JLV

MONTHLY REPORT

Austinville-Ivanhoe
December, 1967

Summary Overall Operation

Production	Obtained	Quarterly Forecast
Crude Ore		
Zinc-Tons	50,090	52,000
Grade Zn	3.16	3.70
Pb	.59	.60
Zinc Concentrates - Tons	2,385	2,692
Lead Concentrates - Tons	318	316
Costs		
Per Ton Crude Zinc Ore	$ 4.62	$ 4.35
Per Ton Zinc Concentrates	$85.67	$70.45
Less Credits	20.32	21.16
Net Cost of Zinc Concentrates	65.35	49.29
Plus Freight Cost	5.88	5.88
Net Cost of Zinc Conc. Delivered	$71.23	$55.17
Delivered Cost Per Pound of Zinc	.058	.045
Payroll		
Tons Per Total Man Shifts Worked		
Total Tons Crude Ore 50,090 / Total Man Shifts Worked 6,134	8.15	8.35
Accident Record		
Frequency Rate	99.88	
Severity Rate	1199.00	

MINING

Statistical Summary

	December, 1967		Work Program Forecast	
Production & Operating Efficiencies	**Austv.**	**Ivan.**	**Austv.**	**Ivan.**
Tons of Ore from Stoping	37,043	11,389	40,000	12,000
Tons of Ore from Development	1,494	164		
Total Tons of Ore Hoisted and/or Produced	38,537	11,553		
Tons Broken	35,779	13,602		
Broken Reserve	3,486	7,432		
Working Days	20			
Tons Ore Obtained Per Day	2,505		2,600	
Men on Payroll (Hourly, Mine)	199		200	
Percent Attendance (Salary & Hourly)	93.55			
Total Mine Shifts Worked (Hourly)	3,465			
Stope Production Shifts (Hourly) (Drilling, breaking & loading ore out of stopes)	1,414			
Tons Ore Obtained Per Hourly Shift	14.46		15.00	
Tons Ore Obtained Per Production Shift (Stope ore production only)	35.42		36.00	

	Austv.	**Ivan.**	**Austv.**	**Ivan.**
Tons Obtained Per Drilling Shift (Stope ore production only)	55.00	43.11	55.00	46.00
Tons Obtained Per Pound of Explosives	2.16	1.37	2.00	1.40
Tons of Waste Removed	538	491		
Fill Placed in Stopes	--	--		
Development and/or Deadwork				
Feet Advanced	397	266	467	183
Diamond Drilling - Underground	768	472	1,540	580
Diamond Drilling - Surface	730	--		
Deep-Hole Drilling - Feet	228	--		

Pumping

	Austy.	Ivan.
Average Gal./Min Pumped	7,224	1,164

Stoping - Ore Extraction

Production Summary

Method	Level	Tons
Room and Pillar	Total	48,585
" " "	4th	6,295
" " "	5th	7,632
" " "	6th	3,238
" " "	7th	10,634
" " "	11th	9,244
Drifts, Crosscuts, Raises	Ivan.	11,389
	Deadwork	1,658

No improvement was realized in crude tonnage and zinc feed grade. Lead feed grade was on target.

Production from Ivanhoe was on target. The 6th and 7th level production at Austinville was well above target. The 4th level production improved slightly, but did not reach target.

The 11th level production did not improve. Improvement is expected next month as back-making operations in some stopes are completed. Diesel locomotive outage near the end of the month caused some haulage difficulties.

Fifth level production improved materially, but did not reach forecast. Further improvement at this time does not appear feasible.

Some improvement in feed grade is expected next month with a general uptrend in grade observed in stopes at month end.

Number of Stopes Working	51
Number of Stopes Available	59

Development and/or Deadwork

	Austy.	Ivan.
Drifts and Crosscuts	181	41
Raises	216	225
Stripping and Slabbing	15,749 cu. ft.	439 cu. ft.

The heavier vacation load during the holiday season hampered deadwork to some extent and diamond drilling considerably.

The 11th level Brown Ore Body development work was confined to the completion of the initial chute and manway which will con-

stitute part of the ventilation connection to the 7th level. Drawdown of the water table in this area has slowed considerably. Additional test holes were in progress at the end of the month.

The 11-09-70XC was advanced 48 feet. Slabbing for the turn to the Southwest was completed and the 11-17-70 Drift SW advanced 26 feet. Ore was encountered in this area and considerable ground disturbance due to faulting was observed. Ground was sufficiently dry and competent, however, and did not effect progress.

