfund Site in Carrizozo, New Mexico, including ground water monitoring, modification and operation of ground water remedy, prepared various plans and ground water monitoring operation and compliance reports, including performance assessment reports, five-year review reports, and close out reports for USACE Albuquerque District and USEPA.

Prepared Proposed Plan and Record of Decision for OU-2 at Brown and Bryant Superfund Site in Arvin, California for USEPA Region 9 under contract with USACE Albuquerque District. Also prepared a Remedial Action Completion Report consistent with the "Close Out Procedures for National Priorities List Sites" OSWER Directive 9320.2-09A-P, January 2000.

Sampling and characterizations at various FAA sites in New Mexico for PCBs contamination for USACE Albuquerque District.

Superfund Activities

Conducting Operation and Maintenance (O&M) of NAPL extraction system and groundwater remediation, which includes groundwater pump and treat, nutrient injection for enhanced in situ bioremediation, and containment system at the Prewitt Superfund site. The O&M includes performance monitoring and system modifications, routine operation and maintenance and troubleshooting, groundwater monitoring, remediation progress evaluation and groundwater containment evaluation, reporting to agencies, and project oversight.

Managed RI/FS activities for Prewitt Superfund Site consisting of surface soils contamination, NAPL in subsurface formations, and groundwater contamination.

Directed development and implementation of RI work plans and Feasibility Study reports.

Directed contamination characterization studies, treatability studies, and NAPL extraction pilot program at the Prewitt Superfund Site.

Managed remedial design activities for surface soils cleanup involving excavation, treatment, off site disposal, and on site treatment by land farming; NAPL extraction; and groundwater contamination containment and remediation.

Supervised remedial action construction activities including; lead, asbestos, and hydrocarbon contaminated soil remediation; well abandonment; and NAPL extraction and groundwater containment system construction.

Engineered RFPs, managed the contracting process, and developed scope of work for characterization, design, and remedial action activities. Negotiated cost and work requirements with the contractors.

Groundwater Corrective Actions and ACLs

Managed groundwater protection program at the Bluewater Mill Site. Engineered and implemented groundwater detection and compliance monitoring programs. Implemented and managed groundwater corrective action programs. Directed development of groundwater ACLs petition for the Bluewater Mill Site. Performed negotiations and responses to USNRC, NMED and DOE's issues and comments during regulatory review and approval process. This was the first ACLs petition developed consistent with the regulatory technical requirements, which was approved by the USNRC.

Engineered and developed the New Mexico Discharge Plan termination petition for the Bluewater Mill Site. Performed negotiations and responses to the NMED and DOE's issues and comments during regulatory review and approval process. The discharge plan for the site was terminated by the State of New Mexico.

Performed groundwater data review and ACLs feasibility report for Quivira Mining Company's Ambrosia Lake Facility. Performed groundwater CAP evaluation, and prepared groundwater ACLs petition. The ACLs petition work included groundwater CAP assessment, determination of extent of groundwater contamination, groundwater fate and transport, human health and the environment hazard and risk assessment from radiological and non radiological contaminants, ALARA analysis, and groundwater corrective action alternative evaluation.

Environmental Monitoring, Laboratory Management, and QA/QC

Developed and implemented environmental monitoring program for groundwater, air, soil and vegetation as required by USNRC, USEPA, and State of New Mexico.

Managed quality and process control laboratory during operation of the Bluewater Uranium Mill Site.

Performed sampling and chemical and radiological analyses for operations and environmental monitoring.

Developed various job specific analytical methods for chemical and radiological parameters, including Gas Chromatography for BTEX and organic mill reagent analysis.

Uranium Study SME	Pearce O'Kelley
SME: Agreement States / NRC regulations Current Employment: Trinitex Services, Inc Capabilities: Agreement State Regulations, NRC, Disposal facility licensing and regulatory issues, IAEA consultant, senior positions with NRC, other regulatory agencies.	Uranium Regulations consultant: Trinitex Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials M. S. Public Health ❖ U of South Carolina B. S. Biology/Chemistry, ❖ U of South Carolina Training and Certifications: Extensive additional, see below

Continuing Education

- *Health Physics and Radiation Protection, 200 hours- Oak Ridge Associated Universities*
- *Medical Uses of Radionuclides, 40 hours - Oak Ridge Associated Universities*
- *Inspection Procedures, 40 hours - U.S. Nuclear Regulatory Commission*
- *Security Systems and Principles, Sandia National Labs, 80 hours*
- *Licensing Practices and Procedures, 40 hours - U.S. Nuclear Regulatory Commission*
- *Irradiator Radiation Safety Workshop, 25 hours - U.S. Nuclear Regulatory Commission*
- *Incineration of Low Level and Mixed Wastes: 1986 Conference - 24 hours*
- *Radiation Protection Engineering, 40 hours - Oak Ridge Associated Universities*
- *Industrial Radiography, 40 hours - U.S. Nuclear Regulatory Commission*
- *Uranium Hexafluoride - Safe Handling, Processing, Transport-24 hours-Martin Marietta*
- *Introduction to Radiological Emergency Preparedness Exercise Evaluation, IS-331, Federal Emergency Management Agency, November 2007*
- *Radiological Emergency Preparedness Program Exercise and Evaluation Methodology, E-304, December 2007*
- *Radiological Emergency Preparedness Planning, E-340, Federal Emergency Management Agency, August 2008*
- *Radiological Emergency Response Operations (RERO), Federal Emergency Management Agency, Las Vegas, May 1987*
- *National Incident Management System (NIMS), IS-700, Federal Emergency Management Agency, August 2005*
- *Introduction to the Incident Command System, IS-100, Federal Emergency Management Agency, June 2007*
- *ICS for Single Resources and Initial Action Incidents, IS-200, Federal Emergency Management Agency, June 2007*
- *National Response Plan (NRP), An Introduction, IS-800, Federal Emergency Management Agency, June 2007*
- *Incident Command System for Expanding Incidents, IS-300, Federal Emergency Management Agency, July 2007*
- *Mitigation Course for Radiological Transportation Emergencies, US Dept. of Energy, October 1989*
- *Introduction to Supervision*
- *Elements of Leadership-Management Development Program*
- *Kepner-Tregoe Problem Solving-Decision Making*
- *Participatory Management, Employee Performance Management System*
- *Fourth Generation Management*
- *Cultural Competence*

- *Change Management*
- *Train the Trainer*
- *Coaching the Team*

Employment Experience

9/06 – 1/09 South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, Columbia, South Carolina. Position: Program Manager II

Management consultant responsible for radiation regulation development and revision, Emergency response planning and review

09/98 – 9/06 South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, Columbia, South Carolina. Position: Bureau Chief

Manage, direct, administer, and supervise the activities and personnel of the Bureau of Radiological Health. The Bureau is responsible for the protection of the public from the adverse effects of ionizing and non-ionizing radiation through a comprehensive regulatory program which includes the activities of licensing, registration, inspections, enforcement, emergency response, fee collection, and regulation development. Responsible for budget, program management and development, planning, quality control, and personnel actions of the Bureau. Consult with Federal officials and national organizations to set and develop radiation protection standards nationwide. Respond to emergencies involving sources of radiation. Participate in all roles of fixed nuclear facility radiological emergency response.

10/88 - 1998 South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, Columbia, South Carolina. Position: Director of the Division of Electronic Products.

Direct and supervise division responsible for registration and inspection of facilities utilizing sources of electronically produced ionizing radiation and nonionizing radiation. Activities of the division also include review of architectural shielding plans, certification of x-ray operators, nonionizing radiation evaluations, emergency response, and survey instrument calibrations. Responsible for supervision, administration, budget, program management and development planning, quality control, and personnel actions of the division. Responsible for development and implementation of regulations pertaining to the safe usage of radiation. Serve as duty officer on the Emergency Radiological Assistance Team. Participate in all roles of fixed nuclear facility radiological emergency response.

12/85 - 10/88 South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, Columbia, South Carolina. Position: Health Physicist III Section Leader of the Radioactive Waste, Compliance and Engineering Section.

Responsible for the licensing and compliance activities of the Barnwell Low-Level Radioactive Waste Disposal Facility, including inspection, environmental surveillance, health physics, burial operations, trench construction, and quality control. Manage high integrity container and solidification media certification programs; prior notification and waste shipment programs, and waste tracking, allocation, and surcharge programs. Responsible for development and maintenance of computer programs for support of above listed programs. Responsible for licensing and compliance inspections of major licensees involving complex uses of radioactive materials. Serve as duty officer on the Emergency Radiological Assistance Team. Participate in all roles of fixed nuclear facility radiological emergency response. Respond to any emergency situation involving radioactive material in the state of South Carolina. Supervise 5 persons including Engineers, Health Physicists, and Secretaries.

2/84 - 12/85 South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, Columbia, South Carolina. Position: Health Physicist Responsible for licensing radioactive material users in the state of South Carolina. Conduct routine and investigational inspections of facilities using radioactive materials. Respond to any emergency situation involving radioactive material in the state of South Carolina. Participate in all roles of fixed nuclear facility radiological emergency response. Assist licensees in areas of problem solving and health physics

2/78 - 1/84 South Carolina Department of Health and Environmental Control. Richland County Health Department, Columbia, South Carolina Position: Environmentalist

Responsible for environmental sanitation inspections, routine and requested, day care facilities, foster homes, motels, hotels, residential care facilities, and school premises in Richland County as well as the supervisory and administrative duties which accompany these programs. Responsible for environmental sanitation inspections of individual waste disposal systems, water supplies and related programs in Richland County, including preliminary site work and final disposition. Assist in subdivision development programs for Richland County. Radiological Defense Officer for Richland County Health Department. Responsible for Asbestos Detection and Abatement Programs in Richland County.

PROFESSIONAL MEMBERSHIPS

- *Organization of Agreement States (OAS)*
- *Health Physics Society (HPS)*
- *Conference of Radiation Control Program Directors (CRCPD)*
- *South Carolina Public Health Association*

OFFICES HELD

OAS Executive Board 2001-2004

OAS Chair 2002-2003

CRCPD – Executive Board 2005-2008

CRCPD – Chair 2006-2007

HPS – Treasurer – Government Section 2005-2006

As Chair of two national state radiological regulatory associations, the Conference of Radiation Control Program Directors (CRCPD) and the Organization of Agreement States (OAS), I was frequently involved with several federal agencies (US Nuclear Regulatory Commission (NRC), Department of Homeland Security (DHS), FEMA, Department of Energy (DOE), Department of State, Environmental Protection Agency (EPA) and others) in helping set policy and standards in the areas radioactive materials regulation and security, radiation protection, and response to Radiological Dispersal Devices. Participated on DHS' Domestic Nuclear Detection Office's Surge Committee, NRC's Chairman's Radiation Source Protection and Security Task Force, and NRC's Radioactive Source Security Steering committee. Served as chair of CRCPD's Homeland Security/Emergency Response Council. During tenure at CRCPD, oversaw development of First Responder's Guide and Handbook for Responding to a Radiological Dispersal Device Incident along with development of RDD exercise scenarios. Served on the International Atomic Energy Agency's (IAEA) Raissa Team that evaluates radiation

AWARDS/APPOINTMENTS

- *Organization of Agreement States Hall of Fame Award*
- *Fellow – Health Physics Society*
- *Michael D. Jarrett Customer Service Award (for Division)*

- Agency facilitator for Kepner-Tregoe Process

COMMITTEES/WORKING GROUPS/TEAMS

INTERNATIONAL:

Served on International Atomic Energy Agency Raissa Evaluation Team responsible for evaluating member country's radiation control program and making recommendations for improvement. 2005- Present

NATIONAL:

- *Conference of Radiation Control Program Directors Liaison to the National Health Physics Society 1995-1998*
- *Conference of Radiation Control Program Directors*
- *Homeland Security/Emergency Response Emerging Issues Committee, Chair, 2006-present*
- *Conference of Radiation Control Program Directors*
- *International Relations Committee, 2005-present*
- *Conference of Radiation Control Program Directors*
- *E-37 Committee, Naval Nuclear Propulsion, 1999-Present.*
- *Conference of Radiation Control Program Directors*
- *S-6 Ad Hoc Committee on Reorganization of Executive Director's Office. Advisor 2000*
- *Organization of Agreement States*
- *Annual Meeting Planning Committee, 1999-2000.*
- *U.S. Nuclear Regulatory Commission's*
- *Management Review Board for Integrated Materials Performance Evaluation Program, 1998-Present.*
- *US Nuclear Regulatory Commission's*
- *Material Security Steering Committee- Co-Chair 2002-2007*
- *US NRC Chairman's Radiation Source Protection and Security Task Force 2005-present*
- *US NRC Chairman's Radiation Source Protection and Security Task Force, Public Education Subgroup 2006-present*
- *US NRC Management Directive 5.3 Revision Working Group 2005-2007*
- *US Nuclear Regulatory Commission's*
- *Decommission Guidance Review Committee, 2002*
- *US Dept. of Homeland Security*
- *Domestic Nuclear Detection Office*
- *Surge Committee, 2005-2007*
- *Health Physics Society Rules and Legislation Committee of the National 1995-2002*
- *Health Physics Society Human Capital Crisis Committee 2001-2002*

STATE:

- *Certification of X-Ray Operators Compromise Committee 1997-1999.*
- *South Carolina Radiation Quality Standards Association Ex-Officio member 1999-2004.*

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL:

DHEC Mentoring Program Development Committee

- *DHEC (Health Services) Continuous Quality Improvement Committee*
- *DHEC (EQC) Employee of the Month Guideline Development Committee*
- *DHEC (Health Services) Strategic Planning Group*
- *DHEC Christmas Party Committee 1988-1997*
- *S.C. Public Health Association Entertainment Committee*
- *S.C. Public Health Association Resolutions Committee.*

Uranium Study Technical Lead**DAN W. McCARN, CPG****Technical Lead:** Mining and Hydrogeology**Current Employment:** Trinitek Services, Inc.

Capabilities: Minerals, Mining, Petroleum, Hydrogeology, Project Licensing, Risk Assessment, over 30 years experience in the nuclear, environmental, petroleum, minerals and environmental with focus on project management of hydrogeological and water-quality investigations; Numerical Modeling; uranium mine and mill licensing & decommissioning; Performance Assessment of nuclear waste repositories; Pollution prevention; Risk assessment; Superfund.

Senior Geologist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants**Education / Credentials**

Doctoral Candidate (Geology)

❖ Leoben Mining University

B.Sc. Geology

❖ Birmingham-Southern College, Birmingham, Alabama

AIPG Certified Prof. Geologist CPG-10245

European Fed. of Geologists: Title #462

Wyoming Professional Geologist PG-3031

PROFESSIONAL AFFILIATIONS

Member of the Society for Mining, Metallurgy, and Exploration (SME)

PROFESSIONAL SUMMARY

He was overseas for 15 years in Europe, Asia, and Latin America.

Strong focus on uranium project licensing, economic assessment of mining feasibility. Capabilities include geological modeling, basin studies, seismic data analysis, environmental sampling, design of monitoring well systems, geochemistry, mineral chemistry, geostatistics, geophysical log interpretation.

Performs scientific programming with focus on geostatistical, geochemical, hydrological model development. Application languages include Visual Basic (6.0 & VBA), Fortran, C. Linear and non-linear methods of solution (Gauss Elimination, LU Decomposition, Adjunct identity element matrix inversion, Newton-Raphson, quadrature including Gauss Point method, analysis of ill-conditioned systems, and minimization methods.

Background includes significant experience in geostatistics, inorganic geochemistry, hydrogeology and numerical modeling as well as litigative experience as an expert witness.

Modified, debugged & documented mineral-solution equilibria and transport modeling codes (LEHGC and PHRQPITZ) applied to Performance Assessment (PA) of the **Waste Isolation Pilot Plant (WIPP)** transuranic waste repository.

Groundwater / geochemistry experience includes development of inverse groundwater models, coupled groundwater / geochemical models, PHREEQC and PHRQPITZ.

Work includes 3 years in Shell Oil's unconventional resource group focused on oil shale

in the Piceance Basin. My duties involved characterization of the thermally reactive inorganic components of the project as well as inorganic trace metal chemistry.

Additional focus areas are listed below:

- Licensing & environmental analysis of uranium in situ recovery (ISR) uranium mining projects;
- Decommissioning of uranium production facilities;
- RCRA & CERCLA project management, reporting and interface with regulators;
- Environmental Hydrogeology;
- Detailed knowledge of entire nuclear fuel cycle;
- Country assessment of nuclear fuel-cycle capability;
- Interpretation of geophysical logs;
- Analysis of core;
- Basin analysis and development of depositional environments for Alamos Basin, Anadarko Basin, Austrian Molasse Basin, Colorado - New Mexico Jurassic Basins, Delaware Basin, Denver Basin, Great Divide Basin, Kazakhstan Basins, Piceance Basin, Raton Basin, San Juan Basin;
- Well site geology;
- Engineering / Mineral economics;
- Uranium deposit geology;
- Developing ore deposit models focused on hydrogeological setting & depositional systems; geochemical & mineralization controls.

EMPLOYMENT SUMMARY

IPI Consulting (3/1995-Present)

Albuquerque, New Mexico

Certified Professional Geologist

- Licensing & environmental analysis of uranium in situ recovery (ISR) uranium mining projects, and decommissioning of uranium production facilities. Environmental Coordinator for Uranium Resources Inc. / Hydro Resources Inc. on the Crownpoint / Church Rock deposit license application Historical water rights issues in the San Juan Basin for Hydro Resources, Inc. (HRI) & Uranium Resources Inc. (URI). Development strategy for Strathmore for ISL uranium mining projects in New Mexico
- IAEA Uranium Geology Technical Committee. Lectures on economic analysis of ISL mining. Invited by Chinese government to review feasibility of newly discovered uranium districts in NW China and Inner Mongolia for ISL mining.
- Economic modeling of ISL mining projects in Kazakhstan (IAEA Projects KAZ/3/003 and RAW/0/007-06) including relational database design for data, ore-reserve estimation & analysis, and development of a computer model (Oracle / Access / VBA / Excel / FORTRAN).

Montanuniversität Leoben (1/2003-Present)

Institut für Geowissenschaften; Abt. für Ökosystemanalyse

Peter-Tunner-Strasse 5; A-8700 Leoben, Austria

Doctoral Candidate, Doktor montanistik. Currently completing requirements for Doctorate in Geology at the Leoben Mining University, Austria.

- Natural and anthropogenic multi-pathway risks associated with naturally occurring uranium mineralization in aquifers. Investigation of anthropogenic redistribution of regional redox-controlled, roll-front type deposits via high-volume irrigation pumping. Focus on Health Physics / risk analysis. Stochastic modeling of radiological exposure based on airborne radon releases and GENII. (ACCESS / EXCEL / VBA / FORTRAN).
- Lectures in Visual Basic, Relational Database Design, geostatistics, numerical modeling, geochemistry and natural water chemistry.

AREVA (9/2008-4/2009)

Exploration Manager, Central Asia

- Uranium projects in Kazakhstan focused on enhancing the geological returns from ongoing exploration and development drilling for acid in situ recovery of uranium in Central Kazakhstan.
- Modeled calcite mobilization and redeposition in proximity to roll-front and interaction with acid ISR mining processes.

Shell Oil (9/2005-2/2008)

Consulting Environmental Geologist

Commercial Oil Shale project in NW Colorado

- Focus on geology, inorganic geochemistry, and regulatory issues for Shell. Management of environmental data, sampling protocols and methods including conversion to EQUIS.
- Reclamation team member. Participation in the Technology Strategy group.

Santa Fe College (4/2004-9/2005)

Adjunct Professor of Computer Science

- Taught course in Visual Basic and physics, lecturing in environmental chemistry, database design, and other topics in computer science, mathematical programming & numerical analysis.

Tactical Staffing Resources, LLC (1/1998-8/1998)

Albuquerque, NM

Hydrologist Under Contract to Sandia National Laboratories

- Staff augmentation contract to modify, debug & document mineral-solution equilibria and transport modeling codes (LEHGC and PHRQPITZ) applied to Performance Assessment (PA) of the **Waste Isolation Pilot Plant (WIPP)** transuranic waste repository.

The LEHGC (Lagrangian-Eulerian HydroGeoChemistry) code is a coupled finite-element groundwater code allowing geochemical models of advection and diffusion to be developed. PHRQPITZ, a chemical equilibria code using a Pitzer correction for brine environments, was modified, and documented along with the preparation of QA/QC documentation.

INTERA, Inc. (11/1992-3/1995)

Albuquerque, NM

Senior Staff Consultant

- As a member of the **WIPP PA Group**, developed geostatistical elements for inverse groundwater modeling (GRASPINV). This code employed a synthetic "pilot point" technique to calibrate transient heads with transmissivities. Applied methods to the groundwater modeling of the Culebra dolomite.
- Support for the U.S. Department of Defense, Defense Nuclear Agency (DNA) collateral effects database of nuclear fuel cycle facilities. Provided coordination between the DNA and the IAEA for exchange of information.

P.E. LaMoreaux and Assoc. (1/1991-11/1992)

Tuscaloosa, Alabama

Project Manager

- Project management of Phase I and II environmental hydrogeological site assessments for large industrial clients (Chrysler) and negotiation with regulators.
- Support for litigations including the collection, preparation, and presentation of evidence for hydrogeological and environmental issues as well as reviewing opposition depositions, preparing lawyers for direct and indirect examination of witnesses, and preparing other expert witnesses for testimony. Gave legal depositions and courtroom testimony.

TECHNICAL RECOGNITION AND ACCOMPLISHMENTS

- 2002 Certificate of Appreciation from TVI Community College for volunteer service.
- New Mexico "Green Zia" Environmental Excellence Advisory Council & Pollution Prevention
- Environmental Program Advisory Board, TVI Community College

SELECTED PUBLICATIONS AND PRESENTATIONS

1. McCarn, Dan W. (2005): Natural Attenuation processes in Cenomanian sediments following acid in situ leach mining of uranium, Stráž pod Ralskem, Northern Bohemia, Czech Republic,

IAEA-TECDOC-1425, 15-18 June 1999.

2. McCarn, Dan W. (2004): Scoping Calculations: Natural and anthropogenic multi-pathway risks associated with naturally occurring uranium mineralization in aquifers; IAEA-TECDOC-1396, pp.289-315.
3. Pelizza, Mark and McCarn, Dan W., (2004): Licensing of In Situ Leach Recovery Operations for the Crownpoint and Church Rock Uranium Deposits, New Mexico: A Case Study, IAEA-TECDOC-1396, pp. 153-173.
4. McCarn, D.W., (2001): The Crownpoint and Churchrock Uranium Deposits, San Juan Basin, New Mexico: An ISL Mining Perspective, IAEA TECDOC 1258, pp. 171-183, Dec. 2001.
5. McCarn, Dan W. (2000): Scalable Economic Analysis of ISL Mineable Ore Deposits, Poster Session, Moscow Conference on Uranium Production, Supply, & Demand, All-Russian Institute for Mineral Resources, December 2000.
6. Dan W. McCarn, Ermek A. Akhmetov, Alexander V. Belykh, Victor P. Zhelnov, Vladimir A. Barmasov, Alexander F. Vershkov, & Pavlin G. Kayukov (1999) Part 1: Executive Summary and Mission Overview, Management of Uranium Reserves: Creation of Computer System for Management of Uranium Reserves in Kazakhstan, IAEA Expert Mission KAZ/3/003, 3-22 July 1999, Almaty, Kazakhstan, International Atomic Energy Agency. (Plus 4 other report sections).
7. DOE/SNF/REP-0033 Rev 0, (1998): Nuclear Dynamics, Consequence Analysis (NDCA) for the Disposal of Spent Nuclear Fuel in an Underground Geologic Repository (Chapter 7, Volume 2 – Summary of Results, Page 7-2) – Contributing Author.
8. McCarn, Dan W. (1998): LEHGC 1.2 Modifications and Sample Problems, Sandia National Laboratories Internal Report, July 5, 1998.
9. McCarn, Dan W. (1998): Brine Mixing Scoping Calculations for the E1 Brine Intrusion Scenario in the Culebra Dolomite, Appendix 1, Waste Isolation Pilot Plant (WIPP), WBS1.1.10.3.5, Effective Date: June 22, 1998.
10. McCarn, Dan W. (1997): Evaluation of proposed strategies for mill tailings wastewater disposal at Stráž, Northeast Bohemia, and Rožná, Southern Moravia, DIAMO Uranium Production Facilities, Czech Republic: Final Report of Mission for the International Atomic Energy Agency, Technical Cooperation Project CZR/3/002-01, September 26 - October 6, 1997, IPI Consulting, Albuquerque, New Mexico, October 24, 1997, (Confidential).
11. McCarn, D., Dubovik, L., Iakoushev, A., and Grebenkov, A. (1996): The Ecological-Commerce (ECO-COM) Zone Concept for Developing Biomass Energy from Contaminated Resources: A New Demonstration Zone for the Republic of Belarus, in International Topical Meeting on Nuclear and Hazardous Waste Management, Seattle, Washington, August 18-23, 1996, pp. 1417-1424.
12. Grebenkov, A. and McCarn, D.W. (1996): The US-Belarus Joint Projects Associated with Remediation of the Chernobyl Contaminated Sites, Environmental Opportunities in Central and Eastern Europe and the Newly Independent States, in Partnerships for Solutions Forum, Colorado School of Mines, Golden, Colorado, p. 19-35.
13. McCarn, D.W. (1994): Current Trends in the Uranium Market: The Issue of Uncommitted Demand, Presentation to the Waste-Management Education & Research Consortium, Las Cruces, New Mexico, Advisory Group Meeting, November 10-11, 1994.

14. LaVenue, M. and McCarn, D.W. (1993): Analysis of 1992 Conditionally Simulated Culebra Transmissivity Fields, Report to the WIPP Geostatistics Committee (GXG) on March 23, 1993 by INTERA, Inc.
15. McCarn, D.W. and Carr, J.R. (1992): Influence of Numerical Precision and Equation Solution Algorithm on Computation of Kriging Weights, Computers & Geosciences, V. 18, No. 9, pp.1127-1167.
16. McCarn, D.W. (1992): IAEA Technical Cooperation Project MEX/9/035-2: Nuclear Waste Management: Permanent Repository for Low- and Intermediate-Level Waste, Report of Mission Laguna Verde (Veracruz) and Mexico City, October 5-17, 1992. Contracted through P.E. LaMoreaux and Associates. Report approved and transmitted to Mexico in 1993.
17. Wolfbauer, J. & Others (1991): Qualitätsmeßstellennetz Tullner Feld Auswertung, BMLF, GZ 41.032/20-IV 1/89, Endbericht, Leoben, Im Juni 1991, Forschungsinstitut für Geo-Datenerfassung und -Systemanalyse, Montanuniversität Leoben.
18. McCarn, D.W. (1989): The River of Lost Souls, in Western Horse: Zucht, Haltung, Westernreiten, Heft 11, November 1989, Ute Kierdorf Verlag, 5272 Wippenfuerth, FRG, p. 12-26. (An article published in a German riding magazine about personal experiences mapping geology and punching cows around the beautiful Purgatoire River canyon, southeastern Colorado.)
19. McCarn, D. (1989): Development of an Austrian Data Management System for the Cleanup of Contaminated Areas Caused by Chemical or Industrial Accidents, in Policy Responses to Large Accidents – International Institute of Applied Systems Analysis, Proceedings of a IIASA meeting, Laxenburg, Austria, p. 17-35.
20. McCarn, D.W. (1989): Modification and Updating the RAPP3C Computer Program (Resource and Production Projection), Consultant's Report, 6-10 November, 1989, IAEA Internal Report, International Atomic Energy Agency, Vienna, Austria.
21. Dahlkamp, F., McCammon, R. and McCarn, D. (1988): Recommendations for a Revised Uranium Deposit Classification System and the Development of Related Deposit Recognition Criteria, IAEA Internal Report, Vienna.
22. DeVergie, P. and McCarn, D. (1988): User's guide for the uranium ore reserve calculation system (URAD), IAEA-TECDOC-484, Vienna.
23. McCarn, D. (Editor) (1988): Geological Data Integration Techniques, Proceedings of an IAEA Technical Committee, IAEA-TECDOC-472, Vienna.
24. Ajuria, S. and McCarn, D. (1988): The Nuclear Fuel Cycle Information System: A Directory of Nuclear Fuel Cycle Facilities, STI/PUB/794, IAEA, Vienna, 144 p.
25. McCarn, D.W. et al (1988): INTURGEO: The International Uranium Geology Information System – A World Atlas of Uranium Occurrences and Deposits, IAEA-TECDOC-471, Vienna, 493 p.
26. Ajuria, S., and McCarn, D. (1987): The Nuclear Fuel Cycle Information System, IAEA TECDOC-408, Vienna, 123 p.
27. McCarn, D. and Mueller-Kahle, E. (1986): Long-Term Uranium Supply-Demand Analysis, IAEA-TECDOC-395, 91 p., Vienna.
28. Paterson and others (1984): World Speculative Uranium Resources - Revised IUREP

Estimates 1983, Internal Report, International Atomic Energy Agency, Vienna, November 1984.

29. DeVergie, P. and McCarn, D. (1985): The RAPP3B Resource and Production Projection Modeling Systems User's Guide, IAEA Internal Report, Vienna.
30. Johnson, V.C., McCarn, D.W., Kocis, D. (1982): National Uranium Resource Evaluation, Trinidad Quadrangle, Colorado, U.S. Department of Energy, PGJ/F-034 (82), Grand Junction, Colorado.
31. McCarn, D.W., Johnson, V.C. and Theiss, N.T. (1982): National Uranium Resource Evaluation, La Junta Quadrangle, Colorado and Kansas, U.S. Department of Energy, PGJ/F-100 (82), Grand Junction, Colorado.
32. McCarn, D.W. and Freeman, R.W. (1976): Chemical Analyses of Ground and Surface Water Samples from Parts of the United States 1956-1975, U.S. Energy Research and Development Administration, GJBX-51 (75), 541p. Grand Junction, Colorado.

Uranium Study Technical Lead	Sheldon Landsberger, Ph.D.
Technical Lead: Radiochemistry Current Employment: Professor and Coordinator of Nuclear and Radiation Engineering Program, UTA Capabilities: Radiation measurements, uranium and trace metals analysis, health physics, international environmental and radiation studies, uranium fuel cycle, in-situ leaching environmental impacts, Over 40-years experience.	Senior Scientist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials PhD, Chemical Engineering ❖ University of Toronto MS, Physics ❖ Concordia University MS, Nuclear Chemistry ❖ Salford University BS, Chemistry/Mathematics ❖ Sir George Williams Univ.

Dr. Landsberger has more than 180 published papers and 120 conference proceedings. For the past 30 years he has been involved in a wide variety of environmental projects including analysis of various media for heavy metals and radioactivity. Some of his work has included: 1. Abestos Pollution Assessment in River Water by PIXE Methods, 2. The Determination of Heavy Metals (Al, Mn, Fe, Ni, Cu, Zn, Cd and Pb) in Urban Snow Using an Atomic Absorption Graphite Furnace, 3. Rapid Determination of Selenium in Various Marine Organisms by Instrumental Neutron Activation Analysis, 4. Sulphur and Heavy Metals in Urban Snow: Multi-Elemental Techniques and Analytical Interpretation, 5. Non-Destructive Determination of Arsenic in Urine, 6. Studies of Radioactivity and Heavy Metals in Phosphate Fertilizer, 7. Determination of Heavy Metals in the Rock River (Illinois) Through the Analysis of Sediments, 8. Arsenic, Chromium and Nickel Determination in Human Samples, 9. Low-Level Radioactive Waste Stream Analysis in a Neutron Activation Analysis Laboratory, 10. Heavy Metals in Urban Soils of East St. Louis, and 11. The Determination of Uranium in Food Samples.

Dr. Landsberger has also been involved in sampling of soils for heavy metal contamination. He also has oversight to sophisticated low-level gamma-ray counting for naturally occurring radioactive material and fission product identification. He continually involved in the determination of heavy metals using neutron activation analysis.

ACADEMIC POSITIONS

UNIVERSITY OF TEXAS

Professor and Coordinator of Nuclear and Radiation Engineering Program, 1997- present

Mechanical Engineering, Energy Thrust Coordinator for Clean and Efficient Energy Technologies, 2007-2009

Director Nuclear Engineering Teaching Lab 2002-2007

UNIVERSITY OF ILLINOIS

Assistant Professor - 1987 - 1990

Affiliate Faculty in Institute for Environmental Studies - 1987-1997.

Associate Professor - 1990-1995

Affiliate Faculty in Computer Science - 1991-1995

Director, Neutron Activation Analysis Laboratory - 1993-1995

Sabbatical Leave - 1995 - Environment Canada/Atmospheric Environment Service

Professor - 1995-1997

Director of Research, TRIGA Reactor 1996-1997

PROFESSIONAL EMPLOYMENT

Supervisor, Center for Neutron Activation Analysis, McMaster University,

Hamilton, Canada, 1983-1986

Faculty Appointment, Argonne National Laboratory, Divisions of Educational Programs and Chemical Technology, 1990-1996

PRESTIGIOUS AWARDS

- Physics Postdoctoral Fellow, National Research Council, Ottawa, Canada, 1982-1983.
- Outstanding Undergraduate Advisor Award, Engineering Council Award - 1994
University of Illinois
- Outstanding Undergraduate Advisor Award, Engineering Council Award - 1995
University of Illinois
- Hayden Head Centennial Endowed Professorship, 2005 – present
College of Engineering, University of Texas
- American Society of Engineering Education Glenn Murphy Award
Nuclear and Radiological Division – 2005
- American Nuclear Society, Arthur Holly Compton Award – 2007

MEMBERSHIPS IN PROFESSIONAL SOCIETIES

- American Nuclear Society
- American Chemical Society
- American Society for Engineering Education
- Nuclear Engineering Departmental Heads Organization

PUBLICATIONS (OUT OF 185)

Books Written

Tsoufanidis, N. and S. Landsberger Measurement and Detection of Radiation, Third Edition, Tsoufanidis and Landsberger, CRC Press (2010).

Books Edited

1. Landsberger, S. and M. Creatchman, Editors "Elemental Analysis of Airborne Particles" Gordon and Breach (1999).

RELEVANT ARTICLES IN JOURNALS

1. Desaulniers, G., A. P'an, M. Trudeau, R. Lecomte, S. Landsberger, P. Paradis and S. Monaro, "On the Use of PIXE as Methodology for Measuring Asbestos in River Water," Int. J. of Appl. Rad. and Isotopes, 32, 122-125 (1981).
2. Landsberger, S., R. E. Jervis, R. Lecomte, P. Paradis, and S. Monaro, "Determination of Sulphur in Snow by Proton-Induced X-ray Emission (PIXE) Method," Environ. Pollut. Series B, 3, 215-233 (1982).
3. Landsberger, S., R. E. Jervis, G. Kajrys and S. Monaro, "Characterization of Trace Elemental Pollutants in Urban Snow Using Proton-Induced X-ray Emission and Instrumental Neutron Activation Analysis," Int. J. Environ. Anal. Chem., 16, 91-130 (1983).
4. Abrahams, P. W., M. Tranter, T. D. Davies, I. L. Blackwood, and S. Landsberger, "Trace-Element Studies in a Remote Scottish Upland Catchment," Water, Air and Soil Pollut., 37, 255-271 (1988).
5. Jickells, T. D., T. D. Davies, M. Tranter, S. Landsberger, K. Jarvis and P. Abrahams, "Trace Elements in Snow Samples from the Scottish Highlands: Sources and Dissolved/Particulate Distributions," Atmos. Environ., 26A, 393-401 (1992).
6. Hamamo, H., S. Landsberger, G. Harbottle and S. Panno, "Studies of Radioactivity and Heavy Metals in Phosphate Fertilizer," J. Radioanal. Nucl. Chem., 194, 331-336 (1995).
7. Buchholz, B. A., and S. Landsberger, "Leaching Dynamic Studies of Municipal Solid Waste Incineration Ash," J. Air and Waste Management Association, 45, 579-590 (1995).
8. Chichester, D. L. and S. Landsberger, "Determination of the Leaching Dynamics of Metals from Municipal Solid Waste Incineration Fly Ash Using a Column Test," J. Air and Waste Management Association, 46, 643-649 (1996).
9. Kaminski, M. D. and S. Landsberger, " Heavy Metals in Urban Soils of East St. Louis, Illinois, Part I: Total Concentration of Heavy Metals in Soils", J. Air and Waste Management Association, 60, 1667-1679 (2000).

10. Kaminski, M. D. and S. Landsberger, "Heavy Metals in Urban Soils of East St. Louis, Illinois, Part II: Leaching Characteristics and Modeling", J. Air and Waste Management Association, 60, 1680-1687 (2000).
11. Iskander, F., S. Landsberger and S. D. Warren, "Determination of ¹³⁷Cs in Soil Samples by Low Level Compton Suppression Gamma Counting", J. Radioanal. Nucl. Chem., 244, 159-163 (2000)
12. Basunia, S. and S. Landsberger, "Contents and Leachability of Heavy Metals (Pb,Cu, Sb, Zn, As) at the Pantex Firing Range, Amarillo, Texas", J. Air and Waste Management, 51, 174-185, (2001).
13. Reguigui, N. and S. Landsberger, "Determination of Soil Depth Profiles for ¹³⁷Cs and ²¹⁰Pb Using Gamma Ray Spectrometry with Compton Suppression", J. Radioanal. Nuc. Chem., 264, 469-476_(2005)
14. Panno, S. V., K. C. Hackley, H. H. Wang, S. Greenberg, I. G. Krapac, S. Landsberger and D. J. O'Kelly." Characterization and Identification of Sources of Na-Cl in Ground Water and Surface Water, with Emphasis on Illinois, Ground Water, 44, 176-187 (2006).
15. Kapsimalis, R., S. Landsberger, and N. Reguigui, "Measurement of Uranium in Small Quantities in Phosphates by Use of γ -Ray Spectroscopy and the 1001 keV Peak of ^{234m}Pa . J. Radioanal. Nuc. Chem., 280, 293-298 (2009).
16. Kapsimalis, R., S. Landsberger and Y. A. Ahmed, "The Determination of Uranium in Food Samples by Compton Suppression Epithermal Neutron Activation Analysis", App. Rad. Isotop., 67, 2097-2099 (2009).
17. Landsberger S., G. George, R. Lara, D. Tamalis, J. Louis-Jean and K. Dayman, "Analysis Of Naturally Occurring Radioactive Material Using Neutron Activation Analysis and Passive Compton Suppression Gamma-Ray Spectrometry", Nukleonika, in press (2012.)
18. Kapsimalis, R. and S. Landsberger. "Various Neutron Activation Analysis and Passive Gamma-Ray Counting Methods for the Determination of Uranium Concentrations in Geological and Environmental Samples" in press Environmental Radioactivity (2012)
19. Landsberger, S. D. Hearnberger, D. Tamalis, T. Meadows and B. Clanton, "Characterization of a Uranium Contaminated Soil Site", (sent for publication)

RELEVANT CONFERENCE PROCEEDINGS (OUT OF 135)

1. Kapsimalis, R. and S. Landsberger, "Determination of Uranium in Phosphate Samples Using Compton-Suppressed Gamma-Ray Spectroscopy", Trans. ANS, 99, 42-44 (2008).

2. Landsberger, S., R. Kapsimalis, P. Doumerc, A. Malato, "Neutron Activation Analysis and Passive Gamma-Ray Counting for the Determination of Uranium Concentrations in Geological and Environmental Samples" Trans. ANS, 101, 109-110, (2009).
3. Landsberger, S., S. Fitch and K. Dayman, "[An Assay of Uranium Ore with Compton-Suppressed Gamma Spectroscopy](#)", Trans. ANS, 102, 181-182 (2010).

Uranium Study SME	Ahmed Hasan, Ph.D.
SME: Radiation chemist, geohydrological modeling Current Employment: Institute for Engineering Research and Applications New Mexico Tech University Capabilities: Past research experience and interests focused on Low- and high-level radioactive waste disposal, conditioning of radioactive waste, radiation protection, and subsurface contaminant transport. I gained experience in the interaction of inorganic contaminants with mineral surfaces, physicochemical characterization of soil and mineral surfaces, development of geochemical codes, mass transfer limited trace element sorption in porous adsorbents, and radionuclide migration. Past research has included investigation of some radionuclides of environmental interests with different types of soils and rocks. Other research program includes hazardous and mixed waste; and colloidal transport of radioactive and metal contaminants and their applications to remediation, performance assessment of the high-level radioactive waste repositories, colloidal transport of contaminants and, disposal of Greater-than-Class C radioactive waste.	Scientist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials Ph.D. Chemistry ❖ Ain Shams University, Egypt MS Chemistry ❖ Ain Shams University, Egypt B.S. Geochemistry ❖ Ain Shams University, Egypt

Appointments

- 2009 – Present: Adjunct Professor, Chemical Engineering Department, New Mexico Institute of Mining and Technology
- 2005 – Present: Senior Research Scientist, New Mexico Institute for Engineering Research and Applications, New Mexico Tech University (IERA-NMIMT)
- 2002 – 2005: Limited term Employee, Sandia National Laboratories, Albuquerque, New Mexico
- 1999 – 2002: Senior Research Scientist II, New Mexico Engineering Research Institute NMERI), University of New Mexico (UNM)
- 1995-1999: Research Scientist I, Institute for Space and Nuclear Power Studies (ISNPS), University of New Mexico
- 1994-1995: IAEA Fellow, Sandia National Laboratories, Albuquerque, NM
- 1987-1994: Research Scientist ()—Egyptian Atomic Energy Authority's Hot Laboratories and Waste Management Center (EAEA-HLWMC)

Synergistic Activities

- Session Chair in the "Entrepreneurs in the Shade of Global Trade) Conference, 2-4th of November, 2009, Jeddah, Saudi Arabia.
- Organized and Chaired a workshop on "Economic Viability of Biofuels for the State of New Mexico", Albuquerque, New Mexico, August 17-18, 2009.
- Organized and chaired an international workshop on sustainable Development of Desert Areas, Cairo, Egypt, February 13-15, 2004.
- Investigated the environmental conflict around the Black Sea and what are the different alternatives to solve these problems.
- Co-organizing the International Conference on Hazardous Waste: Sources, Effects, and Management, 12-16 December 1998, Cairo, Egypt.
- Contributed to the understanding of the groundwater budget at the South valley, Albuquerque, NM using the Groundwater Modeling System (GMS) code.
- Managed the Integrated Management Program for Radioactive Sealed Sources in Egypt. Cradle-to-Grave management of sources that includes Tracking, Awareness, Security, Regulations, Recovery, Transportation, Storage, Recycling, Conditioning, Disposal, and Emergency Response. A five million dollar program funded by the USAID.
- Developed Research Collaborative Agreement between NMT and EAEA and developed two agreements between NMT and Sinai University in academic and research cooperation.
- Developed Memorandum Of Understanding (MOU) between Sandia National Laboratories (SNL) and the Egyptian Atomic Energy Authority (EAEA) in 1996.
- Managed the technical interactions between Los Alamos National Laboratory (LANL) and EAEA through the DOE sister laboratory agreement 1994-2003.
- Supervised and trained 15 IAEA fellows at SNL and NMT since 1996.
- Supervised and hosted about 30 Egyptian students and visitors at NMT and SNL
- Participated in Track II efforts for the Multilateral Peace negotiation in the Middle East in 1996.
- Professional and technical accomplishments includes: Building and running of Analytical Laboratories; Physicochemical characteristics of subsurface contaminants; Performance Assessment of Radioactive Waste Disposal Facilities; and Water Shed and Water Budget

Collaborators and Other Affiliations

Advisors:

1. Professor Mohamed El-Genk: Director Institute for Space and Nuclear Power Studies, University of New Mexico.
2. Professor Hisham F. Aly, Egyptian Atomic Energy Authority, Cairo, Egypt
3. Professor Sohir El-Reefy, Egyptian Atomic Energy Authority, Cairo, Egypt
4. Professor Saad El-Said, Chemistry Department, Ain Shams University, Cairo, Egypt

Sample of Collaborators and Co-Editors:

5. Professor, Erik Nuttal, Chemical and Nuclear Engineering Department, University of New Mexico

6. Professor Bruce Thompson, Civil Engineering Department, University of New Mexico
7. Professor Misra Manoranjan, Metallurgical and Materials Engineering, University of Reno, Nevada
8. Dr. Barbara Smith, Los Alamos National Laboratory, Los Alamos, New Mexico
9. Dr. Robert C. Moore, Sandia National Laboratories, Albuquerque, New Mexico
10. Mr. Johan Cochran, Sandia National Laboratories, Albuquerque, New Mexico
11. Dr. Karim El-Adham, National Center for Nuclear Regulatory Control, Cairo, Egypt
12. Dr. Kent Biringer, Sandia National Laboratories
13. Dr. Amir Mohagegy, Sandia National Laboratories
14. Dr. Kenneth Apt, Los Alamos National Laboratories
15. Dr. Said El-Nashaie, Dean, College of Engineering, Sinai University
16. Dr. Gautam Priyadarshan, Metallurgical and Materials Engineering, University of Reno, Nevada
17. Professor Ken Czerwinski, Department of Chemistry, University of Nevada, Las Vegas

Sample of students and Trainees:

Dr. Cleodia Cassia, Dr. Perez Guerrero, Jesus Salvador, Dr. Mahmoud Ali (EAEA); Dr. Yasser Tawfik (EAEA), Dr. Tarek Mohamadden (Nuclear Material Authority (NMA), Egypt; Dr. Khalid Fouad, (NMA), Dr. Hisham Kadry (NMA), Dr. Mona Gasser (EAEA), Dr. Nasser Awwad (EAEA), Dr. Mona EL-Hazek (NMA), Dr. Mohsen Ali (NMA), Dr. Aisha Al-Dakroury (EAEA), Dr. Mohamed Zaid (EAEA); Dr. Hamdy Gad (EAEA); Dr. Rehab Hassan (EAEA); Mr. Dannel Maquiz (NMT).

Research and Technical Areas of Specialization

Current experience is related to developing an Integrated Model for sustainable development. The IMSD is an innovative approach that will have a broader impact on the economic development by enabling technology integration that help remote communities, optimize the sustainability of resources for existing communities, and promote further housing and communities' development in desert environment. A partnership between the private sector and universities in the U.S. to develop an IMSD will help employ students to facilitate the knowledge transfer and provide them with the necessary skills to support the private sector upon their graduation. Additionally, the IMSD would enable the private sector and universities in the U.S. to assist the regulators to develop the laws that protect the environment and sustain the energy and water resources while promote economic development.

Recent experience includes Integrated Management of Radioactive Sealed Sources (IMPRSS). Cradle-to-Grave management of radioactive sources ensures the safety and security of sources during its life cycle. I managed 13 tasks under the IMPRSS project such as Tracking, Awareness, Security, Regulation, Recovery, Storage, Transportation, Recycling, Conditioning, Disposal, QA/QC and Emergency response. experienced in many technical issues related to safety and security of radioactive sealed sources.

I supervised more than 23 fellows from the International Atomic Energy Agency (IAEA) who received their training in many areas such as disposal of low- and high-level radioactive waste, decommissioning and decontamination, and water and

wastewater treatment. Since 1996, I support various actions sheets between U.S. DOE/ LANL and Egypt under the sister laboratory program in areas of radioactive waste management and environmental monitoring.

Past research experience and interests focused on Low- and high-level radioactive waste disposal, conditioning of radioactive waste, radiation protection, and subsurface contaminant transport. I gained experience in the interaction of inorganic contaminants with mineral surfaces, physicochemical characterization of soil and mineral surfaces, development of geochemical codes, mass transfer limited trace element sorption in porous adsorbents, and radionuclide migration. Past research has included investigation of some radionuclides of environmental interests with different types of soils and rocks.

Other research program includes hazardous and mixed waste; and colloidal transport of radioactive and metal contaminants and their applications to remediation, performance assessment of the high-level radioactive waste repositories, colloidal transport of contaminants and, disposal of Greater-than-Class C radioactive waste.

The research area of Contaminant Transport encompassed the physics and chemistry of the fate and transport of contaminants in aquifers; the application of geophysical techniques to detection of contaminants. The research area of Integrated Watershed Systems encompassed land use practices and resource management; modeling of stream flow; flash flood analysis; measurement and modeling of surface water/ground-water interactions; modeling the impacts of mining; and modeling of environmental remediation practices.

Professional and Technical Accomplishments

Building and running of Analytical Laboratories

Constructed and equipped three analytical laboratories at the Egyptian Atomic Energy Authority, and on laboratory at the University of New Mexico. At EAEA, one of the labs was specialized in characterization of chemical and radiological characteristics of various radionuclides. The labs were equipped with several analytical instrumentation such as UV, IR, Multichannel Analyzers, High-performance liquid chromatograph (HPLC), Potentiometric titration, and Inductive Coupled Plasma-Mass Spectroscopy (ICP-MS). Operated and maintained three COULTER instruments for colloids characterization, DELSA 440, LS 230, and Multisizer, at UNM. Developed a laboratory technique for testing online filters for removal of colloidal and soluble contaminants.

Physicochemical characteristics of subsurface contaminants

Contributed to the understanding of the distribution coefficients of different radionuclides onto various minerals and rocks in the Egyptian soil under different chemical conditions. Identified the geochemical needs and parameters for potential low-level radioactive waste disposal facility in Egypt. Converted one of the major geochemical codes used for the Waste Isolation Pilot Plant (WIPP) from Unix platform to PC user friendly platform. Contributed to the understanding of uranium adsorption/desorption onto colloidal materials such as Iron Oxide and Silica colloids.

Performance Assessment of Radioactive Waste Disposal Facilities

Contributed with SNL in developing performance assessment methodologies for the low-level radioactive waste disposal, waste Isolation Pilot Plant (WIPP), Radioactive Sealed Sources (RSS) and Yucca Mountain Project (YMP). Reviewed and edited all the IAEA and NRC regulations to provide a goal for the performance assessment of low-level radioactive waste facilities. Converted the geochemical code FMT2.0 from Unix to PC platform and ran several test cases for WIPP performance assessment. Conducted some experimental work to study the adsorption/desorption of various radioactive elements onto different substrates. Played a major role for assessing the potential colloid formation at YM drift and their potential for enhancing the migration of radionuclides. Reviewed and edited the IAEA, South Africa, and Russia programs for the borehole disposal of radioactive sealed sources.

Water Shed and Water Budget

I contributed to the understanding of the groundwater budget at the South valley, Albuquerque, NM using the Groundwater Modeling System (GMS) code, which was developed by the US corp. of Engineering. I also, investigated the environmental conflict around the Black Sea and what are the different alternatives to solve these problems. I reviewed several models and international agreements on water budget and water quality. I am helping SNL to expand its water surety program to the Middle East and solve water-related problems such as Mountain Aquifer between Jordan and Israel, and the Nile Basin Initiative.

International

- Developed two Academic and Research agreements with Sinai University, Egypt.
- Developed Memorandum Of Understanding (MOU) between SNL and EAEA in 1996.
- Facilitate technical interactions between Los Alamos National Laboratory (LANL) and EAEA through the Doe sister laboratory agreement since 1994.
- Facilitate technical interactions between NMT and EAEA through the research collaborative agreement since 1995.
- Supervised and trained 15 IAEA fellows to SNL and NMT since 1996.
- Hosted 30 foreign nationals at SNL and NMT
- Participated in Track II efforts for the Multilateral Peace negotiation as part of the Egyptian Delegation in 1996.
- Participated in organizing the International Conference on Hazardous Waste: Sources, Effects, and Management, 12-16 December 1998, Cairo, Egypt.
- Managed the Integrated Management Program for Radioactive Sealed Sources in Egypt. Cradle-to-Grave management of sources that includes Tracking, Awareness, Security, Regulations, Recovery, Transportation, Storage, Recycling, Conditioning, Disposal, and Emergency Response.

HONORS AND AWARDS

US-Egypt S&T Junior Scientist Award: August 2008

Excellence Performance Award: Ain Shams University, 1984, 1985 and 1986.

IAEA Award: Training fellowship at SNL for 12 months, 1994.

MEMBERSHIP AND ACTIVITIES AT PROFESSIONAL SOCIETIES

- **American Nuclear Society, Trinity Section:** Member since 1996
- **American Chemical Society:** Member since 1999.
- **Member of the Organizing Committee of the International Conference on Hazardous Waste:** Sources, Effects, and Management, Cairo, Egypt.

SAMPLE PUBLICATIONS

1. Cooperative Monitoring and Its Role in Regional Security, Kent Biringer, John Olsen, Richard Lincoln, Fred Wehling, Wayne Einfeld, Pauline Spaulding, Ahmed Hasan, and David Betsil, SAND97-0523, 1997.
2. Interaction of Uranium with Silica Colloids, Ahmed A. Hasan and Mohamed S. El-Genk, WERC/WRHSRC/NMHWMS Joint Conference on Environment, Albuquerque, NM, March 31-April 1, 1998.
3. In Situ Biological Denitrification of Groundwater, Lijun Deng, H. Eric Nuttal, Abdesselam Abdelouas, Yongming Lu, Werner Lutze, and Ahmed Hasan, WERC/WRHSRC/NMHWMS Joint Conference on Environment, Albuquerque, NM, March 31-April 1, 1998.
4. An investigation of Uranium Interactions in Batch and Column Techniques, Ahmed Hasan and Mohamed El-Genk, WERC/WRHSRC/NMHWMS Joint Conference on Environment, Albuquerque, NM, March 31-April 1, 1998.
5. Egyptian Nuclear Program: Radioactive Waste Management, Ahmed Hasan, Paul Davis, and John Cochran, 219 ACS National Meeting, San Francisco, California, March 26-30, 2000.
6. Colloids Formation, Stability, Interactions and Transport at Yucca Mountain Drift, A.A. Hasan, S. Alcorn, and B. MacKinnon, 219 ACS National Meeting, San Francisco, California, March 26-30, 2000.
7. Egyptian Radioactive Waste Management Program, Ahmed Hasan, and John Cochran, GlobeEx 2000 International Energy Conference Las Vegas, Nevada USA July 23-28, 2000.
8. Containment of Uranium in the Proposed Egyptian Geologic Repository for Radioactive Waste Using Hydroxy Apatite: A comparison of Synthetic and Animal Bone Derived Hydroxy Apatite for Sorption of Uranium. Mahmoud A. Hasan, Robert C. Moore, Ahmed Hasan, Kathleen Holt, Fred Salas. 9th International Conference on Chemistry and Migration Behavior of Actinides and Fission Products in the Geosphere, Gyeongju, Korea, September 21-26, 2003.
9. Formation of Calcium Apatite in Soils Using Calcium Citrate and Sodium Phosphate for Control of Strontium Migration. Robert C. Moore, Ahmed Hasan, Mahmoud Mohamed, Kathleen Holt and Fred Salas. 9th International Conference on Chemistry and Migration Behavior of Actinides and Fission Products in the Geosphere, Gyeongju, Korea, September 21-26, 2003.
10. Protecting the Human Health and the Environment from Sealed Sources. K. El-Adham, A.A. Hasan, M. R. El-Sorougy, International Conference on National Infrastructures for Radiation Safety: Towards Effective and Sustainable Systems. Rabat, Morocco, 1-5 September 2003. IAEA-CN-107.
11. Integrated Management Program for Radioactive Sealed Sources in Egypt. Ahmed Hasan, John Cochran, Karim El-Adham and Rashad El-Sorougy, WM'03, February 23-27, 2003, Tucson Arizona.
12. Containment of Uranium in the Proposed Egyptian Geologic Repository for Radioactive Waste Using Hydroxy Apatite: A comparison of Synthetic and Animal Bone Derived Hydroxy Apatite for Sorption of Uranium. Mahmoud A. Hasan, Robert C. Moore, Ahmed Hasan, Kathleen Holt, Tom Headley, Hongting Zhao and Fred Salas Sandia Report SAND2004-1243.

13. Sorption of Plutonium (VI) by Hydroxyapatite. R.C. Moore, M. Gasser, N. Awwad, K.C. Holt, F.M. Salas, A. Hasan. Journal of Radio analytical and Nuclear Chemistry, Vol. 263, No. 1 (2005) 97-101
14. Integrated Management Program for Radioactive Sealed Sources in Egypt. Ahmed Hasan, Karim El-Adham. ANES/SENA 2004 Symposium, Miami Beach, Florida, October 3-6, 2004.
15. Waste Generated from LMT-AMTEC Reactor Concept. A. Hasan. T.F. Mohammaden, Y.T. Mohamed. Waste Management 1003 Symposium, February 23-27, 2003. Tucson, Arizona.
16. Integrated Management Program for Radioactive Sealed Sources in Egypt. A. Hasan, J.R. Cochran, El-Adham, R. El-Sorougy. Waste Management 1003 Symposium, February 23-27, 2003. Tucson, Arizona.
17. Overview on Backfill Materials and Permeable Reactive Barriers for Nuclear Waste Disposal Facilities. Mahmoud A. Hasan, Robert C. Moore, Kathleen C. Holt, and Ahmed A. Hasan. SAND2003-2101. Printed October 2003
18. Anionic Sorbents for Arsenic and Technetium Species. Robert C. Moore, Kathleen C. Holt, Hongting Zhao, Ahmed Hasan, Mahmoud Hasan, Ranko Bontchev, Fred Salas, and Daniel Lucero. SAND2003-3360. Printed September 2003
19. Integrated Management Program for Radioactive Sealed Sources in Egypt. Ahmed Hasan and Karim El-Adham. The 227th ACS National Meeting, Anaheim, CA, March 28- April 1, 2004.
20. Development of Intermediate-Depth Borehole Disposal for Unwanted Radioactive Sources in Egypt. J. R. Cochran, A. Hasan, K-El-Adham, M.A.H. Abdel Aziz, and Y.T. Mohamed. WM'05, February 27-March 3, 2005, Tucson, Arizona.
21. Greater Confinement Disposal of Radioactive Waste in Borehole Facilities. J. Cochran, Ahmed Hasan. International Symposium on Disposal of Low Activity Radioactive Waste, Cordoba, Spain, 13-17 December 2004.
22. Sorption of Selenium by Bovine Derived Hydroxyapatite
Mona Gasser⁽¹⁾, Nasser Awwad⁽¹⁾, Robert C. Moore⁽²⁾, Kathleen Holt⁽²⁾, Charles Sanchez⁽³⁾, Hongting Zhao⁽²⁾, and Ahmed Hasan⁽¹⁾. Journal of Chemical and Engineering Data (in press)
23. "In Situ Formation of Apatite in Soil and Groundwater for Containment of Radionuclides and Heavy Metals" R.C. Moore, K. Holt, C. Sanchez, H. Zhao, F. Salas, A. Hasan, and D. Lucero. SAND Report, SAND2002-3642.
24. "Sorption of Arsenic from Drinking Water to Mg(OH)₂, Sorrel's Cements, and Zirconium Doped Materials" R.C. Moore, K. Holt, H. Zhao, F. Salas, A. Hasan, and D. Lucero. SAND Report, SAND2002-3641.
25. Sorption of Np(V) by Hydroxyapatite. Robert C. Moore, Kathleen Holt, Nasser Awwad, Mona Gasser, Charles Sanchez, Hongting Zhao, and Ahmed Hasan. Radiochimica Acta, 2003, v.91(12), p. 721-727
26. Formation of Hydroxyapatite in Soils Using Calcium Citrate and Sodium Phosphate for Control of Strontium Migration. Robert C. Moore, Charles Sanchez, Kathleen Holt, Ahmed Hasan, Mahmoud A. Hasan, Hongting Zhao, and Fred Salas. In press J. Contaminant Hydrology.

Uranium Study SME	John Hart
SME: Regulatory Compliance Specialist, NEPA, RCRA, Environmental Laws, QA Current Employment: John Hart and Associates Capabilities: Mr. Hart has over 32 years experience in environmental regulatory compliance, primarily for U.S. Department of Energy (DOE) and commercial nuclear facilities. He has technical and management experience under a variety of federal and state environmental laws and regulatory programs, including the Nuclear Waste Policy Act, the National Environmental Policy Act (NEPA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), the Clean Air Act, the Clean Water Act, and the Endangered Species Act. He has experience in obtaining environmental permits and approvals for uranium milling operations in New Mexico.	Senior Regulatory Consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials MS Environmental Science, ❖ Indiana University School of Public and Environmental Affairs, Bloomington, Indiana, B.A., Geography and Environmental Studies, ❖ Indiana University, Bloomington, Indiana, Additional Training: Hazardous Materials Health and Safety Training Courses Advanced Project Management Professional Development Courses

Mr. Hart has been the owner and operator of an environmental consulting group since 1989. He has supported regulatory programs at multiple DOE nuclear facilities including the Waste Isolation Pilot Plant, the Yucca Mountain Project, the Feed Materials Production Center, the Nevada Test Site, the Hanford Reservation, the Oak Ridge National Laboratory, and the Los Alamos National Laboratory. Mr. Hart specializes in helping clients find cost-effective compliance approaches for a variety of environmental protection regulatory programs.

He has experience with planned-facility start up regulatory assessments and environmental permitting including the development of airborne pollutants emissions inventories, notices of intent to discharge waterborne contaminants, archaeological resources protection planning, and threatened and endangered species impact evaluations. Much of his experience pertains to regulatory analyses, including multi-program regulatory and standards comparisons. He has authored and co-authored many documents focused on communicating the results of complex nuclear-facility risk evaluations in clear terms, easily understood by the general public.

In addition to his management duties, Mr. Hart provides environmental consulting services to DOE contractors and laboratories, other government clients, and commercial clients. Much of his work is in support of the DOE's Waste Isolation Pilot Plant (WIPP), a geologic repository for radioactive mixed waste, located near Carlsbad, New Mexico. He supported the preparation of a Compliance Recertification Application (CRA) which was submitted by the DOE to the EPA to obtain EPA's

concurrence that the WIPP may continue to operate in compliance with the requirements of 40 CFR Parts 191 and 194, EPA's environmental performance standard. He was a principal author of the WIPP Experimental Program Plan, a document submitted by the DOE to the EPA, in accordance with the WIPP Land Withdrawal Act. Mr. Hart has also supported the development of regulatory-compliance strategy documents for the WIPP, assisted in evaluating compliance.

Project Manager/Section Chief - Assisted the Westinghouse Electric Corporation in complying with RCRA requirements for the disposal of radioactive mixed waste in the WIPP. Directed the preparation of the draft No-Migration Variance Petition pursuant to the 40 CFR Part 268 land disposal restrictions. This work required the development of regulatory-compliance strategies, preparation of numerous background papers, and frequent negotiation with the EPA reviewers of the petition.

Project Manager - Under contract to the Reynolds Electrical and Engineering Company, Inc. (REECo), managed the preparation of multiple RCRA-compliance documents for radioactive mixed waste management units at the DOE's Nevada Test Site, including closure plans, ground water monitoring waiver requests, Health and Safety Plans and Quality Assurance Program Plans.

Project Scientist - Supported the development of license applications for uranium milling operations at United Nuclear Churchrock, near Gallup, NM, and Homestake Mining, near Grants, NM.

Project Scientist - Evaluated technical and regulatory issues pertaining to the characterization and disposal of radioactive mixed wastes stored in underground tanks at the Hanford Reservation. Included analysis of the implications of relevant DOE Orders and federal and State hazardous waste laws and regulations.

Project Coordinator - Responsible for the preparation of RCRA permit applications addressing hazardous and radioactive mixed waste units at the Hanford Reservation, SNLA, and the Los Alamos National Laboratory (LANL).

Project Manager - Coordinated the preparation of 18 closure plans at a RCRA/CERCLA site operated by a Colorado aerospace industries client. The project involved the assimilation of information on the units to be closed, site environmental characteristics, and the development of detailed site investigation and closure/remediation plans. Assisted the client in negotiations with the Colorado Department of Health (CDH) and EPA Region VIII concerning soil and ground water decontamination criteria to be applied to the sites. Each closure plan has been approved by the CDH.

Project Scientist - Contributed to the completion of a hazardous waste site investigation at SNLA. The site is an inactive chemical waste landfill where a variety of hazardous materials, including organic compounds and radioactive wastes, were disposed of over many years. The project included exploratory

drilling, trenching, sampling, and both on- and off-site laboratory analyses. Also contributed to the development of a facility-wide waste volume reduction plan and a laboratory-wide Spill Prevention, Control and Countermeasures (SPCC) Plan, and the installation of ground water monitoring wells in compliance with RCRA requirements.

Indiana University

Bloomington, Indiana

1977 - 1979

Research Assistant - Served as a research assistant supporting an inventory and ecological analysis of Great Lakes coastal wetlands for the U.S. Fish and Wildlife Service.

Southwestern Indiana and

Kentucky Regional Council of Governments

Evansville, Indiana

1975 - 1976

Planner - Supported comprehensive planning activities including land use surveys, demographic studies, neighborhood analyses and transportation studies for a regional planning agency encompassing six counties in southern Indiana and western Kentucky.

Publications and Technical Presentations

Mr. Hart has authored and presented a number of technical publications at national and regional professional meetings. He has been an invited speaker at environmental regulatory compliance training seminars. Technical and regulatory-compliance aspects of various project activities and research programs, and provided support to the development of compliance applications. He coauthored management plans for programs to comply with 40 CFR Part 191 and RCRA requirements for passive institutional controls and long-term monitoring. He assisted Sandia National Laboratories in the development of quality assurance procedures to control Sandia's scientific and engineering research programs related to the WIPP Project. Mr. Hart supported a DOE system-wide study of benefits and detriments associated with the implementation of various optional engineering alternatives for the disposal of waste in the WIPP repository.

He supported scoping assessments for the Yucca Mountain repository environmental impact statement. Mr. Hart supported the resolution of issues related to the emplacement of radioactive mixed waste in the repository.

Mr. Hart co-founded Benchmark Environmental Corporation in 1989, serving as Vice President, Treasurer, and Project Manager. In addition to his administrative duties, Mr. Hart provided technical support to clients, as described below:

Project Manager - Provided environmental support services to the Westinghouse Electric Corporation, the Management and Operations Contractor at the WIPP.

Tasks performed include preparation of a RCRA Compliance Plan, a regulatory compliance tracking database, and a No-Migration Variance Petition for the WIPP.

Also supported the development of a detailed plan to monitor volatile organic compound (VOC) emissions from the WIPP. VOC emissions monitoring was required by the EPA to support DOE's demonstration of "no-migration" of hazardous wastes from the repository.

Mr. Hart served on a six-member DOE task force developing an overall regulatory compliance criteria document for the WIPP. This document defines criteria for DOE's demonstration of compliance with requirements of 40 CFR Parts 191, 268 and 264.

Project Manager - Provided environmental regulatory compliance services to Sandia National Laboratories (SNL). Support focused on implications to the WIPP of compliance with 40 CFR Part 191, Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Waste.

Project Manager - As a subcontractor to the IT Corporation, provided support to the development of the RCRA permit application for the Test Phase of the WIPP project. International Technology Corporation . **Project Manager/Project Scientist** - Prepared NEPA documentation for the WIPP, SNLA and the DOE's Feed Materials Production Center, located near Fernald, Ohio. This work included the preparation of portions of the WIPP Final Environmental Impact Statement (EIS), management of the assessment of risks posed by hazardous constituents and radiation for the Supplemental EIS, and participation in numerous environmental evaluations of project modif

Uranium Study SME	Roger Hansen, J.D.
SME: NEPA, Environmental Laws Current Employment: ROGER P. HANSEN, J.D., AICP Capabilities: Mr. Hansen's experience over 40 years encompasses a wide diversity of environmental regulatory compliance requirements including those pertaining to water quality, air quality, safe drinking water, toxic substances, endangered species, historic preservation, and public lands. His permitting experience has ranged widely and has included such diverse projects as surface coal mines, ski resorts, gold mines, airfields, hazardous waste cleanup, radioactive waste transportation, highways, and even a spaceport. He has taught environmental law at the University of Denver College of Law (DU) and the Colorado School of Mines (CSM). He has also taught political science at Pacific Lutheran University (Tacoma, WA) and environmental ethics and NEPA at the University of Denver.	Senior NEPA Consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials J.D. ❖ University of North Carolina School of Law, Chapel Hill, North Carolina B.S., Journalism, ❖ University of Illinois, Urbana, Illinois Registrations/Certifications: Registered Colorado Attorney (No. 5365) Member, American Institute of Certified Planners (AICP) Member, American Planning Association (APA)

Summary

Mr. Hansen has a multidisciplinary background in environmental and natural resources law, regional planning, and communications. He has worked, mostly in the western states, across a broad spectrum of environmental management and compliance activities at the federal, state, and local levels including those associated with public lands, hazardous and radioactive waste, mining, energy development, transportation, and outdoor recreation. He is an expert in the legal and technical dimensions of National Environmental Policy Act (NEPA) implementation and has supervised or supported preparation of numerous environmental impact statements (EISs), environmental assessments (EAs), and other NEPA documents. He is a former member of the President's Council on Environmental Quality (CEQ) Legal Advisory Committee on NEPA compliance.

Mr. Hansen has provided environmental compliance and/or NEPA support services to nine U.S. Department of Energy (DOE) facilities or laboratories including: Sandia National Laboratories (NM and HI), Waste Isolation Pilot Plant, Hanford, Las Alamos National Laboratory, Idaho National Engineering and Environmental Laboratory, and the Nevada Test Site (NV).

Experience Highlights

NEPA Compliance and Impact Analyses

- **Overall Experience.** Supervised or supported preparation of an estimated 20-30 EISs, EAs, CEs, and other NEPA documents to comply with the requirements of such agencies as the U.S. Department of Energy, U.S. Forest Service, Bureau of Land Management, Federal Aviation Administration, National Aeronautics and Space Administration (NASA), U.S. Air Force, U.S. Navy, and Federal Highway Administration (FHWA). Also worked with "little NEPAs" in California, Hawaii, Washington State, and Montana. Dealt with such issues as: air and water quality, hazardous and radioactive waste, visual resources, cultural resources, endangered species, risk assessment, socioeconomics, transportation, and land use. Conducted training seminars and prepared numerous professional conference papers on NEPA compliance. (See list of publications.)
- **Sandia National Laboratories.** Provided major support and training to Sandia NEPA compliance effort including six EAs and the 1999 site-wide EIS. Authored the *NEPA Compliance Guide* for use by Sandia operations in New Mexico, California, and Hawaii. Conducted several NEPA compliance training workshops for Sandia and other DOE contractor personnel. Authored the *NEPA/CERCLA/RCRA Integration Strategy for the Environmental Restoration Program*.
- **Waste Isolation Pilot Plant (WIPP).** Served as a consultant and regulatory compliance advisor to DOE and Westinghouse Electric Corporation on NEPA compliance for over 20 years. Provided major support for preparation of the WIPP EISs, a Supplement EIS, and other NEPA documents. (WIPP is a DOE geologic transuranic (TRU) waste repository located near Carlsbad, NM.)
- **Northwest Corridor EIS.** Served as a senior consultant and peer reviewer for a Draft EIS (DEIS) on the final link in the "beltway" around Metropolitan Denver being prepared by Felsbrug Holt & Ullevig for the Colorado Department of Transportation (CDOT) and the Federal Highway Administration (FHWA). The EIS addresses freeways, toll roads, and mass transit.
- **City of Mercer Island.** Prepared an EIS for a wireless communication facility (WCF) consisting of a 130-foot monopole with six antenna arrays. Examined the environmental impacts of six alternatives to comply with the Mercer Island, WA Environmental Procedures Code and the Washington State Environmental Policy Act (SEPA).
- **Southwest Regional Spaceport (SRS).** Provided major support to New Mexico State University (NMSU), Physical Science Laboratory (PSL) for preparation of an EIS on a proposed commercial spaceport in southwest New Mexico with the Federal Aviation Administration (FAA) and the New Mexico Office of Space Commercialization (NMOSC) as joint "lead" agencies.

- **U.S. Air Force (USAF) Academy.** Supervised preparation of an EA for an auxiliary training airfield near Colorado Springs which included a comparative environmental analysis of 16 alternative sites.
- **Public Participation.** Organized, implemented, and supported such public participation devices as public meetings, public hearings, workshops, and citizen advisory committees to comply with CEQ and various federal agency requirements.

CERCLA, RCRA, Hazardous and Radioactive Waste Management

- **RCRA "Part B" Permitting.** Provided extensive support to preparation of RCRA Part B permit applications for Rocky Mountain Arsenal (Denver), Pueblo (Colorado) Army Depot, WIPP, LANL, and several private industry clients.
- **Rocky Flats Plant (RFP).** Supervised preparation of work plans for CERCLA ecological risk assessments at a DOE facility near Denver. Interfaced with biological scientists to develop a complex methodology consistent with U.S. Environmental Protection Agency (EPA) guidance. Focused on both terrestrial and aquatic ecosystems.
- **Rocky Mountain Arsenal.** Provided regulatory strategy support for various on-site ground water, soils, geological, and remediation investigations for a DoD facility near Denver, CO.
- **Waste Isolation Pilot Plant (WIPP) DOE Geologic Repository.** Extensively involved with WIPP regulatory compliance issues for many years including NEPA-related environmental impact assessment, air quality, water quality, endangered species, historic/archaeological resources, RCRA, and other EPA requirements. Worked with DOE and Westinghouse on resolving concerns/issues of the State of New Mexico and citizen environmental groups. Authored numerous "white papers" and legal memoranda dealing with RCRA compliance problems and strategies. Served as a member of the WIPP Engineered Alternatives Task Force (EATF) in evaluating engineered alternatives for compliance with EPA requirements in 40 CFR Part 191 and RCRA land disposal restrictions. Supported preparation of the WIPP "no migration" variance petition under 40 CFR § 268.6 which was approved by EPA. Prepared detailed regulatory analyses of oil and gas well drilling, plugging, and abandonment requirements as related to WIPP "human intrusion" scenarios.
- **Nevada Test Site (NTS).** One of five managers designated by IT Corporation to perform tasks associated with a major contract with DOE for consulting services at NTS. Served as the Project Manager for initial strategy development for preparation of a site-wide EIS. Conducted a comprehensive

analysis of federal and state regulatory issues pertaining to the DOE NTS Groundwater Characterization Project (GCP). Analyzed problems and strategies for compliance with requirements contained in NEPA, RCRA, CERCLA, CWA, CAA, SDWA, ESA, related Nevada laws and regulations, and various DOE Orders.

- **Idaho National Engineering and Environmental Laboratory (INEEL).** Prepared a detailed analysis of radioactive, mixed, and hazardous waste regulatory requirements, comparing DOE Order 5820.2A with 10 CFR Parts 60 and 61 and 40 CFR Parts 191, 192, and 260-270. Purpose was to provide background for possible revisions of DOE Order 5820.2A.

Professional Offices and Affiliations (Past and Present)

- **American Bar Association (ABA).** Member, ABA Special Committee on Environmental Law; Chair, Environmental Quality Committee, ABA Section of Environment, Energy, and Resources (EER); Member of EER Section Council (Board of Directors); co-founder, ABA Annual Keystone Conference on Environmental Law.
- **National Association of Environmental Professionals (NAEP).** Member and co-author of professional papers presented at annual conferences in 1993, 1994, 1996, 1997, 1998, 2000, and 2006. Current member, NEPA Working Group.
- **U.S. Environmental Protection Agency (EPA).** Member, National Advisory Committee on Hazardous Materials.
- **Council on Environmental Quality (CEQ), Executive Office of the President.** Member of 11-member Legal Advisory Committee.
- **American Institute of Certified Planners (AICP).** Member and certified land use planner. Also, member of the American Planning Association (APA).

Employment History

- **Principal, Hansen Environmental Consultants, Denver and Aurora, CO (1992-Present).** Providing a broad range of environmental regulatory and NEPA support services to government agencies and consulting firms. Currently consulting on the Northwest Corridor EIS in Metropolitan Denver.
- **Senior Regulatory Specialist and Program Director, IT Corporation, Denver, CO (1978-1992).** Responsible for environmental regulatory analyses, permitting documentation, NEPA compliance services, and technical and legal support for permitting and operation of mining, mineral processing, and energy development projects as well as hazardous, radioactive, and mixed waste management facilities.

- **Project Officer, National Coal Technology Assessment, U.S. Environmental Protection Agency, Research Triangle Park, NC (1976-1978).** Provided project management of a national-level "technology assessment" focusing on the environmental, legal, social, economic, and policy aspects of the development and deployment of advanced coal technologies. (Temporary assignment.)
- **President, Hansen & O'Connor, P.C., Denver, CO (1974-1976).** Organized and headed a small law firm specializing in environmental legal aspects of mining, energy development, and recreation resorts.
- **Executive Director, Rocky Mountain Center on Environment (ROMCOE), Denver, CO (1967-1974).** Founded ROMCOE to serve as an environmental service center and a "forum" for business, government, academia, and the environmental community in the eight Rocky Mountain states (CO, UT, NM, AZ, NV, ID, MT, and WY).

Selected Publications

Hansen, R.P., T.A. Wolff, and A.G. Melcher, 2007, "NEPA and Environmental Streamlining: Benefits and Risks," *Environmental Practice*, Journal of the National Association of Environmental Professionals, Vol. 9, No. 2, June 2007, pp. 83-95.

Hansen, R.P., and T.A. Wolff, 2000, "Making NEPA More Effective and Economical for the New Millennium," *Federal Facilities Environmental Journal* Vol. 11, No. 3, Autumn 2000, pp. 61-70.

Hansen, R.P., and T.A. Wolff, 1998, "Streamlining the Process: A Strategy for Making NEPA Work Better and Cost Less," *Proceedings of the 23rd Annual Conference of the National Association of Environmental Professionals*, San Diego, CA (June 20-26, 1998).

Hansen, R.P., T.A. Wolff, and L.A. McCold, 1997, "The Conflict of Interest Problem in EIS Preparation," *Proceedings of the 22nd Annual Conference of the National Association of Environmental Professionals*, Orlando, FL (May 19-22, 1997).

Hansen, R.P., and T.A. Wolff, 1996, "Tools for NEPA Compliance: Baseline Reports and Compliance Guides," *Proceedings of the 21st Annual Conference of the National Association of Environmental Professionals*, Houston, TX (June 2-6, 1996).

Hansen, R.P., 1995, *National Environmental Policy Act (NEPA) Compliance Guide* Sandia National Laboratories, SAND95-1648, Sandia National Laboratories, Albuquerque, NM (August 1995). (Available from National Technical Information Service, U.S. Department of Commerce.)

Wolff, T.A., and R.P. Hansen, 1994, "Use of Comprehensive NEPA Documents to Reduce Program Risk," *Proceedings of the 19th Annual Conference of the National Association of Environmental Professionals*, New Orleans, LA (June 12-15, 1994).

Hansen, R.P., and T.A. Wolff, 1993, "NEPA/CERCLA/RCRA Integration: Policy vs. Practice," *Proceedings of the 18th Annual Conference of the National Association of Environmental Professionals*, Raleigh, NC (May 24-26, 1993).

Wolff, T.A., and R.P. Hansen, 1993, "The NEPA Threshold Question Revisited: Proposed Actions and Continuing Activities," *Proceedings of the 18th Annual Conference of the National Association of Environmental Professionals*, Raleigh, NC (May 24-26, 1993).

Hansen, R.P., 1992, *NEPA/CERCLA/RCRA Integration Strategy for Environmental Restoration Program Sandia National Laboratories*, SAND92-7312, Sandia National

Laboratories, Albuquerque, NM (October 1992). (Available from National Technical Information Service, U.S. Department of Commerce.)

Hansen, R.P., 1992, "Environmental Law: Looking Back 25 Years," *Proceedings Technology Exchange Symposium*, International Technology Corporation (June 1992).

Hansen, R.P., 1991, "Regulation of Radioactive Mixed Waste Under RCRA," *Proceedings of Haztech International Eighth Annual Conference and Exhibition*, pp. 1A-9 to 1A-21 (1991).

Hansen, R.P., 1989, "Application of RCRA to Radioactive Mixed Waste," *Proceedings of 1989 Third Annual Conference and Exhibitions*, Colorado Hazardous Waste Management Society (1989).

Hansen, R.P., and J.S. Hart, 1988, "Regulation of Radioactive Mixed Waste at the Waste Isolation Pilot Plant (WIPP) Under the Resource Conservation and Recovery Act (RCRA)," *Proceedings of Waste Management '88*, Tucson, AZ, Vol I, pp. 929-934 (1988).

Fedrickson, C.L., R.P. Hansen, and J.S. Hart, 1987, "Issues and Viewpoints Concerning the Application of RCRA to Radioactive Waste Management Facilities," *Proceedings of Waste Management '87*, Tucson, AZ, Vol. 3, pp. 711-716, AZ (1987).

Hansen, R.P., 1986, "Managing the Liability of Responsible Parties at Superfund Sites," *Hazardous Substances*, pp. 11-19 (December 1986).

Hansen, R.P., 1981, "Technology Assessment: A Social Impact Perspective on Alternative Energy Technologies," *Social and Political Perspectives on Energy Policy*, K.M. Gentemann, Ed., Praeger Publishers, New York, NY, pp. 18-33 (1981).

Hansen, R.P., 1981, "Environmental Siting of a Major Coal Syfuels Facility in the Northern Great Plains," *Proceedings of Fourth Annual Coal Utilization Exhibition and Conference, Coal Technology '81*, Houston, TX, pp. 197-232 (1981).

Hansen, R.P., 1976, "Historic and Landmark Preservation: A Creative Trusteeship," *Proceedings of Southwestern Legal Foundation Institute on Planning, Zoning, and Eminent Domain*, Houston, TX, Matthew Bender & Co., pp. 69-118, (1976).

