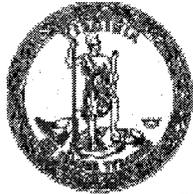


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SOME OF VIRGINIA'S IMPORTED AND EXPORTED MINERAL COMMODITIES AND PRODUCTS

Palmer C. Sweet

INTRODUCTION

Virginia's imported and exported mineral commodities are numerous and include metallic-mineral, industrial-mineral, and fossil-fuel materials. Port facilities on the east coast of Virginia, consist of marine terminals in the Cities of Newport News, Norfolk, Chesapeake, and Portsmouth. Also there are three inland water-ports located in Alexandria on the Potomac River and Hopewell and Richmond on the James River. Crude petroleum is the largest import and coal (more than 46 million tons) is the largest export, mainly through the terminals at Hampton Roads (Newport News, Norfolk, Portsmouth, and Chesapeake). Almost 20 million tons of this exported coal was mined in Virginia. Numerous other metallic-mineral, industrial-mineral, and fossil-fuel commodities are imported and exported. Many products made from these commodities are exported from the Commonwealth. More than 60 million tons of foreign tonnage was handled through all the Virginia terminals in 1997 (Port of Hampton Roads Annual 1999). Some other mineral commodity imports and their end-use include alumina & bauxite (aluminum metal and calcium-aluminate cement), borate minerals (glass, glazes, and fertilizers), cement (portland and masonry for construction), dolomite (glass), garnet (abrasives for sandblasting, and metal cutting), gypsum (wallboard), iron-oxide pigment (colorant), mica (custom-made mica products), perlite (fesco roof board), potash (fertilizers), pumice (concrete cinderblock and pipe), and salt (bleach for pulpwood, food processing, water softener, and snow and ice-control).

Some major exported mineral-commodities and products include calcium aluminate cement; cristobalite for fine grit; fesco board from "popped" perlite; Indiana limestone for green Coke bottles, mullite and kyanite for high temperature ceramics; petroleum coke as a heating component in kilns; sulfur (elemental) for the production of sulfuric acid, wallboard from gypsum, and zirconium concentrates for porcelain. Mineral materials and products, imported and produced in state, are processed and exported to out-of-state and international markets by truck, rail, and water. Some mica is imported by air. Several mineral-commodity markets have expanded and some have "opened-up" because of the North American Free Trade Agreement (NAFTA), which went into effect on January 1, 1994 and the FTA (Free Trade Agreement) between the United States and Canada, which went into effect on January 1, 1989.

Following are brief descriptions of some commodities and products that are imported and exported into and out of Virginia, mainly by water through the ports, but also by truck, rail, and air.

ALUMINA - BAUXITE

Almost 18,000 short tons of powdered alumina from Surinam and 4,000 short tons of bauxite from China were imported into the Elizabeth River Terminals in 2000 (Figure 1): The material is trucked to LaFarge Calcium Aluminate, Inc. in the City of Chesapeake for processing into high temperature cement. In 1999, the Port Authority of Virginia also reported imports of 945 short tons of LaFarge calcium aluminates from France into the Ports of Hampton Roads. Some alumina is exported from Richmond on the James River to Canada.

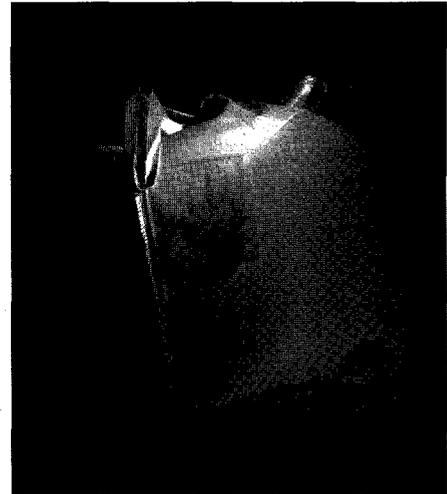


Figure 1: Bulk bags of alumina, imported from Surinam, ready for transport to LaFarge Calcium Aluminate, Inc., Elizabeth River Terminals, City of Chesapeake.