At Ivanhoe, the Simmerman drift bulkhead required additional minor grouting and the drift was not advanced. Other development work proceeded at a satisfactory pace.

Precipitation

Total	3.29 inches
Maximum 12/10/67	1.06 inches

Ventilation

Ventilation was satisfactory throughout the mine.

Capital Authorizations

46-55 Rock Drills

This appropriation was closed.

46-65 Mine Scraper Bucket

This appropriation was closed.

46-67 Mine Locomotive Battery

This appropriation was closed.

46-68 Mine Scraper Buckets

This equipment was received. The appropriation will be closed upon receipt and payment of invoice.

Mine Geology

Diamond Drill Summary

	No. of Holes	No. of Shifts	Feet Cored	Feet Non-C
Underground				
Austinville	4	28	884	56
Ivanhoe	4	17	472	0
Total	8	45	1356	56
Surface				
Austinville	4	--	730	0
Ivanhoe	0	--	0	0

AUSTINVILLE MINE

Underground Cored Holes - Summary

Area	No. of Ore Holes*	No. of Non-Ore Holes	No. of Holes Completed	To Le
Chiswell Hole		1		
NE	1	3	1	172'
			3	712'

*Mineable

Underground Cored Holes - Detail

Hole No.	Area	Lev	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
U-1631	SW	6	58	Assay Data Only		5' 3.0 Zn, 2.7 Pb
U-1635	NE	5	117.4	32	237'(Deepened)	20' Barren
				Assay Data (See Oct. Report)		4' 1.2 Zn, Nil Pb
						17' Barren
U-1640	NE	5	117.4	5'		3' 1.0 Zn, Nil Pb
U-1642**(5)	NE	5	23 P	128'	205'	40' Barren (130'-205')
					210'continuing	10' Barren
						13' Est. Tr Zn, Nil Pb
						15' Est. Tr Zn, Tr Pb
U-1643**(1)	Ch.Hl. 4	50	172'		172'	80' Barren
						142' Barren

**(1) Defines known ore - No reserve change.
**(5) New mineralization - No reserve change.

Hole No.	Area	Lev	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
U-1644**(5)	NE	5	117.4	130	130'	113' Barren 2' Est. 2% Zn, 3% Pb 15' Barren
U-1645**(3)	NE	5	113	125	125'	7' Barren 4' Est. 2% Zn, Nil Pb 36' Barren 6' Est. 1½% Zn, ½% Pb 20' Barren 1' Est. 0.2% Zn, Nil Pb 11' Barren 19' Est. 4% Zn, 1% Pb 22' Barren
U-1646	NE	5	113	120	Inc.	5' Barren 1' Est. 3% Zn, Nil Pb 5' Est. 0.3% Zn, 0.8% Pb 6' Est. 4% Zn, ½% Pb 14' Ra Scat Tr Pb 2' Est. 1% Zn, 4% Pb 52-120' Not seen - will be included in Jan. Report

**(3) Defines and increases known ore.
**(5) New mineralization - No reserve change.

Underground Non-Cored Holes

Hole No.	Area	Lev	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
NC-530	100 O.B.	10SL	90.2	56'	56'	Drilled for power cable
NC-531	NE	11	91	0	--	just begun

Surface Exploration Holes

A-687	Aust.SW	04	None	Assays only:	6' 3.6 Zn (+0.5 Sol. Zn) 0.1 10' Est. 0.1 Zn 14' 0.7 Zn (+0.5 Sol.Zn) Tr 24' 0.8 Zn (+0.2 Sol.Zn)0.5 8' 8.0 Zn (+0.1 Sol Zn) 0.7
A-688	Aust.SW	12	210	210	6' Est. Nil, 1. 39' Barren 1' Est. Nil, 1 35' Barren 4' Est. 0.3, 0.1
A-689	Aust.SW	16	120	120	4' Est. 0.1, 0.2 10' (1' Recov) B ore
A-690	Aust.SW	12	195	195	45' Local trace min. 12' Est. 8, 2

Hole No.	Area	Lev	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
A-691	Aust.SW		108	198	198	10' Est. 0.8, 0.1 16' Est. 1.0, 1.0 47' Est. 7.5, 0.6
A-69?	Aust.SW		24	50	Inc.	Overburden, only