Uranium Study SME	Richard F. Haaker, CHP, CIH
SME: Industrial Hygiene, Health Physics, Safety Current Employment: Trinitek Services, Inc. Capabilities: Industrial hygiene, safety, industrial accident investigation, respiratory protection fit-testing and training, regulatory compliance assessment and program development; health physics, radiological simulation and modeling, radiation protection, licensing support. Software QA support and software testing. Over 37 years experience.	Senior Health and Safety Consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials B.S. Biochemistry ❖ Texas A&M University M.S. Chemistry ❖ Texas A&M University Registration: CIH- American Board of Industrial Hygiene, 1989, Comprehensive Practice (currently certified through 2017) CHP- American Board of Health Physics, 1991, Comprehensive Practice (currently certified through 2012) New Mexico Environment Department certificate of registration as Qualified Expert in Health Physics (through 2012) Additional training: epidemiology, Hazwoper, NORM

Scientific Committees and Memberships

Chairman, American Board of Health Physics – Part 1 Examination Panel, 1999
 Vice-chairman, American Board of Health Physics - Part 1 Examination Panel, 1998
 American Board of Health Physics - Part 1 Panel of Examiners, 1995-2000
 American Industrial Hygiene Association - Ionizing Radiation Committee, 1992-1995

American Conference of Governmental Industrial Hygienists (ACGIH), 2008-
 Health Physics Society, 1991 –
 American Industrial Hygiene Association, Rio Grande Chapter 1991 -
 Health Physics Society, Rio Grande Chapter, 1991-

Training Classes and Short Courses

ArcGIS Desktop: Tools and Functionality, 24 hours (2012)
 Introduction to Cartography, 16 hours (2012)
 Lead Based Paint Inspector/Risk Assessor, 40 hours (2011)
 Biological Monitoring, AIHCE, 8 hours (2010)
 Basics of Epidemiology, AIHCE, 8 hours (2009)
 Naturally Occurring Radioactive Material and Technologically Enhanced Naturally Occurring Radioactive Material (NORM/ TENORM), Health Physics Society (2009)
 ChNE 529 UNM Internal Radiation Dosimetry graduate course audit (2007)
 Internal Dosimetry Applications, (1995), 40 hours.
 VBA Programming for Microsoft Access, UNM Community College, 24 hours (2008)
 Introduction to Structured Query Language, UNM Community College 12 hours (2006)

Mathematica Training, Wolfram Research, 24 hours (2003)
Microsoft Access training, introductory, intermediate and "advanced", UNM Community College, ~60 classroom hours, (1997 – 2008).
Wolfram Mathematica Training, Wolfram Research, 24 hours (2003).
Training for Trainers, AIHCE, 8 hours (2010)
OSHA 7505 Accident Investigation, Red Rock Community College (2009)
Beryllium Particulates and Their Detection, International Symposium (2008)
Beryllium Training, AIHCE, 8 hours, 2003
Heat Stress Prevention, AIHCE, 8 hours, 2003
Radioactive Materials DOT Training, RSA, 2002
Monte Carlo N-Particle Computer Code Training (MCNP4C), 36 hours, LANL, 2000.
Level A PPE Training, 32 hours, Roy F. Weston, Inc., 2000
Unreviewed Safety Question Determination for DOE Nuclear Facilities, Westinghouse, 1998
RCRA Fundamentals, McCoy Associates, Inc., 1997
Auditing Health and Safety Programs, 1995.
Operation & Selection of Direct Reading Combustible Gas & Organic Vapor Monitors, 1995.
Assessment of Occupational Noise Exposure and Risk of Hearing Loss, 1994.
Selection and Use of Protective Equipment, 1994.
Regulatory Issues and the Environmental Health Physicist, 1993.
Environmental Characterization: From Observations to Inferences, 1993.
Technology Transfer Between Industrial Hygiene and Radiation Disciplines, 1993.
Radiation Detection and Measurement, 1990.
Advanced Toxicology: Risk Assessment of Industrial Chemicals, 1989 (OSHA short course)
Supervisor/Contractor Asbestos Training (AHERA), 1989.
HAZWOPER Supervisor training
HAZWOPER Training, 1986, Classroom hours: 24. Current refresher training.
Construction Safety Training Course, presented by OSHA, 1985, Classroom hours: 40.

Employment History

1998-present AQ Safety, Inc., Albuquerque, NM
1997-1997 Radian, Albuquerque, NM
1997-1998. Ecology and Environment, Inc., Albuquerque, NM
1996-1998 ERM /Program Management Company, Los Alamos, NM
1992-1996 Environmental Dimensions Inc., Albuquerque, NM
1988-1992 TMA/Eberline, Albuquerque, NM
1987-1988 Advanced Sciences, Inc., Albuquerque, NM
1986-1987 Roy F. Weston, Inc., Albuquerque, NM
1985-1986 Jacobs Engineering Group, Albuquerque, NM
1983-1984 Hahn-Meitner Institute for Nuclear Science, Berlin, FRG
1978-1983 Research Associate, Department of Geology, University of New Mexico, Albuquerque, NM

Litigation Support in the Last Five Years

Matherne et al vs Kellogg, Brown and Root et al Litigation Support. Testified as an expert witness for plaintiffs in a lawsuit involving exposure of subcontractors to harmful substances at a chemical plant (2008-2009).

Wagner and Appleton et al. vs. Tammany Holding Company, LLC et al. Docket # 2012-453. Civil District Court, Parish of Orleans, Louisiana. Expert report and testimony concerning air and water emissions from a concrete crushing operation located adjacent to a residential neighborhood (2012).

TEXACO Exploration and Production Inc., Bridgeline Gas and Distribution, L.L.C. v. Hilcorp Energy Company, Div. F, Docket #83406, Radiological Contamination at the Henry Gas Plant and Erath Field, Vermilion Parish, Louisiana. Expert report concerning property damage from technologically enhanced naturally occurring radioactive material (2011-date).

Malvin Benoit et al. v. Intracoastal Tubular Services, et al., James Bailey, et al. v. Exxon Mobil Corporation, et al., Eugene Castell, Deceased vs. Exxon Mobil Corporation, et al. Orleans Parish, Louisiana. Expert Report: Occupational Exposure to Radioactive Scale During Oil Pipe Cleaning Operations at Brown and Root and ITCO, Preliminary Report. (2010-2011).

Key Projects -

Software QA Support for DandD Software Package to Sandia National Laboratories. Wrote test cases for testing of the DandD version 2.1 software package for determining radiation dose from residual radioactivity (2001). Performed the testing for DandD. This involved performing independent calculations in Wolfram Mathematica notebooks and comparing results to those calculated by DandD.

Employee Chemical and Beryllium Exposure Database Support for Los Alamos Material Disposal Area B (MDA B). Designed and currently maintain a small database for a Los Alamos environmental contractor who is responsible for the remediation of Material Disposal Area B. The database encompasses employee chemical exposure data, as well as data that may be submitted to the Beryllium Registry to satisfy the requirements of 10 CFR 850, Chronic Beryllium Disease Prevention Program. Wrote a data specification for an analytical chemistry laboratory's electronic data deliverable to ensure that new data can be readily imported into the database.

Health and Safety Planning for Excavation and Remediation of Material Disposal Area B, Los Alamos National Laboratory. Currently serving as a consultant involved in planning for the excavation and remediation of a landfill that contains radioactive waste (including plutonium), chemical waste (possibly including beryllium, heavy metals, shock-sensitive materials, solvents, acids, and incompatible chemicals). The landfill was closed in 1948, after catching on fire on more than one occasion. The landfill is considered a nuclear environmental site. Remediation operations at the site are subject to EPA hazardous waste, Department of Energy nuclear safety, and OSHA health and safety regulations. The excavation and remediation will proceed within an engineered enclosure designed to protect members of the public from emissions. Much of the work will involve heavy equipment that has been reinforced with blast shields. Workers will be required to wear chemical protective suits and be protected by atmosphere-supplying airline respirators (2008 to present).

Support to NRC for Nuclear Power Plant License Termination through Sandia National Laboratories. Reviewed portions of the license termination plans for Maine

Yankee Atomic and Saxton Nuclear Experimental Reactors on behalf of the Nuclear Regulatory Commission (2000).

Support to NRC for Source Material License Termination Review through Sandia National Laboratories. Reviewed source material license termination plans on behalf of the Nuclear Regulatory Commission submitted by the Cabot Corporation for termination of their source material licenses for facilities in Reading and Revere Pennsylvania (1999).

Source Material License Renewal and General License Support for a Source Material Licensee in Boyertown, PA. Wrote bioassay and air sampling program basis documents. Contributed to Decommissioning Funding Plan and Decommissioning Cost Estimate. Performed a dose assessment and ALARA analysis to justify cleanup limits and off-site disposal of waste water treatment sludge at a sanitary landfill. Designed a final status radiation survey for the site and contributed to a decommissioning funding plan cost estimate (2002-2009).

LANL Omega West Reactor Decontamination & Demolition Site-Specific Health and Safety Plan Development. Wrote site specific Health and Safety Plan for D&D of the Omega West Reactor. (2002).

Health and Safety Planning for Excavation and Remediation of Material Disposal Area B, Los Alamos National Laboratory. Currently serving as a consultant involved in planning for the excavation and remediation of a landfill that contains radioactive waste (including plutonium), chemical waste (possibly including beryllium, heavy metals, shock-sensitive materials, solvents, acids, and incompatible chemicals). The landfill was closed in 1948, after catching on fire on more than one occasion. The landfill is considered a nuclear environmental site. Remediation operations at the site are subject to EPA hazardous waste, Department of Energy nuclear safety, and OSHA health and safety regulations. The excavation and remediation will proceed within an engineered enclosure designed to protect members of the public from emissions. Much of the work will involve heavy equipment that has been reinforced with blast shields. Workers will be required to wear chemical protective suits and be protected by atmosphere-supplying airline respirators (2008 to present).

Sherwood Building Decontamination & Demolition (D&D) Support, Los Alamos National Laboratory. Drafted the health and safety plan for demolishing the four-story Sherwood Building. The project involved occupational exposure to noise, heat stress, removal of asbestos containing materials from the building, and the use cutting torches to cut structural steel that was coated with lead paint, and physical hazards such as the use of scaffolding and heavy equipment. Provided industrial hygiene support for implementation of the OSHA lead standard (29 CFR 1926.62) and the OSHA occupational noise exposure standard (29 CFR 1910.95) for the Washington Group, Inc. during the demolition of the structure (2001).

SNL Environmental Risk and Decision Analysis Dept (6416) Conducted a pathway-by-pathway comparison of the models underlying RESRAD, RESRAD-Build, and DandD computer codes for the Nuclear Regulatory Commission. The comparison was published as NUREG/CR-5512 volume 4. It is concerned with suitability of the models for determining that risk-based criteria for termination radioactive materials licenses have been satisfied (~1999).

SNL Radioactive and Mixed Waste Dept (7577) Provided program support to the Waste Characterization Team Leader; working on issues related to management of naturally occurring radioactive material and developing a generic sampling and analysis plan guidance (~1996). Drafted a position paper on RCRA status of equipment containing circuit boards. Performed an analysis of disposal options for building 870 tritiated wastewater. Working with Waste Management, Inc. to get NMED approval of a proposed waste acceptance criteria for non-oil field NORM for their Subtitle D landfills in New Mexico. Participated in drafting an authorized limit request pursuant to DOE/EH guidance for septic tank mixed waste. Drafted procedures related to on-site transport and characterization of radioactive and mixed waste samples.

SNL Environmental Restoration Technology (6131) Mixed waste management consultation regarding wastes expected from a ground water remediation study.

SNL Accident Analysis/Consequence Assessment (6413) 10 CFR 61 modeling support to Hanford HLW Tank Closure EIS.

SNL Environmental Risk and Decision Analysis (6416) -- Dosimetry model support to NTS Greater Confinement Disposal Performance Assessment for TRU waste. Modeled residential structure shielding factors to provide justification of the selection of the default residential structure shielding factors for the NRC's DandD computer code.

Sludge removal from Los Alamos Neutron Scattering Center, Los Alamos National Laboratory. Provided on-site field industrial hygiene and safety support for pumping radioactive sludge from a industrial waste water holding system and from radioactive liquid waste tanks at the Los Alamos Neutron Scattering Center (LANSCE); this task involved a series of permit-required confined space entries regulated managed under 29 CFR 1910.146 and preparation of a Site-Specific Health and Safety Plan. Responsible for monitoring the confined spaces for oxygen, combustible gases and toxic constituents including mercury vapor. Served the role of attendant or "hole watch".

Feed Materials Production Center Remedial Investigation, Fernald, Ohio . Served as the site health and safety officer for a field investigation that involved using a drilling rig to collect sub-surface samples from landfills, and sludge impoundments that contained radioactive and chemical waste. Most of the sub-surface sampling required the use of chemical protective suits and supplied-air respirators because more than 100 different chemicals were suspected of being present in the landfills and the quantities were unknown (1986-1987).

Cerro Grande Fire Recovery Operations, Los Alamos National Laboratory. Developed site-specific health and safety plans for post-Cerro Grande Wildfire recovery activities (2000).

Indoor Air Quality Investigation of a Santa Fe Shopping Center. Conducted air sampling for organic vapors and formaldehyde on two occasions. Identified the problem as insufficient amounts of outdoor (fresh) air being brought in through the ventilation system (1994-1995).

Health and Safety Support for Recovery of a DOE Materials Storage Area, Paducah Gaseous Diffusion Plant. Site Safety Officer for a series of high profile Level A / Level B

entries into a DOE Materials Storage Area to stabilize a decrepit drum of hydrofluoric acid. There were concerns that a nuclear criticality could occur during the activity because of the potential presence of enriched uranium. This prevented the entry team from disturbing the configuration or position of other containers in the area. The highly toxic and corrosive nature of hydrofluoric acid combined with the unfavorable ventilation of the area required that workers wear fully encapsulating chemical protective "Level A" suits. The drum contents were transferred to a new drum that could be safely moved (2000). Site Safety Officer for remediation of a ~1000 gallon tank storage containing greater-than class C radioactive waste (2000). The tank demolition was performed inside an enclosure designed to prevent the spread of contamination. The tank demolition required the use of Level B personal protective equipment.

General Industrial Hygiene and Safety Support to Various Contractors, Los Alamos National Laboratory. OSHA compliance support, 10 CFR 851 environment safety and health program development and support, job hazard analyses, site specific health and safety plan development, audits, technical reviews, etc. for various LANL ER, drilling and D&D projects (1993 to 2011).

Respirator Fit Testing and Training. Routinely provide commercial quantitative respirator fit testing services and respirator training.

NIOSH Dose Reconstruction Technical Basis Document for Mound Site. Worked with another health physicist to contribute to a draft of the internal dosimetry section of the technical basis document for the Mound site dose reconstruction. (2003-2004).

NIOSH Dose Reconstruction Site Profile Review for LANL Site. Worked briefly on the review of the LANL site profile review (2009).

Uranium Mill Tailings Project Health and Safety Support. Functioned as construction safety inspector on DOE surveillance teams on the Uranium Mill Tailings Remedial Action Project. Provided field health and safety support to drilling activities and field investigations. Wrote a Hazard Communication Plan and site-specific health and safety plans (1985-1986).

Hahn-Meitner Institute for Nuclear Science, Berlin, FRG, Guest Scientist. Studied the reaction of simulated borosilicate radioactive waste glasses with salt brines at elevated temperatures. This work resulted in the characterization or identification of a number of phases that precipitated on the surface of the glasses (1983-1984).

Software Support for TurboFRMAC to Sandia National Laboratories. Wrote test cases and contributed to software specifications for new modules added to the TurboFRMAC radiation release assessment software package (2003 to 2009). Constructed an *ad hoc* database of dose coefficients from DCFPAK 1.4 that was used to test perform independent software testing of Sandia's Radionuclide Viewer software and for use in developing test cases for TurboFRMAC.

Software QA Support for MACCS2 to Sandia National Laboratories. Wrote test cases, tested new modules added to the Nuclear Regulatory Commission's MACCS2 software package and related reactor accident consequence computer codes. Designed, populated and manipulated a large database of EPA Federal Guidance Report 12 and 13 dose

coefficients using Microsoft Access and Wolfram Mathematica to construct standard radiation dosimetry data files of acute and annual equivalent dose factors for distribution with the MACCS2 computer code. This involved interpolating, integrating and parsings millions of lines of raw data. Constructed a census database for the SecPop computer code using MySQL 5.0 and Wolfram Mathematica. This task involved extracting data from the published data of the 2000 economic census, the population census and the agricultural census. Various records had to be reconciled among the data sources; then some simple quantities were calculated, and consolidated tables for use in the SECPOP code were constructed. The product was delivered to Sandia as a set of tables in Microsoft Access format that was distributed with MACCS2 (2003 to present).

Selected Relevant Publications and Presentations

Comparison of the Models and Assumptions used in the DandD 1.0 RESRAD 5.61 and RESRAD-Build 1.50 Computer Codes with Respect to the Residential Farmer and Industrial Occupant Scenarios Provided in NUREG/CR-5512. Draft NUREG/CR-5512, volume 4 (1999).

Compliance Assessment Document for the Transuranic Wastes in the Greater Confinement Disposal Boreholes at the Nevada Test Site, Sandia Report SAND-XX-XXX, Volume 2: Performance Assessment Version 1.0 (2000).

Proposal to Dispose of Remediation Waste Generated during the Cleanup of the LANL Solid Waste Management Unit 73-002 Incinerator Ash Pile at the CSI Landfill in Adams County, Colorado, April 1999. Prepared for LANL EM/SWO.

Request for Approval to Transfer Hazardous Waste Containing Residual Radioactive Material for Disposal at the Chemical Waste Management, Inc. RCRA TSD Facility in Model City, NY, November 1998. Prepared for LANL EM/SWO.

The Role of Data Analysis in Sampling Design of Environmental Monitoring, SAND98-0612, March 1998.

A Prioritization and Analysis Strategy for Environmental Surveillance Results, Health Physics (1997), 73, p. 826.

Methods, Approaches and Uncertainties in Assessing NORM Exposures, Proceedings of the Health Physics Society's 29th Midyear Topical Meeting (1996) p.203.

Phase Formation during Corrosion Experiments with Two Simulated Borosilicate Nuclear Waste Glasses, HMI - B 424. Hahn-Meitner Institute for Nuclear Science Berlin GmbH (1985).

Naturally Occurring Glasses: Analogues for Radioactive Waste Forms, PNL-2776, (1979).

Uranium and Thorium Minerals: Natural Analogues for Radioactive Waste Forms, in *Scientific Basis for Nuclear Waste Management* (1980) p. 281, Vol. 2.

Natural Analogues for Crystalline Radioactive Waste Forms, Part II: Non-actinide Phases, in *Scientific Basis for Nuclear Waste Management,* (1981) p. 299, Vol. 3.

Uranium Study SME	Leo Gomez, Ph.D.
SME: Radiation Biologist and Technical Editor Current Employment: Trinitek Services, Inc Capabilities: Over 30 years of professional experience in applying the principles, theories, and practices of radiological health and safety in the performance evaluation and analysis of radiological health hazards in terrestrial, aquatic, and marine environments, international research in radiation bio-effects in aquatic systems.	Senior Radiaiton Biologist: Trinitek Services, Inc, Nuclear & Environmtal Safety Consultants Education / Credentials Ph.D. Radiation Biology ❖ Colorado State University M.S.,, Health Physics ❖ Colorado State University B.S. Biology (microbiology) ❖ University of New Mexico

- Worked in nuclear waste management from 1977-2000 at Sandia National Laboratories in Albuquerque, New Mexico. Was the biological research project manager for four (4) international ocean disposal projects and worked in the Performance Assessment Department for the Waste Isolation Pilot Plant, a transuranic waste repository in southeastern New Mexico. Also collaborated for ten (10) years with the University of New Mexico Institute for Public Policy studying national public perceptions of risk from nuclear technologies.
- In 2006 organized and co-chaired the "*Ultra Low-Level Radiation Effects (ULLRE) Summit*" in Carlsbad, NM. Focus of the summit was to identify the steps needed to conduct research at near zero radiation levels, and to lay the groundwork for scientifically-based radiation protection standards at ultra-low levels of radiation exposure.
- At Los Alamos National Laboratory in New Mexico was responsible for conducting experiments studying the comparative radiation sensitivity of normal mammalian tissues to x-rays and negative pi mesons in collaboration with the University of New Mexico Cancer Center. Worked with the LANL Health Physics group evaluating health and safety of uranium & plutonium facilities and calculating radionuclide body burdens in LANL workers. Also performed a safety evaluation of a nuclear power reactor in California. (1974-1977)
- Managed the whole body counting facility to detect low levels of transuranic elements in workers at Oak Ridge National Laboratory in Tennessee. Also evaluated worker radiation exposures at ORNL and other nuclear facilities. (1973-1974)
- Director of Research at TCI Medical in Albuquerque, NM, (2002-2003) conducting research on medical and nuclear innovations between scientific institutions in the Former Soviet Union and scientific institutions in the U.S. Also Lead Internal Auditor for ISO 9001-2000, Quality Management Systems.
- Served as a US representative on three international ocean pollution commissions.

- Past editor of the international scientific journal, *Radioactive Waste Management and Environmental Restoration*. (1991-2000).
- Conducted Radiation Safety Officer training for employees at Rio Algom uranium mine in New Mexico. (2009-2011).
- In collaboration with NM Tech and Trinitek Services, Inc., conducted a 6-week radiation safety program for 15 Ph.D. Fellows from Egypt. (2010)
- Served as a field agent for the USDOE Environmental Justice program ensuring that public concerns relating to technical projects were considered. (1990-2000).

Leo S. Gomez Consulting, Principal

Radiobiology / Radioecology / Health Physics / Nuclear Waste Management

ORION International Technologies, Inc. Principal Scientist, (Part Time), *Low-Level Radiobiology*

Experience:

2002 - 2003: **TCI Medical**, *Director of Research*

Coordinated research on medical and nuclear innovations between scientific institutions in the former Soviet Union and scientific institutions in the US.

Lead Internal Auditor: ISO 9001-2000 Quality Management Systems.

2000 - 2002: **Sandia National Laboratories (SNL)**, Albuquerque, NM: *Consultant*

1977 - 2000: **Sandia National Laboratories**, Albuquerque, NM (Retired: August 25, 2000)

Seabed Programs Division - Biology Program Coordinator for five U.S. Nuclear Waste Disposal Programs:

Subseabed Disposal Program - SDP

Study feasibility of subseabed disposal of high-level radioactive waste.

Formerly Utilized Sites Remedial Action Program - FUSRAP

Study feasibility of ocean disposal of FUSRAP soil and rubble containing traces of natural radioactive materials.

Low Level Waste Ocean Disposal Project - LLWODP

Study feasibility of ocean disposal of naval nuclear reactor plants.

Waste Isolation Pilot Plant - WIPP (World's first nuclear waste repository)

Demonstration of disposal of defense transuranic waste.

Arctic Nuclear Waste Assessment Program - ANWAP

Study radionuclide contamination of Northern Oceans from the Former Soviet Union.

- Project manager for biological oceanography programs; designed and conducted radiobiology experiments using deep-sea organisms and participated in design of marine radiobiology experiments with staff from *Scripps Institution of Oceanography*, La Jolla, CA, and *Woods Hole Oceanographic Institution*, Woods Hole, MA.
- Organizer and co-chair, *International Biological Oceanography Workshop* held in Jackson Hole, Wyoming, January 1981.
- Conference organizer/Chair/Presenter, *Conference on Waste Management*, San Juan, Puerto Rico (3 Conferences).
- Advisor (Radiobiology) to the *International Atomic Energy Agency Marine Radioactivity Laboratory* in Monaco.
- Task group leader for biosphere transport group attempting to predict potential radiation dose from the WIPP environment to man.
- Collaborator with *University of New Mexico Institute for Public Policy* on studies of national and regional public perceptions of nuclear waste disposal.
- Member, New Business Development Team of SNL's Energy and Environment Division.
- Member, Radiological Assessment Task Group evaluating radiological impacts on the Alaskan Arctic from radioactivity released from the Former Soviet Union.
- Editor: *Radioactive Waste Management & Environmental Restoration, A Multinational Journal*, Taylor & Francis, London (1991-2002).
- On Review Panels for U.S. Department of Energy: a) Environmental Restoration and Waste Management Graduate Fellowships; b) Graduate Health Physics Fellowships; c) Global Climate Change Programs; d) Nuclear Engineering University Programs; e) Low Dose Radiation Research Program.
- Sandia Labs liaison: *NM Waste Management Education/Research Consortium (WERC)*; Board member, WERC Industrial Advisory Board.
- On selection panel for *Young Science Scholars Program*.
- Panelist on National Science Foundation Education Review Panels for a) Comprehensive Regional Centers for Minorities; b) Summer Science Camps; c) Urban Systemic Initiative; d) Rural Systemic Initiative; and e) Committee of Visitors / Informal Science Education.
- Committee member on National Selection Committees for the *Presidential Awards for Excellence in Science & Mathematics Teaching* (three years).
- * Field agent: U.S. Department of Energy, Environmental Justice Strategy Development.
- * Board member on Science Advisory Board, National Hispanic Radio Network.
- Planning Committee member, Chair, and Presenter: *Symposium on Marine Radioecology, 9th International Congress of Radiation Research*, July 1999, Dublin, Ireland.
- Chair, Local Arrangements Committee, *47th Annual Meeting*, Radiation Research Society, April 2000, Albuquerque, NM.

Vice-Chair, Fund Raising Committee, Radiation Research Society, 1999-2001.
Planning Committee member, *Mexican American Engineers & Scientists*,
26th International Symposium and Career Fair, Albuquerque, NM, October 6-11, 2000

- Organizer & Co-chair: *Low Level Radiation Effects Summit* held in Carlsbad, NM, January 16-18, 2006.
- Reviewer: National Institutes of Health *Project Bioshield Program*, 2005.
- Reviewer: National Institutes of Health *Radiation Combined Injury Program*, 2008.

Fuel Cycle Risk Analysis Division

- Co-developer of trophic transport model applied to radionuclide transport through aquatic environment to man from postulated light-water reactor core melt-through accidents.

Constructed equivalence classes of metabolically similar radionuclides to be used in predicting nuclide trophic transport.
Calculated internal dose to man and other biota from exposure to radionuclides in the aquatic environment.

1974 - 1977 **Los Alamos National Laboratory**, University of California, Los Alamos, NM.

Preclinical Studies for Pion Radiotherapy

- Studied comparative effects of negative pi mesons and x-rays on normal tissues and tumors in animals in collaboration with *Cancer Research and Treatment Center*, University of New Mexico School of Medicine.

Radiological Engineering

- Evaluated health and safety aspects of plutonium facilities under Nuclear Regulatory Commission license reviews; calculated plutonium body burdens in Los Alamos National Laboratory workers.

1973 - 1974 **Oak Ridge National Laboratory**, Oak Ridge, Tennessee

Human Whole-Body Counting

Improved capability of detecting low levels of transuranic elements in contaminated workers; evaluated exposure of workers exposed at Oak Ridge National Laboratory and other related nuclear facilities.

1968 - 1973 **Colorado State University**, Fort Collins, Colorado

Ph.D. Dissertation: Lymphatic Transport of ²³⁹PuO₂ in Dogs

- U.S. Public Health Service predoctoral trainee; studied lymphatic transport of high-fired ²³⁹PuO₂ particles in dogs from simulated wounds using production plutonium from the Rocky Flats Division, Dow Chemical Co.

1966 - 1969 **Veterans Administration Hospital**, Albuquerque, New Mexico

Nuclear Medicine

- Performed diagnostic and therapeutic procedures in Nuclear Medicine Department; responsible for radiological safety of laboratory; instructed technicians and medical students in nuclear medicine laboratory techniques.

1963 - 1965 **Lovelace Foundation for Medical Research**, Albuquerque, New Mexico

Radioactive Aerosol Inhalation Studies

- Conducted inhalation exposures of dogs to radioactive aerosols and performed necropsies of exposed dogs.

1962 - 1963 **U.S. Department of Agriculture**, Albuquerque, New Mexico

Livestock Disease Control

- Conducted diagnostic tests for brucellosis and leptospirosis in livestock; performed viability tests on vaccines used in livestock; tested for sheep and cattle scabies.

Membership in Professional Societies

- **American Association for the Advancement of Science**
Committee on Opportunities in Science, 1980-83
- **Health Physics Society, and the International Radiation Protection Association**
Affirmative Action Committee, 1980-83

Membership Committee, 1992-95; Membership Committee Chair, 1993-95
- **International Commission for the Scientific Exploration of the Mediterranean Sea**
Marine Radioactivity Committee and Marine Chemistry Committee
- **International Union of Radioecologists**
- **New York Academy of Sciences**
- **Radiation Research Society**
Vice-Chair, Fund Raising Committee, 1999-2001

Chair, Local Arrangements Committee for 47th Annual Meeting, Albuquerque, NM, April, 2000
- **Radiochemistry Society**
- **Sigma Xi – The Scientific Honorary Society**
- **Society for Advancement of Chicanos and Native Americans in Science**
Co-Founder; Board of Directors, 1975-78

Local Arrangements Committee, 2003 Annual Meeting in Albuquerque, NM

Publications

L.S. Gomez and G. Cravens. 2008. "Why We Need to Know More About Low Dose Radiation Exposure", in *Hot Topics*, Biosphere Systems International Foundation website, (<http://www.biospheresystems.com/index.html>), September 2008.

- L.S. Gomez, J.J. Cousins, C.J. Dorian, S.M. Gomez. 2008. "New Non-Invasive Technology for the Early Detection of Cancer at the Cellular Level", in *Abstracts 2008 AAAS-SWARM Annual Meeting*, University of New Mexico, Albuquerque, NM, April 9-12, 2008.
- L.S. Gomez, D. J. Brenner, O.G. Raabe. 2007. "A Proposed Ultra-Low Level Radiation Biology Research Facility at the Carlsbad, New Mexico, Waste Isolation Pilot Plant (WIPP)", in *Abstracts 2007 Health Physics Society Annual Meeting*, Portland, OR, July 2007.
- N.F. Savignac, L.S. Gomez and B.P. Warner. 2007. "A 'Litmus Paper Dosimeter'", in *Abstracts 2007 Health Physics Society Annual Meeting*, Portland, OR, July 2007.
- L.S. Gomez, D.J. Brenner and O.G. Raabe. 2006. "Final Report: Ultra-Low Level Radiation Effects Summit", held at Carlsbad, NM, January 15-18, 2006, ORION International Technologies, Inc. Albuquerque, NM.
- S.M. Gomez, P.I. Pohl, S.A. Jackson, J.N. Nishio, A. Reeb, D. Cox, F. M. Torres, L.S. Gomez. 2005. "Biofuel Production on an Integrated Farm", presented at the *2005 Annual Iberoamerican Research and Development Summit: Creating Sustainability Through Innovation*, October 4-6, 2005, Albuquerque, NM.
- L.S. Gomez. 2003. "Technical Collaborations between a Small American Business and Leading Research Institutions in the Former Soviet Union", presented at the *International Workshop on Radiological Sciences and Applications, June 16-18, 2003*, Albuquerque, NM; and at the *Annual Meeting of the Radiochemistry Society, July 14-17, 2003*, Carlsbad, NM.
- L.S. Gomez. 2002. Book review: "Quantities, Units and Terms in Radioecology", ICRU Report 65, *Journal of the ICRU*, Vol 1, No. 2, 2001, 48pp, Nuclear Technology Publishing, in *Radiation Research*, Volume 158, p. 250.
- M.A. Champ, L.S. Gomez, V.M. Makeyev, J.M. Brooks, H.D. Palmer, and F. Betz. 2001. "Ocean Storage of Nuclear Wastes? Experience from the Russian Arctic", in *Marine Pollution Bulletin, Special Volume, "Arctic III"*, Volume 43, Issue 1-6, Jan.-June, 2001, 142pp., Elsevier Science B. V.
- L.S. Gomez. 2000. "Emplacement of Mercury Wastes in the Sediments of the Deep-Ocean?", SAND2000-0616C, Sandia National Laboratories, Albuquerque, NM, presented at the *EPA Workshop on Mercury in Products, Processes, Waste and the Environment: Eliminating, Reducing and Managing Risks from Non-Combustion Sources*, Baltimore, MD, March, 2000.
- L.S. Gomez, 1998. "Contamination of the Northern Oceans from Releases of Radioactivity from the Former Soviet Union", SAND98-1920A, Sandia National Laboratories, Albuquerque, NM, in *Proceedings of the 11th International Congress of Radiation Research*, Dublin, Ireland, July 1999, pp. 303-305.
- D. Layton, B. Napier, L. Gomez, J. Knezovich, and M. Varela, 1997. "Introduction to ANWAP", in *Radionuclides in the Arctic Seas from the Former Soviet Union: Potential Health and Ecological Risks*, Arctic Nuclear Waste Assessment Program (ANWAP), Office of Naval Research (ONR), Washington, DC.

D.R. Anderson, M.E. Fewell, L.S. Gomez, M.G. Marietta, P.N. Swift, K.M. Trauth, P. Vaughn, and R. J. MacKinnon, 1997. "Performance Assessment for Environmental Decision Making", SAND97-0723, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, M.G. Marietta, and D.W. Jackson, 1996. "Compilation of Selected Marine Radioecological Data for the Formerly Utilized Sites Remedial Action Program", in *Concentration Factors of Radionuclides in the Marine Organisms*, RWMC-96-P-18, Environmental Parameter Series 6, Radioactive Waste Management Center, Japan.

H.C. Jenkins-Smith, C.L. Silva, and L.S. Gomez, 1995. "Understanding Public Reception of Scientific Information About the Risks of Nuclear Waste Storage", SAND95-0327A, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, 1994. "Marine Environment", in *Environmental Assessment for the Purchase of Russian Low Enriched Uranium Derived From the Dismantlement of Nuclear Weapons in the Countries of the Former Soviet Union*, U.S. Enrichment Corporation, Bethesda, MD.

J.E. Johnson and L.S. Gomez, 1993. "Risk /Benefit Analysis of the Disposal of Mixed Waste", Technical Completion Report, Project Number WERC-01-4-23218, New Mexico Waste-Management Education and Research Consortium, in cooperation with the U.S. Department of Energy, pp. 1074-1084.

L.S. Gomez, M.G. Marietta, and A.R. DuCharme, 1993. "Assessing the Effects of Russian Contamination on the Northern Oceans", SAND92-2864A, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, H.C. Jenkins-Smith, and K.W. Miller, 1992. "Changes in Risk Perception Over Time", SAND91-2266C, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, M.G. Marietta, and D.W. Jackson, 1990. "Compilation of Selected Marine Radioecological Data for the Formerly Utilized Sites Remedial Action Program (FUSRAP): Summaries of Available Radioecological Concentration Factors and Biological Half-Lives", SAND89-1585, Sandia National Laboratories, Albuquerque, NM.

S.G. Bertram-Howery, M.G. Marietta, D.R. Anderson, K.F. Brinster, L.S. Gomez, R.V. Guzowski, and R.P. Rechard, 1989. "Draft Forecast of the Final Report for the Comparison to 40 CFR 191, Subpart B for the Waste Isolation Pilot Plant", SAND88-1452, Sandia National Laboratories, Albuquerque, NM.

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S.L. Kupferman, D.R. Anderson, L.H. Brush, L.S. Gomez, L.E. Shephard, 1982. "Ocean Disposal Feasibility Study: Candidate DOE (FUSRAP) Soil Characterization", in *Transactions of the 1982 Winter Meeting of the American Nuclear Society*, November 14-19, 1982, Washington, DC.

L.H. Brush, D.R. Anderson, L.S. Gomez, S.L. Kupferman, L.E. Shephard, J.C. Laul, 1982. "Characterization of Trace Contaminants at the Middlesex, New Jersey, Formerly Utilized Sites Remedial Action Program (FUSRAP) Site", invited paper at American Statistical Association/ Environmental Protection Agency Conference on Environmental Sampling and Analysis of Sampling Data, Coolfont, WV, July 12-16, 1982.

S.L. Kupferman, D.R. Anderson, L.H. Brush, L.S. Gomez, J.C. Laul, and L.E. Shephard, 1982. "Ocean FUSRAP: Feasibility of Remedial Action Program (FUSRAP)", in *Proceedings of Waste Management '82 Symposium, Waste Isolation in the U.S. and Elsewhere*, Technical Programs and Public Communications, Vol. 2, March 8-11, 1982, Tucson, AZ, pp. 471-485.

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Subseabed Disposal Program", in *Impacts of Radionuclide Releases into the Marine Environment*, Vienna, October 6-10, 1980, IAEA-SM-248/142, pp. 607-628.

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W.C. Black, L.S. Gomez, J.M. Yuhas, and M.M. Kligerman, 1980. "Quantitation of the Late Effects of X-Irradiation on the Large Intestine", *Cancer*, 45, pp. 444-451.

S.W. Jordan, C.R. Key, L.S. Gomez, J. Agnew, and S. Barton, 1978. "Late Effects of Radiation on the Mouse Kidney", *Journal of Experimental and Molecular Pathology*, 29, pp. 115-129.

J.F. Dicello, M. Zaider and L.S. Gomez, 1978. "Charge Dispositions as a Function of Depth for π^- and π^+ Beams", *Radiation Research*, 74, p. 84 (Abstract).

A.E. Dross, A.M. Gage, J.M. Graf, F.A. Guevara, L.S. Gomez, J.J. Koelling, R. Mullin, D.G. Rose, J.E. Ayer, W. Burkhardt, R.T. Kratzke, 1977. "Environmental Assessment, Babcock and Wilcox Company, Parks Township Site, SNM-414, Docket No. 70-364."

L.S. Gomez, D.M. Smith, J.F. Dicello and H.I. Amols, 1977. "Effects of Negative Pions and X-Rays on Testes Weight Loss and Spermatogenic Stem Cell Renewal in Mice", *Radiation Research*, 20, pp. 672-673 (Abstract).

W.C. Black, L.S. Gomez, and M.M. Kligerman, 1976. "Late Effects of Radiation on the Rat Rectum", *Radiation Research*, 67, p. 541, (Abstract).

J.L. Lebel, R.L. Bistline, J. Schallberger, G.E. Dagle and L.S. Gomez, 1976. "Studies of Plutonium and the Lymphatic System: Six Years of Progress at Colorado State University", in *Radiation and the Lymphatic System*, Proceedings of the Fourteenth Annual Hanford Biology Symposium, Conf-740930, pp. 2-9.

M.M. Kligerman, J.F. Dicello, H.T. Davis, R.G. Thomas, C.J. Sternhagen, L.S. Gomez, and D.F. Peterson, 1975. "Initial Comparative Response of Experimental Tumors to Peak Pions and X-Rays", *Radiology*, 116, pp. 181-182.

G.E. Dagle, J.L. Lebel, R.D. Phemister, R.L. Watters, and L.S. Gomez, 1975. "Translocation Kinetics of PuO_2 from the Popliteal Lymph Node of Beagles", *Health Physics*, 28, pp. 395-398.

L.S. Gomez, J.L. Lebel, R.L. Watters, R.W. Bistline, and G.E. Dagle, 1974. "Effects of Delayed Lymphadenectomy on $^{239}\text{PuO}_2$ Translocation in Dogs", *Health Physics*, 27, 213 ff.

L.S. Gomez, 1973. "Lymph Transport of $^{239}\text{PuO}_2$ in Dogs", USAEC Document COO-1787-17 (Ph.D. Dissertation).

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R.L. Watters, J.L. Lebel, R.W. Bistline, G.E. Dagle, and L.S. Gomez, 1971. "A Study of the Translocation of Plutonium and Americium from Puncture Wounds", USAEC Document COO-1787-11.

Uranium Study SME	William M. Floyd
SME: Regulations-NRC, Agreement States, Current Employment: Trinitek Services, Inc Capabilities: Program management-Agreement state	Regulatory consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials M.S. (Biology/Chemistry) ❖ Northern Illinois University B.S. (Biology) 1965 ❖ Northern Illinois University <u>Additional Training</u> In excess of twenty weeks of radiation-related training sponsored by the U.S. Nuclear Regulatory Commission, U.S. Department of Energy, U.S. Environmental Protection Agency, Department of Transportation, Department of Defense and Federal Emergency Management Agency

EMPLOYMENT: 2006-2008

Radiation Protection Consultant, EWA Services, Herndon, Virginia. Contractural participant in the decommissioning of U-238 ballistic test ranges at New Mexico Institute of Mining and Technology, Socorro, New Mexico.

1990-2003

Manager, Radiation Protection Program, New Mexico Environment Department. Supervised seven technical staff members in all Program activities, including the licensing and inspection of more than 200 radioactive material licensees, and the registration and inspection of more than 1400 radiation generating devices (x-ray machines and particle accelerators) in the State. Served as point of contact for all

inquiries pertaining to radiation issues from other State and Federal agencies and members of the public.

1979-1990

Environmental Scientist, New Mexico Radiation Protection Bureau. Duties included the licensing and inspection of radioactive material licensees, and the registration and inspection of x-ray registrants. Assisted in the training of Program staff.

1976-1979

Environmental Scientist, New Mexico Environmental Improvement Division, Food Quality Unit. Duties included the review and endorsement of all bakery, beverage plant and food warehouse inspection reports submitted by Food and Drug Administration cost reimbursement contract inspectors within the State.

1974-1976

Public Health Sanitarian, Indiana Board of Health, Water Pollution Control Division, Indianapolis, Indiana. Duties included water quality surveys of various river drainage areas, sampling of municipal and industrial dischargers, and lake classification studies. I

supervised one of the two survey teams responsible for classifying all natural and man-made lakes within the State as to level of pollution.

1973-1974

Biology teacher, Manzano High School, Albuquerque, New Mexico.

1968-1972

Active duty, U.S. Air Force, Kirtland AFB, New Mexico. Duties included space survivability studies involving radiation-related activities and the mitigation of avian hazards at various military installations in the United States and the Panama Canal Zone.

Uranium Study SME	Nicholas S. Fisher, Ph.D.
SME: Senior Aquatic Scientist Current Employment Distinguished Professor, Marine Sciences Research Center State University of New York, Stony Brook, NY; & Director, Consortium for Inter-Disciplinary Environmental Research Stony Brook University Capabilities: Marine, estuaries, freshwater, toxicity, radionuclide uptake, biogeochemistry of metals in aquatic systems; contaminant-biota interactions; aquatic radioecology; aquatic pollution management strategies; aquatic toxicology.	Uranium Regulations consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials Ph.D. Marine Biology ❖ State University of New York, Stony Brook B.A. Biology, Brandeis University ❖ Waltham, Massachusetts
Positions Held: 2011 Visiting Scientist, Harvard University 2006 - present Director, Consortium for Inter-Disciplinary Environmental Research, Stony Brook University 2005 - present Distinguished Professor, Marine Sciences Research Center, Stony Brook University 1991 - 2005 Professor, Marine Sciences Research Center, Stony Brook University 1998 - 2003 Associate Dean, Marine Sciences Research Center, Stony Brook University 1988 - 1991 Associate Professor, Marine Sciences Research Center, Stony Brook University 1985 - 1987 Oceanographer, Brookhaven National Laboratory, Upton, New York. 1980 - 1985 Research Scientist, International Laboratory of Marine Radioactivity, International Atomic Energy Agency, Monaco. 1977 - 1980 Senior Research Scientist, Marine Studies Group, Ministry for Conservation, Melbourne, Australia. 1974 - 1977 Postdoctoral Investigator, Chemistry Department, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts. Awards/Distinctions: 1985 - Appointed as Marine Ecologist, Ecology Institute (Honorary Institute) Oldendorf-Luhe, Germany 1992 - Who's Who in America; Who's Who in the East, Who's Who in the World 2001 - 2007 Elected Chair, Marine Biogeochemistry Committee, International Commission for the Scientific Exploration of the Mediterranean (CIESM) 2004 - 2005 John Simon Guggenheim Memorial Fellowship 2005 Awarded State University of New York Distinguished Professorship 2006 Graduate School Dean's Award for Excellence in Graduate Mentoring Member: 1983 - present American Men and Women in Science 1975 - present American Society of Limnology and Oceanography 1974 - 1995 American Phycological Society 1996 - present Society of Environmental Toxicology and Chemistry Advisory Activities: 1976 Advisory Panel to New York State Attorney General on PCBs in the environment 1983 - 1985 GESAMP Working Group on the Interchange of Pollutants between the Atmosphere and the Oceans 1984 - present Editorial Advisory Board, Marine Ecology Progress Series 1988 NSF Ocean Chemistry Review Panel 1989 New York State Sea Grant Review Panel	

1990 NOAA National Status & Trends Review Panel
1990 NOAA Coastal Oceans Program Toxic Substances Review Panel
1991 New York Bight and Hudson Estuary Programs Toxic Substances Review Panel
1992 - 2000 International Union of Pure and Applied Chemistry Commission on Environmental Analytical Chemistry
1993 - present Editorial Board, Marine Environmental Research
1997 - 1998 COASTES Advisory Panel
2003 New Hampshire Sea Grant Review Panel
2003 - present IAEA Coordinated Research Group on the Bioaccumulation of Radionuclides
2003 - present Expert Advisor for US Arctic Monitoring and Assessment Program
2005 - present External Advisory Committee, Center for Environmental Health Sciences, Dartmouth College
2007 - present Steering Committee, University of Haifa's School of Marine Sciences, Haifa, Israel
*External Advisory Committee review of Dartmouth College's Center for Environmental Health Sciences. Hanover, NH, October, 2011.

Consultant for numerous organizations including:

U.S. Environmental Protection Agency; Brookhaven National Laboratory; International Atomic Energy Agency; National Association of Photographic Manufacturers; New York City Office of Management and Budget; Risø National Laboratory, Roskilde, Denmark; National Environmental Law Center; New York State Department of State; Fisher Island Conservancy; Applied Biomathematics; Hong Kong University of Science and Technology; Northeast Utilities; US District Court Maine (appointed Special Master of the Court) University and departmental service (select activities): Director, Stony Brook University's Consortium for Inter-Disciplinary Environmental Research (CIDER, 2006-); MSRC Colloquium coordinator (3 years); Distinguished Visiting Scholar Committee (chair, 4 years); Radiation Safety Officer;

Convenor of workshops (recent, and relevant)

*University of Wisconsin, Milwaukee. Presented a seminar on "Finding patterns of metal-biota interactions in the sea." Milwaukee, November, 2011.

Society of Environmental Toxicology and Chemistry, 32nd Annual Meeting. Presented "Geochemical and biological factors allow better understanding of sedimentary As, Cd and uptake in a deposit-feeding polychaete *Nereis succinea*" (with Z. Baumann). Boston, November, 2011.

*Harvard University School of Public Health. Presented a seminar on "The application of a model to assess the bioaccumulation of metals in aquatic animals and their trophic transfer in aquatic ecosystems." Boston, December 2011.

*Workshop on Fukushima radioactivity in the Pacific. Presented a paper on "Fukushima-derived radionuclides in Pacific biota." Salt Lake City, February, 2012.

ASLO 2012. Presented "Bioaccumulation by zooplankton and micronektonic fish of Fukushima released cesium and silver radioisotopes in Japanese coastal waters" (with Z. Baumann);

"Impacts of the Fukushima Dai-ichi nuclear power plants on the ocean" (with K. Buesseler);

"Trends in community structure of zooplankton and micronekton from waters nearby Fukushima and their relation to bioaccumulated cesium radionuclide" (with J. Nishikawa). Salt Lake City, February, 2012.

*NOAA Headquarters. Presented "Fukushima-derived radionuclides in Pacific biota." Silver Spring, MD, March, 2012.

*SERDP & ESTCP Workshop on Research and Development Needs for Understanding and Assessing the Bioavailability of Contaminants in Soils and Sediments. Presented

"Bioaccumulation of metals in sediment-dwelling animals." Annapolis, August, 2008.

Society of Environmental Toxicology and Chemistry, 29th Annual Meeting. Presented "Assessing the bioaccumulation of metals in killifish (*Fundulus heteroclitus*), a bioindicator

organism." (with J. Dutton). Tampa, November, 2008.

*SERDP & ESTCP's Partners in Environmental Technology Technical Symposium & Workshop. Presented "Factors affecting metal bioaccumulation in marine organisms," and *SETAC Workshop on Ecological Assessment of Selenium in the Aquatic Environment. Pensacola, FL, February 2009.

*Interdisciplinary Progress in Environmental Science and Management. Presented keynote speech on "Interdisciplinary approaches for addressing marine contamination issues." Newcastle-upon-Tyne, UK, July, 2011.

10th International Conference on Mercury as a Global Pollutant. Presented a seminar on "Dissolved organic matter, regardless of origin, limits algal accumulation of methylmercury" (with A. Luengen), and "Trends in mercury concentrations in US commercial fish, a research synthesis" (with R. Karimi). Halifax, Nova Scotia, July 2011.

Extensive additional workshops, invited speaker internationally and nationally

PUBLICATIONS (examples of recent, relevant)

Dutton, J., and N.S. Fisher. 2011. Salinity effects on the bioavailability of aqueous metals for the estuarine killifish *Fundulus heteroclitus*. **Environmental Toxicology and Chemistry** 30: 2107-2114.

Fisher, N.S., and K.O. Buesseler. 2011. Tracking Fukushima radionuclides: a research cruise in Japanese waters. **Bulletin of Atomic Scientists**
<http://www.thebulletin.org/web-edition/roundtables/fukushima-what-dont-we-know> .

Environmental Toxicology and Chemistry

Dutton, J., and N.S. Fisher. In press. Bioavailability of sediment-bound and algal metals to killifish (*Fundulus heteroclitus*). **Aquatic Biology**

Wang, W.-X., and N.S. Fisher. 1999. Delineating metal accumulation pathways for aquatic invertebrates. **Science of the Total Environment** 237/238: 459-472.

Cochran, J.K., S.B. Moran, N.S. Fisher, T.M. Beasley, and J.M. Kelley. 2000. Sources and transport of anthropogenic radionuclides in the Ob River system, Siberia. **Earth and Planetary Science Letters** 179: 125-137.

Fisher, N.S., and S.E. Hook. 2002. Toxicology tests with aquatic animals need to consider the trophic transfer of metals. **Toxicology** 181/182: 531-536.

Fisher, N.S. 2002. Considerations for a mussel-based monitoring program for radioactive contaminants in the Mediterranean Sea. In: Mediterranean Mussel Watch. Designing a Regional Program for Detecting Radionuclides and Trace Contaminants, F. Briand and N.S. Fisher (Eds.), CIESM Workshop Monograph No. 15, Monaco, pp. 59-62.

Fisher, N.S. 2002. Editor. Bioaccumulation of Metals and Radionuclides in Marine Organisms. CIESM Workshop Monograph No. 19, Monaco, 120 pp.

Wong, W.H., J.S. Levinton, B.S. Twining, and N.S. Fisher. 2003. Assimilation of micro- and mesozooplankton by zebra mussels: A demonstration of the food web link between zooplankton and benthic suspension feeders. **Limnology and Oceanography** 48: 308-312.

Stewart, G.M., and N.S. Fisher. 2003. Experimental studies on the accumulation of polonium-210 by marine phytoplankton. **Limnology and Oceanography** 48: 1193-1201.

Mylon, S.E., B.S. Twining, N.S. Fisher, and G. Benoit. 2003. Relating the speciation of Cd, Cu, and Pb in two Connecticut rivers with their uptake in algae. **Environmental Science and Technology** 37: 1261-1267.

Stewart, G.M., and N.S. Fisher. 2003. Bioaccumulation of polonium-210 in marine copepods. **Limnology and Oceanography** 48: 2011-2019.

Fowler, M. Peterson, and N.S. Fisher. 2004. 210Po and 210Pb concentrations, fluxes, particle settling velocities, and organic carbon at the DYFAMED site, Northwestern Mediterranean.

Griscom, S.B., and N.S. Fisher. 2004. Bioavailability of sediment-bound metals to marine bivalve molluscs: an overview. **Estuaries** 27: 826-838.

Fowler, S.W., and N.S. Fisher. 2004. Radionuclides in the biosphere. In: Radioactivity in the

- Environment, Vol. 6, Marine Radioactivity, H.D. Livingston (Ed.), Elsevier Science, Amsterdam, pp. 167-203.
- Rose, P.S., and N.S. Fisher. 2004. Medical radioisotopes entering the marine environment. In: Novel Chemical Contaminants and Pathogens In Coastal Waters, N.S. Fisher (Ed.), CIESM Workshop Monograph No. 26, Monaco, pp. 73-77.
- Campbell, P.G.C., S.J. Clearwater, P.B. Brown, N.S. Fisher, C. Hogstrand, G.R. Lopez, L.M. Mayer and J.S. Meyer. 2005. Digestive physiology, chemistry, and nutrition. In: Toxicity of Dietborne Metals to Aquatic Biota, J.S. Meyer, W.J. Adams, K.V. Brix, S.N. Luoma, D.R. Mount, W.A. Stubblefield, and C.M. Wood (Eds.), SETAC Press, Pensacola, FL, pp. 13-57.
- Fisher, N.S. 2007. Editor. Marine Sciences and Public Health—Some Major Issues. CIESM Workshop Monograph No. 31, Monaco, 128 pp.
- Mathews, T., and N.S. Fisher. 2007. Metal concentrations in Mediterranean fish tissues: exploring biomagnification patterns. **Rapp. Comm. Int. Mer Medit.** 38: 290.
- Stewart, G.M., S.W. Fowler, and N.S. Fisher. 2008. The bioaccumulation of U- and Th-series radionuclides in marine organisms. In: U-Th Series Nuclides in Aquatic Systems, S. Krishnaswami and J.K. Cochran (Eds.), Elsevier Science, Amsterdam, pp. 269-305.
- Baines, S.B., and N.S. Fisher. 2008. Modeling the effect of temperature on bioaccumulation of metals by a marine bioindicator organism, *Mytilus edulis*. **Environmental Science and Technology** 42: 3277-3282.
- Mathews, T., and N.S. Fisher. 2008. Evaluating the trophic transfer of cadmium, polonium, and methylmercury in an estuarine food chain. **Environmental Toxicology and Chemistry** 27: 1093-1101.
- Mathews, T., N.S. Fisher, R.A. Jeffree, and J.-L. Teyssié. 2008. Assimilation and retention of metals in teleost and elasmobranch fishes following dietary exposure. **Marine Ecology Progress Series** 360: 1-12.
- Mathews, T., and N.S. Fisher. 2008. Trophic transfer of seven trace metals in a four-step marine food chain. **Marine Ecology Progress Series** 367: 23-33.
- Chen, C., A. Amirbahman, N.S. Fisher, G. Harding, C. Lamborg, and D. Taylor. 2008. Methylmercury in marine ecosystems: spatial patterns and processes of production, bioaccumulation, and biomagnification. **EcoHealth** 5: 399-408.
- Stewart, A.R., M. Grosell, D. Buchwalter, N.S. Fisher, S.N. Luoma, T. Mathews, P. Orr, and W.-X. Wang. 2010. Bioaccumulation and trophic transfer of selenium. In: Ecological Assessment of Selenium in the Aquatic Environment, P.M. Chapman, W.J. Adams, M.L. Brooks, C.G. Delos, S.N. Luoma, W.A. Maher, H.M. Ohlendorf, T.S. Presser, and D.P. Shaw (Eds.), SETAC Press, Pensacola, FL, 93-139.
- Fisher, N.S., T. Mathews, and J. Dutton. 2010. Dietary sources dominate metal uptake in marine fish. **Rapp. Comm. Int. Mer Medit.** 39: 251.
- Karimi, R., N.S. Fisher, and C.L. Folt. 2010. Multielement stoichiometry in aquatic invertebrates: when growth dilution matters. **American Naturalist** 176: 699-709.
- Fisher, N.S., and C.Y. Chen. 2011. Interdisciplinary approaches for addressing marine contamination issues. **Environmental Conservation** 38: 187-198.

Uranium Study SME	Thomas Cardwell
SME: Agreement State-NRC Regulations for Radiation Protection Current Employment: Trinitek Services, Inc. Capabilities: Radiation Programs, uranium licensing, emergency management, compliance inspections	Regulatory Specialist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials BS, Biology ❖ University of Texas

1981 - 1989 - Uranium Inspector- Texas Bureau of Radiation Control

In 1981 Texas signed the Low Level Waste and Uranium Mining and Milling Agreement with the Nuclear Regulatory Commission (NRC). I was assigned to a working group to draft the Texas Regulations for Uranium Mining and Milling. Our task was to review the NRC uranium regulations and draft the Texas uranium regulations. We reviewed the Texas Statutes and drafted the first Texas uranium regulations with consideration for the various NRC compatibility issues. The regulations were approved by NRC and adopted into the Texas Regulations for Control of Radiation.

My responsibilities as an inspector were to inspect conventional strip mines, heap leach operations, and in-situ mines for compliance with regulations and license conditions. This included worker safety requirements, general public safety, environmental monitoring requirements, and tailings impoundment monitoring requirements. I was responsible for responding to incidents such as spills and remediation of spills.

I was assigned to committees to review all new uranium mining licenses and major amendments. This included reviewing requirements for monitoring internal and external exposures to workers, establishing environmental monitoring locations for air, water and soil samples and intervals of sampling, monitoring of tailings impoundments and waste water retention ponds at in-situ facilities. We also reviewed facility plans and made recommendations for plant processes for controlling contamination in and around the facilities. I was responsible for reviewing requests for releasing buildings, land and equipment for unrestricted use and uranium license termination. This included review of licensees' survey results, planning agency confirmatory surveys, supervising survey teams, and recommending license termination.

1989 - 1997 -- Incident Investigator - Texas Bureau of Radiation Control

My duties included investigating incidents involving radioactive materials and radiation machines, including incidents from uranium operations. I investigated incidents at uranium facilities such as high bioassay results for workers and reports of spills of lixiviates from the mining processes. The investigations included performing timeline and root cause analyses. I reviewed licensees' reports and the procedures to prevent recurrences of the incidents. Many of the spills were in unrestricted areas and the responsibilities included overseeing the clean-up and release of the affected areas.

1997 - 2009 - supervisor- Texas Radiation Control Program

My duties during this time period were as supervisor of the X-ray Inspection Branch from 1997 - 2004. The responsibilities included setting staffing patterns, setting workloads, setting and monitoring budget, monitoring work performance, hiring, and disciplinary actions.

During 2004 - 2009, my duties were as Inspection Program Supervisor. These duties included supervision of the Radioactive Material Inspections Program, Incident Investigation Program, Mammography Inspection Program and the X-ray Inspection Program. The responsibilities included supervising four first level managers, reviewing workload and staffing patterns, resolving employee issues, finalizing budgets for the various programs, monitoring workloads, and setting policies.

Uranium Study Technical Lead	Francis X. Cameron, J.D.
Technical Lead: NEPA, facilitation Current Employment: principal with the Zero Gravity Group Capabilities: NEPA, environmental law, uranium fuel cycle regulatory issues, facilitation public regulatory hearings/meetings, public out-reach, rulemaking, US NRC rule-making, Agreement States issues, over 40 years experience with senior NRC and other federal, state and tribal agencies	Senior Consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials J.D. ❖ University of Pittsburgh M.M.A., Natural Resources ❖ University of Rhode Island B.A., Political Science & International Affairs ❖ University of Pittsburgh Additional training: environmental law

SUMMARY OF PROFESSIONAL EXPERIENCE

REPRESENTATIVE PROJECTS

Convening And Facilitation Of Collaborative And Consensus Building Processes

Consultant to the International Atomic Energy Agency on the development of the Draft Safety Guide on Transparency, Openness, and Public involvement (2011).

The nature and scope of the performance assessment for the disposal of depleted uranium in Utah (Department of Environmental Quality, State of Utah, 2010)

The development of the technical basis for the NRC rulemaking on the licensing and oversight of reprocessing facilities (U.S. Nuclear Regulatory Commission, 2010 - 2011)

Negotiated rulemaking on program integrity issues (Department of Education, 2010)

The development of the criteria for site-specific performance assessments for the disposal of depleted uranium (U.S. Nuclear Regulatory Commission, 2009)

Negotiated rulemaking on the federal student loans programs, TRIO and GEAR UP (Department of Education, 2009)

The development of NRC policy on the blending of low-level radioactive waste (U.S. Nuclear Regulatory Commission, 2010)

Development of the 2009 research agenda, National Invasive Species Advisory Committee (DOI, 2008)

Workshop for Tribal leaders on radioactive waste transportation and disposal (U.S. Nuclear Regulatory Commission, 2006)

Facilitation of workshops to develop a client-based research strategy for the Water Environment Research Foundation (2006)

Facilitation of the development of the vision and guiding principles for the design of a new science and engineering complex (George Washington University, 2008)

Facilitation of the meetings of the Interagency Task Force on the Security of Radioactive Devices (Interagency Task Force, 2006 -2010)

Public Outreach

Facilitation of public meetings on the environmental review for all proposed new reactor sites (U.S.Nuclear Regulatory Commission, 2004 through 2010)

Facilitation of the public meeting on the environmental review on the license renewal for the Diablo Canyon nuclear power plant in San Luis Obispo, CA (NRC, 2010)

Facilitation of the public meetings on the Generic Environmental Impact Statement on the licensing of uranium recovery facilities (NRC, 2009)

Design and facilitation of small group stakeholders meeting on the proposed new reactor for the North Anna site, North Anna VA (NRC, 2007)

Facilitation of the public outreach meeting for the Nuclear Fuels Service site in Erwin, TN public outreach meeting (NRC, Region II, 2009)

Facilitation Of Management Retreats

Chairman Jaczko and NRC office directors on teamwork and communication (NRC, Office of the Chairman, 2010)

Strategic planning session for the Board of Directors and Advisory Committee of Waste Management Symposia on the program tracks and leadership succession (2010)

Senior Leadership Meeting for NRC office directors on establishing an open and collaborative work environment (Executive Director for Operations, NRC, 2009)

Members and staff of the NRC Advisory Committee on Reactor Safeguards on revisions to program reviews (Advisory Committee on Reactor Safeguards, 2009)

Communications workshop for the staff of the Department of Energy and the New York State Energy and Development Administration (DOE, 2006)

Training

Instructor, Facilitation Training Program (U.S. Nuclear Regulatory Commission, 2011)

Instructor, "Implications for Agency Project Managers from Recent Judicial Decisions" Duke University, Environmental Leadership Program, Nicholas School of the Environment (2011)

Curriculum design and Instructor, "Public Participation Strategies for the NEPA Process", for environmental project managers, Duke University, Environmental Leadership Program, Nicholas School of the Environment (2010)

Curriculum design and Instructor, "The Law of the National Environmental Policy Act" for NRC project managers, Duke University, Nicholas School of the Environment (2009)

Instructor, "Cumulative Impacts Analysis, Climate Change", for environmental project managers, Duke University, Nicholas School of the Environment (2010)

EMPLOYMENT HISTORY

President, The Zero Gravity Group LLC (2008 to present)

Assistant General Counsel, Office of the General Counsel, U. S Nuclear Regulatory Commission, Senior Executive Service (2006 to 2008)

Alternative Dispute Resolution Specialist and Special Counsel for Public Liaison, U. S. Nuclear Regulatory Commission (1991 to 2008)

Associate Professor (tenured), University of Rhode Island, environmental law and policy; Chair, University Curriculum Committee (1972 to 1980)

Elizabeth A. Dupree Ellis, Ph.D.
Oak Ridge Associated Universities

Education

B.A., Zoology, Duke University, 1973
Sc.M., Epidemiology, Johns Hopkins University, 1978
Ph.D., Epidemiology, University of North Carolina, Chapel Hill, 1989

Positions

Oak Ridge Associated Universities
Occupational Exposure and Worker Health
Associate Director, Center for Epidemiologic Research **2007-present**

Oak Ridge Associated Universities
Basic and Applied Research
Associate Director, Center for Epidemiologic Research **1998-2007**
Serves as Associate Director for the Center for Epidemiologic Research which conducts and supports quality epidemiologic research with primary emphasis on occupational health studies. The program has offices in Oak Ridge, TN and Arvada, CO.

Associate Director, Center for Epidemiologic Research, ORAU **1991-1998**
Leader, Epidemiology Support Section, Center for Epidemiologic Research, **1987-1991**
Epidemiologist, Center for Epidemiologic Research, ORAU **1983-1987**
Associate Epidemiologist, Center for Epidemiologic Research, ORAU **1978-1981**

The Johns Hopkins University, Baltimore, MD
Department of Epidemiology
Research Assistant **1977-1978**

Energy Research and Development Administration
Office of Environmental Research, Human Health Studies Program
Intern **1977**

Publications

Dupree, EA. 1980. Mortality among workers at a uranium refining and processing plant. American Journal of Epidemiology 112:446 (abstract).

Hudson DR, EL Frome, EA Dupree, MS Hansard, WL Beck, and CC Lushbaugh. 1981. Exploratory analysis of mortality in a cohort of nuclear material workers. American Journal of Epidemiology

114:446 (poster session).

- Lushbaugh CC, WL Beck, EA Dupree, EL Frome, SA Fry, MS Hansard, DR Hudson, and AP Polednak. 1981. Health and mortality of DOE workers. *Trans. Am. Nuclear Soc.* 38:81.
- Fry SA, CC Lushbaugh, CM Shy, DL Cragle, H Checkoway, S Blum, AV Carpenter, EA Dupree, EL Frome, PG Groer, and J Wilson. 1985. The U.S. Department of Energy Health and Mortality Study: The Oak Ridge studies. In: *Epidemiological studies of some populations exposed to ionizing radiation*, (Weeks JL, compiler), pp. 18-40, Pinawa, Manitoba: Atomic Energy of Canada Limited, (AECL publication no. 8360).
- Dupree EA, DL Cragle, RW McLain, DJ Crawford-Brown, and MJ Teta. 1987. Mortality among workers at a uranium processing facility: Linde Air Products Ceramics Plant, 1943-49. *Scandinavian Journal of Work, Environment and Health* 13:100-107.
- Fry SA, AV Carpenter, DL Cragle, EA Dupree, PG Groer, CC Lushbaugh, H Checkoway, DJ Crawford-Brown, CM Shy, JE Watson, and EL Frome. 1988. Studies of mortality among populations of U.S. nuclear industry workers. In: *Proceedings of the International Conference, Health Effects of Low Dose Ionizing Radiation--Recent Advances and Their Implications*. London, England: British Nuclear Energy Society, pp. 77-80.
- Dupree EA. 1989. Doctoral dissertation, University of North Carolina, School of Public Health, Department of Epidemiology, Chapel Hill, NC. An epidemiologic investigation of mortality among workers occupationally exposed to uranium compounds at a uranium processing plant.
- Dupree EA, J Watkins, J Ingle, P Wallace, C West, and W Tankersley. 1993. Risk of lung cancer among uranium processing workers. *American Journal of Epidemiology* 138:640 (abstract).
- Dupree EA, J Watkins, JN Ingle, PW Wallace, CM West, and WG Tankersley. 1995. Uranium dust exposure and lung cancer risk in four uranium processing operations. *Epidemiology* 6:370-375.
- Fry SA, DL Cragle, DJ Crawford-Brown, EA Dupree, EL Frome, ES Gilbert, GR Petersen, CM Shy, WG Tankersley, GL Voelz, PW Wallace, JP Watkins, JE Watson, and LD Wiggs. 1995. Health and Mortality among Contractor Employees at U.S. Department of Energy Facilities. In: *Radiation and Public Perception: Benefits and Risks* (Young JP, Yalow RS, editors). Developed from the symposium *Radiation and Society*, held at the April 1992 national meeting of the American Chemical Society, San Francisco, pp. 239-258.
- Fry SA, EA Dupree, AH Sipe, DL Seiler, and PW Wallace. A study of mortality and morbidity among persons occupationally exposed to > 5 rem (> 50 mSv) in a year. Phase I: Mortality, through 1984. *Applied Occupational and Environmental Hygiene* suppl. March 1996.
- Ellis ED, Watkins J, Ingle J, Phillips J. 2000. External radiation exposure and mortality among a cohort of uranium processing workers. *American Journal of Epidemiology* 152:91-95.
- Boice JD, RW Leggett, ED Ellis, PW Wallace, M Mumma, SS Cohen, AB Brill, BB Boecker, JG Barnes, RC Yoder, and KF Eckerman. 2006. A comprehensive dose reconstruction methodology for former Rocketdyne/Atomics International radiation workers. *Health Physics* 90(5):409-430.

Boice JD, SS Cohen, MT Mummaw, ED Ellis, KF Eckerman, RW Legett, BB Boecker, AB Brill, and B Henderson. 2006. Mortality among radiation workers at Rocketdyne (Atomics International), 1948-1999. *Radiation Research* 166:98-115.

Guseva IC, Ellis ED Tirmarche M. 2007. Cancer risk in nuclear workers occupationally exposed to uranium – emphasis on internal exposure. *Health Physics* 94(1):1-17.

Ellis ED, Watkins J, Tankersley W, Phillips J, Girardi D. 2010. Mortality among titanium dioxide workers at three DuPont plants. *Journal of Occupational and Environmental Medicine. Journal of Occupational and Environmental Medicine* 52(3):303-309.

Boice JD, SS Cohen, MT Mummaw, ED Ellis, KF Eckerman, RW Legett, BB Boecker, AB Brill, and B Henderson. 2011. Updated mortality analysis of radiation workers at Rocketdyne (Atomics International), 1948-2008. *Radiation Research* 176:244-258.

Tirmarche M, Harrison JD, Pacquet F, Blettner M, Laurier D, Shilnikova N, Blanchondon E, Lecomte JF, Sokolnikov M, Ellis E, and Marsh JW. Assessment and control of lung cancer risk from radon. *Annals of the ICRP* (accepted for publication)

Ellis ED, Watkins JD, Tankersley W, Phillips J, Girardi D. Occupational exposure and mortality among workers at three titanium dioxide plants. *American Journal of Industrial Medicine* (submitted)

Synergistic Activities

2006 – present. Member, International Commission on Radiation Protection, Committee 2, Task Group 64 to review knowledge and make recommendations on further study of the health effects of occupational radiation exposure to alpha emitters.

1994 – present. Program Director for the DOE Illness and Injury Surveillance Program. The program assesses the overall health of contractor workers employed at 13 DOE sites.

2000 – present. Chair of the Oak Ridge Site-wide Institutional Review Board (IRB) and member of the DOE Central IRB.

George Holdsworth Ph.D.
Oak Ridge Associated Universities

An experienced scientist specializing in toxicology and human health risk assessments.

Senior Toxicologist: Oak Ridge Associated Universities (2003-present)

Technical support to the U.S. EPA IRIS program office for • the preparation of toxicological reviews and IRIS summary sheets, • peer review, and • meeting support. Member of the writing team for toxicological reviews of n-hexane and 1,2,3-trichloropropane, among others. Provided write-ups of experimental studies and overall technical support for the Agency's *Toxicological Review and Risk Characterization of Formaldehyde*, currently in preparation. Prepared monographs on the impact of environmental stressors on human health for the U.S. Centers for Disease Control and Prevention (CDC). Currently providing technical support to NIOSH on criteria documents, skin notation profiles, and immediately dangerous to life and health (IDLH values).

Senior Toxicologist: T N & Associates (1996-2003)

Extensive experience in support of government programs in the human health sciences. For the U.S. EPA, researched and authored issue papers on potential human health impacts of chemicals of environmental concern, for example, in support of U.S. EPA's Superfund Technical Support Center (STSC). Prepared monographs to assess the human health impacts of drinking water disinfectants and their by-products. In a collaborative study, developed a decision analysis methodology for choosing among alternative drinking water disinfection strategies. Researched and wrote toxicological reviews and summary sheets for compounds nominated for inclusion in the U.S. EPA's IRIS database. Assessed the mutagenic potential of trace inorganic and organic contaminants in finished drinking water. For the U.S. EPA's NCEA-Washington, DC office, collaborated in the development of a monograph on the bioaccumulation of dioxins in aquatic life. For the U.S. EPA's IRIS Office, carried out a Congress-mandated Needs Assessment. In a multi-year program for the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), developed Toxicity Profiles of environmentally and militarily important chemicals, in support of an inter-Agency initiative to develop Toxicity Reference Values protective of wildlife. During a three year period (1999-2002), participated in 13 risk assessments in support of environmental remediation at governmental sites.

Senior Scientist: Integrated Computer Systems (1992-1995)

For the U.S. DOE's ERWM program through HAZWRAP, reviewed baseline risk assessments for technical adequacy. Other tasks included reviews of RFI/RI work plans, RCRA Part B permit applications (with ACL demonstration), and RI reports for regulatory compliance and technical adequacy. Prepared issue papers on such subjects as: *The application of quantitative uncertainty analysis to human health evaluations in the baseline risk assessment*; *A modified slope factor for soil-borne plutonium*; *The relevance of the CERFA amendments to CERCLA for cleanup at DOE sites*, among many others.

Senior Scientist: Integrated Laboratory Systems (1991-1992)

For the U.S. EPA Environmental Criteria and Assessment Office (ECAO-Cincinnati), researched and wrote toxicological assessments of chemicals of environmental concern (RQ documents). Revised and updated Health and Environmental Effects Documents (HEEDs). Wrote issue

papers on the following topics: *The assessment of health risk from dermal exposure to polycyclic aromatic hydrocarbons (PAHs); A compilation of dermal, oral, and inhalation absorption factors for Superfund chemicals; The development of a simple and directly applicable mathematical model for route-to-route extrapolations using dermal, oral, and inhalation absorption factors;* and contributed to a review of an assessment of the health effects of mixtures of environmentally important pollutants. Developed quantitative toxicity values (slope factors, RfDs and RfCs) for chemicals of environmental concern. For the NIEHS, researched and wrote issue papers ("Executive Summaries") on the genotoxicity and mutagenicity of selected chemicals.

Scientist: Oak Ridge Research Institute (1983-1991)

For the U.S. EPA, assessed the human health risk from pesticides in drinking water supplies and investigated the occurrence of organohalide byproducts in drinking water disinfection and their role in hyperlipoproteinemia.. For the U.S. DOE, investigated the distribution of chemical species of mercury in soil in support of the East Fork Popular Creek project. Supervised development of an enzyme-linked immunoassay (EIA) for chemolithotrophic bacteria (*Thiobacillus* spp.) at acid mine drainage sites.

Assistant Visiting Professor: University of Cincinnati and St. Bartholomew's Hospital. (1976-1982)

Researched the kinetics of plasma lipoprotein breakdown. Designed a substrate partition assay to determine the binding efficiency of abnormal triglyceride-rich lipoproteins to the enzyme, lipoprotein lipase.

Research Fellow: University of Birmingham/Research Associate: Unilever, Inc. (1964-1976)

Researched the structure and molecular architecture of the liver cell (bile canalicular) plasma membrane. Participated in electron microscopy/freeze fracture studies of natural and artificial membranes.

Education and Training

U.S. EPA Risk Assessment Guidance for Superfund, Cincinnati, OH. (1998)

Ph.D. Biochemistry. University of Birmingham, U.K. (1973)

M.I. Biol. Biochemistry. Barking Coll. Tech, U.K. (1970)

H.N.C. Applied Biology. Luton Coll. Tech, U.K. (1968)

Contact Information

George.Holdsworth@orise.ornl.gov.

(865) 576-3974

Publications

Henson, A.F., G. Holdsworth and R.C. Chandon. 1971. Physicochemical analyses of the bovine milk fat globule membrane: Electron microscopy. *J. Dairy Sci.* 54: 1752-1763.

Holdsworth, G. and J.B. Finean. 1972. A structural study of the low-density lipoprotein component of hens eggs and of an isolated surface component. *Chem. Phys. Lipids* 9: 217-229.

Holdsworth, G. 1973. Studies of the structure and origins of the low-density lipoprotein fraction of hens eggs. Ph.D. Thesis. University of Birmingham, UK.

Holdsworth, G., R.H. Michell and J.B. Finean. 1974. Transfer of very low density lipoproteins from hen plasma into egg yolk. *FEBS. Lett.* 39: 275-277.

Holdsworth, G., R.H. Michell and J.B. Finean. 1974. Transfer of very low density lipoproteins from hen plasma into egg yolk. *Biochem. Soc. Trans.* 2: 486-487.

Holdsworth, G. and R. Coleman. 1975. Enzyme profiles of mammalian bile. *Biochim. Biophys. Acta* 389: 47-50.

Holdsworth, G. and R. Coleman. 1975. Presence of plasma membrane enzymes in bile and their partial purification by affinity chromatography with concanavalin A. *Biochem. Soc. Trans.* 3: 746-747.

Coleman, R. and G. Holdsworth. 1975. Effects of detergents upon erythrocytes: Different patterns of solubilization of membrane proteins by dihydroxy and trihydroxy bile salts. *Biochem. Soc. Trans.* 3: 747-748.

Coleman, R. and G. Holdsworth. 1976. The release of membrane components prior to hemolysis during extraction of intact erythrocytes with bile salts. *Biochim. Biophys. Acta* 426: 776-780.

Coleman, R., O.S. Vyvoda and G. Holdsworth. 1976. Glycocholate can remove lipid and protein components from the outer leaflet of the plasma membrane without lysis. *Biochem. Soc. Trans.* 4: 224.

Coleman, R., G. Holdsworth and J.B. Finean. 1976. Detergent extraction of erythrocyte ghosts: Comparison of residues after cholate and Triton X-100 treatments. *Biochim. Biophys. Acta.* 436: 38-44.

Holdsworth, G. and R. Coleman. 1976. Plasma membrane components can be removed from isolated lymphocytes by the bile salts glycocholate and taurocholate without cell lysis. *Biochem. J.* 158: 493-495.

Coleman, R., G. Holdsworth and O.S. Vyvoda. 1976. Detergents as tools in the dissection of membranes. In: *Methodological Developments in Biochemistry, Volume 6*, (Ed. E. Reid), Horwood, Chichester, U.K.

Coleman, R., G. Holdsworth and O.S. Vyvoda. 1977. Hepatocyte surface enzymes and their appearance in the bile. In: *Membrane Alteration as the Basis for Liver Injury*. (Eds., H. Poppes, L. Bianchi and W. Reutter), M.T.P. Press, Lancaster, U.K.

Vyvoda, O.S., R. Coleman and G. Holdsworth. 1977. Effects of different bile salts on the composition and morphology of a liver plasma membrane preparation. *Biochim. Biophys. Acta* 465: 68-76.

Taylor, K.G., D.J. Galton, G. Holdsworth and M. Rosser. 1977. Hypertriglyceridemia, plasma triglyceride clearance and lipoprotein lipase in adipose tissue of adult diabetics. *Diabetologia* 13: 435.

Galton, D.J., D.J. Betteridge, K.G. Taylor, G. Holdsworth and J. Stocks. 1977. Defects of enzyme regulation in metabolic disease. *Clin. Sci. Mol. Med.* 53: 197-203.

Taylor, K.G., G. Holdsworth and D.J. Galton. 1977. Clofibrate increases lipoprotein lipase activity of hypertriglyceridemic patients. *Lancet* ii: 1106-1107.

Holdsworth, G., K.G. Taylor and D.J. Galton. 1978. The release of lipoprotein lipase from human adipose tissue is potentiated by serum lipoproteins. *Biochem. Soc. Trans.* 6: 105-106.

Holdsworth, G., K.G. Taylor and D.J. Galton. 1979. Lipoprotein lipase activity in human adipose tissue during induced hypertriglyceridemia. *Atherosclerosis* 33: 253-258.

Taylor, K.G., D.J. Galton and G. Holdsworth. 1979. Insulin-independent diabetes, a defect in the activity of the enzyme lipoprotein lipase in adipose tissue. *Diabetologia* 16: 313-317.

Stocks, J., G. Holdsworth and D.J. Galton. 1979. Hypertriglyceridemia associated with an abnormal triglyceride-rich lipoprotein carrying excess apolipoprotein C-III-2. *Lancet* ii: 667-671.

Taylor, K.G., G. Holdsworth and D.J. Galton. 1980. Lipoprotein lipase in adipose tissue and plasma triglyceride clearance in patients with primary hypertriglyceridemia. *Eur. J. Clin. Invest.* 10: 133-138.

McIver, P.M., G. Holdsworth and D.J. Galton. 1981. Severe hypertriglyceridemia associated with pancytopenia and lipoprotein lipase deficiency. *Ann. Int. Med.* 94: 211-212.

Stocks, J., G. Holdsworth, P. M. Dodson and D.J. Galton. 1981. An abnormal triglyceride-rich lipoprotein carrying excess apolipoprotein C-II. *Atherosclerosis* 38: 1-9.

Dodson, P.M., J. Stocks, G. Holdsworth and D.J. Galton. 1981. High-fibre and low-fat diets in diabetes mellitus. *Br. J. Nutr.* 46: 289-294.

Reckless, J.P.D., J. Stocks, G. Holdsworth et al. 1982. Studies of a variant very low density lipoprotein with an acquired deficiency of apolipoprotein C-II. *Clin. Sci.* 62: 93-100.

Reckless, J.P.D., J. Stocks, G. Holdsworth et al. 1982. The roles of C-apolipoproteins in the metabolism of triglyceride-rich lipoproteins. Clin. Sci. 62: 125-129.

Holdsworth, G., J. Stocks, P.M. Dodson and D.J. Galton. 1982. An abnormal triglyceride-rich lipoprotein containing excess sialylated apolipoprotein C-III. J. Clin. Invest. 69: 932-939.

Avila, E.M., G. Holdsworth, N. Sasaki, R.L. Jackson and J.A.K. Harmony. 1982. Apoprotein E suppresses phytohemagglutinin-activated phospholipid turnover in peripheral blood mononuclear cells. J. Biol. Chem. 257: 5900-5909.

Holdsworth, G., J.G. Noel, and R.L. Jackson. 1982. Cyclohexanedione modification of apolipoprotein C-II destroys its activator properties for lipoprotein lipase. Arteriosclerosis 2: A440.

Sasaki, N., G. Holdsworth, R.L. Barnhardt, M.L. Kashyap, C.J. Glueck and R.L. Jackson. 1983. Effect of high carbohydrate diets on the content of apolipoproteins C-II, C-III, and E in human plasma high density lipoprotein subfractions. Atherosclerosis 46: 341-352.