BORATES

Borates (60,000 to 75,000 tons) are imported yearly from Turkey into the Southern Aggregates Dock at Money Point on the Elizabeth River. The borate mineral ulexite is imported in bulk, dried in a rotary kiln and shipped in bulk by rail to Owens-Corning glass plants. The addition of a small amount of borax in a batch of glass improves melting conditions and imparts clarity and brilliance to the product. Some is also marketed for the American Borate Company, located in the City of Virginia Beach. Over 80,000 tons of boric acid (10,197 short tons), etibor powder (19,230 short tons), and ulexite (52,407 short tons) are imported from Ben Durman, Turkey. Four to five shiploads of borates are imported each year into Elizabeth River Terminals. The boric acid and etibor powder are distributed by the American Borate



Figure 2: Stockpile of borates, ready for loading into railroad hopper cars of American Borate Company, Elizabeth River Terminals, City of Chesapeake.

Company (Figure 2). The ulexite, which is imported crushed to minus 8-inch size, is trucked to a site one mile from the terminal to be ground and dried. After preparation, the ulexite is stored until it is shipped either by rail in covered hopper cars or by tanker truck to various markets in the south and midwest. Refined borate powder, appears like a pile of sugar in storage. The Port Authority of Virginia notes that several grades of colemanite (boron hydroxide), and crushed colemanite hydroboracite, amounting to 157 short tons are also imported from Argentina and Spain into Hampton Roads. Additional uses in manufacturing other than glass, include it as an ingredient in fiberglass, glazes, and fertilizer, as a fire retardant in cellulose insulation, and in heat-resistant borosilicate glass such as Pyrex.

CEMENT

In 1999, about 62,532 tons of Fondu grade cement clinker, 27,131 tons of high alumina, Secar 41 and Secar 51 cement clinker, and 3,443 tons of 41-grade cement clinker were imported from France into the Ports of Hampton Roads, according to the Port Authority of Virginia. An additional 40 tons of calcium aluminate cement from the Netherlands was also imported during the year. All of this material was earmarked for the City of Chesapeake plant of LaFarge Calcium Aluminate, Inc., which operates an aluminate cement manufacturing plant. Many thousands of additional tons of both portland and masonry cement are shipped from domestic production plants by truck and by rail to distribution terminals in the Norfolk area. For example, Blue Circle Cement, Inc., has a terminal at Money Point in the City of Chesapeake and imports masonry and portland cement from its plant at Ravena, New York (Figure 3). The product is brought to the terminal at Money Point in ocean-going barges (18,000 tons) and is sold in bulk and in bags to local and out-of-state distributors. Lehigh Portland Cement in the City of Norfolk imports all of its portland and masonry cement by rail from Maryland.

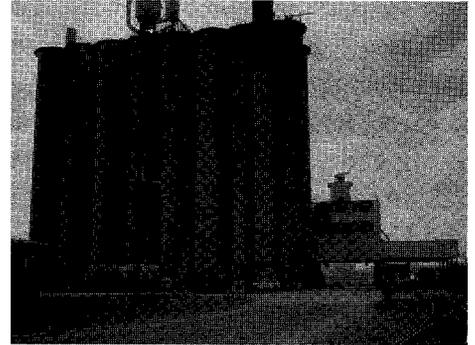


Figure 3: Silos of Blue Circle Cement, Inc., Money Point on the Elizabeth River, City of Chesapeake.

COAL



Figure 4: Coal export terminal of Dominion Terminal Associates on the James River, Port of Newport News.

Hampton roads, more than 5 million tons were shipped to the following countries: Netherlands, Italy, Japan, and France: Virginia's ports also supplied 100 percent of the coal imported by Sweden, Egypt, and Algeria (Virginia Center for Coal and Energy Research, 1998) (Figure 5). When NAFTA was ratified on January 1, 1994, a ten percent tariff on United States coal imported into Mexico was eliminated. About 1,858,000 tons of coal was exported to Mexico in 1997, with 261,000 tons or 14 percent of the total exported out of the Ports of Hampton Roads. There is a potential market of 21 million metric tons of steam coal in Mexico (Coal News, 1993).