IVANHOE MINE

Underground Cored Holes - Summary

Area	No. of Ore Holes*	No. of Non-Ore Holes	No. of Holes Completed	Total Length
Rdl-Sharp	1	3	3	472'

*Mineable

Underground Cored Holes - Detail

Hole No.	Area	Lev	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
J-569	Sharp O.B.	6	33	Assay Data Only		0-3' 0.5 Zn, 0.2 Pb 46' 2.6 Zn, 1.9 Pb 6' 0.3 Zn, 0.9 Pb
J-572**(1)	Sharp O.B.	6	29	65'	130'	0-90' Barren 4' Est. 0.1% Zn, Nil Pb 3' Est. 2½% Zn, Nil Pb 33' Est. Scat Tr Zn & Pb
J-573**(3)	Sharp O.B.	6	29	180'	180'	0-89' Barren 5' Est. 8% Zn, Tr Pb 8' Est. Tr Zn, Nil Pb 13' Est. 1.0% Zn, 0.2% Pb 25' Est. 0.2% Zn, Tr Pb 14' Est. 1.0% Zn, ½% Pb 7' Est. Tr Zn, Nil Pb
J-574	Sharp O.B.	6	37	135'	135'	Barren
J-575	Sharp O.B.	6	33 #4	92'	Inc.	Barren to date