Cardin, A.D., G. Holdsworth and R.L. Jackson. 1984. Isolation and characterization of plasma lipoproteins and apolipoproteins. In: Methods in Pharmacology, 5, 141-166, (Ed. A. Schwartz) Plenum Publishing Corp.

Holdsworth, G., J.G. Noel, K. Steje, M. Shinomiya and R.L. Jackson. 1984. Modification of apolipoprotein C-II with 1,2-cyclohexanedione and 2,3-butanedione. Role of arginine in the activation of lipoprotein lipase. Biochim. Biophys. Acta 794: 472-478.

Holdsworth, G., J.G. Noel, M.K. Kashyap and R.L. Jackson. 1985. Kinetics of lipoprotein lipase interaction with triacylglycerol-rich lipoproteins carrying excess apolipoprotein C-III/2. Biochem. Soc. Trans. 13: 131-132.

Holdsworth, G., T.R. Osborne, G.T. Patterson and N.W. Revis. 1985. Comparison of the apolipoprotein AI/AII ratio of smoker's and non-smoker's high-density lipoproteins. Biochem. Soc. Trans. 13: 133.

Revis, N.W., P. McCauley, R. Bull and G. Holdsworth. 1986. Relationship of drinking water disinfectants to plasma cholesterol and thyroid hormone levels in experimental studies. Proc. Natl. Acad. Sci. USA. 83: 1485-1489.

Jackson, R.L. and G. Holdsworth. 1986. Isolation and properties of human apolipoproteins C-I, C-II, and C-III. In: Plasma Lipoproteins, Part A. Methods in Enzymology. (Eds. J.P. Segrest and J.J. Albers) Acad. Press, N.Y.

Revis, N.W., P. McCauley and G. Holdsworth. 1986. Relationship of dietary iodide and drinking water disinfectants to thyroid function in experimental animals. Env. Health Perspect. 69: 243-248.

Revis, N.W., D. Harmon-Hines and G. Holdsworth. 1987. Determinants of high blood pressure in Blacks: The Scarboro Community Study. Proc. 2nd Int. Conf. on Hypertension in Blacks. Morehead College, Atlanta, GA

Cohen, J., G. Holdsworth, C. Hassan and T.J. Savin. 1997. A Case Study: A Decision Analysis Methodology for Choosing Among Drinking Water Disinfection Strategies. U.S. EPA Workshop on Comparing Risks from Disinfectant By-Products (DBPs) and Microbes in Drinking Water. Cincinnati, Ohio.

Holdsworth, G., M.S. Johnson and E.R. Janus. 2001. Wildlife Toxicity Assessment for 2-Amino-4,6-dinitrotoluene and 4-Amino-2,6-dinitrotoluene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ113801C. Aberdeen Proving Ground, MD. August, 2001.

Salice, C.J. and G. Holdsworth. 2001. Wildlife Toxicity Assessment for 1,3-Dinitrobenzene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ113801. Aberdeen Proving Ground, MD. October, 2001.

Salice, C.J. and G. Holdsworth. 2001. Wildlife Toxicity Assessment for 1,3,5-Trinitrobenzene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ113801B. Aberdeen Proving Ground, MD. November, 2001.

Holdsworth, G., M.S. Johnson and M.S. Hawkins. 2001. Wildlife Toxicity Assessment for HMX. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ113801E. Aberdeen Proving Ground, MD. November, 2001.

Holdsworth, G., M.S. Johnson and M.J. McAtee. 2001. Wildlife Toxicity Assessment for Pentaerythritol Tetranitrate (PETN). U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 37-EJ113801G. Aberdeen Proving Ground, MD. November, 2001.

Salice, C.J., G. Holdsworth and E. Janus. 2002. Wildlife Toxicity Assessment for 1,3,5-Trinitrohexahydro-1,3,5-triazine (RDX). U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01B. Aberdeen Proving Ground, MD.

Salice, C.J., G. Holdsworth, H.I. Paulus and M.J. Quinn. 2004. Wildlife Toxicity Assessment for Propylene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ-1138-01N. Aberdeen Proving Ground, MD.

Salice, C.J., G. Holdsworth, H.L. Ilg and M.J. Quinn. 2004. Wildlife Toxicity Assessment for Ethylene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 37-EJ1138-01Q. Aberdeen Proving Ground, MD.

Salice, C.J., G. Holdsworth and M.J. Quinn. 2005. Wildlife Toxicity Assessment for Aldrin. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01J. Aberdeen Proving Ground, MD.

Muneer, A., C.J. Salice, G. Holdsworth, M.S. Johnson and M.J. Quinn. 2005. Wildlife Toxicity Assessment for Benzo(a)pyrene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01P. Aberdeen Proving Ground, MD.

Salice, C.J., H. Paulus, G. Holdsworth, M.S. Johnson and M.J. Quinn. 2005. Wildlife Toxicity Assessment for Chlordane. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 87-MA02T6-05A. Aberdeen Proving Ground, MD.

G. Holdsworth, H.L. Ilg and M.J. Quinn. 2006. Wildlife Toxicity Assessment for Acetylene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01L. Aberdeen Proving Ground, MD.

G. Holdsworth, H.L. Ilg and H.T. Bausum. 2006. Wildlife Toxicity Assessment for Phenanthrene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01K. Aberdeen Proving Ground, MD.

Muneer, A., C.J. Salice, G. Holdsworth and M.J. Quinn. 2007. Wildlife Toxicity Assessment for Thallium. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01O. Aberdeen Proving Ground, MD.

Pamela S. Whitson
Scientific Programmer/Analyst
Oak Ridge Associated Universities

Education

B.S. Degree Communications, major in Advertising, The University of Tennessee, 1972
M.S. Library and Information Science, The University of Tennessee, 1993
A.S. Health Information Technology, Roane State Community College, 1999

Certifications

Certified Tumor Registrar, National Cancer Registrars Association, 1995
Registered Health Information Technician, American Health Information Management Association, 1999
Registered Health Information Administrator, American Health Information Management Association, 2000

Positions

Oak Ridge Associated Universities **2012-present**
Scientific Programmer/Analyst, Center for Epidemiologic Research

Develop, maintain, and execute software to produce timely and accurate analysis data for the Illness and Injury Surveillance Program; develop queries to research ad-hoc requests
Maintain bibliographic function and data integrity in the Comprehensive Epidemiologic Data Resource
Research, develop, design, and implement electronic methods for scanning and retrieval of archived information

Oak Ridge Associated Universities **1989-2012**
Research Associate, Center for Epidemiologic Research

Provided editorial and research support to epidemiologic surveillance project, including data analysis and verification and writing and editorial review of technical site reports
Provided information support to research staff, including developing and implementing document control systems for both hard copy and digital records

Oak Ridge Associated Universities **1986-1989**
Administrative Program Specialist

Provided program support in processing contracts, travel, and work assignments for safety experts

East Tennessee Children's Hospital **1984-1986**
Medical Record Technician/Medical Transcriptionist

Analyzed medical records for completeness and maintained patient and diagnostic indexes.
Produced medical and administrative reports and established procedures for tracking and locating reports.

**The University of Tennessee, Energy, Environment, and Resources Center
Research Assistant**

1982-1984

Analyzed and coded information for inclusion in the Research In Progress Data Base for the U.S. Department of Energy
Served as liaison with the computer programmer for fine refinements
Coordinated the analysis and coding of research records for production of computer-generated publications.

**Tennessee Valley Authority
Editorial Assistant**

1974-1982

Prepared text and tabular material for employee publications and technical manuals
Performed layout and paste-up of text and graphics in preparation for offset printing of publications
Responsible for writing and editing division policy statements

Synergistic Activities

Ms. Whitson has several years experience as an information management coordinator in support of epidemiologic research. Her responsibilities include developing and implementing systems for storage and retrieval of research documents; abstracting and coding of morbidity data for use in epidemiologic research; and providing writing and editorial support for epidemiologic surveillance reporting projects. These projects utilize Microsoft Office, 3M Codefinder, ProCite, and SAS software. Her experiences include project management, developing coding quality standards, developing health data abstraction tools and procedures, and providing medical record and cancer registry technical support. She is a Certified Tumor Registrar from the National Cancer Registrars Association and a Registered Health Information Administrator from the American Health Information Management Association.

Phillip W. Wallace
Manager, Information Technologies
Oak Ridge Associated Universities

Education

B.S., Industrial Management, University of Tennessee, 1974

M.B.A., Management, University of Tennessee, 1975

Positions

Oak Ridge Associated Universities
Center for Epidemiologic Research
Manager, Information Technologies

1984-present

Serve as Manager of Information Technology for Occupational Exposure and Worker Health program. Responsibilities include ensuring compliance to Federal government cyber security requirements, overseeing activities of software developers, and maintain integrity of data holdings within OEWH.

Served as Manager of Information Technology for project network supporting and performing dose reconstructions as part of EEOICPA compensation efforts. Currently provide advice to subordinate manager who oversees this operation.

Oversaw the design and implementation of the DOE Beryllium Registry (10 CFR 850) and currently oversee the routine operation, work with DOE HQ staff on requirements, work with DOE sites to provide guidance on data submissions, and provide analyses of the data to DOE HQ.

Oversee the daily operation of the DOE Illness and Injury Surveillance program; interact with DOE HQ staff to review program status and plan future directions; oversee the functions of receiving data and returning errors to the submitting site, creating special reports as required, and working with sites to assess health situations as specified by the site Occupational Medicine Director.

Hands-on experience supporting epidemiologic studies through software development and data manipulation

Maintain validity and integrity of data on over 400,000 DOE workers.

Create tables containing over 4,000,000 dosimetry records, ensuring quality for use in health studies.

Lockheed Missiles and Spacecraft Corporation **1983-1984**

Manager, Space Telescope Management Information System Project

Directed computer science efforts on project for building NASA space telescope.

Systems Development Corporation **1980-1983**

Manager, Computer Systems

Directed programming efforts on project management for DOE's Gas Centrifuge Enrichment project.

Union Carbide Corporation, Nuclear Division **1978-1980**

Programmer/Analyst

Responsible for software that tracked nuclear material shipments across DOE and NRC facilities

Burroughs Corporation **1975-1978**

Programmer/Analysts and Software/Technical Representative

Provided technical assistance to sales force

Selected Publications

Wallace PW. Project management using information systems. Presented at the American Society for Engineering Management 4th Annual Meeting, October 1983.

Dupree EA, J Watkins, JN Ingle, P Wallace, and C West. Risk of lung cancer among uranium processing workers. American Journal of Epidemiology 1993; 138:640 (abstract).

Groer PG, CA Pereira, and PW Wallace. 1989. Weight of evidence analysis of lung cancer in Colorado Plateau uranium miners. In: Proceedings of the 14th L. H. Gray Conference on Low Dose Radiation: Biological Bases of Risk Assessment.

Payne D, J Reagan, and P Wallace. Data Modeling of Scientific Data. In: Proceedings of the 1991 International Oracle Users Group Conference.

Fry SA, EA Dupree, AH Sipe, DL Seiler, and PW Wallace. 1992. A study of mortality and morbidity among persons occupationally exposed to >5 rem (>50 mSv) in a Year. Phase I: Mortality, through 1984. Applied Occupational and Environmental Hygiene suppl.; March 1996.

Dupree EA, JP Watkins, JN Ingle, PW Wallace, CM West, and WG Tankersley. 1995. Uranium Dust Exposure and Lung Cancer Risk in Four Uranium Processing Operations. Epidemiology; 6:370-375.

Synergistic Activities

Extensive direct experience in working with epidemiologists, biostatisticians, and health physicists in the area of health studies and dosimetry data assessments, writing software routines, developing algorithms, and documentation.



Managing the Computer Science section of the ORAU Center for Epidemiologic Research for 27 years.

Advising the IT effort of the NIOSH Dose Reconstruction project for ORAU since project startup

Ensuring data quality and integrity in all facets of IT tasks for CER

Applying experience with related activities and DOE to achieve optimally designed application systems that fit program needs

ANTHONY W. CREECH, P.G.
Section Manager, Groundwater & Geology**EDUCATION**

B.S., Geology, College of William and Mary, 1982

Post-Graduate Study, Geology, Old Dominion University, 1982-1984

PROFESSIONAL REGISTRATION

Professional Geologist: Virginia-No. 0943,

PROFESSIONAL AFFILIATIONS

Solid Waste Association of North America (Board Member)

SUMMARY OF EXPERIENCE

Mr. Creech has over 23 years of progressive experience in geology, hydrogeology, due diligence, solid waste, health and safety, and environmental compliance management, research, and evaluation. Mr. Creech supervises all geology efforts in the company.

His areas of expertise include geologic and hydrogeologic studies (e.g., water supply investigation, landfill siting and monitoring), site characterization, risk assessment, corrective action plans, environmental site assessments, and environmental compliance auditing. He acts as program manager for all groundwater related activities performed by the company, including monitoring programs (landfills, petroleum storage facilities, wastewater treatment facilities, etc.). Mr. Creech developed and maintains written protocols for QA/QC, statistical analyses, and training of field personnel. He has provided expert witness testimony involving real and/or alleged contamination of property. He also represented clients to county boards, planning commissions, public hearings, and various regulatory entities, including the VDEQ, VDH, and EPA.

DETAILED EXPERIENCE**Water Resource Management**

Mr Creech leads Resource's efforts to work with water users in encouraging, promoting, and protecting water resources. These efforts



include the evaluation and development of incentives for alternative water sources such as reuse water; water supply inventory and future planning, source protection, and regional cooperation.

Environmental

Project manager on water resource investigation and resource protection projects for local governments throughout Virginia, including groundwater withdrawal permitting and recharge area delineation.

Project manager on various environmental investigations conducted at commercial/ industrial sites throughout Virginia.

Project Manager for ongoing groundwater and gas monitoring programs at more than 25 landfill sites throughout Virginia. Responsibilities include development of and personnel training for monitoring protocols; design standards for monitoring wells; confirmation procedures upon detection of decomposition gases; and corrective action measures.

Project Manager for Environmental Compliance Audits conducted at commercial/industrial facilities throughout the United States. Mr. Creech has conducted audits in over ten states at facilities including printers, bakeries, textile plants, power stations, and correctional centers.

Project Manager for open-end master contract for underground storage tank response for

Virginia Department of Environmental Quality. Responsible for all aspects of UST projects including alternate water supply studies, site characterizations, remediation assessments, and corrective action plans.

Manager of all UST projects for commercial and private clients. Responsible for administration of sub-contractors, health and safety and environmental quality assurance/quality control. Mr. Creech insures that all petroleum contaminated soils are handled consistent with RCRA guidelines, and that appropriate permits (e.g., NPDES, Air Emissions) are maintained for on-site remedial activities.

Manager of environmental site assessment program. has performed or supervised hundreds of ESAs throughout the Commonwealth of Virginia. Responsibilities have included site characterization (Phase II) and remediation design and implementation.

Provided soil and hydrology expertise on wetland delineation and similar projects throughout Virginia and North Carolina, including planned highway routes and an 1800-acre power plant site. He is familiar with the varied soil taxonomy protocols of the USDA, USCOE, USGS and ASTM, and can field identify hydric and other soils accordingly. In addition, Mr. Creech has installed or supervised installation of hundreds of observation wells and piezometers, including wells on wetland investigation sites.

While director of a division of a national testing laboratory, conducted all aspects of laboratory management, including hiring and training, QA/QC, profitability, and field sampling procedures.

North Carolina

For projects for the North Carolina Department of Transportation, conducted geologic evaluations. He provided services such as installation of monitoring wells and piezometers, permeability studies, wetland soils identification, and hydrogeologic profiles associated with potential wetland mitigation sites.

Managed several environmental studies at Jockey International's former facility in Cedar Falls, North Carolina. These projects included Phase I environmental site assessment, oversight of the removal of a 10,000 gallon aboveground storage tank, installation of monitoring wells, and collection/evaluation of soil and groundwater samples related to a potential transformer release and to a former chemical storage area.

Project Manager for several environmental investigations performed for Dominion North Carolina Power at power stations and district offices throughout North Carolina.

Solid Waste

Project Manager for ongoing groundwater and gas monitoring programs at more than 25 landfill sites throughout Virginia. Responsibilities include development of and personnel training for monitoring protocols; design standards for monitoring wells; confirmation procedures upon detection of decomposition gases; and corrective action measures.

Has provided Part A Applications and Notice of Intent for several sanitary landfills.

As a member of the Solid Waste Association of North America, has provided training to landfill operators in groundwater monitoring programs.

Has presented several papers on landfill groundwater statistical evaluation, release monitoring, and surface water evaluations to the Ground Water Protection Council.

Petroleum Storage

Project Manager for UST projects for commercial and private clients, including UST closure, site characterization, risk assessment, alternate water supply studies, and corrective action. Responsible for the administration of sub-contractors, health and safety and environmental quality assurance/quality control.



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Insures that all petroleum contaminated soils and waters are handled consistent with RCRA guidelines, and that appropriate permits (e.g., NPDES, Air Emissions) are maintained for on-site remedial activities.

Project Manager for open-end master contract for underground storage tank response for Virginia Department of Environmental Quality. Responsible for all aspects of UST projects including alternate water supply studies, site characterizations, remediation assessments, and corrective action plans.

Project Manager for OPA '90 plan for bulk storage and pipeline system in central Texas.

Prepared SPCC and ODC Plans for petroleum storage facilities throughout Virginia.

Groundwater Withdrawal

Project Manager for multiple municipal Groundwater Withdrawal Permit Applications for County's in Virginia Coastal Plain (including King William and New Kent Counties, in which water supply planning and aquifer protection has become critical).

Project Manager for Ground Water Withdrawal Permit application, and subsequent renewal for clay quarry in King William County, Virginia.

Project Manager for Ground Water Withdrawal Permit application for golf course in York County, Virginia.

Project Manager for Ground Water Withdrawal Permit application for landfill gas to energy facility in Charles City County, Virginia.

Provided detailed geologic assessment of potential risk of impact to groundwater well located in a Superfund remediation site in Westmoreland County, Virginia.

Environmental Compliance Auditing

Conducted industrial environmental compliance audits at facilities in Washington, Texas, South Dakota, Tennessee, South Carolina, New

Jersey, West Virginia, North Carolina, Virginia, the District of Columbia, Delaware, Maryland, and Jamaica.

Project Manager of a detailed environmental compliance audit program of over 20 correctional facilities for the Virginia Department of Corrections.

Provided Environmental Compliance Audits for Jockey International, Weston Foods, Dominion Generation, the Virginia Department of Corrections, and several other industrial clients.

JOHN L. COMBS, P.E.
Executive Vice President**EDUCATION**

B.S., U.S. Military Academy, 1967
M.E., University of Virginia (Civil Engineering), 1973
MBA Program, University of Richmond, 1975-1979
MA Program Liberty University, (2011-2013)
Graduate, Virginia Certified Planning Commissioners' Program

APPOINTMENTS***Commonwealth of Virginia***

Appointed by the Governor
Board for Architects, Professional Engineers, Land Surveyors, Certified Interior Designers and Landscape Architects (2010-2014 term)

Hanover County, Virginia

Former Member & Chair of Planning Commission

PROFESSIONAL REGISTRATION

Professional Engineer: Virginia, Maryland
Member, American Society of Civil Engineers

SUMMARY OF EXPERIENCE

Mr. Combs has been a registered professional engineer in Virginia since 1973 and in Maryland since 1975. He has been providing professional planning and engineering services since 1973 to the present.

In 1979, Mr. Combs co-founded and continues to serve as a managing principal of Resource International, Ltd. ("Resource"). Resource provides professional consulting services to private individuals and companies, Fortune 500 companies, and to local, state and federal government. The firm's services include civil and environmental engineering, land planning, land surveying, environmental compliance and permitting, construction administration, construction claims analysis and expert witness testimony.

Mr. Combs' areas of expertise include the **engineering design** and construction of municipal and industrial wastewater treatment and water supply facilities, public utility water and wastewater lines, roads and infrastructure. Also, **environmental** compliance and permitting; environmental impact assessments and statements (EIA/EIS); environmental contamination assessments and remediation; **land use planning; comprehensive municipal planning**; design and development; and construction claims analysis and **expert witness** testimony.

**FEATURED EXPERIENCE****Land Use Planning**

Principal planner for the preparation of the conceptual development plan for the 350 acre Kings Charter PUD, Hanover County. The mixed use project consisted of approximately 250,000 square feet of commercial retail and office space; and approximately 1,100 single and multifamily housing units.

Principal planner for the preparation of the conceptual development plan for the 190 acre Lewistown Commerce Center (now called Winding Brook), Hanover County. The project is commercial retail and destination use, e.g., Bass Pro.

Principal planner for the preparation of the conceptual development plan for the 240 acre Bell Creek Development. The project included a 128+ acre cut out parcel for the Totopotomoy Creek Battlefield at Rural Plains (donated to the National Park Service); 170 acres of commercial retail, office and light industrial; 3,900 single and multifamily housing units.

Principal planner for the preparation of the conceptual development plan for the 3,500 acre New Kent PUD. The project included a 344 acre cut out parcel for the Colonial Downs Horse Race Track complex (for which planning services were also provided), 400,000 square feet of commercial industrial development, and 3,900 single and multifamily housing units.

Principal planner for the preparation of the conceptual development plan for the 2,400 acre New Kent Vineyards PUD. The project included a 50 acre winery and vineyards complex, 2,000,000 square feet of commercial



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retail and office development, and 2,400 single and multifamily housing units.

Comprehensive Municipal Planning

As a past Chairman of the Hanover County, Virginia, Planning Commission, conducted over 30 public hearings and public information meetings on controversial issues. Topics included rezonings, comprehensive land use plan changes, road corridor locations, land use ordinance changes, and growth management plans.

Routinely assist counties and towns on planning issues such as small area plans, corridor plans, and revisions to zoning and subdivision ordinances.

Engineering Design, Permitting and Construction

Principal-in-Charge for the firm's annual contract with the Virginia Department of Environmental Quality. Services provided included the identification, containment, modeling and remediation of ground and surface water contamination.

Principal-in-Charge and Project Manager for the civil engineering and surveying services for the 344 acre Colonial Downs pari-mutuel horse race track complex in New Kent County, Virginia. Services included site plan preparation, environmental studies, storm water management, and the design and permitting of the County's Chickahominy Wastewater Treatment Plant.

Project Manager and Principal Design Engineer for the Hanover County, Virginia, Doswell Water Treatment Plant and associated intake, transmission and storage facilities.

Project Manager and Principal Design Engineer for the Hanover County, Virginia, Doswell Wastewater Treatment Plant and associated collection and discharge facilities.

Principal-in-Charge and Project Manager for the civil engineering and environmental feasibility studies for the 6,500 acre Del Webb planned retirement community in New Kent County, Virginia.

Principal-in-Charge and Project Manager for the preparation of the master utilities infrastructure plan, design and construction administration for the 3,000 acre New Kent Planned Unit Development in New Kent County, Virginia.

Principal-in-Charge and lead consultant for the Environmental & Civil Engineering Feasibility Study for a 5,900+ acre planned residential community to be located in Virginia. Upon its ultimate completion, the project will require the delineation of over 240,000 linear feet of wetlands, the permitting and construction of almost \$2 million of wetlands mitigation, Phase IA archeological studies, and threatened and endangered species surveys. Also, approximately \$195 million in roads, water and sewer utilities, and stormwater management facilities will be required.

Principal-in-Charge for the North Carolina Department of Transportation open end environmental contract. This contract is for the selection, planning and permitting of wetland mitigation sites required by unavoidable wetlands impacts during road construction. Since 1995, Resource has successfully planned and permitted over 10,000 wetland mitigation acres, ranging from coastal marsh to Piedmont upland hardwood forest.

Construction Claims Analysis & Expert Witness Testimony

U. S. Department of the Air Force Langley Air Force Base, Virginia.

Principal construction claims investigator and expert witness for the Air Force on construction change order claim for unsuitable material removal and replacement.

Hanover County, Virginia

Principal expert for the County concerning private group legal suite against the County for wastewater treatment plant discharge permit violations.

Hanover Group, LLC and Hanover County, Virginia

Expert witness for plaintiffs in private group legal suit against the plaintiffs for extension of wastewater collection lines to serve new development consistent with the County's Comprehensive Plan. *Federal Court.*

Town of Orange, Virginia

Expert witness for the Town in private development legal suit against the Town for alleged violations in administering the Town's site plan ordinance.

Colonial Downs Holdings, Inc.

Expert witness for the plaintiff in arbitration to settle construction claims of general contractor.

MICHAEL E. FIORE, P.E.
President**EDUCATION**

B.S., Civil Engineering, Notre Dame, 1965

M.S., Civil Engineering, Notre Dame, 1967

Graduate Studies, Virginia Commonwealth University, 1979-1980

PROFESSIONAL REGISTRATION

Professional Engineer: Virginia, Pennsylvania, South Carolina, North Carolina, Michigan, Illinois, New Jersey, Kentucky, Georgia, Florida, Mississippi, Ohio, Indiana

PROFESSIONAL AFFILIATIONS

*National Society of Professional Engineers
American Water Works Association
Water Environment Federation
Virginia Society of Professional Engineers*

SUMMARY OF EXPERIENCE

Mr. Fiore has over 44 years of management and engineering experience. Since 1979, Mr. Fiore, co-founder and President of Resource International, Ltd., has served as Principal-in-Charge of engineering and environmental engineering projects, ensuring both dedicated resources of the firm and quality assurance of deliverables. Mr. Fiore's areas of expertise include civil engineering; solid waste facility design; design of over 50 sanitary landfills; solid waste facility permitting; leachate and landfill gas treatment; landfill gas flaring and gas energy recovery systems; transfer station design and operation; resource/energy recovery; recycling; groundwater monitoring; landfill closure and post closure; regulatory liaison; compliance and enforcement negotiation; commercial and industrial development; water supply; wastewater systems; storm water management; environmental impact; industrial waste treatment and disposal; regional planning and resource management; and financial and technical feasibility analysis.

**DETAILED EXPERIENCE****Solid Waste Management/Energy Recovery**

Principal-in-Charge of over 100 solid waste facility planning, design and permitting projects including landfills, energy recovery, recycling and materials recovery, waste transfer and waste processing.

Principal-in-Charge of Sub-title "D" landfill projects. Projects for municipal, regional and private clients range in size from 40 to 2,000 tons per day for more than 25 separate landfills.

Project experience includes; waste-to-energy, waste tire processing and disposal, medical waste systems, landfill gas to energy system design and construction, containment plume migration, groundwater monitoring, industrial and special waste handling and regulatory liaison.

Solid waste management experience includes waste collection and transfer, transfer station permitting and design, recycling program development financial analysis, disposal alternative studies, revenue stream analysis, waste characterization, and operations support.

Served on the Virginia State Advisory Committee for Solid Waste Regulations.

Served on the Virginia Solid Waste Facility Operator Certification Board as a test advisor.

Past instructor of Virginia Solid Waste Facility Operator Training Course.

Federal

Project Manager for Air Force Headquarters - Environmental control handbook prepared for base commanders and environmental personnel dealing with air, water, solid waste, recycling, waste minimization.

Principal-in-Charge of industrial and municipal water and wastewater facility planning design and operation projects. Industries served include fertilizer, food, metal finishing, tobacco, paper and petroleum. Governmental clients include regional authorities, local government, state government and federal government.

Project Manager for the Department of Energy - Savannah River Plant - Landfill evaluation to define regulatory compliance and operational studies for non - hazardous waste.

Principal-in-Charge of environmental planning projects including industrial plant siting, environmental compliance analyses, air permitting, regional solid waste and water quality planning.

Project manger for Air Combat Command, Langley Air Force Base - Presentation to environmental committee regarding solid waste recycling and waste minimization issues.

Project Engineer for USEPA - effluent guideline study for Carbon Black Industry.

Industrial/Commercial

Principal-in-Charge of industrial waste facility planning design and operation projects. Industries served include fertilizer, food, metal finishing, waste management, tobacco, paper manufacturing, pharmaceutical, building materials, and petroleum.

Principal-in-Charge of industrial solid waste facility planning, design and permitting projects including landfills, energy recovery, recycling and materials recovery.

Industrial solid waste management includes: waste characterization and minimization;

industrial landfill permitting, design, and construction; fly ash disposal; waste reuse and recycling.

Industrial site engineering includes: storm water management, drainage design, wetlands permitting and mitigation; master site planning and local permitting.

Industrial water supply to include well supply, water storage fire flow, water reuse, and permitting.

Governmental clients include regional authorities, local government, state government and federal government.

Wastewater

Principal-in-Charge for 38,000 gallon per day spray irrigation wastewater treatment facility in operation since 1992.

Principal-in-Charge of wastewater collection system, wastewater pumping facilities, and water distribution and storage system for four (4) Industrial Parks.

Principal-in-Charge of wastewater collection and treatment feasibility analysis and Farmers Home Administration Grant for 2 ½ mile sewerage collection system and 100,000 gpd SBR Treatment plant.

Principal-in-Charge for wastewater collection treatment and water distribution feasibility study for King William County's Central Garage area.

Principal-in-charge for Master Sewer Plan for Westmoreland County and rehabilitation engineering for 50,000 gallon elevated water storage tank.

JAMES L. RUDNICKY
Project Scientist**EDUCATION**

M.S., Forestry, University of Massachusetts, 1984

B.S., Forestry, University of Massachusetts, 1981

Post-Graduate Studies, Forest Ecology, University of Maine, 1992

PROFESSIONAL REGISTRATION

Completed: Stream School and Save Our Streams Methodology, Virginia Save Our Streams, 2005

Completed: Perennial Stream Identification Workshop, Virginia's Chesapeake Bay Local Assistance Department, 2004

Completed: Erosion Control for Coastal Environments, International Erosion Control Association, 2002

Completed: Basic Plan Review, Virginia Department of Conservation and Recreation, 2001

Completed: Basic Erosion and Sediment Control, Virginia Department of Conservation and Recreation, 2001

Completed: Local Storm Water Management and Erosion Control, International Erosion Control Association, 2001

Completed: Stream Restoration, Virginia Department of Forestry, 2001

Completed: Management Planning, Virginia Department of Conservation and Recreation, 2001

Completed: Revised Universal Soil Loss Equation (RUSLE), USDA Natural Resources Conservation Service, 2000

SUMMARY OF EXPERIENCE

Mr. Rudnický has over 25 years of experience in natural resource studies and management, primarily in urbanized areas in the Mid-Atlantic and Northeast. During this time, he has worked for local, state and federal government agencies. Mr. Rudnický was a Research Assistant at The Institute of Ecosystem Studies, which is an internationally prominent research organization of The New York Botanical Garden. In this position, he assisted on studies



on the long-term effects of human use and management on urban forests in New York City. Mr. Rudnický was also a Visiting Lecturer at the University of Massachusetts where he co-taught Advanced Forest Ecology and conducted a research project examining management options for preserving habitat for threatened bird species for the National Park Service. In Virginia, Mr. Rudnický developed management plans for rare wetland communities for Virginia's Division of Natural Heritage. He also served as a District Manager for a Soil and Water Conservation District that promoted and provided financial assistance for the installation of land practices to prevent water pollution. As a Project Scientist, Mr. Rudnický works with government agencies, landowners and developers on environmental regulations pertaining to land development.

DETAILED EXPERIENCE**Wetland Monitoring and Restoration**

- Has successfully obtained local, state and federal permits for developments on single family lots, industrial facilities and large subdivisions that impacted environmental features.
- At the 1,200-acre Farms of New Kent subdivision and golf course, obtained state and federal permits to impact wetlands. The compensation plan utilized a combination of preservation and wetland bank purchases to reduce mitigation costs by half.

- Prepared wetland remediation and monitoring plans for a residential and golf course development. The plans were developed in co-ordination with state and federal agencies. Activities included a stream channel restoration that required vegetation, biological and stream channel monitoring to reach success criteria. Prepared a joint permit application (JPA) to obtain federal permit for conducting stream restoration work.
- Assisted with the development of an innovated compensation plan for a mixed-use commercial development in Hanover County, Virginia. The plan utilized a combination of an innovated Low Impact Development facility and preservation that reduced mitigation costs over \$100,000.
- Has monitored construction activities on multiple sites to ensure compliance with environmental regulations. Prepared construction monitoring reports for state agencies as required by environmental regulations.
- Has designed monitoring and restoration studies in swamps, bogs, barrier islands, fens, pocosins and other unique wetland habitats throughout Virginia, New York, Massachusetts and Maine. Some of these projects have included groundwater monitoring.
- Has assisted with developing management activities, including monitoring, for state and nationally threatened and endangered plant, animal and bird species.
- Has assisted the U.S. Army Corps of Engineers and the Virginia Department of Environmental Quality on identifying wetland violations and the restoration of the impacted areas.
- Has assisted James City County with creating and restoring wetlands around stormwater ponds through bank stabilization, plantings and debris removal.
- Has delineated wetlands on multiple sites throughout Virginia.
- Has prepared and reviewed Joint Permit Applications for projects proposing to impact wetland and waters.
- Reviewed a commercial plan to enlarge an existing dam, install a roadway and expand a downstream wetland for an improvement of the Stafford County Airport.

Wetland Mitigation Banking

- Prepared and given presentations to the Interagency Review Team (IRT) that led to the approval of potential mitigation banks.
- Prepared Mitigation Banking Instruments (MBI) that led to approval of mitigation banks by the IRT. Prepared JPAs for federal permits to allow work at the banks.

Stream Assessment and Restoration

- Has attended perennial stream assessment workshops conducted by Virginia's Chesapeake Bay Local Assistance Board and Virginia's Department of Conservation and Recreation. Has conducted numerous perennial stream assessments throughout Virginia since the year 2000.
- Has attended stream restoration workshop conducted by Virginia's Department of Forestry.
- Has conducted the latest version of Stream Impact and Compensation Assessment (SICAM) for proposed developments.
- Has training for biological and chemical monitoring of stream water quality.

Chesapeake Bay Preservation Act Activities

- Inspected developments within James City County to ensure compliance with the Chesapeake Bay Preservation Ordinance.
- Has reviewed Resource Protection Area restoration plans and inspected sites for compliance with approved plans.
- Field delineated Resource Protection Area boundaries and confirmed accuracy of boundaries identified by others.
- Managed a nutrient and sedimentation reduction program in the Fredericksburg area. This work included developing and providing educational activities.
- Was a member of the Stafford County Stormwater Management Technical Review Committee and has participated on working

groups for the Rappahannock and York River Watershed Management groups.

- Assisted in developing workshops for local- and state-level government staff on land disturbing programs and Low Impact Development.

Government Agency Activities

- Has been employed by local, state and federal agencies, including the U.S. Forest Service, National Park Service, Virginia's Department of Conservation and Recreation, Tri-County/City Soil and Water Conservation District and James City County.
- Has managed projects requiring coordination between multiple agencies, non-profit groups and private citizens.
- Has negotiated co-operative agreements between government agencies and private citizens.
- Has assisted federal and state agencies with processing wetlands, Chesapeake Bay Preservation and landfill violations.
- Has reviewed development plans and conducted field inspections for compliance.
- Has prepared and presented applications to multiple Wetlands Boards.
- Has prepared and presented projects at Board of Supervisor and City Council meetings.
- As a District Manager, worked directly under a citizen-elected Board of Directors. Successfully prepared grants to support District activities. Annually managed funds in excess of \$200,000 that supported District's operations, including a cost-share program to assist local landowners with land conservation practices.



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STEVEN F. CHURCH

Staff Engineer

EDUCATION

B.S., Mechanical Engineering, Norwich University, 1983

M.S., Civil Environmental Engineering, Virginia Polytechnic Institute and State University, 2001

SUMMARY OF EXPERIENCE

Mr. Church has experience in Civil/Environmental Engineering fieldwork, design, construction administration, inspection, and review for municipal and state clients in Virginia and West Virginia. He has directly contributed to the successful completion of major projects by: providing field investigations and site inspections; water and sewer system data collection, conceptualization and design; authoring technical studies, system characterizations, and project reports; and coordinating the needs and requirements of municipalities, private companies, and private citizens.

Also, he has over 18 years of experience completing major analytic studies and technical writing projects for the U.S. Department of Defense (DoD) and U.S. Congress, and completing the technical, financial, and administrative program management tasks associated with those projects.

DETAILED EXPERIENCE

Water Supply Systems

Utilities Design Engineer on a company team supporting a 345-acre site development in New Kent County, Virginia that included a 975,000 gpd water demand, two water supply wells, a 1,000,000 gallon water storage tank, and 24-inch distribution mains. Designed the water supply and distribution system using distribution system modeling software. Contributed designs for the wastewater collection and transport system which included gravity sewer system, pump station, and force main modeling. Completed a Master Utility Plan for developer and county evaluation and approval. Managed CAD personnel for the production of all

construction plans. Managed contract bid document production and bid solicitation.

Design Engineer of municipal water supply improvements for the Berkeley Beach and Ebb Tide Beach areas in Westmoreland County, Virginia. Water distribution system computer modeling was completed to support the local water supply company's upgrade and expansion goals. The modeling effort incorporated the system's three water wells, 20,000 gallon atmospheric storage tank, three hydropneumatic tanks, and approximately 44,000 linear feet of distribution pipe to assess the benefit of installing an additional 20,000 gallon storage tank. The modeling environment was validated against field tests of the operating system.

Lead Design Engineer of alternative water supply systems to serve a proposed 570 acre intermodal transportation facility in Isle of Wight County, Virginia. A water distribution model was configured that evaluated the demands, water pressures, and fire flow requirements imposed by the existing and proposed system connections. Multiple existing water supply tanks were modeled iteratively with proposed water supply tank capacities and locations. Viable solutions that satisfied complex hydraulic grade and flow criteria were presented.

Lead Design Engineer of new municipal water supply and wastewater collection systems for Mount Olive, Virginia. The water supply system included a new 10,000 gallon storage tank, a hydropneumatic tank, two booster pumps, and 17,000 feet of distribution pipe. The sanitary sewer collection system included individual septic tank effluent pumps and 5,500-feet of force main piping. Engineered the water distribution system and sanitary force main routing and sizing using computer modeling tools. Wrote the system technical specifications and coordinated with state agencies and municipal utilities for design review and acceptance. Managed CAD personnel for the production of all construction plans. Managed contract bid document production and bid solicitation.

Lead Design Engineer for an 800-foot long 8-inch water line extension in Ashland, Virginia.

Work included tying into an existing water line and coordinating with state and local officials, utility companies, and property owners regarding easements, existing utilities, and system alignment and depth. Managed CAD personnel for the production of all construction plans.

Lead Design Engineer of municipal water and wastewater system capital improvements (through extensions) to the existing utilities in the Town of LaCrosse, Virginia. Completed a quality assurance review of the plans depicting the existing water and wastewater systems. Reviewed, evaluated and rationalized historical engineering data, and managed CAD personnel to produce comprehensive and up-to-date system plans. Engineered incremental, phased extensions of the existing water and wastewater networks using municipal pipe system computer modeling software.

Review Engineer for a water supply project in Westmoreland County, Virginia. The system included a new water supply well, well house, and 6,000 feet of small-diameter distribution piping. Work included modifying and improving previously completed construction plans and technical specifications in response to prior state agency reviews. Managed CAD personnel for construction plan revisions. Managed contract bid document production and solicitation.



EDWARD J. HOLLOS, P.E., BCEE
Group Manager, Solid Waste**EDUCATION**

B.S. - Civil Engineering, Northeastern University, 1968

PROFESSIONAL REGISTRATION

Professional Engineer – Virginia #024258, Delaware #7002, Pennsylvania #20750E, and MD #17127

PROFESSIONAL AFFILIATIONS

American Academy of Environmental Engineers

VA DPOR Board for Waste Management Facility Operators - Writer for Class I & II Tests

PUBLICATIONS AND PRESENTATIONS

SWANA VA Chapter Landfill Gas Management Training Session; Portsmouth, VA; February, 1998; "Overview of Landfill Gas Management".

EIA. W.A.S.T.E. Conference 1996 Washington, DC, October 1996; "What's New in Landfilling".

VMI, Virginia Conference on the Environmental, Lexington, VA; April 1995; "Alternative Daily Covers".

"Should You Consider an Alternative Daily Cover," Virginia Review, 1994.

Association of Engineering Geologists, Carolina Section, Conference on Landfill Issues and New Technologies; Raleigh, NC; May 1991; "Update on Sub-Title D and DSWA Case Studies"

SUMMARY OF EXPERIENCE

Mr. Hollos has over 35 years experience on civil and environmental engineering projects primarily related to the sound and economical management of municipal and industrial solid wastes. His experience includes the development of solid waste management plans; estimating remaining life and/or capacities of solid waste facilities; facility siting studies; Part A and Part B permitting; design of "Greenfield" sites and existing facility expansions



preparation of permit amendments; permit-by-rule (PBR) facilities; and landfill closures; preparation of bidding documents and provision of bid phase services; construction management activities; certification of facility construction; and development of program costs for financial assurance of facilities. In the Commonwealth of Virginia, Mr. Hollos has worked on over 40 municipal waste, CDD, or industrial landfills involving facility permitting, new cell construction, site expansion, closure, post-closure care, environmental monitoring, and operations consulting. These services also included the development of Site Plans for facilities to obtain the necessary local zoning approvals for landfills, recycling facilities, and landfill gas to energy facilities.

DETAILED EXPERIENCE**Municipal Waste Management**

Prince Edward County, Virginia – As Project Manager provides general operations consulting for the County's Subtitle D Landfill. Prepared Contract Documents, Technical Specifications, and Construction Drawings for Cells C and D and the Phase 1 Closure and assisted the County in the public bidding of these projects. Provided construction management services for Cells C and D the Phae 1 Closure and compiled the CQA documentation reports for submittal to DEQ. Prepared minor permit amendment to update technical specifications for geosynthetics used



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in liner and cap construction. Assists the county in updating of Closure/Post-Closure Costs for annual updating of their financial assurance statements; provide information for annual budgeting; review and evaluate requests for disposal of “special wastes” (asbestos containing materials); prepared greenhouse gas (GHG) report demonstrating that the County’s facility does not meet the emissions threshold for reporting to the USEPA under the USEPA Mandatory Reporting Rule.

BFI Waste Industries of Virginia, LLC (Old Dominion Landfill, Henrico County, VA) – As Project Manager provided general consulting services including the preparation of technical specifications and construction drawings for Disposal Cells (Phases 7 and 8) and initial partial closure (Phase 1 Closure). Updated and revised Closure/Post-Closure Costs using actual bid prices for recent construction activities to allow the facility to update its Financial Assurance. Assisted in the preparation of a Part A Permit Amendment application for the expansion of the Old Dominion Landfill.

BFI Waste Industries of Virginia, LLC (King & Queen Landfill, King & Queen County, VA) – As Project Manager provided general consulting services including the preparation of technical specifications and construction drawings for Disposal Cell 2E-5. Prepared two major permit amendments: One for a revised closure cap for the entire landfill and one for an alternate bottom liner for phases that have yet to be constructed. Updated and revised Closure/Post-Closure Costs to allow facility to update its Financial Assurance.

Westmoreland County, Virginia – As Project Manager assists the County in updating its Post-Closure Costs for the annual financial assurance required of this closed landfill; prepared a greenhouse gas (GHG) report demonstrating that the County’s landfill did not exceed the tonnage threshold for reporting to the USEPA. Evaluating “leachate” production rates from the closed facility to include televising and / or smoke testing leachate lines

and storm drain lines to determine nature and source of flows.

Fluvanna County, VA - Project Manager-provided general operations consulting for the County's HB 1205 Landfill including preparation of closure plan; landfill gas monitoring plan; permit amendment for use of alternative daily covers; a Part A Permit Amendment for landfill gas management issues; periodic site inspections; and updating closure/post-closure costs for financial assurance.

Chesterfield County, VA, Shoosmith Brothers Landfill - Provided internal QC review of proposed landfill expansion plans for the Lewis Road Landfill. Involved in the preparation of a minor Part B permit amendment to allow the usage of tire shreds in lieu of stone aggregate for landfill gas recovery wells and leachate recirculation devices; provided training to site operators for recognizing and managing unauthorized wastes that occasionally may be brought to the landfill in collection vehicles.

Prince William County, VA - Project Manager, responsible for the preparation of a Part A Application for a 1000-acre expansion area adjacent to the existing County landfill. Prepared submittal to the DEQ of Part B Permit Application for expansion of the existing county landfill. The design was for a Subtitle D lined facility featuring leachate recirculation capability. The project included meetings with the citizen's oversight committee to discuss the proposed design and response to questions or concerns raised by members of this committee. Also developed preliminary designs and the final design for the upgrade of the public use area at the County's Landfill.

Lynchburg, Virginia – Assisted City personnel in development of its landfill gas (LFG) management program and development of its SSM Plan for its LFG control system.

Montgomery County, Virginia – Assisted County in preparation of construction documents and specifications and construction of an active landfill gas interception system that was



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situated between the County's closed landfill and an adjacent county recycling center.

Sussex County, VA, Atlantic Waste Disposal Inc. – Quality Assurance Engineer for the internal review of drawings and specifications of the initial subtitle D lined municipal waste landfill prior to release of documents for bidding and construction. Project Manager for the internal quality control review of the Part B Permit Amendment Application for the reconfiguration and expansion of the disposal facility and submittal of the Part B Permit Amendment Application to the DEQ for review and approval.

Fairfax County, VA -Quality Control Engineer, provided internal QC review of the design and construction plans for the first section of the Area Three Lined Landfill (ATLL), a double composite lined ash monofill for the I-95 Waste-to-Energy Facility.

Orange Regional Landfill, Chapel Hill, NC: Designed two Subtitle D Lined Disposal Cells, the most recent being an alternate liner design approved by the DNREC. Prepared plans and specifications for a 7-acre Subtitle D disposal cell; construction management oversight, permit amendment application for alternative liner design; and general consulting such as budgeting; updating closure/post-closure costs.

King George County, VA: Provided independent technical review on behalf of the County for the planned waste exhumation project to relocate municipal wastes to the new King George Landfill and Recycling Center.

Petersburg, VA: Provided operations consulting for the City's municipal waste landfill.

City of Salem, VA - Quality Assurance Engineer for the internal review of the Part B Application for a landfill expansion. Project Manager for the preparation of the closure plan and preparation of associated bidding documents and design drawings.

Burke County, NC: QC review of drawings for lateral expansion of County's Sanitary Landfill.

Campbell County, VA: Completed Part B permit application documents for expansion of the County landfill. Prepared bidding documents and construction drawings for the initial two Subtitle D disposal cells in Phase III and provided construction management services for these two cells.

Carroll County, VA: QC review of annual Groundwater Monitoring Report and QC review of drawings for lateral expansion of County's sanitary landfill.

City of Martinsville, VA: QC review of Annual Groundwater Reports.

Greensville County, VA: QC review of proposed Part B permit application documents for expansion of the existing County landfill. QC review of Annual Groundwater Report.

Hanover County, VA: QC review of expansion plans for lined landfill segment between two existing disposal areas and proposed closure plan. QC review of Annual Groundwater Report.

Henry County, VA: QC review of Annual Groundwater Reports.

Louisa County, VA: QC review of Annual Groundwater Reports.

Mecklenburg County, VA: QC review of Annual Groundwater Report.

Orange County, VA: Provided operations consulting services to the County in the operation of its municipal waste landfill.

Rappahanock County, VA: QC review of bidding documents and construction drawings. Operations consulting.

Russell County, VA: QC review of Annual Groundwater Reports.



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Rivanna Solid Waste Authority, Albemarle County, VA: QC review of Master Site Plan, closure plans, bidding documents and construction drawings. Provided general operation consulting. Prepared Part A Application in conjunction with geotechnical firm for expansion of the landfill to adjacent areas of the site.

Delaware Solid Waste Authority (Northern Solid Waste Facility), Kent County, DE: Performed a siting study for the location of a new municipal waste landfill in New Castle County. After a site was selected through a public participation process, prepared permit application package for submittal to DNREC. Since the most politically acceptable site was an active U.S. Army Corps of Engineers (COE) dredge spoil disposal area, became involved in negotiations with the COE. Prepared bidding documents and construction drawings for dewatering of site and construction of separation dike. Prepared bidding documents and construction drawings for the Phase I disposal area which included a maintenance facility, leachate pump station, and tap-in to an 84' sewer force main. Provided construction management.

Delaware Solid Waste Authority (Central Solid Waste Facility), New Castle County, DE: Performed site evaluation study. Prepared permit application package for submittal to DNREC. Prepared bidding documents and construction drawings for the first lined municipal waste landfill in the state of Delaware for areas A and B. Provided construction management services for construction of the disposal area, leachate lagoon, scale and weigh station, maintenance building, access road and upgraded public convenience area.

Delaware Solid Waste Authority (Southern Solid Waste Facility), Sussex County, DE: Prepared permit application package for submittal to DNREC for Cell 2. After receipt of approval from DNREC prepared bidding documents and construction drawings for double-lined disposal cell, two leachate pump stations, and four aboveground leachate storage tanks with lined secondary containment lagoons. Upgraded

entrance road and public convenience area. Provided construction management services.

Sugarloaf Landfill, Luzerne County, PA: Prepared Phase I and Phase II permit applications for submittal to DER. Provided expert witness testimony on behalf of client before Environmental Hearing Board in effort to obtain permit.

Sycamore Landfill, Charleston, WV: Provided QC review of construction drawings and specifications for lateral expansion of this private municipal waste landfill. Researched acceptability of industrial residual waste streams for disposal.

Town of South Boston, VA: Preparation of closure plan for the Town's landfill. Negotiated Letter of Agreement with the DEQ Enforcement Section. QC review of landfill gas management plan. Provided operations consulting.

Western Berks Refuse Authority, Berks County, PA: Design and permitting of three separate disposal cells one of which was a dedicated industrial waste facility. Preparation of bidding documents and construction drawings. Construction management activities. General operations consulting including monthly attendance at Authority Board meetings. Assistance in determining tipping fee adjustments.

York County, PA: Design and permitting activities for County landfill. Operations consulting.

Isle of Wight County, VA: Prepared greenhouse gas (GHG) report for the County demonstrating that their closed landfill facility does not meet the tonnage threshold for reporting to the USEPA.

Industrial and CDD Waste Management

City of Portsmouth, VA: Operations consultation to the City for its CDD landfill. Assisted in preparation of an Environmental Assessment as part of property transfer with the US Navy.



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Assisted in negotiations with the Navy regarding the property transfer. QC review of Annual Groundwater Reports. Preparation of closure plan.

Lynchburg, VA, Internet Foundry – Assisted in the preparation of a Part A permit Application Package for a 50+ acre “Greenfield” landfill site in Campbell County, VA.

Pittsylvania County, VA First Piedmont Corporation – In a quality control capacity, assisted in obtaining major permit amendment for the Phase III disposal area and the preparation of construction drawings and specifications – also provided operations consulting for Phase I Area.

Taylor Road Landfill, Chesterfield County, VA: Preparation of Part A and Part B Applications of the expansion of this CDD facility. QC review of construction drawings and specifications. QC review of Annual Groundwater Reports.

Darbytown Road CDD Landfill, Henrico County, VA: Provided operations consulting services to this privately owned facility. QC review of Annual Groundwater Reports. Development of landfill closure plan.

Charles City Road CDD Landfill, Henrico County, VA: Provided operational consulting services to this privately owned facility. QC review of Annual Groundwater Reports. Development of Landfill Closure Plan.

Incendere Incorporated, Chesterfield County, VA: Assisted client in obtaining "Permit-by-Rule" for a medical waste transfer facility.

Virginia Recycling Corporation, New Kent County, Project Manager for the development of Permit-By-Rule application for a tire shredding and recycling facility.

623 Landfill, Henrico County, VA: Independent consultant review of Part B permit application for this CDD landfill.

Brown-Boveri Corporation, Bucks County, PA: Final closure plan for phase out of industrial

wastewater treatment plant and monitoring of plant demolition and closure.

Franklin County, VA: Franklin County, VA, Shredded Products Corporation – Project manager for the preparation of Part A and Part B landfill permit applications for a “Greenfield” captive industrial waste landfill. (The Part A was prepared in conjunction with a subcontracted geological/hydro geological consulting firm). Also was Project Manager for the preparation of bidding documents and construction drawings for first disposal area (Cell A) and the adjacent automobile shredder plant site and provided construction management services. Also provided internal QC review of bidding document for Cell B constructions.

General Battery Corporation, Berks County, PA: Evaluation of existing industrial waste landfill site.

Carpenter Technology Corporation, Berks County, PA: Assisted with design of industrial waste landfill.

Process Recovery Corporation, Berks County, PA: Peer review of design engineer's Phase II permit application package for this industrial waste facility for foundry wastes.

Ashcake Road Landfill, Ashland, VA; Provide QC review of all landfill related documents associated with construction and operation of the facility.

INGENCO Distributed Energy, Richmond, VA Assisted and assisting INGENCO in obtaining local government approvals (Site Plans and CUPs) for eight different landfill gas to energy (LFGTE) projects in Henrico County, VA; Brunswick Co., VA; Dinwiddie Co., VA; King & Queen County, VA (2); Pulaski County, VA; Wake County, NC; and Pine Grove, PA.

Transfer Stations, Recycling Facilities and Public Use Areas



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Peer Review Consultation

Culpeper County, VA - Project Manager for a solid waste management planning study that included an economic comparison of transfer/out of county disposal of solid waste versus in-county disposal in a county-owned Subtitle D Landfill.

Transylvania County, NC: QC review of proposed upgrade of public convenience center.

City of Virginia Beach, VA: Transfer station study, which included evaluation of compacting versus non-compacting facilities including the number and types of equipment and general layout of the facility.

City of Portland, ME: Preliminary design of a solid waste baling facility and preliminary design of a clay-lined balefill.

Fayette Reclamation, Inc., Fayette County, WV: Evaluation and layout of proposed plant site for the location of a solid waste composting facility.

Warren County, VA: Operations consulting. Preparation of "Permit-By-Rule" application for transfer station, design of transfer station, and preparation of bid documents and construction drawings. Preparation of closure plan and development of bid documents and construction drawings for the landfill closure. Construction management activities related to both the transfer station and the closure. QC review of Annual Groundwater Reports.

Lee County, VA: Performed independent consultant review of an economic study of landfill and transfer station alternatives.

Virginia Recycling Corporation, New Kent County, VA. Obtained permit-by-rule (PBR) from VDEQ for a tire recycling facility.

Proco Company (Tire Recyclers, Inc.), Charles City County, VA. Assisted TRI in obtaining local government approval and VDEQ approval (PBR) for a state-of-the-art used tire processing facility for the shredding and grinding of automobile and truck tires.

Dorrance Township, Luzerne County, PA: Independent consultant evaluation of proposed County landfill site located in the Township.

Douglas Township, Berks County, PA: Independent consultant review of a privately owned municipal landfill on behalf of the Township, which used grant monies for the cost of the review.

Pen Argyl, PA: Independent consultant review on behalf of the Borough of the proposed landfill expansion of the Grand Central Landfill. This work included obtaining state grant monies to pay for a portion of the cost of the review and meeting with DER (now DEP) officials to discuss comments.

Studies and Solid Waste Planning

Cumberland County and Prince Edward County, Virginia – Project Manager for development of the Counties' July 1, 2004 Solid Waste Management Plan and submittal of the Plan to the VA DEQ. Currently involved in updating of the plan.

Northampton County, Virginia – Prepared a study for county officials to assist them in decision making for the future management of solid waste generated within the County. The study provided an overview of systems that were deemed inappropriate for consideration because of excessive capital and infrastructure costs relative to the low waste stream generated within the County. The study focused on continued landfilling of county wastes versus the transfer of wastes to a disposal facility outside the County.

Blair County, PA: Preparation of the County Solid Waste Plan including waste generation surveys, evaluation of potential refuse-derived fuel (RDF) or steam users, evaluation of potential landfill sites, and participation in public meeting and hearings.



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Central Nagatuck Valley Region Council of Governments, Waterbury, CT: Evaluation of municipally and privately owned and operated landfills within the COG region. Prepared solid waste management planning study for the region.

Exeter Township, Berks County, PA: Performed recycling study for the Township. Performed independent consultant review of proposed landfill gas management plans for the Pioneer Crossing Landfill, a private municipal waste landfill located within the township.

Guilford County, NC: Assisted in the performance of a waste transport and hauling survey and the development of a follow-up solid waste collection study.

Maryland Environmental Services: Performed landfill evaluations, waste stream surveys and waste characterization surveys of three eastern shore counties to determine feasibility of a regional waste-to-energy facility.

Morris County, NJ: Evaluation of potential landfill sites and assistance in preparation of the County's landfill siting study.

Southern Schuylkill Council of Governments, Schuylkill County, PA: Preparation of Solid Waste Management Plan. Preparation of Phase I landfill site application for a SSCOG owned and operated landfill.

Water/Wastewater

City of Baltimore, MD: Design, permitting and construction management assistance for two lined sludge storage basins. The basins were lined with a dense graded hydraulic asphalt to sustain truck and heavy equipment traffic during sludge removal operations.

Valley Forge Sewer Authority, Montgomery County, PA: Design of dense graded hydraulic asphalt lined sludge storage facility.

Montrose Sewer Authority, Susquehanna County, PA: Study to determine feasibility of

sewering South Montrose, Pennsylvania, the viability of pumping sewage to the existing Montrose Plant or treating to discharge standards with aerated lagoon.

Town of Orange, VA. Prepared bidding and construction drawings for the construction of a earthen and HDPE lined raw water storage reservoir used as a drought alleviation measure for the Town's water supply; also provided construction management oversight for the facility.

JOHN H. BROOKS, III, PWD
VICE PRESIDENT - ENVIRONMENTAL

EDUCATION

M.S., Biology, University of Richmond, 1997

B.S., Biology with minor in Chemistry, Old Dominion University, 1994

PROFESSIONAL REGISTRATIONS

Virginia Certified Professional Wetland Delineator, No. 3

Certified in Wetland Delineation, the Wetland Program and Office of Continuing Education University College, Ohio State University, 1997

Certified in Intermittent and Perennial Stream Identification for Riparian Buffer Rules – Wetlands/401 Unit North Carolina Division of Water Quality, 1999/2000

Certified in Habitat Evaluation Procedures, Virginia Polytechnic Institute and University (VA Tech), 1999

Certified in Freshwater Wetland Construction, Institute for Wetland & Environmental Education & Research, Leverette, MA, 2001

Certified in Basic Processes of Hydric Soils, Advanced Problems in Hydric Soil Evaluations, and Intensive Field Study of Hydric Soils, North Carolina State University, 2002

Certified in Stream Restoration, Environmental Concern, Inc., St. Michaels, MD, 2003

Certified in Intermittent and Perennial Stream Identification for Riparian Buffer Rules – North Carolina and Virginia, North Carolina State University, Department of Forestry and Wetlands/401 Unit North Carolina Division of Water Quality, 2004

24-hour HAZWOPER Training, 2005

Certified in Rosgen's Applied Fluvial Geomorphology (Level I), Wildland Hydrology, Inc., Watershed Conservation Resource Center Fayetteville, AR, 2007



Certified in Rosgen's Applied River Morphology and Applications (Level II), Wildland Hydrology, Inc., Watershed Conservation Resource Center Fayetteville, AR, 2007.

Certified in Rosgen's River Assessment & Monitoring (Level III), Wildland Hydrology, Inc., Pilot View Resource Conservation and Development, Inc., Dobson, NC, 2009.

PROFESSIONAL AFFILIATIONS

Virginia Association of Wetland Professionals

SUMMARY OF EXPERIENCE

Mr. Brooks has over fourteen years of experience in environmental industry. His technical areas of expertise include wetland delineations, permitting, mitigation banking planning, and design, stream restoration, botany, ecology, limnology, threatened and endangered species studies, **National Environmental Policy Act (NEPA) Documents: Environmental Impact Statements (EIS), Environmental Assessments (EA), Categorical Exclusions**, storm water, water withdrawal permitting, as well as, a working knowledge of Part A and B application for landfill permits, UST removal and remediation, ground and surface water contamination.

He has performed 100s of wetland determinations, delineation, and assessments throughout North Carolina, West Virginia, Georgia, Wisconsin, Kentucky, and Virginia.



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Mr. Brooks has prepared many Joint Permit Applications for temporary and permanent impacts to non-tidal and tidal wetlands, for residential, municipal, commercial, professional, and industrial clients. He has also conducted hundreds of Phase I and Phase II Environmental Site Assessments (ESAs) and is listed on the Virginia Field Office's list of surveyors for the federally-listed sensitive joint-vetch (*Aeschynomene virginica*) and small whorled pogonia (*Isotria medeoloides*).

DETAILED EXPERIENCE

National Environmental Policy Act (NEPA)

Documents: Environmental Impact Statements (EIS), Environmental Assessments (EA), Categorical Exclusions, Etc.

He has completed many NEPA documents such as EAs and CEs for municipalities and counties for Rural Utility Services under RUS Bulletin 1794A-602 for both water supply and waste water treatment projects. Several examples of RUS projects are the Town of Orange Water Storage Facility, several localized water supply and waste water systems for Northumberland County, Town of Washington water supply and waste water systems, and several localized water supply and waste water systems for Westmoreland County. These EAs and CEs were conducted for publicly funded projects, in order to identify potential impacts to environmental and historical resources, as well as, socio-economic impacts in order to determine the preferred alternative and obtain a Finding of no significant Impact (FONSI) for the proposed project.

Managed and completed 30 EAs for the Virginia State Police as part of the STARS program and updating of radio/cell tower equipment across Central Virginia.

Wetland Delineation and Permitting

Mr. Brooks has prepared numerous Joint Permit Applications (JPA) for temporary and permanent impacts to non-tidal and tidal wetlands, and streams for residential,

municipal, commercial, professional, and industrial clients in Virginia.

Managed and participated on numerous wetland delineations either individually or as a member of a team of active scientists on 100s of projects in the Piedmont and Coastal Plain regions of Virginia, according to methodologies prescribed by the U.S. Army Corps of Engineers 1987 Manual for Identifying and Delineating Wetlands, to include the 2009 Coastal Plain Wetland Delineation Supplement. Also, has conducted wetland delineations in the following states, North Carolina, West Virginia, Maryland, and Georgia.

Completed numerous wetland delineations and wetland permits for rock quarries and sand & gravel facilities located throughout Virginia, North Carolina, and West Virginia.

Wetland delineations and jurisdictional determinations for Bluegreen Properties of Virginia at the Meadows at Dahlgren, Fasmart at Elko, Westmoreland Industrial Park, Winterpock Village, Isle of Wight Industrial Park and Virginia Power CT sites in Caroline and Fauquier Counties.

Wetland Compensation Design/Monitoring

Integral in the conceptual/final designs and planning of wetland creation sites located in the Highland Springs, Varina, Sandston, and Lakeside Areas of Henrico County, Lawrenceville, Westmoreland County, King and Queen County, Colonial Heights, Fredericksburg, Goochland County, New Kent County, Stafford County, Isle of Wight County, Green County and Prince George County, Virginia, as well as, four sites located in the coastal plain of North Carolina. Activities included development of conceptual mitigation/compensation plans that include site-specific water budgets, monitoring well location, design, construction plans, and onsite construction management, as well as, both hydrologic and vegetative sampling plans and monitoring required as a part of the permit.

Conducted both hydrological and vegetative sampling and monitoring at various active and



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completed created wetland sites located in the Piedmont and Coastal Plain regions of Virginia.

Prepared invasive species management plans for broad-leaved cattail (*Typha latifolia*), Chinese privet (*Ligustrum sinense*), Japanese stilt grass (*Microstegium vimineum*), and phragmites (*Phragmites communis*).

Mitigation Banking

Evaluated many sites in North Carolina and Virginia for the purposes of stream restoration, wetland creation, wetland restoration and ecological restoration.

Proposed and prepared several Mitigation Banking Prospectuses, which are currently under the review of the Mitigation Banking Review Team.

Designed and implemented several wetland/stream restoration and compensation sites through out the coastal plain and piedmont areas of Virginia and North Carolina.

Stream Restoration and Design

Coordinated, Designed and Implemented the relocation and restoration of multiple streams and stream systems.

Managed shoreline stabilization projects along eroding segments of the York River in Yorktown, Virginia and the James River located in Richmond, Virginia. Work included a wetland delineation of approximately 3000 linear feet of shoreline and preparation of wetland permits from the Corps of Engineers and Local Wetlands Board for 600 square feet of non-vegetated wetland impacts.

Designed and implemented the restoration/relocation of 1,700 linear feet of Anderson Creek, a perennial stream in Rockville, Virginia.

Completed the assessment and preliminary design of the restoration/relocation of 3,500 linear feet of Fontaine Creek and 7,500 linear

feet of an unnamed perennial stream flowing to Fontaine Creek in Skippers, Virginia.

Completed the assessment and preliminary design of the restoration of approximately 7,000 linear feet of perennial stream in Green County, Virginia.

Completed the assessment and design for the restoration of approximately 8,000 linear feet of perennial stream in Prince George County, Virginia.

Completed and implemented a restoration and planting plan for re-establishment of approximately 5 acres of Resource Protection Area along Almond Creek and the James River in Henrico County, Virginia.

Completed the assessment and design for the restoration of approximately 18,000 linear feet of intermittent/perennial stream in Henrico County, Virginia.

Completed and implemented a conservation plan for approximately 100 acres of stream side buffer in New Kent County, Virginia.

Completed the assessment and design for the restoration of approximately 9,000 linear feet of intermittent/perennial stream in Goochland County, Virginia.

All of the above stream restoration projects included coordination with local, state and federal agencies, permitting, as well as, the use of Rosgen Natural Stream Channel Design Methodologies. The current status of these projects change regularly, most if not all are nearing construction; are currently under construction or recently completed; or are in the post construction assessment/monitoring phase.

Stream Perennality and Stream Attribute Analysis Methodology (SAAMS)

Qualified to assess streams and wetlands as part of Resource Protection Area (RPA) determinations conducted in accordance with



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the Chesapeake Bay Preservation Act utilizing the North Carolina Department of Water Quality (NCDWQ) Perennial Stream Evaluation Methodology. He has also conducted stream potentiality studies as a part of the Neuse/Tar Pamlico/Catawba Riparian Buffer Rules for North Carolina.

Practiced in the utilization and application of both the Virginia Department of Environmental Quality's "Stream Impact Compensation Assessment Manual" (SICAM) method, and the Army Corps of Engineer's "Stream Attribute Assessment Methodology" (SAAM), which is for determining the necessary compensatory mitigation requirement for impact to streams. Streams were rated for both compensation for impacts and lift potential as related to mitigation banking.

Phase I and II Environmental Site Assessments

Project scientist for hundreds of Phase I Environmental Site Assessments (ESAs) and Phase II ESAs on agricultural, residential, commercial, and industrial sites throughout Virginia and West Virginia. These Phase I ESAs are part of the due diligence process and innocent landowner defense.

Phase I Environmental Site Assessments completed for Link-Belt Construction Equipment, Dekalb Poultry, Nations Bank, Bluegreen Properties of Virginia, Kings Charter Office Park, Commerce Bank, Farmer Machine Co., Lawhorn, Atlantic Development & Acquisition, LLC, NCDOT, and Virginia Power's CT sites in Caroline and Fauquier counties. Work has included data research, site evaluations and regulatory review and report writing.

Phase II Environmental Site Assessments for McCray Oil Company, Kings Charter Office Park, Link Belt Construction Equipment Co., Commerce Bank, and Rudlin Torah Academy.

Environmental Assessments for the Virginia Department of Military Affairs, the counties of

Hanover, Richmond, and Westmoreland, and the NCDOT.

Environmental Audits

Field project scientist as part of Environmental Compliance Audits conducted at 30 Virginia Department of Correction Correctional Facilities, as well, as many other industrial and mining facilities.

Threatened/Endangered Species Surveys

Managed and participated in surveys for multiple federal and state threatened and endangered species in Virginia, North Carolina, and West Virginia.

Threatened and endangered species surveys for small whorled pogonia, and the dwarf wedge mussel in King William County, and sensitive joint-vetch in King George County. Section 7 consultation with regulatory agencies regarding bald eagle, swamp pink, small whorled pogonia, Indiana bat, Loggerhead shrike, and Northeastern beech tiger beetles.

Mr. Brooks is listed on the Virginia Field Office's list of surveyors for the federally-listed sensitive joint-vetch (*Aeschynomene virginica*), small whorled pogonia (*Isotria medeoloides*), and swamp pink (*Helonias bullata*).

UST Removal and Remediation

Completed UST investigations for Mary Washington College and McCray Oil Company, both of which received reimbursement from the Virginia Petroleum Storage Tank Fund. Also conducted UST investigation for Virginia Power's Ladysmith and Septa Substations.

Conducted petroleum release modeling for McCray Oil Company in Hanover County, VA, with which the VDEQ files on the site were closed.

Regulatory and Legislative

Mr. Brooks has served as a member of the Virginia Department of Environmental Quality's (VDEQ) Technical Advisory Committees for the



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State Programmatic General Permit (SPGP) Regulations and the Surface Water Withdrawal Regulations. As a member of both technical advisory committees (TAC), he had the responsibility to review the current regulations and the proposed regulations in order to compare the proposed changes, make suggestions on changes to the proposed regulations, discuss all changes suggested by the TAC, as well as review pertinent scientific studies in order to properly craft the new regulations.

Mr. Brooks is currently serving as a member of the Attorney General's Regulatory Reform Task Force (Task Force) charged with reviewing Virginia Regulations, (e.g. environmental regulations) to reduce redundancies, in efficiencies, and remove out dated sections. As such he has reviewed all state environmental laws, code, and regulations for the following agencies: Virginia the Virginia Marine Resource (VMRC), Virginia Department of Conservation and Recreation (VDCR), Virginia Department of Agriculture and Consumer Services (VDACS), and Virginia Department of Environmental Quality (VDEQ). As the charge of the Task Force suggests, Mr. Brooks is working closely with the Attorney General's Office (AGO) to identify, address changes, remove redundancies, and even suggest changes to regulatory guidance in order to promote more efficient and streamlined environmental regulatory and governmental process.

Other

Consultation with the Virginia Department of Historic Resources regarding archaeological and archaeological sites associated Section 106 review due to local, state, or federal permits or funding for sites across the Commonwealth of Virginia.

Completed and had approved a FEMA Floodplain map revision for Virginia Power's Fauquier CT site and Stafford County's Government Island Project, which included computer modeling of Marsh Run, Aquia Creek and several of their unnamed tributaries.

Extensive research in water quality in order to assess the health of aquatic systems in Chesapeake and Virginia Beach, Virginia.

Authored Environmental Impact Statements for projects associates with proposed U.S. Army Corps projects.

Mr. Brooks has acted as an expert witness in several legal proceedings.

THADDEUS J. KRASKA, P.W.D.
Project Scientist

EDUCATION

B.A., Zoology, University of New Hampshire,
1998

M.S., Resource Management & Administration,
Antioch University, 2000

PROFESSIONAL REGISTRATIONS

**Virginia Certified Professional Wetland
Delineator, No. 4**

*Certified in Wetland Delineation, the Wetland
Program and Office of Continuing Education
University College, Ohio State University, 2000*

*Certified in Wetland Creation and Restoration,
the Wetland Program and Office of Continuing
Education University College, Ohio State
University, 2003*

*Certified in Field Indicators for Hydric Soils,
Advanced Hydric Soil Identification, Virginia
Institute of Marine Sciences, 2003*

*Certified in Intermittent and Perennial Stream
Identification for Riparian Buffer Rules – North
Carolina and Virginia, North Carolina State
University, Department of Forestry and
Wetlands/401 Unit North Carolina Division of
Water Quality, 2005*

24-Hour HAZWOPER training, December, 2005

*Certified in Rosgen's Applied Fluvial
Geomorphology (Level I), Wildland Hydrology,
Inc., Watershed Conservation Resource Center
Fayetteville, AR, 2009*

*Certified for Visible Emissions Evaluations by
EPA Method 9 (MAN090928-740)*

PROFESSIONAL AFFILIATIONS

Virginia Association of Wetland Professionals

SUMMARY OF EXPERIENCE

Mr. Kraska has over ten years of environmental
experience. His expertise is in the identification



and delineation of Waters of the U.S., including
wetlands. He has performed 100's of wetland
determinations, delineation, and assessments
throughout New Hampshire, West Virginia, and
the Commonwealth of Virginia. Mr. Kraska has
prepared numerous Joint Permit Applications
for temporary and permanent impacts to
nontidal and tidal wetlands, for residential,
municipal, commercial, professional, and
industrial clients in Virginia.

He has experience in wetland
creation/restoration design and planning,
vegetative, and hydrological analysis,
monitoring, and performing functional value
assessments. He has also conducted nearly 50
Phase I and Phase II Environmental Site
Assessments (ESA) and has completed
groundwater and soil sampling for investigating
suspected contamination as part of Phase II
ESAs conducted in both Virginia and West
Virginia and is listed on the Virginia Field
Office's list of surveyors for the federally-listed
small whorled pogonia (*Isotria medeoloides*)
and swamp pink (*Helonias bullata*). Mr. Kraska
has also completed over 100 visible emissions
evaluations for sites regulated by the Non-
metallic source pollution standards (NSPS)
requirements and the EPA Method 9 criteria.

DETAILED EXPERIENCE

Wetland Delineation and Permitting

Mr. Kraska has prepared numerous Joint
Permit Applications (JPA) for temporary and
permanent impacts to non-tidal and tidal
wetlands, and streams for residential,



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municipal, commercial, professional, and industrial clients in Virginia.

Managed and participated on numerous wetland delineations either individually or as a member of a team of active scientists on 100s of projects in the Piedmont and Coastal Plain regions of Virginia, according to methodologies prescribed by the *U.S. Army Corps of Engineers 1987 Manual for Identifying and Delineating Wetlands*. He is also trained in the application of the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region*. He has conducted wetland delineations in the following states, North Carolina, West Virginia, and New Hampshire.

Completed numerous wetland delineations and wetland permits for rock quarries and sand & gravel facilities located throughout Virginia, and North Carolina.

Mr. Kraska has completed Wetland delineations and jurisdictional determinations for Hanover Presbyterian Church, Kenwood United Methodist Church, Hanover County, Stafford County, Virginia Department of Corrections, Roslyn Farms Corporation, and the Isle of Wight Industrial Park, as well as for numerous private developers and industrial clients.

Wetland Compensation Design/Monitoring

Integral participant in the conceptual design and planning of wetland creation sites located in Stafford County, as well as, the Highland Springs, Varina, and Lakeside Areas of Henrico County. Activities included development of conceptual mitigation plans that include site-specific water budgets, monitoring well location, construction, and installation, as well as, both hydrologic and vegetative sampling plans.

Conducted both hydrological and vegetative sampling and monitoring at various active and completed created wetland sites located in the Piedmont region of Virginia.

Assisted with the development of Environmental Bank Prospectus' for wetland banking sites, including restoration,

enhancement, creation, and preservation of wetlands, streams, or other aquatic resource areas, for the submission to the Mitigation Bank Review Team (MBRT).

Developed conceptual and final wetland and stream restoration plans and designs including the establishment of vegetation, stabilization of grades, etc.

Prepared invasive species management plans for broad-leaved cattail (*Typha latifolia*), and reed grass (*Phragmites communis*).

Wetland Assessments

Assesses streams and wetlands as part of Resource Protection Area (RPA) determinations conducted in accordance with the Chesapeake Bay Preservation Act utilizing the North Carolina Department of Water Quality (NCDWQ) Perennial Stream Evaluation Methodology – Version 3.1.

Practiced in the utilization and application of the joint Virginia Department of Environmental Quality's and Army Corps of Engineer's "Unified Stream Methodology" (USM) for determining the necessary compensatory mitigation requirement for impact to streams.

Completed a comprehensive wetland assessment utilizing The New Hampshire Comparative Methodology. This study consisted of approximately 3,000 total acres and 7 wetlands for the Town of Hopkinton, New Hampshire. Fourteen functional values were analyzed for each wetland located within the Hardy Springs Brook Watershed. The results of the assessment are currently being used in conjunction with the town's revision of their Master Plan.

Phase I and II Environmental Site Assessments

Project scientist for over 50 Phase I Environmental Site Assessments (ESA) on agricultural, residential, commercial, and industrial sites throughout Virginia and West Virginia. These Phase I ESAs are part of the

due diligence process and innocent landowner defense.

Project scientist for a Phase I Environmental Site Assessment at the Hanover Presbyterian Church in Hanover County.

Environmental Audits

Field project scientist as part of Environmental Compliance Audits conducted at 10 Virginia Department of Correction Correctional Facilities.

Environmental Assessments and NEPA Categorical Exclusions

Completed many Environmental Assessments (EAs) for municipalities, counties, state governmental agencies, such as for the Town of Orange, Northumberland County, Town of Washington, New Kent County, Hanover County, and Westmoreland County. These EAs were conducted for publicly funded projects, in order to identify potential impacts to environmental and historical resources, as well as, socio-economic impacts in order to determine the preferred alternative and obtain a Finding of no significant Impact (FONSI) for the proposed project.

Co-managed and completed 30 EAs for the Virginia State Police as part of the STARS program and updating of radio/cell tower equipment across Central Virginia.

Threatened/ Endangered Species Surveys

Responsible for identifying the first known occurrence of the federally and state threatened small whorled pogonia (*Isotria medeoloides*) in Pittsylvania County, Virginia in May 2005 and is listed on the Virginia Field Office's list of surveyors for the federally-listed small whorled pogonia (*Isotria medeoloides*). Also listed as an approved surveyor for the federally threatened/state endangered swamp pink (*Helonias bullata*). He has participated as a member of a team of scientists on numerous surveys for these species in Caroline, Hanover,

Henrico, New Kent, Pittsylvania, Stafford County, and Spotsylvania Counties.

Section 7 consultation with regulatory agencies regarding bald eagle, swamp pink, small whorled pogonia, Indiana bat, Loggerhead shrike, and Northeastern beech tiger beetles.

Section 106 consultations

Consultation with the Virginia Department of Historic Resources regarding archaeological and archaeological sites associated Section 106 review due to local, state, or federal permits or funding for sites across the Commonwealth of Virginia.

CHARLES WILSON, P.E.
Project Engineer

EDUCATION

*B.S., Civil Engineering, University of Kentucky,
1997*

PROFESSIONAL REGISTRATIONS

Professional Engineer – Virginia
Professional Engineer - Kentucky

PROFESSIONAL AFFILIATIONS

*Order of the Engineer
Solid Waste Association of North America*

SUMMARY OF EXPERIENCE

Mr. Wilson has 14 years of progressive experience that includes assistance in landfill development and closures of over 22 facilities encompassing site planning, design, permit application preparation, cost analyses, construction drawings, technical specifications, construction monitoring and construction documentation. These duties include HELP modeling (computer modeling for hydrologic/hydraulic investigation and leachate production/control), site grading and drainage plans, and sediment pond design. He is well versed in documentation of all aspects of the liner and cap installation process and conducting the required field tests. Other experience in solid waste includes landfill gas system construction monitoring and conducting required field tests.

DETAILED EXPERIENCE

King William School Board, King William, VA - Assisted in the preparation of the site plan and specifications for the renovation of the High School Football field.

Ashcake Road Landfill – provided construction quality assurance for Phase 3 cell construction. Prepared site volume calculations from aerial surveys.

Ingenco

- Dinwiddie Facility – prepared construction drawings for tank farm loading pad.



- King and Queen Facility – prepared site plan for landfill gas to energy facility.
- Brunswick Facility – prepared site plan for landfill gas to energy facility.

Doswell Limited Partnership – prepared site plan amendment for the facility for the purpose of SPCC site upgrades.

R-Board Sanitary Landfill, Stafford County, Virginia

- Revised the Part B Permit Amendment 3 Addendum 1 Application and Permit Drawings to address comment made by VDEQ.
- Revised the Solid Waste Management Plan to address comments made by VDEQ.

King & Queen Sanitary Landfill (BFI), King & Queen County, Virginia

- Updated the Storm Water Pollution Prevention Plan (SWPPP) and the Spill Prevention, Control and Countermeasure Plan (SPCC).

Allied/BFI Waste Services

- Updated the Storm Water Pollution Prevention Plan (SWPPP) and the Spill Prevention, Control and Countermeasure Plan (SPCC) for BFI-Roanoke Facility.
- Updated the Storm Water Pollution Prevention Plan (SWPPP) and the Spill Prevention, Control and Countermeasure Plan (SPCC) for BFI-Charlottesville Facility.
- Updated the Storm Water Pollution Prevention Plan (SWPPP) and the Spill



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- Prevention, Control and Countermeasure Plan (SPCC) for BFI-Grafton Facility.
- Updated the Storm Water Pollution Prevention Plan (SWPPP) and the Spill Prevention, Control and Countermeasure Plan (SPCC) for BFI-Lynchburg Facility.
- Update the Storm Water Pollution Prevention Plan (SWPPP) for BFI-Fluvanna Transfer Station.

Landfill liner system design and construction CQA monitoring (Kentucky) which includes conducting weekly progress meetings and daily meetings with contractors. Provide on-site observation of geosynthetics deployment, documented all placements and testing of membrane. In addition, reviewing contractor's submittals and consulting daily with contractors on design and specification issues. Also responsible for answering Department of Environmental Quality comments on site issues and to prepare all field data for CQA reports.

Blue Ridge Recycling & Disposal Facility, Estill County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management.

Prince Edward County Sanitary Landfill - Provided Project Management and Construction Quality Assurance for Phase 1 Closure Cap Construction. Prepared permit drawings and application for the Part B Minor Permit Amendment Application.

Chesapeake Energy Center, Chesapeake, Virginia -Prepared construction documents and drawings for the New Metals Pond Construction and the Old Metals Pond Closure. Providing Project Management and Construction Quality Assurance for the geosynthetics portion of the construction and closure projects.

King & Queen Sanitary Landfill (BFI)- Prepared permit drawings , revised HELP model runs, developed equipment/manpower table, developed practical working face dimensions, and application for the Part B Major Permit

Amendment application for closure cap profile revisions.