Coal, mainly metallurgical grade, is exported through four main terminals in the Hampton Roads area. More than half of the coal is exported through Lamberts Point and Coal Pier 6 of the Norfolk Southern Corporation in the City of Norfolk, while the remainder is exported through Dominion Terminal Associates, or Pier IX Terminal Company, both located in the City of Newport News (Figure 4). More than 46 million tons of coal were exported from Hampton Roads in 1997. This represents almost 52 percent of the total coal that was exported from the United States, of which about 20 million tons was mined in Virginia. Of the steam and metallurgical coal ex-

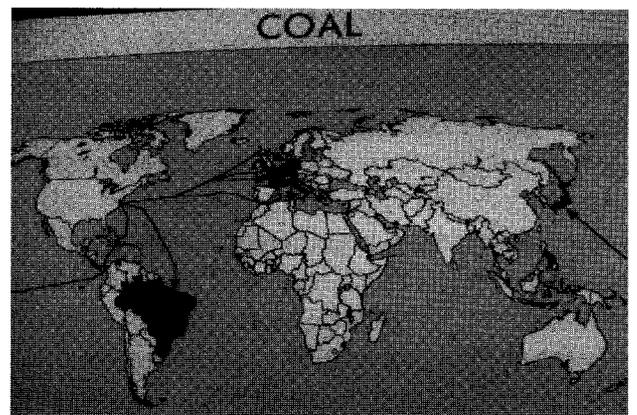


Figure 5: Some of the main countries that coal is exported to from the Ports of Newport News and Norfolk.

CRUDE PETROLEUM (SULFUR-PETROLEUM COKE)

About 62,000 barrels of crude oil are refined per day at the BP-Amoco Yorktown Distribution Terminal on the York River. Ocean tankers (500,000 barrels) arrive 3 to 4 times per month from Mexico and West Africa at the 3000-foot pier in the York River. The crude oil is heated in a boiler and fed under pressure into a distillation cylinder where it vaporizes, expands, and condenses into liquid. Refined petroleum products including gasoline, butane, propane, heating oil, and jet fuel, are daily barged out of the Yorktown refinery north and south to all the major ports along the Atlantic Coast (Figure 6). Presently tariffs on crude petroleum imported into the United States are 5.25 cents to 10.5 cents per barrel; duty-free crude from Canada and Mexico will not be available until January 1, 2003.



Figure 6: Distribution Terminal of BP-Amoco on the York River, near Yorktown.

During the refining of the crude petroleum, hydrogen sulfide gas is produced and is converted into molten sulfur; almost 4385 barrels (1418 tons) of molten, elemental sulfur are produced per month. The majority of the sulfur is shipped to Richmond, in

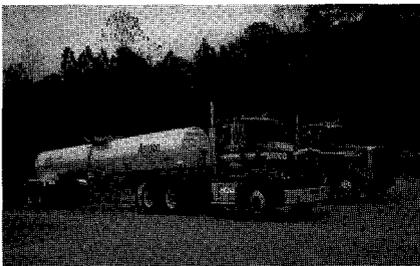


Figure 7: BP-Amoco tanker truck of molten sulfur, ready for transport to E. I. Dupont Co. in Richmond.

3000-gallon tanker trucks (Figure 7). The sulfur is marketed to E. I. DuPont Co. for manufacture of sulfuric acid. A minor amount of the sulfur is sold to an electric company in North Carolina where it is converted into sulfur trioxide. The product is injected into a coal fired boiler, where it "locks up" the fly ash and produces clinkers (Sweet, 1995).

are centered around industrial boilers, where high BTU fuel is necessary. Some coke is sold to processors in the Charleston, South Carolina area, who crush, size, and resell the material to their customers. BP-Amoco also has small foreign markets for petroleum coke, which is shipped from the port in the City of Newport News (Sweet, 1995). Some green petroleum coke (about 200 tons) has been imported from Venezuela into Elizabeth River Terminals. The coke is marketed to the Chapprel Steel Plant in Petersburg and in Hertford, NC. The coke is used to encapsulate molten metals to maintain the temperature in the electric furnaces. Some coke has also been exported to Canada in the past and tariff elimination through NAFTA may again open Canadian markets.