**(1) Defines known ore --- No reserve change.
**(3) Defines and increases known ore.

Underground Non-Cored Holes

None

Surface Exploration Holes

None

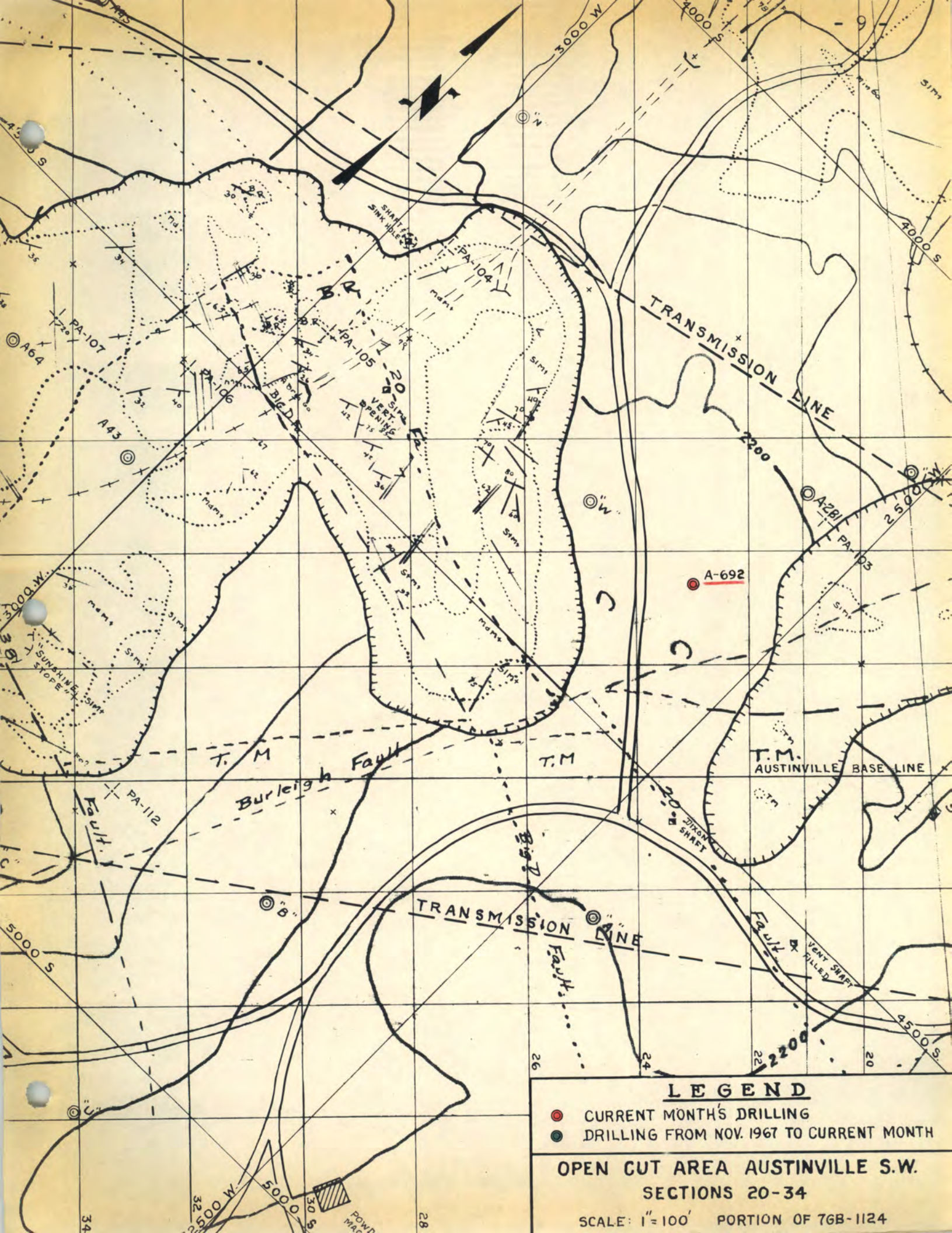
LEGEND

- = CURRENT MONTH'S DRILLING
- = DRILLING FROM NOV. 1967 TO CURRENT MONTH

OPEN CUT AREA AUSTINVILLE S.W.

SECTIONS 01-18

SCALE: 1" = 100' PORTION OF 7GB-1124



LEGEND

- CURRENT MONTH'S DRILLING
- DRILLING FROM NOV. 1967 TO CURRENT MONTH

OPEN CUT AREA AUSTINVILLE S.W.

SECTIONS 20-34

SCALE: 1" = 100' PORTION OF 7GB-1124

MILLING

Statistical Summary

Production Data	December 1967	Work Program Forecast
Tons of Ore Milled	50,090	52,000
Days Worked	20	
Tons Per Day	2,505	2,600
Tons Per Operating Hour	114.4	
Tons of Concentrates		
Zinc	2,385	
Lead	318	
Concentration Ratio for Total Concentrates	18.5	
Metallurgical Comparison		
Feed - % Zinc	3.2	3.7
% Lead	.59	.60
% Oxidized Zinc	.13	
Zinc Concentrate - % Zinc	61.5	61.5
% Lead	.38	
% Zinc Recovery	92.7	92.4
% Sulfide Zinc Recovery	96.7	
Lead Concentrate - % Zinc	2.3	
% Lead	76.8	76.0
% Lead Recovery	82.4	76.9
Tailings - % Zinc	.23	
% Lead	.09	
Operating Time		
Hours Operated	438.12	
Hours Unscheduled	240.00	
Hours Lost	41.88	

Composite Screen Analysis of Flotation Feed

Mesh	Cumulative % Retained
On 48	6.6
65	18.0
100	33.6
150	45.9
200	57.7
270	62.9
Minus 270	37.1

Mill Operation

Zinc metallurgy was normal except for lower than forecast feed grade.

Lead metallurgy was good. A higher than forecast recovery was achieved. Five and one-half unit shifts were lost waiting for ore to accumulate.

Major Mill Maintenance

No major mill maintenance was necessary during December.

Engineering and Maintenance

Yard Track Extension - Approp. 46-63

Ties were placed on the roadbed and treated with creosote.

Additional Air Compressor - Approp. 46-66

The foundation was completed and the compressor was set and grouted on its base.

Limestone & Waste Rock

Limestone

Tons, Production	39,805
Tons Sold, Unprocessed	48,577
Tons Sold, Dried	2,155
Total Tons Sold	50,732

Production was from the 14-inch and 6-inch cyclones in combination. Virtually all production was stocked in the lower plant for damp rail shipments and the limestone dryer plant.

Waste Rock

Production	3,463
Tons Sold	1,680

Limestone Sales

Although cumulative sales for the year, January through December, exceeded sales for 1966 by approximately 30,000 tons, another 13,000 tons would have had to be sold to equal or exceed the most tonnage shipped in any one calendar year.

Despite severe weather conditions, orders for limestone continue to be placed. Customer stockpiles were depleted during favorable weather conditions this fall, and due to a railroad car shortage customers were unable to replace the limestone.

A 10% cut by Congress in funds appropriated for the operation of the Agricultural Conservation Program in 1968 is sure to adversely affect limestone sales. Agricultural Stabilization and Conservation Service officials in both Virginia and North Carolina do not feel the use of limestone will be greatly affected but will not commit themselves definitely.