R-Board Sanitary Landfill, Stafford County, Virginia - Provided Project Management and Construction Quality Assurance for Cell E Construction. Currently, working on the Part B Major Permit Amendment Application and associated drawings and calculations to horizontally expand the facility's waste boundary.

Old Dominion Sanitary Landfill (BFI), Henrico County, Virginia - Prepared permit drawings for the Part A Permit Application to horizontally expand the facilities waste boundary.

Ashcake Road Landfill, Hanover County, Virginia. Prepared permit drawings, technical specifications, and revised calculations for the Part B Major Permit Amendment application for the liner system design revisions.

Old Dominion Sanitary Landfill (BFI), Henrico County, Virginia Prepared permit drawings for the Part A Permit Application to horizontally expand the facilities waste boundary

Town of Orange Raw Water Storage Basin-Provided Project Management and Construction Quality Assurance for the geosynthetics portion of the raw water storage basin construction.

Benson Valley Area Landfill (BFI Waste Systems): Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Assisted in the permit application and drawings for a Horizontal Expansion. Provide CQA monitoring and Documentation of Gas Well Installation and Gas Header Line installation. Provided CQA monitoring and Documentation for over 14 acres of Primary Liner System. Provided CQA monitoring and Documentation for 8 acres Closure Cap Area.

Epperson Waste Disposal, Grant County, Kentucky: Completed the State Annual Survey



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Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Final Cap Construction. Assisted in preparation of a Permit Modification which consisted of Relocating a Non-Waste Fill Area within the given permitted footprint. Provided CQA monitoring and Documentation for Repairs conducted on the Primary Liner System. Provided CQA monitoring and Documentation for over 21 acres of Primary Liner System.

West Kentucky Landfill, Graves County, Kentucky: Assisted in the preparation of the Permit Application and Drawings for a Horizontal Expansion.

Green Valley Environmental Corporation Landfill, Greenup County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Worked on the Design of the Proposed Horizontal Expansion. Provide CQA monitoring and Documentation of Gas Well Installation. Provided CQA monitoring and Documentation for over 12 acres of Primary Liner System.

Laurel Ridge Landfill, Laurel County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Prepared a Permit Modification Application and Drawings to Re-grade the Bottom Contours of the Landfill. Assisted in the permit application and drawings for a Horizontal Expansion. Provided CQA monitoring and Documentation for over 18 acres of Primary Liner System.

Tri-K Landfill Inc., Lincoln County, Kentucky:

Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Final Cap Construction. Assisted in preparation of Horizontal Expansion Application and Permit Drawings. Assisted in preparation of Surface Mining Permit Application and Drawings. Provided CQA monitoring and Documentation for Repairs conducted on the Primary Liner System. Provided CQA monitoring and Documentation for over 22 acres of Primary Liner System.

Southern Sanitation Landfill, Logan County, Kentucky: Worked on the design of a Proposed Horizontal Expansion. Prepared Construction Drawing.

Ohio County Balefill, Ohio County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Assisted in preparation of Horizontal Expansion Application and Permit Drawings. Provided CQA monitoring and Documentation for over 29 acres of Primary Liner System. Provided CQA Documentation for Final Cap Construction.

Local Sanitation of Rowan County, Rowan County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Provided CQA monitoring and Documentation for over 4 acres of Primary Liner System.

Valley View Landfill, Trimble County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the



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Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Final Cap Construction. Assisted in preparation of Unit 6 Relocation Application and Permit Drawings. Assisted in preparation of a Vertical Expansion Application and Permit Drawings. Assisted in preparation of a Horizontal Expansion Application and Permit Drawings. Provided CQA monitoring and Documentation for Repairs conducted on the Primary Liner System. Provided CQA monitoring and Documentation for over 34 acres of Primary Liner System. Assisted in preparation of Surface Mining Permit Application and Drawings.

Dozit Company Inc. Landfill, Union County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Provided CQA monitoring and Documentation for Repairs conducted on the Primary Liner System. Provided CQA monitoring and Documentation for over 10 acres of Primary Liner System.

Tri-County Sanitary Landfill, Whitley County, Kentucky: Assisted in preparation of a Final Closure Plan and Drawings. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Final Cap Construction. Provided CQA monitoring and Documentation for over 6 acres of Final Cap.

Eastern Kentucky Power, Spurlock Power Station, Mason County, Kentucky: Assisted in preparation of Special Waste Application and Permit Drawings.

Weyerhaeuser Hawesville Plant, Hancock County, Kentucky: Assisted in preparation of Permit Application and Permit Drawings.

B&J Landfill, Fulton County, Kentucky: Provided CQA monitoring and Documentation for over 9 acres of Final Cap.

Prichard Landfill, Wayne County, West Virginia: Provided CQA monitoring and Documentation for over 22 acres of Final Cap.

Dafter Landfill, Chippewa County, Michigan: Provided QA monitoring and Documentation for over 3 acres of Geosynthetic Installation.

C+C Landfill, Calhoun County, Michigan: Provided QA monitoring and Documentation for over 6 acres of Geosynthetic Installation.

Outerloop Landfill, Jefferson County, Kentucky: Provided QA monitoring and documentation for over 10 acres of Geosynthetic Installation.

CHARLES D. RIEDLINGER, P.E.
Senior Vice President**EDUCATION**

B.S. Civil Engineering Technology, Old Dominion University, 1974.

PROFESSIONAL REGISTRATION

Professional Engineer: Virginia-No.12510, West Virginia- No.8437, North Carolina-No. 13979

PROFESSIONAL AFFILIATIONS

American Water Works Association

SUMMARY OF EXPERIENCE

Mr. Riedlinger has 37 years of progressive experience in Civil/Environmental Engineering with municipal, state, commercial/industrial and federal clients. Mr. Riedlinger has responsibility for leading all engineering efforts in the company.

His area of expertise is in engineering planning, design, and construction for water and wastewater projects. Mr. Riedlinger has conducted client rate studies and prepared financial reports for water utilities and sewer utilities. He has been responsible for designing water treatment plants, water storage tanks, booster stations, pressure reducing stations, sewage pump stations, collection systems and wastewater treatment plants. Mr. Riedlinger has been involved in comprehensive reports, equipment review, preliminary layout, cost estimates and financial studies.

DETAILED EXPERIENCE**Water/Wastewater**

Principal-in-Charge of the design, bidding, and construction services for expansion of a .125-mgd lagoon to a .405-mgd wastewater treatment plant by utilization of SBR process. Plant meets stringent discharge limits.

Project Manager for a substantial number of water treatment plants, water lines, booster stations, and tanks for numerous clients throughout West Virginia.



Principal-in-Charge of a county-wide master sewer plan for Westmoreland County, Virginia.

Project Manager of the rehabilitation of a 250,000- gallon elevated water storage tank for Westmoreland County, Virginia.

Principal Engineer for a 345-acre site development in New Kent County that included a 250,000-gallon water storage tank, 14,000 feet of water line, 126,000-gpd wastewater plant, three pump stations, force main and gravity collection system, and over 15,000 feet of roads

Principal Engineer for various projects in King William County, including new water supply and sewer treatment system for the Courthouse Complex, Route 360 area sewer evaluation and master plan, and Central Garage water system including a new 150,000-gallon elevated water storage tank.

Principal Engineer for new water system and sewer extension for County of Richmond/Town of Warsaw, Virginia. Work included a new 500,000-gallon elevated water storage tank, various lengths of 16" and 12" water transmission mains, new sewer collection lines, pump station and force main.

Environmental/Landfill

Principal Engineer for numerous Environmental Assessments, UST studies and removals, and environmental studies.

During his career, Mr. Riedlinger has been responsible for meeting with regulatory agencies, assisting with certification and reporting forms. He has coordinated the site investigations which include soil vapor surveying, and groundwater monitoring. In addition, Mr. Riedlinger supervised UST design, tank removal and remediation. Representative clients for which Mr. Riedlinger has performed UST projects include the following:

- Dominion Generation
- State of Delaware - General Services
- Charles E. Smith Company
- Marriot Hotels, Maryland
- Virginia Department of Military Affairs
- Hilton Hotels, Washington, DC
- Mary Washington College, Virginia

Responsible for Phase I and Phase II Site Assessments associated with Due Diligence. Representative clients include Equitable Insurance, Prudential Insurance, Nations Bank, Virginia Department of Corrections, and numerous commercial and industrial clients.

Program Manager for a contract with the U.S. Army Corps of Engineers for environmental related work at Fort Meade, Maryland. Initial work was to negotiate task orders and general client management as well as managing engineering for the various tasks. Task orders were for asbestos surveys, PCB investigations, underground storage tank upgrades, solid waste management programs, oil water separator investigations/design, Title V air studies, and waste minimization studies.

Principal Engineer for a 345-acre site development in New Kent County that included a 250,000-gallon water storage tank, 14,000 feet of water line, 126,000-gpd wastewater plant, three pump stations, force main and

gravity collection system, and over 15,000 feet of roads.

Principal Engineer for new water system and sewer extension for County of Richmond/Town of Warsaw, Virginia. Work included a new 500,000-gallon elevated water storage tank, various lengths of 16" and 12" transmission mains, new sewer collection lines, pump station and force main.

Project Manager for a substantial number of water treatment plants, water lines, booster stations, and tanks for numerous clients throughout West Virginia.

Responsible for meeting with regulatory agencies, assisting with certification and reporting forms, and designing underground storage tank management programs. He coordinates the site investigations which include soil vapor surveying, soil sampling, geophysical surveying, and groundwater monitoring. In addition, Mr. Riedlinger supervises tank design, piping design, instrument and control design, and the preparation of installation specifications.

Mr. Riedlinger managed the determination of PCB-containing power transformers on the city property, the identification of materials or wastes present which could have posed an environmental hazard. He was responsible for the review past activities or operations on the site, and the history of site ownership and use.

Principal-in-charge of gas monitoring and groundwater monitoring at numerous landfills throughout Virginia.

Principal-in-charge for the development of permit amendment documents, bidding documents and construction documents for BFI facilities in Henrico (Old Dominion Facility) and King and Queen counties.

Principal engineer for transfer station modifications in Goochland County. Work

included permit revisions as well as design, bidding and construction documents.

Principal engineer for transfer station modifications in New Kent County. Work included design, bidding and construction administration.

Principal engineer for landfill cell construction in Prince Edward County. Work included permit amendment documents, bidding documents and construction documents.

Principal Engineer for a 345-acre site development in New Kent County that included a 250,000-gallon water storage tank, 14,000 feet of water line, 126,000-gpd wastewater plant, three pump stations, force main and gravity collection system, and over 15,000 feet of roads.

Industrial Parks

Principal Engineer of the Westmoreland Industrial Park. Work included site study, environmental site assessment, wetland delineation, funding assistance, site design, road design, water service design, sewer service design, stormwater design, and bidding assistance of construction administration.

Principal Engineer for Industrial Park project for Richmond County. Work included site survey, conceptual layouts and stormwater management.

Principal Engineer for Industrial Park project in Lancaster County. Work included site evaluation, environmental site assessment, preliminary layout, utility studies and public hearings.

Principal-in-Charge of a county-wide master sewer plan for Westmoreland County, Virginia.

Project Manager of the rehabilitation of a 250,000- gallon elevated water storage tank for Westmoreland County, Virginia.

Construction Administration

Principal-in-Charge for coordinating all field work and reports for inspection of over 13,000,000 square feet of building space for the Department of the Navy's LANDIV facilities.

Project Manager for a substantial number of rural water treatment plants, water lines, booster stations, and tanks for numerous clients throughout West Virginia.

Principal-in-Charge of the design, bidding and construction administration of a combined conventional gravity system and grinder pump system in Allegany County, Maryland.

Principal-in-Charge of the design, bidding, and construction service of a 40,000 linear feet of 8" to 36" interceptor sewers and force mains and three pumping stations for client in Fauquier County, Virginia.

Project Manager for bidding and construction services of a 3.4 MGP total barrier oxidation ditch, pump stations, force mains, and collections system for the City of Rehoboth Beach, Delaware.

Project Manager for construction, administration and resident project representation of new wastewater pumping station, 600 linear feet of 18" force main and 13,000 linear feet of 18" to 30" diameter interceptor for the City of Dover, Delaware.

Principal-in-Charge of engineering sewers for 18,000 linear feet of 10" to 20" water transmission mains for client in Delaware. Work included surveying, alignment selection, hydraulic analyses, preparation of plans and specifications as well as construction administration.

Wells

Project Manager for the design and construction of five (5) 24" water supply wells for the City of Dover, Delaware.

Project Manager for the design and construction of one (1) 24" water supply well for the City of Rehoboth Beach, Delaware.

Project Manager for the construction of five (5) 16" water supply wells at Point Pleasant, West Virginia.

Principal-in-Charge of the design, bidding and construction administration of a combined conventional gravity system and grinder pump system in Allegany County, Maryland.

Project Manager for construction, administration and resident project representation of new wastewater pumping station, 600 linear feet of 18" force main and 13,000 linear feet of 18" to 30" diameter interceptor for the City of Dover, Delaware.

Principal-in-Charge of 1,740 linear feet of 18" ductile iron water transmission main for the Town of Leesburg. Scope of services included surveying, soil corrosivity analysis, location of existing utilities and a geotechnical study.

Principal-in-Charge of engineering sewers for 18,000 linear feet of 10" to 20" water transmission mains for client in Delaware. Work included surveying, alignment selection, hydraulic analyses, preparation of plans and specifications as well as construction administration.

Dams

Principal-In-Charge of the design, bidding and construction administration of a combined conventional gravity system and grinder pump system in Allegany County, Maryland.

Project Manager for bidding and construction services of a 3.4 MGP total barrier oxidation ditch, pump stations, force mains, and collections system for the City of Rehoboth Beach, Delaware.

Project Manager for construction, administration and resident project representation of new

wastewater pumping station, 600 linear feet of 18" force main and 13,000 linear feet of 18" to 30" diameter interceptor for the City of Dover, Delaware.

Principal-in-Charge of project involving scheduling field activities including inspections, data collection sampling, data analysis and reporting for Washington, DC project. Project included over 13,000,000 square feet of building space and over 1200 housing units.

Principal-in-Charge for the State of Delaware project. Project included over 12,000,000 square feet of build space at over 1500 buildings.

Principal-in-Charge for the Department of the Navy. Project included over 13,000,000 of building space and over 1500 facilities.

Principal-in-Charge of two (2) Virginia Community College System open-end contracts for environmental and civil work. Work included projects with Northern Virginia Community College Campus, Lord Fairfax Community College, J. Sergeant Reynolds Community College, and Blue Ridge Community College. Projects have included: asbestos abatement, indoor air and facility renovations

Department of Military Affairs

Project Manager for engineering contract with the Virginia Department of Military Affairs. Work included site work, pavement replacement, UST removal, and UST replacement.

Principal-in-Charge of the design, bidding, and construction service of a 40,000 linear feet of 8" to 36" interceptor sewers and force mains and three pumping stations for client in Fauquier County, Virginia.

Program Manager for a contract with the U. S Army Corps of Engineers for environmental related work at Fort Meade, Maryland. Initial work was negotiate task orders and general

client management as well as managing engineering for the various tasks. Task orders were for asbestos surveys, PCB investigations, underground storage tank upgrades, solid waste management programs, oil water separator investigations/and design, Title V air studies, and waste minimization studies. Contract was renewed for the maximum time allowed by the contract. Task orders have amounted to over \$700,000 each year.

Project Manager for a \$645,000 contract to perform asbestos surveys at the Department of the Navy facilities in Norfolk, Cranney Island and Yorktown. Project included over 12,000,000 square feet of building space and over 1,500 facilities.

Project Manager for a contract to perform inspections, prepare abatement plans and specification for at the Department of the Navy facilities under jurisdiction of LANTDIV.

Principal-in-Charge of project with major transportation maintenance facility where engineering and geologic services were performed. Investigation identified areas of contaminated soils, investigated the integrity of the groundwater, developed a remedial action plan and monitored remedial action. Project developed into a design/construction project for remediation of soil and the construction of an industrial wastewater treatment facility for separation of oil and treatment of contaminated storm water. Total project cost was approximately \$4,000,000.

Stormwater

Principal-in-Charge of all stormwater on an entire community of approximately 1,000 homes surrounding a golf course on 1,000 acres in New Kent County, Virginia for Bluegreen Properties, Inc. Work included five stormwater management basins.

Principal-in-Charge for Westmoreland County in the site selection, concept design, and preparation of funding application for the

development of an 80-acre site as an industrial park. Design included three storm water management basins. Mr. Riedlinger also provided the design and construction services for Phase I development.

Principal-in-Charge for Richmond County for its industrial park located adjacent to the Town of Warsaw. Mr. Riedlinger designed a stormwater management basin to service the entire property and provided site engineering for initial site grading. In addition, he has worked with the County in developing initial concepts and layouts. He also prepared opinions of cost to assist in funding applications.

Principal Engineer for a 345-acre site development in New Kent County that included a 250,000-gallon water storage tank, 14,000 feet of water line, 126,000-gpd wastewater plant, three pump stations, force main and gravity collection system, and over 15,000 feet of roads.

Federal

Program Manager for a contract with the U. S Army Corps of Engineers for environmental related work at Fort Meade, Maryland. Initial work was negotiate task orders and general client management as well as managing engineering for the various tasks. Task orders were for asbestos surveys, PCB investigations, underground storage tank upgrades, solid waste management programs, oil water separator investigations/and design, Title V air studies, and waste minimization studies. Contract was renewed for the maximum time allowed by the contract. Task orders have amounted to over \$700,000 each year.

Project Manager for a \$645,000 contract to perform asbestos surveys at the Department of the Navy facilities in Norfolk, Cranney Island and Yorktown. Project included over 12,000,000 square feet of building space and over 1,500 facilities.

Project Manager for a contract to perform inspections, prepare abatement plans and

specification for at the Department of the Navy facilities under jurisdiction of LANTDIV.

Project manager and instructor for training at the Washington Navy Yard (formally CHESDIV) involving courses for asbestos inspection, asbestos abatement design and underground storage tank removal.

Project Manager of National Bureau of Standards Inspection and Asbestos Abatement Projects. Included survey of facilities as well as preparation of abatement plans and specifications.

Principal-in-Charge of project with major transportation maintenance facility where engineering and geologic services were performed. Investigation identified areas of contaminated soils, investigated the integrity of the groundwater, developed a remedial action plan and monitored remedial action. Project developed into a design/construction project for remediation of soil and the construction of an industrial wastewater treatment facility for separation of oil and treatment of contaminated storm water. Total project cost was approximately \$4,000,000.

MICHAEL R. WILLINGER, P.G.
Project Geologist II

EDUCATION

B.S., Geology, concentration in Engineering Geology, James Madison University, 1999

40-Hour Hazardous Waste Operations and Emergency Response-Confined Space Training

Certified for Visible Emissions Evaluation by EPA Method 9

PROFESSIONAL REGISTRATION

Professional Geologist: Virginia-No. 1605

PROFESSIONAL AFFILIATIONS

American Institute of Professional Geologists (AIPG), Virginias Section; Former Membership Directory Editor, Registered Member

Solid Waste Association of North America (SWANA), Virginia Chapter; Member

Virginia Association of Professional Soil Scientists (VAPSS), Member

CONTINUING EDUCATION

The Waterloo Training Course Series – Water Quality Data Management & Modeling, September 21-23, 2005

Virginia Tech Outreach and International Affairs – Basic Soil Science Short Course, March 9-10, 2006

ASTM International Technical and Professional Training – Environmental Site Assessments for Commercial Real Estate, April 25-26, 2006

VAPSS Spring 2006 Technical Session – Acid Sulfate Soils: Their Recognition and Remediation, May 22-23, 2006

The Nielsen Environmental Field School - The Complete Ground-Water Monitoring Field Course, March 19-23, 2007.

Sanitas Technologies – Applied Groundwater Statistics Short Course, March 13-14, 2008

Princeton Groundwater, Inc. – The Groundwater Pollution and Hydrology Course, March 15-19, 2010.

Princeton Groundwater, Inc. – The Remediation Course, October 25-29, 2010.



SUMMARY OF EXPERIENCE

Mr. Willinger has twelve years of progressive geologic, hydrogeologic, and geotechnical engineering experience with municipal, commercial/industrial and federal clients.

His areas of expertise include geologic and hydrogeologic studies, solid waste facility groundwater monitoring programs, and environmental site assessments. He is also experienced in all aspects of planning, implementation, and managing services related to underground storage tank (UST) and aboveground storage tank (AST) closures, release detection and abatement, site characterizations, and remediation.

DETAILED EXPERIENCE

Environmental

Responsible for revamping the groundwater monitoring system at a regional poultry-processing plant in Talmo, Georgia. The project included the abandonment of the existing monitoring well system, the design and



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installation of a new system that meets Georgia Environmental Protection Division (GAEPD) criteria for groundwater monitoring, and quarterly monitoring reports to GAEPD. Also provided a Groundwater Monitoring Program and Land Application System Evaluation, which included groundwater-monitoring instruction for plant personnel, and recommendations for an erosion and sediment control plan that was necessary to maintain compliance with GAEPD land application permit regulations.

Executes groundwater and landfill gas monitoring programs at a number of solid waste facilities throughout the Commonwealth of Virginia. Duties include field operations, statistical analysis of collected data, and reporting to state regulatory agencies.

Performed two successful Alternate Source Demonstrations at a regional municipal landfill that allowed the facility to remain in the detection monitoring phase. This saved the facility thousands of dollars annually in sampling and laboratory costs alone.

Performed numerous Phase I and Phase II Environmental Site Assessments (ESA) at a variety of commercial, residential, and industrial sites throughout Virginia, and in Pennsylvania, West Virginia, Maryland, Georgia, and Kentucky. Clients for ESAs have included banks, commercial lenders, developers, real estate investment trusts, church organizations, and manufacturers. Specific sites include: Waterside Festival Marketplace in Norfolk, Virginia; The Arboretum, an office park in Midlothian, Virginia; Colonial Beach Yacht Center in Colonial Beach Virginia; Mundet, Inc. manufacturing facilities in Colonial Heights and Buena Vista, Virginia; Interbake Foods Richmond Division bakery facility, several Jockey International plants in Kentucky and Georgia, and many others.

Qualified as an Environmental Professional as defined in ASTM Practice E1527-05.

As ESA Program Manager prepares scope of services and budgets for ESA projects, assigns

ESAs to appropriate personnel, acts as project manager, and peer reviews reports for approval by Resource principals.

Performed Environmental Assessments (EAs) throughout Virginia for the Commonwealth's Statewide Agencies Radio System (STARS) program. These EAs were performed in compliance with National Environmental Policy Act (NEPA) requirements for the installation of new cellular/radio towers.

Assisted in the implementation of a Hazardous Chemicals Reporting database program that allowed the client, Smurfit Stone Container Corporation, to maintain compliance with OSHA and EPA regulatory tracking and reporting requirements.

Served on a two-man team in a nationwide lead-based paint assessment project designed to obtain Department of Housing and Urban Development (HUD) lead-free certification for apartment complexes owned by AIMCO, a national real estate investment management firm.

Hydrogeology

Completed a Water Supply Study for Philip Morris USA that allowed the company to evaluate scenarios and options for the use of groundwater to supply their Richmond manufacturing facility in the event of restrictions on the use of the public water supply by the City of Richmond or the Commonwealth of Virginia.

Performed Groundwater Characterization Studies at a number of United States Navy fueling stations and tank farms, including the Norfolk Naval Base, Craney Island Fueling Terminal, and Naval Air Station Oceana.

Petroleum Storage

Project Manager on initial abatement, UST closures, and site characterizations for several regional petroleum corporations including Rennie Petroleum Corporation and FasMart/Shore Stop. Project tasks included



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performing fieldwork, receptor surveys, drilling supervision, data analysis, and preparation of final reports for presentation to clients and the Virginia Department of Environmental Quality (DEQ).

Project Manager on initial abatement, site characterization, and UST closure at a municipal facility in The Town of Orange, Virginia.

Performed extensive field activities for remediation of UST releases including mobilization and operation of a mobile high-vacuum, dual-phase extraction system, monitoring and data collection, and compilation and analysis of data for reports to DEQ.

Assisted in the initial abatement and remediation of a release from a 500,000-gallon AST including removal of free product from site, and operation of subsurface exploration equipment during the site characterization phase of the remediation.

**Appendix F. Statements of Qualifications for Trinitek Services
and Subcontractor Companies**

Trinitek Services, Inc

Oak Ridge Associated Universities (ORAU)

Resource International, Ltd.

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Trinitek Services, Inc.

Nuclear and Environmental Safety Consultants

Trinitek Services, Inc.
2501 Rio Grande Blvd., NW, Suite B
Albuquerque, NM 87104
(505) 242-8200 Phone
(505) 242-8201 FAX
(866)-990-4387 toll-free
www.3tks.com

Summary Statement of Qualifications

Trinitek Services is a small, woman-owned (WOSB), disadvantaged small business (SDB) incorporated in the state of New Mexico (USA). We provide expert regulatory consulting, technical, engineering and scientific services including training and audits focusing on environmental compliance, nuclear engineering, radiation safety, NEPA permitting, environmental assessments, compliance assessments, security systems, nuclear materials licensing, quality assurance, transport-management of nuclear / hazardous wastes. We work in the USA and internationally.

Qualifications and Experience

- Environmental Permitting
- Environmental Remediation
- Licensing Actions for NRC and Agreement States
- Radiation Protection Programs
- Nuclear Materials Protection
- Emergency Response Actions
- Training
- Compliance Audits
- Nuclear Quality Assurance
- Radioactive Waste Consulting
- Environmental Assessments
- Uranium recovery, In-Situ and Conventional Mills
- Hazmat/Rad Transport Consult
- Security Assessments

- Registered Small Disadvantaged Minority Business, WOSB
- Economically Disadvantaged Woman-Owned Small Business (EDWOSB)
- Minority-Owned Business, SDB
- PTAP (Procurement Technical Assistance Program) Certification
- CCR Updated; ORCA current
- DUNS Registry: 80-452-5058
- Primary NAICS Code 541620: Environmental Consultants
- CAGE Code: 503D5
- SIC: 8748 (Environmental Consulting)

Staff Credentials

- Nuclear engineers, PhDs, CHPs (Certified Health Physicists), RCTs (Radiation Control Technicians), PEs, CIHs (Certified Industrial Hygienists), CHMMs (Certified Hazardous Materials Managers), CSPs (Certified Safety Professionals, trainers, and university educators).
- Security Systems specialists and trainers with extensive experience in local, federal and international law enforcement
- Staff and associates come directly from the regulatory framework of NRC, Agreement States, and DOE. We maintain our relationships with senior regulatory decision-makers at these agencies. This allows us to provide clients with assurance that their nuclear safety and environmental actions will be comprehensive and complete.
- Work experience in the regional, national and international arena. Our staff and associates are the best qualified experts in their fields and well experienced with permitting/licensing, developing, and managing related health, safety and environmental compliance programs.
- Staff with USDOE "Q" Clearances.

Affiliations:

- Procurement Technical Assistance Program (PTAP)
- NM Small Business Development Center
- Albuquerque Hispano Chamber of Commerce
- Better Business Bureau (Good Standing)
- Health Physics Society (HPS)
- HPS Fellow Emeritus
- American Academy of Health Physics
- INMM: Institute of Nuclear Material Management
- ASSE: American Society of Safety Engineers
- ASIS: Security International

NAICS Services Focus: Radiation, Environment, Health, Safety

- **Environmental, Scientific, Engineering Consulting Services:** 541620; 541690; 541712; 541330; 541990; 924110; 562910; 562998
- **Administrative and Management Consulting Services:** 541611; 541618
- **Technical Training and Education Services:** 611430; 611519; 611699; 611710; 923110
- **Radiation/Uranium Consulting, Training And Measurements:** 212291; 541380; 621512
- **Security Systems Analysis:** 561621
- **Emergency Management Consulting And Training:** 624230
- **Regulatory-Environmental and Radiation:** 921120; 921190; 922190
- **International Nonproliferation Consulting And Training:** 928110; 928120

Recent Clients: Government and Commercial

- **AVM Environmental**
- **AMEC** (Phoenix, Arizona)
- **Brainard Animal Health Center**, NM
- **Cavanagh Services Group**, Utah
- **Energetic Materials Research and Training Center**, New Mexico Tech, Socorro, NM
- **Federal Aviation Administration**, Albuquerque, NM
- **Lovelace Respiratory Research Institute (LRRI)**, Kirtland Air Force Base, NM – USDOE Project
- **Mesteña Uranium, LLC**, Corpus Christi, TX
- **Neutron Energy, Inc**, Englewood, CO
- **New Mexico Tech University** (Albuquerque, NM)/ USDOE Global Threat Reduction Initiative (GTRI) Source Recovery program/ Egyptian Atomic Energy Authority (EAEA)/ SNL contract
- **Parametrix, Inc** / Cochiti Pueblo, NM, US Army Corps of Engineers fund
- **Rio Grande Resources Corporation – General Atomics**, San Mateo, NM
- **SWCA, Environmental Consultants**, Albuquerque, Phoenix
- **UniTech Services Group**, Santa Fe, NM and Springfield, MA
- **URS Washington Group**, Carlsbad, NM
- **Cavin and Ingram, PC**, Lee Ranch, NM
- **Pajarito Scientific Corporation**, Santa Fe, NM and international



Worker and Public Health Studies

When people are exposed to hazardous substances at work or in their communities, ORAU helps provide accurate, timely answers to health concerns. Combining more than 30 years of experience in occupational exposure research and established partnerships with leading universities and medical centers, we conduct health studies with the highest levels of quality and integrity.



Worker and Public Health Screenings

Whether you need a rapid health screening or an in-depth epidemiologic study, ORAU works with you to customize a solution to meet your needs and budget. Through our comprehensive approach, we provide support to collect, manage, interpret, analyze and publish public exposure and worker health data. Our team of experts includes:

- Epidemiologists
- Statisticians
- Technical writers
- Information and database managers
- Health communication specialists
- Public health professionals
- Health physicists

Occupational Illness and Injury Surveillance

Identifying groups of workers that may be at increased risk for occupational-related injury or illness facilitates rapid response to worker health concerns. ORAU can assess the overall health of your workforce, regardless of the number of sites and facilities. If the study indicates excessive risk, we work with you to decide if additional investigations are needed.

Beryllium Exposure Studies and Testing

ORAU operates one of only four laboratories in the United States certified to perform the beryllium lymphocyte proliferation test, which determines if a person has developed a sensitization to beryllium. Our lab consistently achieves a near-zero-percent error rate in tests performed and is accredited by the College of American Pathologists. ORAU maintains a registry of beryllium test data for more than 28,000 current and former employees from 21 U.S. Department of Energy sites.

Research and Medical Database Management

ORAU combines medical study expertise with database design and epidemiologic information systems experience to help our customers conduct reliable studies, track results and analyze population trends. ORAU manages DOE's worker health data center, which aggregates data from five illness and injury databases and the Nuclear Regulatory Commission Radiation Exposure Information Reporting System. Together these systems contain millions of worker health records that are being used by medical professionals worldwide to ensure the continued health of workers in the nuclear, aerospace and defense fields.

Radiation Dose Reconstruction

ORAU's team of health physicists and radiation records specialists excels in analyzing worker and facility data to support dose reconstruction. When data isn't available for an unmonitored worker, we have developed statistical methods to analyze co-worker data to estimate doses to their unmonitored colleagues.



Customer Highlight: Toxic Exposure Hits Home

After the 2008 coal fly ash spill at its Kingston Fossil Plant, the Tennessee Valley Authority sought ORAU's expertise to manage public health concerns. We partnered with Vanderbilt Medical Center to conduct an independent medical screening program at no cost to the 214 area residents who chose to participate. An extensive outreach effort helped answer questions and calm fears, and the study found no immediate adverse health effects caused by the spill.

Working with ORAU

We have a variety of contract vehicles in place to make it easy to work with us, including GSA MOBIS and the DOE ORISE Work for Others program. Visit www.orau.org/contracts for details.

Key Customers

- Defense Threat Reduction Agency
- National Institute for Occupational Safety and Health
- U.S. Department of Energy
- U.S. Nuclear Regulatory Commission



For more information:

865-576-3115

occ.health@orau.org

www.orau.org/occupational-exposure-worker-health-studies



For program information:

DOE National Supplemental
Screening Program
866-812-6703

DOE Beryllium Vendors Medical
Screening Program
866-219-3442

NIOSH Dose Reconstruction Project
800-322-0111

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Managed by ORAU for the U.S. Department of Energy

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www.resourceintl.com



MISSION STATEMENT

**“We challenge ourselves to rethink the traditional,
To apply innovative and sustainable technology,
And to identify creative engineering and
environmental solutions,
In order to earn our clients for life.”**

Our Corporate Challenge

“Be the Best, Make it Personal, NOW.”

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- 9. Transportation Services**
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GENERAL OVERVIEW

Resource International, LTD., a SWaM certified Small Business (License#684640), provides engineering & consulting services to small businesses, large commercial & industrial corporations, & all levels of government. Started in 1979, the company is headquartered in Ashland, Virginia.

Resource's experienced team of engineering and scientific professionals provides complete planning to assist the economic development needs of our clients. Our commitment to quality service is exemplified through the following blend of assets:

- Experienced urban & suburban planners.
- Innovative water & wastewater system designers.
- 30 years of commercial & industrial design.
- Environmental planners & designers protecting water & wetland resources.
- Professionals using technology to achieve sustainable development.
- Engineers experienced solid waste management field.



We employ a broad, experienced team of professionals including:

- Civil Engineers
- Land Surveyors
- Municipal Engineers
- Wetland Scientists
- Environmental Engineers
- Solid Waste Engineers
- Groundwater Specialists
- Municipal Planners
- Land Planners
- Landscape Architects
- Transportation Engineers
- Geologists
- Hydrologists
- Computer Modelers
- Graphic Designers

These professionals provide services to industrial, commercial, and government clients in the areas of:

- Land Development Planning & Engineering
- Municipal Planning & Ordinances
- Economic Development
- Water Supply & Wastewater Treatment
- Solid Waste - Planning, Permitting, Design, & Closure
- Wetlands Delineation & Permitting
- Environmental Assessments & Impact Analysis
- Financial Feasibility Studies
- Industrial Permitting
- Industrial Site Development

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LAND PLANNING SERVICES

Resource International, LTD. offers comprehensive land planning, landscape, and design services through our in-house certified planners and technical staff in a variety of commercial, industrial, governmental, residential, and recreational developments.

Planning gives the direction for growth to the community while landscape services improves the quality of life within it. Our team provides comprehensive land planning, design, land use, and zoning services for private and public clients within the state of Virginia, North Carolina, and West Virginia. We believe very strongly in working together as a team. Collaboration enables us to provide a complete service by assisting clients from the design concept to final construction of their project.

Land Planning Services:

- Site Planning
- Conceptual Design
- Landscape Services
- Rezoning Applications
- Public Presentation
- Permitting Assistance
- Fatal Flaw Analysis & Due Diligence Studies
- Environmental Overview
- Site Research and Feasibility
- Site/Facility Expansion Plan
- Renderings



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LAND DEVELOPMENT SERVICES

Resource International, LTD. offers a full range of engineering and technical services to support commercial, residential, and industrial property developers. These services include site plan preparation, public hearings and presentations, development layout and feasibility studies, site and project engineering, commercial building design, recreational facility planning, on-site and off-site utilities, parking lot design, and project management.



Farms of New Kent
New Kent County, VA



JDA Building
Isle of Wight, VA



Soccer Field



King Charter
Hanover County, VA

SUBDIVISIONS & PLANNED COMMUNITIES

Types of Projects

- Age Restricted Development
- Golf Course Communities
- Mixed-Use Development
- Multifamily Complexes
- Neo-Traditional Communities
- Planned Unit Development
- Traditional Subdivisions

COMMERCIAL DEVELOPMENT

Types of Projects

- Banks
- Convenience Centers
- Day Care Centers
- Flex Space
- Gas Stations
- Mini-Storages
- Office Buildings
- Office Parks
- Quick Serve Restaurants
- Service Centers
- Shopping Centers



Atlee Station
Hanover County, VA

INDUSTRIAL DEVELOPMENT

Types of Projects

- Brick/Paver Plants
- Distribution Centers
- Economic Development

- Manufacturing Facilities
- Import Centers
- Industrial Parks
- Warehouses

OTHER DEVELOPMENT

Types of Projects

- Dam Rehabilitation
- Fairgrounds
- Parks
- Trails
- Utilities



The Bluffs at Bell Creek
Hanover County, VA

SERVICES OFFERED

- Feasibility Studies
- Concept Plans
- Opinions of Probable Costs
- Early Land Disturbance Plans
- Erosion Control Plans
- Geotechnical Investigation Coordination
- Lot Grading Plans
- Master Plans
- Plans of Development
- Rezoning, CUP, & Special Exceptions
- Storm Water Management Basin Design
- Site Observations
- Traffic Impact Studies
- As Reported Drawings

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COMMERCIAL SERVICES

Resource International, LTD. offers a full range of engineering and technical services to support commercial and industrial property developers. These services include development layout and feasibility studies, site and project engineering, commercial building design, on-site and off-site utilities, parking lot design, project management, site plan preparation, and public hearings and presentations.

Development Services

- Site Planning and Development
- Site Investigation Report
- Conceptual Plan
- Subdivisions
- Master Plans
- Industrial Parks
- Site Feasibility Studies
- Rezoning - Local Permitting
- Public Hearing
- Earthwork Computations
- Environmental Site Assessments
- Wetland Permitting
- Boundary Survey
- Construction Phase Services
- Up-to-Date Computer Software for Storm Water Analysis and Design
- Budget Cost Estimates



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ENVIRONMENTAL SERVICES

Resource International, LTD. has a staff of natural resource professionals which includes biologists, ecologists, geologists, hydrologists, hydrogeologists, and engineers who are fully knowledgeable of all phases of environmental science.



**Small Whorled Pogonia
(Endangered Species)**



Wetland Delineation



Dock Permitting (RP19)

Environmental

- ESA's Phase I and II
- Environmental Impact Assessments
- Threatened and Endangered Species Studies

Permitting

- NPDES
- VPA
- Waters of the U.S./Wetland
- Solid Waste
- Storm Water
- Air Pollution

Wetlands and Streams

- Wetland Determinations & Delineations
- Stream & Perenity Assessments
- Wetland Functional Value Assessments
- RPA Determinations
- Permitting
- Wetland Creation/Restoration Siting & Design
- Stream Restoration & Design

Groundwater

- Groundwater Studies
- Groundwater Withdrawal Permits
- Groundwater Contamination Assessment
- Groundwater Monitoring & Modeling
- Risk Assessment
- Corrective Action Plans

Facility

- UST Removal, Reimbursement
- Above Ground Storage Tanks
- Spill Prevention Plans
- Waste Minimizations
- ISO - 14000 consultation
- Landfill Gas Monitoring



Waters of the US Delineation

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SURVEYING SERVICES

Resource International, LTD. surveying department is managed by a licensed surveyor and includes field crews and associated office support personnel who are responsible for obtaining field data and converting it to plat, design and/or construction information for projects. Over the past five years, Resource staff has completed over 350 surveying projects. Resource uses both conventional surveying practices and technically advanced methods involving the use of satellite-based GPS (Global Positioning System). The horizontal and vertical control from these surveys are the very data bases from which GIS (Geographic Information Systems) evolve. Resource routinely provides surveys conforming to ALTA/ACSM standards. Strip surveys for utility designs, topographic surveys for site plans and wetland boundary surveys have been performed for engineering, environmental, electrical, mechanical, structural, geotechnical, and architectural design projects. We offer the following surveying services:

- Ground Control
- ALTA/ACSM
- Boundary Surveys
- Utility Design Survey
- Topographic Survey
- Record Drawing Surveys
- Easement Plats
- Wetland Surveys
- Environmental Surveys
- Construction Verification Surveys



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WATER/WASTEWATER SERVICES

Resource International, LTD. has provided a full range of engineering services for governmental and industrial clients which have included problem definition, engineering feasibility, design, construction surveillance, and operations consultation.

WATER

Resource has been providing quality engineering and scientific services to ensure safe, dependable sources of drinking water. Water engineering encompasses the full range of treatment, pumping, storage, collection, and distribution facilities.

Resource has planned and designed water supply systems ranging from small developments to major county facilities as well as designed water transmission lines, pumping stations, and storage systems to meet operating, emergency, and fire protection requirements. Resource uses innovative and cost-effective methods to develop efficient and reliable solutions. For example, computer modeling of system networks allows us to test various development alternatives within a water system. Resource uses network modeling to size pipes, locate storage tanks, optimize system operations and develop water supply plans.

Resource's construction management team has assisted clients in bidding projects, awarding contracts and administering the contract during construction. In addition, Resource provides representatives to observe construction for conformance with the contract documents.

WASTEWATER

Resource has been providing quality engineering and scientific services to ensure effective and dependable infrastructure for wastewater collection, transport, treatment, and disposal. Resource's innovation has produced more cost-effective wastewater facility alternatives than normally available through conventional methods. Resource has planned and designed wastewater systems ranging from small developments to major county facilities. Resource has designed collection systems, pumping stations, and treatment plants. Computer modeling of system networks allows us to test various development alternatives within a community's wastewater system. Resource has provided timely and quality engineering services to ensure effective

and dependable wastewater collection, pumping and treatment.

- Collection Systems
- Pumping Systems
- Feasibility Studies
- Process Design
- Process Evaluation
- Treatment Plant Designs
- Treatability Studies
- Construction Management
- Start-up Services
- Force Main Design
- Discharge Permitting
- Funding Applications
- Master Plans
- Pre-treatment Facility
- Bidding Assistance
- I & I Studies
- Construction Surveillance

INDUSTRIAL

- Facility Site and Building Design
- Process System Design
- Equipment Layout Design
- Dam and Reservoir Design
- Permitting (Air, water, etc.)
- Endangered Species Determinations
- Wetlands Delineation
- Geological Studies
- Water Supply Design
- Hazardous Waste Surveys
- Wastewater Treatment Plant Design
- Oil Spill Plans
- Stormwater Plans
- Waste Minimization Studies
- Pollution Prevention Plans
- Odor Control Plans
- Air Emission Testing

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SOLID WASTE SERVICES

Resource International, LTD. has over 30 years of solid waste experience and a team on professional engineers, scientists, and technical professionals to meet your needs.



**Lining Subgrade
King & Queen Landfill**



**Liner Installation
Ashcake Road Landfill**



**Landfill Gas to Energy
Stafford County, VA**



**Active Gas Extraction System
Fredericksburg, VA**

LANDFILL FACILITIES

- Part A & Part B Permitting & Design
- Cost Opinions for Financial Assurance
- Landfill Gas Control & Management
- Air Permitting
- Environmental Monitoring & Modeling
- Storm Water Pollution Prevention Plans
- VPDES Permits & Outfall Monitoring
- Operations Review & Evaluations
- Construction Phase Services
- QA/QC & CQA Documentation
- Surveying

WASTE TRANSFER

- Permit-by-Rule Submittals
- Transfer Stations
- Material Recovery Facilities
- Drop-off Centers / Public Use Areas
- Spill Prevention, Control, & Countermeasures Plans
- Construction Phase Services

PLANS & STUDIES

- Site Selection Evaluations & Studies
- Site Plans & Local Zoning & Approvals
- Solid Waste Management Plans
- Waste Characterization Studies
- Financial Analyses
- Site Life Evaluations
- Rate (Tipping Fee) Studies
- Privatization Studies (Public vs. Private Operations)
- Transportation Studies



**Membrane Liner Installation
King William County, VA**



**Landfill Closure
Prince Edward County, VA**



**Leachate Pond
Prince Edward County, VA**



**Convenience Center
New Kent County, VA**

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TRANSPORTATION SERVICES

Resource International, LTD. incorporates transportation studies and design services in many of our projects. The transportation staff interacts with all Resource departments frequently to assist with questions of access, geometric standards, entrance permits, traffic operations, traffic generation, street design, and pavement design.



Route 106 - Roundabout



Traffic Signal



Road Design

Land Development

- Traffic Impact Studies
- Entrance Design
- Traffic Circulation
- Roundabouts
- Pavement Design
- Utility Coordination
- Pedestrian and Bicycle Facilities

Road Design

- Preliminary Plans
- Coordination with Controlling Agencies
- Construction Plans
- Maintenance of Traffic Plans
- Public Hearings
- Construction Administration



Interchange Modification

Traffic Operations

- Traffic Signal Design
- Capacity Studies
- Accident Analyses
- Intersection Analyses
- Traffic Volume Counts
- Sign Layout
- Traffic Calming



Road Layout Plan

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P.O. Box 6160
Ashland, VA 23005-6160
(804) 550-9200

www.resourceintl.com



INDUSTRIAL SERVICES

Resource International, LTD. has over 30 years of experience in assisting with permitting industrial projects. Project services include permits and compliance applications for:



Regional Jail Facility

- Air Pollution Permits
- Wastewater Discharge Permits
- Solid Waste Facility Permits
- Site Plan Design & Permitting
- Environmental Permitting & Compliance



Landfill Gas to Energy



Distribution Center

Selected industries that Resource has provided site and environmental permitting services for include:

- Electrical Utilities
- Chemical
- Paper
- Fertilizer
- Aggregate
- Food
- Apparel
- Waste Management



Agronomics Facility



Paper Company

Services provided to our industrial clients include:

- Feasibility Studies
- Compliance Oversight & Review
- Environmental Permitting
- Engineering Design & Construction Plans
- Regulatory Permitting & Negotiations
- Construction Administration



Power Station



Landfill Gas to Energy



Co-Generation Plant

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GRANTS/FUNDING

Resource International, LTD. (Resource) understands the problems related to funding, finding the best alternatives available and evaluating options for defining a cost effective and viable project. Resource has helped local communities obtain over **\$133, 936,733** million dollars in grant and loan funding. Resource has assisted communities with various aspects of projects that include the following:

- Defining projects and opinions of costs through a Preliminary Engineering Report (PER).
- Prepare financial analysis of project including rates.
- Prepare Rural Utilities Services (RUS) funding application and assist in other funding source applications.
- Prepare the Environmental Assessment required by most funding sources.
- Prepare Plans and Specifications in accordance with funding agency requirements.
- Prepare Contract Documents in accordance with funding agency requirements.
- Assist in bidding and prepare documents of the bid results for the funding agencies.
- Administer the project during construction and provide documentation to funding agencies for close-out.

The following clients and projects are examples of Resource's experience with funding sources for projects such as low interest loans and grants.

- Westmoreland County
 - o Route 3 Industrial Park
EDA Grant \$ 521,160
 - o Route 3 Wastewater System
RUS Loan \$ 308,200
RUS Grant \$ 350,000
 - o Coles Point Phase 1
RUS Loan \$1,814,923
RUS Grant \$3,750,194
 - o Coles Point Phase 2
RUS Loan \$ 670,756
RUS Grant \$ 638,650
 - o Washington District Phase 1
RUS Loan \$2,461,210
RUS Grant \$4,251,500
CDBG \$ 280,000
 - o Washington District Phase 2
RUS Loan \$4,500,000
RUS Grant \$2,513,800
- Richmond County/Town of Warsaw
 - o Water and Wastewater
EDA Grant \$1,000,000
CDBG Grant \$ 700,000
- Northumberland County
 - o Fletton/Chesapeake System
RUS Loan \$1,241,580
RUS Grant \$2,338,590
 - o Callao System
RUS Loan \$ 935,770
RUS Grant \$1,445,000
- King William County
 - o Mount Olive Community and Utility Systems
CDBG Grant \$1,400,000
RUS Grant \$ 94,400
- Bell Creek Community Development Authority, Hanover County, VA
 - o Special Assessment Bonds \$15, 980,000
- The Farms of New Kent Community Development Authority, New Kent County, VA
 - o Special Assessment Bonds \$85, 666,000
- Town of Orange
 - o Raw Water Storage Basin
EPA Grant \$ 315,000
RUS Grant \$ 500,000
State Grant \$ 260,000

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(804) 550-9200

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LOCAL GOVERNMENT SUPPLEMENTAL STAFF SUPPORT

Resource International, LTD. (Resource), a multi-disciplinary engineering and environmental consulting firm, assists Virginia's Cities, Towns, and Counties with engineers, scientists, and planners to supplement their short term or long term staff needs. Resource understands the problems related to staff turnover or having the budget to fund full time positions and can provide you with experts for the following positions:

- Director of Community Development
- Traffic Engineer
- Public Works Engineer
- Certified Erosion and Sediment Control Inspectors
- Director of Economic Development
- County Utilities Engineer
- Certified Site Plan Reviewer
- Certified Erosion and Sediment Control Plan Reviewer
- Certified Utility Plan Reviewer

Below are examples of the type of technical services Resource has provided local governments to supplement their staffing needs:

- **Westmoreland County** – Supplemental staffing for utility plan review, site plan review and civil engineering (Public Works). Support services for master sewer planning, utility design, assistance in loan and grant applications, and environmental services.
- **King William County** – Supplemental staffing for site plan review, erosion and sediment control plan review, utility rate evaluation, utility standards, assistance in grant applications, utility plan review of developer's projects and utility master plans. Support services for park facilities master plan, utility design, assistance in loan and grant applications, and environmental services.
- **Town of Orange** – Supplemental staffing for site plan review and erosion and sediment control plan review. Support services for Utility design, roads design, public works facility design, grant applications and environmental services
- **Town of Dumfries** - Supplemental staffing for Interim Director of Community Development; also Traffic Engineer to review special traffic studies
- **Northumberland County** – Support services for review of utility plans of developer's projects and support services for design of wastewater projects.
- **Lancaster County** – Supplemental staffing for Comprehensive Plan update and support services for industrial parks and zoning assistance.
- **New Kent County** – Support services for water and wastewater projects, small area plan and solid waste transfer station.
- **Hanover County** – Support services consisting of design services for Utilities Department, Public Works Department and the Parks and Recreation Department
- **Essex County** - Support services for site plan review, erosion and sediment control plan review, and erosion and sediment control site inspections.

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ENGINEERS ● SCIENTISTS ● SURVEYORS ● PLANNERS



9560 Kings Charter Drive
Ashland, VA 23005
(804) 550-9200 * FAX (804) 550-9259

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APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

III.A. Initial Literature Analysis and Recommendations

Number	Description	Task Assignment
1.	Virginia and Other Relevant Studies Utilize summary information prepared by the Uranium Working Group agencies from the existing Virginia uranium mining studies (that is, National Academy of Sciences/National Academies Press [NAS/NAP], Virginia Beach, Roanoke River Basin, Chmura, as well as other relevant studies), and make recommendations relevant to the Board of Health's mission to protect public health and the environment. The summary should include, but not be limited to: uranium milling and mining, public drinking water systems, private wells, cisterns, springs, and recreational water issues, human and animal health (including occupational and reproductive health; teratogenesis; mutagenesis; carcinogenesis; unintentional injury; chronic disease; and toxic exposures (both acute and chronic), silicosis, and other unusual occurrences of diseases of public health concern with special attention to vulnerable populations such as infants and children). a) Review available scientific literature on: 1) epidemiologic studies measuring long-term effects of exposures to radioactive materials and toxic substances as might be encountered in mining operations of the type proposed for Virginia; 2) limitations of available studies and recommendations of public health experts on design of relevant studies. b) Assist VDH with development of surveillance and epidemiologic studies to evaluate short and long term health effects associated with mining. Studies must include consideration of sources for accurate, valid baseline levels of materials of concern in the environment and in animals and humans.	Trinitek: • All except topics set aside for Resource and ORAU. • Animal health • Evaluate findings Resource International: • Review Virginia-based studies pertaining to water quality Oak Ridge Associated Universities (ORAU): • Facets related to toxicology and epidemiology (excluding animal health)

(Continued next page)

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS
III.A. Initial Literature Analysis and Recommendations ... continued

Number	Description	Task Assignment
2.	Existing Regulatory Programs Compares existing uranium mining and milling regulatory programs including Nuclear Regulatory Commission (NRC), any Agreement State programs, and international programs (such as Canada and France) and recommends provisions from within those regulatory programs that are relevant to the Board of Health's mission as described above. Identify where additional requirements may be appropriate to accommodate Virginia-specific population density, rainfall, climate, water table levels, and unique geography.	Trinitek: • All Resource International: • Evaluate findings from a Virginia perspective Oak Ridge Associated Universities (ORAU): • N/A
3.	International Emerging Standards Summarizes pertinent information and studies from such groups as the International Atomic Energy Agency, the World Nuclear Association, etc. and provides recommendations based on this review that are relevant to the Board of Health's mission as described above, including modern best international practices and other emerging standards and technologies. Identify internationally accepted best practices that can be implemented to mitigate the risk of radioactive releases, discussing technologies available to reduce emissions and maintain a focus on pollution prevention and reduction, including strategies for emergency hazards enumerated in the Commonwealth of Virginia Emergency Operations Plan.	Trinitek: • IAEA, WNA, etc. • Nuclear/radiation controls and containments • Strategies for Virginia Emergency Operations Plan Resource International: • Hydrogeology • Pollution Prevention Oak Ridge Associated Universities (ORAU): • N/A

(Continued next page)

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS
III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff

Subsection 1. – Coordinate With VDH Staff

Trinitek will coordinate with VDH staff and be available to attend at least monthly progress meetings to develop analyses of the following items and to develop and provide a final report. The Trinitek project manager will be available to meet with VDH staff, either face-to-face or via conference calls, as needed to develop interim deliverables and the final report.

Number	Description	Task Assignment
a)	Existing Statutes and Regulations Compare the Commonwealth's existing statutes and regulations to recommendations in the initial report.	Trinitek: - Health statutes and regulations - Evaluate findings
b)	Modification or Expansion of Existing Regulations Identify areas where VDH's existing regulations might need to be modified or expanded to ensure protection of public health and the environment.	Resource International: - Environmental quality statutes and regulations Oak Ridge Associated Universities (ORAU): - N/A
c)	Recommended Changes Recommend changes (including statutory changes) to meet these needs.	
d1)	Waterworks Regulations Perform an evaluation that includes a review of the Waterworks Regulations (12VAC5-590 et seq.).	Trinitek: - Evaluate findings Resource International: - All Oak Ridge Associated Universities (ORAU): - N/A
d2)	Disease Reporting and Control Regulations An evaluation that includes a review of the Disease Reporting and Control Regulations (12VAC5-90-90 et seq.) (requirements for reporting by healthcare providers and laboratories).	Trinitek: - Evaluate findings Resource International: - N/A Oak Ridge Associated Universities (ORAU): - All

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff ... continued

Number	Description	Task Assignment
d3)	Private Well Regulations Perform an evaluation that includes a review of the Private Well Regulations (12VAC5-630 et seq.). Develop conceptual framework and initial project costs to determine the impact on quantity and quality of water in private wells and springs and recommended procedures for replacing or remediating affected supplies. Framework should be capable of characterizing an inventory of impacted wells, springs, recreational waters and cisterns.	Trinitek: - Evaluate health impacts - Evaluate findings Resource International: - All except evaluation of health impacts Oak Ridge Associated Universities (ORAU): - N/A
d4)	Facilitate the Stakeholder Process Facilitate the stakeholder process, including any potentially inspected regulated community (at least 5 statewide meetings with separate final report) to gauge concerns and identify possible solutions concerning regulation of public water supplies and private wells as to water quality and quantity.	Trinitek: - All Resource International: - N/A Oak Ridge Associated Universities (ORAU): - N/A
d5)	Recreational Uses of Waters Perform an evaluation that includes a review of the regulations concerning recreational use of waters (campgrounds, summer camps, etc.).	Trinitek: - Evaluate findings Resource International: - All Oak Ridge Associated Universities (ORAU): - N/A

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS
III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff ... continued

Number	Description	Task Assignment
e)	Health Outcomes Data Determine and characterize available data (including national and Virginia-specific data) on potential health outcomes related to exposures of concern. Determine if current reporting requirements and laboratory testing capability cover chemicals likely to be encountered in mining operations under consideration. Determine if current tobacco use surveillance is adequate for establishing baseline data for rates of lung cancer, silicosis, and radon-associated health problems using standard epidemiological analytic methods. Determine whether other available data is sufficient to establish baseline rates for conditions of concern (e.g., current silicosis reporting data) or if retrospective or other studies are indicated to determine baseline rates. Evaluate and propose changes to cancer, congenital malformation reporting if necessary.	Trinitek: - Evaluate findings Resource International: - N/A Oak Ridge Associated Universities (ORAU): - All
f)	Test Case Report Investigation Worksheets and Documents Develop and test case report investigation worksheets and other documents for local Health Department and Central Office use in any necessary investigations for relevant health outcomes.	Trinitek: - Evaluate findings Resource International: - N/A Oak Ridge Associated Universities (ORAU): - All
g)	Locus of Long-Term Health Monitoring Determine locus of responsibility for the long-term monitoring of adverse health effects ensuring worker health and safety as well as additional recommended monitoring.	Trinitek: - Evaluate findings Resource International: - N/A Oak Ridge Associated Universities (ORAU): - All

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff ... continued

Number	Description	Task Assignment
h)	Worker Safety Evaluate monitoring of work spaces, monitoring of exposures for mine workers, tracking of worker cumulative exposures, adequacy of existing MSHA regulations and comparisons with international standards for radon and radon daughters.	Trinitek: • All Resource International: • N/A Oak Ridge Associated Universities (ORAU): • N/A
i)	Environmental and Health Framework Recommend a framework for environmental, human health and animal health monitoring so that data can be maintained in compatible systems for analyzing health effects, including long term monitoring.	Trinitek: • Environmental monitoring except water • Animal health • Evaluate findings Resource International: • Water monitoring Oak Ridge Associated Universities (ORAU): • Facets related to toxicology and epidemiology (excluding animal health)
j)	Impacts to Cisterns and Onsite Sewage Systems Determines potential impacts (if any) on cisterns and onsite sewage systems.	Trinitek: • Evaluation of health impacts • Evaluate findings Resource International: • All except evaluation of health impacts Oak Ridge Associated Universities (ORAU): • N/A

(Continued next page)

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

Subsection 2 – Address VDH-Related Issues

Trinitek recommendations should address VDH-related issues, including those listed below, as well as any other issues identified by Trinitek as being necessary and relevant for effective life cycle regulation of uranium mining and milling in Virginia.

Number	Description	Task Assignment
a)	Water Quality Monitoring Plan for Surface Waters Including but not limited to: 1) Human health risks associated with chemical toxicity; 2) Human health risks associated with radiological toxicity; and, 3) Human health risks associated with consumption of affected animal and marine populations.	Trinitek: • Health risk evaluations • Evaluate findings Resource International: • Preparation of plans Oak Ridge Associated Universities (ORAU): • N/A
b)	Water Quality Monitoring Plan for Groundwaters Including but not limited to: 1) Human health risks associated with chemical toxicity; 2) Human health risks associated with radiological toxicity; 3) Human health risks associated with consumption of affected animal and marine populations; and, 4) The potential impact on groundwater quality and quantity as these affect public wells, private wells and springs.	Trinitek: • Health risk evaluations • Evaluate findings Resource International: • Preparation of plans Oak Ridge Associated Universities (ORAU): • N/A
c)	Adequacy of Virginia's Water Quality Standards for Groundwater and Surface Waters, and Virginia's Waterworks Regulations As the above regulations relate to human health outcomes: 1) To address water-soluble radionuclides or absorbed chemicals; 2) To address the potential for undiluted tailings liquids to exceed existing Safe Drinking Water Act standards for uranium; and, 3) To address the potential for revised Public Drinking Water System's monitoring schedules for radiological contaminants and other hazardous substances within potentially impacted areas.	Trinitek: • Water-soluble radionuclides and absorbed chemicals • Undiluted tailings liquids exceeding SDWA standards • Evaluate findings Resource International: • Address potential revisions to Public Drinking Water System's monitoring schedules Oak Ridge Associated Universities (ORAU): • N/A

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff ... continued

Number	Description	Task Assignment
d)	Safe Disposal of Mine Waste Evaluate the existing standards for the safe disposal of mine waste as it pertains to human health.	Trinitek: • All Resource International: • Evaluate findings from a Virginia perspective Oak Ridge Associated Universities (ORAU): • N/A
e)	Environmental Impact Analysis Evaluate necessary components of full environmental impact analysis.	Trinitek: • All Resource International: • Evaluate findings from a Virginia perspective Oak Ridge Associated Universities (ORAU): • N/A
f)	Methods for Incorporating "As Low As Reasonably Achievable" (ALARA) Standards To be incorporated into Commonwealth regulations, like those that exist for radiological protection.	Trinitek: • All Resource International: • N/A Oak Ridge Associated Universities (ORAU): • N/A
g)	Financial Assurance Recommendations for compliance period financial assurance mechanisms providing for minimization of long-term impacts to water resources and necessary remediation.	Trinitek: • Evaluate the adequacy of existing NRC requirements for milling • Evaluate findings Resource International: • Evaluate the adequacy of all other pertinent existing requirements and recommend changes Oak Ridge Associated Universities (ORAU): • N/A

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS
III.B. Ongoing Technical Advice and Assistance to Commonwealth of Virginia Staff ... continued

Number	Description	Task Assignment
h)	Environmental Monitoring Recommendations for environmental monitoring, including but not limited to: 1) Required components of an environmental monitoring plan; 2) Recommended goals to include in an environmental monitoring plan; and, 3) Recommended baseline and characterization data needed.	Trinitek: - Air quality, soil, and biota monitoring portion of plan and baseline/characterization data - Evaluate findings Resource International: - Water quality monitoring portion of plan and baseline/characterization data Oak Ridge Associated Universities (ORAU): - N/A
i)	Evaluate NRC Regulations Evaluation of NRC regulations for milling and tailings management given state-specific climate (e.g., rainfall) and hydrologic considerations.	Trinitek: - All Resource International: - Evaluate findings from a Virginia perspective relevant to state-specific climate (e.g., rainfall) and hydrologic considerations Oak Ridge Associated Universities (ORAU): - N/A

III.C. Assist VDH in Preparing and Presenting Reports

Number	Description	Task Assignment
N/A	Assist VDH in preparing and presenting information and assist in VDH staff's presentations.	Trinitek will lead this portion of the project but will be assisted by Resource International and ORAU as appropriate to complete the task.

APPENDIX D
RFP # 1200001-999 Virginia Department of Health
TASK ASSIGNMENTS MATRIX FOR SERVICES REQUIRED IN STATEMENT OF NEEDS

III.D. Assist VDH in Formulating a Draft Conceptual Regulatory Framework

Number	Description	Task Assignment
N/A	Discuss the reports and recommendations enumerated above with VDH and assist staff in implementing findings/recommendations into a draft conceptual regulatory framework that would address VDH-issues for the entire life-cycle compliance period of milling projects in Virginia, as well as other impacted Commonwealth of Virginia regulations.	Trinitek will lead this portion of the project but will be assisted by Resource International and ORAU as appropriate to complete the task.

MICHAEL R. WILLINGER, P.G.
Project Geologist II

EDUCATION

B.S., Geology, concentration in Engineering Geology, James Madison University, 1999

40-Hour Hazardous Waste Operations and Emergency Response-Confined Space Training

Certified for Visible Emissions Evaluation by EPA Method 9

PROFESSIONAL REGISTRATION

Professional Geologist: Virginia-No. 1605

PROFESSIONAL AFFILIATIONS

American Institute of Professional Geologists (AIPG), Virginias Section; Former Membership Directory Editor, Registered Member

Solid Waste Association of North America (SWANA), Virginia Chapter; Member

Virginia Association of Professional Soil Scientists (VAPSS), Member

CONTINUING EDUCATION

The Waterloo Training Course Series – Water Quality Data Management & Modeling, September 21-23, 2005

Virginia Tech Outreach and International Affairs – Basic Soil Science Short Course, March 9-10, 2006

ASTM International Technical and Professional Training – Environmental Site Assessments for Commercial Real Estate, April 25-26, 2006

VAPSS Spring 2006 Technical Session – Acid Sulfate Soils: Their Recognition and Remediation, May 22-23, 2006

The Nielsen Environmental Field School - The Complete Ground-Water Monitoring Field Course, March 19-23, 2007.

Sanitas Technologies – Applied Groundwater Statistics Short Course, March 13-14, 2008

Princeton Groundwater, Inc. – The Groundwater Pollution and Hydrology Course, March 15-19, 2010.

Princeton Groundwater, Inc. – The Remediation Course, October 25-29, 2010.



SUMMARY OF EXPERIENCE

Mr. Willinger has twelve years of progressive geologic, hydrogeologic, and geotechnical engineering experience with municipal, commercial/industrial and federal clients.

His areas of expertise include geologic and hydrogeologic studies, solid waste facility groundwater monitoring programs, and environmental site assessments. He is also experienced in all aspects of planning, implementation, and managing services related to underground storage tank (UST) and aboveground storage tank (AST) closures, release detection and abatement, site characterizations, and remediation.

DETAILED EXPERIENCE

Environmental

Responsible for revamping the groundwater monitoring system at a regional poultry-processing plant in Talmo, Georgia. The project included the abandonment of the existing monitoring well system, the design and



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installation of a new system that meets Georgia Environmental Protection Division (GAEPD) criteria for groundwater monitoring, and quarterly monitoring reports to GAEPD. Also provided a Groundwater Monitoring Program and Land Application System Evaluation, which included groundwater-monitoring instruction for plant personnel, and recommendations for an erosion and sediment control plan that was necessary to maintain compliance with GAEPD land application permit regulations.

Executes groundwater and landfill gas monitoring programs at a number of solid waste facilities throughout the Commonwealth of Virginia. Duties include field operations, statistical analysis of collected data, and reporting to state regulatory agencies.

Performed two successful Alternate Source Demonstrations at a regional municipal landfill that allowed the facility to remain in the detection monitoring phase. This saved the facility thousands of dollars annually in sampling and laboratory costs alone.

Performed numerous Phase I and Phase II Environmental Site Assessments (ESA) at a variety of commercial, residential, and industrial sites throughout Virginia, and in Pennsylvania, West Virginia, Maryland, Georgia, and Kentucky. Clients for ESAs have included banks, commercial lenders, developers, real estate investment trusts, church organizations, and manufacturers. Specific sites include: Waterside Festival Marketplace in Norfolk, Virginia; The Arboretum, an office park in Midlothian, Virginia; Colonial Beach Yacht Center in Colonial Beach Virginia; Mundet, Inc. manufacturing facilities in Colonial Heights and Buena Vista, Virginia; Interbake Foods Richmond Division bakery facility, several Jockey International plants in Kentucky and Georgia, and many others.

Qualified as an Environmental Professional as defined in ASTM Practice E1527-05.

As ESA Program Manager prepares scope of services and budgets for ESA projects, assigns

ESAs to appropriate personnel, acts as project manager, and peer reviews reports for approval by Resource principals.

Performed Environmental Assessments (EAs) throughout Virginia for the Commonwealth's Statewide Agencies Radio System (STARS) program. These EAs were performed in compliance with National Environmental Policy Act (NEPA) requirements for the installation of new cellular/radio towers.

Assisted in the implementation of a Hazardous Chemicals Reporting database program that allowed the client, Smurfit Stone Container Corporation, to maintain compliance with OSHA and EPA regulatory tracking and reporting requirements.

Served on a two-man team in a nationwide lead-based paint assessment project designed to obtain Department of Housing and Urban Development (HUD) lead-free certification for apartment complexes owned by AIMCO, a national real estate investment management firm.

Hydrogeology

Completed a Water Supply Study for Philip Morris USA that allowed the company to evaluate scenarios and options for the use of groundwater to supply their Richmond manufacturing facility in the event of restrictions on the use of the public water supply by the City of Richmond or the Commonwealth of Virginia.

Performed Groundwater Characterization Studies at a number of United States Navy fueling stations and tank farms, including the Norfolk Naval Base, Craney Island Fueling Terminal, and Naval Air Station Oceana.

Petroleum Storage

Project Manager on initial abatement, UST closures, and site characterizations for several regional petroleum corporations including Rennie Petroleum Corporation and FasMart/Shore Stop. Project tasks included



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performing fieldwork, receptor surveys, drilling supervision, data analysis, and preparation of final reports for presentation to clients and the Virginia Department of Environmental Quality (DEQ).

Project Manager on initial abatement, site characterization, and UST closure at a municipal facility in The Town of Orange, Virginia.

Performed extensive field activities for remediation of UST releases including mobilization and operation of a mobile high-vacuum, dual-phase extraction system, monitoring and data collection, and compilation and analysis of data for reports to DEQ.

Assisted in the initial abatement and remediation of a release from a 500,000-gallon AST including removal of free product from site, and operation of subsurface exploration equipment during the site characterization phase of the remediation.



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JOHN L. COMBS, P.E.

Executive Vice President

EDUCATION

B.S., U.S. Military Academy, 1967
M.E., University of Virginia (Civil Engineering), 1973
MBA Program, University of Richmond, 1975-1979
MA Program Liberty University, (2011-2013)
Graduate, Virginia Certified Planning Commissioners' Program

APPOINTMENTS

Commonwealth of Virginia
Appointed by the Governor
Board for Architects, Professional Engineers, Land Surveyors, Certified Interior Designers and Landscape Architects (2010-2014 term)
Hanover County, Virginia
Former Member & Chair of Planning Commission

PROFESSIONAL REGISTRATION

Professional Engineer: Virginia, Maryland
Member, American Society of Civil Engineers

SUMMARY OF EXPERIENCE

Mr. Combs has been a registered professional engineer in Virginia since 1973 and in Maryland since 1975. He has been providing professional planning and engineering services since 1973 to the present.

In 1979, Mr. Combs co-founded and continues to serve as a managing principal of Resource International, Ltd. ("Resource"). Resource provides professional consulting services to private individuals and companies, Fortune 500 companies, and to local, state and federal government. The firm's services include civil and environmental engineering, land planning, land surveying, environmental compliance and permitting, construction administration, construction claims analysis and expert witness testimony.

Mr. Combs' areas of expertise include the **engineering design** and construction of municipal and industrial wastewater treatment and water supply facilities, public utility water and wastewater lines, roads and infrastructure. Also, **environmental** compliance and permitting; environmental impact assessments and statements (EIA/EIS); environmental contamination assessments and remediation; **land use planning; comprehensive municipal planning**; design and development; and construction claims analysis and **expert witness** testimony.



FEATURED EXPERIENCE

Land Use Planning

Principal planner for the preparation of the conceptual development plan for the 350 acre Kings Charter PUD, Hanover County. The mixed use project consisted of approximately 250,000 square feet of commercial retail and office space; and approximately 1,100 single and multifamily housing units.

Principal planner for the preparation of the conceptual development plan for the 190 acre Lewistown Commerce Center (now called Winding Brook), Hanover County. The project is commercial retail and destination use, e.g., Bass Pro.

Principal planner for the preparation of the conceptual development plan for the 240 acre Bell Creek Development. The project included a 128+ acre cut out parcel for the Totopotomoy Creek Battlefield at Rural Plains (donated to the National Park Service); 170 acres of commercial retail, office and light industrial; 3,900 single and multifamily housing units.

Principal planner for the preparation of the conceptual development plan for the 3,500 acre New Kent PUD. The project included a 344 acre cut out parcel for the Colonial Downs Horse Race Track complex (for which planning services were also provided), 400,000 square feet of commercial industrial development, and 3,900 single and multifamily housing units.

Principal planner for the preparation of the conceptual development plan for the 2,400 acre New Kent Vineyards PUD. The project included a 50 acre winery and vineyards complex, 2,000,000 square feet of commercial



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retail and office development, and 2,400 single and multifamily housing units.

Comprehensive Municipal Planning

As a past Chairman of the Hanover County, Virginia, Planning Commission, conducted over 30 public hearings and public information meetings on controversial issues. Topics included rezonings, comprehensive land use plan changes, road corridor locations, land use ordinance changes, and growth management plans.

Routinely assist counties and towns on planning issues such as small area plans, corridor plans, and revisions to zoning and subdivision ordinances.

Engineering Design, Permitting and Construction

Principal-in-Charge for the firm's annual contract with the Virginia Department of Environmental Quality. Services provided included the identification, containment, modeling and remediation of ground and surface water contamination.

Principal-in-Charge and Project Manager for the civil engineering and surveying services for the 344 acre Colonial Downs pari-mutuel horse race track complex in New Kent County, Virginia. Services included site plan preparation, environmental studies, storm water management, and the design and permitting of the County's Chickahominy Wastewater Treatment Plant.

Project Manager and Principal Design Engineer for the Hanover County, Virginia, Doswell Water Treatment Plant and associated intake, transmission and storage facilities.

Project Manager and Principal Design Engineer for the Hanover County, Virginia, Doswell Wastewater Treatment Plant and associated collection and discharge facilities.

Principal-in-Charge and Project Manager for the civil engineering and environmental feasibility studies for the 6,500 acre Del Webb planned retirement community in New Kent County, Virginia.

Principal-in-Charge and Project Manager for the preparation of the master utilities infrastructure plan, design and construction administration for the 3,000 acre New Kent Planned Unit Development in New Kent County, Virginia.

Principal-in-Charge and lead consultant for the Environmental & Civil Engineering Feasibility Study for a 5,900+ acre planned residential community to be located in Virginia. Upon its ultimate completion, the project will require the delineation of over 240,000 linear feet of wetlands, the permitting and construction of almost \$2 million of wetlands mitigation, Phase IA archeological studies, and threatened and endangered species surveys. Also, approximately \$195 million in roads, water and sewer utilities, and stormwater management facilities will be required.

Principal-in-Charge for the North Carolina Department of Transportation open end environmental contract. This contract is for the selection, planning and permitting of wetland mitigation sites required by unavoidable wetlands impacts during road construction. Since 1995, Resource has successfully planned and permitted over 10,000 wetland mitigation acres, ranging from coastal marsh to Piedmont upland hardwood forest.

Construction Claims Analysis & Expert Witness Testimony

U. S. Department of the Air Force Langley Air Force Base, Virginia.

Principal construction claims investigator and expert witness for the Air Force on construction change order claim for unsuitable material removal and replacement.

Hanover County, Virginia

Principal expert for the County concerning private group legal suite against the County for wastewater treatment plant discharge permit violations.

Hanover Group, LLC and Hanover County, Virginia

Expert witness for plaintiffs in private group legal suit against the plaintiffs for extension of wastewater collection lines to serve new development consistent with the County's Comprehensive Plan. *Federal Court.*

Town of Orange, Virginia

Expert witness for the Town in private development legal suit against the Town for alleged violations in administering the Town's site plan ordinance.

Colonial Downs Holdings, Inc.

Expert witness for the plaintiff in arbitration to settle construction claims of general contractor.

CHARLES D. RIEDLINGER, P.E.
Senior Vice President**EDUCATION**

B.S. Civil Engineering Technology, Old Dominion University, 1974.

PROFESSIONAL REGISTRATION

Professional Engineer: Virginia-No.12510, West Virginia- No.8437, North Carolina-No. 13979

PROFESSIONAL AFFILIATIONS

American Water Works Association

SUMMARY OF EXPERIENCE

Mr. Riedlinger has 37 years of progressive experience in Civil/Environmental Engineering with municipal, state, commercial/industrial and federal clients. Mr. Riedlinger has responsibility for leading all engineering efforts in the company.

His area of expertise is in engineering planning, design, and construction for water and wastewater projects. Mr. Riedlinger has conducted client rate studies and prepared financial reports for water utilities and sewer utilities. He has been responsible for designing water treatment plants, water storage tanks, booster stations, pressure reducing stations, sewage pump stations, collection systems and wastewater treatment plants. Mr. Riedlinger has been involved in comprehensive reports, equipment review, preliminary layout, cost estimates and financial studies.

DETAILED EXPERIENCE**Water/Wastewater**

Principal-in-Charge of the design, bidding, and construction services for expansion of a .125-mgd lagoon to a .405-mgd wastewater treatment plant by utilization of SBR process. Plant meets stringent discharge limits.

Project Manager for a substantial number of water treatment plants, water lines, booster stations, and tanks for numerous clients throughout West Virginia.



Principal-in-Charge of a county-wide master sewer plan for Westmoreland County, Virginia.

Project Manager of the rehabilitation of a 250,000- gallon elevated water storage tank for Westmoreland County, Virginia.

Principal Engineer for a 345-acre site development in New Kent County that included a 250,000-gallon water storage tank, 14,000 feet of water line, 126,000-gpd wastewater plant, three pump stations, force main and gravity collection system, and over 15,000 feet of roads

Principal Engineer for various projects in King William County, including new water supply and sewer treatment system for the Courthouse Complex, Route 360 area sewer evaluation and master plan, and Central Garage water system including a new 150,000-gallon elevated water storage tank.

Principal Engineer for new water system and sewer extension for County of Richmond/Town of Warsaw, Virginia. Work included a new 500,000-gallon elevated water storage tank, various lengths of 16" and 12" water transmission mains, new sewer collection lines, pump station and force main.

Environmental/Landfill

Principal Engineer for numerous Environmental Assessments, UST studies and removals, and environmental studies.

During his career, Mr. Riedlinger has been responsible for meeting with regulatory agencies, assisting with certification and reporting forms. He has coordinated the site investigations which include soil vapor surveying, and groundwater monitoring. In addition, Mr. Riedlinger supervised UST design, tank removal and remediation. Representative clients for which Mr. Riedlinger has performed UST projects include the following:

- Dominion Generation
- State of Delaware - General Services
- Charles E. Smith Company
- Marriot Hotels, Maryland
- Virginia Department of Military Affairs
- Hilton Hotels, Washington, DC
- Mary Washington College, Virginia

Responsible for Phase I and Phase II Site Assessments associated with Due Diligence. Representative clients include Equitable Insurance, Prudential Insurance, Nations Bank, Virginia Department of Corrections, and numerous commercial and industrial clients.

Program Manager for a contract with the U.S. Army Corps of Engineers for environmental related work at Fort Meade, Maryland. Initial work was to negotiate task orders and general client management as well as managing engineering for the various tasks. Task orders were for asbestos surveys, PCB investigations, underground storage tank upgrades, solid waste management programs, oil water separator investigations/design, Title V air studies, and waste minimization studies.

Principal Engineer for a 345-acre site development in New Kent County that included a 250,000-gallon water storage tank, 14,000 feet of water line, 126,000-gpd wastewater plant, three pump stations, force main and

gravity collection system, and over 15,000 feet of roads.

Principal Engineer for new water system and sewer extension for County of Richmond/Town of Warsaw, Virginia. Work included a new 500,000-gallon elevated water storage tank, various lengths of 16" and 12" transmission mains, new sewer collection lines, pump station and force main.

Project Manager for a substantial number of water treatment plants, water lines, booster stations, and tanks for numerous clients throughout West Virginia.

Responsible for meeting with regulatory agencies, assisting with certification and reporting forms, and designing underground storage tank management programs. He coordinates the site investigations which include soil vapor surveying, soil sampling, geophysical surveying, and groundwater monitoring. In addition, Mr. Riedlinger supervises tank design, piping design, instrument and control design, and the preparation of installation specifications.

Mr. Riedlinger managed the determination of PCB-containing power transformers on the city property, the identification of materials or wastes present which could have posed an environmental hazard. He was responsible for the review past activities or operations on the site, and the history of site ownership and use.

Principal-in-charge of gas monitoring and groundwater monitoring at numerous landfills throughout Virginia.

Principal-in-charge for the development of permit amendment documents, bidding documents and construction documents for BFI facilities in Henrico (Old Dominion Facility) and King and Queen counties.

Principal engineer for transfer station modifications in Goochland County. Work included permit revisions as well as design, bidding and construction documents.



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Principal engineer for transfer station modifications in New Kent County. Work included design, bidding and construction administration.

Principal engineer for landfill cell construction in Prince Edward County. Work included permit amendment documents, bidding documents and construction documents.

Principal Engineer for a 345-acre site development in New Kent County that included a 250,000-gallon water storage tank, 14,000 feet of water line, 126,000-gpd wastewater plant, three pump stations, force main and gravity collection system, and over 15,000 feet of roads.

Industrial Parks

Principal Engineer of the Westmoreland Industrial Park. Work included site study, environmental site assessment, wetland delineation, funding assistance, site design, road design, water service design, sewer service design, stormwater design, and bidding assistance of construction administration.

Principal Engineer for Industrial Park project for Richmond County. Work included site survey, conceptual layouts and stormwater management.

Principal Engineer for Industrial Park project in Lancaster County. Work included site evaluation, environmental site assessment, preliminary layout, utility studies and public hearings.

Principal-in-Charge of a county-wide master sewer plan for Westmoreland County, Virginia.

Project Manager of the rehabilitation of a 250,000-gallon elevated water storage tank for Westmoreland County, Virginia.

Construction Administration

Principal-in-Charge for coordinating all field work and reports for inspection of over 13,000,000 square feet of building space for the Department of the Navy's LANDIV facilities.

Project Manager for a substantial number of rural water treatment plants, water lines, booster stations, and tanks for numerous clients throughout West Virginia.

Principal-in-Charge of the design, bidding and construction administration of a combined conventional gravity system and grinder pump system in Allegany County, Maryland.

Principal-in-Charge of the design, bidding, and construction service of a 40,000 linear feet of 8" to 36" interceptor sewers and force mains and three pumping stations for client in Fauquier County, Virginia.

Project Manager for bidding and construction services of a 3.4 MGP total barrier oxidation ditch, pump stations, force mains, and collections system for the City of Rehoboth Beach, Delaware.

Project Manager for construction, administration and resident project representation of new wastewater pumping station, 600 linear feet of 18" force main and 13,000 linear feet of 18" to 30" diameter interceptor for the City of Dover, Delaware.

Principal-in-Charge of engineering sewers for 18,000 linear feet of 10" to 20" water transmission mains for client in Delaware. Work included surveying, alignment selection, hydraulic analyses, preparation of plans and specifications as well as construction administration.