Another by-product produced during the refining of crude oil is petroleum coke. About 220,000 tons of petroleum coke are produced per year at the Yorktown plant (Figure 8). Most of the coke is sent by rail in hopper cars to Louisiana Carbon in Louisiana where it is marketed to cement plants to be mixed with coal for use as fuel in their kilns. Other markets



Figure 8: Stockpile of by-product petroleum coke being loaded into railroad hopper cars at BP-Amoco's refinery near Yorktown.

DOLOMITE

More than 11,000 short tons of glass-grade dolomite were imported, from Spain, into Elizabeth River

Terminals in 2000. The dolomite is received, crushed, sized, and stored under controlled temperatures. It is railed, in bulk, to the glass plants in Kingsport, Tennessee.

GARNET

Garnet (13,947 short tons) is imported, in bulk, from Australia into Elizabeth River Terminals. The garnet is screened and packaged into 60 and 100-pound bags for Barton Mines Co., in New York. The garnet is marketed to Newport News Shipbuilding for sandblasting, as the material is very inert and can be used over and over (Figure 9). The bags of garnet are also shipped to customers throughout the United States for use in high-pressure metal cutting. About 1000 tons of a coarser-grained garnet is imported from India in 4400 bulk bags; this garnet is marketed in bags (Figure 10).

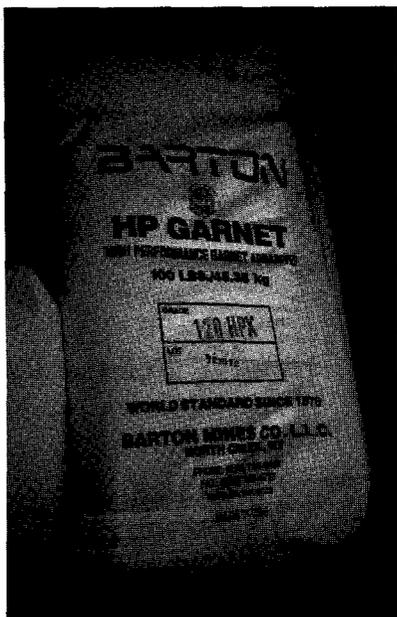


Figure 9: Garnet, in 100-pound bags, imported from Australia, and ready for shipment to Newport News Shipbuilding, for Barton Mines Co., Elizabeth River Terminals, City of Chesapeake.



Figure 10: Bulk bags of garnet, imported from India, stored at Elizabeth River Terminals, City of Chesapeake.

GYPSUM

Gypsum and minor anhydrite are imported from Nova Scotia, Mexico, and Spain. United States Gypsum Co. imports gypsum and anhydrite (in large ocean going freighters) from Nova Scotia to produce wallboard and other gypsum-based products at its Norfolk plant. Fundy Gypsum Co., Ltd., owned by United States Gypsum Co., has quarries at Little Narrows and Windsor in Nova Scotia (Figure 11). Approximately 300,000 tons of gypsum and anhydrite are shipped, from ports at Hansport and Little Narrows, annually to Virginia. In 1999, the Virginia Port Authority reported that imports included 270,883 short tons of gypsum rock from Canada and Spain; 6 short tons of selenites from Germany; 34,350 short tons of anhydrite from Canada, and 119 short tons of synthetic anhydrite from the United Kingdom. The majority of the gypsum and anhydrite is unloaded at United States Gypsum's dock in the City of Norfolk as well as at Elizabeth River Terminals. At the processing plant in Norfolk, the gypsum is ground into "landplaster" ($\text{CaSO}_4 + \text{H}_2\text{O}$). The material is then calcined to remove the water in order to produce "stucco". Water is then added to the stucco along with additional ingredients, such as sugar

and starch and poured, molded, and dried between sheets of paper to produce wallboard. The wallboard is marketed by truck throughout the eastern United States. The plant also produces a fertilizer from lower grade gypsum that is used by the peanut industry. Most of the imported anhydrite is sold to cement companies and is used as a source of sulfur in producing cement clinker.