PERSONNEL DEPARTMENT

Employee Relations

There were no meetings held with the Union during the month of December.

Grievances

The John E. Dean Grievance was denied by the Company in Step 4, and this answer was accepted by the Union.

The Company offered to pay Ira J. Poole as requested in his grievance; however, the Union has rejected this offer and advanced the grievance to arbitration.

The Glen I. Ingo Grievance is scheduled for arbitration January 5, 1968.

Visitors

None

Real Estate

Rental unit 123 was dismantled during the month of December and removed from the available rental units. Of the 95 rental units available, 84 are occupied.

The real estate account showed a gain of $354.45 for the month of December with an accumulative gain of $3,089.53 for the first five months of the fiscal year.

Safety

The Company-Union Safety Committee meeting was held on December 21, 1967.

There were no departmental safety meetings held in December.

National Safety Council calendars were mailed to each employee at his home. Windshield scrapers with our safety slogan imprinted were distributed to all employees along with a letter from the Superintendent promoting safety.

COST SUMMARY

	COST PER TON OF ORE			
	AUSTINVILLE		IVANHOE	
	DECEMBER 1967	FORE-CAST	DECEMBER 1967	FORE-CAST
Mining				
Development	$ .39	$ .40	$ .46	$ .44
Stoping	.92	.86	.99	.86
Loading & Hauling	.37	.28	.22	.23
Hoisting	.21	.17	.31	.31
Drainage	.30	.27	.18	.16
Ventilation	.00	.01	.01	.01
Compressed Air	.08	.09	.08	.05
Equipment Maintenance	.18	.12	.44	.19
Rock Drilling	.16	.15	.14	.14
General Mining Expense	.47	.41	.36	.31
Total Mining	$ 3.08	$ 2.76	$ 3.19	$ 2.70

	COST PER TON OF ORE	
	DECEMBER 1967	FORE-CAST
Mining (Combined)	$ 3.10	$ 2.75
Milling		
Crushing Primary	$ .03	$ .03
Crushing Secondary	.09	.08
Grinding	.19	.20
Flotation	.19	.18
Filtering & Drying	.05	.05
Loading Concentrates	.02	.01
Tailings Disposal	.01	.01
General Milling Expense	.13	.13
Total Milling	$ .71	$ .69
General Indirect		
General	$ .10	$ .10
Clerical	.14	.12
Personnel	.10	.09
General Plant Maintenance	.08	.09
Fixed Charges	.39	.38
Total General Indirect	$ .81	$ .78
Total Cost Per Ton of Ore	$ 4.62	$ 4.22
Total Cost Per Ton of Zinc Conc.	$ 85.67	$ 68.37
Delivered Cost Per Pound of Zinc	$ .058	$ .046

Crude ore production and grade were below the estimate thus setting the stage for a poor month. However this was aggravated by a paid holiday and an accumulation of normally and hopefully infrequent cyclical charges, the major ones being complete overhaul of a diesel locomotive at Ivanhoe, the annual delivery of fuel oil at Flatwoods Shaft, replacement of hoisting ropes in the cage compartment of Van Mater Shaft, and the moving expense of a transferred Mine Engineer, Mr. Almon.

One diesel locomotive was out of service essentially throughout the month which adversely affected crude ore haulage to Austinville, and because of necessary two-shift haulage from Ivanhoe, Austinville 11th level Section 40 and 100 haulage was restricted.

The primary contributors to such high costs remain crude tonnage and grade which is below target, and every effort will continue to achieve or better the estimated optimum productive capacity of the Austinville-Ivanhoe Mines.

The weather during December was extremely wet, cold and not conducive to spreading operations; therefore, limestone sales were not as good as had been anticipated. As a result of this and the comparatively lower lead concentrate production, the combined credits, though most welcome, served only to reduce the concentrate and/or metal cost to a figure which was still substantially above target.