Wells

Project Manager for the design and construction of five (5) 24" water supply wells for the City of Dover, Delaware.



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Project Manager for the design and construction of one (1) 24" water supply well for the City of Rehoboth Beach, Delaware.

Project Manager for the construction of five (5) 16" water supply wells at Point Pleasant, West Virginia.

Principal-in-Charge of the design, bidding and construction administration of a combined conventional gravity system and grinder pump system in Allegany County, Maryland.

Project Manager for construction, administration and resident project representation of new wastewater pumping station, 600 linear feet of 18" force main and 13,000 linear feet of 18" to 30" diameter interceptor for the City of Dover, Delaware.

Principal-in-Charge of 1,740 linear feet of 18" ductile iron water transmission main for the Town of Leesburg. Scope of services included surveying, soil corrosivity analysis, location of existing utilities and a geotechnical study.

Principal-in-Charge of engineering sewers for 18,000 linear feet of 10" to 20" water transmission mains for client in Delaware. Work included surveying, alignment selection, hydraulic analyses, preparation of plans and specifications as well as construction administration.

Dams

Principal-In-Charge of the design, bidding and construction administration of a combined conventional gravity system and grinder pump system in Allegany County, Maryland.

Project Manager for bidding and construction services of a 3.4 MGP total barrier oxidation ditch, pump stations, force mains, and collections system for the City of Rehoboth Beach, Delaware.

Project Manager for construction, administration and resident project representation of new

wastewater pumping station, 600 linear feet of 18" force main and 13,000 linear feet of 18" to 30" diameter interceptor for the City of Dover, Delaware.

Principal-in-Charge of project involving scheduling field activities including inspections, data collection sampling, data analysis and reporting for Washington, DC project. Project included over 13,000,000 square feet of building space and over 1200 housing units.

Principal-in-Charge for the State of Delaware project. Project included over 12,000,000 square feet of build space at over 1500 buildings.

Principal-in-Charge for the Department of the Navy. Project included over 13,000,000 of building space and over 1500 facilities.

Principal-in-Charge of two (2) Virginia Community College System open-end contracts for environmental and civil work. Work included projects with Northern Virginia Community College Campus, Lord Fairfax Community College, J. Sergeant Reynolds Community College, and Blue Ridge Community College. Projects have included: asbestos abatement, indoor air and facility renovations

Department of Military Affairs

Project Manager for engineering contract with the Virginia Department of Military Affairs. Work included site work, pavement replacement, UST removal, and UST replacement.

Principal-in-Charge of the design, bidding, and construction service of a 40,000 linear feet of 8" to 36" interceptor sewers and force mains and three pumping stations for client in Fauquier County, Virginia.

Program Manager for a contract with the U. S Army Corps of Engineers for environmental related work at Fort Meade, Maryland. Initial work was negotiate task orders and general



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client management as well as managing engineering for the various tasks. Task orders were for asbestos surveys, PCB investigations, underground storage tank upgrades, solid waste management programs, oil water separator investigations/and design, Title V air studies, and waste minimization studies. Contract was renewed for the maximum time allowed by the contract. Task orders have amounted to over \$700,000 each year.

Project Manager for a \$645,000 contract to perform asbestos surveys at the Department of the Navy facilities in Norfolk, Cranney Island and Yorktown. Project included over 12,000,000 square feet of building space and over 1,500 facilities.

Project Manager for a contract to perform inspections, prepare abatement plans and specification for at the Department of the Navy facilities under jurisdiction of LANTDIV.

Principal-in-Charge of project with major transportation maintenance facility where engineering and geologic services were performed. Investigation identified areas of contaminated soils, investigated the integrity of the groundwater, developed a remedial action plan and monitored remedial action. Project developed into a design/construction project for remediation of soil and the construction of an industrial wastewater treatment facility for separation of oil and treatment of contaminated storm water. Total project cost was approximately \$4,000,000.

Stormwater

Principal-in-Charge of all stormwater on an entire community of approximately 1,000 homes surrounding a golf course on 1,000 acres in New Kent County, Virginia for Bluegreen Properties, Inc. Work included five stormwater management basins.

Principal-in-Charge for Westmoreland County in the site selection, concept design, and preparation of funding application for the

development of an 80-acre site as an industrial park. Design included three storm water management basins. Mr. Riedlinger also provided the design and construction services for Phase I development.

Principal-in-Charge for Richmond County for its industrial park located adjacent to the Town of Warsaw. Mr. Riedlinger designed a stormwater management basin to service the entire property and provided site engineering for initial site grading. In addition, he has worked with the County in developing initial concepts and layouts. He also prepared opinions of cost to assist in funding applications.

Principal Engineer for a 345-acre site development in New Kent County that included a 250,000-gallon water storage tank, 14,000 feet of water line, 126,000-gpd wastewater plant, three pump stations, force main and gravity collection system, and over 15,000 feet of roads.

Federal

Program Manager for a contract with the U. S Army Corps of Engineers for environmental related work at Fort Meade, Maryland. Initial work was negotiate task orders and general client management as well as managing engineering for the various tasks. Task orders were for asbestos surveys, PCB investigations, underground storage tank upgrades, solid waste management programs, oil water separator investigations/and design, Title V air studies, and waste minimization studies. Contract was renewed for the maximum time allowed by the contract. Task orders have amounted to over \$700,000 each year.

Project Manager for a \$645,000 contract to perform asbestos surveys at the Department of the Navy facilities in Norfolk, Cranney Island and Yorktown. Project included over 12,000,000 square feet of building space and over 1,500 facilities.

Project Manager for a contract to perform inspections, prepare abatement plans and



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specification for at the Department of the Navy facilities under jurisdiction of LANTDIV.

Project manager and instructor for training at the Washington Navy Yard (formally CHESDIV) involving courses for asbestos inspection, asbestos abatement design and underground storage tank removal.

Project Manager of National Bureau of Standards Inspection and Asbestos Abatement Projects. Included survey of facilities as well as preparation of abatement plans and specifications.

Principal-in-Charge of project with major transportation maintenance facility where engineering and geologic services were performed. Investigation identified areas of contaminated soils, investigated the integrity of the groundwater, developed a remedial action plan and monitored remedial action. Project developed into a design/construction project for remediation of soil and the construction of an industrial wastewater treatment facility for separation of oil and treatment of contaminated storm water. Total project cost was approximately \$4,000,000.

CHARLES WILSON, P.E.
Project Engineer

EDUCATION

*B.S., Civil Engineering, University of Kentucky,
1997*

PROFESSIONAL REGISTRATIONS

Professional Engineer – Virginia
Professional Engineer - Kentucky

PROFESSIONAL AFFILIATIONS

*Order of the Engineer
Solid Waste Association of North America*

SUMMARY OF EXPERIENCE

Mr. Wilson has 14 years of progressive experience that includes assistance in landfill development and closures of over 22 facilities encompassing site planning, design, permit application preparation, cost analyses, construction drawings, technical specifications, construction monitoring and construction documentation. These duties include HELP modeling (computer modeling for hydrologic/hydraulic investigation and leachate production/control), site grading and drainage plans, and sediment pond design. He is well versed in documentation of all aspects of the liner and cap installation process and conducting the required field tests. Other experience in solid waste includes landfill gas system construction monitoring and conducting required field tests.

DETAILED EXPERIENCE

King William School Board, King William, VA - Assisted in the preparation of the site plan and specifications for the renovation of the High School Football field.

Ashcake Road Landfill – provided construction quality assurance for Phase 3 cell construction. Prepared site volume calculations from aerial surveys.

Ingenco

- Dinwiddie Facility – prepared construction drawings for tank farm loading pad.



- King and Queen Facility – prepared site plan for landfill gas to energy facility.
- Brunswick Facility – prepared site plan for landfill gas to energy facility.

Doswell Limited Partnership – prepared site plan amendment for the facility for the purpose of SPCC site upgrades.

R-Board Sanitary Landfill, Stafford County, Virginia

- Revised the Part B Permit Amendment 3 Addendum 1 Application and Permit Drawings to address comment made by VDEQ.
- Revised the Solid Waste Management Plan to address comments made by VDEQ.

King & Queen Sanitary Landfill (BFI), King & Queen County, Virginia

- Updated the Storm Water Pollution Prevention Plan (SWPPP) and the Spill Prevention, Control and Countermeasure Plan (SPCC).

Allied/BFI Waste Services

- Updated the Storm Water Pollution Prevention Plan (SWPPP) and the Spill Prevention, Control and Countermeasure Plan (SPCC) for BFI-Roanoke Facility.
- Updated the Storm Water Pollution Prevention Plan (SWPPP) and the Spill Prevention, Control and Countermeasure Plan (SPCC) for BFI-Charlottesville Facility.
- Updated the Storm Water Pollution Prevention Plan (SWPPP) and the Spill



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Prevention, Control and Countermeasure Plan (SPCC) for BFI-Grafton Facility.

- Updated the Storm Water Pollution Prevention Plan (SWPPP) and the Spill Prevention, Control and Countermeasure Plan (SPCC) for BFI-Lynchburg Facility.
- Update the Storm Water Pollution Prevention Plan (SWPPP) for BFI-Fluvanna Transfer Station.

Landfill liner system design and construction CQA monitoring (Kentucky) which includes conducting weekly progress meetings and daily meetings with contractors. Provide on-site observation of geosynthetics deployment, documented all placements and testing of membrane. In addition, reviewing contractor's submittals and consulting daily with contractors on design and specification issues. Also responsible for answering Department of Environmental Quality comments on site issues and to prepare all field data for CQA reports.

Blue Ridge Recycling & Disposal Facility, Estill County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management.

Prince Edward County Sanitary Landfill - Provided Project Management and Construction Quality Assurance for Phase 1 Closure Cap Construction. Prepared permit drawings and application for the Part B Minor Permit Amendment Application.

Chesapeake Energy Center, Chesapeake, Virginia -Prepared construction documents and drawings for the New Metals Pond Construction and the Old Metals Pond Closure. Providing Project Management and Construction Quality Assurance for the geosynthetics portion of the construction and closure projects.

King & Queen Sanitary Landfill (BFI)- Prepared permit drawings , revised HELP model runs, developed equipment/manpower table, developed practical working face dimensions, and application for the Part B Major Permit

Amendment application for closure cap profile revisions.

R-Board Sanitary Landfill, Stafford County, Virginia - Provided Project Management and Construction Quality Assurance for Cell E Construction. Currently, working on the Part B Major Permit Amendment Application and associated drawings and calculations to horizontally expand the facility's waste boundary.

Old Dominion Sanitary Landfill (BFI), Henrico County, Virginia - Prepared permit drawings for the Part A Permit Application to horizontally expand the facilities waste boundary.

Ashcake Road Landfill, Hanover County, Virginia. Prepared permit drawings, technical specifications, and revised calculations for the Part B Major Permit Amendment application for the liner system design revisions.

Old Dominion Sanitary Landfill (BFI), Henrico County, Virginia Prepared permit drawings for the Part A Permit Application to horizontally expand the facilities waste boundary

Town of Orange Raw Water Storage Basin-Provided Project Management and Construction Quality Assurance for the geosynthetics portion of the raw water storage basin construction.

Benson Valley Area Landfill (BFI Waste Systems): Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Assisted in the permit application and drawings for a Horizontal Expansion. Provide CQA monitoring and Documentation of Gas Well Installation and Gas Header Line installation. Provided CQA monitoring and Documentation for over 14 acres of Primary Liner System. Provided CQA monitoring and Documentation for 8 acres Closure Cap Area.

Epperson Waste Disposal, Grant County, Kentucky: Completed the State Annual Survey



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Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Final Cap Construction. Assisted in preparation of a Permit Modification which consisted of Relocating a Non-Waste Fill Area within the given permitted footprint. Provided CQA monitoring and Documentation for Repairs conducted on the Primary Liner System. Provided CQA monitoring and Documentation for over 21 acres of Primary Liner System.

West Kentucky Landfill, Graves County, Kentucky: Assisted in the preparation of the Permit Application and Drawings for a Horizontal Expansion.

Green Valley Environmental Corporation Landfill, Greenup County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Worked on the Design of the Proposed Horizontal Expansion. Provide CQA monitoring and Documentation of Gas Well Installation. Provided CQA monitoring and Documentation for over 12 acres of Primary Liner System.

Laurel Ridge Landfill, Laurel County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Prepared a Permit Modification Application and Drawings to Re-grade the Bottom Contours of the Landfill. Assisted in the permit application and drawings for a Horizontal Expansion. Provided CQA monitoring and Documentation for over 18 acres of Primary Liner System.

Tri-K Landfill Inc., Lincoln County, Kentucky:

Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Final Cap Construction. Assisted in preparation of Horizontal Expansion Application and Permit Drawings. Assisted in preparation of Surface Mining Permit Application and Drawings. Provided CQA monitoring and Documentation for Repairs conducted on the Primary Liner System. Provided CQA monitoring and Documentation for over 22 acres of Primary Liner System.

Southern Sanitation Landfill, Logan County, Kentucky: Worked on the design of a Proposed Horizontal Expansion. Prepared Construction Drawing.

Ohio County Balefill, Ohio County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Assisted in preparation of Horizontal Expansion Application and Permit Drawings. Provided CQA monitoring and Documentation for over 29 acres of Primary Liner System. Provided CQA Documentation for Final Cap Construction.

Local Sanitation of Rowan County, Rowan County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Provided CQA monitoring and Documentation for over 4 acres of Primary Liner System.

Valley View Landfill, Trimble County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the



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Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Final Cap Construction. Assisted in preparation of Unit 6 Relocation Application and Permit Drawings. Assisted in preparation of a Vertical Expansion Application and Permit Drawings. Assisted in preparation of a Horizontal Expansion Application and Permit Drawings. Provided CQA monitoring and Documentation for Repairs conducted on the Primary Liner System. Provided CQA monitoring and Documentation for over 34 acres of Primary Liner System. Assisted in preparation of Surface Mining Permit Application and Drawings.

Dozit Company Inc. Landfill, Union County, Kentucky: Completed the State Annual Survey Report Form and Cross Sections for Submittal to the Division of Waste Management. Completed Portions of the Sites Fiscal Budget. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Cell Construction. Provided CQA monitoring and Documentation for Repairs conducted on the Primary Liner System. Provided CQA monitoring and Documentation for over 10 acres of Primary Liner System.

Tri-County Sanitary Landfill, Whitley County, Kentucky: Assisted in preparation of a Final Closure Plan and Drawings. Prepared Construction Drawing, Construction Specifications, and Bid Documents for Final Cap Construction. Provided CQA monitoring and Documentation for over 6 acres of Final Cap.

Eastern Kentucky Power, Spurlock Power Station, Mason County, Kentucky: Assisted in preparation of Special Waste Application and Permit Drawings.

Weyerhaeuser Hawesville Plant, Hancock County, Kentucky: Assisted in preparation of Permit Application and Permit Drawings.

B&J Landfill, Fulton County, Kentucky: Provided CQA monitoring and Documentation for over 9 acres of Final Cap.

Prichard Landfill, Wayne County, West Virginia: Provided CQA monitoring and Documentation for over 22 acres of Final Cap.

Dafter Landfill, Chippewa County, Michigan: Provided QA monitoring and Documentation for over 3 acres of Geosynthetic Installation.

C+C Landfill, Calhoun County, Michigan: Provided QA monitoring and Documentation for over 6 acres of Geosynthetic Installation.

Outerloop Landfill, Jefferson County, Kentucky: Provided QA monitoring and documentation for over 10 acres of Geosynthetic Installation.

ANTHONY W. CREECH, P.G.
Section Manager, Groundwater & Geology**EDUCATION**

B.S., Geology, College of William and Mary, 1982

Post-Graduate Study, Geology, Old Dominion University, 1982-1984

PROFESSIONAL REGISTRATION

Professional Geologist: Virginia-No. 0943,

PROFESSIONAL AFFILIATIONS

Solid Waste Association of North America (Board Member)

SUMMARY OF EXPERIENCE

Mr. Creech has over 23 years of progressive experience in geology, hydrogeology, due diligence, solid waste, health and safety, and environmental compliance management, research, and evaluation. Mr. Creech supervises all geology efforts in the company.

His areas of expertise include geologic and hydrogeologic studies (e.g., water supply investigation, landfill siting and monitoring), site characterization, risk assessment, corrective action plans, environmental site assessments, and environmental compliance auditing. He acts as program manager for all groundwater related activities performed by the company, including monitoring programs (landfills, petroleum storage facilities, wastewater treatment facilities, etc.). Mr. Creech developed and maintains written protocols for QA/QC, statistical analyses, and training of field personnel. He has provided expert witness testimony involving real and/or alleged contamination of property. He also represented clients to county boards, planning commissions, public hearings, and various regulatory entities, including the VDEQ, VDH, and EPA.

DETAILED EXPERIENCE**Water Resource Management**

Mr Creech leads Resource's efforts to work with water users in encouraging, promoting, and protecting water resources. These efforts



include the evaluation and development of incentives for alternative water sources such as reuse water; water supply inventory and future planning, source protection, and regional cooperation.

Environmental

Project manager on water resource investigation and resource protection projects for local governments throughout Virginia, including groundwater withdrawal permitting and recharge area delineation.

Project manager on various environmental investigations conducted at commercial/industrial sites throughout Virginia.

Project Manager for ongoing groundwater and gas monitoring programs at more than 25 landfill sites throughout Virginia. Responsibilities include development of and personnel training for monitoring protocols; design standards for monitoring wells; confirmation procedures upon detection of decomposition gases; and corrective action measures.

Project Manager for Environmental Compliance Audits conducted at commercial/industrial facilities throughout the United States. Mr. Creech has conducted audits in over ten states at facilities including printers, bakeries, textile plants, power stations, and correctional centers.

Project Manager for open-end master contract for underground storage tank response for Virginia Department of Environmental Quality.



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Responsible for all aspects of UST projects including alternate water supply studies, site characterizations, remediation assessments, and corrective action plans.

Manager of all UST projects for commercial and private clients. Responsible for administration of sub-contractors, health and safety and environmental quality assurance/quality control. Mr. Creech insures that all petroleum contaminated soils are handled consistent with RCRA guidelines, and that appropriate permits (e.g., NPDES, Air Emissions) are maintained for on-site remedial activities.

Manager of environmental site assessment program. has performed or supervised hundreds of ESAs throughout the Commonwealth of Virginia. Responsibilities have included site characterization (Phase II) and remediation design and implementation.

Provided soil and hydrology expertise on wetland delineation and similar projects throughout Virginia and North Carolina, including planned highway routes and an 1800-acre power plant site. He is familiar with the varied soil taxonomy protocols of the USDA, USCOE, USGS and ASTM, and can field identify hydric and other soils accordingly. In addition, Mr. Creech has installed or supervised installation of hundreds of observation wells and piezometers, including wells on wetland investigation sites.

While director of a division of a national testing laboratory, conducted all aspects of laboratory management, including hiring and training, QA/QC, profitability, and field sampling procedures.

North Carolina

For projects for the North Carolina Department of Transportation, conducted geologic evaluations. He provided services such as installation of monitoring wells and piezometers, permeability studies, wetland soils identification, and hydrogeologic profiles associated with potential wetland mitigation sites.

Managed several environmental studies at Jockey International's former facility in Cedar Falls, North Carolina. These projects included Phase I environmental site assessment, oversight of the removal of a 10,000 gallon aboveground storage tank, installation of monitoring wells, and collection/evaluation of soil and groundwater samples related to a potential transformer release and to a former chemical storage area.

Project Manager for several environmental investigations performed for Dominion North Carolina Power at power stations and district offices throughout North Carolina.

Solid Waste

Project Manager for ongoing groundwater and gas monitoring programs at more than 25 landfill sites throughout Virginia. Responsibilities include development of and personnel training for monitoring protocols; design standards for monitoring wells; confirmation procedures upon detection of decomposition gases; and corrective action measures.

Has provided Part A Applications and Notice of Intent for several sanitary landfills.

As a member of the Solid Waste Association of North America, has provided training to landfill operators in groundwater monitoring programs.

Has presented several papers on landfill groundwater statistical evaluation, release monitoring, and surface water evaluations to the Ground Water Protection Council.

Petroleum Storage

Project Manager for UST projects for commercial and private clients, including UST closure, site characterization, risk assessment, alternate water supply studies, and corrective action. Responsible for the administration of sub-contractors, health and safety and environmental quality assurance/quality control.



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Insures that all petroleum contaminated soils and waters are handled consistent with RCRA guidelines, and that appropriate permits (e.g., NPDES, Air Emissions) are maintained for on-site remedial activities.

Project Manager for open-end master contract for underground storage tank response for Virginia Department of Environmental Quality. Responsible for all aspects of UST projects including alternate water supply studies, site characterizations, remediation assessments, and corrective action plans.

Project Manager for OPA '90 plan for bulk storage and pipeline system in central Texas.

Prepared SPCC and ODC Plans for petroleum storage facilities throughout Virginia.

Groundwater Withdrawal

Project Manager for multiple municipal Groundwater Withdrawal Permit Applications for County's in Virginia Coastal Plain (including King William and New Kent Counties, in which water supply planning and aquifer protection has become critical).

Project Manager for Ground Water Withdrawal Permit application, and subsequent renewal for clay quarry in King William County, Virginia.

Project Manager for Ground Water Withdrawal Permit application for golf course in York County, Virginia.

Project Manager for Ground Water Withdrawal Permit application for landfill gas to energy facility in Charles City County, Virginia.

Provided detailed geologic assessment of potential risk of impact to groundwater well located in a Superfund remediation site in Westmoreland County, Virginia.

Environmental Compliance Auditing

Conducted industrial environmental compliance audits at facilities in Washington, Texas, South Dakota, Tennessee, South Carolina, New

Jersey, West Virginia, North Carolina, Virginia, the District of Columbia, Delaware, Maryland, and Jamaica.

Project Manager of a detailed environmental compliance audit program of over 20 correctional facilities for the Virginia Department of Corrections.

Provided Environmental Compliance Audits for Jockey International, Weston Foods, Dominion Generation, the Virginia Department of Corrections, and several other industrial clients.

THADDEUS J. KRASKA, P.W.D.
Project Scientist

EDUCATION

B.A., Zoology, University of New Hampshire, 1998

M.S., Resource Management & Administration, Antioch University, 2000

PROFESSIONAL REGISTRATIONS

Virginia Certified Professional Wetland Delineator, No. 4

Certified in Wetland Delineation, the Wetland Program and Office of Continuing Education University College, Ohio State University, 2000

Certified in Wetland Creation and Restoration, the Wetland Program and Office of Continuing Education University College, Ohio State University, 2003

Certified in Field Indicators for Hydric Soils, Advanced Hydric Soil Identification, Virginia Institute of Marine Sciences, 2003

Certified in Intermittent and Perennial Stream Identification for Riparian Buffer Rules – North Carolina and Virginia, North Carolina State University, Department of Forestry and Wetlands/401 Unit North Carolina Division of Water Quality, 2005

24-Hour HAZWOPER training, December, 2005

Certified in Rosgen's Applied Fluvial Geomorphology (Level I), Wildland Hydrology, Inc., Watershed Conservation Resource Center Fayetteville, AR, 2009

Certified for Visible Emissions Evaluations by EPA Method 9 (MAN090928-740)

PROFESSIONAL AFFILIATIONS

Virginia Association of Wetland Professionals

SUMMARY OF EXPERIENCE

Mr. Kraska has over ten years of environmental experience. His expertise is in the identification



and delineation of Waters of the U.S., including wetlands. He has performed 100's of wetland determinations, delineation, and assessments throughout New Hampshire, West Virginia, and the Commonwealth of Virginia. Mr. Kraska has prepared numerous Joint Permit Applications for temporary and permanent impacts to nontidal and tidal wetlands, for residential, municipal, commercial, professional, and industrial clients in Virginia.

He has experience in wetland creation/restoration design and planning, vegetative, and hydrological analysis, monitoring, and performing functional value assessments. He has also conducted nearly 50 Phase I and Phase II Environmental Site Assessments (ESA) and has completed groundwater and soil sampling for investigating suspected contamination as part of Phase II ESAs conducted in both Virginia and West Virginia and is listed on the Virginia Field Office's list of surveyors for the federally-listed small whorled pogonia (*Isotria medeoloides*) and swamp pink (*Helonias bullata*). Mr. Kraska has also completed over 100 visible emissions evaluations for sites regulated by the Non-metallic source pollution standards (NSPS) requirements and the EPA Method 9 criteria.

DETAILED EXPERIENCE

Wetland Delineation and Permitting

Mr. Kraska has prepared numerous Joint Permit Applications (JPA) for temporary and permanent impacts to non-tidal and tidal wetlands, and streams for residential,



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municipal, commercial, professional, and industrial clients in Virginia.

Managed and participated on numerous wetland delineations either individually or as a member of a team of active scientists on 100s of projects in the Piedmont and Coastal Plain regions of Virginia, according to methodologies prescribed by the *U.S. Army Corps of Engineers 1987 Manual for Identifying and Delineating Wetlands*. He is also trained in the application of the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region*. He has conducted wetland delineations in the following states, North Carolina, West Virginia, and New Hampshire.

Completed numerous wetland delineations and wetland permits for rock quarries and sand & gravel facilities located throughout Virginia, and North Carolina.

Mr. Kraska has completed Wetland delineations and jurisdictional determinations for Hanover Presbyterian Church, Kenwood United Methodist Church, Hanover County, Stafford County, Virginia Department of Corrections, Roslyn Farms Corporation, and the Isle of Wight Industrial Park, as well as for numerous private developers and industrial clients.

Wetland Compensation Design/Monitoring

Integral participant in the conceptual design and planning of wetland creation sites located in Stafford County, as well as, the Highland Springs, Varina, and Lakeside Areas of Henrico County. Activities included development of conceptual mitigation plans that include site-specific water budgets, monitoring well location, construction, and installation, as well as, both hydrologic and vegetative sampling plans.

Conducted both hydrological and vegetative sampling and monitoring at various active and completed created wetland sites located in the Piedmont region of Virginia.

Assisted with the development of Environmental Bank Prospectus' for wetland banking sites, including restoration,

enhancement, creation, and preservation of wetlands, streams, or other aquatic resource areas, for the submission to the Mitigation Bank Review Team (MBRT).

Developed conceptual and final wetland and stream restoration plans and designs including the establishment of vegetation, stabilization of grades, etc.

Prepared invasive species management plans for broad-leaved cattail (*Typha latifolia*), and reed grass (*Phragmites communis*).

Wetland Assessments

Assesses streams and wetlands as part of Resource Protection Area (RPA) determinations conducted in accordance with the Chesapeake Bay Preservation Act utilizing the North Carolina Department of Water Quality (NCDWQ) Perennial Stream Evaluation Methodology – Version 3.1.

Practiced in the utilization and application of the joint Virginia Department of Environmental Quality's and Army Corps of Engineer's "Unified Stream Methodology" (USM) for determining the necessary compensatory mitigation requirement for impact to streams.

Completed a comprehensive wetland assessment utilizing The New Hampshire Comparative Methodology. This study consisted of approximately 3,000 total acres and 7 wetlands for the Town of Hopkinton, New Hampshire. Fourteen functional values were analyzed for each wetland located within the Hardy Springs Brook Watershed. The results of the assessment are currently being used in conjunction with the town's revision of their Master Plan.

Phase I and II Environmental Site Assessments

Project scientist for over 50 Phase I Environmental Site Assessments (ESA) on agricultural, residential, commercial, and industrial sites throughout Virginia and West Virginia. These Phase I ESAs are part of the

due diligence process and innocent landowner defense.

Project scientist for a Phase I Environmental Site Assessment at the Hanover Presbyterian Church in Hanover County.

Environmental Audits

Field project scientist as part of Environmental Compliance Audits conducted at 10 Virginia Department of Correction Correctional Facilities.

Environmental Assessments and NEPA Categorical Exclusions

Completed many Environmental Assessments (EAs) for municipalities, counties, state governmental agencies, such as for the Town of Orange, Northumberland County, Town of Washington, New Kent County, Hanover County, and Westmoreland County. These EAs were conducted for publicly funded projects, in order to identify potential impacts to environmental and historical resources, as well as, socio-economic impacts in order to determine the preferred alternative and obtain a Finding of no significant Impact (FONSI) for the proposed project.

Co-managed and completed 30 EAs for the Virginia State Police as part of the STARS program and updating of radio/cell tower equipment across Central Virginia.

Threatened/ Endangered Species Surveys

Responsible for identifying the first known occurrence of the federally and state threatened small whorled pogonia (*Isotria medeoloides*) in Pittsylvania County, Virginia in May 2005 and is listed on the Virginia Field Office's list of surveyors for the federally-listed small whorled pogonia (*Isotria medeoloides*). Also listed as an approved surveyor for the federally threatened/state endangered swamp pink (*Helonias bullata*). He has participated as a member of a team of scientists on numerous surveys for these species in Caroline, Hanover,

Henrico, New Kent, Pittsylvania, Stafford County, and Spotsylvania Counties.

Section 7 consultation with regulatory agencies regarding bald eagle, swamp pink, small whorled pogonia, Indiana bat, Loggerhead shrike, and Northeastern beech tiger beetles.

Section 106 consultations

Consultation with the Virginia Department of Historic Resources regarding archaeological and archaeological sites associated Section 106 review due to local, state, or federal permits or funding for sites across the Commonwealth of Virginia.

JOHN H. BROOKS, III, PWD
VICE PRESIDENT - ENVIRONMENTAL

EDUCATION

M.S., Biology, University of Richmond, 1997

B.S., Biology with minor in Chemistry, Old Dominion University, 1994

PROFESSIONAL REGISTRATIONS

Virginia Certified Professional Wetland Delineator, No. 3

Certified in Wetland Delineation, the Wetland Program and Office of Continuing Education University College, Ohio State University, 1997

Certified in Intermittent and Perennial Stream Identification for Riparian Buffer Rules – Wetlands/401 Unit North Carolina Division of Water Quality, 1999/2000

Certified in Habitat Evaluation Procedures, Virginia Polytechnic Institute and University (VA Tech), 1999

Certified in Freshwater Wetland Construction, Institute for Wetland & Environmental Education & Research, Leverette, MA, 2001

Certified in Basic Processes of Hydric Soils, Advanced Problems in Hydric Soil Evaluations, and Intensive Field Study of Hydric Soils, North Carolina State University, 2002

Certified in Stream Restoration, Environmental Concern, Inc., St. Michaels, MD, 2003

Certified in Intermittent and Perennial Stream Identification for Riparian Buffer Rules – North Carolina and Virginia, North Carolina State University, Department of Forestry and Wetlands/401 Unit North Carolina Division of Water Quality, 2004

24-hour HAZWOPER Training, 2005

Certified in Rosgen's Applied Fluvial Geomorphology (Level I), Wildland Hydrology, Inc., Watershed Conservation Resource Center Fayetteville, AR, 2007



Certified in Rosgen's Applied River Morphology and Applications (Level II), Wildland Hydrology, Inc., Watershed Conservation Resource Center Fayetteville, AR, 2007.

Certified in Rosgen's River Assessment & Monitoring (Level III), Wildland Hydrology, Inc., Pilot View Resource Conservation and Development, Inc., Dobson, NC, 2009.

PROFESSIONAL AFFILIATIONS

Virginia Association of Wetland Professionals

SUMMARY OF EXPERIENCE

Mr. Brooks has over fourteen years of experience in environmental industry. His technical areas of expertise include wetland delineations, permitting, mitigation banking planning, and design, stream restoration, botany, ecology, limnology, threatened and endangered species studies, **National Environmental Policy Act (NEPA) Documents: Environmental Impact Statements (EIS), Environmental Assessments (EA), Categorical Exclusions**, storm water, water withdrawal permitting, as well as, a working knowledge of Part A and B application for landfill permits, UST removal and remediation, ground and surface water contamination.

He has performed 100s of wetland determinations, delineation, and assessments throughout North Carolina, West Virginia, Georgia, Wisconsin, Kentucky, and Virginia.



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Mr. Brooks has prepared many Joint Permit Applications for temporary and permanent impacts to non-tidal and tidal wetlands, for residential, municipal, commercial, professional, and industrial clients. He has also conducted hundreds of Phase I and Phase II Environmental Site Assessments (ESAs) and is listed on the Virginia Field Office's list of surveyors for the federally-listed sensitive joint-vetch (*Aeschynomene virginica*) and small whorled pogonia (*Isotria medeoloides*).

DETAILED EXPERIENCE

National Environmental Policy Act (NEPA)

Documents: Environmental Impact Statements (EIS), Environmental Assessments (EA), Categorical Exclusions, Etc.

He has completed many NEPA documents such as EAs and CEs for municipalities and counties for Rural Utility Services under RUS Bulletin 1794A-602 for both water supply and waste water treatment projects. Several examples of RUS projects are the Town of Orange Water Storage Facility, several localized water supply and waste water systems for Northumberland County, Town of Washington water supply and waste water systems, and several localized water supply and waste water systems for Westmoreland County. These EAs and CEs were conducted for publicly funded projects, in order to identify potential impacts to environmental and historical resources, as well as, socio-economic impacts in order to determine the preferred alternative and obtain a Finding of no significant Impact (FONSI) for the proposed project.

Managed and completed 30 EAs for the Virginia State Police as part of the STARS program and updating of radio/cell tower equipment across Central Virginia.

Wetland Delineation and Permitting

Mr. Brooks has prepared numerous Joint Permit Applications (JPA) for temporary and permanent impacts to non-tidal and tidal wetlands, and streams for residential,

municipal, commercial, professional, and industrial clients in Virginia.

Managed and participated on numerous wetland delineations either individually or as a member of a team of active scientists on 100s of projects in the Piedmont and Coastal Plain regions of Virginia, according to methodologies prescribed by the U.S. Army Corps of Engineers 1987 Manual for Identifying and Delineating Wetlands, to include the 2009 Coastal Plain Wetland Delineation Supplement. Also, has conducted wetland delineations in the following states, North Carolina, West Virginia, Maryland, and Georgia.

Completed numerous wetland delineations and wetland permits for rock quarries and sand & gravel facilities located throughout Virginia, North Carolina, and West Virginia.

Wetland delineations and jurisdictional determinations for Bluegreen Properties of Virginia at the Meadows at Dahlgren, Fasmart at Elko, Westmoreland Industrial Park, Winterpock Village, Isle of Wight Industrial Park and Virginia Power CT sites in Caroline and Fauquier Counties.

Wetland Compensation Design/Monitoring

Integral in the conceptual/final designs and planning of wetland creation sites located in the Highland Springs, Varina, Sandston, and Lakeside Areas of Henrico County, Lawrenceville, Westmoreland County, King and Queen County, Colonial Heights, Fredericksburg, Goochland County, New Kent County, Stafford County, Isle of Wight County, Green County and Prince George County, Virginia, as well as, four sites located in the coastal plain of North Carolina. Activities included development of conceptual mitigation/compensation plans that include site-specific water budgets, monitoring well location, design, construction plans, and onsite construction management, as well as, both hydrologic and vegetative sampling plans and monitoring required as a part of the permit.

Conducted both hydrological and vegetative sampling and monitoring at various active and



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completed created wetland sites located in the Piedmont and Coastal Plain regions of Virginia.

Prepared invasive species management plans for broad-leaved cattail (*Typha latifolia*), Chinese privet (*Ligustrum sinense*), Japanese stilt grass (*Microstegium vimineum*), and phragmites (*Phragmites communis*).

Mitigation Banking

Evaluated many sites in North Carolina and Virginia for the purposes of stream restoration, wetland creation, wetland restoration and ecological restoration.

Proposed and prepared several Mitigation Banking Prospectuses, which are currently under the review of the Mitigation Banking Review Team.

Designed and implemented several wetland/stream restoration and compensation sites through out the coastal plain and piedmont areas of Virginia and North Carolina.

Stream Restoration and Design

Coordinated, Designed and Implemented the relocation and restoration of multiple streams and stream systems.

Managed shoreline stabilization projects along eroding segments of the York River in Yorktown, Virginia and the James River located in Richmond, Virginia. Work included a wetland delineation of approximately 3000 linear feet of shoreline and preparation of wetland permits from the Corps of Engineers and Local Wetlands Board for 600 square feet of non-vegetated wetland impacts.

Designed and implemented the restoration/relocation of 1,700 linear feet of Anderson Creek, a perennial stream in Rockville, Virginia.

Completed the assessment and preliminary design of the restoration/relocation of 3,500 linear feet of Fontaine Creek and 7,500 linear

feet of an unnamed perennial stream flowing to Fontaine Creek in Skippers, Virginia.

Completed the assessment and preliminary design of the restoration of approximately 7,000 linear feet of perennial stream in Green County, Virginia.

Completed the assessment and design for the restoration of approximately 8,000 linear feet of perennial stream in Prince George County, Virginia.

Completed and implemented a restoration and planting plan for re-establishment of approximately 5 acres of Resource Protection Area along Almond Creek and the James River in Henrico County, Virginia.

Completed the assessment and design for the restoration of approximately 18,000 linear feet of intermittent/perennial stream in Henrico County, Virginia.

Completed and implemented a conservation plan for approximately 100 acres of stream side buffer in New Kent County, Virginia.

Completed the assessment and design for the restoration of approximately 9,000 linear feet of intermittent/perennial stream in Goochland County, Virginia.

All of the above stream restoration projects included coordination with local, state and federal agencies, permitting, as well as, the use of Rosgen Natural Stream Channel Design Methodologies. The current status of these projects change regularly, most if not all are nearing construction; are currently under construction or recently completed; or are in the post construction assessment/monitoring phase.

Stream Perenniality and Stream Attribute Analysis Methodology (SAAMS)

Qualified to assess streams and wetlands as part of Resource Protection Area (RPA) determinations conducted in accordance with



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Hanover, Richmond, and Westmoreland, and the NCDOT.

the Chesapeake Bay Preservation Act utilizing the North Carolina Department of Water Quality (NCDWQ) Perennial Stream Evaluation Methodology. He has also conducted stream potentiality studies as a part of the Neuse/Tar Pamlico/Catawba Riparian Buffer Rules for North Carolina.

Practiced in the utilization and application of both the Virginia Department of Environmental Quality's "Stream Impact Compensation Assessment Manual" (SICAM) method, and the Army Corps of Engineer's "Stream Attribute Assessment Methodology" (SAAM), which is for determining the necessary compensatory mitigation requirement for impact to streams. Streams were rated for both compensation for impacts and lift potential as related to mitigation banking.

Phase I and II Environmental Site Assessments

Project scientist for hundreds of Phase I Environmental Site Assessments (ESAs) and Phase II ESAs on agricultural, residential, commercial, and industrial sites throughout Virginia and West Virginia. These Phase I ESAs are part of the due diligence process and innocent landowner defense.

Phase I Environmental Site Assessments completed for Link-Belt Construction Equipment, Dekalb Poultry, Nations Bank, Bluegreen Properties of Virginia, Kings Charter Office Park, Commerce Bank, Farmer Machine Co., Lawhorn, Atlantic Development & Acquisition, LLC, NCDOT, and Virginia Power's CT sites in Caroline and Fauquier counties. Work has included data research, site evaluations and regulatory review and report writing.

Phase II Environmental Site Assessments for McCray Oil Company, Kings Charter Office Park, Link Belt Construction Equipment Co., Commerce Bank, and Rudlin Torah Academy.

Environmental Assessments for the Virginia Department of Military Affairs, the counties of

Environmental Audits

Field project scientist as part of Environmental Compliance Audits conducted at 30 Virginia Department of Correction Correctional Facilities, as well, as many other industrial and mining facilities.

Threatened/Endangered Species Surveys

Managed and participated in surveys for multiple federal and state threatened and endangered species in Virginia, North Carolina, and West Virginia.

Threatened and endangered species surveys for small whorled pogonia, and the dwarf wedge mussel in King William County, and sensitive joint-vetch in King George County. Section 7 consultation with regulatory agencies regarding bald eagle, swamp pink, small whorled pogonia, Indiana bat, Loggerhead shrike, and Northeastern beech tiger beetles.

Mr. Brooks is listed on the Virginia Field Office's list of surveyors for the federally-listed sensitive joint-vetch (*Aeschynomene virginica*), small whorled pogonia (*Isotria medeoloides*), and swamp pink (*Helonias bullata*).

UST Removal and Remediation

Completed UST investigations for Mary Washington College and McCray Oil Company, both of which received reimbursement from the Virginia Petroleum Storage Tank Fund. Also conducted UST investigation for Virginia Power's Ladysmith and Septa Substations. Conducted petroleum release modeling for McCray Oil Company in Hanover County, VA, with which the VDEQ files on the site were closed.

Regulatory and Legislative

Mr. Brooks has served as a member of the Virginia Department of Environmental Quality's (VDEQ) Technical Advisory Committees for the



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State Programmatic General Permit (SPGP) Regulations and the Surface Water Withdrawal Regulations. As a member of both technical advisory committees (TAC), he had the responsibility to review the current regulations and the proposed regulations in order to compare the proposed changes, make suggestions on changes to the proposed regulations, discuss all changes suggested by the TAC, as well as review pertinent scientific studies in order to properly craft the new regulations.

Mr. Brooks is currently serving as a member of the Attorney General's Regulatory Reform Task Force (Task Force) charged with reviewing Virginia Regulations, (e.g. environmental regulations) to reduce redundancies, in efficiencies, and remove out dated sections. As such he has reviewed all state environmental laws, code, and regulations for the following agencies: Virginia the Virginia Marine Resource (VMRC), Virginia Department of Conservation and Recreation (VDCR), Virginia Department of Agriculture and Consumer Services (VDACS), and Virginia Department of Environmental Quality (VDEQ). As the charge of the Task Force suggests, Mr. Brooks is working closely with the Attorney General's Office (AGO) to identify, address changes, remove redundancies, and even suggest changes to regulatory guidance in order to promote more efficient and streamlined environmental regulatory and governmental process.

Other

Consultation with the Virginia Department of Historic Resources regarding archaeological and archaeological sites associated Section 106 review due to local, state, or federal permits or funding for sites across the Commonwealth of Virginia.

Completed and had approved a FEMA Floodplain map revision for Virginia Power's Fauquier CT site and Stafford County's Government Island Project, which included computer modeling of Marsh Run, Aquia Creek and several of their unnamed tributaries.

Extensive research in water quality in order to assess the health of aquatic systems in Chesapeake and Virginia Beach, Virginia.

Authored Environmental Impact Statements for projects associates with proposed U.S. Army Corps projects.

Mr. Brooks has acted as an expert witness in several legal proceedings.

EDWARD J. HOLLOS, P.E., BCEE
Group Manager, Solid Waste**EDUCATION**

B.S. - Civil Engineering, Northeastern University, 1968

PROFESSIONAL REGISTRATION

Professional Engineer – Virginia #024258, Delaware #7002, Pennsylvania #20750E, and MD #17127

PROFESSIONAL AFFILIATIONS

American Academy of Environmental Engineers

VA DPOR Board for Waste Management Facility Operators - Writer for Class I & II Tests

PUBLICATIONS AND PRESENTATIONS

SWANA VA Chapter Landfill Gas Management Training Session; Portsmouth, VA; February, 1998; "Overview of Landfill Gas Management".

EIA. W.A.S.T.E. Conference 1996 Washington, DC, October 1996; "What's New in Landfilling".

VMI, Virginia Conference on the Environmental, Lexington, VA; April 1995; "Alternative Daily Covers".

"Should You Consider an Alternative Daily Cover," Virginia Review, 1994.

Association of Engineering Geologists, Carolina Section, Conference on Landfill Issues and New Technologies; Raleigh, NC; May 1991; "Update on Sub-Title D and DSWA Case Studies"

SUMMARY OF EXPERIENCE

Mr. Hollos has over 35 years experience on civil and environmental engineering projects primarily related to the sound and economical management of municipal and industrial solid wastes. His experience includes the development of solid waste management plans; estimating remaining life and/or capacities of solid waste facilities; facility siting studies; Part A and Part B permitting; design of "Greenfield" sites and existing facility expansions



preparation of permit amendments; permit-by-rule (PBR) facilities; and landfill closures; preparation of bidding documents and provision of bid phase services; construction management activities; certification of facility construction; and development of program costs for financial assurance of facilities. In the Commonwealth of Virginia, Mr. Hollos has worked on over 40 municipal waste, CDD, or industrial landfills involving facility permitting, new cell construction, site expansion, closure, post-closure care, environmental monitoring, and operations consulting. These services also included the development of Site Plans for facilities to obtain the necessary local zoning approvals for landfills, recycling facilities, and landfill gas to energy facilities.

DETAILED EXPERIENCE**Municipal Waste Management**

Prince Edward County, Virginia – As Project Manager provides general operations consulting for the County's Subtitle D Landfill. Prepared Contract Documents, Technical Specifications, and Construction Drawings for Cells C and D and the Phase 1 Closure and assisted the County in the public bidding of these projects. Provided construction management services for Cells C and D the Phae 1 Closure and compiled the CQA documentation reports for submittal to DEQ. Prepared minor permit amendment to update technical specifications for geosynthetics used



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in liner and cap construction. Assists the county in updating of Closure/Post-Closure Costs for annual updating of their financial assurance statements; provide information for annual budgeting; review and evaluate requests for disposal of "special wastes" (asbestos containing materials); prepared greenhouse gas (GHG) report demonstrating that the County's facility does not meet the emissions threshold for reporting to the USEPA under the USEPA Mandatory Reporting Rule.

BFI Waste Industries of Virginia, LLC (Old Dominion Landfill, Henrico County, VA) – As Project Manager provided general consulting services including the preparation of technical specifications and construction drawings for Disposal Cells (Phases 7 and 8) and initial partial closure (Phase 1 Closure). Updated and revised Closure/Post-Closure Costs using actual bid prices for recent construction activities to allow the facility to update its Financial Assurance. Assisted in the preparation of a Part A Permit Amendment application for the expansion of the Old Dominion Landfill.

BFI Waste Industries of Virginia, LLC (King & Queen Landfill, King & Queen County, VA) – As Project Manager provided general consulting services including the preparation of technical specifications and construction drawings for Disposal Cell 2E-5. Prepared two major permit amendments: One for a revised closure cap for the entire landfill and one for an alternate bottom liner for phases that have yet to be constructed. Updated and revised Closure/Post-Closure Costs to allow facility to update its Financial Assurance.

Westmoreland County, Virginia – As Project Manager assists the County in updating its Post-Closure Costs for the annual financial assurance required of this closed landfill; prepared a greenhouse gas (GHG) report demonstrating that the County's landfill did not exceed the tonnage threshold for reporting to the USEPA. Evaluating "leachate" production rates from the closed facility to include televising and / or smoke testing leachate lines

and storm drain lines to determine nature and source of flows.

Fluvanna County, VA - Project Manager-provided general operations consulting for the County's HB 1205 Landfill including preparation of closure plan; landfill gas monitoring plan; permit amendment for use of alternative daily covers; a Part A Permit Amendment for landfill gas management issues; periodic site inspections; and updating closure/post-closure costs for financial assurance.

Chesterfield County, VA, Shoosmith Brothers Landfill - Provided internal QC review of proposed landfill expansion plans for the Lewis Road Landfill. Involved in the preparation of a minor Part B permit amendment to allow the usage of tire shreds in lieu of stone aggregate for landfill gas recovery wells and leachate recirculation devices; provided training to site operators for recognizing and managing unauthorized wastes that occasionally may be brought to the landfill in collection vehicles.

Prince William County, VA - Project Manager, responsible for the preparation of a Part A Application for a 1000-acre expansion area adjacent to the existing County landfill. Prepared submittal to the DEQ of Part B Permit Application for expansion of the existing county landfill. The design was for a Subtitle D lined facility featuring leachate recirculation capability. The project included meetings with the citizen's oversight committee to discuss the proposed design and response to questions or concerns raised by members of this committee. Also developed preliminary designs and the final design for the upgrade of the public use area at the County's Landfill.

Lynchburg, Virginia – Assisted City personnel in development of its landfill gas (LFG) management program and development of its SSM Plan for its LFG control system.

Montgomery County, Virginia – Assisted County in preparation of construction documents and specifications and construction of an active landfill gas interception system that was



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situated between the County's closed landfill and an adjacent county recycling center.

Sussex County, VA, Atlantic Waste Disposal Inc. – Quality Assurance Engineer for the internal review of drawings and specifications of the initial subtitle D lined municipal waste landfill prior to release of documents for bidding and construction. Project Manager for the internal quality control review of the Part B Permit Amendment Application for the reconfiguration and expansion of the disposal facility and submittal of the Part B Permit Amendment Application to the DEQ for review and approval.

Fairfax County, VA -Quality Control Engineer, provided internal QC review of the design and construction plans for the first section of the Area Three Lined Landfill (ATLL), a double composite lined ash monofill for the I-95 Waste-to-Energy Facility.

Orange Regional Landfill, Chapel Hill, NC: Designed two Subtitle D Lined Disposal Cells, the most recent being an alternate liner design approved by the DNREC. Prepared plans and specifications for a 7-acre Subtitle D disposal cell; construction management oversight, permit amendment application for alternative liner design; and general consulting such as budgeting; updating closure/post-closure costs.

King George County, VA: Provided independent technical review on behalf of the County for the planned waste exhumation project to relocate municipal wastes to the new King George Landfill and Recycling Center.

Petersburg, VA: Provided operations consulting for the City's municipal waste landfill.

City of Salem, VA - Quality Assurance Engineer for the internal review of the Part B Application for a landfill expansion. Project Manager for the preparation of the closure plan and preparation of associated bidding documents and design drawings.

Burke County, NC: QC review of drawings for lateral expansion of County's Sanitary Landfill.

Campbell County, VA: Completed Part B permit application documents for expansion of the County landfill. Prepared bidding documents and construction drawings for the initial two Subtitle D disposal cells in Phase III and provided construction management services for these two cells.

Carroll County, VA: QC review of annual Groundwater Monitoring Report and QC review of drawings for lateral expansion of County's sanitary landfill.

City of Martinsville, VA: QC review of Annual Groundwater Reports.

Greensville County, VA: QC review of proposed Part B permit application documents for expansion of the existing County landfill. QC review of Annual Groundwater Report.

Hanover County, VA: QC review of expansion plans for lined landfill segment between two existing disposal areas and proposed closure plan. QC review of Annual Groundwater Report.

Henry County, VA: QC review of Annual Groundwater Reports.

Louisa County, VA: QC review of Annual Groundwater Reports.

Mecklenburg County, VA: QC review of Annual Groundwater Report.

Orange County, VA: Provided operations consulting services to the County in the operation of its municipal waste landfill.

Rappahanock County, VA: QC review of bidding documents and construction drawings. Operations consulting.

Russell County, VA: QC review of Annual Groundwater Reports.



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Rivanna Solid Waste Authority, Albemarle County, VA: QC review of Master Site Plan, closure plans, bidding documents and construction drawings. Provided general operation consulting. Prepared Part A Application in conjunction with geotechnical firm for expansion of the landfill to adjacent areas of the site.

Delaware Solid Waste Authority (Northern Solid Waste Facility), Kent County, DE: Performed a siting study for the location of a new municipal waste landfill in New Castle County. After a site was selected through a public participation process, prepared permit application package for submittal to DNREC. Since the most politically acceptable site was an active U.S. Army Corps of Engineers (COE) dredge spoil disposal area, became involved in negotiations with the COE. Prepared bidding documents and construction drawings for dewatering of site and construction of separation dike. Prepared bidding documents and construction drawings for the Phase I disposal area which included a maintenance facility, leachate pump station, and tap-in to an 84' sewer force main. Provided construction management.

Delaware Solid Waste Authority (Central Solid Waste Facility), New Castle County, DE: Performed site evaluation study. Prepared permit application package for submittal to DNREC. Prepared bidding documents and construction drawings for the first lined municipal waste landfill in the state of Delaware for areas A and B. Provided construction management services for construction of the disposal area, leachate lagoon, scale and weigh station, maintenance building, access road and upgraded public convenience area.

Delaware Solid Waste Authority (Southern Solid Waste Facility), Sussex County, DE: Prepared permit application package for submittal to DNREC for Cell 2. After receipt of approval from DNREC prepared bidding documents and construction drawings for double-lined disposal cell, two leachate pump stations, and four aboveground leachate storage tanks with lined secondary containment lagoons. Upgraded

entrance road and public convenience area. Provided construction management services.

Sugarloaf Landfill, Luzerne County, PA: Prepared Phase I and Phase II permit applications for submittal to DER. Provided expert witness testimony on behalf of client before Environmental Hearing Board in effort to obtain permit.

Sycamore Landfill, Charleston, WV: Provided QC review of construction drawings and specifications for lateral expansion of this private municipal waste landfill. Researched acceptability of industrial residual waste streams for disposal.

Town of South Boston, VA: Preparation of closure plan for the Town's landfill. Negotiated Letter of Agreement with the DEQ Enforcement Section. QC review of landfill gas management plan. Provided operations consulting.

Western Berks Refuse Authority, Berks County, PA: Design and permitting of three separate disposal cells one of which was a dedicated industrial waste facility. Preparation of bidding documents and construction drawings. Construction management activities. General operations consulting including monthly attendance at Authority Board meetings. Assistance in determining tipping fee adjustments.

York County, PA: Design and permitting activities for County landfill. Operations consulting.

Isle of Wight County, VA: Prepared greenhouse gas (GHG) report for the County demonstrating that their closed landfill facility does not meet the tonnage threshold for reporting to the USEPA.

Industrial and CDD Waste Management

City of Portsmouth, VA: Operations consultation to the City for its CDD landfill. Assisted in preparation of an Environmental Assessment as part of property transfer with the US Navy.



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Assisted in negotiations with the Navy regarding the property transfer. QC review of Annual Groundwater Reports. Preparation of closure plan.

Lynchburg, VA, Internet Foundry – Assisted in the preparation of a Part A permit Application Package for a 50+ acre "Greenfield" landfill site in Campbell County, VA.

Pittsylvania County, VA First Piedmont Corporation – In a quality control capacity, assisted in obtaining major permit amendment for the Phase III disposal area and the preparation of construction drawings and specifications – also provided operations consulting for Phase I Area.

Taylor Road Landfill, Chesterfield County, VA: Preparation of Part A and Part B Applications of the expansion of this CDD facility. QC review of construction drawings and specifications. QC review of Annual Groundwater Reports. Darbytown Road CDD Landfill, Henrico County, VA: Provided operations consulting services to this privately owned facility. QC review of Annual Groundwater Reports. Development of landfill closure plan.

Charles City Road CDD Landfill, Henrico County, VA: Provided operational consulting services to this privately owned facility. QC review of Annual Groundwater Reports. Development of Landfill Closure Plan.

Incendere Incorporated, Chesterfield County, VA: Assisted client in obtaining "Permit-by-Rule" for a medical waste transfer facility.

Virginia Recycling Corporation, New Kent County, Project Manager for the development of Permit-By-Rule application for a tire shredding and recycling facility.

623 Landfill, Henrico County, VA: Independent consultant review of Part B permit application for this CDD landfill.

Brown-Boveri Corporation, Bucks County, PA: Final closure plan for phase out of industrial

wastewater treatment plant and monitoring of plant demolition and closure.

Franklin County, VA: Franklin County, VA, Shredded Products Corporation – Project manager for the preparation of Part A and Part B landfill permit applications for a "Greenfield" captive industrial waste landfill. (The Part A was prepared in conjunction with a subcontracted geological/hydro geological consulting firm). Also was Project Manager for the preparation of bidding documents and construction drawings for first disposal area (Cell A) and the adjacent automobile shredder plant site and provided construction management services. Also provided internal QC review of bidding document for Cell B constructions.

General Battery Corporation, Berks County, PA: Evaluation of existing industrial waste landfill site.

Carpenter Technology Corporation, Berks County, PA: Assisted with design of industrial waste landfill.

Process Recovery Corporation, Berks County, PA: Peer review of design engineer's Phase II permit application package for this industrial waste facility for foundry wastes.

Ashcake Road Landfill, Ashland, VA; Provide QC review of all landfill related documents associated with construction and operation of the facility.

INGENCO Distributed Energy, Richmond, VA Assisted and assisting INGENCO in obtaining local government approvals (Site Plans and CUPs) for eight different landfill gas to energy (LFGTE) projects in Henrico County, VA; Brunswick Co., VA; Dinwiddie Co., VA; King & Queen County, VA (2); Pulaski County, VA; Wake County, NC; and Pine Grove, PA.

Transfer Stations, Recycling Facilities and Public Use Areas



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Peer Review Consultation

Dorrance Township, Luzerne County, PA: Independent consultant evaluation of proposed County landfill site located in the Township.

Douglas Township, Berks County, PA: Independent consultant review of a privately owned municipal landfill on behalf of the Township, which used grant monies for the cost of the review.

Pen Argyl, PA: Independent consultant review on behalf of the Borough of the proposed landfill expansion of the Grand Central Landfill. This work included obtaining state grant monies to pay for a portion of the cost of the review and meeting with DER (now DEP) officials to discuss comments.

Studies and Solid Waste Planning

Cumberland County and Prince Edward County, Virginia – Project Manager for development of the Counties' July 1, 2004 Solid Waste Management Plan and submittal of the Plan to the VA DEQ. Currently involved in updating of the plan.

Northampton County, Virginia – Prepared a study for county officials to assist them in decision making for the future management of solid waste generated within the County. The study provided an overview of systems that were deemed inappropriate for consideration because of excessive capital and infrastructure costs relative to the low waste stream generated within the County. The study focused on continued landfilling of county wastes versus the transfer of wastes to a disposal facility outside the County.

Blair County, PA: Preparation of the County Solid Waste Plan including waste generation surveys, evaluation of potential refuse-derived fuel (RDF) or steam users, evaluation of potential landfill sites, and participation in public meeting and hearings.

Culpeper County, VA - Project Manager for a solid waste management planning study that included an economic comparison of transfer/out of county disposal of solid waste versus in-county disposal in a county-owned Subtitle D Landfill.

Transylvania County, NC: QC review of proposed upgrade of public convenience center.

City of Virginia Beach, VA: Transfer station study, which included evaluation of compacting versus non-compacting facilities including the number and types of equipment and general layout of the facility.

City of Portland, ME: Preliminary design of a solid waste baling facility and preliminary design of a clay-lined balefill.

Fayette Reclamation, Inc., Fayette County, WV: Evaluation and layout of proposed plant site for the location of a solid waste composting facility.

Warren County, VA: Operations consulting. Preparation of "Permit-By-Rule" application for transfer station, design of transfer station, and preparation of bid documents and construction drawings. Preparation of closure plan and development of bid documents and construction drawings for the landfill closure. Construction management activities related to both the transfer station and the closure. QC review of Annual Groundwater Reports.

Lee County, VA: Performed independent consultant review of an economic study of landfill and transfer station alternatives.

Virginia Recycling Corporation, New Kent County, VA. Obtained permit-by-rule (PBR) from VDEQ for a tire recycling facility.

Proco Company (Tire Recyclers, Inc.), Charles City County, VA. Assisted TRI in obtaining local government approval and VDEQ approval (PBR) for a state-of-the-art used tire processing facility for the shredding and grinding of automobile and truck tires.



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Central Nagatuck Valley Region Council of Governments, Waterbury, CT: Evaluation of municipally and privately owned and operated landfills within the COG region. Prepared solid waste management planning study for the region.

Exeter Township, Berks County, PA: Performed recycling study for the Township. Performed independent consultant review of proposed landfill gas management plans for the Pioneer Crossing Landfill, a private municipal waste landfill located within the township.

Guilford County, NC: Assisted in the performance of a waste transport and hauling survey and the development of a follow-up solid waste collection study.

Maryland Environmental Services: Performed landfill evaluations, waste stream surveys and waste characterization surveys of three eastern shore counties to determine feasibility of a regional waste-to-energy facility.

Morris County, NJ: Evaluation of potential landfill sites and assistance in preparation of the County's landfill siting study.

Southern Schuylkill Council of Governments, Schuylkill County, PA: Preparation of Solid Waste Management Plan. Preparation of Phase I landfill site application for a SSCOG owned and operated landfill.

Water/Wastewater

City of Baltimore, MD: Design, permitting and construction management assistance for two lined sludge storage basins. The basins were lined with a dense graded hydraulic asphalt to sustain truck and heavy equipment traffic during sludge removal operations.

Valley Forge Sewer Authority, Montgomery County, PA: Design of dense graded hydraulic asphalt lined sludge storage facility.

Montrose Sewer Authority, Susquehanna County, PA: Study to determine feasibility of

sewering South Montrose, Pennsylvania, the viability of pumping sewage to the existing Montrose Plant or treating to discharge standards with aerated lagoon.

Town of Orange, VA. Prepared bidding and construction drawings for the construction of a earthen and HDPE lined raw water storage reservoir used as a drought alleviation measure for the Town's water supply; also provided construction management oversight for the facility.



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STEVEN F. CHURCH

Staff Engineer

EDUCATION

B.S., Mechanical Engineering, Norwich University, 1983

M.S., Civil Environmental Engineering, Virginia Polytechnic Institute and State University, 2001

SUMMARY OF EXPERIENCE

Mr. Church has experience in Civil/Environmental Engineering fieldwork, design, construction administration, inspection, and review for municipal and state clients in Virginia and West Virginia. He has directly contributed to the successful completion of major projects by: providing field investigations and site inspections; water and sewer system data collection, conceptualization and design; authoring technical studies, system characterizations, and project reports; and coordinating the needs and requirements of municipalities, private companies, and private citizens.

Also, he has over 18 years of experience completing major analytic studies and technical writing projects for the U.S. Department of Defense (DoD) and U.S. Congress, and completing the technical, financial, and administrative program management tasks associated with those projects.

DETAILED EXPERIENCE

Water Supply Systems

Utilities Design Engineer on a company team supporting a 345-acre site development in New Kent County, Virginia that included a 975,000 gpd water demand, two water supply wells, a 1,000,000 gallon water storage tank, and 24-inch distribution mains. Designed the water supply and distribution system using distribution system modeling software. Contributed designs for the wastewater collection and transport system which included gravity sewer system, pump station, and force main modeling. Completed a Master Utility Plan for developer and county evaluation and approval. Managed CAD personnel for the production of all

construction plans. Managed contract bid document production and bid solicitation.

Design Engineer of municipal water supply improvements for the Berkeley Beach and Ebb Tide Beach areas in Westmoreland County, Virginia. Water distribution system computer modeling was completed to support the local water supply company's upgrade and expansion goals. The modeling effort incorporated the system's three water wells, 20,000 gallon atmospheric storage tank, three hydropneumatic tanks, and approximately 44,000 linear feet of distribution pipe to assess the benefit of installing an additional 20,000 gallon storage tank. The modeling environment was validated against field tests of the operating system.

Lead Design Engineer of alternative water supply systems to serve a proposed 570 acre intermodal transportation facility in Isle of Wight County, Virginia. A water distribution model was configured that evaluated the demands, water pressures, and fire flow requirements imposed by the existing and proposed system connections. Multiple existing water supply tanks were modeled iteratively with proposed water supply tank capacities and locations. Viable solutions that satisfied complex hydraulic grade and flow criteria were presented.

Lead Design Engineer of new municipal water supply and wastewater collection systems for Mount Olive, Virginia. The water supply system included a new 10,000 gallon storage tank, a hydropneumatic tank, two booster pumps, and 17,000 feet of distribution pipe. The sanitary sewer collection system included individual septic tank effluent pumps and 5,500-feet of force main piping. Engineered the water distribution system and sanitary force main routing and sizing using computer modeling tools. Wrote the system technical specifications and coordinated with state agencies and municipal utilities for design review and acceptance. Managed CAD personnel for the production of all construction plans. Managed contract bid document production and bid solicitation.

Lead Design Engineer for an 800-foot long 8-inch water line extension in Ashland, Virginia.

Work included tying into an existing water line and coordinating with state and local officials, utility companies, and property owners regarding easements, existing utilities, and system alignment and depth. Managed CAD personnel for the production of all construction plans.

Lead Design Engineer of municipal water and wastewater system capital improvements (through extensions) to the existing utilities in the Town of LaCrosse, Virginia. Completed a quality assurance review of the plans depicting the existing water and wastewater systems. Reviewed, evaluated and rationalized historical engineering data, and managed CAD personnel to produce comprehensive and up-to-date system plans. Engineered incremental, phased extensions of the existing water and wastewater networks using municipal pipe system computer modeling software.

Review Engineer for a water supply project in Westmoreland County, Virginia. The system included a new water supply well, well house, and 6,000 feet of small-diameter distribution piping. Work included modifying and improving previously completed construction plans and technical specifications in response to prior state agency reviews. Managed CAD personnel for construction plan revisions. Managed contract bid document production and solicitation.



MICHAEL E. FIORE, P.E.
President**EDUCATION**

B.S., Civil Engineering, Notre Dame, 1965

M.S., Civil Engineering, Notre Dame, 1967

Graduate Studies, Virginia Commonwealth University, 1979-1980

PROFESSIONAL REGISTRATION

Professional Engineer: Virginia, Pennsylvania, South Carolina, North Carolina, Michigan, Illinois, New Jersey, Kentucky, Georgia, Florida, Mississippi, Ohio, Indiana

PROFESSIONAL AFFILIATIONS

*National Society of Professional Engineers
American Water Works Association
Water Environment Federation
Virginia Society of Professional Engineers*

SUMMARY OF EXPERIENCE

Mr. Fiore has over 44 years of management and engineering experience. Since 1979, Mr. Fiore, co-founder and President of Resource International, Ltd., has served as Principal-in-Charge of engineering and environmental engineering projects, ensuring both dedicated resources of the firm and quality assurance of deliverables. Mr. Fiore's areas of expertise include civil engineering; solid waste facility design; design of over 50 sanitary landfills; solid waste facility permitting; leachate and landfill gas treatment; landfill gas flaring and gas energy recovery systems; transfer station design and operation; resource/energy recovery; recycling; groundwater monitoring; landfill closure and post closure; regulatory liaison; compliance and enforcement negotiation; commercial and industrial development; water supply; wastewater systems; storm water management; environmental impact; industrial waste treatment and disposal; regional planning and resource management; and financial and technical feasibility analysis.

**DETAILED EXPERIENCE****Solid Waste Management/Energy Recovery**

Principal-in-Charge of over 100 solid waste facility planning, design and permitting projects including landfills, energy recovery, recycling and materials recovery, waste transfer and waste processing.

Principal-in-Charge of Sub-title "D" landfill projects. Projects for municipal, regional and private clients range in size from 40 to 2,000 tons per day for more than 25 separate landfills.

Project experience includes; waste-to-energy, waste tire processing and disposal, medical waste systems, landfill gas to energy system design and construction, containment plume migration, groundwater monitoring, industrial and special waste handling and regulatory liaison.

Solid waste management experience includes waste collection and transfer, transfer station permitting and design, recycling program development financial analysis, disposal alternative studies, revenue stream analysis, waste characterization, and operations support.

Served on the Virginia State Advisory Committee for Solid Waste Regulations.

Served on the Virginia Solid Waste Facility Operator Certification Board as a test advisor.

Past instructor of Virginia Solid Waste Facility Operator Training Course.



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Federal

Project Manager for Air Force Headquarters - Environmental control handbook prepared for base commanders and environmental personnel dealing with air, water, solid waste, recycling, waste minimization.

Principal-in-Charge of industrial and municipal water and wastewater facility planning design and operation projects. Industries served include fertilizer, food, metal finishing, tobacco, paper and petroleum. Governmental clients include regional authorities, local government, state government and federal government.

Project Manager for the Department of Energy - Savannah River Plant - Landfill evaluation to define regulatory compliance and operational studies for non - hazardous waste.

Principal-in-Charge of environmental planning projects including industrial plant siting, environmental compliance analyses, air permitting, regional solid waste and water quality planning.

Project manager for Air Combat Command, Langley Air Force Base - Presentation to environmental committee regarding solid waste recycling and waste minimization issues.

Project Engineer for USEPA - effluent guideline study for Carbon Black Industry.

Industrial/Commercial

Principal-in-Charge of industrial waste facility planning design and operation projects. Industries served include fertilizer, food, metal finishing, waste management, tobacco, paper manufacturing, pharmaceutical, building materials, and petroleum.

Principal-in-Charge of industrial solid waste facility planning, design and permitting projects including landfills, energy recovery, recycling and materials recovery.

Industrial solid waste management includes: waste characterization and minimization;

industrial landfill permitting, design, and construction; fly ash disposal; waste reuse and recycling.

Industrial site engineering includes: storm water management, drainage design, wetlands permitting and mitigation; master site planning and local permitting.

Industrial water supply to include well supply, water storage fire flow, water reuse, and permitting.

Governmental clients include regional authorities, local government, state government and federal government.

Wastewater

Principal-in-Charge for 38,000 gallon per day spray irrigation wastewater treatment facility in operation since 1992.

Principal-in-Charge of wastewater collection system, wastewater pumping facilities, and water distribution and storage system for four (4) Industrial Parks.

Principal-in-Charge of wastewater collection and treatment feasibility analysis and Farmers Home Administration Grant for 2 ½ mile sewerage collection system and 100,000 gpd SBR Treatment plant.

Principal-in-Charge for wastewater collection treatment and water distribution feasibility study for King William County's Central Garage area.

Principal-in-charge for Master Sewer Plan for Westmoreland County and rehabilitation engineering for 50,000 gallon elevated water storage tank.

JAMES L. RUDNICKY
Project Scientist**EDUCATION**

M.S., Forestry, University of Massachusetts, 1984

B.S., Forestry, University of Massachusetts, 1981

Post-Graduate Studies, Forest Ecology, University of Maine, 1992

PROFESSIONAL REGISTRATION

Completed: Stream School and Save Our Streams Methodology, Virginia Save Our Streams, 2005

Completed: Perennial Stream Identification Workshop, Virginia's Chesapeake Bay Local Assistance Department, 2004

Completed: Erosion Control for Coastal Environments, International Erosion Control Association, 2002

Completed: Basic Plan Review, Virginia Department of Conservation and Recreation, 2001

Completed: Basic Erosion and Sediment Control, Virginia Department of Conservation and Recreation, 2001

Completed: Local Storm Water Management and Erosion Control, International Erosion Control Association, 2001

Completed: Stream Restoration, Virginia Department of Forestry, 2001

Completed: Management Planning, Virginia Department of Conservation and Recreation, 2001

Completed: Revised Universal Soil Loss Equation (RUSLE), USDA Natural Resources Conservation Service, 2000

SUMMARY OF EXPERIENCE

Mr. Rudnický has over 25 years of experience in natural resource studies and management, primarily in urbanized areas in the Mid-Atlantic and Northeast. During this time, he has worked for local, state and federal government agencies. Mr. Rudnický was a Research Assistant at The Institute of Ecosystem Studies, which is an internationally prominent research organization of The New York Botanical Garden. In this position, he assisted on studies



on the long-term effects of human use and management on urban forests in New York City. Mr. Rudnický was also a Visiting Lecturer at the University of Massachusetts where he co-taught Advanced Forest Ecology and conducted a research project examining management options for preserving habitat for threatened bird species for the National Park Service. In Virginia, Mr. Rudnický developed management plans for rare wetland communities for Virginia's Division of Natural Heritage. He also served as a District Manager for a Soil and Water Conservation District that promoted and provided financial assistance for the installation of land practices to prevent water pollution. As a Project Scientist, Mr. Rudnický works with government agencies, landowners and developers on environmental regulations pertaining to land development.

DETAILED EXPERIENCE**Wetland Monitoring and Restoration**

- Has successfully obtained local, state and federal permits for developments on single family lots, industrial facilities and large subdivisions that impacted environmental features.
- At the 1,200-acre Farms of New Kent subdivision and golf course, obtained state and federal permits to impact wetlands. The compensation plan utilized a combination of preservation and wetland bank purchases to reduce mitigation costs by half.

- Prepared wetland remediation and monitoring plans for a residential and golf course development. The plans were developed in co-ordination with state and federal agencies. Activities included a stream channel restoration that required vegetation, biological and stream channel monitoring to reach success criteria. Prepared a joint permit application (JPA) to obtain federal permit for conducting stream restoration work.
- Assisted with the development of an innovated compensation plan for a mixed-use commercial development in Hanover County, Virginia. The plan utilized a combination of an innovated Low Impact Development facility and preservation that reduced mitigation costs over \$100,000.
- Has monitored construction activities on multiple sites to ensure compliance with environmental regulations. Prepared construction monitoring reports for state agencies as required by environmental regulations.
- Has designed monitoring and restoration studies in swamps, bogs, barrier islands, fens, pocosins and other unique wetland habitats throughout Virginia, New York, Massachusetts and Maine. Some of these projects have included groundwater monitoring.
- Has assisted with developing management activities, including monitoring, for state and nationally threatened and endangered plant, animal and bird species.
- Has assisted the U.S. Army Corps of Engineers and the Virginia Department of Environmental Quality on identifying wetland violations and the restoration of the impacted areas.
- Has assisted James City County with creating and restoring wetlands around stormwater ponds through bank stabilization, plantings and debris removal.
- Has delineated wetlands on multiple sites throughout Virginia.
- Has prepared and reviewed Joint Permit Applications for projects proposing to impact wetland and waters.
- Reviewed a commercial plan to enlarge an existing dam, install a roadway and expand a downstream wetland for an improvement of the Stafford County Airport.

Wetland Mitigation Banking

- Prepared and given presentations to the Interagency Review Team (IRT) that led to the approval of potential mitigation banks.
- Prepared Mitigation Banking Instruments (MBI) that led to approval of mitigation banks by the IRT. Prepared JPAs for federal permits to allow work at the banks.

Stream Assessment and Restoration

- Has attended perennial stream assessment workshops conducted by Virginia's Chesapeake Bay Local Assistance Board and Virginia's Department of Conservation and Recreation. Has conducted numerous perennial stream assessments throughout Virginia since the year 2000.
- Has attended stream restoration workshop conducted by Virginia's Department of Forestry.
- Has conducted the latest version of Stream Impact and Compensation Assessment (SICAM) for proposed developments.
- Has training for biological and chemical monitoring of stream water quality.

Chesapeake Bay Preservation Act Activities

- Inspected developments within James City County to ensure compliance with the Chesapeake Bay Preservation Ordinance.
- Has reviewed Resource Protection Area restoration plans and inspected sites for compliance with approved plans.
- Field delineated Resource Protection Area boundaries and confirmed accuracy of boundaries identified by others.
- Managed a nutrient and sedimentation reduction program in the Fredericksburg area. This work included developing and providing educational activities.
- Was a member of the Stafford County Stormwater Management Technical Review Committee and has participated on working

groups for the Rappahannock and York River Watershed Management groups.

- Assisted in developing workshops for local- and state-level government staff on land disturbing programs and Low Impact Development.

Government Agency Activities

- Has been employed by local, state and federal agencies, including the U.S. Forest Service, National Park Service, Virginia's Department of Conservation and Recreation, Tri-County/City Soil and Water Conservation District and James City County.
- Has managed projects requiring coordination between multiple agencies, non-profit groups and private citizens.
- Has negotiated co-operative agreements between government agencies and private citizens.
- Has assisted federal and state agencies with processing wetlands, Chesapeake Bay Preservation and landfill violations.
- Has reviewed development plans and conducted field inspections for compliance.
- Has prepared and presented applications to multiple Wetlands Boards.
- Has prepared and presented projects at Board of Supervisor and City Council meetings.
- As a District Manager, worked directly under a citizen-elected Board of Directors. Successfully prepared grants to support District activities. Annually managed funds in excess of \$200,000 that supported District's operations, including a cost-share program to assist local landowners with land conservation practices.

Elizabeth A. Dupree Ellis, Ph.D.
Oak Ridge Associated Universities

Education

B.A., Zoology, Duke University, 1973
Sc.M., Epidemiology, Johns Hopkins University, 1978
Ph.D., Epidemiology, University of North Carolina, Chapel Hill, 1989

Positions

Oak Ridge Associated Universities
Occupational Exposure and Worker Health
Associate Director, Center for Epidemiologic Research **2007-present**

Oak Ridge Associated Universities
Basic and Applied Research
Associate Director, Center for Epidemiologic Research **1998-2007**
Serves as Associate Director for the Center for Epidemiologic Research which conducts and supports quality epidemiologic research with primary emphasis on occupational health studies. The program has offices in Oak Ridge, TN and Arvada, CO.

Associate Director, Center for Epidemiologic Research, ORAU **1991-1998**
Leader, Epidemiology Support Section, Center for Epidemiologic Research, **1987-1991**
Epidemiologist, Center for Epidemiologic Research, ORAU **1983-1987**
Associate Epidemiologist, Center for Epidemiologic Research, ORAU **1978-1981**

The Johns Hopkins University, Baltimore, MD
Department of Epidemiology
Research Assistant **1977-1978**

Energy Research and Development Administration
Office of Environmental Research, Human Health Studies Program
Intern **1977**

Publications

Dupree, EA. 1980. Mortality among workers at a uranium refining and processing plant. American Journal of Epidemiology 112:446 (abstract).

Hudson DR, EL Frome, EA Dupree, MS Hansard, WL Beck, and CC Lushbaugh. 1981. Exploratory analysis of mortality in a cohort of nuclear material workers. American Journal of Epidemiology

114:446 (poster session).

- Lushbaugh CC, WL Beck, EA Dupree, EL Frome, SA Fry, MS Hansard, DR Hudson, and AP Polednak. 1981. Health and mortality of DOE workers. *Trans. Am. Nuclear Soc.* 38:81.
- Fry SA, CC Lushbaugh, CM Shy, DL Cragle, H Checkoway, S Blum, AV Carpenter, EA Dupree, EL Frome, PG Groer, and J Wilson. 1985. The U.S. Department of Energy Health and Mortality Study: The Oak Ridge studies. In: *Epidemiological studies of some populations exposed to ionizing radiation*, (Weeks JL, compiler), pp. 18-40, Pinawa, Manitoba: Atomic Energy of Canada Limited, (AECL publication no. 8360).
- Dupree EA, DL Cragle, RW McLain, DJ Crawford-Brown, and MJ Teta. 1987. Mortality among workers at a uranium processing facility: Linde Air Products Ceramics Plant, 1943-49. *Scandinavian Journal of Work, Environment and Health* 13:100-107.
- Fry SA, AV Carpenter, DL Cragle, EA Dupree, PG Groer, CC Lushbaugh, H Checkoway, DJ Crawford-Brown, CM Shy, JE Watson, and EL Frome. 1988. Studies of mortality among populations of U.S. nuclear industry workers. In: *Proceedings of the International Conference, Health Effects of Low Dose Ionizing Radiation--Recent Advances and Their Implications*. London, England: British Nuclear Energy Society, pp. 77-80.
- Dupree EA. 1989. Doctoral dissertation, University of North Carolina, School of Public Health, Department of Epidemiology, Chapel Hill, NC. An epidemiologic investigation of mortality among workers occupationally exposed to uranium compounds at a uranium processing plant.
- Dupree EA, J Watkins, J Ingle, P Wallace, C West, and W Tankersley. 1993. Risk of lung cancer among uranium processing workers. *American Journal of Epidemiology* 138:640 (abstract).
- Dupree EA, J Watkins, JN Ingle, PW Wallace, CM West, and WG Tankersley. 1995. Uranium dust exposure and lung cancer risk in four uranium processing operations. *Epidemiology* 6:370-375.
- Fry SA, DL Cragle, DJ Crawford-Brown, EA Dupree, EL Frome, ES Gilbert, GR Petersen, CM Shy, WG Tankersley, GL Voelz, PW Wallace, JP Watkins, JE Watson, and LD Wiggs. 1995. Health and Mortality among Contractor Employees at U.S. Department of Energy Facilities. In: *Radiation and Public Perception: Benefits and Risks* (Young JP, Yalow RS, editors). Developed from the symposium Radiation and Society, held at the April 1992 national meeting of the American Chemical Society, San Francisco, pp. 239-258.
- Fry SA, EA Dupree, AH Sipe, DL Seiler, and PW Wallace. A study of mortality and morbidity among persons occupationally exposed to > 5 rem (> 50 mSv) in a year. Phase I: Mortality, through 1984. *Applied Occupational and Environmental Hygiene* suppl. March 1996.
- Ellis ED, Watkins J, Ingle J, Phillips J. 2000. External radiation exposure and mortality among a cohort of uranium processing workers. *American Journal of Epidemiology* 152:91-95.
- Boice JD, RW Leggett, ED Ellis, PW Wallace, M Mumma, SS Cohen, AB Brill, BB Boecker, JG Barnes, RC Yoder, and KF Eckerman. 2006. A comprehensive dose reconstruction methodology for former Rocketdyne/Atomics International radiation workers. *Health Physics* 90(5):409-430.

Boice JD, SS Cohen, MT Mummaw, ED Ellis, KF Eckerman, RW Legett, BB Boecker, AB Brill, and B Henderson. 2006. Mortality among radiation workers at Rocketdyne (Atomics International), 1948-1999. *Radiation Research* 166:98-115.

Guseva IC, Ellis ED Tirmarche M. 2007. Cancer risk in nuclear workers occupationally exposed to uranium – emphasis on internal exposure. *Health Physics* 94(1):1-17.

Ellis ED, Watkins J, Tankersley W, Phillips J, Girardi D. 2010. Mortality among titanium dioxide workers at three DuPont plants. *Journal of Occupational and Environmental Medicine. Journal of Occupational and Environmental Medicine* 52(3):303-309.

Boice JD, SS Cohen, MT Mummaw, ED Ellis, KF Eckerman, RW Legett, BB Boecker, AB Brill, and B Henderson. 2011. Updated mortality analysis of radiation workers at Rocketdyne (Atomics International), 1948-2008. *Radiation Research* 176:244-258.

Tirmarche M, Harrison JD, Pacquet F, Blettner M, Laurier D, Shilnikova N, Blanchondon E, Lecomte JF, Sokolnikov M, Ellis E, and Marsh JW. Assessment and control of lung cancer risk from radon. *Annals of the ICRP* (accepted for publication)

Ellis ED, Watkins JD, Tankersley W, Phillips J, Girardi D. Occupational exposure and mortality among workers at three titanium dioxide plants. *American Journal of Industrial Medicine* (submitted)

Synergistic Activities

2006 – present. Member, International Commission on Radiation Protection, Committee 2, Task Group 64 to review knowledge and make recommendations on further study of the health effects of occupational radiation exposure to alpha emitters.