More than 10,000 short tons of premium-grade gypsum were imported in bulk from Spain into Elizabeth River Terminals in 2000. The gypsum is sold by U. S. Gypsum Co. as a "landplaster" for the peanut fields in southern Virginia. Some gypsum was also imported from Spain into Southern Aggregates Dock at Money Point in 2000. This gypsum is trucked to Roanoke Cement Company in southern Botetourt County, north of Roanoke, for use in cement manufacture.



Figure 11: Shipping dock of Fundy Gypsum Co., Ltd., owned by the U. S. Gypsum Co., at Little Narrows, Nova Scotia.

INDUSTRIAL SAND

CED Enterprises, located near Gore in western Frederick County, purchases industrial-grade silica sand quarried from the Ridgeley (Oriskany) Sandstone by U. S. Silica Company in Berkeley Springs, West Virginia. The sand is recrystallized in a propane fueled rotary kiln to produce cristobalite. The cristobalite is sized into the 200 to 400-mesh range and bagged on site. The product is marketed as a fine grit, used mainly as a filler in paint and in commercial casting molds. This material is trucked to the Great Lakes area and the western United States. Some of the product is trucked to the Port of Baltimore and shipped overseas.

INDIANA LIMESTONE

Almost 3,000 short tons of Indiana Limestone was railed by National Lime and Stone Co. in Indianapolis, IN, to Elizabeth River Terminals in 2000. The stone is exported to Panama for production of green Coca-Cola bottles.

IRON-OXIDE PIGMENTS

Blue Ridge Talc Co., Inc., located at Henry in northern Henry County, imports iron-oxide pigments in bulk by rail from the Cleveland-Cliffs Iron Co. in Negaunee, Michigan. The material is dried, pulverized, fine ground, sized, and packaged prior to shipping. Bagged material is sold as a coloring agent in a variety of products. The largest market is for paint pigment; additional markets are pigments for art supplies (crayons, chalk, water colors) as well as for building products (colored cinderblock, brick, caulking compounds, mortar colors, etc.). The pigments are shipped by truck throughout the United States and to Canada and Mexico.

KYANITE

Kyanite, an aluminum silicate, is produced domestically only in central Buckingham County, Virginia. Kyanite Mining Corporation produces the majority of the world's kyanite from two surface mines, one at Willis Mountain and one at nearby East Ridge. Kyanite-bearing quartzite is quarried in open pits at both localities. The kyanite concentrate produced from this quartzite has a maximum of 61.8 percent alumina and a minimum iron content of 0.16 percent. By calcining, the kyanite is converted to mullite at temperatures

greater than 3000 degrees Fahrenheit. The mullite is a super-duty refractory, with a pyrometric cone ranging from 36 to 37, which aids ceramics and glass in resisting cracking, warping, slagging, and deforming at high temperatures. Both kyanite and mullite products are bagged in 50 and 100-pound bags and 3500 pound bulk bags and are sold in 35, 48, 100, 200, and 325-mesh sizes. It is marketed to the refractory, ceramic, glass, metallurgical, and foundry industries (Figure 12).

Approximately 20 percent of the mullite-kyanite production is exported and shipped worldwide, out of most of the United States ports. More than 15,000 tons of this material is annually shipped out of Virginia ports. The major part of the mullite and kyanite shipped from the Port at Norfolk is destined for Japan, Korea, United Kingdom, Netherlands, Italy, and Australia (Figure 13). The remainder of the product is marketed domestically and shipped by both truck and rail. Some of the mullite-kyanite is also shipped in tanker trucks.

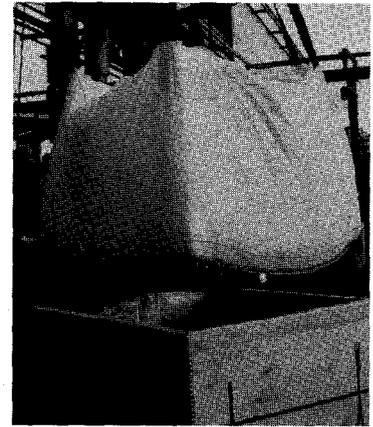


Figure 12: Bulk bag of mullite, at the Dillwyn plant of Kyanite Mining Corporation, Buckingham County, ready for transportation to the Port of Norfolk.