ORIGINAL SIGNED
By K. R. Winslow

K. R. Winslow
Superintendent

Attachments:
Status of Capital Expenditures
Real Estate Report
Monthly Labor Report
Comparative Accident Records
Supply Balances

cc: Mr. W. T. Pettijohn, N. Y. (4)
Austinville (3)

STATUS OF CAPITAL EXPENDITURES

December, 1967

Project & No.	Authorized	Current Expense	Year to Date	Total to Date	Unexpected Balance
(c) 46-09 Rock Plant	$86,250	$ --	$ 1,19[illegible]	$86,230	$ 20
(c) 46-55 Rock Drills	96,000	--	50,625	95,625	[illegible]375
(a) 46-63 Yard Track Extension	8,500	302	4,774	4,774	3,726
(c) 46-64 Pulverizer-Mixer	16,000	188	15,095	15,095	905
(c) 46-65 Mine Scraper Bucket	980	--	980	980	70
(a) 46-66 Air Compressor	35,000	30,708	31,739	31,739	3,261
(c) 46-67 Mine Locomotive Battery	4,300	--	4,121	4,121	179
(a) 46-68 Mine Scrapers	3,300	--	--	--	3,300
(a) 46-69 Ivanhoe Sump Level Warning	2,600	--	--	--	2,600

(a) Equipment on order - installation in progress
(b) Expected to be closed next month
(c) Appropriation closed this month

Mill Notes - December, 1967

MISCELLANEOUS DATA

Shifts Worked	60
Mill Feed % Moisture	1.73

METEROLOGICAL OBSERVATIONS

Outside air temperature, degrees F. at 7:00 A.M.

Average	36°
Maximum	59°
Minimum	20°

PRECIPITATION, INCHES

Total 3.29
Maximum 1.06 Date 12/10/67

POWER FOR GRINDING	KWH PER TON
Symons Crushers	.252
Gyrasphere Crushers	.248
8x12 Marcy Rod Mills	4.991
Tricone Ball Mill	2.218
4x10 Marcy Regrind Mills	.244
TOTALS	7.953

MOBILE EQUIPMENT MAINTENANCE

Overhauled the right and left cutting clutches and the left track adjustment on No. 2 bulldozer and replaced five worn track rollers. Replaced four worn track rollers on No. 3 bulldozer.

Installed a new water pump in No. 4 front end loader. Replaced a broken output shaft in No. 1 mine locomotive transmission. Removed the engine from No. 2 locomotive and sent it to the repair shop for rebuilding.

REAL ESTATE MAINTENANCE

Refinished floors in two rooms, leveled floors and repaired flue in house No. 134.

Painted the interior of house No. 409.

Maintenance Notes - December, 1967

Mill

11/27/67 - Replaced one flight in the zinc concentrate dryer. Repaired 7-A tailing pump. Installed new bearings, impeller and a used shaft. Replaced two outer and two inner wear shoes on the West Wemco classifier. Installed 60' of 6" 901 plastic coated schedule 10 aluminum pipe in tailing line to the bottom. Replaced a 4' section of cover over the return side of the West weightometer conveyor belt. Repaired the West lead froth pump discharge pipe line. Replaced a 1" plug valve in water pipe line under #1 East tailing thickener.

11/28/67 - Installed a new Space Ray Model F-100B infra-red gas heater at the zinc concentrate dryer. Installed a 20' section of 6" rubber hose pipe in tailing line to the bottom.

11/29/67 - Welded a ¼" thick band on the transportmeter conveyor snub pulley. Replaced check valve body in zinc thickener ODS pump-suction side.

12/ 4/67 - Repaired the East Wemco classifier. Installed one new "A" flight, two inner and two outer wear shoes. Replaced one spiral flight in the zinc concentrate dryer. Repaired the East Symons screen. Installed four #56 spacer rubbers and two wear plates. Replaced spray water pipe line on south launder of #1 lead rougher.

12/11/67 - Installed 30' of 6" 901 plastic coated schedule 10 aluminum pipe in tailing line to bottom. Replaced four outer wear shoes on the West Wemco classifier. Replaced south side wear rubber under the West Gyrasphere crusher. Replaced 5' section of 4" rubber hose in the West Gyrasphere conveyor belt cleaner sump discharge pipe line. Rebuilt two of the 6" tailing cyclone classifiers. Replaced rubber tail skirt on the West screen conveyor belt.

12/13/67 - Replaced bearings in the lead concentrate pump.

12/18/67 - Replaced two outerwear shoes on the East Wemco classifier. Installed a new suction shell half liner in 7-A tailing pump. Repaired #1 East conditioner. Installed a new wear plate, support channels, stand pipe and sand relief pipe line. Repaired lead concentrate pump gland water line.