1994 – present. Program Director for the DOE Illness and Injury Surveillance Program. The program assesses the overall health of contractor workers employed at 13 DOE sites.

2000 – present. Chair of the Oak Ridge Site-wide Institutional Review Board (IRB) and member of the DOE Central IRB.

George Holdsworth Ph.D.
Oak Ridge Associated Universities

An experienced scientist specializing in toxicology and human health risk assessments.

Senior Toxicologist: Oak Ridge Associated Universities (2003-present)

Technical support to the U.S. EPA IRIS program office for • the preparation of toxicological reviews and IRIS summary sheets, • peer review, and • meeting support. Member of the writing team for toxicological reviews of n-hexane and 1,2,3-trichloropropane, among others. Provided write-ups of experimental studies and overall technical support for the Agency's *Toxicological Review and Risk Characterization of Formaldehyde*, currently in preparation. Prepared monographs on the impact of environmental stressors on human health for the U.S. Centers for Disease Control and Prevention (CDC). Currently providing technical support to NIOSH on criteria documents, skin notation profiles, and immediately dangerous to life and health (IDLH values).

Senior Toxicologist: T N & Associates (1996-2003)

Extensive experience in support of government programs in the human health sciences. For the U.S. EPA, researched and authored issue papers on potential human health impacts of chemicals of environmental concern, for example, in support of U.S. EPA's Superfund Technical Support Center (STSC). Prepared monographs to assess the human health impacts of drinking water disinfectants and their by-products. In a collaborative study, developed a decision analysis methodology for choosing among alternative drinking water disinfection strategies. Researched and wrote toxicological reviews and summary sheets for compounds nominated for inclusion in the U.S. EPA's IRIS database. Assessed the mutagenic potential of trace inorganic and organic contaminants in finished drinking water. For the U.S. EPA's NCEA-Washington, DC office, collaborated in the development of a monograph on the bioaccumulation of dioxins in aquatic life. For the U.S. EPA's IRIS Office, carried out a Congress-mandated Needs Assessment. In a multi-year program for the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), developed Toxicity Profiles of environmentally and militarily important chemicals, in support of an inter-Agency initiative to develop Toxicity Reference Values protective of wildlife. During a three year period (1999-2002), participated in 13 risk assessments in support of environmental remediation at governmental sites.

Senior Scientist: Integrated Computer Systems (1992-1995)

For the U.S. DOE's ERWM program through HAZWRAP, reviewed baseline risk assessments for technical adequacy. Other tasks included reviews of RFI/RI work plans, RCRA Part B permit applications (with ACL demonstration), and RI reports for regulatory compliance and technical adequacy. Prepared issue papers on such subjects as: *The application of quantitative uncertainty analysis to human health evaluations in the baseline risk assessment*; *A modified slope factor for soil-borne plutonium*; *The relevance of the CERFA amendments to CERCLA for cleanup at DOE sites*, among many others.

Senior Scientist: Integrated Laboratory Systems (1991-1992)

For the U.S. EPA Environmental Criteria and Assessment Office (ECAO-Cincinnati), researched and wrote toxicological assessments of chemicals of environmental concern (RQ documents). Revised and updated Health and Environmental Effects Documents (HEEDs). Wrote issue

papers on the following topics: *The assessment of health risk from dermal exposure to polycyclic aromatic hydrocarbons (PAHs); A compilation of dermal, oral, and inhalation absorption factors for Superfund chemicals; The development of a simple and directly applicable mathematical model for route-to-route extrapolations using dermal, oral, and inhalation absorption factors;* and contributed to a review of an assessment of the health effects of mixtures of environmentally important pollutants. Developed quantitative toxicity values (slope factors, RfDs and RfCs) for chemicals of environmental concern. For the NIEHS, researched and wrote issue papers ("Executive Summaries") on the genotoxicity and mutagenicity of selected chemicals.

Scientist: Oak Ridge Research Institute (1983-1991)

For the U.S. EPA, assessed the human health risk from pesticides in drinking water supplies and investigated the occurrence of organohalide byproducts in drinking water disinfection and their role in hyperlipoproteinemia.. For the U.S. DOE, investigated the distribution of chemical species of mercury in soil in support of the East Fork Popular Creek project. Supervised development of an enzyme-linked immunoassay (EIA) for chemolithotrophic bacteria (*Thiobacillus* spp.) at acid mine drainage sites.

Assistant Visiting Professor: University of Cincinnati and St. Bartholomew's Hospital. (1976-1982)

Researched the kinetics of plasma lipoprotein breakdown. Designed a substrate partition assay to determine the binding efficiency of abnormal triglyceride-rich lipoproteins to the enzyme, lipoprotein lipase.

Research Fellow: University of Birmingham/Research Associate: Unilever, Inc. (1964-1976)

Researched the structure and molecular architecture of the liver cell (bile canalicular) plasma membrane. Participated in electron microscopy/freeze fracture studies of natural and artificial membranes.

Education and Training

U.S. EPA Risk Assessment Guidance for Superfund, Cincinnati, OH. (1998)

Ph.D. Biochemistry. University of Birmingham, U.K. (1973)

M.I. Biol. Biochemistry. Barking Coll. Tech, U.K. (1970)

H.N.C. Applied Biology. Luton Coll. Tech, U.K. (1968)

Contact Information

George.Holdsworth@orise.ornl.gov.

(865) 576-3974

Publications

Henson, A.F., G. Holdsworth and R.C. Chandon. 1971. Physicochemical analyses of the bovine milk fat globule membrane: Electron microscopy. *J. Dairy Sci.* 54: 1752-1763.

Holdsworth, G. and J.B. Finean. 1972. A structural study of the low-density lipoprotein component of hens eggs and of an isolated surface component. *Chem. Phys. Lipids* 9: 217-229.

Holdsworth, G. 1973. Studies of the structure and origins of the low-density lipoprotein fraction of hens eggs. Ph.D. Thesis. University of Birmingham, UK.

Holdsworth, G., R.H. Michell and J.B. Finean. 1974. Transfer of very low density lipoproteins from hen plasma into egg yolk. *FEBS. Lett.* 39: 275-277.

Holdsworth, G., R.H. Michell and J.B. Finean. 1974. Transfer of very low density lipoproteins from hen plasma into egg yolk. *Biochem. Soc. Trans.* 2: 486-487.

Holdsworth, G. and R. Coleman. 1975. Enzyme profiles of mammalian bile. *Biochim. Biophys. Acta* 389: 47-50.

Holdsworth, G. and R. Coleman. 1975. Presence of plasma membrane enzymes in bile and their partial purification by affinity chromatography with concanavalin A. *Biochem. Soc. Trans.* 3: 746-747.

Coleman, R. and G. Holdsworth. 1975. Effects of detergents upon erythrocytes: Different patterns of solubilization of membrane proteins by dihydroxy and trihydroxy bile salts. *Biochem. Soc. Trans.* 3: 747-748.

Coleman, R. and G. Holdsworth. 1976. The release of membrane components prior to hemolysis during extraction of intact erythrocytes with bile salts. *Biochim. Biophys. Acta* 426: 776-780.

Coleman, R., O.S. Vyvoda and G. Holdsworth. 1976. Glycocholate can remove lipid and protein components from the outer leaflet of the plasma membrane without lysis. *Biochem. Soc. Trans.* 4: 224.

Coleman, R., G. Holdsworth and J.B. Finean. 1976. Detergent extraction of erythrocyte ghosts: Comparison of residues after cholate and Triton X-100 treatments. *Biochim. Biophys. Acta.* 436: 38-44.

Holdsworth, G. and R. Coleman. 1976. Plasma membrane components can be removed from isolated lymphocytes by the bile salts glycocholate and taurocholate without cell lysis. *Biochem. J.* 158: 493-495.

Coleman, R., G. Holdsworth and O.S. Vyvoda. 1976. Detergents as tools in the dissection of membranes. In: *Methodological Developments in Biochemistry, Volume 6*, (Ed. E. Reid), Horwood, Chichester, U.K.

Coleman, R., G. Holdsworth and O.S. Vyvoda. 1977. Hepatocyte surface enzymes and their appearance in the bile. In: *Membrane Alteration as the Basis for Liver Injury*. (Eds., H. Poppes, L. Bianchi and W. Reutter), M.T.P. Press, Lancaster, U.K.

Vyvoda, O.S., R. Coleman and G. Holdsworth. 1977. Effects of different bile salts on the composition and morphology of a liver plasma membrane preparation. *Biochim. Biophys. Acta* 465: 68-76.

Taylor, K.G., D.J. Galton, G. Holdsworth and M. Rosser. 1977. Hypertriglyceridemia, plasma triglyceride clearance and lipoprotein lipase in adipose tissue of adult diabetics. *Diabetologia* 13: 435.

Galton, D.J., D.J. Betteridge, K.G. Taylor, G. Holdsworth and J. Stocks. 1977. Defects of enzyme regulation in metabolic disease. *Clin. Sci. Mol. Med.* 53: 197-203.

Taylor, K.G., G. Holdsworth and D.J. Galton. 1977. Clofibrate increases lipoprotein lipase activity of hypertriglyceridemic patients. *Lancet* ii: 1106-1107.

Holdsworth, G., K.G. Taylor and D.J. Galton. 1978. The release of lipoprotein lipase from human adipose tissue is potentiated by serum lipoproteins. *Biochem. Soc. Trans.* 6: 105-106.

Holdsworth, G., K.G. Taylor and D.J. Galton. 1979. Lipoprotein lipase activity in human adipose tissue during induced hypertriglyceridemia. *Atherosclerosis* 33: 253-258.

Taylor, K.G., D.J. Galton and G. Holdsworth. 1979. Insulin-independent diabetes, a defect in the activity of the enzyme lipoprotein lipase in adipose tissue. *Diabetologia* 16: 313-317.

Stocks, J., G. Holdsworth and D.J. Galton. 1979. Hypertriglyceridemia associated with an abnormal triglyceride-rich lipoprotein carrying excess apolipoprotein C-III-2. *Lancet* ii: 667-671.

Taylor, K.G., G. Holdsworth and D.J. Galton. 1980. Lipoprotein lipase in adipose tissue and plasma triglyceride clearance in patients with primary hypertriglyceridemia. *Eur. J. Clin. Invest.* 10: 133-138.

McIver, P.M., G. Holdsworth and D.J. Galton. 1981. Severe hypertriglyceridemia associated with pancytopenia and lipoprotein lipase deficiency. *Ann. Int. Med.* 94: 211-212.

Stocks, J., G. Holdsworth, P. M. Dodson and D.J. Galton. 1981. An abnormal triglyceride-rich lipoprotein carrying excess apolipoprotein C-II. *Atherosclerosis* 38: 1-9.

Dodson, P.M., J. Stocks, G. Holdsworth and D.J. Galton. 1981. High-fibre and low-fat diets in diabetes mellitus. *Br. J. Nutr.* 46: 289-294.

Reckless, J.P.D., J. Stocks, G. Holdsworth et al. 1982. Studies of a variant very low density lipoprotein with an acquired deficiency of apolipoprotein C-II. *Clin. Sci.* 62: 93-100.

Reckless, J.P.D., J. Stocks, G. Holdsworth et al. 1982. The roles of C-apolipoproteins in the metabolism of triglyceride-rich lipoproteins. *Clin. Sci.* 62: 125-129.

Holdsworth, G., J. Stocks, P.M. Dodson and D.J. Galton. 1982. An abnormal triglyceride-rich lipoprotein containing excess sialylated apolipoprotein C-III. *J. Clin. Invest.* 69: 932-939.

Avila, E.M., G. Holdsworth, N. Sasaki, R.L. Jackson and J.A.K. Harmony. 1982. Apoprotein E suppresses phytohemagglutinin-activated phospholipid turnover in peripheral blood mononuclear cells. *J. Biol. Chem.* 257: 5900-5909.

Holdsworth, G., J.G. Noel, and R.L. Jackson. 1982. Cyclohexanedione modification of apolipoprotein C-II destroys its activator properties for lipoprotein lipase. *Arteriosclerosis* 2: A440.

Sasaki, N., G. Holdsworth, R.L. Barnhardt, M.L. Kashyap, C.J. Glueck and R.L. Jackson. 1983. Effect of high carbohydrate diets on the content of apolipoproteins C-II, C-III, and E in human plasma high density lipoprotein subfractions. *Atherosclerosis* 46: 341-352.

Cardin, A.D., G. Holdsworth and R.L. Jackson. 1984. Isolation and characterization of plasma lipoproteins and apolipoproteins. In: *Methods in Pharmacology*, 5, 141-166, (Ed. A. Schwartz) Plenum Publishing Corp.

Holdsworth, G., J.G. Noel, K. Steje, M. Shinomiya and R.L. Jackson. 1984. Modification of apolipoprotein C-II with 1,2-cyclohexanedione and 2,3-butanedione. Role of arginine in the activation of lipoprotein lipase. *Biochim. Biophys. Acta* 794: 472-478.

Holdsworth, G., J.G. Noel, M.K. Kashyap and R.L. Jackson. 1985. Kinetics of lipoprotein lipase interaction with triacylglycerol-rich lipoproteins carrying excess apolipoprotein C-III/2. *Biochem. Soc. Trans.* 13: 131-132.

Holdsworth, G., T.R. Osborne, G.T. Patterson and N.W. Revis. 1985. Comparison of the apolipoprotein AI/AII ratio of smoker's and non-smoker's high-density lipoproteins. *Biochem. Soc. Trans.* 13: 133.

Revis, N.W., P. McCauley, R. Bull and G. Holdsworth. 1986. Relationship of drinking water disinfectants to plasma cholesterol and thyroid hormone levels in experimental studies. *Proc. Natl. Acad. Sci. USA.* 83: 1485-1489.

Jackson, R.L. and G. Holdsworth. 1986. Isolation and properties of human apolipoproteins C-I, C-II, and C-III. In: *Plasma Lipoproteins, Part A. Methods in Enzymology.* (Eds. J.P. Segrest and J.J. Albers) Acad. Press, N.Y.

Revis, N.W., P. McCauley and G. Holdsworth. 1986. Relationship of dietary iodide and drinking water disinfectants to thyroid function in experimental animals. *Env. Health Perspect.* 69: 243-248.

Revis, N.W., D. Harmon-Hines and G. Holdsworth. 1987. Determinants of high blood pressure in Blacks: The Scarboro Community Study. Proc. 2nd Int. Conf. on Hypertension in Blacks. Morehead College, Atlanta, GA

Cohen, J., G. Holdsworth, C. Hassan and T.J. Savin. 1997. A Case Study: A Decision Analysis Methodology for Choosing Among Drinking Water Disinfection Strategies. U.S. EPA Workshop on Comparing Risks from Disinfectant By-Products (DBPs) and Microbes in Drinking Water. Cincinnati, Ohio.

Holdsworth, G., M.S. Johnson and E.R. Janus. 2001. Wildlife Toxicity Assessment for 2-Amino-4,6-dinitrotoluene and 4-Amino-2,6-dinitrotoluene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ113801C. Aberdeen Proving Ground, MD. August, 2001.

Salice, C.J. and G. Holdsworth. 2001. Wildlife Toxicity Assessment for 1,3-Dinitrobenzene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ113801. Aberdeen Proving Ground, MD. October, 2001.

Salice, C.J. and G. Holdsworth. 2001. Wildlife Toxicity Assessment for 1,3,5-Trinitrobenzene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ113801B. Aberdeen Proving Ground, MD. November, 2001.

Holdsworth, G., M.S. Johnson and M.S. Hawkins. 2001. Wildlife Toxicity Assessment for HMX. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ113801E. Aberdeen Proving Ground, MD. November, 2001.

Holdsworth, G., M.S. Johnson and M.J. McAtee. 2001. Wildlife Toxicity Assessment for Pentaerythritol Tetranitrate (PETN). U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 37-EJ113801G. Aberdeen Proving Ground, MD. November, 2001.

Salice, C.J., G. Holdsworth and E. Janus. 2002. Wildlife Toxicity Assessment for 1,3,5-Trinitrohexahydro-1,3,5-triazine (RDX). U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01B. Aberdeen Proving Ground, MD.

Salice, C.J., G. Holdsworth, H.I. Paulus and M.J. Quinn. 2004. Wildlife Toxicity Assessment for Propylene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ-1138-01N. Aberdeen Proving Ground, MD.

Salice, C.J., G. Holdsworth, H.L. Ilg and M.J. Quinn. 2004. Wildlife Toxicity Assessment for Ethylene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 37-EJ1138-01Q. Aberdeen Proving Ground, MD.

Salice, C.J., G. Holdsworth and M.J. Quinn. 2005. Wildlife Toxicity Assessment for Aldrin. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01J. Aberdeen Proving Ground, MD.

Muneer, A., C.J. Salice, G. Holdsworth, M.S. Johnson and M.J. Quinn. 2005. Wildlife Toxicity Assessment for Benzo(a)pyrene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01P. Aberdeen Proving Ground, MD.

Salice, C.J., H. Paulus, G. Holdsworth, M.S. Johnson and M.J. Quinn. 2005. Wildlife Toxicity Assessment for Chlordane. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 87-MA02T6-05A. Aberdeen Proving Ground, MD.

G. Holdsworth, H.L. Ilg and M.J. Quinn. 2006. Wildlife Toxicity Assessment for Acetylene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01L. Aberdeen Proving Ground, MD.

G. Holdsworth, H.L. Ilg and H.T. Bausum. 2006. Wildlife Toxicity Assessment for Phenanthrene. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01K. Aberdeen Proving Ground, MD.

Muneer, A., C.J. Salice, G. Holdsworth and M.J. Quinn. 2007. Wildlife Toxicity Assessment for Thallium. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Project Number 39-EJ1138-01O. Aberdeen Proving Ground, MD.

Phillip W. Wallace
Manager, Information Technologies
Oak Ridge Associated Universities

Education

B.S., Industrial Management, University of Tennessee, 1974

M.B.A., Management, University of Tennessee, 1975

Positions

Oak Ridge Associated Universities
Center for Epidemiologic Research
Manager, Information Technologies

1984-present

Serve as Manager of Information Technology for Occupational Exposure and Worker Health program. Responsibilities include ensuring compliance to Federal government cyber security requirements, overseeing activities of software developers, and maintain integrity of data holdings within OEWH.

Served as Manager of Information Technology for project network supporting and performing dose reconstructions as part of EEOICPA compensation efforts. Currently provide advice to subordinate manager who oversees this operation.

Oversaw the design and implementation of the DOE Beryllium Registry (10 CFR 850) and currently oversee the routine operation, work with DOE HQ staff on requirements, work with DOE sites to provide guidance on data submissions, and provide analyses of the data to DOE HQ.

Oversee the daily operation of the DOE Illness and Injury Surveillance program; interact with DOE HQ staff to review program status and plan future directions; oversee the functions of receiving data and returning errors to the submitting site, creating special reports as required, and working with sites to assess health situations as specified by the site Occupational Medicine Director.

Hands-on experience supporting epidemiologic studies through software development and data manipulation

Maintain validity and integrity of data on over 400,000 DOE workers.

Create tables containing over 4,000,000 dosimetry records, ensuring quality for use in health studies.

Lockheed Missiles and Spacecraft Corporation **1983-1984**

Manager, Space Telescope Management Information System Project

Directed computer science efforts on project for building NASA space telescope.

Systems Development Corporation **1980-1983**

Manager, Computer Systems

Directed programming efforts on project management for DOE's Gas Centrifuge Enrichment project.

Union Carbide Corporation, Nuclear Division **1978-1980**

Programmer/Analyst

Responsible for software that tracked nuclear material shipments across DOE and NRC facilities

Burroughs Corporation **1975-1978**

Programmer/Analysts and Software/Technical Representative

Provided technical assistance to sales force

Selected Publications

Wallace PW. Project management using information systems. Presented at the American Society for Engineering Management 4th Annual Meeting, October 1983.

Dupree EA, J Watkins, JN Ingle, P Wallace, and C West. Risk of lung cancer among uranium processing workers. American Journal of Epidemiology 1993; 138:640 (abstract).

Groer PG, CA Pereira, and PW Wallace. 1989. Weight of evidence analysis of lung cancer in Colorado Plateau uranium miners. In: Proceedings of the 14th L. H. Gray Conference on Low Dose Radiation: Biological Bases of Risk Assessment.

Payne D, J Reagan, and P Wallace. Data Modeling of Scientific Data. In: Proceedings of the 1991 International Oracle Users Group Conference.

Fry SA, EA Dupree, AH Sipe, DL Seiler, and PW Wallace. 1992. A study of mortality and morbidity among persons occupationally exposed to >5 rem (>50 mSv) in a Year. Phase I: Mortality, through 1984. Applied Occupational and Environmental Hygiene suppl.; March 1996.

Dupree EA, JP Watkins, JN Ingle, PW Wallace, CM West, and WG Tankersley. 1995. Uranium Dust Exposure and Lung Cancer Risk in Four Uranium Processing Operations. Epidemiology; 6:370-375.

Synergistic Activities

Extensive direct experience in working with epidemiologists, biostatisticians, and health physicists in the area of health studies and dosimetry data assessments, writing software routines, developing algorithms, and documentation.



Managing the Computer Science section of the ORAU Center for Epidemiologic Research for 27 years.

Advising the IT effort of the NIOSH Dose Reconstruction project for ORAU since project startup

Ensuring data quality and integrity in all facets of IT tasks for CER

Applying experience with related activities and DOE to achieve optimally designed application systems that fit program needs

Pamela S. Whitson
Scientific Programmer/Analyst
Oak Ridge Associated Universities

Education

B.S. Degree Communications, major in Advertising, The University of Tennessee, 1972
M.S. Library and Information Science, The University of Tennessee, 1993
A.S. Health Information Technology, Roane State Community College, 1999

Certifications

Certified Tumor Registrar, National Cancer Registrars Association, 1995
Registered Health Information Technician, American Health Information Management Association, 1999
Registered Health Information Administrator, American Health Information Management Association, 2000

Positions

Oak Ridge Associated Universities **2012-present**
Scientific Programmer/Analyst, Center for Epidemiologic Research

Develop, maintain, and execute software to produce timely and accurate analysis data for the Illness and Injury Surveillance Program; develop queries to research ad-hoc requests
Maintain bibliographic function and data integrity in the Comprehensive Epidemiologic Data Resource
Research, develop, design, and implement electronic methods for scanning and retrieval of archived information

Oak Ridge Associated Universities **1989-2012**
Research Associate, Center for Epidemiologic Research

Provided editorial and research support to epidemiologic surveillance project, including data analysis and verification and writing and editorial review of technical site reports
Provided information support to research staff, including developing and implementing document control systems for both hard copy and digital records

Oak Ridge Associated Universities **1986-1989**
Administrative Program Specialist

Provided program support in processing contracts, travel, and work assignments for safety experts

East Tennessee Children's Hospital **1984-1986**
Medical Record Technician/Medical Transcriptionist

Analyzed medical records for completeness and maintained patient and diagnostic indexes.
Produced medical and administrative reports and established procedures for tracking and locating reports.

**The University of Tennessee, Energy, Environment, and Resources Center
Research Assistant**

1982-1984

Analyzed and coded information for inclusion in the Research In Progress Data Base for the U.S. Department of Energy
Served as liaison with the computer programmer for fine refinements
Coordinated the analysis and coding of research records for production of computer-generated publications.

**Tennessee Valley Authority
Editorial Assistant**

1974-1982

Prepared text and tabular material for employee publications and technical manuals
Performed layout and paste-up of text and graphics in preparation for offset printing of publications
Responsible for writing and editing division policy statements

Synergistic Activities

Ms. Whitson has several years experience as an information management coordinator in support of epidemiologic research. Her responsibilities include developing and implementing systems for storage and retrieval of research documents; abstracting and coding of morbidity data for use in epidemiologic research; and providing writing and editorial support for epidemiologic surveillance reporting projects. These projects utilize Microsoft Office, 3M Codefinder, ProCite, and SAS software. Her experiences include project management, developing coding quality standards, developing health data abstraction tools and procedures, and providing medical record and cancer registry technical support. She is a Certified Tumor Registrar from the National Cancer Registrars Association and a Registered Health Information Administrator from the American Health Information Management Association.

Uranium Study Technical Lead	Francis X. Cameron, J.D.
Technical Lead: NEPA, facilitation Current Employment: principal with the Zero Gravity Group Capabilities: NEPA, environmental law, uranium fuel cycle regulatory issues, facilitation public regulatory hearings/meetings, public out-reach, rulemaking, US NRC rule-making, Agreement States issues, over 40 years experience with senior NRC and other federal, state and tribal agencies	Senior Consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials J.D. ❖ University of Pittsburgh M.M.A., Natural Resources ❖ University of Rhode Island B.A., Political Science & International Affairs ❖ University of Pittsburgh Additional training: environmental law

SUMMARY OF PROFESSIONAL EXPERIENCE

REPRESENTATIVE PROJECTS

Convening And Facilitation Of Collaborative And Consensus Building Processes

Consultant to the International Atomic Energy Agency on the development of the Draft Safety Guide on Transparency, Openness, and Public involvement (2011).

The nature and scope of the performance assessment for the disposal of depleted uranium in Utah (Department of Environmental Quality, State of Utah, 2010)

The development of the technical basis for the NRC rulemaking on the licensing and oversight of reprocessing facilities (U.S. Nuclear Regulatory Commission, 2010 - 2011)

Negotiated rulemaking on program integrity issues (Department of Education, 2010)

The development of the criteria for site-specific performance assessments for the disposal of depleted uranium (U.S. Nuclear Regulatory Commission, 2009)

Negotiated rulemaking on the federal student loans programs, TRIO and GEAR UP (Department of Education, 2009)

The development of NRC policy on the blending of low-level radioactive waste (U.S. Nuclear Regulatory Commission, 2010)

Development of the 2009 research agenda, National Invasive Species Advisory Committee (DOI, 2008)

Workshop for Tribal leaders on radioactive waste transportation and disposal (U.S. Nuclear Regulatory Commission, 2006)

Facilitation of workshops to develop a client-based research strategy for the Water Environment Research Foundation (2006)

Facilitation of the development of the vision and guiding principles for the design of a new science and engineering complex (George Washington University, 2008)

Facilitation of the meetings of the Interagency Task Force on the Security of Radioactive Devices (Interagency Task Force, 2006 -2010)

Public Outreach

Facilitation of public meetings on the environmental review for all proposed new reactor sites (U.S.Nuclear Regulatory Commission, 2004 through 2010)

Facilitation of the public meeting on the environmental review on the license renewal for the Diablo Canyon nuclear power plant in San Luis Obispo, CA (NRC, 2010)

Facilitation of the public meetings on the Generic Environmental Impact Statement on the licensing of uranium recovery facilities (NRC, 2009)

Design and facilitation of small group stakeholders meeting on the proposed new reactor for the North Anna site, North Anna VA (NRC, 2007)

Facilitation of the public outreach meeting for the Nuclear Fuels Service site in Erwin, TN public outreach meeting (NRC, Region II, 2009)

Facilitation Of Management Retreats

Chairman Jaczko and NRC office directors on teamwork and communication (NRC, Office of the Chairman, 2010)

Strategic planning session for the Board of Directors and Advisory Committee of Waste Management Symposia on the program tracks and leadership succession (2010)

Senior Leadership Meeting for NRC office directors on establishing an open and collaborative work environment (Executive Director for Operations, NRC, 2009)

Members and staff of the NRC Advisory Committee on Reactor Safeguards on revisions to program reviews (Advisory Committee on Reactor Safeguards, 2009)

Communications workshop for the staff of the Department of Energy and the New York State Energy and Development Administration (DOE, 2006)

Training

Instructor, Facilitation Training Program (U.S. Nuclear Regulatory Commission, 2011)

Instructor, "Implications for Agency Project Managers from Recent Judicial Decisions" Duke University, Environmental Leadership Program, Nicholas School of the Environment (2011)

Curriculum design and Instructor, "Public Participation Strategies for the NEPA Process", for environmental project managers, Duke University, Environmental Leadership Program, Nicholas School of the Environment (2010)

Curriculum design and Instructor, "The Law of the National Environmental Policy Act" for NRC project managers, Duke University, Nicholas School of the Environment (2009)

Instructor, "Cumulative Impacts Analysis, Climate Change", for environmental project managers, Duke University, Nicholas School of the Environment (2010)

EMPLOYMENT HISTORY

President, The Zero Gravity Group LLC (2008 to present)

Assistant General Counsel, Office of the General Counsel, U. S Nuclear Regulatory Commission, Senior Executive Service (2006 to 2008)

Alternative Dispute Resolution Specialist and Special Counsel for Public Liaison, U. S. Nuclear Regulatory Commission (1991 to 2008)

Associate Professor (tenured), University of Rhode Island, environmental law and policy; Chair, University Curriculum Committee (1972 to 1980)

Uranium Study SME	Thomas Cardwell
SME: Agreement State-NRC Regulations for Radiation Protection Current Employment: Trinitek Services, Inc. Capabilities: Radiation Programs, uranium licensing, emergency management, compliance inspections	Regulatory Specialist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials BS, Biology ❖ University of Texas

1981 - 1989 - Uranium Inspector- Texas Bureau of Radiation Control

In 1981 Texas signed the Low Level Waste and Uranium Mining and Milling Agreement with the Nuclear Regulatory Commission (NRC). I was assigned to a working group to draft the Texas Regulations for Uranium Mining and Milling. Our task was to review the NRC uranium regulations and draft the Texas uranium regulations. We reviewed the Texas Statutes and drafted the first Texas uranium regulations with consideration for the various NRC compatibility issues. The regulations were approved by NRC and adopted into the Texas Regulations for Control of Radiation.

My responsibilities as an inspector were to inspect conventional strip mines, heap leach operations, and in-situ mines for compliance with regulations and license conditions. This included worker safety requirements, general public safety, environmental monitoring requirements, and tailings impoundment monitoring requirements. I was responsible for responding to incidents such as spills and remediation of spills.

I was assigned to committees to review all new uranium mining licenses and major amendments. This included reviewing requirements for monitoring internal and external exposures to workers, establishing environmental monitoring locations for air, water and soil samples and intervals of sampling, monitoring of tailings impoundments and waste water retention ponds at in-situ facilities. We also reviewed facility plans and made recommendations for plant processes for controlling contamination in and around the facilities. I was responsible for reviewing requests for releasing buildings, land and equipment for unrestricted use and uranium license termination. This included review of licensees' survey results, planning agency confirmatory surveys, supervising survey teams, and recommending license termination.

1989 - 1997 -- Incident Investigator - Texas Bureau of Radiation Control

My duties included investigating incidents involving radioactive materials and radiation machines, including incidents from uranium operations. I investigated incidents at uranium facilities such as high bioassay results for workers and reports of spills of lixiviates from the mining processes. The investigations included performing timeline and root cause analyses. I reviewed licensees' reports and the procedures to prevent recurrences of the incidents. Many of the spills were in unrestricted areas and the responsibilities included overseeing the clean-up and release of the affected areas.

1997 - 2009 - supervisor- Texas Radiation Control Program

My duties during this time period were as supervisor of the X-ray Inspection Branch from 1997 - 2004. The responsibilities included setting staffing patterns, setting workloads, setting and monitoring budget, monitoring work performance, hiring, and disciplinary actions.

During 2004 - 2009, my duties were as Inspection Program Supervisor. These duties included supervision of the Radioactive Material Inspections Program, Incident Investigation Program, Mammography Inspection Program and the X-ray Inspection Program. The responsibilities included supervising four first level managers, reviewing workload and staffing patterns, resolving employee issues, finalizing budgets for the various programs, monitoring workloads, and setting policies.

Alternate Project Manager
Trinitek management support
Gloria E Chavez, Ph.D.
Technical Lead: Environmental Monitoring, Rad Waste

Current Employment: President, Trinitek Services

Capabilities: Practicing in the radiation health physics profession for 40 years as a researcher, manager, technical staff member. International Programs, Radiation Safety, Risk Assessment, Regulations: NRC, Agreement States, DOE, environmental programs and monitoring, emergency management, radioactive waste, nuclear material management, security VA & systems analysis, nuclear quality assurance

President: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants

Education / Credentials

Ph.D. Environmental Health Physics

❖ Colorado State U, Dept of Radiology & Radiation Biology

MS Health Physics

❖ Colorado State U, Dept of Radiology & Radiation Biology

BS Biology / Chemistry

❖ University of NM

Additional training: RCRA, NQA-1, DOT, Radioactive waste, International Program management, radioactive waste, safety, environmental laws, statistics, nuclear QA

Experience Summary: Over 40 years experience in radiation safety and environmental programs working in industry, USDOE National Laboratories (Sandia National Laboratories, Idaho National Laboratory), uranium mill tailings remediation, education and training. Experience in a broad range of health physics and nuclear work areas including: nuclear materials management, transportation, radioactive waste operations, radiation safety and related environmental health and safety compliance programs, nuclear quality assurance, emergency response, program/project management, international programs, systems analysis, nuclear regulatory development, security assessments, education and training. Work for industrial clients, NRC Agreement State, Department of Energy, Department of State, Department of Interior, Department of Justice.

Work experience at Uranium Mill Tailings Remediation Action (UMTRA) projects (1973-1974), the Idaho National Engineering Laboratory, the Nevada Test Site (NTS), Tonopah Test Range, NV and Sandia National Laboratories, Albuquerque, and commercial clients, various locations.

Experience in managing technical, complex, multidisciplinary, multimillion dollar projects/programs and teams, program developer, educator and trainer. Experience in finding solutions to complex technical and management problems. Experience in public speaking media relations, and public hearings and testimony.

- Employed as a scientist for 29 years at Sandia National Laboratories (1979-2008)
- 20-years Radiation Technical Advisor on the New Mexico Radiation Technical Advisory Council (1983 to 2003)
- Adjunct Professor at the University of New Mexico (nuclear engineering department: taught "radiation protection engineering" graduate course; helped set up health physics program)
- Adjunct Professor at the University of New Mexico (civil engineering department: developed and taught "radioactive and mixed waste management" course series) DOE distance learning program)
- Southwest Indian Polytechnic Institute, volunteer professor: "Biology and scientific methodology" for three years.
- Participant on DOE health physics and radioactive waste grant and fellowship selection committees for several years late 1980s to mid-'90's

- Appointed by five NM Governors to the NM Radiation Technical Advisory (1983—2003)
- AEC Fellowship (converted to ERDA, then DOE): Ph.D. Program
- US Public Health Service Training grant: MS in Health Physics, 1973

Management – Current experience “growing” and managing a small woman-owned business as well as extensive prior experience managing small to large and complex international multidisciplinary technical and business teams.

Regulatory- Currently manage a regulatory compliance company focusing on environmental and nuclear areas. Worked at Sandia National Labs (SNL) as an ES&H Coordinator for the ES&H, security, logistics, and facilities VP ensuring regulatory requirements were transmitted, implemented, and compliance assessed for the division of 1000 people. As a New Mexico Governor(s) appointee for 20 years (5-year appointments) to the Radiation Protection Advisory Council (RTAC) participated in numerous public meetings to review radiation protection regulations and ensure compatibility with NRC regulations. Helped write and promulgate regulations on NORM and medical radiation. Participated in enforcement meetings related to NRC Agreement State regulatory compliance. Provided testimony at public meetings on radiation safety issues. Participated in public meetings as Vice-Chair of the RTAC to review WIPP transportation route discussions, public concerns and issues, listening to public testimony and making recommendations. Provided technical support in emergency response to the state of New Mexico in the Co-60 rebar incident.

Nuclear Facility Supervisor – Responsible for nuclear material accountability and control for up to special nuclear material (SNM), and Classified (various levels) for a USDOE SNL non-reactor nuclear facility used for storage of radioactive waste materials. Preparation of USDOE Nuclear Facility Risk Assessment Documents (SAR, FSAR), annual updates, USQs (unreviewed safety questions), Formality of Operations, and all other documents necessary for a compliant nuclear facility per DOE STD 3009-94 and DOE ORDER 420.1, DOE Guide 414.1-2, responding to USDOE review comments and ensuring operational readiness. Member of USDOE EFCOG, Safety Analysis subgroup.

Senior Science Advisor – To the U.S. Department of State (one of five advisors in the USA) on non-proliferation programs (ISTC, STCU, special assignments) in the Former Soviet Union states. Travel to Russia, Kazakhstan, Ukraine.

USDOE Initiatives for Proliferation Prevention (IPP) Program Manager – Over 20 complex, multi-million dollar technical projects involving many Russian nuclear cities, Russian senior technical staff, US senior technical staff, US industry partners; travel to Moscow, Siberia, Troitsk, Ekatarinburg and nuclear facilities. Successes included receiving an R&D 100 Award in 2006 and the establishment of successful commercialization joint ventures between US companies and Russian institutes creating a medical device manufacturing facility in Snezhinsk, an optical laser complex near Troitsk, and a high temperature battery manufacturing capability near Moscow to the mutual benefit of the US companies and Russian former weapon scientists.

Emergency Response Environmental Duty Officer – While at Sandia National Laboratories, responsible for decisions and actions related to environment, safety and health on behalf of Sandia in emergencies.

Radioactive Waste – Worked in Radioactive Waste operations at SNL from 1979 as project leader, later technical manager, and returning as a Waste certification Official over a 20year time frame. Was on DOE LLW teams to develop policy. Taught university classes on radioactive, LLW and mixed waste. Wrote NORM regulations for New Mexico. Also worked in

TSCA, RCRA and other areas. Sandia National Laboratories Mixed Waste and TSCA Program manager

Research – Radiologic characterization of a radioactive/mixed waste disposal site at SNL. Modeling the atmospheric releases (submicron radioactive aerosols) from a fuel processing facility in Idaho (National Reactor Testing Station, now the INEEL).

Environment, Safety and Health (ES&H) – Worked in environmental programs at Sandia National Laboratories (SNL) for over 20 years including. As Environmental Program Manager developed, managed and expanded SNLs environmental programs, performed environmental remediation assessments for radioactive waste disposal sites. Worked as TSCA (PCBs) Project Leader, Technical Manager for radioactive and mixed waste facilities and Radioactive waste operations: designed, developed, implemented radioactive waste operations program, Radiation Measurements Project Leader (Dosimetry manager); set up environmental Dosimetry program; managed personnel Dosimetry program and supported underground testing radiation measurements. As Environmental, Safety And Health Division Technical Manager and coordinator reporting to the Vice-President for ES&H, responsible for ensuring SNL ES&H operations were complete and effective, implementing new requirements lab-wide, Conducting management compliance assessments for all ES&H programs including RCRA, OSHA, CWA, CAA,

Nuclear Facility Training Manager – Responsible for development and implementation of a training and qualification program for nuclear facility supervisors, material handlers and staff including development of scenarios for emergency response evaluations in the event of a criticality or other incident, meeting USDOE Order requirements.

Nuclear QA Program Manager – Responsible for setting up and implementing nuclear quality assurance (QA) program for critical processes, supporting nuclear facilities, radioactive waste certification. 10CFR 830.120, subpart A.

NQA-1 Certified Lead Auditor – Conducted numerous audits of radioactive/mixed waste treatment and disposal facilities, radioactive waste container suppliers; developed supplier qualification program, later implemented by SNL's supplier program. Ensured SNL waste certification program met requirements for NTS (Nevada Test Site) WAC (Waste acceptance Criteria). Selected as NTS Waste-Certification Official (WCO) Working Group Chair.

Project Leader and Systems Analyst – For SNL and U.S. Department of Justice, a successful Community Security Systems Assessment Methodology (CVAM), in use throughout USA. Developed a "Train-the-Trainer" curriculum. Managed this multidisciplinary team consisting of senior technical staff, weapons experts (former Navy Seals, special forces, state police, security forces) resulting in a copyrighted training program producing royalties. Developed and implemented a training program for the methodology. Conducted security systems assessments for Department of Interior (Water systems, dams), National Park Service (icons including Washington monument, Mount Rushmore, St Louis Arch), communities, U.S. Marshall, and State of New Mexico.

Security Systems Assessments Team Leader – For US Department of Justice and U.S. Department of Interior, evaluations of critical infrastructure systems including dams, water systems, facilities.

Project/Program Manager – Experience managing multidisciplinary technical, international, complex teams on multimillion dollar projects and programs.

Security Clearance – Held Q-Clearance (W) from 1979 to 2007.

Trainer/Educator – Curriculum development and instructor on radiation safety, integrated safety analysis, hazard assessments, radioactive waste, QA, supplier qualifications, and security systems analysis.

EMPLOYMENT SUMMARY

Trinitek Services, Inc. Experience (2007 to Present)

- President, Trinitek Services, Inc., a woman-owned small business offering environmental and nuclear safety consulting. Responsible for management of day-to-day operations, marketing and business development.
- Technical contributor to client projects including uranium ion exchange processes.
- Development of Environmental Report structure for uranium deconversion facility as part of permitting process.
- Sampling and Analysis Plan for radionuclide characterization in sediments
- Radiological characterization of Sediments in rivers and tributaries
- Radiation Health Effects listener for public meetings with tribes
- Comprehensive Radiation Safety Training for EAEA (Egyptian Atomic Energy Authority) under MOU with New Mexico Tech U, US DOE funding.

Sandia National Laboratory Experience (1979 to 2008)

International Programs: 2003-2008

- Senior Science Advisor to the Department of State (one of five in the USA) on non-proliferation programs (ISTC, STCU, special assignments) in the Former Soviet Union States (travel to Russia, Ukraine, Kazakhstan institutes including Stepnogorsk).
- USDOE Initiatives for Proliferation Prevention (IPP) Program Manager (Over 20 complex, multi-million dollar technical projects involving many Russian nuclear cities, Russian senior technical staff, US senior technical staff, US industry partners; travel to Moscow, Siberia, Troitsk, Ekatarinburg and nuclear facilities).
- Successes included receiving an R&D 100 Award in 2006 and the establishment of successful commercialization joint ventures between US companies and Russian institutes creating a medical device manufacturing facility in Snezhinsk, an optical laser complex near Troitsk, and a high temperature battery manufacturing capability near Moscow to the mutual benefit of the US companies and Russian former weapon scientists.

Security Systems and Consequence Analysis: 2002-2003

- Project Leader and Systems Analyst for Successful Department of Justice funded Community Security Systems Assessment Methodology, in use throughout USA, multidisciplinary team consisting of senior technical staff, weapons experts (former Navy Seals, special forces, state police, security forces) resulting in a copyrighted training program producing royalties. Developed and Implemented training program for methodology.
- Department of Interior Security Systems Assessments for critical Infrastructure Systems analyst team member.
- Project member for High level waste tanks clean-up process at Hanford supporting CH2M Hill efforts.

Nuclear Facilities: 2000-2002

- Nuclear facility supervisor responsible for nuclear material accountability and control for up to SNM, and Classified (various levels)
- Nuclear facility training manager responsible for development and implementation of training and qualification program for nuclear facility supervisors and staff including development of scenarios for emergency response evaluations in the event of a criticality or other incident.
- Preparation of Nuclear Facility Risk Assessment Documents (SAR, FSAR)
- Nuclear QA program manager set up QA program for critical processes
- Member of EFCOG Working Group on Safety systems

Radioactive Waste Certification, Nuclear Quality Assurance: 1986-1991

- NQA-1 certified lead auditor: conducted numerous audits of radioactive/mixed waste treatment and disposal facilities, radioactive waste container suppliers; developed supplier qualification program later implemented by SNL's supplier program
- DOT shipper for radioactive and hazardous materials (DOE/NRC)
- Waste certification official for radioactive waste disposed at NTS, and elsewhere.
- Chair of DOE Waste Certification Official Working Group, NTS
- Member of DOE Packaging and Management Council

Environmental Safety and Health (ES&H): 1991-1996

- Environmental , Safety And Health Division Technical Manager and coordinator reporting to the Vice-President for ES&H, responsible for ensuring SNL ES&H operations were complete and effective, implementing new requirements lab-wide
- Conducting management compliance assessments

Environmental Programs, TSCA-RCRA, Radioactive Waste Operations, Emergency Response 1984-1991

- Environmental program manager: managed and expanded SNL's environmental programs
- Radioactive waste disposal site characterization
- TSCA (PCBs) Project Leader
- Emergency Response Environmental Duty Officer for SNL responsible for decisions and actions on behalf of Sandia in emergencies
- Technical Manager for radioactive and mixed waste facilities and Radioactive waste operations: designed, developed, implemented program
- Depositions for EPA remediation action
- Prepared SNI's environmental monitoring reports for Albuquerque, Livermore, Tonopah, Kauai for 10 years.

Radiation Dosimetry, Environmental Monitoring 1979-1984

- Radiation Measurements Project Leader (Dosimetry manager); set up environmental Dosimetry program; managed personnel Dosimetry program and supported underground testing radiation measurements
- Environmental program manager: developed SNLs environmental programs

- Performed environmental remediation assessments for radioactive waste disposal sites

Miscellaneous (1973 to 1979)

- Uranium Mill Tailings Remediation Action Project, Grand Junction: Working Level measurements
- Fort St. Vrain fuel loading radiological assistance
- Field Research modeling atmospheric releases from fuel reprocessing facilities at INEL
- Characterization and assessment of highly radioactive test reactor leaching ponds at INEL

TECHNICAL RECOGNITION AND ACCOMPLISHMENTS

- 2010. Sandia National Laboratories, Licensed copyright award for Community Vulnerability Assessments Methodology
- 2010. Emeritus Status, Health Physics Society
- 2008. Selected as Health Physics Society Fellow, Pittsburgh, PA.
- 2007: Selected as a Sandia National Laboratory "Women's Hall of Fame Winner"
- 2006 R&D 100 Award winner (Chicago), Program manager and team leader for international, multidisciplinary engineering team. The 100 most significant, newly introduced research and development advances in multiple disciplines. Winning one of the R&D 100 Awards provides a mark of excellence known to industry, government, and academia as proof that the product is one of the most innovative ideas of the year, nationally and internationally.
- Invited speaker to ANS Winter meeting in New Orleans, 2006: Russian Nuclear cities
- 2004-2007 Member (representing SNL) of DOE ILAB nonproliferation laboratories committee
- 2004-2006 Selected as US Department of State Senior Science advisor in nonproliferation programs in FSU countries primarily for radiological, chemical and biological WMD scientists, traveling to Russia, Kazakhstan and Ukraine
- 2003-2004 Royalty stream for successful Systems Analysis Community Security Assessment Methodology for Department of Justice considering multiple terrorist factors and consequence analysis
- 2002-2003 Selected as Chair for the DOE Nevada Test Site Waste Certification Official (WCO) radioactive waste disposal Working Group
- Selected by HPS Directors as a USA Delegate to the International Radiation Protection Association (IRPA) Congresses: the 1996 Congress (Vienna, Austria), 2000 congress (Hiroshima, Japan), 2004 Congress (Madrid, Spain). Attended by 1500 scientists from 60 countries. As delegate, vote for new officers, new policies, future meeting sites, negotiate with other country delegates on issues.
- Invited speaker to Los Alamos Emergency Responder Symposium, 2003
- Member of the HPS Strategic Planning Committee, 2002 -2004
- Member of HPS International Committee 1997 to 2001.
- Elected to Board of Directors National Health Physics Society (1993 - 1996).
- Selected as Participant on DOE health physics and radioactive waste grant and fellowship selection committees for several years late 1980s to mid-'90's
- Member of HPS Publications Committee (1991 - 1993)
- Member and Chair of National Health Physics Society Technical Program Committee (1988 - 1991),
- Member and Chair of National Health Physics Society Technical Program Committee (1988 - 1991), Responsible for technical programs at Anaheim 1988 HPS meeting

(350 international, technical presenters and 2500 attendees), Albuquerque 1989 HPS annual meeting (2000+ attendees).

- City of Albuquerque Award for bringing in large convention, presented by Mayor
- WYCA Woman of the Year (Woman on the Move) in Science and Technology for New Mexico, 1989
- Appointed by several Governors of New Mexico as Member of Radiation Technical Advisory Council (RTAC) (1985 - 1990; 1992 - 1996, and 1997 to 2002. Reappointed in 2003. Vice-Chairman of RTAC - 1990 - 1991.
- Member of Rio Grande Chapter HPS Public Information Committee (1983-1986), planned/assembled State Fair Booth, participated in various speaking activities
- 1989 Local Arrangements Committee Member Mid-Year HPS, Publicity Chair-Media.
- Publicity Chair for Albuquerque Mid-Year symposium 1983, hosted by the Rio Grande Chapter HPS President and Board Member for Rio Grande Chapter Health Physics Society (HPS) (1981 - 1983).
- Winner of Best Student Presentation, Health Physics Society Annual Meeting, Minneapolis, MN, 1978
- US DOE Fellowship 1976 – 1978
- US ERDA: Fellowship 1975-1976
- US AEC Fellowship 1974 -1975 at National Realtor Testing Station (NRTS, now INEEL)
- US Public Health Service Training Grant, 1973
- 1970 Nominated to Sigma Xi
- 1968 Several Scholarships to the University of New Mexico
- 1968 Awards for 4.0/4.0 Math in HS
- National Honor Society 1964-1968

PUBLIC SERVICE / VOLUNTEER

- 2011 –present Member of Hug-Li's: make dolls for children with terminal illnesses in hospice
- 2009-2011 Member of the National Adoption Exchange Board of Directors
- 2009-2011 Chairman of the New Mexico Adoption Exchange Advisory Board
- 2007-2011 Member of the New Mexico Adoption Exchange Advisory Board, a non-profit national organization finding adoptive homes for hard-to-place kids (teens, sibling groups, medical)
- 2006- present Adoption Spokesman for the Adoption Exchange and New Mexico Children Youth and Family Department (NM CYFD)
- 2006-2007 Women in Philanthropy
- 2004-2005 Treatment Foster Parent
- 2000-2002 Founding Member of East Mountain Charter High School Governing Board, groundbreaking, fundraising, selection of new principal for highly acclaimed new H.S.
- Three-year volunteer instructor at SIPI (Southwest Indian Polytechnic Institute)
- Volunteer for MANOS teaching minority HS kids radiation physics in workshops
- Long-term member of the Sandia Labs Hispanic Council and minority organizations 1997 –1998. Member of Women's Art Group.
- Planned and implemented Sandia's 1996 Hispanic Heritage Month Activities.
- 1990 - 1997. Member of Sandia National Labs' Hispanic Leadership and Outreach committee. Volunteer speaker, mentor, career fairs etc., for numerous minority education and public science education programs.

- 1995 - 1998. Elected to Board of Directors of the Friends of the Rio Grande Botanic Garden, the newest Botanic Garden in the USA, fundraising and design input, Secretary and Publicity Chair.
- 1989-1996 Member of Albuquerque Council for International Visitors, greeting/ hosting in home visits State Department Dignitaries (and translator) as requested, including: Minister of Justice from Turkey, Past-President of Ban's Birth from Chile, South America, President of the Montenegro-Helsinki Peace Accord from Montenegro, Educator from South Africa in charge of developing new integrated school system since the cessation of apartheid
- Selected as member of women's art group: public art focus 1994
- 1984 - 1994. Member of Sandia's Volunteers in Action Committee
- 1988 - 1995. Docent for New Mexico Natural History Museum
- 1988-1995 Docent for Rio Grande Nature Center V leading interpretive walks and providing training for other docents in ecological/environmental areas
- 1985-1988 Secretary for the Ranchos de Placitas Architectural Committee, review and approve designs of new homes in the community to ensure covenants adhered to, water supplies adequate, design consistent with passive solar design for homes from \$250K +
- 1983-1989 Member of Rio Grande Chapter of the Health Physics Society: public information committee (planned/assembled State Fair Booth, participated in various speaking activities), past president and board member
- 1984 - 1994. Member of Sandia's Volunteers in Action Committee

Other Experience

Designed and built a very effective passive solar home (4000 SF area), plus extensive landscaping and courtyard design to fit into environment, efficiently collect and store solar energy for heat. Design included complex curves and varying, complex roof and wall lines, greenhouse additions, clerestory windows, insulation specifications. Tasks included designing and writing specifications, doing preliminary architectural renderings, calculating beam loading and roofing specifications, cost estimating, scheduling, conducting property survey for drainage and foundation, purchasing construction materials, laying and pouring foundation, building adobe walls, sheet-rocking, interior finishing, laying and cutting flagstone floors and walls, laying complex brick floors, welding gate (over 400 welds), selecting and daily oversight of subcontractors for electrical, plumbing, and framing to specifications meeting designated codes. Completed house stayed at no less than 60 degrees F for two winters until supplemental heating was installed. Design was copied by many contractors due to attractive design.

Designed radioactive and mixed waste packaging, management, storage facility at Sandia National Labs for Low-level, mixed waste including nuclear material and classified waste. Project oversight for construction with AE.

PUBLICATIONS, PRESENTATIONS, AND TRAINING

- Publications, presentations, training in numerous areas including health physics, environmental health physics radioactive waste management, nuclear quality assurance, radioactive material packaging, international programs, Russian decontamination technologies for high level waste, emergency management, systems analysis methodologies for critical infrastructure protection.

- Presentations at HPS, DOE National Packing Council (QA – 2001 Seattle, WA), ANS invited speaker (2005, New Orleans – radioactive waste decontamination technologies partnering with Russians at MCC, Zheleznogorsk, Siberia)
- IRPA-Madrid, Spain (2004), international radioactive waste technologies.
- Invited Co-speaker with Senator Domenici on non-proliferation programs (2006) at the National Atomic Museum, Albuquerque, NM.
- 2003, National Response team presentations at LANL and at SNL on systems analysis and consequence assessments.

Additional Experience as an Educator /Trainer

- 2011. Radiation Safety Basics. Private client
- 2010. Developed and conducted an extensive Comprehensive Radiation Safety and Source Recovery Training for 15 Egyptian Atomic Energy Authority Staff, under contract to New Mexico Tech U, funded by US DOE
- 2009 and 2010. Developed a series of course curriculums for radiation safety professionals, Trinitek Services, Inc. under an MOU with New Mexico Tech (New Mexico Institute of Mining and Technology).
- 2003. Project Leader and Course Developer for community vulnerability assessment methodology and train-the-trainer course, Sandia National Laboratories (funded by the Department of Justice).
- 2001 through 2003. As Nuclear Facility Training Supervisor at Sandia National Laboratories, developed and implemented the training curriculum and qualification process for nuclear facility management, operations staff and material handlers.
- 1994. Technical Advisor and Lead Presenter for University of New Mexico College of Engineering Waste Energy Research Consortium (WERC), Mixed Waste Program Series, a graduate distance learning program for university credit. Developed Concept for the six-week program covering regulations, sources, waste management options for radioactive mixed waste, Selected Program Leaders, speakers and coordinated series. Televised to 170 receptor sites from Alaska to Washington, DC. Translated into Spanish and Russian.
- 1993. WERC Teleconference Presentation, on Mixed Waste (part of Low Level Waste series), 70 receptor sites in USA.
- 1993. Guest Lecturer on Mixed Waste, UNM Graduate Hazardous Waste Seminar, Civil Engineering Seminar Series.
- 1992. Adjunct Professor UNM, Nuclear Engineering Dept. "Radiation Safety Engineering", Graduate Course. Televised to University locations across USA as part of distance learning programs.
- 1991 and 1993. Trainer on Radiation Safety, International Safeguards, for International Safeguards Agencies, sponsored by Sandia National Laboratories.
- 1990 and 1991. Faculty for Executive Enterprises Mixed Waste Seminars, Presentation and Publication at Seattle, WA; Washington, D.C.; and Albuquerque, NM.
- 1989-1991 and 1997-1998. Instructor at the Southwest Polytechnic Indian Institute, Albuquerque, NM.
- 1982-1987. Faculty for Radiation Protection Technologists.
- 1982. Instructor for SNL Legal Staff, Radiation Effects, Pleasanton, CA.

PROFESSIONAL AFFILIATIONS

Current

Health Physics Society; Fellow; Emeritus Member, Plenary member since 1979

Rio Grande Chapter membership
The Institute of Nuclear Material Management (INMM)
Local chapter Membership
American Society of Safety Engineers
Professional and the Latino Workforce
Local chapter membership

Former

- International Radiation Protection Association (IRPA) Congress, selected as USA Delegate to the 1996 Congress (Vienna, Austria)
- IRPA Delegate to 2000 Congress (Hiroshima, Japan),
- IRPA Delegate 2004 Congress (Madrid, Spain).
- Past Member of the American Nuclear Society
- SACNAS Spanish American Chicano Native American Society for Engineers and Scientists
- WES Women in Engineering Society
- MAES Mexican American Engineering Society
- Eastern Idaho Chapter of HPS (1975–1978)

BUSINESS MEMBERSHIPS

- Member of the Albuquerque Hispano Chamber of Commerce (AHCC) International Committee
- Albuquerque Hispano Chamber Of Commerce (AHCC) Member (Trinitek Services)
- Better Business Bureau Member (Trinitek Services)
- Procurements Technical Assistance Program (PTAP)

Uranium Study SME	Nicholas S. Fisher, Ph.D.
SME: Senior Aquatic Scientist Current Employment Distinguished Professor, Marine Sciences Research Center State University of New York, Stony Brook, NY; & Director, Consortium for Inter-Disciplinary Environmental Research Stony Brook University Capabilities: Marine, estuaries, freshwater, toxicity, radionuclide uptake, biogeochemistry of metals in aquatic systems; contaminant-biota interactions; aquatic radioecology; aquatic pollution management strategies; aquatic toxicology.	Uranium Regulations consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials Ph.D. Marine Biology ❖ State University of New York, Stony Brook B.A. Biology, Brandeis University ❖ Waltham, Massachusetts
<u>Positions Held:</u> 2011 Visiting Scientist, Harvard University 2006 - present Director, Consortium for Inter-Disciplinary Environmental Research, Stony Brook University 2005 - present Distinguished Professor, Marine Sciences Research Center, Stony Brook University 1991 - 2005 Professor, Marine Sciences Research Center, Stony Brook University 1998 - 2003 Associate Dean, Marine Sciences Research Center, Stony Brook University 1988 - 1991 Associate Professor, Marine Sciences Research Center, Stony Brook University 1985 - 1987 Oceanographer, Brookhaven National Laboratory, Upton, New York. 1980 - 1985 Research Scientist, International Laboratory of Marine Radioactivity, International Atomic Energy Agency, Monaco. 1977 - 1980 Senior Research Scientist, Marine Studies Group, Ministry for Conservation, Melbourne, Australia. 1974 - 1977 Postdoctoral Investigator, Chemistry Department, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts. <u>Awards / Distinctions:</u> 1985 - Appointed as Marine Ecologist, Ecology Institute (Honorary Institute) Oldendorf-Luhe, Germany 1992 - Who's Who in America; Who's Who in the East, Who's Who in the World 2001 - 2007 Elected Chair, Marine Biogeochemistry Committee, International Commission for the Scientific Exploration of the Mediterranean (CIESM) 2004 - 2005 John Simon Guggenheim Memorial Fellowship 2005 Awarded State University of New York Distinguished Professorship 2006 Graduate School Dean's Award for Excellence in Graduate Mentoring Member: 1983 - present American Men and Women in Science 1975 - present American Society of Limnology and Oceanography 1974 - 1995 American Phycological Society 1996 - present Society of Environmental Toxicology and Chemistry Advisory Activities: 1976 Advisory Panel to New York State Attorney General on PCBs in the environment 1983 - 1985 GESAMP Working Group on the Interchange of Pollutants between the Atmosphere and the Oceans 1984 - present Editorial Advisory Board, Marine Ecology Progress Series 1988 NSF Ocean Chemistry Review Panel 1989 New York State Sea Grant Review Panel	

1990 NOAA National Status & Trends Review Panel
1990 NOAA Coastal Oceans Program Toxic Substances Review Panel
1991 New York Bight and Hudson Estuary Programs Toxic Substances Review Panel
1992 - 2000 International Union of Pure and Applied Chemistry Commission on Environmental Analytical Chemistry
1993 - present Editorial Board, Marine Environmental Research
1997 - 1998 COASTES Advisory Panel
2003 New Hampshire Sea Grant Review Panel
2003 - present IAEA Coordinated Research Group on the Bioaccumulation of Radionuclides
2003 - present Expert Advisor for US Arctic Monitoring and Assessment Program
2005 - present External Advisory Committee, Center for Environmental Health Sciences, Dartmouth College
2007 - present Steering Committee, University of Haifa's School of Marine Sciences, Haifa, Israel
*External Advisory Committee review of Dartmouth College's Center for Environmental Health Sciences. Hanover, NH, October, 2011.

Consultant for numerous organizations including:

U.S. Environmental Protection Agency; Brookhaven National Laboratory; International Atomic Energy Agency; National Association of Photographic Manufacturers; New York City Office of Management and Budget; Risø National Laboratory, Roskilde, Denmark; National Environmental Law Center; New York State Department of State; Fisher Island Conservancy; Applied Biomathematics; Hong Kong University of Science and Technology; Northeast Utilities; US District Court Maine (appointed Special Master of the Court) University and departmental service (select activities): Director, Stony Brook University's Consortium for Inter-Disciplinary Environmental Research (CIDER, 2006-); MSRC Colloquium coordinator (3 years); Distinguished Visiting Scholar Committee (chair, 4 years); Radiation Safety Officer;

Convenor of workshops (recent, and relevant)

*University of Wisconsin, Milwaukee. Presented a seminar on "Finding patterns of metal-biota interactions in the sea." Milwaukee, November, 2011.
Society of Environmental Toxicology and Chemistry, 32nd Annual Meeting. Presented "Geochemical and biological factors allow better understanding of sedimentary As, Cd and uptake in a deposit-feeding polychaete *Nereis succinea*" (with Z. Baumann). Boston, November, 2011.
*Harvard University School of Public Health. Presented a seminar on "The application of a model to assess the bioaccumulation of metals in aquatic animals and their trophic transfer in aquatic ecosystems." Boston, December 2011.
*Workshop on Fukushima radioactivity in the Pacific. Presented a paper on "Fukushima-derived radionuclides in Pacific biota." Salt Lake City, February, 2012.
ASLO 2012. Presented "Bioaccumulation by zooplankton and micronektonic fish of Fukushima released cesium and silver radioisotopes in Japanese coastal waters" (with Z. Baumann);
"Impacts of the Fukushima Dai-ichi nuclear power plants on the ocean" (with K. Buesseler);
"Trends in community structure of zooplankton and micronekton from waters nearby Fukushima and their relation to bioaccumulated cesium radionuclide" (with J. Nishikawa). Salt Lake City, February, 2012.
*NOAA Headquarters. Presented "Fukushima-derived radionuclides in Pacific biota." Silver Spring, MD, March, 2012.
*SERDP & ESTCP Workshop on Research and Development Needs for Understanding and Assessing the Bioavailability of Contaminants in Soils and Sediments. Presented "Bioaccumulation of metals in sediment-dwelling animals." Annapolis, August, 2008.
Society of Environmental Toxicology and Chemistry, 29th Annual Meeting. Presented "Assessing the bioaccumulation of metals in killifish (*Fundulus heteroclitus*), a bioindicator

organism.” (with J. Dutton). Tampa, November, 2008.

*SERDP & ESTCP's Partners in Environmental Technology Technical Symposium & Workshop. Presented “Factors affecting metal bioaccumulation in marine organisms,” and *SETAC Workshop on Ecological Assessment of Selenium in the Aquatic Environment. Pensacola, FL, February 2009.

*Interdisciplinary Progress in Environmental Science and Management. Presented keynote speech on “Interdisciplinary approaches for addressing marine contamination issues.” Newcastle-upon-Tyne, UK, July, 2011.

10th International Conference on Mercury as a Global Pollutant. Presented a seminar on “Dissolved organic matter, regardless of origin, limits algal accumulation of methylmercury” (with A. Luengen), and “Trends in mercury concentrations in US commercial fish, a research synthesis” (with R. Karimi). Halifax, Nova Scotia, July 2011.

Extensive additional workshops, invited speaker internationally and nationally

PUBLICATIONS (examples of recent, relevant)

Dutton, J., and N.S. Fisher. 2011. Salinity effects on the bioavailability of aqueous metals for the estuarine killifish *Fundulus heteroclitus*. **Environmental Toxicology and Chemistry** 30: 2107-2114.

Fisher, N.S., and K.O. Buesseler. 2011. Tracking Fukushima radionuclides: a research cruise in Japanese waters. **Bulletin of Atomic Scientists**
<http://www.thebulletin.org/web-edition/roundtables/fukushima-what-dont-we-know> .

Environmental Toxicology and Chemistry

Dutton, J., and N.S. Fisher. In press. Bioavailability of sediment-bound and algal metals to killifish (*Fundulus heteroclitus*). **Aquatic Biology**

Wang, W.-X., and N.S. Fisher. 1999. Delineating metal accumulation pathways for aquatic invertebrates. **Science of the Total Environment** 237/238: 459-472.

Cochran, J.K., S.B. Moran, N.S. Fisher, T.M. Beasley, and J.M. Kelley. 2000. Sources and transport of anthropogenic radionuclides in the Ob River system, Siberia. **Earth and Planetary Science Letters** 179: 125-137.

Fisher, N.S., and S.E. Hook. 2002. Toxicology tests with aquatic animals need to consider the trophic transfer of metals. **Toxicology** 181/182: 531-536.

Fisher, N.S. 2002. Considerations for a mussel-based monitoring program for radioactive contaminants in the Mediterranean Sea. In: Mediterranean Mussel Watch. Designing a Regional Program for Detecting Radionuclides and Trace Contaminants, F. Briand and N.S. Fisher (Eds.), CIESM Workshop Monograph No. 15, Monaco, pp. 59-62.

Fisher, N.S. 2002. Editor. Bioaccumulation of Metals and Radionuclides in Marine Organisms. CIESM Workshop Monograph No. 19, Monaco, 120 pp.

Wong, W.H., J.S. Levinton, B.S. Twining, and N.S. Fisher. 2003. Assimilation of micro- and mesozooplankton by zebra mussels: A demonstration of the food web link between zooplankton and benthic suspension feeders. **Limnology and Oceanography** 48: 308-312.

Stewart, G.M., and N.S. Fisher. 2003. Experimental studies on the accumulation of polonium-210 by marine phytoplankton. **Limnology and Oceanography** 48: 1193-1201.

Mylon, S.E., B.S. Twining, N.S. Fisher, and G. Benoit. 2003. Relating the speciation of Cd, Cu, and Pb in two Connecticut rivers with their uptake in algae. **Environmental Science and Technology** 37: 1261-1267.

Stewart, G.M., and N.S. Fisher. 2003. Bioaccumulation of polonium-210 in marine copepods. **Limnology and Oceanography** 48: 2011-2019.

Fowler, M. Peterson, and N.S. Fisher. 2004. ²¹⁰Po and ²¹⁰Pb concentrations, fluxes, particle settling velocities, and organic carbon at the DYFAMED site, Northwestern Mediterranean.

Griscom, S.B., and N.S. Fisher. 2004. Bioavailability of sediment-bound metals to marine bivalve molluscs: an overview. **Estuaries** 27: 826-838.

Fowler, S.W., and N.S. Fisher. 2004. Radionuclides in the biosphere. In: Radioactivity in the

- Environment, Vol. 6, Marine Radioactivity, H.D. Livingston (Ed.), Elsevier Science, Amsterdam, pp. 167-203.
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- Mathews, T., and N.S. Fisher. 2008. Trophic transfer of seven trace metals in a four-step marine food chain. **Marine Ecology Progress Series** 367: 23-33.
- Chen, C., A. Amirbahman, N.S. Fisher, G. Harding, C. Lamborg, and D. Taylor. 2008. Methylmercury in marine ecosystems: spatial patterns and processes of production, bioaccumulation, and biomagnification. **EcoHealth** 5: 399-408.
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- Karimi, R., N.S. Fisher, and C.L. Folt. 2010. Multielement stoichiometry in aquatic invertebrates: when growth dilution matters. **American Naturalist** 176: 699-709.
- Fisher, N.S., and C.Y. Chen. 2011. Interdisciplinary approaches for addressing marine contamination issues. **Environmental Conservation** 38: 187-198.

Uranium Study Project Manager**Stanley A Fitch, MSE, CHP, RRPT**

SME: radiation regulations, Agreement States-NRC, nuclear material, risk

Current Employment: Vice-President, Trinitek Services

Capabilities: Practicing in the radiation health physics profession for over 25 years as a manager, technical staff member and technician in occupational, environmental, and regulatory aspects of radiation protection, uranium mining/milling regulatory and operational experiences, radiation measurements and risk assessment, in defense and research applications including reactor operations as well as facilities operations; and at Title 1 and 2 uranium mill tailings reclamation projects (UMTRA), nuclear materials security.

Vice-President: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants

Education / Credentials

MSE-Nuclear and Radiation Engineering

❖ University of Texas At Austin

BS Radiation Protection

❖ Thomas Edison State College, New Jersey

CHP- Certified by the American Board of Health Physics

RRPT - Certified by the National Registry of Radiation Protection Technologists

Additional training: RCRA, DOT, Radioactive waste, NRC Inspections, radioactive waste, safety, nuclear material security

Management and Technical Qualifications – Former regulator specializing in managing radiation and environmental protection programs and personnel for 24 years, with budgets in excess of \$1M/year. Primary focus is in the safety of nuclear materials and radiation safety and safeguards.

Radiation/Nuclear Safety Assessments – Extensive experiences and credentials performing radiation surveys, monitoring, radiation detection techniques and processes, assessments and characterization of radiation and radioactivity. Managed and planned projects requiring decontamination, remediation, radiation shielding calculations and design, operational controls and facility controls and processes to control radiation environments, performance assessments audits. Experience in USDOE facilities, USNRC and state regulated facilities, and industry. Worked with nuclear material, classified material and radiation sources in high radiation environments as well as performing baseline and operations surveys.

Radiation Safety Officer (RSO) for Nuclear Fuel Cycle, Industrial And Research Facilities. Extensive experience developing Radiation Protection and Worker Safety Programs, preparing implementing procedures, managing day-to-day operations to ensure compliance with applicable regulations in complex research facilities, uranium industry operations, commercial client operations and facilities.

Radiation Regulatory Framework – Frequent interactions with NRC Commissioners, Region and Headquarters staff, and with the state radiation control program directors. Extensive understanding of the operational framework and internal practices of NRC, Agreement States, DOE, and IAEA.

Teamed with NRC's Office of Nuclear Material Safety and Safeguards (NMSS), OAS, CRCPD, and FDA in promulgation of effective national regulations for public and environmental

health. Also teamed with NRC's Office of Nuclear Security and Incident Response (NSIR) in promulgation of standards for the common defense and security. Chaired the Organization of Agreement States, Inc. (OAS) frequently interacting with USNRC Commissioners and Program Heads.

National Security and Antiterrorism – Co-chaired NRC's Materials Security Working Group (MSWG), which was charged with devising appropriate laws and regulations for safeguarding radioactive materials from malevolent exploitation. The works of the MSWG are now USA federal law and were adopted by the International Atomic Energy Agency (IAEA) and adopted by other nations pursuant to IAEA Code of Conduct.

Incident Response – Worked in close assistance to the National Nuclear Security Administration (NNSA), Department of Homeland Security, Federal Bureau of Investigation, National Guard, and state radiation control agencies in exercising and otherwise preparing for response to radiation incidences and radiological terrorism.

Environmental – Health physics and regulatory oversight of numerous projects (from small to vast) at NRC, DOE, and EPA regulated facilities. NEPA consulting on NPDES, NESHAPS, CWA, and RCRA. Constituents included radioactive, mixed, hazardous, and biological wastes. Research laboratories, D&D of uranium mills and mines. Radiation Safety Officer and health physicist for regulatory oversight and public outreach.

Department of Energy – Radiation protection in the DOE research and weapons framework.

Training – Has taught numerous courses on radiation protection, environmental protection, security of radiation sources, and national and international rules to users of radiation, the public, and regulators.

EMPLOYMENT SUMMARY

Trinitek Services, Inc.

Albuquerque, New Mexico. Vice-President; 2006 to present. Health physics and environmental consulting for customers in the nuclear fuel cycle, uranium production, radioactive waste management, government, industry, medicine, and academia involving uses of radioactive materials, x-ray machines, and particle accelerators.

New Mexico Environment Department, Radiation Control Bureau

Albuquerque office manager and health physicist; 1998 to 2006. Responsible for licensing and regulating radioactive material and radiation machines. Trained by the Nuclear Regulatory Commission and the Conference of Radiation Control Program Directors (CRCPD).

Sandia National Laboratories, Radiation Protection Program

Albuquerque, New Mexico. Project Coordinator and Health Physicist – Facilities Environment Safety and Health (ES&H) Program; Contractor; "Q" cleared; 1993–1998. Responsible for radiation protection oversight of radioactive materials and x-ray machine usage, and construction and maintenance projects across Sandia Labs.

Atlantic Richfield Company, Bluewater Uranium Mill

Grants, New Mexico. Health Physicist and lead technician on this extensive UMTRA Title 2 project; 1988–1993. Managed the counting laboratory and clean-up verification protocols.

Chem-Nuclear Systems, Inc., DOE UMTRA Project

Ambrosia Lake, New Mexico. HP supervisor, lead technician; 1987–1988. Large UMTRA Title 1 uranium mill and tailings remediation project.

PROFESSIONAL AFFILIATIONS

American Academy of Health Physics, member and diplomate (2004–present)

National Registry of Radiation Protection Technologists, member and diplomate (1995–present)

Organization of Agreement States, Inc. (OAS)

Past Chair (2004–2005); Chair (2003–2004); Chair-Elect (2002–2003)

Secretary (2001–2002)

Chairman, OAS Incorporation Working Group (2001–2002)

Health Physics Society (HPS), member (1990–present); member of the Governmental and Societal Relations Committee (2007–present)

HPS Rio Grande Chapter, member (1996–present); President (2007–2008)

Conference of Radiation Control Program Directors, Inc. (1998–present) Past Member, Part U Working Group (for the development of national uranium mill regulations)

International Radiation Protection Association (IRPA)

Attendee of the IRPA-10 and 11 conferences, held in Hiroshima and Madrid, respectively. Speaker at the IRPA-11 conference in 2004, on materials security efforts in the United States of America.

NOTEWORTHY PRESENTATIONS, PAPERS, AND PUBLICATIONS

- *Albuquerque Particle Accelerator Incident*; Annual Meeting of the Health Physics Society; Denver, Colorado; June 2000.
- *Radiological Control and Response to a Terrorist Attack*; Antiterrorism Conference, sponsored by Sandia National Laboratories; Albuquerque, New Mexico; October 2002.
- *Security of Radioactive Materials in the United States of America*; IRPA-11 Congress; International Radiation Protection Association; Madrid, Spain; May 2004.
- *Instrument Sensitivities for Gamma Radiation Surveys*; Midyear Meeting of the Health Physics Society, Scottsdale, Arizona; January 2006.
- *Proposed 1999 Amendment Of The 1990 Radiation Exposure Compensation Act*; Thomas Edison State College; June 1999.
- *Regulatory Requirements Pertinent to Portable Nuclear Gauges, New Mexico Edition*; Copyright © 2006, Trinitek Services, LC; Sandia Park, New Mexico.

- *New Mexico Register*, publication of amendments to Chapter 3 entitled *Radiation Protection*, of Title 20 entitled *Environmental Protection*, of the New Mexico Administrative Code (NMAC); Santa Fe, New Mexico; June 1999, April 2002, March 2004.
- *Topical Report – Options for Disposal and Reapplication of Depleted Uranium Hexafluoride*, 3TKS-TR-08/2008; Copyright © 2008, Trinitek Services, Inc.; Sandia Park, New Mexico.
- *2008 Distinguished Public Service Award — Pete V. Domenici*, Health Physics Society Journal, Volume 95, Number 6, December 2008.
- *Options for Disposal and Reapplication of Depleted Uranium Hexafluoride*; Waste Management Symposium; Phoenix, Arizona; March, 2009.
- Landsberger, S., S. Fitch and K. Dayman, “An Assay of Uranium Ore with Compton-Suppressed Gamma Spectroscopy”, Trans. ANS, 102, 181-182 (2010).

TRAINING

Following is a partial list of pertinent courses related to NRC and DOE that Mr. Fitch has completed pursuant to his career:

<u>Year</u>	<u>Course Name and Topic(s)</u>
1988	Department of Energy (DOE) Radiological Control Technician (160 hours college equivalent)
1995	DOE Radiological Control Technician (200 hours college equivalent) Sandia National Laboratories
1998	Gamma Irradiator Radiation Safety (8 hours) MDS Nordion, Inc., sponsored by Ethicon Endo-Surgery Albuquerque, New Mexico
1998	Advanced Transportation of Radioactive Materials (40 hours) [Equivalent to NRC course H-308] United States Department of Energy Albuquerque Training Center
1998	Inspection Techniques for Radioactive Material Regulators (40 hours) ProTechnics Incorporated (vendor) Sponsored by New Mexico Environment Department Albuquerque, New Mexico
1999	Diagnostic and Therapeutic Nuclear Medicine Course H-304 (40 hours) United States Nuclear Regulatory Commission Houston, Texas
1999	Industrial Radiography H-305 (40 hours) United States Nuclear Regulatory Commission Niantic, Connecticut
1999	Well Logging H-314 (40 hours) United States Nuclear Regulatory Commission Houston, Texas

- 2000 Inspection Procedures G-108 (40 hours)
 United States Nuclear Regulatory Commission
 Chattanooga, Tennessee
- 2000 Inspecting for Performance – Materials Version
 G-304 (40 hours)
 United States Nuclear Regulatory Commission
 Orlando, Florida
- 2006 Increased Controls S-201 (40 hours)
 United States Nuclear Regulatory Commission
 Taught at Sandia National Laboratories
 Albuquerque, New Mexico

Uranium Study SME	William M. Floyd
SME: Regulations-NRC, Agreement States, Current Employment: Trinitek Services, Inc Capabilities: Program management-Agreement state	Regulatory consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials M.S. (Biology/Chemistry) ❖ Northern Illinois University B.S. (Biology) 1965 ❖ Northern Illinois University <u>Additional Training</u> In excess of twenty weeks of radiation-related training sponsored by the U.S. Nuclear Regulatory Commission, U.S. Department of Energy, U.S. Environmental Protection Agency, Department of Transportation, Department of Defense and Federal Emergency Management Agency

EMPLOYMENT: 2006-2008

Radiation Protection Consultant, EWA Services, Herndon, Virginia. Contractual participant in the decommissioning of U-238 ballistic test ranges at New Mexico Institute of Mining and Technology, Socorro, New Mexico.

1990-2003

Manager, Radiation Protection Program, New Mexico Environment Department. Supervised seven technical staff members in all Program activities, including the licensing and inspection of more than 200 radioactive material licensees, and the registration and inspection of more than 1400 radiation generating devices (x-ray machines and particle accelerators) in the State. Served as point of contact for all

inquiries pertaining to radiation issues from other State and Federal agencies and members of the public.

1979-1990

Environmental Scientist, New Mexico Radiation Protection Bureau. Duties included the licensing and inspection of radioactive material licensees, and the registration and inspection of x-ray registrants. Assisted in the training of Program staff.

1976-1979

Environmental Scientist, New Mexico Environmental Improvement Division, Food Quality Unit. Duties included the review and endorsement of all bakery, beverage plant and food warehouse inspection reports submitted by Food and Drug Administration cost reimbursement contract inspectors within the State.

1974-1976

Public Health Sanitarian, Indiana Board of Health, Water Pollution Control Division, Indianapolis, Indiana. Duties included water quality surveys of various river drainage areas, sampling of municipal and industrial dischargers, and lake classification studies. I

supervised one of the two survey teams responsible for classifying all natural and man-made lakes within the State as to level of pollution.

1973-1974

Biology teacher, Manzano High School, Albuquerque, New Mexico.

1968-1972

Active duty, U.S. Air Force, Kirtland AFB, New Mexico. Duties included space survivability studies involving radiation-related activities and the mitigation of avian hazards at various military installations in the United States and the Panama Canal Zone.

Uranium Study SME	Leo Gomez, Ph.D.
SME: Radiation Biologist and Technical Editor Current Employment: Trinitex Services, Inc Capabilities: Over 30 years of professional experience in applying the principles, theories, and practices of radiological health and safety in the performance evaluation and analysis of radiological health hazards in terrestrial, aquatic, and marine environments, international research in radiation bio-effects in aquatic systems.	Senior Radiation Biologist: Trinitex Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials Ph.D. Radiation Biology ❖ Colorado State University M.S., Health Physics ❖ Colorado State University B.S. Biology (microbiology) ❖ University of New Mexico

- Worked in nuclear waste management from 1977-2000 at Sandia National Laboratories in Albuquerque, New Mexico. Was the biological research project manager for four (4) international ocean disposal projects and worked in the Performance Assessment Department for the Waste Isolation Pilot Plant, a transuranic waste repository in southeastern New Mexico. Also collaborated for ten (10) years with the University of New Mexico Institute for Public Policy studying national public perceptions of risk from nuclear technologies.
- In 2006 organized and co-chaired the *"Ultra Low-Level Radiation Effects (ULLRE) Summit"* in Carlsbad, NM. Focus of the summit was to identify the steps needed to conduct research at near zero radiation levels, and to lay the groundwork for scientifically-based radiation protection standards at ultra-low levels of radiation exposure.
- At Los Alamos National Laboratory in New Mexico was responsible for conducting experiments studying the comparative radiation sensitivity of normal mammalian tissues to x-rays and negative pi mesons in collaboration with the University of New Mexico Cancer Center. Worked with the LANL Health Physics group evaluating health and safety of uranium & plutonium facilities and calculating radionuclide body burdens in LANL workers. Also performed a safety evaluation of a nuclear power reactor in California. (1974-1977)
- Managed the whole body counting facility to detect low levels of transuranic elements in workers at Oak Ridge National Laboratory in Tennessee. Also evaluated worker radiation exposures at ORNL and other nuclear facilities. (1973-1974)
- Director of Research at TCI Medical in Albuquerque, NM, (2002-2003) conducting research on medical and nuclear innovations between scientific institutions in the Former Soviet Union and scientific institutions in the U.S. Also Lead Internal Auditor for ISO 9001-2000, Quality Management Systems.
- Served as a US representative on three international ocean pollution commissions.