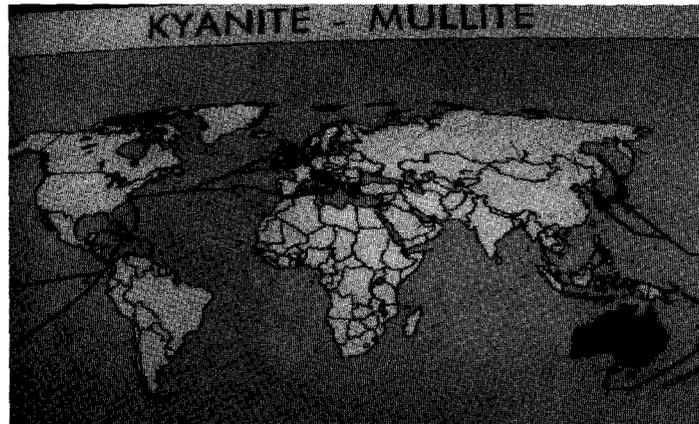


Figure 13: Export countries for kyanite-mullite through the Port of Norfolk.

MICA

Asheville Mica Company and its affiliate, Mica Company of Canada, are located in the City of Newport News. They import several grades of mica, mainly muscovite mica from India, and a minor amount of amber block mica from Madagascar. More than 300 tons of mica come into the Port of Norfolk annually. Some mica is also imported by air. Asheville Mica Company produces fabricated plate-mica, which is marketed for custom-made electrical insulation applications such as in the manufacture of hair dryers, toasters, generator motors, electric frying pans, etc. Mica Company of Canada utilizes splittings from Asheville Mica to produce reconstituted plate-mica and built up custom-made mica products. These products are used in the manufacture of insulating washers, for use as terminal washers and for shields in lithium batteries. Finished products are shipped by truck, by mail, and by UPS, mainly to domestic markets. Very few of these products are sold overseas, although minor markets exist in Canada.

PERLITE

Schuller International, a Division of Manville, operates a plant just south of Woodstock in Shenandoah County. The company imports perlite, a hydrated volcanic glass with "onion-skin" appearance, from the Harborlite Corporation located at No Agua Mountain in western Taos County, New Mexico (Barker and others, 1996). At the mine, the granular perlite is blasted, ripped, and loaded into trucks, which haul it to the screening plant for crushing and sizing. The sized, crude perlite is hauled by truck to a railhead located at Antonito, Colorado, 24 miles north of the screening plant. Here it is loaded for shipment to the Schuller plant in Virginia, which receives more than 25,000 tons of perlite per year, arriving in 100-ton hopper cars. The perlite is "popped" or expanded in vertical, gas fired furnaces; the expanded material is used in the manufacture of fesco (roof insulation) board. The fesco board is made up of about 70 percent perlite, 25 percent filler (newspapers) and 5 percent binders (asphalt & starch). Three different sizes of board are produced at the plant, which has a capacity of 200 million board feet per week. The fesco board is marketed and shipped by truck throughout the eastern United States.

POTASH

Muriate of Potash is red in color and is imported in bulk (10,019 short tons in 2000) from Russia into Elizabeth River Terminals. About 8,102 short tons of white sulfate of Potash is imported in bulk from Germany into Elizabeth River Terminals. The sulfate of Potash is sold in bulk to LESCO, in Prince George County. This company distributes fertilizers for use on golf courses, etc (Figure 14).

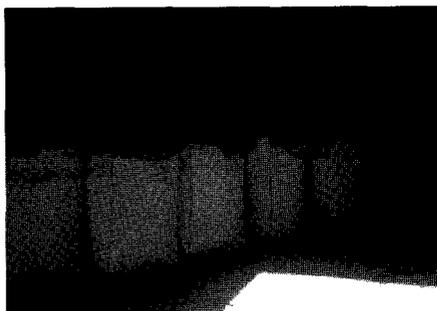


Figure 14: Bulk bags of white sulfate of Potash, imported from Germany, and marketed to LESCO, for fertilizer, from Elizabeth River Terminals, City of Chesapeake.