Maintenance Notes - December, 1967

Electric Shop

11/27/67 - Repaired wiring and replaced breaker on mill light circuit. Changed oil in 75 kw. generator. Replaced coil in water pump starter for main plant boiler. Replaced plug on Atlas locomotive on 7th level.

11/28/67 - Repaired wiring on slusher on 11th level. Replaced contactor on locomotive at Ivanhoe shaft. Replaced two units in electric heater at limestone dryer. Replaced motor on locomotive on 5th level.

11/29/67 - Relocated slusher on 7th level. Repaired telephones on 11th level. Repaired telephone in rock house. Repaired controller on 2½ ton locomotive. Replaced motor on 2½ ton locomotive.

11/30/67 - Repaired controller on locomotive at Ivanhoe shaft. Repaired wiring on slusher on 11th level. Replaced motor on heater fan in mine engineers office. Repaired commutator on #7 air compressor generator.

12/ 1/67 - Repaired wiring on bag conveyor at limestone dryer. Repaired contactor on locomotive on 11th level. Replaced thermostat on oil filter for Symons crusher. Replaced light switch in mill.

12/ 4/67 - Cleaned and checked contacts on numbers 1, 2, 3, and 4 air compressors. Relocated telephone line on 7th level. Cleaned and checked controls on Vulcan hoist. Repaired telephone on 11th level. Cleaned and checked controls on mine crusher.

12/ 5/67 - Replaced motor on 2½ ton locomotive. Repaired light circuit in mill. Relocated slusher on 7th level. Repaired telephone on 11th level. Repaired controller on locomotive on 11th level.

12/ 6/67 - Repaired motor on exhaust fan at limestone dryer. Repaired wiring on slusher on 11th level. Relocated slusher on 11th level. Removed starter for slusher from 11th level for use at Ivanhoe.

12/ 7/67 - Replaced breaker on slusher at Ivanhoe shaft. Cleaned and checked contacts on mine pumps at Ivanhoe shaft. Replaced motor on locomotive on 11th level. Repaired mine air light. Replaced lamps in hoist room.

12/ 8/67 - Installing alarm system for sump flood condition on air compressors at Ivanhoe shaft. Repaired wiring on slusher on 3rd level. Cleaned and checked controls on Ivanhoe shaft. Repaired vibrator

on box car loader at damp bulk limestone loading site. Repaired wiring on locomotive on 11th level.

12/11/67 - Repaired control circuit on flume pumps supplying water for Flatwoods shaft. Cleaned and checked controls on Vulcan hoist. Repaired wiring on locomotive on 7th level. Replaced start-stop button on boxcar puller at limestone dryer.

12/12/67 - Relocated slusher cable on 7th level. Repaired wiring on locomotive on 11th level. Repaired wiring on slusher at Ivanhoe shaft. Cleaned and checked controls on mine pumps. Repaired reagent feed motor for mill.

12/13/67 - Replaced bearing in shop electric welder. Replaced motor on slusher on 7th level. Cleaned and checked controls on mine pumps at Ivanhoe shaft. Repaired telephone on 8th level at Ivanhoe shaft. Repaired wiring on slusher on 7th level at Ivanhoe shaft.

12/14/67 - Repaired transceiver at yard office. Replaced outlets at zinc dryer with grounded type outlets. Installed lights on trees in New Town and decorations at recreation hall for Christmas. Replaced lights in garage for water truck at Ivanhoe shaft.

12/15/67 - Replaced bearings in car loader motor at limestone dryer. Relocating cable for battery chargers on 4th level. Repaired wiring on boxcar loader at limestone dryer. Repaired mine air light.

12/18/67 - Cleaned and checked contacts on Vulcan hoist. Repaired telephone system in mill. Cleaned and checked controls on mine crusher. Replaced amp meter on battery charger on 5th level. Repaired wiring on conveyor at rock crushing plant at Ivanhoe.

12/19/67 - Relocating cable for slusher on 11th level. Repaired meter for mine locomotive. Moved cable on 4th level at Ivanhoe to make way for blasting in area. Repaired wiring on locomotive on 4th level.

12/20/67 - Installed new wire to battery charger on 4th level. Repaired wiring on lights on diesel engine. Repaired wiring on bag conveyor at limestone dryer. Installing conduit for #8 air compressor.