- Past editor of the international scientific journal, *Radioactive Waste Management and Environmental Restoration*. (1991-2000).
- Conducted Radiation Safety Officer training for employees at Rio Algom uranium mine in New Mexico. (2009-2011).
- In collaboration with NM Tech and Trinitek Services, Inc., conducted a 6-week radiation safety program for 15 Ph.D. Fellows from Egypt. (2010)
- Served as a field agent for the USDOE Environmental Justice program ensuring that public concerns relating to technical projects were considered. (1990-2000).

Leo S. Gomez Consulting, Principal

Radiobiology / Radioecology / Health Physics / Nuclear Waste Management

ORION International Technologies, Inc. Principal Scientist, (Part Time), *Low-Level Radiobiology*

Experience:

2002 - 2003: **TCI Medical**, *Director of Research*

Coordinated research on medical and nuclear innovations between scientific institutions in the former Soviet Union and scientific institutions in the US.

Lead Internal Auditor: ISO 9001-2000 Quality Management Systems.

2000 - 2002: **Sandia National Laboratories (SNL)**, Albuquerque, NM: *Consultant*

1977 - 2000: **Sandia National Laboratories**, Albuquerque, NM (Retired: August 25, 2000)

Seabed Programs Division - Biology Program Coordinator for five U.S. Nuclear Waste Disposal Programs:

Subseabed Disposal Program - SDP

Study feasibility of subseabed disposal of high-level radioactive waste.

Formerly Utilized Sites Remedial Action Program - FUSRAP

Study feasibility of ocean disposal of FUSRAP soil and rubble containing traces of natural radioactive materials.

Low Level Waste Ocean Disposal Project - LLWODP

Study feasibility of ocean disposal of naval nuclear reactor plants.

Waste Isolation Pilot Plant - WIPP (World's first nuclear waste repository)

Demonstration of disposal of defense transuranic waste.

Arctic Nuclear Waste Assessment Program - ANWAP

Study radionuclide contamination of Northern Oceans from the Former Soviet Union.

- Project manager for biological oceanography programs; designed and conducted radiobiology experiments using deep-sea organisms and participated in design of marine radiobiology experiments with staff from Scripps Institution of Oceanography, La Jolla, CA, and Woods Hole Oceanographic Institution, Woods Hole, MA.
- Organizer and co-chair, *International Biological Oceanography Workshop* held in Jackson Hole, Wyoming, January 1981.
- Conference organizer/Chair/Presenter, *Conference on Waste Management*, San Juan, Puerto Rico (3 Conferences).
- Advisor (Radiobiology) to the *International Atomic Energy Agency Marine Radioactivity Laboratory* in Monaco.
- Task group leader for biosphere transport group attempting to predict potential radiation dose from the WIPP environment to man.
- Collaborator with *University of New Mexico Institute for Public Policy* on studies of national and regional public perceptions of nuclear waste disposal.
- Member, New Business Development Team of SNL's Energy and Environment Division.
- Member, Radiological Assessment Task Group evaluating radiological impacts on the Alaskan Arctic from radioactivity released from the Former Soviet Union.
- Editor: *Radioactive Waste Management & Environmental Restoration, A Multinational Journal*, Taylor & Francis, London (1991-2002).
- On Review Panels for U.S. Department of Energy: a) Environmental Restoration and Waste Management Graduate Fellowships; b) Graduate Health Physics Fellowships; c) Global Climate Change Programs; d) Nuclear Engineering University Programs; e) Low Dose Radiation Research Program.
- Sandia Labs liaison: *NM Waste Management Education/Research Consortium (WERC)*; Board member, WERC Industrial Advisory Board.
- On selection panel for *Young Science Scholars Program*.
- Panelist on National Science Foundation Education Review Panels for a) Comprehensive Regional Centers for Minorities; b) Summer Science Camps; c) Urban Systemic Initiative; d) Rural Systemic Initiative; and e) Committee of Visitors / Informal Science Education.
- Committee member on National Selection Committees for the *Presidential Awards for Excellence in Science & Mathematics Teaching* (three years).
- * Field agent: U.S. Department of Energy, Environmental Justice Strategy Development.
- * Board member on Science Advisory Board, National Hispanic Radio Network.
- Planning Committee member, Chair, and Presenter: *Symposium on Marine Radioecology, 9th International Congress of Radiation Research*, July 1999, Dublin, Ireland.
- Chair, Local Arrangements Committee, *47th Annual Meeting*, Radiation Research Society, April 2000, Albuquerque, NM.
- Vice-Chair, Fund Raising Committee, Radiation Research Society, 1999-2001.

Planning Committee member, *Mexican American Engineers & Scientists*,
26th *International Symposium and Career Fair*, Albuquerque, NM, October 6-11, 2000

- Organizer & Co-chair: *Low Level Radiation Effects Summit* held in Carlsbad, NM, January 16-18, 2006.
- Reviewer: National Institutes of Health *Project Bioshield Program*, 2005.
- Reviewer: National Institutes of Health *Radiation Combined Injury Program*, 2008.

Fuel Cycle Risk Analysis Division

- Co-developer of trophic transport model applied to radionuclide transport through aquatic environment to man from postulated light-water reactor core melt-through accidents.

Constructed equivalence classes of metabolically similar radionuclides to be used in predicting nuclide trophic transport.
Calculated internal dose to man and other biota from exposure to radionuclides in the aquatic environment.

1974 - 1977 **Los Alamos National Laboratory** , University of California, Los Alamos, NM.

Preclinical Studies for Pion Radiotherapy

- Studied comparative effects of negative pi mesons and x-rays on normal tissues and tumors in animals in collaboration with *Cancer Research and Treatment Center*, University of New Mexico School of Medicine.

Radiological Engineering

- Evaluated health and safety aspects of plutonium facilities under Nuclear Regulatory Commission license reviews; calculated plutonium body burdens in Los Alamos National Laboratory workers.

1973 - 1974 **Oak Ridge National Laboratory**, Oak Ridge, Tennessee

Human Whole-Body Counting

Improved capability of detecting low levels of transuranic elements in contaminated workers; evaluated exposure of workers exposed at Oak Ridge National Laboratory and other related nuclear facilities.

1968 - 1973 **Colorado State University**, Fort Collins, Colorado

Ph.D. Dissertation: Lymphatic Transport of ²³⁹PuO₂ in Dogs

- U.S. Public Health Service predoctoral trainee; studied lymphatic transport of high-fired ²³⁹PuO₂ particles in dogs from simulated wounds using production plutonium from the Rocky Flats Division, Dow Chemical Co.

1966 - 1969 **Veterans Administration Hospital**, Albuquerque, New Mexico

Nuclear Medicine

- Performed diagnostic and therapeutic procedures in Nuclear Medicine Department; responsible for radiological safety of laboratory; instructed technicians and medical students in nuclear medicine laboratory techniques.

1963 - 1965 **Lovelace Foundation for Medical Research**, Albuquerque, New Mexico

Radioactive Aerosol Inhalation Studies

- Conducted inhalation exposures of dogs to radioactive aerosols and performed necropsies of exposed dogs.

1962 - 1963 **U.S. Department of Agriculture**, Albuquerque, New Mexico

Livestock Disease Control

- Conducted diagnostic tests for brucellosis and leptospirosis in livestock; performed viability tests on vaccines used in livestock; tested for sheep and cattle scabies.

Membership in Professional Societies

- **American Association for the Advancement of Science**
Committee on Opportunities in Science, 1980-83
- **Health Physics Society, and the International Radiation Protection Association**
Affirmative Action Committee, 1980-83

Membership Committee, 1992-95; Membership Committee Chair, 1993-95
- **International Commission for the Scientific Exploration of the Mediterranean Sea**
Marine Radioactivity Committee and Marine Chemistry Committee
- **International Union of Radioecologists**
- **New York Academy of Sciences**
- **Radiation Research Society**
Vice-Chair, Fund Raising Committee, 1999-2001

Chair, Local Arrangements Committee for 47th Annual Meeting, Albuquerque, NM, April, 2000
- **Radiochemistry Society**
- **Sigma Xi – The Scientific Honorary Society**
- **Society for Advancement of Chicanos and Native Americans in Science**
Co-Founder; Board of Directors, 1975-78

Local Arrangements Committee, 2003 Annual Meeting in Albuquerque, NM

Publications

L.S. Gomez and G. Cravens. 2008. "Why We Need to Know More About Low Dose Radiation Exposure", in *Hot Topics*, Biosphere Systems International Foundation website, (<http://www.biospheresystems.com/index.html>), September 2008.

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- L.S. Gomez, J.J. Cousins, C.J. Dorian, S.M. Gomez. 2008. "New Non-Invasive Technology for the Early Detection of Cancer at the Cellular Level", in *Abstracts 2008 AAAS-SWARM Annual Meeting*, University of New Mexico, Albuquerque, NM, April 9-12, 2008.
- L.S. Gomez, D. J. Brenner, O.G. Raabe. 2007. "A Proposed Ultra-Low Level Radiation Biology Research Facility at the Carlsbad, New Mexico, Waste Isolation Pilot Plant (WIPP)", in *Abstracts 2007 Health Physics Society Annual Meeting*, Portland, OR, July 2007.
- N.F. Savignac, L.S. Gomez and B.P. Warner. 2007. "A 'Litmus Paper Dosimeter'", in *Abstracts 2007 Health Physics Society Annual Meeting*, Portland, OR, July 2007.
- L.S. Gomez, D.J. Brenner and O.G. Raabe. 2006. "Final Report: Ultra-Low Level Radiation Effects Summit", held at Carlsbad, NM, January 15-18, 2006, ORION International Technologies, Inc. Albuquerque, NM.
- S.M. Gomez, P.I. Pohl, S.A. Jackson, J.N. Nishio, A. Reeb, D. Cox, F. M. Torres, L.S. Gomez. 2005. "Biofuel Production on an Integrated Farm", presented at the *2005 Annual Iberoamerican Research and Development Summit: Creating Sustainability Through Innovation*, October 4-6, 2005, Albuquerque, NM.
- L.S. Gomez. 2003. "Technical Collaborations between a Small American Business and Leading Research Institutions in the Former Soviet Union", presented at the *International Workshop on Radiological Sciences and Applications, June 16-18, 2003*, Albuquerque, NM; and at the *Annual Meeting of the Radiochemistry Society, July 14-17, 2003*, Carlsbad, NM.
- L.S. Gomez. 2002. Book review: "Quantities, Units and Terms in Radioecology", ICRU Report 65, *Journal of the ICRU*, Vol 1, No. 2, 2001, 48pp, Nuclear Technology Publishing, in *Radiation Research*, Volume 158, p. 250.
- M.A. Champ, L.S. Gomez, V.M. Makeyev, J.M. Brooks, H.D. Palmer, and F. Betz. 2001. "Ocean Storage of Nuclear Wastes? Experience from the Russian Arctic", in *Marine Pollution Bulletin, Special Volume, "Arctic III"*, Volume 43, Issue 1-6, Jan.-June, 2001, 142pp., Elsevier Science B. V.
- L.S. Gomez. 2000. "Emplacement of Mercury Wastes in the Sediments of the Deep-Ocean?", SAND2000-0616C, Sandia National Laboratories, Albuquerque, NM, presented at the *EPA Workshop on Mercury in Products, Processes, Waste and the Environment: Eliminating, Reducing and Managing Risks from Non-Combustion Sources*, Baltimore, MD, March, 2000.
- L.S. Gomez, 1998. "Contamination of the Northern Oceans from Releases of Radioactivity from the Former Soviet Union", SAND98-1920A, Sandia National Laboratories, Albuquerque, NM, in *Proceedings of the 11th International Congress of Radiation Research*, Dublin, Ireland, July 1999, pp. 303-305.
- D. Layton, B. Napier, L. Gomez, J. Knezovich, and M. Varela, 1997. "Introduction to ANWAP", in *Radionuclides in the Arctic Seas from the Former Soviet Union: Potential Health and Ecological Risks*, Arctic Nuclear Waste Assessment Program (ANWAP), Office of Naval Research (ONR), Washington, DC.
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D.R. Anderson, M.E. Fewell, L.S. Gomez, M.G. Marietta, P.N. Swift, K.M. Trauth, P. Vaughn, and R. J. MacKinnon, 1997. "Performance Assessment for Environmental Decision Making", SAND97-0723, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, M.G. Marietta, and D.W. Jackson, 1996. "Compilation of Selected Marine Radioecological Data for the Formerly Utilized Sites Remedial Action Program", in *Concentration Factors of Radionuclides in the Marine Organisms*, RWMC-96-P-18, Environmental Parameter Series 6, Radioactive Waste Management Center, Japan.

H.C. Jenkins-Smith, C.L. Silva, and L.S. Gomez, 1995. "Understanding Public Reception of Scientific Information About the Risks of Nuclear Waste Storage", SAND95-0327A, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, 1994. "Marine Environment", in *Environmental Assessment for the Purchase of Russian Low Enriched Uranium Derived From the Dismantlement of Nuclear Weapons in the Countries of the Former Soviet Union*, U.S. Enrichment Corporation, Bethesda, MD.

J.E. Johnson and L.S. Gomez, 1993. "Risk /Benefit Analysis of the Disposal of Mixed Waste", Technical Completion Report, Project Number WERC-01-4-23218, New Mexico Waste-Management Education and Research Consortium, in cooperation with the U.S. Department of Energy, pp. 1074-1084.

L.S. Gomez, M.G. Marietta, and A.R. DuCharme, 1993. "Assessing the Effects of Russian Contamination on the Northern Oceans", SAND92-2864A, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, H.C. Jenkins-Smith, and K.W. Miller, 1992. "Changes in Risk Perception Over Time", SAND91-2266C, Sandia National Laboratories, Albuquerque, NM.

L.S. Gomez, M.G. Marietta, and D.W. Jackson, 1990. "Compilation of Selected Marine Radioecological Data for the Formerly Utilized Sites Remedial Action Program (FUSRAP): Summaries of Available Radioecological Concentration Factors and Biological Half-Lives", SAND89-1585, Sandia National Laboratories, Albuquerque, NM.

S.G. Bertram-Howery, M.G. Marietta, D.R. Anderson, K.F. Brinster, L.S. Gomez, R.V. Guzowski, and R.P. Rechard, 1989. "Draft Forecast of the Final Report for the Comparison to 40 CFR 191, Subpart B for the Waste Isolation Pilot Plant", SAND88-1452, Sandia National Laboratories, Albuquerque, NM.

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D.W. Jackson, L.S. Gomez, and M.G. Marietta, 1983. "Compilation of Selected Marine Radioecological Data for the U.S. Subseabed Program", SAND83-1725, Sandia National Laboratories, Albuquerque, NM.

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S.L. Kupferman, D.R. Anderson, L.H. Brush, L.S. Gomez, J.C. Laul, and L.E. Shephard, 1982. "Ocean FUSRAP: Feasibility of Remedial Action Program (FUSRAP)", in *Proceedings of Waste Management '82 Symposium, Waste Isolation in the U.S. and Elsewhere*, Technical Programs and Public Communications, Vol. 2, March 8-11, 1982, Tucson, AZ, pp. 471-485.

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Subseabed Disposal Program", in *Impacts of Radionuclide Releases into the Marine Environment*, Vienna, October 6-10, 1980, IAEA-SM-248/142, pp. 607-628.

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W.C. Black, L.S. Gomez, J.M. Yuhas, and M.M. Kligerman, 1980. "Quantitation of the Late Effects of X-Irradiation on the Large Intestine", *Cancer*, 45, pp. 444-451.

S.W. Jordan, C.R. Key, L.S. Gomez, J. Agnew, and S. Barton, 1978. "Late Effects of Radiation on the Mouse Kidney", *Journal of Experimental and Molecular Pathology*, 29, pp. 115-129.

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A.E. Dross, A.M. Gage, J.M. Graf, F.A. Guevara, L.S. Gomez, J.J. Koelling, R. Mullin, D.G. Rose, J.E. Ayer, W. Burkhardt, R.T. Kratzke, 1977. "Environmental Assessment, Babcock and Wilcox Company, Parks Township Site, SNM-414, Docket No. 70-364."

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J.L. Lebel, R.L. Bistline, J. Schallberger, G.E. Dagle and L.S. Gomez, 1976. "Studies of Plutonium and the Lymphatic System: Six Years of Progress at Colorado State University", in *Radiation and the Lymphatic System*, Proceedings of the Fourteenth Annual Hanford Biology Symposium, Conf-740930, pp. 2-9.

M.M. Kligerman, J.F. Dicello, H.T. Davis, R.G. Thomas, C.J. Sternhagen, L.S. Gomez, and D.F. Peterson, 1975. "Initial Comparative Response of Experimental Tumors to Peak Pions and X-Rays", *Radiology*, 116, pp. 181-182.

G.E. Dagle, J.L. Lebel, R.D. Phemister, R.L. Watters, and L.S. Gomez, 1975. "Translocation Kinetics of PuO_2 from the Popliteal Lymph Node of Beagles", *Health Physics*, 28, pp. 395-398.

L.S. Gomez, J.L. Lebel, R.L. Watters, R.W. Bistline, and G.E. Dagle, 1974. "Effects of Delayed Lymphadenectomy on $^{239}\text{PuO}_2$ Translocation in Dogs", *Health Physics*, 27, 213 ff.

L.S. Gomez, 1973. "Lymph Transport of $^{239}\text{PuO}_2$ in Dogs", USAEC Document COO-1787-17 (Ph.D. Dissertation).

L.S. Gomez, J.L. Lebel, and R.L. Watters, 1972. "The Effects of Lymph Node Removal on PuO_2 Translocation", *Health Physics*, 22, 883 ff.

J.L. Lebel, R.L. Watters, R.W. Bistline, G.E. Dagle, and L.S. Gomez, 1972. "A Study of the Translocation of Plutonium and Americium from Puncture Wounds", USAEC Document COO-1787-16.

R.L. Watters, J.L. Lebel, R.W. Bistline, G.E. Dagle, and L.S. Gomez, 1971. "A Study of the Translocation of Plutonium and Americium from Puncture Wounds", USAEC Document COO-1787-11.

Uranium Study SME	Richard F. Haaker, CHP, CIH
SME: Industrial Hygiene, Health Physics, Safety Current Employment: Trinitek Services, Inc. Capabilities: Industrial hygiene, safety, industrial accident investigation, respiratory protection fit-testing and training, regulatory compliance assessment and program development; health physics, radiological simulation and modeling, radiation protection, licensing support. Software QA support and software testing. Over 37 years experience.	Senior Health and Safety Consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials B.S. Biochemistry ❖ Texas A&M University M.S. Chemistry ❖ Texas A&M University Registration: CIH- American Board of Industrial Hygiene, 1989, Comprehensive Practice (currently certified through 2017) CHP- American Board of Health Physics, 1991, Comprehensive Practice (currently certified through 2012) New Mexico Environment Department certificate of registration as Qualified Expert in Health Physics (through 2012) Additional training: epidemiology, Hazwoper, NORM

Scientific Committees and Memberships

Chairman, American Board of Health Physics – Part 1 Examination Panel, 1999
 Vice-chairman, American Board of Health Physics - Part 1 Examination Panel, 1998
 American Board of Health Physics - Part 1 Panel of Examiners, 1995-2000
 American Industrial Hygiene Association - Ionizing Radiation Committee, 1992-1995

American Conference of Governmental Industrial Hygienists (ACGIH), 2008-
 Health Physics Society, 1991 –
 American Industrial Hygiene Association, Rio Grande Chapter 1991 -
 Health Physics Society, Rio Grande Chapter, 1991-

Training Classes and Short Courses

ArcGIS Desktop: Tools and Functionality, 24 hours (2012)
 Introduction to Cartography, 16 hours (2012)
 Lead Based Paint Inspector/Risk Assessor, 40 hours (2011)
 Biological Monitoring, AIHCE, 8 hours (2010)
 Basics of Epidemiology, AIHCE, 8 hours (2009)
 Naturally Occurring Radioactive Material and Technologically Enhanced Naturally Occurring Radioactive Material (NORM/ TENORM), Health Physics Society (2009)
 ChNE 529 UNM Internal Radiation Dosimetry graduate course audit (2007)
 Internal Dosimetry Applications, (1995), 40 hours.
 VBA Programming for Microsoft Access, UNM Community College, 24 hours (2008)
 Introduction to Structured Query Language, UNM Community College 12 hours (2006)

Mathematica Training, Wolfram Research, 24 hours (2003)
Microsoft Access training, introductory, intermediate and "advanced", UNM Community College, ~60 classroom hours, (1997 – 2008).
Wolfram Mathematica Training, Wolfram Research, 24 hours (2003).
Training for Trainers, AIHCE, 8 hours (2010)
OSHA 7505 Accident Investigation, Red Rock Community College (2009)
Beryllium Particulates and Their Detection, International Symposium (2008)
Beryllium Training, AIHCE, 8 hours, 2003
Heat Stress Prevention, AIHCE, 8 hours, 2003
Radioactive Materials DOT Training, RSA, 2002
Monte Carlo N-Particle Computer Code Training (MCNP4C), 36 hours, LANL, 2000.
Level A PPE Training, 32 hours, Roy F. Weston, Inc., 2000
Unreviewed Safety Question Determination for DOE Nuclear Facilities, Westinghouse, 1998
RCRA Fundamentals, McCoy Associates, Inc., 1997
Auditing Health and Safety Programs, 1995.
Operation & Selection of Direct Reading Combustible Gas & Organic Vapor Monitors, 1995.
Assessment of Occupational Noise Exposure and Risk of Hearing Loss, 1994.
Selection and Use of Protective Equipment, 1994.
Regulatory Issues and the Environmental Health Physicist, 1993.
Environmental Characterization: From Observations to Inferences, 1993.
Technology Transfer Between Industrial Hygiene and Radiation Disciplines, 1993.
Radiation Detection and Measurement, 1990.
Advanced Toxicology: Risk Assessment of Industrial Chemicals, 1989 (OSHA short course)
Supervisor/Contractor Asbestos Training (AHERA), 1989.
HAZWOPER Supervisor training
HAZWOPER Training, 1986, Classroom hours: 24. Current refresher training.
Construction Safety Training Course, presented by OSHA, 1985, Classroom hours: 40.

Employment History

1998-present AQ Safety, Inc., Albuquerque, NM
1997-1997 Radian, Albuquerque, NM
1997-1998. Ecology and Environment, Inc., Albuquerque, NM
1996-1998 ERM /Program Management Company, Los Alamos, NM
1992-1996 Environmental Dimensions Inc., Albuquerque, NM
1988-1992 TMA/Eberline, Albuquerque, NM
1987-1988 Advanced Sciences, Inc., Albuquerque, NM
1986-1987 Roy F. Weston, Inc., Albuquerque, NM
1985-1986 Jacobs Engineering Group, Albuquerque, NM
1983-1984 Hahn-Meitner Institute for Nuclear Science, Berlin, FRG
1978-1983 Research Associate, Department of Geology, University of New Mexico, Albuquerque, NM

Litigation Support in the Last Five Years

Matherne et al vs Kellogg, Brown and Root et al Litigation Support. Testified as an expert witness for plaintiffs in a lawsuit involving exposure of subcontractors to harmful substances at a chemical plant (2008-2009).

Wagner and Appleton et al. vs. Tammany Holding Company, LLC et al. Docket # 2012-453. Civil District Court, Parish of Orleans, Louisiana. Expert report and testimony concerning air and water emissions from a concrete crushing operation located adjacent to a residential neighborhood (2012).

TEXACO Exploration and Production Inc., Bridgeline Gas and Distribution, L.L.C. v. Hilcorp Energy Company, Div. F, Docket #83406, Radiological Contamination at the Henry Gas Plant and Erath Field, Vermilion Parish, Louisiana. Export report concerning property damage from technologically enhanced naturally occurring radioactive material (2011-date).

Malvin Benoit et al. v. Intracoastal Tubular Services, et al., James Bailey, et al. v. Exxon Mobil Corporation, et al., Eugene Castell, Deceased vs. Exxon Mobil Corporation, et al. Orleans Parish, Louisiana. Expert Report: Occupational Exposure to Radioactive Scale During Oil Pipe Cleaning Operations at Brown and Root and ITCO, Preliminary Report. (2010-2011).

Key Projects -

Software QA Support for DandD Software Package to Sandia National

Laboratories. Wrote test cases for testing of the DandD version 2.1 software package for determining radiation dose from residual radioactivity (2001). Performed the testing for DandD. This involved performing independent calculations in Wolfram Mathematica notebooks and comparing results to those calculated by DandD.

Employee Chemical and Beryllium Exposure Database Support for Los Alamos Material Disposal Area B (MDA B). Designed and currently maintain a small database for a Los Alamos environmental contractor who is responsible for the remediation of Material Disposal Area B. The database encompasses employee chemical exposure data, as well as data that may be submitted to the Beryllium Registry to satisfy the requirements of 10 CFR 850, Chronic Beryllium Disease Prevention Program. Wrote a data specification for an analytical chemistry laboratory's electronic data deliverable to ensure that new data can be readily imported into the database.

Health and Safety Planning for Excavation and Remediation of Material Disposal Area B, Los Alamos National Laboratory. Currently serving as a consultant involved in planning for the excavation and remediation of a landfill that contains radioactive waste (including plutonium), chemical waste (possibly including beryllium, heavy metals, shock-sensitive materials, solvents, acids, and incompatible chemicals). The landfill was closed in 1948, after catching on fire on more than one occasion. The landfill is considered a nuclear environmental site. Remediation operations at the site are subject to EPA hazardous waste, Department of Energy nuclear safety, and OSHA health and safety regulations. The excavation and remediation will proceed within an engineered enclosure designed to protect members of the public from emissions. Much of the work will involve heavy equipment that has been reinforced with blast shields. Workers will be required to wear chemical protective suits and be protected by atmosphere-supplying airline respirators (2008 to present).

Support to NRC for Nuclear Power Plant License Termination through Sandia National Laboratories. Reviewed portions of the license termination plans for Maine

Yankee Atomic and Saxton Nuclear Experimental Reactors on behalf of the Nuclear Regulatory Commission (2000).

Support to NRC for Source Material License Termination Review through Sandia National Laboratories. Reviewed source material license termination plans on behalf of the Nuclear Regulatory Commission submitted by the Cabot Corporation for termination of their source material licenses for facilities in Reading and Revere Pennsylvania (1999).

Source Material License Renewal and General License Support for a Source Material Licensee in Boyertown, PA. Wrote bioassay and air sampling program basis documents. Contributed to Decommissioning Funding Plan and Decommissioning Cost Estimate. Performed a dose assessment and ALARA analysis to justify cleanup limits and off-site disposal of waste water treatment sludge at a sanitary landfill. Designed a final status radiation survey for the site and contributed to a decommissioning funding plan cost estimate (2002-2009).

LANL Omega West Reactor Decontamination & Demolition Site-Specific Health and Safety Plan Development. Wrote site specific Health and Safety Plan for D&D of the Omega West Reactor. (2002).

Health and Safety Planning for Excavation and Remediation of Material Disposal Area B, Los Alamos National Laboratory. Currently serving as a consultant involved in planning for the excavation and remediation of a landfill that contains radioactive waste (including plutonium), chemical waste (possibly including beryllium, heavy metals, shock-sensitive materials, solvents, acids, and incompatible chemicals). The landfill was closed in 1948, after catching on fire on more than one occasion. The landfill is considered a nuclear environmental site. Remediation operations at the site are subject to EPA hazardous waste, Department of Energy nuclear safety, and OSHA health and safety regulations. The excavation and remediation will proceed within an engineered enclosure designed to protect members of the public from emissions. Much of the work will involve heavy equipment that has been reinforced with blast shields. Workers will be required to wear chemical protective suits and be protected by atmosphere-supplying airline respirators (2008 to present).

Sherwood Building Decontamination & Demolition (D&D) Support, Los Alamos National Laboratory. Drafted the health and safety plan for demolishing the four-story Sherwood Building. The project involved occupational exposure to noise, heat stress, removal of asbestos containing materials from the building, and the use cutting torches to cut structural steel that was coated with lead paint, and physical hazards such as the use of scaffolding and heavy equipment. Provided industrial hygiene support for implementation of the OSHA lead standard (29 CFR 1926.62) and the OSHA occupational noise exposure standard (29 CFR 1910.95) for the Washington Group, Inc. during the demolition of the structure (2001).

SNL Environmental Risk and Decision Analysis Dept (6416) Conducted a pathway-by-pathway comparison of the models underlying RESRAD, RESRAD-Build, and DandD computer codes for the Nuclear Regulatory Commission. The comparison was published as NUREG/CR-5512 volume 4. It is concerned with suitability of the models for determining that risk-based criteria for termination radioactive materials licenses have been satisfied (~1999).

SNL Radioactive and Mixed Waste Dept (7577) Provided program support to the Waste Characterization Team Leader; working on issues related to management of naturally occurring radioactive material and developing a generic sampling and analysis plan guidance (~1996). Drafted a position paper on RCRA status of equipment containing circuit boards. Performed an analysis of disposal options for building 870 tritiated wastewater. Working with Waste Management, Inc. to get NMED approval of a proposed waste acceptance criteria for non-oil field NORM for their Subtitle D landfills in New Mexico. Participated in drafting an authorized limit request pursuant to DOE/EH guidance for septic tank mixed waste. Drafted procedures related to on-site transport and characterization of radioactive and mixed waste samples.

SNL Environmental Restoration Technology (6131) Mixed waste management consultation regarding wastes expected from a ground water remediation study.

SNL Accident Analysis/Consequence Assessment (6413) 10 CFR 61 modeling support to Hanford HLW Tank Closure EIS.

SNL Environmental Risk and Decision Analysis (6416) -- Dosimetry model support to NTS Greater Confinement Disposal Performance Assessment for TRU waste. Modeled residential structure shielding factors to provide justification of the selection of the default residential structure shielding factors for the NRC's DandD computer code.

Sludge removal from Los Alamos Neutron Scattering Center, Los Alamos National Laboratory. Provided on-site field industrial hygiene and safety support for pumping radioactive sludge from a industrial waste water holding system and from radioactive liquid waste tanks at the Los Alamos Neutron Scattering Center (LANSCE); this task involved a series of permit-required confined space entries regulated managed under 29 CFR 1910.146 and preparation of a Site-Specific Health and Safety Plan. Responsible for monitoring the confined spaces for oxygen, combustible gases and toxic constituents including mercury vapor. Served the role of attendant or "hole watch".

Feed Materials Production Center Remedial Investigation, Fernald, Ohio . Served as the site health and safety officer for a field investigation that involved using a drilling rig to collect sub-surface samples from landfills, and sludge impoundments that contained radioactive and chemical waste. Most of the sub-surface sampling required the use of chemical protective suits and supplied-air respirators because more than 100 different chemicals were suspected of being present in the landfills and the quantities were unknown (1986-1987).

Cerro Grande Fire Recovery Operations, Los Alamos National Laboratory. Developed site-specific health and safety plans for post-Cerro Grande Wildfire recovery activities (2000).

Indoor Air Quality Investigation of a Santa Fe Shopping Center. Conducted air sampling for organic vapors and formaldehyde on two occasions. Identified the problem as insufficient amounts of outdoor (fresh) air being brought in through the ventilation system (1994-1995).

Health and Safety Support for Recovery of a DOE Materials Storage Area, Paducah Gaseous Diffusion Plant. Site Safety Officer for a series of high profile Level A / Level B

entries into a DOE Materials Storage Area to stabilize a decrepit drum of hydrofluoric acid. There were concerns that a nuclear criticality could occur during the activity because of the potential presence of enriched uranium. This prevented the entry team from disturbing the configuration or position of other containers in the area. The highly toxic and corrosive nature of hydrofluoric acid combined with the unfavorable ventilation of the area required that workers wear fully encapsulating chemical protective "Level A" suits. The drum contents were transferred to a new drum that could be safely moved (2000). Site Safety Officer for remediation of a ~1000 gallon tank storage containing greater-than class C radioactive waste (2000). The tank demolition was performed inside an enclosure designed to prevent the spread of contamination. The tank demolition required the use of Level B personal protective equipment.

General Industrial Hygiene and Safety Support to Various Contractors, Los Alamos National Laboratory. OSHA compliance support, 10 CFR 851 environment safety and health program development and support, job hazard analyses, site specific health and safety plan development, audits, technical reviews, etc. for various LANL ER, drilling and D&D projects (1993 to 2011).

Respirator Fit Testing and Training. Routinely provide commercial quantitative respirator fit testing services and respirator training.

NIOSH Dose Reconstruction Technical Basis Document for Mound Site. Worked with another health physicist to contribute to a draft of the internal dosimetry section of the technical basis document for the Mound site dose reconstruction. (2003-2004).

NIOSH Dose Reconstruction Site Profile Review for LANL Site. Worked briefly on the review of the LANL site profile review (2009).

Uranium Mill Tailings Project Health and Safety Support. Functioned as construction safety inspector on DOE surveillance teams on the Uranium Mill Tailings Remedial Action Project. Provided field health and safety support to drilling activities and field investigations. Wrote a Hazard Communication Plan and site-specific health and safety plans (1985-1986).

Hahn-Meitner Institute for Nuclear Science, Berlin, FRG, Guest Scientist. Studied the reaction of simulated borosilicate radioactive waste glasses with salt brines at elevated temperatures. This work resulted in the characterization or identification of a number of phases that precipitated on the surface of the glasses (1983-1984).

Software Support for TurboFRMAC to Sandia National Laboratories. Wrote test cases and contributed to software specifications for new modules added to the TurboFRMAC radiation release assessment software package (2003 to 2009). Constructed an *ad hoc* database of dose coefficients from DCFPAK 1.4 that was used to test perform independent software testing of Sandia's Radionuclide Viewer software and for use in developing test cases for TurboFRMAC.

Software QA Support for MACCS2 to Sandia National Laboratories. Wrote test cases, tested new modules added to the Nuclear Regulatory Commission's MACCS2 software package and related reactor accident consequence computer codes. Designed, populated and manipulated a large database of EPA Federal Guidance Report 12 and 13 dose

coefficients using Microsoft Access and Wolfram Mathematica to construct standard radiation dosimetry data files of acute and annual equivalent dose factors for distribution with the MACCS2 computer code. This involved interpolating, integrating and parsings millions of lines of raw data. Constructed a census database for the SecPop computer code using MySQL 5.0 and Wolfram Mathematica. This task involved extracting data from the published data of the 2000 economic census, the population census and the agricultural census. Various records had to be reconciled among the data sources; then some simple quantities were calculated, and consolidated tables for use in the SECPOP code were constructed. The product was delivered to Sandia as a set of tables in Microsoft Access format that was distributed with MACCS2 (2003 to present).

Selected Relevant Publications and Presentations

Comparison of the Models and Assumptions used in the DandD 1.0 RESRAD 5.61 and RESRAD-Build 1.50 Computer Codes with Respect to the Residential Farmer and Industrial Occupant Scenarios Provided in NUREG/CR-5512. Draft NUREG/CR-5512, volume 4 (1999).

Compliance Assessment Document for the Transuranic Wastes in the Greater Confinement Disposal Boreholes at the Nevada Test Site, Sandia Report SAND-XX-XXX, Volume 2: Performance Assessment Version 1.0 (2000).

Proposal to Dispose of Remediation Waste Generated during the Cleanup of the LANL Solid Waste Management Unit 73-002 Incinerator Ash Pile at the CSI Landfill in Adams County, Colorado, April 1999. Prepared for LANL EM/SWO.

Request for Approval to Transfer Hazardous Waste Containing Residual Radioactive Material for Disposal at the Chemical Waste Management, Inc. RCRA TSD Facility in Model City, NY, November 1998. Prepared for LANL EM/SWO.

The Role of Data Analysis in Sampling Design of Environmental Monitoring, SAND98-0612, March 1998.

A Prioritization and Analysis Strategy for Environmental Surveillance Results, *Health Physics* (1997), 73, p. 826.

Methods, Approaches and Uncertainties in Assessing NORM Exposures, Proceedings of the Health Physics Society's 29th Midyear Topical Meeting (1996) p.203.

Phase Formation during Corrosion Experiments with Two Simulated Borosilicate Nuclear Waste Glasses, HMI - B 424. Hahn-Meitner Institute for Nuclear Science Berlin GmbH (1985).

Naturally Occurring Glasses: Analogues for Radioactive Waste Forms, PNL-2776, (1979).

Uranium and Thorium Minerals: Natural Analogues for Radioactive Waste Forms, in *Scientific Basis for Nuclear Waste Management* (1980) p. 281, Vol. 2.

Natural Analogues for Crystalline Radioactive Waste Forms, Part II: Non-actinide Phases, in *Scientific Basis for Nuclear Waste Management*, (1981) p. 299, Vol. 3.

Uranium Study SME	Roger Hansen, J.D.
SME: NEPA, Environmental Laws Current Employment: ROGER P. HANSEN, J.D., AICP Capabilities: Mr. Hansen's experience over 40 years encompasses a wide diversity of environmental regulatory compliance requirements including those pertaining to water quality, air quality, safe drinking water, toxic substances, endangered species, historic preservation, and public lands. His permitting experience has ranged widely and has included such diverse projects as surface coal mines, ski resorts, gold mines, airfields, hazardous waste cleanup, radioactive waste transportation, highways, and even a spaceport. He has taught environmental law at the University of Denver College of Law (DU) and the Colorado School of Mines (CSM). He has also taught political science at Pacific Lutheran University (Tacoma, WA) and environmental ethics and NEPA at the University of Denver.	Senior NEPA Consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials J.D. ❖ University of North Carolina School of Law, Chapel Hill, North Carolina B.S., Journalism, ❖ University of Illinois, Urbana, Illinois Registrations / Certifications: Registered Colorado Attorney (No. 5365) Member, American Institute of Certified Planners (AICP) Member, American Planning Association (APA)

Summary

Mr. Hansen has a multidisciplinary background in environmental and natural resources law, regional planning, and communications. He has worked, mostly in the western states, across a broad spectrum of environmental management and compliance activities at the federal, state, and local levels including those associated with public lands, hazardous and radioactive waste, mining, energy development, transportation, and outdoor recreation. He is an expert in the legal and technical dimensions of National Environmental Policy Act (NEPA) implementation and has supervised or supported preparation of numerous environmental impact statements (EISs), environmental assessments (EAs), and other NEPA documents. He is a former member of the President's Council on Environmental Quality (CEQ) Legal Advisory Committee on NEPA compliance.

Mr. Hansen has provided environmental compliance and/or NEPA support services to nine U.S. Department of Energy (DOE) facilities or laboratories including: Sandia National Laboratories (NM and HI), Waste Isolation Pilot Plant, Hanford, Las Alamos National Laboratory, Idaho National Engineering and Environmental Laboratory, and the Nevada Test Site (NV).

Experience Highlights

NEPA Compliance and Impact Analyses

- **Overall Experience.** Supervised or supported preparation of an estimated 20-30 EISs, EAs, CEs, and other NEPA documents to comply with the requirements of such agencies as the U.S. Department of Energy, U.S. Forest Service, Bureau of Land Management, Federal Aviation Administration, National Aeronautics and Space Administration (NASA), U.S. Air Force, U.S. Navy, and Federal Highway Administration (FHWA). Also worked with “little NEPAs” in California, Hawaii, Washington State, and Montana. Dealt with such issues as: air and water quality, hazardous and radioactive waste, visual resources, cultural resources, endangered species, risk assessment, socioeconomics, transportation, and land use. Conducted training seminars and prepared numerous professional conference papers on NEPA compliance. (See list of publications.)
- **Sandia National Laboratories.** Provided major support and training to Sandia NEPA compliance effort including six EAs and the 1999 site-wide EIS. Authored the *NEPA Compliance Guide* for use by Sandia operations in New Mexico, California, and Hawaii. Conducted several NEPA compliance training workshops for Sandia and other DOE contractor personnel. Authored the *NEPA/CERCLA/RCRA Integration Strategy for the Environmental Restoration Program*.
- **Waste Isolation Pilot Plant (WIPP).** Served as a consultant and regulatory compliance advisor to DOE and Westinghouse Electric Corporation on NEPA compliance for over 20 years. Provided major support for preparation of the WIPP EISs, a Supplement EIS, and other NEPA documents. (WIPP is a DOE geologic transuranic (TRU) waste repository located near Carlsbad, NM.)
- **Northwest Corridor EIS.** Served as a senior consultant and peer reviewer for a Draft EIS (DEIS) on the final link in the “beltway” around Metropolitan Denver being prepared by Felsbrug Holt & Ullevig for the Colorado Department of Transportation (CDOT) and the Federal Highway Administration (FHWA). The EIS addresses freeways, toll roads, and mass transit.
- **City of Mercer Island.** Prepared an EIS for a wireless communication facility (WCF) consisting of a 130-foot monopole with six antenna arrays. Examined the environmental impacts of six alternatives to comply with the Mercer Island, WA Environmental Procedures Code and the Washington State Environmental Policy Act (SEPA).
- **Southwest Regional Spaceport (SRS).** Provided major support to New Mexico State University (NMSU), Physical Science Laboratory (PSL) for preparation of an EIS on a proposed commercial spaceport in southwest New Mexico with the Federal Aviation Administration (FAA) and the New Mexico Office of Space Commercialization (NMOSC) as joint “lead” agencies.

- **U.S. Air Force (USAF) Academy.** Supervised preparation of an EA for an auxiliary training airfield near Colorado Springs which included a comparative environmental analysis of 16 alternative sites.
- **Public Participation.** Organized, implemented, and supported such public participation devices as public meetings, public hearings, workshops, and citizen advisory committees to comply with CEQ and various federal agency requirements.

CERCLA, RCRA, Hazardous and Radioactive Waste Management

- **RCRA “Part B” Permitting.** Provided extensive support to preparation of RCRA Part B permit applications for Rocky Mountain Arsenal (Denver), Pueblo (Colorado) Army Depot, WIPP, LANL, and several private industry clients.
- **Rocky Flats Plant (RFP).** Supervised preparation of work plans for CERCLA ecological risk assessments at a DOE facility near Denver. Interfaced with biological scientists to develop a complex methodology consistent with U.S. Environmental Protection Agency (EPA) guidance. Focused on both terrestrial and aquatic ecosystems.
- **Rocky Mountain Arsenal.** Provided regulatory strategy support for various on-site ground water, soils, geological, and remediation investigations for a DoD facility near Denver, CO.
- **Waste Isolation Pilot Plant (WIPP) DOE Geologic Repository.** Extensively involved with WIPP regulatory compliance issues for many years including NEPA-related environmental impact assessment, air quality, water quality, endangered species, historic/archaeological resources, RCRA, and other EPA requirements. Worked with DOE and Westinghouse on resolving concerns/issues of the State of New Mexico and citizen environmental groups. Authored numerous “white papers” and legal memoranda dealing with RCRA compliance problems and strategies. Served as a member of the WIPP Engineered Alternatives Task Force (EATF) in evaluating engineered alternatives for compliance with EPA requirements in 40 CFR Part 191 and RCRA land disposal restrictions. Supported preparation of the WIPP “no migration” variance petition under 40 CFR § 268.6 which was approved by EPA. Prepared detailed regulatory analyses of oil and gas well drilling, plugging, and abandonment requirements as related to WIPP “human intrusion” scenarios.
- **Nevada Test Site (NTS).** One of five managers designated by IT Corporation to perform tasks associated with a major contract with DOE for consulting services at NTS. Served as the Project Manager for initial strategy development for preparation of a site-wide EIS. Conducted a comprehensive

analysis of federal and state regulatory issues pertaining to the DOE NTS Groundwater Characterization Project (GCP). Analyzed problems and strategies for compliance with requirements contained in NEPA, RCRA, CERCLA, CWA, CAA, SDWA, ESA, related Nevada laws and regulations, and various DOE Orders.

- **Idaho National Engineering and Environmental Laboratory (INEEL).** Prepared a detailed analysis of radioactive, mixed, and hazardous waste regulatory requirements, comparing DOE Order 5820.2A with 10 CFR Parts 60 and 61 and 40 CFR Parts 191, 192, and 260-270. Purpose was to provide background for possible revisions of DOE Order 5820.2A.

Professional Offices and Affiliations (Past and Present)

- **American Bar Association (ABA).** Member, ABA Special Committee on Environmental Law; Chair, Environmental Quality Committee, ABA Section of Environment, Energy, and Resources (EER); Member of EER Section Council (Board of Directors); co-founder, ABA Annual Keystone Conference on Environmental Law.
- **National Association of Environmental Professionals (NAEP).** Member and co-author of professional papers presented at annual conferences in 1993, 1994, 1996, 1997, 1998, 2000, and 2006. Current member, NEPA Working Group.
- **U.S. Environmental Protection Agency (EPA).** Member, National Advisory Committee on Hazardous Materials.
- **Council on Environmental Quality (CEQ), Executive Office of the President.** Member of 11-member Legal Advisory Committee.
- **American Institute of Certified Planners (AICP).** Member and certified land use planner. Also, member of the American Planning Association (APA).

Employment History

- **Principal, Hansen Environmental Consultants, Denver and Aurora, CO (1992-Present).** Providing a broad range of environmental regulatory and NEPA support services to government agencies and consulting firms. Currently consulting on the Northwest Corridor EIS in Metropolitan Denver.
- **Senior Regulatory Specialist and Program Director, IT Corporation, Denver, CO (1978-1992).** Responsible for environmental regulatory analyses, permitting documentation, NEPA compliance services, and technical and legal support for permitting and operation of mining, mineral processing, and energy development projects as well as hazardous, radioactive, and mixed waste management facilities.

- **Project Officer, National Coal Technology Assessment, U.S. Environmental Protection Agency, Research Triangle Park, NC (1976-1978).** Provided project management of a national-level “technology assessment” focusing on the environmental, legal, social, economic, and policy aspects of the development and deployment of advanced coal technologies. (Temporary assignment.)
- **President, Hansen & O’Connor, P.C., Denver, CO (1974-1976).** Organized and headed a small law firm specializing in environmental legal aspects of mining, energy development, and recreation resorts.
- **Executive Director, Rocky Mountain Center on Environment (ROMCOE), Denver, CO (1967-1974).** Founded ROMCOE to serve as an environmental service center and a “forum” for business, government, academia, and the environmental community in the eight Rocky Mountain states (CO, UT, NM, AZ, NV, ID, MT, and WY).

Selected Publications

Hansen, R.P., T.A. Wolff, and A.G. Melcher, 2007, “NEPA and Environmental Streamlining: Benefits and Risks,” *Environmental Practice*, Journal of the National Association of Environmental Professionals, Vol. 9, No. 2, June 2007, pp. 83-95.

Hansen, R.P., and T.A. Wolff, 2000, “Making NEPA More Effective and Economical for the New Millennium,” *Federal Facilities Environmental Journal* Vol. 11, No. 3, Autumn 2000, pp. 61-70.

Hansen, R.P., and T.A. Wolff, 1998, “Streamlining the Process: A Strategy for Making NEPA Work Better and Cost Less,” *Proceedings of the 23rd Annual Conference of the National Association of Environmental Professionals*, San Diego, CA (June 20-26, 1998).

Hansen, R.P., T.A. Wolff, and L.A. McCold, 1997, “The Conflict of Interest Problem in EIS Preparation,” *Proceedings of the 22nd Annual Conference of the National Association of Environmental Professionals*, Orlando, FL (May 19-22, 1997).

Hansen, R.P., and T.A. Wolff, 1996, “Tools for NEPA Compliance: Baseline Reports and Compliance Guides,” *Proceedings of the 21st Annual Conference of the National Association of Environmental Professionals*, Houston, TX (June 2-6, 1996).

Hansen, R.P., 1995, *National Environmental Policy Act (NEPA) Compliance Guide* Sandia National Laboratories, SAND95-1648, Sandia National Laboratories, Albuquerque, NM (August 1995). (Available from National Technical Information Service, U.S. Department of Commerce.)

Wolff, T.A., and R.P. Hansen, 1994, "Use of Comprehensive NEPA Documents to Reduce Program Risk," *Proceedings of the 19th Annual Conference of the National Association of Environmental Professionals*, New Orleans, LA (June 12-15, 1994).

Hansen, R.P., and T.A. Wolff, 1993, "NEPA/CERCLA/RCRA Integration: Policy vs. Practice," *Proceedings of the 18th Annual Conference of the National Association of Environmental Professionals*, Raleigh, NC (May 24-26, 1993).

Wolff, T.A., and R.P. Hansen, 1993, "The NEPA Threshold Question Revisited: Proposed Actions and Continuing Activities," *Proceedings of the 18th Annual Conference of the National Association of Environmental Professionals*, Raleigh, NC (May 24-26, 1993).

Hansen, R.P., 1992, *NEPA/CERCLA/RCRA Integration Strategy for Environmental Restoration Program Sandia National Laboratories*, SAND92-7312, Sandia National

Laboratories, Albuquerque, NM (October 1992). (Available from National Technical Information Service, U.S. Department of Commerce.)

Hansen, R.P., 1992, "Environmental Law: Looking Back 25 Years," *Proceedings Technology Exchange Symposium*, International Technology Corporation (June 1992).

Hansen, R.P., 1991, "Regulation of Radioactive Mixed Waste Under RCRA," *Proceedings of Haztech International Eighth Annual Conference and Exhibition*, pp. 1A-9 to 1A-21 (1991).

Hansen, R.P., 1989, "Application of RCRA to Radioactive Mixed Waste," *Proceedings of 1989 Third Annual Conference and Exhibitions*, Colorado Hazardous Waste Management Society (1989).

Hansen, R.P., and J.S. Hart, 1988, "Regulation of Radioactive Mixed Waste at the Waste Isolation Pilot Plant (WIPP) Under the Resource Conservation and Recovery Act (RCRA)," *Proceedings of Waste Management '88*, Tucson, AZ, Vol I, pp. 929-934 (1988).

Fedrickson, C.L., R.P. Hansen, and J.S. Hart, 1987, "Issues and Viewpoints Concerning the Application of RCRA to Radioactive Waste Management Facilities," *Proceedings of Waste Management '87*, Tucson, AZ, Vol. 3, pp. 711-716, AZ (1987).

Hansen, R.P., 1986, "Managing the Liability of Responsible Parties at Superfund Sites," *Hazardous Substances*, pp. 11-19 (December 1986).

Hansen, R.P., 1981, "Technology Assessment: A Social Impact Perspective on Alternative Energy Technologies," *Social and Political Perspectives on Energy Policy*, K.M. Gentemann, Ed., Praeger Publishers, New York, NY, pp. 18-33 (1981).

Hansen, R.P., 1981, "Environmental Siting of a Major Coal Syfuels Facility in the Northern Great Plains," *Proceedings of Fourth Annual Coal Utilization Exhibition and Conference, Coal Technology '81*, Houston, TX, pp. 197-232 (1981).

Hansen, R.P., 1976, "Historic and Landmark Preservation: A Creative Trusteeship," *Proceedings of Southwestern Legal Foundation Institute on Planning, Zoning, and Eminent Domain*, Houston, TX, Matthew Bender & Co., pp. 69-118, (1976).

Uranium Study SME	John Hart
SME: Regulatory Compliance Specialist, NEPA, RCRA, Environmental Laws, QA Current Employment: John Hart and Associates Capabilities: Mr. Hart has over 32 years experience in environmental regulatory compliance, primarily for U.S. Department of Energy (DOE) and commercial nuclear facilities. He has technical and management experience under a variety of federal and state environmental laws and regulatory programs, including the Nuclear Waste Policy Act, the National Environmental Policy Act (NEPA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), the Clean Air Act, the Clean Water Act, and the Endangered Species Act. He has experience in obtaining environmental permits and approvals for uranium milling operations in New Mexico.	Senior Regulatory Consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials MS Environmental Science, ❖ Indiana University School of Public and Environmental Affairs, Bloomington, Indiana, B.A., Geography and Environmental Studies, ❖ Indiana University, Bloomington, Indiana, Additional Training: Hazardous Materials Health and Safety Training Courses Advanced Project Management Professional Development Courses

Mr. Hart has been the owner and operator of an environmental consulting group since 1989. He has supported regulatory programs at multiple DOE nuclear facilities including the Waste Isolation Pilot Plant, the Yucca Mountain Project, the Feed Materials Production Center, the Nevada Test Site, the Hanford Reservation, the Oak Ridge National Laboratory, and the Los Alamos National Laboratory. Mr. Hart specializes in helping clients find cost-effective compliance approaches for a variety of environmental protection regulatory programs.

He has experience with planned-facility start up regulatory assessments and environmental permitting including the development of airborne pollutants emissions inventories, notices of intent to discharge waterborne contaminants, archaeological resources protection planning, and threatened and endangered species impact evaluations. Much of his experience pertains to regulatory analyses, including multi-program regulatory and standards comparisons. He has authored and co-authored many documents focused on communicating the results of complex nuclear-facility risk evaluations in clear terms, easily understood by the general public.

In addition to his management duties, Mr. Hart provides environmental consulting services to DOE contractors and laboratories, other government clients, and commercial clients. Much of his work is in support of the DOE's Waste Isolation Pilot Plant (WIPP), a geologic repository for radioactive mixed waste, located near Carlsbad, New Mexico. He supported the preparation of a Compliance Recertification Application (CRA) which was submitted by the DOE to the EPA to obtain EPA's

concurrence that the WIPP may continue to operate in compliance with the requirements of 40 CFR Parts 191 and 194, EPA's environmental performance standard. He was a principal author of the WIPP Experimental Program Plan, a document submitted by the DOE to the EPA, in accordance with the WIPP Land Withdrawal Act. Mr. Hart has also supported the development of regulatory-compliance strategy documents for the WIPP, assisted in evaluating compliance.

Project Manager/Section Chief - Assisted the Westinghouse Electric Corporation in complying with RCRA requirements for the disposal of radioactive mixed waste in the WIPP. Directed the preparation of the draft No-Migration Variance Petition pursuant to the 40 CFR Part 268 land disposal restrictions. This work required the development of regulatory-compliance strategies, preparation of numerous background papers, and frequent negotiation with the EPA reviewers of the petition.

Project Manager - Under contract to the Reynolds Electrical and Engineering Company, Inc. (REECo), managed the preparation of multiple RCRA-compliance documents for radioactive mixed waste management units at the DOE's Nevada Test Site, including closure plans, ground water monitoring waiver requests, Health and Safety Plans and Quality Assurance Program Plans.

Project Scientist – Supported the development of license applications for uranium milling operations at United Nuclear Churchrock, near Gallup, NM, and Homestake Mining, near Grants, NM.

Project Scientist - Evaluated technical and regulatory issues pertaining to the characterization and disposal of radioactive mixed wastes stored in underground tanks at the Hanford Reservation. Included analysis of the implications of relevant DOE Orders and federal and State hazardous waste laws and regulations.

Project Coordinator - Responsible for the preparation of RCRA permit applications addressing hazardous and radioactive mixed waste units at the Hanford Reservation, SNLA, and the Los Alamos National Laboratory (LANL).

Project Manager - Coordinated the preparation of 18 closure plans at a RCRA/CERCLA site operated by a Colorado aerospace industries client. The project involved the assimilation of information on the units to be closed, site environmental characteristics, and the development of detailed site investigation and closure/remediation plans. Assisted the client in negotiations with the Colorado Department of Health (CDH) and EPA Region VIII concerning soil and ground water decontamination criteria to be applied to the sites. Each closure plan has been approved by the CDH.

Project Scientist - Contributed to the completion of a hazardous waste site investigation at SNLA. The site is an inactive chemical waste landfill where a variety of hazardous materials, including organic compounds and radioactive wastes, were disposed of over many years. The project included exploratory

drilling, trenching, sampling, and both on- and off-site laboratory analyses. Also contributed to the development of a facility-wide waste volume reduction plan and a laboratory-wide Spill Prevention, Control and Countermeasures (SPCC) Plan, and the installation of ground water monitoring wells in compliance with RCRA requirements.

Indiana University

Bloomington, Indiana

1977 - 1979

Research Assistant - Served as a research assistant supporting an inventory and ecological analysis of Great Lakes coastal wetlands for the U.S. Fish and Wildlife Service.

Southwestern Indiana and

Kentucky Regional Council of Governments

Evansville, Indiana

1975 - 1976

Planner - Supported comprehensive planning activities including land use surveys, demographic studies, neighborhood analyses and transportation studies for a regional planning agency encompassing six counties in southern Indiana and western Kentucky.

Publications and Technical Presentations

Mr. Hart has authored and presented a number of technical publications at national and regional professional meetings. He has been an invited speaker at environmental regulatory compliance training seminars. Technical and regulatory-compliance aspects of various project activities and research programs, and provided support to the development of compliance applications. He coauthored management plans for programs to comply with 40 CFR Part 191 and RCRA requirements for passive institutional controls and long-term monitoring. He assisted Sandia National Laboratories in the development of quality assurance procedures to control Sandia's scientific and engineering research programs related to the WIPP Project. Mr. Hart supported a DOE system-wide study of benefits and detriments associated with the implementation of various optional engineering alternatives for the disposal of waste in the WIPP repository.

He supported scoping assessments for the Yucca Mountain repository environmental impact statement. Mr. Hart supported the resolution of issues related to the emplacement of radioactive mixed waste in the repository.

Mr. Hart co-founded Benchmark Environmental Corporation in 1989, serving as Vice President, Treasurer, and Project Manager. In addition to his administrative duties, Mr. Hart provided technical support to clients, as described below:

Project Manager - Provided environmental support services to the Westinghouse Electric Corporation, the Management and Operations Contractor at the WIPP.

Tasks performed include preparation of a RCRA Compliance Plan, a regulatory compliance tracking database, and a No-Migration Variance Petition for the WIPP.

Also supported the development of a detailed plan to monitor volatile organic compound (VOC) emissions from the WIPP. VOC emissions monitoring was required by the EPA to support DOE's demonstration of "no-migration" of hazardous wastes from the repository.

Mr. Hart served on a six-member DOE task force developing an overall regulatory compliance criteria document for the WIPP. This document defines criteria for DOE's demonstration of compliance with requirements of 40 CFR Parts 191, 268 and 264.

Project Manager - Provided environmental regulatory compliance services to Sandia National Laboratories (SNL). Support focused on implications to the WIPP of compliance with 40 CFR Part 191, Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Waste.

Project Manager - As a subcontractor to the IT Corporation, provided support to the development of the RCRA permit application for the Test Phase of the WIPP project. International Technology Corporation . **Project Manager/Project Scientist** - Prepared NEPA documentation for the WIPP, SNLA and the DOE's Feed Materials Production Center, located near Fernald, Ohio. This work included the preparation of portions of the WIPP Final Environmental Impact Statement (EIS), management of the assessment of risks posed by hazardous constituents and radiation for the Supplemental EIS, and participation in numerous environmental evaluations of project modif

Uranium Study SME	Ahmed Hasan, Ph.D.
SME: Radiation chemist, geohydrological modeling Current Employment: Institute for Engineering Research and Applications New Mexico Tech University Capabilities: Past research experience and interests focused on Low- and high-level radioactive waste disposal, conditioning of radioactive waste, radiation protection, and subsurface contaminant transport. I gained experience in the interaction of inorganic contaminants with mineral surfaces, physicochemical characterization of soil and mineral surfaces, development of geochemical codes, mass transfer limited trace element sorption in porous adsorbents, and radionuclide migration. Past research has included investigation of some radionuclides of environmental interests with different types of soils and rocks. Other research program includes hazardous and mixed waste; and colloidal transport of radioactive and metal contaminants and their applications to remediation, performance assessment of the high-level radioactive waste repositories, colloidal transport of contaminants and, disposal of Greater-than-Class C radioactive waste.	Scientist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials Ph.D. Chemistry ❖ Ain Shams University, Egypt MS Chemistry ❖ Ain Shams University, Egypt B.S. Geochemistry ❖ Ain Shams University, Egypt

Appointments

- 2009 – Present: Adjunct Professor, Chemical Engineering Department, New Mexico Institute of Mining and Technology
- 2005 – Present: Senior Research Scientist, New Mexico Institute for Engineering Research and Applications, New Mexico Tech University (IERA-NMIMT)
- 2002 – 2005: Limited term Employee, Sandia National Laboratories, Albuquerque, New Mexico
- 1999 – 2002: Senior Research Scientist II, New Mexico Engineering Research Institute NMERI), University of New Mexico (UNM)
- 1995-1999: Research Scientist I, Institute for Space and Nuclear Power Studies (ISNPS), University of New Mexico
- 1994-1995: IAEA Fellow, Sandia National Laboratories, Albuquerque, NM
- 1987-1994: Research Scientist ()—Egyptian Atomic Energy Authority's Hot Laboratories and Waste Management Center (EAEA-HLWMC)

Synergistic Activities

- Session Chair in the “Entrepreneurs in the Shade of Global Trade) Conference, 2-4th of November, 2009, Jeddah, Saudi Arabia.
- Organized and Chaired a workshop on “Economic Viability of Biofuels for the State of New Mexico”, Albuquerque, New Mexico, August 17-18, 2009.
- Organized and chaired an international workshop on sustainable Development of Desert Areas, Cairo, Egypt, February 13-15, 2004.
- Investigated the environmental conflict around the Black Sea and what are the different alternatives to solve these problems.
- Co-organizing the International Conference on Hazardous Waste: Sources, Effects, and Management, 12-16 December 1998, Cairo, Egypt.
- Contributed to the understanding of the groundwater budget at the South valley, Albuquerque, NM using the Groundwater Modeling System (GMS) code.
- Managed the Integrated Management Program for Radioactive Sealed Sources in Egypt. Cradle-to-Grave management of sources that includes Tracking, Awareness, Security, Regulations, Recovery, Transportation, Storage, Recycling, Conditioning, Disposal, and Emergency Response. A five million dollar program funded by the USAID.
- Developed Research Collaborative Agreement between NMT and EAEA and developed two agreements between NMT and Sinai University in academic and research cooperation.
- Developed Memorandum Of Understanding (MOU) between Sandia National Laboratories (SNL) and the Egyptian Atomic Energy Authority (EAEA) in 1996.
- Managed the technical interactions between Los Alamos National Laboratory (LANL) and EAEA through the DOE sister laboratory agreement 1994-2003.
- Supervised and trained 15 IAEA fellows at SNL and NMT since 1996.
- Supervised and hosted about 30 Egyptian students and visitors at NMT and SNL
- Participated in Track II efforts for the Multilateral Peace negotiation in the Middle East in 1996.
- Professional and technical accomplishments includes: Building and running of Analytical Laboratories; Physicochemical characteristics of subsurface contaminants; Performance Assessment of Radioactive Waste Disposal Facilities; and Water Shed and Water Budget

Collaborators and Other Affiliations

Advisors:

1. Professor Mohamed El-Genk: Director Institute for Space and Nuclear Power Studies, University of New Mexico.
2. Professor Hisham F. Aly, Egyptian Atomic Energy Authority, Cairo, Egypt
3. Professor Sohir El-Reefy, Egyptian Atomic Energy Authority, Cairo, Egypt
4. Professor Saad El-Said, Chemistry Department, Ain Shams University, Cairo, Egypt

Sample of Collaborators and Co-Editors:

5. Professor, Erik Nuttal, Chemical and Nuclear Engineering Department, University of New Mexico

6. Professor Bruce Thompson, Civil Engineering Department, University of New Mexico
7. Professor Misra Manoranjan, Metallurgical and Materials Engineering, University of Reno, Nevada
8. Dr. Barbara Smith, Los Alamos National Laboratory, Los Alamos, New Mexico
9. Dr. Robert C. Moore, Sandia National Laboratories, Albuquerque, New Mexico
10. Mr. Johan Cochran, Sandia National Laboratories, Albuquerque, New Mexico
11. Dr. Karim El-Adham, National Center for Nuclear Regulatory Control, Cairo, Egypt
12. Dr. Kent Biringer, Sandia National Laboratories
13. Dr. Amir Mohagegy, Sandia National Laboratories
14. Dr. Kenneth Apt, Los Alamos National Laboratories
15. Dr. Said El-Nashaie, Dean, College of Engineering, Sinai University
16. Dr. Gautan Priyadarshan, Metallurgical and Materials Engineering, University of Reno, Nevada
17. Professor Ken Czerwinski, Department of Chemistry, University of Nevada, Las Vegas

Sample of students and Trainees:

Dr. Cleodia Cassia, Dr. Perez Guerrero, Jesus Salvador, Dr. Mahmoud Ali (EAEA); Dr. Yasser Tawfik (EAEA), Dr. Tarek Mohamadden (Nuclear Material Authority (NMA), Egypt; Dr. Khalid Fouad, (NMA), Dr. Hisham Kadry (NMA), Dr. Mona Gasser (EAEA), Dr. Nasser Awwad (EAEA), Dr. Mona EL-Hazek (NMA), Dr. Mohsen Ali (NMA), Dr. Aisha Al-Dakroury (EAEA), Dr. Mohamed Zaid (EAEA); Dr. Hamdy Gad (EAEA); Dr. Rehab Hassan (EAEA); Mr. Dannel Maquiz (NMT).

Research and Technical Areas of Specialization

Current experience is related to developing an Integrated Model for sustainable development. The IMSD is an innovative approach that will have a broader impact on the economic development by enabling technology integration that help remote communities, optimize the sustainability of resources for existing communities, and promote further housing and communities' development in desert environment. A partnership between the private sector and universities in the U.S. to develop an IMSD will help employ students to facilitate the knowledge transfer and provide them with the necessary skills to support the private sector upon their graduation. Additionally, the IMSD would enable the private sector and universities in the U.S. to assist the regulators to develop the laws that protect the environment and sustain the energy and water resources while promote economic development.

Recent experience includes Integrated Management of Radioactive Sealed Sources (IMPRSS). Cradle-to-Grave management of radioactive sources ensures the safety and security of sources during its life cycle. I managed 13 tasks under the IMPRSS project such as Tracking, Awareness, Security, Regulation, Recovery, Storage, Transportation, Recycling, Conditioning, Disposal, QA/QC and Emergency response. experienced in many technical issues related to safety and security of radioactive sealed sources.

I supervised more than 23 fellows from the International Atomic Energy Agency (IAEA) who received their training in many areas such as disposal of low- and high-level radioactive waste, decommissioning and decontamination, and water and

wastewater treatment. Since 1996, I support various actions sheets between U.S. DOE/ LANL and Egypt under the sister laboratory program in areas of radioactive waste management and environmental monitoring.

Past research experience and interests focused on Low- and high-level radioactive waste disposal, conditioning of radioactive waste, radiation protection, and subsurface contaminant transport. I gained experience in the interaction of inorganic contaminants with mineral surfaces, physicochemical characterization of soil and mineral surfaces, development of geochemical codes, mass transfer limited trace element sorption in porous adsorbents, and radionuclide migration. Past research has included investigation of some radionuclides of environmental interests with different types of soils and rocks.

Other research program includes hazardous and mixed waste; and colloidal transport of radioactive and metal contaminants and their applications to remediation, performance assessment of the high-level radioactive waste repositories, colloidal transport of contaminants and, disposal of Greater-than-Class C radioactive waste.

The research area of Contaminant Transport encompassed the physics and chemistry of the fate and transport of contaminants in aquifers; the application of geophysical techniques to detection of contaminants. The research area of Integrated Watershed Systems encompassed land use practices and resource management; modeling of stream flow; flash flood analysis; measurement and modeling of surface water/ground-water interactions; modeling the impacts of mining; and modeling of environmental remediation practices.

Professional and Technical Accomplishments

Building and running of Analytical Laboratories

Constructed and equipped three analytical laboratories at the Egyptian Atomic Energy Authority, and on laboratory at the University of New Mexico. At EAEA, one of the labs was specialized in characterization of chemical and radiological characteristics of various radionuclides. The labs were equipped with several analytical instrumentation such as UV, IR, Multichannel Analyzers, High-performance liquid chromatograph (HPLC), Potentiometric titration, and Inductive Coupled Plasma-Mass Spectroscopy (ICP-MS). Operated and maintained three COULTER instruments for colloids characterization, DELSA 440, LS 230, and Multisizer, at UNM. Developed a laboratory technique for testing online filters for removal of colloidal and soluble contaminants.

Physicochemical characteristics of subsurface contaminants

Contributed to the understanding of the distribution coefficients of different radionuclides onto various minerals and rocks in the Egyptian soil under different chemical conditions. Identified the geochemical needs and parameters for potential low-level radioactive waste disposal facility in Egypt. Converted one of the major geochemical codes used for the Waste Isolation Pilot Plant (WIPP) from Unix platform to PC user friendly platform. Contributed to the understanding of uranium adsorption/desorption onto colloidal materials such as Iron Oxide and Silica colloids.

Performance Assessment of Radioactive Waste Disposal Facilities

Contributed with SNL in developing performance assessment methodologies for the low-level radioactive waste disposal, waste Isolation Pilot Plant (WIPP), Radioactive Sealed Sources (RSS) and Yucca Mountain Project (YMP). Reviewed and edited all the IAEA and NRC regulations to provide a goal for the performance assessment of low-level radioactive waste facilities. Converted the geochemical code FMT2.0 from Unix to PC platform and ran several test cases for WIPP performance assessment. Conducted some experimental work to study the adsorption/desorption of various radioactive elements onto different substrates. Played a major role for assessing the potential colloid formation at YM drift and their potential for enhancing the migration of radionuclides. Reviewed and edited the IAEA, South Africa, and Russia programs for the borehole disposal of radioactive sealed sources.

Water Shed and Water Budget

I contributed to the understanding of the groundwater budget at the South valley, Albuquerque, NM using the Groundwater Modeling System (GMS) code, which was developed by the US corp. of Engineering. I also, investigated the environmental conflict around the Black Sea and what are the different alternatives to solve these problems. I reviewed several models and international agreements on water budget and water quality. I am helping SNL to expand its water surety program to the Middle East and solve water-related problems such as Mountain Aquifer between Jordan and Israel, and the Nile Basin Initiative.

International

- Developed two Academic and Research agreements with Sinai University, Egypt.
- Developed Memorandum Of Understanding (MOU) between SNL and EAEA in 1996.
- Facilitate technical interactions between Los Alamos National Laboratory (LANL) and EAEA through the Doe sister laboratory agreement since 1994.
- Facilitate technical interactions between NMT and EAEA through the research collaborative agreement since 1995.
- Supervised and trained 15 IAEA fellows to SNL and NMT since 1996.
- Hosted 30 foreign nationals at SNL and NMT
- Participated in Track II efforts for the Multilateral Peace negotiation as part of the Egyptian Delegation in 1996.
- Participated in organizing the International Conference on Hazardous Waste: Sources, Effects, and Management, 12-16 December 1998, Cairo, Egypt.
- Managed the Integrated Management Program for Radioactive Sealed Sources in Egypt. Cradle-to-Grave management of sources that includes Tracking, Awareness, Security, Regulations, Recovery, Transportation, Storage, Recycling, Conditioning, Disposal, and Emergency Response.

HONORS AND AWARDS

US-Egypt S&T Junior Scientist Award: August 2008

Excellence Performance Award: Ain Shams University, 1984, 1985 and 1986.

IAEA Award: Training fellowship at SNL for 12 months, 1994.

MEMBERSHIP AND ACTIVITIES AT PROFESSIONAL SOCIETIES

- **American Nuclear Society, Trinity Section:** Member since 1996
- **American Chemical Society:** Member since 1999.
- **Member of the Organizing Committee of the International Conference on Hazardous Waste:** Sources, Effects, and Management, Cairo, Egypt.

SAMPLE PUBLICATIONS

1. Cooperative Monitoring and Its Role in Regional Security, Kent Biringer, John Olsen, Richard Lincoln, Fred Wehling, Wayne Einfeld, Pauline Spaulding, Ahmed Hasan, and David Betsil, SAND97-0523, 1997.
2. Interaction of Uranium with Silica Colloids, Ahmed A. Hasan and Mohamed S. El-Genk, WERC/WRHSRC/NMHWMS Joint Conference on Environment, Albuquerque, NM, March 31-April 1, 1998.
3. In Situ Biological Denitrification of Groundwater, Lijun Deng, H. Eric Nuttal, Abdesselam Abdelouas, Yongming Lu, Werner Lutze, and Ahmed Hasan, WERC/WRHSRC/NMHWMS Joint Conference on Environment, Albuquerque, NM, March 31-April 1, 1998.
4. An investigation of Uranium Interactions in Batch and Column Techniques, Ahmed Hasan and Mohamed El-Genk, WERC/WRHSRC/NMHWMS Joint Conference on Environment, Albuquerque, NM, March 31-April 1, 1998.
5. Egyptian Nuclear Program: Radioactive Waste Management, Ahmed Hasan, Paul Davis, and John Cochran, 219 ACS National Meeting, San Francisco, California, March 26-30, 2000.
6. Colloids Formation, Stability, Interactions and Transport at Yucca Mountain Drift, A.A. Hasan, S. Alcorn, and B. MacKinnon, 219 ACS National Meeting, San Francisco, California, March 26-30, 2000.
7. Egyptian Radioactive Waste Management Program, Ahmed Hasan, and John Cochran, GlobeEx 2000 International Energy Conference Las Vegas, Nevada USA July 23-28, 2000.
8. Containment of Uranium in the Proposed Egyptian Geologic Repository for Radioactive Waste Using Hydroxy Apatite: A comparison of Synthetic and Animal Bone Derived Hydroxy Apatite for Sorption of Uranium. Mahmoud A. Hasan, Robert C. Moore, Ahmed Hasan, Kathleen Holt, Fred Salas. 9th International Conference on Chemistry and Migration Behavior of Actinides and Fission Products in the Geosphere, Gyeongju, Korea, September 21-26, 2003.
9. Formation of Calcium Apatite in Soils Using Calcium Citrate and Sodium Phosphate for Control of Strontium Migration. Robert C. Moore, Ahmed Hasan, Mahmoud Mohamed, Kathleen Holt and Fred Salas. 9th International Conference on Chemistry and Migration Behavior of Actinides and Fission Products in the Geosphere, Gyeongju, Korea, September 21-26, 2003.
10. Protecting the Human Health and the Environment from Sealed Sources. K. El-Adham, A.A. Hasan, M. R. El-Sorougy, International Conference on National Infrastructures for Radiation Safety: Towards Effective and Sustainable Systems. Rabat, Morocco, 1-5 September 2003. IAEA-CN-107.
11. Integrated Management Program for Radioactive Sealed Sources in Egypt. Ahmed Hasan, John Cochran, Karim El-Adham and Rashad El-Sorougy, WM'03, February 23-27, 2003, Tucson Arizona.
12. Containment of Uranium in the Proposed Egyptian Geologic Repository for Radioactive Waste Using Hydroxy Apatite: A comparison of Synthetic and Animal Bone Derived Hydroxy Apatite for Sorption of Uranium. Mahmoud A. Hasan, Robert C. Moore, Ahmed Hasan, Kathleen Holt, Tom Headley, Hongting Zhao and Fred Salas Sandia Report SAND2004-1243.

13. Sorption of Plutonium (VI) by Hydroxyapatite. R.C. Moore, M. Gasser, N. Awwad, K.C. Holt, F.M. Salas, A. Hasan. Journal of Radio analytical and Nuclear Chemistry, Vol. 263, No. 1 (2005) 97-101
14. Integrated Management Program for Radioactive Sealed Sources in Egypt. Ahmed Hasan, Karim El-Adham. ANES/SENA 2004 Symposium, Miami Beach, Florida, October 3-6, 2004.
15. Waste Generated from LMT-AMTEC Reactor Concept. A. Hasan. T.F. Mohammeden, Y.T. Mohamed. Waste Management 1003 Symposium, February 23-27, 2003. Tucson, Arizona.
16. Integrated Management Program for Radioactive Sealed Sources in Egypt. A. Hasan, J.R. Cochran, El-Adham, R. El-Sorougy. Waste Management 1003 Symposium, February 23-27, 2003. Tucson, Arizona.
17. Overview on Backfill Materials and Permeable Reactive Barriers for Nuclear Waste Disposal Facilities. Mahmoud A. Hasan, Robert C. Moore, Kathleen C. Holt, and Ahmed A. Hasan. SAND2003-2101. Printed October 2003
18. Anionic Sorbents for Arsenic and Technetium Species. Robert C. Moore, Kathleen C. Holt, Hongting Zhao, Ahmed Hasan, Mahmoud Hasan, Ranko Bontchev, Fred Salas, and Daniel Lucero. SAND2003-3360. Printed September 2003
19. Integrated Management Program for Radioactive Sealed Sources in Egypt. Ahmed Hasan and Karim El-Adham. The 227th ACS National Meeting, Anaheim, CA, March 28- April 1, 2004.
20. Development of Intermediate-Depth Borehole Disposal for Unwanted Radioactive Sources in Egypt. J. R. Cochran, A. Hasan, K-El-Adham, M.A.H. Abdel Aziz, and Y.T. Mohamed. WM'05, February 27-March 3, 2005, Tucson, Arizona.
21. Greater Confinement Disposal of Radioactive Waste in Borehole Facilities. J. Cochran, Ahmed Hasan. International Symposium on Disposal of Low Activity Radioactive Waste, Cordoba, Spain, 13-17 December 2004.
22. Sorption of Selenium by Bovine Derived Hydroxyapatite
Mona Gasser⁽¹⁾, Nasser Awwad⁽¹⁾, Robert C. Moore⁽²⁾, Kathleen Holt⁽²⁾, Charles Sanchez⁽³⁾, Hongting Zhao⁽²⁾, and Ahmed Hasan⁽¹⁾. Journal of Chemical and Engineering Data (in press)
23. "In Situ Formation of Apatite in Soil and Groundwater for Containment of Radionuclides and Heavy Metals" R.C. Moore, K. Holt, C. Sanchez, H. Zhao, F. Salas, A. Hasan, and D. Lucero. SAND Report, SAND2002-3642.
24. "Sorption of Arsenic from Drinking Water to Mg(OH)₂, Sorrel's Cements, and Zirconium Doped Materials" R.C. Moore, K. Holt, H. Zhao, F. Salas, A. Hasan, and D. Lucero. SAND Report, SAND2002-3641.
25. Sorption of Np(V) by Hydroxyapatite. Robert C. Moore, Kathleen Holt, Nasser Awwad, Mona Gasser, Charles Sanchez, Hongting Zhao, and Ahmed Hasan. Radiochimica Acta, 2003, v.91(12), p. 721-727
26. Formation of Hydroxyapatite in Soils Using Calcium Citrate and Sodium Phosphate for Control of Strontium Migration. Robert C. Moore, Charles Sanchez, Kathleen Holt, Ahmed Hasan, Mahmoud A. Hasan, Hongting Zhao, and Fred Salas. In press J. Contaminant Hydrology.

Uranium Study Technical Lead	Sheldon Landsberger, Ph.D.
Technical Lead: Radiochemistry Current Employment: Professor and Coordinator of Nuclear and Radiation Engineering Program, UTA Capabilities: Radiation measurements, uranium and trace metals analysis, health physics, international environmental and radiation studies, uranium fuel cycle, in-situ leaching environmental impacts, Over 40-years experience.	Senior Scientist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials PhD, Chemical Engineering ❖ University of Toronto MS, Physics ❖ Concordia University MS, Nuclear Chemistry ❖ Salford University BS, Chemistry/Mathematics ❖ Sir George Williams Univ.

Dr. Landsberger has more than 180 published papers and 120 conference proceedings. For the past 30 years he has been involved in a wide variety of environmental projects including analysis of various media for heavy metals and radioactivity. Some of his work has included: 1. Abestos Pollution Assessment in River Water by PIXE Methods, 2. The Determination of Heavy Metals (Al, Mn, Fe, Ni, Cu, Zn, Cd and Pb) in Urban Snow Using an Atomic Absorption Graphite Furnace, 3. Rapid Determination of Selenium in Various Marine Organisms by Instrumental Neutron Activation Analysis, 4. Sulphur and Heavy Metals in Urban Snow: Multi-Elemental Techniques and Analytical Interpretation, 5. Non-Destructive Determination of Arsenic in Urine, 6. Studies of Radioactivity and Heavy Metals in Phosphate Fertilizer, 7. Determination of Heavy Metals in the Rock River (Illinois) Through the Analysis of Sediments, 8. Arsenic, Chromium and Nickel Determination in Human Samples, 9. Low-Level Radioactive Waste Stream Analysis in a Neutron Activation Analysis Laboratory, 10. Heavy Metals in Urban Soils of East St. Louis, and 11. The Determination of Uranium in Food Samples.

Dr. Landsberger has also been involved in sampling of soils for heavy metal contamination. He also has oversight to sophisticated low-level gamma-ray counting for naturally occurring radioactive material and fission product identification. He continually involved in the determination of heavy metals using neutron activation analysis.

ACADEMIC POSITIONS

UNIVERSITY OF TEXAS

Professor and Coordinator of Nuclear and Radiation Engineering Program, 1997- present

Mechanical Engineering, Energy Thrust Coordinator for Clean and Efficient Energy Technologies, 2007-2009

Director Nuclear Engineering Teaching Lab 2002-2007

UNIVERSITY OF ILLINOIS

Assistant Professor - 1987 - 1990

Affiliate Faculty in Institute for Environmental Studies - 1987-1997.