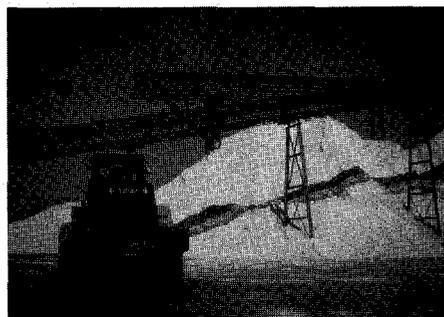


Figure 15: Stockpiles of pumice, imported from Greece into the Southern Aggregates Dock, Money Point, on the Elizabeth River.

PUMICE

About 100,000 short tons of pumice are imported from Greece into the Southern Aggregates Dock at Money Point on the Elizabeth River (Figure 15). About four ships a year unload bulk pumice for use by Witelite Pumice Division of Southern Aggregates Company for use in concrete cinderblock and concrete pipe. In the past, some of the ping pong ball size pumice was marketed to a factory in North Carolina, whose product was stone-washed jeans. Witelite also imports pumice into many other ports, including Charleston, SC, where the pumice has been utilized as sub-base material for roads in coastal marshy areas. The low-weight make it more favorable than heavier rock.

SALT

Salt, in bulk, is imported by ship from the Bahamas to the Elizabeth River Terminals in the City of Chesapeake. More than 68,000 short tons of sea salt was imported for Southern-Morton Company in 2000. The majority is used for industrial applications such as a bleaching agent for pulpwood at paper-pulp product manufacturing companies, and as a water softner. About 24,000 short tons of better-grade salt is marketed for food processing, such as pickles, ham, and fish and related applications. International Salt Company imports about 100,000 short tons of mainly ice-control salt from Chile into the Southern Aggregates Dock at Money Point (Figure 16). Also imported into Hampton Roads in 1999, the Port Authority of Virginia reports 42,904 short tons of solar salt from the Bahamas; 20 short tons of edible salt from France; 20 short tons of marine salt from Spain; 89 short tons of resistance salt from India, and 82,947 short tons of deicing salt from Chile. About 300,000 tons is utilized by the Virginia Department of Transportation for distribution across the Commonwealth for snow and ice control. The salt is used also in industrial applications such as bleaching agents for pulpwood at paper-pulp product manufacturing companies. A potassium salt (KCI) is a new product being marketed for use both as a water softner and as a reliable and inexpensive natural source of potassium in diets. Some of the salt is railed from the Potash Corporation of Saskatchewan, Province of Saskatchewan, Canada, into the Hampton Roads area of Virginia, where it is marketed. Bertram (2000) notes that 9.8 million short tons of salt were imported by the United States in 1999, with the major portion imported from Canada.

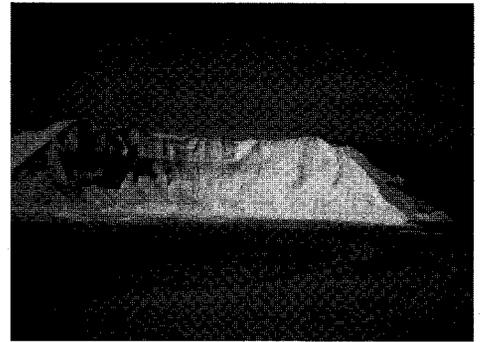


Figure 16: Large stockpile of salt, imported from Chile, to the Southern Aggregates Dock, Money Point, on the Elizabeth River.

VERMICULITE

Virginia is only one of two states in the nation that mines vermiculite. Virginia Vermiculite, Ltd. operates an open-pit mine and processing facility near Boswells Tavern, Louisa County in central Virginia. The vermiculite is mined with a backhoe and front-end loader and is trucked to the adjacent plant. At the plant, pieces of vermiculite greater than four inches in diameter are removed and the remainder is washed and run through a rod mill to shear the vermiculite into thin platelets. Biotite, feldspar, and other impurities are removed by washing the material over a riffle table. The vermiculite is further concentrated by froth flotation; dewatered, dried in a rotary kiln, and screened to produce four basic sized products. More than 45,000 tons were produced in Virginia in 1999.