Associate Professor - 1990-1995

Affiliate Faculty in Computer Science - 1991-1995

Director, Neutron Activation Analysis Laboratory - 1993-1995

Sabbatical Leave - 1995 - Environment Canada/Atmospheric Environment Service

Professor - 1995-1997

Director of Research, TRIGA Reactor 1996-1997

PROFESSIONAL EMPLOYMENT

Supervisor, Center for Neutron Activation Analysis, McMaster University,

Hamilton, Canada, 1983-1986

Faculty Appointment, Argonne National Laboratory, Divisions of Educational Programs and Chemical Technology, 1990-1996

PRESTIGIOUS AWARDS

- Physics Postdoctoral Fellow, National Research Council, Ottawa, Canada, 1982-1983.
- Outstanding Undergraduate Advisor Award, Engineering Council Award - 1994
University of Illinois
- Outstanding Undergraduate Advisor Award, Engineering Council Award - 1995
University of Illinois
- Hayden Head Centennial Endowed Professorship, 2005 – present
College of Engineering, University of Texas
- American Society of Engineering Education Glenn Murphy Award
Nuclear and Radiological Division – 2005
- American Nuclear Society, Arthur Holly Compton Award – 2007

MEMBERSHIPS IN PROFESSIONAL SOCIETIES

- American Nuclear Society
- American Chemical Society
- American Society for Engineering Education
- Nuclear Engineering Departmental Heads Organization

PUBLICATIONS (OUT OF 185)

Books Written

Tsoufanidis, N. and S. Landsberger Measurement and Detection of Radiation, Third Edition, Tsoufanidis and Landsberger, CRC Press (2010).

Books Edited

1. Landsberger, S. and M. Creatchman, Editors "Elemental Analysis of Airborne Particles" Gordon and Breach (1999).

RELEVANT ARTICLES IN JOURNALS

1. Desaulniers, G., A. P'an, M. Trudeau, R. Lecomte, S. Landsberger, P. Paradis and S. Monaro, "On the Use of PIXE as Methodology for Measuring Asbestos in River Water," Int. J. of Appl. Rad. and Isotopes, 32, 122-125 (1981).
2. Landsberger, S., R. E. Jervis, R. Lecomte, P. Paradis, and S. Monaro, "Determination of Sulphur in Snow by Proton-Induced X-ray Emission (PIXE) Method," Environ. Pollut. Series B, 3, 215-233 (1982).
3. Landsberger, S., R. E. Jervis, G. Kajrys and S. Monaro, "Characterization of Trace Elemental Pollutants in Urban Snow Using Proton-Induced X-ray Emission and Instrumental Neutron Activation Analysis," Int. J. Environ. Anal. Chem., 16, 91-130 (1983).
4. Abrahams, P. W., M. Tranter, T. D. Davies, I. L. Blackwood, and S. Landsberger, "Trace-Element Studies in a Remote Scottish Upland Catchment," Water, Air and Soil Pollut., 37, 255-271 (1988).
5. Jickells, T. D., T. D. Davies, M. Tranter, S. Landsberger, K. Jarvis and P. Abrahams, "Trace Elements in Snow Samples from the Scottish Highlands: Sources and Dissolved/Particulate Distributions," Atmos. Environ., 26A, 393-401 (1992).
6. Hamamo, H., S. Landsberger, G. Harbottle and S. Panno, "Studies of Radioactivity and Heavy Metals in Phosphate Fertilizer," J. Radioanal. Nucl. Chem., 194, 331-336 (1995).
7. Buchholz, B. A., and S. Landsberger, "Leaching Dynamic Studies of Municipal Solid Waste Incineration Ash," J. Air and Waste Management Association, 45, 579-590 (1995).
8. Chichester, D. L. and S. Landsberger, "Determination of the Leaching Dynamics of Metals from Municipal Solid Waste Incineration Fly Ash Using a Column Test," J. Air and Waste Management Association, 46, 643-649 (1996).
9. Kaminski, M. D. and S. Landsberger, " Heavy Metals in Urban Soils of East St. Louis, Illinois, Part I: Total Concentration of Heavy Metals in Soils", J. Air and Waste Management Association, 60, 1667-1679 (2000).

10. Kaminski, M. D. and S. Landsberger, "Heavy Metals in Urban Soils of East St. Louis, Illinois, Part II: Leaching Characteristics and Modeling", J. Air and Waste Management Association, 60, 1680-1687 (2000).
11. Iskander, F., S. Landsberger and S. D. Warren, "Determination of ¹³⁷Cs in Soil Samples by Low Level Compton Suppression Gamma Counting", J. Radioanal. Nucl. Chem., 244, 159-163 (2000)
12. Basunia, S. and S. Landsberger, "Contents and Leachability of Heavy Metals (Pb,Cu, Sb, Zn, As) at the Pantex Firing Range, Amarillo, Texas", J. Air and Waste Management, 51, 174-185, (2001).
13. Reguigui, N. and S. Landsberger, "Determination of Soil Depth Profiles for ¹³⁷Cs and ²¹⁰Pb Using Gamma Ray Spectrometry with Compton Suppression", J. Radioanal. Nuc. Chem., 264, 469-476_(2005)
14. Panno, S. V., K. C. Hackley, H. H. Wang, S. Greenberg, I. G. Krapac, S. Landsberger and D. J. O'Kelly." Characterization and Identification of Sources of Na-Cl in Ground Water and Surface Water, with Emphasis on Illinois, Ground Water, 44, 176-187 (2006).
15. Kapsimalis, R., S. Landsberger, and N. Reguigui, "Measurement of Uranium in Small Quantities in Phosphates by Use of γ -Ray Spectroscopy and the 1001 keV Peak of ^{234m}Pa . J. Radioanal. Nuc. Chem., 280, 293-298 (2009).
16. Kapsimalis, R., S. Landsberger and Y. A. Ahmed, "The Determination of Uranium in Food Samples by Compton Suppression Epithermal Neutron Activation Analysis", App. Rad. Isotop., 67, 2097-2099 (2009).
17. Landsberger S., G. George, R. Lara, D. Tamalis J. Louis-Jean and K. Dayman, "Analysis Of Naturally Occurring Radioactive Material Using Neutron Activation Analysis and Passive Compton Suppression Gamma-Ray Spectrometry", Nukleonika, in press (2012.)
18. Kapsimalis, R. and S. Landsberger. "Various Neutron Activation Analysis and Passive Gamma-Ray Counting Methods for the Determination of Uranium Concentrations in Geological and Environmental Samples" in press Environmental Radioactivity (2012)
19. Landsberger, S. D. Hearnberger, D. Tamalis, T. Meadows and B. Clanton, "Characterization of a Uranium Contaminated Soil Site", (sent for publication)

RELEVANT CONFERENCE PROCEEDINGS (OUT OF 135)

1. Kapsimalis, R. and S. Landsberger, "Determination of Uranium in Phosphate Samples Using Compton-Suppressed Gamma-Ray Spectroscopy", Trans. ANS, 99, 42-44 (2008).

2. Landsberger, S., R. Kapsimalis, P. Doumerc, A. Malato, "Neutron Activation Analysis and Passive Gamma-Ray Counting for the Determination of Uranium Concentrations in Geological and Environmental Samples" Trans. ANS, 101, 109-110, (2009).
3. Landsberger, S., S. Fitch and K. Dayman, "[An Assay of Uranium Ore with Compton-Suppressed Gamma Spectroscopy](#)", Trans. ANS, 102, 181-182 (2010).

Uranium Study Technical Lead**DAN W. McCARN, CPG****Technical Lead:** Mining and Hydrogeology**Current Employment:** Trinitek Services, Inc.

Capabilities: Minerals, Mining, Petroleum, Hydrogeology, Project Licensing, Risk Assessment, over 30 years experience in the nuclear, environmental, petroleum, minerals and environmental with focus on project management of hydrogeological and water-quality investigations; Numerical Modeling; uranium mine and mill licensing & decommissioning; Performance Assessment of nuclear waste repositories; Pollution prevention; Risk assessment; Superfund.

Senior Geologist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants**Education / Credentials**

Doctoral Candidate (Geology)

❖ Leoben Mining University

B.Sc. Geology

❖ Birmingham-Southern College, Birmingham, Alabama

AIPG Certified Prof. Geologist CPG-10245

European Fed. of Geologists: Title #462

Wyoming Professional Geologist PG-3031

PROFESSIONAL AFFILIATIONS

Member of the Society for Mining, Metallurgy, and Exploration (SME)

PROFESSIONAL SUMMARY

He was overseas for 15 years in Europe, Asia, and Latin America.

Strong focus on uranium project licensing, economic assessment of mining feasibility. Capabilities include geological modeling, basin studies, seismic data analysis, environmental sampling, design of monitoring well systems, geochemistry, mineral chemistry, geostatistics, geophysical log interpretation.

Performs scientific programming with focus on geostatistical, geochemical, hydrological model development. Application languages include Visual Basic (6.0 & VBA), Fortran, C. Linear and non-linear methods of solution (Gauss Elimination, LU Decomposition, Adjunct identity element matrix inversion, Newton-Raphson, quadrature including Gauss Point method, analysis of ill-conditioned systems, and minimization methods.

Background includes significant experience in geostatistics, inorganic geochemistry, hydrogeology and numerical modeling as well as litigative experience as an expert witness.

Modified, debugged & documented mineral-solution equilibria and transport modeling codes (LEHGC and PHRQPITZ) applied to Performance Assessment (PA) of the **Waste Isolation Pilot Plant (WIPP)** transuranic waste repository.

Groundwater / geochemistry experience includes development of inverse groundwater models, coupled groundwater / geochemical models, PHREEQC and PHRQPITZ.

Work includes 3 years in Shell Oil's unconventional resource group focused on oil shale

in the Piceance Basin. My duties involved characterization of the thermally reactive inorganic components of the project as well as inorganic trace metal chemistry.

Additional focus areas are listed below:

- Licensing & environmental analysis of uranium in situ recovery (ISR) uranium mining projects;
- Decommissioning of uranium production facilities;
- RCRA & CERCLA project management, reporting and interface with regulators;
- Environmental Hydrogeology;
- Detailed knowledge of entire nuclear fuel cycle;
- Country assessment of nuclear fuel-cycle capability;
- Interpretation of geophysical logs;
- Analysis of core;
- Basin analysis and development of depositional environments for Alamos Basin, Anadarko Basin, Austrian Molasse Basin, Colorado - New Mexico Jurassic Basins, Delaware Basin, Denver Basin, Great Divide Basin, Kazakhstan Basins, Piceance Basin, Raton Basin, San Juan Basin;
- Well site geology;
- Engineering / Mineral economics;
- Uranium deposit geology;
- Developing ore deposit models focused on hydrogeological setting & depositional systems; geochemical & mineralization controls.

EMPLOYMENT SUMMARY

IPI Consulting (3 / 1995-Present)

Albuquerque, New Mexico

Certified Professional Geologist

- Licensing & environmental analysis of uranium in situ recovery (ISR) uranium mining projects, and decommissioning of uranium production facilities. Environmental Coordinator for Uranium Resources Inc. / Hydro Resources Inc. on the Crownpoint / Church Rock deposit license application Historical water rights issues in the San Juan Basin for Hydro Resources, Inc. (HRI) & Uranium Resources Inc. (URI). Development strategy for Strathmore for ISL uranium mining projects in New Mexico
- IAEA Uranium Geology Technical Committee. Lectures on economic analysis of ISL mining. Invited by Chinese government to review feasibility of newly discovered uranium districts in NW China and Inner Mongolia for ISL mining.
- Economic modeling of ISL mining projects in Kazakhstan (IAEA Projects KAZ/3/003 and RAW/0/007-06) including relational database design for data, ore-reserve estimation & analysis, and development of a computer model (Oracle / Access / VBA / Excel / FORTRAN).

Montanuniversität Leoben (1 / 2003-Present)

Institut für Geowissenschaften; Abt. für Ökosystemanalyse

Peter-Tunner-Strasse 5; A-8700 Leoben, Austria

Doctoral Candidate, Doktor montanistik. Currently completing requirements for Doctorate in Geology at the Leoben Mining University, Austria.

- Natural and anthropogenic multi-pathway risks associated with naturally occurring uranium mineralization in aquifers. Investigation of anthropogenic redistribution of regional redox-controlled, roll-front type deposits via high-volume irrigation pumping. Focus on Health Physics / risk analysis. Stochastic modeling of radiological exposure based on airborne radon releases and GENII. (ACCESS / EXCEL / VBA / FORTRAN).
- Lectures in Visual Basic, Relational Database Design, geostatistics, numerical modeling, geochemistry and natural water chemistry.

AREVA (9/2008-4/2009)

Exploration Manager, Central Asia

- Uranium projects in Kazakhstan focused on enhancing the geological returns from ongoing exploration and development drilling for acid in situ recovery of uranium in Central Kazakhstan.
- Modeled calcite mobilization and redeposition in proximity to roll-front and interaction with acid ISR mining processes.

Shell Oil (9/2005-2/2008)

Consulting Environmental Geologist

Commercial Oil Shale project in NW Colorado

- Focus on geology, inorganic geochemistry, and regulatory issues for Shell. Management of environmental data, sampling protocols and methods including conversion to EQUIS.
- Reclamation team member. Participation in the Technology Strategy group.

Santa Fe College (4/2004-9/2005)

Adjunct Professor of Computer Science

- Taught course in Visual Basic and physics, lecturing in environmental chemistry, database design, and other topics in computer science, mathematical programming & numerical analysis.

Tactical Staffing Resources, LLC (1/1998-8/1998)

Albuquerque, NM

Hydrologist Under Contract to Sandia National Laboratories

- Staff augmentation contract to modify, debug & document mineral-solution equilibria and transport modeling codes (LEHGC and PHRQPITZ) applied to Performance Assessment (PA) of the **Waste Isolation Pilot Plant (WIPP)** transuranic waste repository.

The LEHGC (Lagrangian-Eulerian HydroGeoChemistry) code is a coupled finite-element groundwater code allowing geochemical models of advection and diffusion to be developed. PHRQPITZ, a chemical equilibria code using a Pitzer correction for brine environments, was modified, and documented along with the preparation of QA/QC documentation.

INTERA, Inc. (11/1992-3/1995)

Albuquerque, NM

Senior Staff Consultant

- As a member of the **WIPP PA Group**, developed geostatistical elements for inverse groundwater modeling (GRASPINV). This code employed a synthetic “pilot point” technique to calibrate transient heads with transmissivities. Applied methods to the groundwater modeling of the Culebra dolomite.
- Support for the U.S. Department of Defense, Defense Nuclear Agency (DNA) collateral effects database of nuclear fuel cycle facilities. Provided coordination between the DNA and the IAEA for exchange of information.

P.E. LaMoreaux and Assoc. (1/1991-11/1992)

Tuscaloosa, Alabama

Project Manager

- Project management of Phase I and II environmental hydrogeological site assessments for large industrial clients (Chrysler) and negotiation with regulators.
- Support for litigations including the collection, preparation, and presentation of evidence for hydrogeological and environmental issues as well as reviewing opposition depositions, preparing lawyers for direct and indirect examination of witnesses, and preparing other expert witnesses for testimony. Gave legal depositions and courtroom testimony.

TECHNICAL RECOGNITION AND ACCOMPLISHMENTS

- 2002 Certificate of Appreciation from TVI Community College for volunteer service.
- New Mexico “Green Zia” Environmental Excellence Advisory Council & Pollution Prevention
- Environmental Program Advisory Board, TVI Community College

SELECTED PUBLICATIONS AND PRESENTATIONS

1. McCarn, Dan W. (2005): Natural Attenuation processes in Cenomanian sediments following acid in situ leach mining of uranium, Stráž pod Ralskem, Northern Bohemia, Czech Republic,

IAEA-TECDOC-1425, 15-18 June 1999.

2. McCarn, Dan W. (2004): Scoping Calculations: Natural and anthropogenic multi-pathway risks associated with naturally occurring uranium mineralization in aquifers; IAEA-TECDOC-1396, pp.289-315.
3. Pelizza, Mark and McCarn, Dan W., (2004): Licensing of In Situ Leach Recovery Operations for the Crownpoint and Church Rock Uranium Deposits, New Mexico: A Case Study, IAEA-TECDOC-1396, pp. 153-173.
4. McCarn, D.W., (2001): The Crownpoint and Churchrock Uranium Deposits, San Juan Basin, New Mexico: An ISL Mining Perspective, IAEA TECDOC 1258, pp. 171-183, Dec. 2001.
5. McCarn, Dan W. (2000): Scalable Economic Analysis of ISL Mineable Ore Deposits, Poster Session, Moscow Conference on Uranium Production, Supply, & Demand, All-Russian Institute for Mineral Resources, December 2000.
6. Dan W. McCarn, Ermek A. Akhmetov, Alexander V. Belykh, Victor P. Zhelnov, Vladimir A. Barmasov, Alexander F. Vershkov, & Pavlin G. Kayukov (1999) Part 1: Executive Summary and Mission Overview, Management of Uranium Reserves: Creation of Computer System for Management of Uranium Reserves in Kazakhstan, IAEA Expert Mission KAZ/3/003, 3-22 July 1999, Almaty, Kazakhstan, International Atomic Energy Agency. (Plus 4 other report sections).
7. DOE/SNF/REP-0033 Rev 0, (1998): Nuclear Dynamics, Consequence Analysis (NDCA) for the Disposal of Spent Nuclear Fuel in an Underground Geologic Repository (Chapter 7, Volume 2 – Summary of Results, Page 7-2) – Contributing Author.
8. McCarn, Dan W. (1998): LEHGC 1.2 Modifications and Sample Problems, Sandia National Laboratories Internal Report, July 5, 1998.
9. McCarn, Dan W. (1998): Brine Mixing Scoping Calculations for the E1 Brine Intrusion Scenario in the Culebra Dolomite, Appendix 1, Waste Isolation Pilot Plant (WIPP), WBS1.1.10.3.5, Effective Date: June 22, 1998.
10. McCarn, Dan W. (1997): Evaluation of proposed strategies for mill tailings wastewater disposal at Stráž, Northeast Bohemia, and Rožná, Southern Moravia, DIAMO Uranium Production Facilities, Czech Republic: Final Report of Mission for the International Atomic Energy Agency, Technical Cooperation Project CZR/3/002-01, September 26 - October 6, 1997, IPI Consulting, Albuquerque, New Mexico, October 24, 1997, (Confidential).
11. McCarn, D., Dubovik, L., Iakoushev, A., and Grebenkov, A. (1996): The Ecological-Commerce (ECO-COM) Zone Concept for Developing Biomass Energy from Contaminated Resources: A New Demonstration Zone for the Republic of Belarus, in International Topical Meeting on Nuclear and Hazardous Waste Management, Seattle, Washington, August 18-23, 1996, pp. 1417-1424.
12. Grebenkov, A. and McCarn, D.W. (1996): The US-Belarus Joint Projects Associated with Remediation of the Chernobyl Contaminated Sites, Environmental Opportunities in Central and Eastern Europe and the Newly Independent States, in Partnerships for Solutions Forum, Colorado School of Mines, Golden, Colorado, p. 19-35.
13. McCarn, D.W. (1994): Current Trends in the Uranium Market: The Issue of Uncommitted Demand, Presentation to the Waste-Management Education & Research Consortium, Las Cruces, New Mexico, Advisory Group Meeting, November 10-11, 1994.

14. LaVenue, M. and McCarn, D.W. (1993): Analysis of 1992 Conditionally Simulated Culebra Transmissivity Fields, Report to the WIPP Geostatistics Committee (GXG) on March 23, 1993 by INTERA, Inc.
15. McCarn, D.W. and Carr, J.R. (1992): Influence of Numerical Precision and Equation Solution Algorithm on Computation of Kriging Weights, Computers & Geosciences, V. 18, No. 9, pp.1127-1167.
16. McCarn, D.W. (1992): IAEA Technical Cooperation Project MEX/9/035-2: Nuclear Waste Management: Permanent Repository for Low- and Intermediate-Level Waste, Report of Mission Laguna Verde (Veracruz) and Mexico City, October 5-17, 1992. Contracted through P.E. LaMoreaux and Associates. Report approved and transmitted to Mexico in 1993.
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18. McCarn, D.W. (1989): The River of Lost Souls, in Western Horse: Zucht, Haltung, Westernreiten, Heft 11, November 1989, Ute Kierdorf Verlag, 5272 Wippenfuerth, FRG, p. 12-26. (An article published in a German riding magazine about personal experiences mapping geology and punching cows around the beautiful Purgatoire River canyon, southeastern Colorado.)
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20. McCarn, D.W. (1989): Modification and Updating the RAPP3C Computer Program (Resource and Production Projection), Consultant's Report, 6-10 November, 1989, IAEA Internal Report, International Atomic Energy Agency, Vienna, Austria.
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22. DeVergie, P. and McCarn, D. (1988): User's guide for the uranium ore reserve calculation system (URAD), IAEA-TECDOC-484, Vienna.
23. McCarn, D. (Editor) (1988): Geological Data Integration Techniques, Proceedings of an IAEA Technical Committee, IAEA-TECDOC-472, Vienna.
24. Ajuria, S. and McCarn, D. (1988): The Nuclear Fuel Cycle Information System: A Directory of Nuclear Fuel Cycle Facilities, STI/PUB/794, IAEA, Vienna, 144 p.
25. McCarn, D.W. et al (1988): INTURGEO: The International Uranium Geology Information System – A World Atlas of Uranium Occurrences and Deposits, IAEA-TECDOC-471, Vienna, 493 p.
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27. McCarn, D. and Mueller-Kahle, E. (1986): Long-Term Uranium Supply-Demand Analysis, IAEA-TECDOC-395, 91 p., Vienna.
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Estimates 1983, Internal Report, International Atomic Energy Agency, Vienna, November 1984.

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32. McCarn, D.W. and Freeman, R.W. (1976): Chemical Analyses of Ground and Surface Water Samples from Parts of the United States 1956-1975, U.S. Energy Research and Development Administration, GJBX-51 (75), 541p. Grand Junction, Colorado.

Uranium Study SME

SME: Agreement States / NRC regulations

Current Employment: Trinitex Services, Inc

Capabilities: Agreement State Regulations, NRC, Disposal facility licensing and regulatory issues, IAEA consultant, senior positions with NRC, other regulatory agencies.

Pearce O'Kelley

Uranium Regulations consultant: Trinitex Services, Inc, Nuclear & Environmental Safety Consultants

Education / Credentials

M. S. Public Health

❖ U of South Carolina

B. S. Biology/Chemistry,

❖ U of South Carolina

Training and Certifications:

Extensive additional, see below

Continuing Education

- *Health Physics and Radiation Protection, 200 hours- Oak Ridge Associated Universities*
- *Medical Uses of Radionuclides, 40 hours - Oak Ridge Associated Universities*
- *Inspection Procedures, 40 hours - U.S. Nuclear Regulatory Commission*
- *Security Systems and Principles, Sandia National Labs, 80 hours*
- *Licensing Practices and Procedures, 40 hours - U.S. Nuclear Regulatory Commission*
- *Irradiator Radiation Safety Workshop, 25 hours - U.S. Nuclear Regulatory Commission*
- *Incineration of Low Level and Mixed Wastes: 1986 Conference - 24 hours*
- *Radiation Protection Engineering, 40 hours - Oak Ridge Associated Universities*
- *Industrial Radiography, 40 hours - U.S. Nuclear Regulatory Commission*
- *Uranium Hexafluoride - Safe Handling, Processing, Transport-24 hours-Martin Marietta*
- *Introduction to Radiological Emergency Preparedness Exercise Evaluation, IS-331, Federal Emergency Management Agency, November 2007*
- *Radiological Emergency Preparedness Program Exercise and Evaluation Methodology, E-304, December 2007*
- *Radiological Emergency Preparedness Planning, E-340, Federal Emergency Management Agency, August 2008*
- *Radiological Emergency Response Operations (RERO), Federal Emergency Management Agency, Las Vegas, May 1987*
- *National Incident Management System (NIMS), IS-700, Federal Emergency Management Agency, August 2005*
- *Introduction to the Incident Command System, IS-100, Federal Emergency Management Agency, June 2007*
- *ICS for Single Resources and Initial Action Incidents, IS-200, Federal Emergency Management Agency, June 2007*
- *National Response Plan (NRP), An Introduction, IS-800, Federal Emergency Management Agency, June 2007*
- *Incident Command System for Expanding Incidents, IS-300, Federal Emergency Management Agency, July 2007*
- *Mitigation Course for Radiological Transportation Emergencies, US Dept. of Energy, October 1989*
- *Introduction to Supervision*
- *Elements of Leadership-Management Development Program*
- *Kepner-Tregoe Problem Solving-Decision Making*
- *Participatory Management, Employee Performance Management System*
- *Fourth Generation Management*
- *Cultural Competence*

- *Change Management*
- *Train the Trainer*
- *Coaching the Team*

Employment Experience

9/06 – 1/09 South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, Columbia, South Carolina. Position: Program Manager II

Management consultant responsible for radiation regulation development and revision, Emergency response planning and review

09/98 – 9/06 South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, Columbia, South Carolina. Position: Bureau Chief

Manage, direct, administer, and supervise the activities and personnel of the Bureau of Radiological Health. The Bureau is responsible for the protection of the public from the adverse effects of ionizing and non-ionizing radiation through a comprehensive regulatory program which includes the activities of licensing, registration, inspections, enforcement, emergency response, fee collection, and regulation development. Responsible for budget, program management and development, planning, quality control, and personnel actions of the Bureau. Consult with Federal officials and national organizations to set and develop radiation protection standards nationwide. Respond to emergencies involving sources of radiation. Participate in all roles of fixed nuclear facility radiological emergency response.

10/88 - 1998 South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, Columbia, South Carolina. Position: Director of the Division of Electronic Products.

Direct and supervise division responsible for registration and inspection of facilities utilizing sources of electronically produced ionizing radiation and nonionizing radiation. Activities of the division also include review of architectural shielding plans, certification of x-ray operators, nonionizing radiation evaluations, emergency response, and survey instrument calibrations. Responsible for supervision, administration, budget, program management and development planning, quality control, and personnel actions of the division. Responsible for development and implementation of regulations pertaining to the safe usage of radiation. Serve as duty officer on the Emergency Radiological Assistance Team. Participate in all roles of fixed nuclear facility radiological emergency response.

*12/85 - 10/88 South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, Columbia, South Carolina. Position: Health Physicist III
Section Leader of the Radioactive Waste, Compliance and Engineering Section.*

Responsible for the licensing and compliance activities of the Barnwell Low-Level Radioactive Waste Disposal Facility, including inspection, environmental surveillance, health physics, burial operations, trench construction, and quality control. Manage high integrity container and solidification media certification programs; prior notification and waste shipment programs, and waste tracking, allocation, and surcharge programs. Responsible for development and maintenance of computer programs for support of above listed programs. Responsible for licensing and compliance inspections of major licensees involving complex uses of radioactive materials. Serve as duty officer on the Emergency Radiological Assistance Team. Participate in all roles of fixed nuclear facility radiological emergency response. Respond to any emergency situation involving radioactive material in the state of South Carolina. Supervise 5 persons including Engineers, Health Physicists, and Secretaries.

2/84 - 12/85 *South Carolina Department of Health and Environmental Control, Bureau of Radiological Health, Columbia, South Carolina. Position: Health Physicist*
Responsible for licensing radioactive material users in the state of South Carolina. Conduct routine and investigational inspections of facilities using radioactive materials. Respond to any emergency situation involving radioactive material in the state of South Carolina. Participate in all roles of fixed nuclear facility radiological emergency response. Assist licensees in areas of problem solving and health physics

2/78 - 1/84 *South Carolina Department of Health and Environmental Control. Richland County Health Department, Columbia, South Carolina Position: Environmentalist*

Responsible for environmental sanitation inspections, routine and requested, day care facilities, foster homes, motels, hotels, residential care facilities, and school premises in Richland County as well as the supervisory and administrative duties which accompany these programs. Responsible for environmental sanitation inspections of individual waste disposal systems, water supplies and related programs in Richland County, including preliminary site work and final disposition. Assist in subdivision development programs for Richland County. Radiological Defense Officer for Richland County Health Department. Responsible for Asbestos Detection and Abatement Programs in Richland County.

PROFESSIONAL MEMBERSHIPS

- *Organization of Agreement States (OAS)*
- *Health Physics Society (HPS)*
- *Conference of Radiation Control Program Directors (CRCPD)*
- *South Carolina Public Health Association*

OFFICES HELD

OAS Executive Board 2001-2004

OAS Chair 2002-2003

CRCPD – Executive Board 2005-2008

CRCPD – Chair 2006-2007

HPS – Treasurer – Government Section 2005-2006

As Chair of two national state radiological regulatory associations, the Conference of Radiation Control Program Directors (CRCPD) and the Organization of Agreement States (OAS), I was frequently involved with several federal agencies (US Nuclear Regulatory Commission (NRC), Department of Homeland Security (DHS), FEMA, Department of Energy (DOE), Department of State, Environmental Protection Agency (EPA) and others) in helping set policy and standards in the areas radioactive materials regulation and security, radiation protection, and response to Radiological Dispersal Devices. Participated on DHS' Domestic Nuclear Detection Office's Surge Committee, NRC's Chairman's Radiation Source Protection and Security Task Force, and NRC's Radioactive Source Security Steering committee. Served as chair of CRCPD's Homeland Security/Emergency Response Council. During tenure at CRCPD, oversaw development of First Responder's Guide and Handbook for Responding to a Radiological Dispersal Device Incident along with development of RDD exercise scenarios. Served on the International Atomic Energy Agency's (IAEA) Raissa Team that evaluates radiation

AWARDS/APPOINTMENTS

- *Organization of Agreement States Hall of Fame Award*
- *Fellow – Health Physics Society*
- *Michael D. Jarrett Customer Service Award (for Division)*

- Agency facilitator for Kepner-Tregoe Process

COMMITTEES/WORKING GROUPS/TEAMS

INTERNATIONAL:

Served on International Atomic Energy Agency Raissa Evaluation Team responsible for evaluating member country's radiation control program and making recommendations for improvement. 2005- Present

NATIONAL:

- Conference of Radiation Control Program Directors Liaison to the National Health Physics Society 1995-1998
- Conference of Radiation Control Program Directors
- Homeland Security/Emergency Response Emerging Issues Committee, Chair, 2006-present
- Conference of Radiation Control Program Directors
- International Relations Committee, 2005-present
- Conference of Radiation Control Program Directors
- E-37 Committee, Naval Nuclear Propulsion, 1999-Present.
- Conference of Radiation Control Program Directors
- S-6 Ad Hoc Committee on Reorganization of Executive Director's Office. Advisor 2000
- Organization of Agreement States
- Annual Meeting Planning Committee, 1999-2000.
- U.S. Nuclear Regulatory Commission's
- Management Review Board for Integrated Materials Performance Evaluation Program, 1998-Present.
- US Nuclear Regulatory Commission's
- Material Security Steering Committee- Co-Chair 2002-2007
- US NRC Chairman's Radiation Source Protection and Security Task Force 2005-present
- US NRC Chairman's Radiation Source Protection and Security Task Force, Public Education Subgroup 2006-present
- US NRC Management Directive 5.3 Revision Working Group 2005-2007
- US Nuclear Regulatory Commission's
- Decommission Guidance Review Committee, 2002
- US Dept. of Homeland Security
- Domestic Nuclear Detection Office
- Surge Committee, 2005-2007
- Health Physics Society Rules and Legislation Committee of the National 1995-2002
- Health Physics Society Human Capital Crisis Committee 2001-2002

STATE:

- Certification of X-Ray Operators Compromise Committee 1997-1999.
- South Carolina Radiation Quality Standards Association Ex-Officio member 1999-2004.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL:

DHEC Mentoring Program Development Committee

- DHEC (Health Services) Continuous Quality Improvement Committee
- DHEC (EQC) Employee of the Month Guideline Development Committee
- DHEC (Health Services) Strategic Planning Group
- DHEC Christmas Party Committee 1988-1997
- S.C. Public Health Association Entertainment Committee
- S.C. Public Health Association Resolutions Committee.

Uranium Study Technical Lead

SME: uranium operations and environmental compliance: Radiochemistry

Current Employment: AVM Environmental Services, Inc.

Capabilities: Mr. Natver Patel has 35 years of experience in the industry with over 25 years of experience in radiological and environmental remediation and regulatory compliance. He was an U.S. Nuclear Regulatory Commission (USNRC) and New Mexico Environment Department (NMED) approved Radiation Safety Officer for the Bluewater Uranium Mill Site responsible for licensing activities, radiation protection and environmental compliance from 1987 to 1998 when the Bluewater Mill Site license was successfully terminated. He has managed the Environment and Radiation Protection Program at the Bluewater Uranium Mill Site project. The project included a 6000 tpd uranium mill decommissioning, 24 million ton tailings remediation, and groundwater remediation.

Natver M Patel

Uranium Regulations consultant: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants

Education / Credentials

M. S. in Chemistry,

❖ New Mexico Tech, Socorro, NM

B. S. in Chemistry, 1971,

❖ Gujarat University, India

Training and Certifications:

360 hours of training in radiation protection, radiation detection and measurements and environmental surveillance; Groundwater hydrology; Management and supervisor training; 40 hr. and annual 8 hr. refresher HAZWOPER training; 8 hr. HAZWOPER supervisor training; 40hr. Hazardous Chemical Safety.

Background Summary:

He has considerable experience in environmental remediation, including management and supervision of radiological and environmental staff, regulatory and environmental compliance, contamination characterization, radiological source term studies and remedial design, contamination cleanup and remedial activities; verification of contamination cleanup; groundwater corrective actions and monitoring; management of process and quality control laboratory.

Mr. Patel also designed and performed radiological characterization, assessment, remedial support surveys, post remediation status surveys in accordance with MARSSIM at various uranium mine sites. Mr. Patel has performed environmental services consisting of characterization, assessment and investigation for over 15 projects for U. S. Army Corps of Engineers Albuquerque District. Mr. Patel has significant experience in interacting and negotiating with regulatory agencies. USEPA approved Project Manager at a Superfund site. He has also managed and performed Remedial Investigation (RI), Feasibility Study (FS), Remedial Design (RD), and Remedial Action (RA) work at superfund sites. The work included characterization and remediation of surface soils, NAPL in the subsurface formation, and groundwater contamination.

Professional Experience:

Uranium Mill Decommissioning, Tailings Remediation and Mine Contamination Characterization:

Developed and implemented environmental and radiation protection programs and procedures in compliance with USNRC, USEPA, and New Mexico State regulations, USNRC Material License requirements, and Bluewater Mill decommissioning and tailings reclamation plans. Maintained these programs in full compliance without any violations or deficiency throughout the entire life of the Bluewater Uranium Mill Site Project.

Developed environmental and radiological aspects of the decommissioning and reclamation plan for Bluewater Uranium Mill Site addressing decommissioning of 6000 tpd mill and reclamation of tailings piles consisting of over 24 million tons.

Supervised radiological and environmental staff, consultants and contractors performing Site occupational health physics, radiological, and environmental monitoring; and mill decommissioning and tailings remedial activities at the Bluewater Uranium Mill Site.

Conducted revision to various remedial designs, including radon barrier thickness design using site specific calibration of USNRC approved computer code which reduced barrier thickness while complying with USNRC's emission standard and resulting in significant remedial cost reduction.

Conducted radiological source term and contamination characterization studies of tailings piles, over 300 acre evaporation ponds area, and over 700 acres of tailings contaminated area at the Bluewater Mill Site.

Developed and implemented excavation control program for cleanup of over 1100 acres of windblown tailings and evaporation ponds residue contaminated areas up to several feet deep at the Bluewater Uranium Mill Site. The excavation control included real time field gamma radiation level measurements and quick sampling and analysis techniques to facilitate continuous excavation for a cost effective remediation.

Developed and implemented cleanup verification program consisting of about 8,000 on site soil sample analysis and over 25,000 radiation level measurements to demonstrate compliance with cleanup criteria for all excavated areas. Developed site specific correlation studies for gamma radiation levels to soil Ra-226 concentrations for soil clean up verification. The USNRC permitted determination of action levels using correlation and gamma radiation measurements to demonstrate compliance with the clean up criteria.

Supervised the design and licensing of an onsite disposal cell at the ARCO's Bluewater Mill. This disposal cell was constructed adjacent to the existing tailings pile for disposal of 11(e)(2), byproduct material which was contaminated with PCBs.

Performed radiological characterization consistent with approach and guidance provided in MARSSIM at United Nuclear Corporation's Northeast Church Rock Mine (NECR) Site for Removal Site Evaluation under CERCLA of the areas contaminated with uranium ore during 2006 to 2011. The characterization for RSE at the NECR included direct scan and static gamma radiation surveys using 2x2 NaI scintillators coupled with scaler/ratemeters and DGPS, field subsurface soil screening using 3X3 NaI Scintillator and SCA for vertical extent of contamination characterization,

exposure rate measurements, site-specific correlation of direct gamma radiation levels to Ra-226 soil concentrations, and soil sampling. Also designed and performed excavation control surveys to direct removal of contaminated soils during remediation of land areas at NECR Mine Site in 2009 and 2011. Conducted cleanup verification surveys in accordance with MARSSIM for cleanup status at the NECR during 2009-2011.

Developed plans and procedures, and performed radiological characterization, cleanup excavation control and verification surveys at United Nuclear Corporation's Section 27 Uranium Mine Site near Ambrosia Lake during 2010 and 2011. Performed occupational health physics monitoring during cleanup activities during 2010. Performed RESRAD modeling to determine radiation dose and risk levels for various land use and cleanup scenarios.

Developed plans and procedures, and performed radiological characterization and assessment consistent with MARSSIM for remedial design at San Mateo Uranium Mine Site during 2011-2012. The Mine Site is being remediation as required by USFS using CERCLA process using MARSSIM approach.

Regulatory Negotiations, Permitting and Compliance.

Conducted environmental and radiological permitting, licensing, approval, and compliance activities with the USNRC, USEPA, and NMED for the Bluewater Uranium Mill Site project. Currently, conducting license termination activities and negotiations for Bluewater Mill Site with USNRC, DOE, and NMED. Managed and negotiated all CERCLA activities with USEPA, state, and regulatory oversight contractors for the Prewitt Refinery Superfund Site.

Prepared and submitted various environmental and remedial action completion reports; including mill decommissioning report, reclamation completion report, windblown cleanup reports, environmental monitoring and effluent data reports, New Mexico groundwater discharge plan reports, superfund progress reports, and USEPA's NESHAPs compliance reports.

Developed various successful petitions to USNRC for exemption from cleanup criteria for contaminated soil areas, modification to the decommissioning and reclamation plans, and alternate procedures based on risk assessment and cost and benefit analysis which resulted in significant remedial cost savings at the Bluewater Uranium Mill Site.

Conducted waste management and disposal permitting with USEPA, USNRC, and NMED, including successful permitting and on-site disposal of mixed waste [11(e)(2) uranium byproduct material containing PCBs].

Coordinated development of Long Term Surveillance Plan (LTSP) for the Bluewater Mill Site with DOE and its contractor personnel. Successful coordination and negotiations for all radiological and groundwater requirements with USNRC, USEPA and NMED for termination of USNRC's Bluewater Mill license.

Environmental Projects for Government

Retained sediment characterization at Galisteo Reservoir for USACE Albuquerque District to determine any impact from historical mining activities upstream of the reservoir.

Investigation of the surface water and lake-bottom sediments at Cochiti Lake was performed for USACE Albuquerque District to determine baseline radionuclide concentrations. The Cerro Grande fire burned in and around the LANL area in May – June 2000. The resulting burn area is unstable and can easily erode. This has caused concern regarding storm runoff and deposit of sediment and possible contaminants in the Cochiti Lake. The USACE expected that the Cochiti Lake will be impacted by runoff from the LANL area.

Monitoring of release water from the Santa Rosa Reservoir to determine any impact of the reservoir drawdown on the released water quality for USACE Albuquerque District.

Investigation of mercury contamination at 17 stream gaging stations near dams in New Mexico and Colorado for USACE Albuquerque District.

Performed surface and subsurface soil sampling and investigation for USACE Albuquerque District to assess the nature and extent of surface soil contamination related to railroad and other historical activities at the Santa Fe Rail Yard Property in Santa Fe, New Mexico. The sampling was performed to provide the first level screening of potentially contaminated areas and contaminants on-site.

Various environmental tasks for both operable units at Cimarron Mining Company Superfund Site in Carrizozo, New Mexico, including ground water monitoring, modification and operation of ground water remedy, prepared various plans and ground water monitoring operation and compliance reports, including performance assessment reports, five-year review reports, and close out reports for USACE Albuquerque District and USEPA.

Prepared Proposed Plan and Record of Decision for OU-2 at Brown and Bryant Superfund Site in Arvin, California for USEPA Region 9 under contract with USACE Albuquerque District. Also prepared a Remedial Action Completion Report consistent with the "Close Out Procedures for National Priorities List Sites" OSWER Directive 9320.2-09A-P, January 2000.

Sampling and characterizations at various FAA sites in New Mexico for PCBs contamination for USACE Albuquerque District.

Superfund Activities

Conducting Operation and Maintenance (O&M) of NAPL extraction system and groundwater remediation, which includes groundwater pump and treat, nutrient injection for enhanced in situ bioremediation, and containment system at the Prewitt Superfund site. The O&M includes performance monitoring and system modifications, routine operation and maintenance and troubleshooting, groundwater monitoring, remediation progress evaluation and groundwater containment evaluation, reporting to agencies, and project oversight.

Managed RI/FS activities for Prewitt Superfund Site consisting of surface soils contamination, NAPL in subsurface formations, and groundwater contamination.

Directed development and implementation of RI work plans and Feasibility Study reports.

Directed contamination characterization studies, treatability studies, and NAPL extraction pilot program at the Prewitt Superfund Site.

Managed remedial design activities for surface soils cleanup involving excavation, treatment, off site disposal, and on site treatment by land farming; NAPL extraction; and groundwater contamination containment and remediation.

Supervised remedial action construction activities including; lead, asbestos, and hydrocarbon contaminated soil remediation; well abandonment; and NAPL extraction and groundwater containment system construction.

Engineered RFPs, managed the contracting process, and developed scope of work for characterization, design, and remedial action activities. Negotiated cost and work requirements with the contractors.

Groundwater Corrective Actions and ACLs

Managed groundwater protection program at the Bluewater Mill Site. Engineered and implemented groundwater detection and compliance monitoring programs. Implemented and managed groundwater corrective action programs. Directed development of groundwater ACLs petition for the Bluewater Mill Site. Performed negotiations and responses to USNRC, NMED and DOE's issues and comments during regulatory review and approval process. This was the first ACLs petition developed consistent with the regulatory technical requirements, which was approved by the USNRC.

Engineered and developed the New Mexico Discharge Plan termination petition for the Bluewater Mill Site. Performed negotiations and responses to the NMED and DOE's issues and comments during regulatory review and approval process. The discharge plan for the site was terminated by the State of New Mexico.

Performed groundwater data review and ACLs feasibility report for Quivira Mining Company's Ambrosia Lake Facility. Performed groundwater CAP evaluation, and prepared groundwater ACLs petition. The ACLs petition work included groundwater CAP assessment, determination of extent of groundwater contamination, groundwater fate and transport, human health and the environment hazard and risk assessment from radiological and non radiological contaminants, ALARA analysis, and groundwater corrective action alternative evaluation.

Environmental Monitoring, Laboratory Management, and QA/QC

Developed and implemented environmental monitoring program for groundwater, air, soil and vegetation as required by USNRC, USEPA, and State of New Mexico.

Managed quality and process control laboratory during operation of the Bluewater Uranium Mill Site.

Performed sampling and chemical and radiological analyses for operations and environmental monitoring.

Developed various job specific analytical methods for chemical and radiological parameters, including Gas Chromatography for BTEX and organic mill reagent analysis.

Uranium Study SME	Noel Savignac, Ph.D.
SME: Uranium, health physics, and environment Current Employment: Trinitek Services, Inc Capabilities: more than 20 years experience as a consultant in radiation protection, radiation dose modeling, policy statements, procedure manuals, technical investigations, training programs, and audits, manager of environmental services for a uranium mining and milling firm, a health physicist at a nuclear power plant, and a university radiation safety officer and instructor.	Senior Health Physicist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials Ph.D. Health Physics ❖ Colorado State University M.S., Health Physics ❖ Colorado State University M.S., Physiology ❖ University of New Mexico B.S. Biology ❖ Wake Forest College

PROFESSIONAL EXPERIENCE in radiation protection includes:

Uranium Project Experience

1) New Mexico Operations:

- Conoco Oil Company, Crown Point, NM - Radiological assessment of a proposed uranium mill site.
- Homestake Mining Company, Grants, NM - Radiological and environmental monitoring procedures for mill decommissioning, radiological assessment for the uranium mill license renewal, radiological evaluations of mill operations using the MILDOS computer code, radiation protection annual retraining, and mill audits.
- Mobil Oil Company, Crown Point, NM - MILDOS computer evaluation of radiological impacts of an in-situ uranium extraction facility, and a quality control evaluation of a laboratory that processes radiological samples.
- Sohio, Laguna, NM – Assessment of residual contamination after mill decommissioning, Radiation Safety Officer, and radiation protection annual retraining, and site audits.
- United Nuclear Corporation, Gallup, NM - Church Rock Mill license application, hiring and training of radiation and environmental protection staff, mining plans for Dalton Pass Mine and Canyon Mines, radiation protection annual retraining, and mill audits.

2) Colorado Operations:

- Energy Fuels Resources, Denver, CO – Testimony at public hearings, radiological exposures pathways assessment, radiological and environmental procedures for uranium mills.
- Power Tech, Denver, CO – radiological and environmental procedures for an in-situ uranium extraction facility.
- Cotter Corporation, Cañon City, CO – Testimony at public hearings, audits of the radiation protection program, respirator protection procedures, bioassay procedures, and responses to notice of violations.

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- Homestake Mining Company, Gunnison, CO - Environmental baseline monitoring program for the proposed Pitch Uranium Mill, participation in the Colorado Department of Health public hearings on the project.
 - Umetco, Craig, CO - Audit of the radiological and environmental monitoring programs, and radiation and environmental monitoring procedures.
 - Umetco, Uravan, CO - Radiological assessments for the Uravan and Spring Creek Mesa tailings disposal facility license applications, participation in public hearings on both applications, audits of the radiological and environmental monitoring programs, and radiation and environmental monitoring procedures.
 - Umetco, Grand Junction, CO - Radiation protection annual retraining.

3) Texas Operations

- Energy Minerals Corporation, La Palangana Project, TX – MILDOS assessment of the radiological dose from uranium in-situ leach operations.
- Cogema, Bruni, TX - Audits of the radiological and environmental monitoring programs.

4) Wyoming Operations

- Federal American Partners, Riverton, WY - Radiological and environmental monitoring programs for the uranium mill, license amendments, and license amendments.
- Pathfinder Mining Company, Riverton, WY - Radiological and environmental audits, and a Ra-226 exposure assessment.
- Cameco (Power Resources, Inc.), Casper, Cheyenne, WY – MILDOS assessments of radiation doses from four uranium in-situ leaching operations.
- Umetco, Riverton, WY - Audits of radiological and environmental monitoring programs, and radiation and environmental monitoring procedures.
- United Nuclear Corporation, Casper, WY - Radiological and environmental assessment for the proposed Morton Ranch Uranium Mill application.

5) Utah Operations:

- Atlas Minerals Corporation, Moab, UT - Radiological assessment for mill license renewal, radiological and environmental audits, and radiological and environmental monitoring procedures.
- Energy Fuels Nuclear, Inc., Blanding, UT - Radiological and environmental audits.
- Plateau Resources Limited, Ticaboo, UT - Mill license renewal and several license amendments, radiological and environmental monitoring procedures, mill and tailings decommissioning and reclamation plans, groundwater monitoring program, Radiation Safety Officer, and mill audits.
- Rio Algom Corp., Moab, UT - Uranium mill license application and license amendments, radiological and environmental audits, radiological and environmental monitoring procedures, and groundwater flow patterns.

6) Virginia Operations

- Marline Uranium Corporation, Danville, VA - Surface water impacts and radiological impacts for the proposed Swanson Uranium Mill. Participated in public hearings on mill license application.

7) USA

- American Mining Congress – Past Chairman of the Uranium Environmental Subcommittee.
- National Commission of Radiological Protection and Measurements (NCRP) - "Effluent Monitoring and Environmental Surveillance in the Mineral Extraction Industry" (NCRP Report 118).

Environmental and Radiological Compliance

- Assessments of the radiation doses and risks to the public from airborne emissions and radiation generating machines for compliance with the National Environmental Policy Act.
- Assessments of the Los Alamos National Laboratories' performance objectives and their occupational and environmental radiation protection programs for compliance with DOE Orders.
- Radiological protection program (835) implementation plan, technical basis documents, and a site specific RadCon Manual for the Lovelace Respiratory Research Institute (LRRI)
- Environmental monitoring plan for LRRI.
- Application to ship low-level radioactive waste to the DOE Nevada Test Site.
- Sandia National Laboratory compliance with environmental, safety, and health regulations in preparation for DOE "Tiger Team" audits.
- Evaluations of alpha-track detectors for the measurement of radon in compliance with the EPA National Emission Standards for Hazardous Air Pollutants (NESHAPS) regulations.
- Radiological doses from airborne emissions for compliance with the NESHAPS regulations.
- Policy statements, program designs, technical specifications, program documents, action plans and operational procedures in applied health physics and environmental monitoring.
- Peer review panel assessments for the DOE Uranium Mill Tailings Remedial Action Project to assess radiological measurement procedures and compliance with regulations.
- Audits of the radiation and environmental protection programs at uranium mills, and uranium liquid extraction facilities.
- Assessments of the Department of Transportation shipping regulations and the EPA "Reportable Quantities" regulations for transport of radioactive materials.
- Leak tests of nuclear level gauges using a procedure that tests hundreds of sources in ~25% of the time required for leak tests using classical methods.

Hazard Assessments

- Environmental exposures from mercury released to a creek flowing through Oak Ridge, TN.
- Environmental documentation on high-level nuclear waste repositories as part of a Peer Review Panel.
- Remedial radiological actions required at the Fernald Feed Materials Production Center.
- Radiological doses from a leaking radium source and safe storage of the source for disposal.
- Radiological doses from uranium during asbestos removal at a uranium mill.
- Hazards of a thorium oxide spill.
- Environmental and radiological liabilities of a uranium mill prior to sales offering.
- Occupational doses from U-238 and Th-232 in SO₂ scrubber sludge from a copper smelter.
- Occupational doses and environmental hazards from Re-187 from a copper smelter.
- Occupational doses from Th-232 in a metal casting facility.
- Occupational doses and environmental contamination from Po-210 in kerosene-diesel fuel.
- Potential environmental doses from U-238 and Tc-99 in a disposal pond.

Radiological Training Courses

- Annual Refresher Training for Radiation Protection.
- Atmospheric Dispersion Calculations using CAP88-PC.
- Basic Radiation Protection.
- Economic Benefits of Radioactive Materials and Radiation.
- Environmental Monitoring Procedures.
- Internal Dosimetry for the Uranium Milling Industry.
- Implementation of 10 CFR 20.1001-20.2401.
- National Emission Standards for Hazardous Air Pollutants.
- New Employee Radiation Protection Orientation.
- Radiation Exposure Calculations for Uranium Milling.
- Radiation Protection Annual Retraining
- Radiation Protection for the Uranium Milling Industry.
- Radiation Safety Officer Training.
- Radon Exposures and Radon Mitigation Measures.
- Regulatory Guides for Uranium Milling.
- Sampling Procedures.
- Standards for Release of Equipment for Unrestricted Use.

Licensing and Registration

- Registration of a 13.5 MeV linear accelerator.
- Radioactive materials license for an 8,000 Ci Co-60 gamma irradiator.
- Registration of two high voltage microwave machines.

EMPLOYMENT HISTORY:

Noel Savignac Consultants 1980 - Present. Radiation Protection Consultant to DOE, states, and corporations.

United Nuclear Corporation Manager of Environmental Services. Obtained radioactive materials licenses for uranium mills, trained environmental and occupational monitoring personnel, calculated radiological exposures and prepared environmental reports.

University of Wyoming Radiation Safety Officer. Managed the Radiation Safety Office and taught radiation safety courses.

ASSOCIATIONS (current and past):

American Institute of Mining Engineers

American Mining Congress, Uranium Environmental Subcommittee former chairman

American Nuclear Society

Beta Beta Beta

Health Physics Society

Rio Grande Chapter Health Physics Society former chairman

National Council of Radiation Protection and Measurements, contributing author to NCRP Report 118 "Radiation Protection in the Mineral Extraction Industry"

New Mexico Mining Association, Uranium Environmental Subcommittee

Ronald McDonald House Board of Directors

Sigma Xi

Wyoming Mining Association, Uranium Environmental Subcommittee.

CLIENT LIST:

All-Tec Inc.
ARA (Mission Research) Corp.
Assagai Analytical Labs
Atlas Minerals Corp.
Aware, Inc.
BDM Corp.
Black Law Firm
Bogle & Gates Law Firm
Chem-Nuclear Systems, Inc.
Cameco Resources
Cogema Mining, Inc.
Cotter Corporation
Cyprus Miami Mining Corp.
Dawn Mining Company
Duke Engineering & Services
Energy Fuels Nuclear, Inc.

Los Alamos National Laboratory
(through subcontractors)
Lovelace Respiratory Research Institute
Marline Uranium Corp.
McGowen Working Partners
Montgomery & Andrews
NM Environment Department
Pathfinder Mines Corp.
Plains Electric
Plateau Resources Ltd.
Power Resources, Inc.
PRC Env. Management, Inc.
Power Resources Inc.
Power Tech
Precision Castparts Corp.
Public Service Company of NM

Energy Laboratories, Inc.
Energy Metals Corporation
Envir. Sci. & Engr., Inc.
Federal American Partners
Ferret-Nebraska, Inc.
Franchini Law Firm
Giant Industries Inc.
Hecla Mining Company
Hollington Law Firm
Holmes, Roberts & Owen, Inc.
Homestake Mining Company
HRI, Inc.
ICF Kaiser Engineers, Inc.
Intera, Inc.
IT Corporation/D'Appolonia
Jacobs Engineering, Inc.
Ktech Corporation
Kleinfelder Corp.

Quivera Mining Company
Remote Sensing Systems
Rio Algom Corp.
Sandia National Labs
(through subcontractors)
Science and Engineering Associates
Sinclair Oil Company
Simmons Law Firm
Thunderbird/Red Lion Inns
Titan/Spectron Dev. Labs
Tomin Corp.
U.S. Energy/Crested Corp.
USX
Umetco
United Nuclear Corp.
Western Nuclear, Inc.
Weston, Roy F., Inc.

Uranium Study SME

SME: Risk Assessment, modeling, chemical engineering QA

Current Employment: John Hart and Associates

Capabilities: Mr. Djordjevic has over 16 years of environmental management experience mainly supporting the U.S. Department of Energy (DOE). This experience encompasses analysis of performance, risk, safety and design issues related to the generation, storage, characterization, transportation, and disposal of radioactive and mixed transuranic (TRU), low-level, and high-level radioactive wastes..

Sinisa Djordjevic

Scientist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants

Education / Credentials

Ph.D. Studies Engineering

❖ University of New Mexico,

Master of Chemical Engineering

❖ Illinois Institute of Technology, Chicago, IL,

B.S., Chemical Engineering

❖ Northwestern University, Evanston, IL

Certifications and Affiliations

Engineer in Training (State of New Mexico)
Registrar Accreditation Board (RAB) -
Environmental Management Systems Provisional Auditor (Certificate No. E051661)
American Institute of Chemical Engineers, Member
Association of Energy Engineers, Senior Member
New Mexico Hazardous Waste Management Society, Member
ANSI-RAB & EARA Approved ISO 14000 Lead Auditor Training, QSD, 1997
Radiation Safety Training Certificate, University of New Mexico, 1992
OSHA Site Remediation and Hazards and Protection Training, IT Corp., 1991

Professional Qualifications

He has specialized experience and skills in the following areas:

- TRU and Mixed Waste Management and Transportation
- Risk and Performance Assessment
- Development and Application of Computer Simulation Models
- Waste Characterization and Certification
- Regulatory Compliance
- Remedial Systems Design and Analysis
- Systems Analysis and Engineering
- Environmental Data Management
- ISO 14000 Environmental Management Systems (Planning, Implementation, Gap Analysis, Auditing, and Training)
- Energy Management
- Information Systems Architecture, Research, and Brokering
- Innovative and Emerging Environmental Technology Modeling and Analysis
- Industrial Ecology and Sustainable Development
- Computer Software Services, Programming, Graphical User Interface Development

- Quality Assurance and ISO 9000 Quality Management Systems
- Educational Systems and Training

Experience

John Hart and Associates, P.A.

Albuquerque, New Mexico

1998-present

Mr. Djordjevic is currently providing software quality assurance support to the National Aeronautics and Space Administration (NASA) Mars exploration program. He has served on a John Hart and Associates, P.A. (JHA) team that developed and is currently implementing an NQA-1 compliant program for safety analyses of mission launches. He has also supported work JHA performed for Washington TRU Solutions, LLC, and Sandia National Laboratories (SNL) at the WIPP. He has performed internal audits of SNL's compliance with quality assurance program requirements. He compiled a data base of RCRA requirements applicable to the project and developed comparative checklists of interim status and draft permit requirements. He also supported SNL in the development of software to compile waste inventory information for updates to the WIPP Baseline Inventory Report.

Benchmark Environmental Corporation

Albuquerque, New Mexico

1988-1994

Mr. Djordjevic conceptualized and participated in the implementation of several National Transuranic Program Office initiatives. These initiatives will significantly increase the amount and rate of TRU waste shipments while substantially reducing the costs and risks associated with repackaging, testing and treating the wastes. These initiatives include: the TRUPACT-II Matrix Depletion Program; the Flammability Assessment Methodology; an Alternative Method of Certifying TRU Waste Containers; Hydrogen Gas Getters; Mixing of TRUPACT-II Shipping Categories Program; RH TRU Waste Canister Sampling; and, Development of a Unified Flammable Gas Testing Procedure.

Mr. Djordjevic analyzed Rocky Flats Environmental Technology Site (RFETS) hydrogeologic data and screened both conventional and innovative treatment technologies for use in environmental restoration efforts at the RFETS. He then assembled technologies into alternatives and then screened alternatives based on cost, feasibility, and effectiveness to select the baseline remediation strategy. He prepared cost and schedule estimates for the baseline remedial alternative and documented the assessment methodology.

IT Corporation

Albuquerque, New Mexico

Mr. Djordjevic managed the development, application, and documentation of the pathways analysis and aggregation models as part of the Systems Analysis Methodology for the DOE-HQ Mixed Low Level Waste (MLLW) Management Program. The Methodology is an analytical tool that aids decision-makers in evaluating the feasibility and effectiveness of various, mixed-waste management options. The purpose of the pathways analysis model is to evaluate site hydrogeologic properties, various waste forms and disposal facility technologies with respect to compliance with the performance objectives in the U.S. Nuclear Regulatory Commission (NRC) regulation 10 CFR Part 61, DOE orders and other regulations. Mr. Djordjevic also managed the development, application, and documentation of the aggregation model of the methodology. The aggregation (multi-criteria decision-making) model aggregated the results of the pathways analysis, risk, cost, schedule, and regulatory models of the methodology. He interfaced with DOE Performance Assessment Task Team and the DOE Peer Review Panel during the development of the Methodology. In addition, he provided computational support to the probabilistic risk assessment task and assisted in the collection and estimation of accident probabilities associated with mixed waste treatment processes. Sensitivity and uncertainty analyses were an integral part of the Methodology.

As a primary technical lead of the Waste Isolation Pilot Plant (WIPP) Engineered Alternatives Task Force, which was established by the DOE, Mr. Djordjevic developed, applied, and documented the Design Analysis Model and provided computational support to the probabilistic risk assessment task. The purpose of this performance assessment (PA) model was to evaluate engineered alternatives to the TRU waste forms and the WIPP facility to enhance repository performance. This work included evaluation of the WIPP site hydrogeologic properties and estimation of hydrogeologic properties of various waste forms and backfills. Mr. Djordjevic enhanced the model with improved gas generation and mechanical room closure models. He linked the model with the Lawrence Berkeley multiphase hydrologic flow model TOUGH2. As part of this effort he also developed methodologies for use in WIPP regulatory compliance evaluations.

Developed a methodology and an integrated computational model to simulate the release of hazardous chemicals from leaking underground storage tanks. The model simulated volatilization of the organic chemicals leaking from the tanks and transport of the vapors upward through the soil to the ground surface. The model simulated air dispersion of the chemicals at the ground surface to receptors downwind using Gaussian plume models. The model also simulated the migration of chemicals downward through the vadose zone to the groundwater surface and subsequent migration in the groundwater to receptor wells. The model internally calculated all physico-chemical parameter values (e.g., diffusivities, dispersivities, half-lives and partition coefficients) required to perform transport calculations. The model was used in a risk assessment of leaking tanks at the Idaho National Engineering Laboratory.

Mr. Djordjevic has provided support to various other DOE site programs. He verified the RISKCHEM code developed by SNL to evaluate environmental restoration strategies for SNL operable units. The code is an extension of the DOE RESRAD code. He performed system energy and mass balances and cost estimates as part of the Systems Design Study (SDS) for the INEL Buried Waste Remediation project. He quantified the physico-chemical processes (e.g., evaporation, thermal expansion) as part of safety analyses of the HLW tank wastes at the INEL that are required for tank certification. Mr. Djordjevic evaluated operations of the Waste Receiving and Processing (WRAP) Module 1 facility at the Hanford Site and the Waste Handling and Packaging Plant (WHPP) at the Oak Ridge National Laboratory, with respect to safety issues and compliance with the WIPP Waste Acceptance Criteria. Mr. Djordjevic wrote the TRAMPAC section of the Los Alamos National Laboratory TRU Waste Certification Plan and the TRUtech Team Certification and Characterization Procedure. Mr. Djordjevic prepared and documented WIPP closure and post-closure cost estimates for the RCRA permit application to the State of New Mexico.

Mr. Djordjevic was a primary technical resource and author of the Safety Analysis Report for the TRUPACT-II shipping package (for shipments of contact-handled TRU waste) and the 72-B cask (for shipments of remote-handled TRU wastes). His analyses established payload characteristics, which would ensure safe transport of TRU wastes in these shipping packages. He prepared the TRUPACT-II Gas Generation Test Program Work Plan and served as an alternate member of the Interface Working Group for the program.

As a project engineer, Mr. Djordjevic developed, adapted, and applied mathematical models of groundwater flow and contaminant transport on high performance work stations and microcomputers for the Swakopmund uranium mill tailings disposal site in Namibia, Africa. He adapted and applied graphics post processing packages and participated in presentations and discussions with clients.

Mr. Djordjevic was an author of the WIPP Test Phase No-Migration Variance Petition. He estimated the concentrations of RCRA regulated constituents in waste containers and performed source emission calculations as well as air dispersion and contaminant transport modeling for the NMVP. He was a principal technical resource and author of numerous other WIPP related documents, including the WIPP Waste Acceptance Criteria, the Experimental-Waste Characterization Quality Assurance Program Plan, the Final Safety Analysis Report, and the Waste Characterization Program Plan. Specifically, Mr. Djordjevic provided technical expertise in the areas of environmental assessment, safety analysis, and TRU waste management operations.

He used waste characterization data in the Mixed Waste Inventory Report to derive representative concentrations of RCRA-regulated constituents and radionuclides in untreated mixed low level wastes at major DOE sites. He collected and hydrogeologic data at the major DOE sites and various disposal facility technologies and designs and prepared input

data sets for the pathways analysis model of the Systems Analysis Methodology of the DOE-HQ MLLW Management Program. The results were used to rank DOE systemwide and site-specific waste management options. He also provided peer review of the disposal facility performance modeling methodology for the DOE HQ Programmatic Environmental Impact Statement.

He led the development, application and documentation of a methodology, conceptual model and associated computer code to perform PA evaluations of potential final waste forms for alpha LLW and alpha mixed LLW at the Idaho National Engineering Laboratory (INEL). The evaluations consisted of analyzing site hydrogeologic data at three potential disposal sites and PA modeling of both untreated wastes and six potential final waste forms to assess compliance with applicable DOE orders (5820.2A and 5400.5) and other regulations (NRC regulations in 10 CFR Part 20, 10 CFR Part 60, 10 CFR Part 61 and EPA regulations in 40 CFR Part 61 and in 40 CFR Part 141).

Mr. Djordjevic reviewed existing and proposed engineered barriers that minimize contact between infiltrating water and waste in commercial LLW disposal facilities as required in 10 CFR Part 61. He then developed a model, and barrier material hydrogeologic properties to evaluate the ability of the barriers to enhance the long-term performance of these facilities. Engineered barriers included concrete overpacks, vaults, backfills, engineered soil covers as well as state-of-the art barriers, including an engineered sorptive layer underlying the facility and an advanced cap design incorporating a double capillary layer. Designs were compared on the basis of a dose reduction factor using activity-to-dose conversion factors listed in 10 CFR Part 20.

Principia Mathematica

Evergreen, Colorado

Developed and applied a linked groundwater flow and surface water flow model to evaluate historical and proposed water usage along the Arkansas River Basin, Colorado-Kansas to support interstate litigation. Presented findings of the analyses and explained complex technical issues to the Colorado State Engineers Office and the State's counsel.

Publications

NuPac. 1989. "Safety Analysis Report for the TRUPACT-II Shipping Package," Rev. 10. Federal Way, Washington, Nuclear Packaging, Inc.

DOE. 1990. "Waste Isolation Pilot Plant No-Migration Variance Petition." DOE/WIPP 89-003. Carlsbad, New Mexico, U.S. Department of Energy-Waste Isolation Pilot Plant Project Office.

DOE. 1991. "Evaluation of the Effectiveness and Feasibility of the Waste Isolation Pilot Plant Engineered Alternatives: Final Report of the Engineered Alternatives Task Force." DOE/WIPP 91-007, Rev. 0. Carlsbad, New Mexico, U.S. Department of Energy.

DOE. 1991. "Quality Assurance Program Plan for the Waste Isolation Pilot Plant Experimental-Waste Characterization Program." DOE/EM/48063-1, Rev. 1. Washington, D.C., U.S. Department of Energy, Office of Waste Operations.

DOE. 1991. "TRUPACT-II Content Codes (TRUCON)." DOE/WIPP 89-004, Rev. 5. Carlsbad, New Mexico, U.S. Department of Energy-WIPP Project Office.

DOE. 1991. "Waste Characterization Program Plan for Waste Isolation Pilot Plant Experimental Waste." DOE/WIPP 89-025, Rev. 1. Carlsbad, New Mexico, U.S. Department of Energy.

IT Corporation. 1991. "Position Paper on Flammability Concerns Associated With TRU Waste Destined for WIPP." Carlsbad, New Mexico, Westinghouse Electric Corporation, Waste Isolation Division.

IT Corporation. 1991. "Technical Requirements Document for Modified Waste Forms to be Included in the WIPP Experimental Program." Carlsbad, New Mexico, Westinghouse Electric Corporation.

Myers, J.S., S.M. Djordjevic, M. Adams, L.R. Spangler, J. Valdez, D. Vetter, and P. Drez. 1991. "Design Analysis of Engineered Alternatives for the Waste Isolation Pilot Plant," Proceedings of the Symposium on Waste Management. Tuscon, Arizona, Arizona Board of Regents, Waste Management '91.

Bassi, J., M.S. Abashian, S. Chakraborti, M. Devarakonda, and S.M. Djordjevic. 1992. "A Decision Methodology for the Evaluation of Mixed Low-Level Radioactive Waste Management Options for DOE Sites," Proceedings of the Fourteenth Annual U.S. Department of Energy Low-Level Radioactive Waste Management Conference, Phoenix, Arizona.

DOE. 1992. "TRU Waste Acceptance Criteria for the Waste Isolation Pilot Plant." WIPP-DOE-069, Rev. 4. Carlsbad, New Mexico, Westinghouse Electric Corp., Waste Isolation Division.

Djordjevic, S.M., and H.E. Nuttall. 1992. "A Coupled Geochemical and Solute Transport Model for Mixed-Waste Remediation in Groundwater." Presented at Minneapolis, Minnesota, AIChE 1992 Summer National Meeting.

IT Corporation. 1992. "An Evaluation of the Remote-Handled Transuranic Waste Forms at the Oak Ridge National Laboratory for Acceptance at the Waste Isolation Pilot Plant," Albuquerque, New Mexico.

IT Corporation. 1992. "Hanford Waste Receiving and Processing Facility Title I Design Review: Comparison of WRAP 1 Design With WIPP Criteria and Requirements." Richland, Washington, Westinghouse Hanford Company.

Abashian, M.S., M. Carageorges, S. Chakraborti, M. Devarakonda, and S.M. Djordjevic. 1993. "An Integrated Approach for Evaluating DOE Mixed Low-Level Waste Management Options," Proceedings of the 1993 IT Symposium, Scottsdale, Arizona.

Booher, W., and S.M. Djordjevic. 1993. "Electrokinetics and its Potential Application in the Remediation of Uranium-Contaminated Soils," Proceedings of the 1993 IT Symposium, Scottsdale, Arizona.

Case, J.B., R. Spangler, and S.M. Djordjevic. 1993. "A RCRA Tank Assessment of Eleven Stainless Steel Tanks Containing High-Level Radioactive Waste at the INEL Chemical Processing Plant," Proceedings of the 1993 IT Symposium, Scottsdale Arizona.

DOE. 1993. "Mixed Low-Level Waste Systems Analysis Methodology and Applications Report, Draft." DOE/LLW-194. Washington, D.C., Office of Environmental Restoration and Waste Management.

Djordjevic, S.M., L.R. Spangler, R. Sobocinski, and M.S. Abashian. 1993. "Pathways Analysis Model to Evaluate DOE Mixed Low-Level Waste Disposal Facilities," Proceedings of the Symposium on Waste Management I. Tucson, Arizona, Arizona Board of Regents, Waste Management '93.

IT Corporation. 1993. "Effects of Supercompacting Contact-Handled Transuranic Waste on the Performance of the Waste Isolation Pilot Plant (WIPP)." Carlsbad, New Mexico, Westinghouse Electric Corporation.

Benchmark Environmental Corporation. 1994. "Parameters for Performance Assessment Modeling of Chemicals at the Waste Isolation Pilot Plant." Carlsbad, New Mexico, Westinghouse Electric Corp., Waste Isolation Division, September.

IT Corporation. 1994. "Use of Engineered Soils and Other Site Modifications for Low-Level Waste Disposal." Idaho Falls, Idaho, EG&G Idaho, Inc.

Smith, T.H., J. Myers, S.M. Djordjevic, T.A. DeBiase, D. DeWitt, and M. Goodrich. 1994. "Preliminary Parametric Performance Assessment of Potential Final Waste Forms for Alpha Low Level Wastes at the Idaho National Engineering Laboratory." EGG-WM-11415. Idaho Falls, Idaho, EG&G Idaho, Inc.

Connolly, M.J., S.M. Djordjevic, C.A. Loehr, and L.R. Spangler. 1996. "Assessment of Gas Flammability in Transuranic Waste Containers," Proceedings of the Symposium on Waste Management. Tucson, Arizona, Arizona Board of Regents, Waste Management '96.

Connolly, M.J., S.M. Djordjevic, C.A. Loehr, K.J. Liekhus, and L.R. Spangler. 1996. "Position for Determining Gas Phase Volatile Organic Compound Concentrations in Transuranic Waste Containers," Proceedings of the Symposium on Waste Management. Tucson, Arizona, Arizona Board of Regents, Waste Management '96.

Connolly, M.J., S.M. Djordjevic, C.A. Loehr, M.C. Smith, V. Banjac, and W.F. Lyon. 1996. "The TRUPACT-II Matrix Depletion Program," Proceedings of the Symposium on Waste Management. Tucson, Arizona, Arizona Board of Regents, Waste Management '96.

Djordjevic, S.M., L.R. Spangler, and M.J. Connolly. 1996. "Certifying Containers For TRUPACT-II Shipment Using Flammable Gas Headspace Measurements." Accepted for

presentation at Waste Management '97. Tucson, Arizona, Arizona Board of Regents, Waste Management '97.

Djordjevic, S.M., L.R. Spangler, and M.J. Connolly. 1996. "Development and Implementation of a Mixing of TRUPACT-II Shipping Categories Methodology." Accepted for presentation at Waste Management '97. Tucson, Arizona, Arizona Board of Regents, Waste Management '97.

LANL. 1996. "Los Alamos National Laboratory Transuranic Waste Certification Plan." PLAN-CSTDO-004,R.0. Los

Uranium Study SME	Theodore A. Wolff, Ph.D.
SME: NEPA Current Employment: Trinitek Services, Inc. Capabilities: NEPA, Radiation Programs, uranium licensing, emergency management, compliance inspections. Ted has a broad background in institutional issues and government relations both with the State of New Mexico and at Sandia Labs in 40years. His experience includes working as a manager in the State of New Mexico Radiation Control Bureau, prior to coming to Sandia. He was responsible for helping the State of New Mexico conduct strategic planning and interacted with a variety of agencies and officials at the federal, state, county, local and tribal governments.	Scientist: Trinitek Services, Inc, Nuclear & Environmental Safety Consultants Education / Credentials Ph.D. Biology ❖ University of Utah, Salt Lake City, Utah, MS Public Health ❖ University of North Carolina, Chapel Hill B.S. Biology ❖ New Mexico Highlands University Additional Training: Qualified evaluator by Federal Emergency Management Agency training for emergency response activities.

2009-2012 Ted Wolff was an internal environmental and safety auditor and led a number of successful audits at Sandia National Laboratories (SNL). Prior to joining the auditing Department, at SNL, he supported risk assessments, emergency response activities, and improvement opportunities for the annual emergency response exercise. Ted also assisted in National Environmental Policy Act (NEPA) analysis and coordination for inactive uranium mill tailing sites. As part of interdisciplinary teams he prepared NEPA documents for Department of Energy (DOE). As the task leader for NEPA compliance at SNL, he developed a strategy for compliance with NEPA for the Kauai Test Facility (KTF). This facility was operated by SNL for the DOE. Completed documentation provided the KTF with a competitive advantage over other rocket launching facilities. The work was documented in a paper co-authored and published in the Environmental Practice by Cambridge University Press. Ted also helped plan, write, and produce a number of Environmental Assessments and Environmental Impact Statements for various proposed actions. This included being part of a interdisciplinary team that drafted the Environmental Assessment for the conversion of highly enriched uranium (HEU) to low enriched uranium (LEU) and the transportation of the LEU to the U.S. from Russia. This work was completed for the DOE.

Special Projects, Public Relations and Communication

He supported the SNL Center Director with risk assessments, emergency response activities, and improvement opportunities for the annual emergency response exercise for the labs, and served on the Integrated Laboratory Management System Core Team, promote mission success through operational excellence, and support

the Center Director in preparing for the Audits and related ES&H compliance activities.

Institutional Issues and International Experience

I have a broad background in institutional issues and government relations both with the State of New Mexico and at SNL. His experience includes working as a manager in the State of New Mexico Radiation Control Bureau, prior to coming to Sandia. He was responsible for helping the State of New Mexico conduct strategic planning and interacted with a variety of agencies and officials at the federal, state, county, local and tribal governments. He responded to requests from Congressional staff for the Governor, reviewed state and federal legislation, and testified before state legislative committees, and served the Governor of NM and his Environmental Secretary as the staff person for the President's State Planning Council. This activity required trips to Washington, D.C. and elsewhere. He managed the NM Radiation Protection Bureau and oversaw radiation protection practices across the state. Concurrent with duties as head of that program, he served as the Governor's state liaison officer to the U.S. Nuclear Regulatory Commission, and represented New Mexico on radiation issues at meetings of the Western Interstate Energy Board, the National Governor's Association, and the Conference of Radiation Control Program Directors.

While at Sandia, he was appointed by the governor to the State's Radiation Technical Advisory Council and served on this Council for a number of years. Because of his institutional issues experience at Sandia with the transportation of radioactive materials, the DOE head of the WIPP Pilot project requested and facilitated his loan to the Joint Integration Office for the WIPP for a yearlong assignment. In 2002, DOE excerpted an article that he co-authored and published it in a headquarters' publication. Ted supported the DOE/NNSA for several months in the Russian Federation where he conducted transparency monitoring for the conversion of highly enriched uranium to low enriched uranium. Both activities required exceptional performance and a high degree of cultural sensitivity.

As a member of Sandia National Laboratories' technical staff, he assisted in the National Environmental Policy Act (NEPA) analysis and coordination for inactive uranium mill tailing sites for which DOE had assessment and environmental restoration responsibilities. He analyzed radioactive material transportation issues, took part in interdisciplinary teams that wrote NEPA documents for DOE and was the task leader for an institutional issues analysis program conducted for the DOE's Defense Programs and Civilian Programs. He was the key person who developed a strategy for compliance with NEPA for the Kauai Test Facility (KTF). The completed documentation provided the KTF with a competitive advantage over other rocket launching facilities. This work included in a paper he co-

authored that was published in Environmental Practice in 2007 by Cambridge University Press.

Ted was part of an interdisciplinary team that helped prepare the Environmental Assessment for the Conversion of highly enriched uranium (HEU) to low enriched uranium (LEU) and the LEU Transportation to the U.S. from Russia. This work was completed for the DOE/NNSA. He also helped plan and produce a number of Environmental Assessments and Environmental Impact Statements for various projects. Ted worked in Sandia's Environmental Safety and Health program and worked on various environmental protection issues (PCB management, air permitting, hazardous material release reporting, etc.). As the team leader, he developed a Sandia-wide NEPA program. His prompt and responsive support of data collection needed by DOE Headquarters for the preparation of a programmatic Environmental Impact Statement for the Reconfiguration of the Nuclear Weapon's Complex led to an "Award for Excellence."

Community Involvement and Issues Management Department:

In this position, I was involved in a number of environmental issues and educational outreach activities and public involvement activities which included chairing, facilitating, and coordinating committees. I served on the Board of Directors of Shared Vision, a community non-profit whose mission included convening and facilitating public deliberation and taking action on major issues that are crucial to the future of the Albuquerque metropolitan area.

Mid-Region Council of Governments (MRCOG) of New Mexico Urban Transportation Planning Policy Board's Public Involvement Committee (PIC): MRCOG conducts area-wide cooperative and comprehensive planning on transportation issues. I serve as Sandia's representative of the PIC, which is the Council's outreach effort for public input on transportation issues. The Council uses input from the PIC to conduct area-wide cooperative and comprehensive planning.

Greater Chamber of Commerce: serve on the Transportation Planning Council

Judge co-chair 2007 Intel International Science and Engineering Fair. Host Committee Board Member and Intel International Science and Engineering Fair-Judge co-chair with responsibility for recruiting, training, and managing ~1,000 judges for 1,500 student projects.

Judge Chairman for Annual Northwestern New Mexico Regional Science and Engineering Fair: I organize and assist science fair judges with Senior and Junior Science Fair Exhibits, award prizes, and advance worthy exhibitors to state and national science fairs.

New Mexico Environmental Health Conference Planning Committee: I serve on the planning committee for this annual conference that has attracted up to 600 attendees. Sandia is a Conference planning partner. I am working to propel the Conference into a position as the premier Environmental Health Conference in this region.

Adventures in Science and Knowledge (ASK): I worked with Sandia volunteers to produce a pilot on-line "textbook" to promote on-line teaching via an Internet Home page for 5th grade children.

School to World: I organized and managed the Health and Medicine Cluster for this very successful careers awareness event.

Miscellaneous Volunteer Activities: I participated in the annual Peace Corps Day activities, Habitat for Humanity, School to World, US Savings Bond Drive, was a loaned executive to the Central NM United and participated on Way United Way Fund Review Panels.

Peace Corps Volunteer, U.S. Department of State- I completed 12-week Intensive training program that included teaching methodology, Malay language, Malaysian and Asian area studies and health science at Northern Illinois University and the University of Hawaii at Hilo, Hawaii. My principal assignment was as a Health Science and Biology teacher at the Sultan Abdul Aziz School, Kuala Selangor, Malaysia. I prepared students for the Senior Cambridge School Certificate examinations, both set and marked in England. I also advised the science society, organized a science fair, and participated in various Asian community activities.

I have made a number of presentations at conferences, training sessions and at DOE Headquarters.

REPRESENTATIVE PUBLICATIONS & PRESENTATIONS

Reviewing NEPA's Past: Promoting NEPA's Future Roger P. Hansen, J.D., AICP, Aurora, CO

Theodore A. Wolff, Ph.D., Albuquerque, NM, published December 2012 in Environmental Practice, Cambridge University Press.

Wolff, T. A. and Lewis T. Nielsen "The Mosquitoes of New Mexico" 128 pages, June 2007 UNM Press, 2008 New Mexico Book Awards Finalist

Hansen, R. P., T. A Wolff and Albert G. Melcher NEPA and Environmental Streamlining: Benefits and Risks. Proceedings of the Conference of the National Association of Environmental Professionals April 23-26, 1996 Albuquerque, New Mexico, published June 2007 in "Environmental Practice" Cambridge University Press.

Hansen, R. P., and T. A. Wolff. "Making NEPA More Effective and Economical for the New Millennium," Federal Facilities Environmental Journal/Autumn 2000.

Wolff, T. A. and R. P. Hansen. "National Environmental Policy Act (NEPA) Compliance at Sandia National Laboratories/New Mexico (SNL/NM)," SAND98-1691, Sandia National Laboratories, Albuquerque, New Mexico

Hansen, R. P., and T. A Wolff. "Streamlining the Process: A Strategy for Making NEPA Work Better and Cost Less" Proceedings of the Conference of the National Association of Environmental Professionals, Environmental Management: Linking NEPA, ISO 14000 and Sustainable Development June 20-26, 1998 San Diego, California

Hansen, R. P., T. A Wolff and Lance N McCold "The Conflict of Interest Problem in EIS Preparation" Proceedings of the Conference of the National Association of Environmental Professionals May 19-22, 1997 Orlando, Florida

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