Crude, unexfoliated vermiculite is shipped (about 50 percent each by truck and by rail) to over 50 destinations. Some outlets include North Dakota, Ohio, West Virginia, North Carolina, as well as a number of other eastern States; some vermiculite is exported to Norway, and Switzerland.

Principal markets are in construction, agriculture, horticulture and general industry. Construction uses include insulation, as an aggregate in lightweight insulating concrete, and premix products such as spray-on insulating-fire resistant plasters. In its expanded form, vermiculite is used extensively in the production of fire-retardant wallboard required in garages and commercial buildings. A vermiculite product is used to coat the interior of airplanes to prevent combustion in the event of a fire. Expanded vermiculite is also used as a light-weight packing material. Agricultural applications include filler in lightweight fertilizers where vermiculite is used as a base carrier and as a growing medium where vermiculite is used in combination with peat moss or bark and other ingredients to produce products such as potting soils used in greenhouses. Vermiculite is also being used as an asbestos substitute in the

manufacturing of brake shoes. In the water pollution control market, it is used as a heavy metal absorber in wastewater streams. A new use is as a carrier for lime in flue gas desulfurization to remove sulfur dioxide and perhaps assist in controlling acid rain.

ZIRCONIUM CONCENTRATES

About 21,105 short tons of zirconium concentrates are railed in bulk, by Iluka Resources, Inc., Virginia, from their plant in Stony Creek, Sussex County to Elizabeth River Terminals (Figure 17). The concentrates are exported to Belgium, Germany, and Italy for use in porcelain.



Figure 17: Stockpile of zirconium concentrates, Elizabeth River Terminals, railed from Iluka Resources, Inc, Virginia, Stony Creek in Sussex County.

TRADE — NAFTA AND FTA

The North American Free Trade Agreement (NAFTA), which went into effect on January 1, 1994, was suppose to eliminate tariffs on goods and services between the United States, Canada, and Mexico over a fifteen-year time span, and would create the world's largest market; some 360 million people, with an economic output of more than \$6 trillion a year. Tariffs on mineral commodities and products from the United States into Canada would be reduced, resulting in a potential increase of exports to that country. In 1998, total three-way trade among Canada, Mexico and the United States rose to about \$752 billion, with Canada-U. S. and Canada-Mexico trade accounting for \$484 billion. Since the implementation of NAFTA, Canada's trade with the United States has risen 80 percent. A contrasting opinion according to the "Fair Trade Watch" of the United Steelworkers of America, where in 1998, Mexican worker's wages fell by 60 percent; there was a \$15.7 billion trade deficit with Mexico, and 600,000 U. S. jobs were lost.

The United States-Canada Free Trade Agreement (FTA), signed in 1988 and went into effect on January 1, 1989, has led to increased merchandise and service exports to Canada. By 1992, merchandise exports to Canada supported 1.5 million jobs in the United States and 602,000 short tons of imports, from Canada, came through the port of Norfolk alone. The NAFTA expanded the extent of coverage under the Canada-U. S. FTA to include virtually all aspects of cross-border trade in services. The agreement also provides for enhanced access and for fair, transparent and non-discriminatory treatment in the provision of cross-border services between the NAFTA members. According to an economic impact study by the Royal Bank of Canada, in June, 1999, it was stated than Canadian merchandise

exports to the United States, expressed in current dollars, have increased by 169 percent (\$101 billion to 271.5 billion), while imports from the United States have increased by 149 percent in the decade since implementation of the FTA.

The Royal Bank of Canada describes the trade as an "explosion" between the United States and Canada. The share of Canadian merchandise exports going to the United States increased from 71 percent in 1989 to 84 percent in 1998. Total Canadian exports in merchandise trade and services to the United States in 1998 were \$297 billion. Canada and the United States currently exchange nearly \$1.5 billion in goods and services each day.

On his first visit to the United States since taking office as President of Mexico, Vicente Fox, on March 22, 2001, called for the United States, Mexico, and Canada to create a common energy policy and also pledged to help California overcome its energy crisis. California, struggling with a tight power supply, has been ordering rolling blackouts; President Fox, in a speech to California lawmakers in Sacramento, promised that Mexico would continue to supply surplus electricity to California.

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