12/21/67 - Repaired wiring on slusher on 4th level. Replaced controller on locomotive on 11th level. Repaired two lights at house No. 147. Repaired two air lights. Repaired weightometer at limestone dryer.

12/22/67 - Repaired controller on locomotive on 11th level. Read all plant kilowatt hour meters. Repaired blasting machine. Changed oil in #1, 2 and 3 air compressors and No. 3 and 4 compressor generators.

Maintenance Notes - December, 1967

Machine Shop

11/29/67 - Set up mine crusher ½", making a total of 2½" shims.

12/ 2/67 - Mine crusher repair; a total of 24 man-hours required for the job as follows:
1. Built up heads of check plate bolts with hand-weld rods
2. Built up chute wear plates
3. Repaired flatform (for operator's use)
4. Replaced missing bolts
5. Tightened all loose bolts
6. Installed new finger spacers.

12/ 4/67 - Lubricated Vulcan hoist cables.

Due to a broken shaft, the assembly of #5B mine pump V. M. Shaft, was removed and replaced with a rebuilt shaft assembly. The assembly which was removed had run a total of 82 hours and was rebuilt at a cost of $247.44 for parts and $27.84 for labor, making a total cost of $275.28 for the job.

12/ 7/67 - Due to mechanical water seal failure and a badly worn shaft, the shaft assembly of #5B mine pump was removed and replaced with a rebuilt assembly. The assembly which was removed had run a total of 12 hours and was rebuilt at a cost of $247.58 for parts and $19.94 for labor, making a total cost of $267.52 for the job.

12/ 9/67 - Installed 2 new 1575 ft. 6x27 H FS purple lang FC flattened cables on the Lidgerwood hoist. Also lubricated the cables after installation, 47 man-hours being required to complete the job.

12/12/67 - Lubricated the Lidgerwood hoist cables.

12/15/67 - Due to mechanical water seal failure the shaft assembly of #7B1 mine pump, Ivanhoe Shaft, was removed and replaced with a rebuilt assembly. The assembly which was removed had run a total of 1059 hours and was rebuilt at a cost of $46.76 for parts and $24.37 for labor, making a total cost of $71.13 for the job.

12/18/67 - Installed a rebuilt ore skip in the south skip compartment, the one removed having been in service since 5/22/67. Work was started immediately reconditioning the one which was removed.

JLV
NCS

02-153

Month of - DECEMBER 1967

AGRICULTURAL LIMESTONE STOCKING RECORD

Lower Plant -- Site No. 2,4,6&8

Tons Stocked. 28,914

Total Tons Stocked, to Date. 161,269 .

Lower Plant -- Site No. 10 & 11

Tons Stocked. 10,035

Total Tons Stocked to Date. 25,053

Austin Meadows--Site No. 5

Tons Stocked. 856

Total Tons Stocked to Date. 33,270

_____

Tons Stocked. _____

Total Tons Stocked to Date. _____

_____

Tons Stocked. _____

Total Tons Stocked to Date. _____

TOTAL TONS STOCKED. 39,805

JKV

MONTHLY REPORT

Austinville-Ivanhoe
November, 1967

Summary Overall Operation

Production	Obtained	Quarterly Forecast
Crude Ore		
Zinc Tons	52,930	54,600
Grade Zn	3.30	3.70
Pb	.60	.60
Zinc Concentrates - Tons	2,604	3,037
Lead Concentrates - Tons	348	332
Costs		
Per Ton Crude Zinc Ore	$ 4.49	$ 4.23
Per Ton Zinc Concentrates	$80.47	$68.57
Less Credits	30.81	27.33
Net Cost of Zinc Concentrates	49.66	41.24
Plus Freight Cost	5.88	5.88
Net Cost of Zinc Conc. Delivered	$55.54	$47.12
Delivered Cost Per Pound of Zinc	.045	.039
Payroll		
Tons Per Total Man Shifts Worked		
Total Tons Crude Ore 52,930 / Total Man Shifts Worked 6,404	8.40	8.35
Accident Record		
Frequency Rate	48.14	
Severity Rate	948	

MINING

Statistical Summary

	November, 1967		Work Program Forecast	
	Austv.	Ivan.	Austv.	Ivan.
Production & Operating Efficiencies				
Tons of Ore from Stoping	37,466	13,354	42,000	12,600
Tons of Ore from Development	2,110	--		
Total Tons of Ore Hoisted and/or Produced	39,576	13,354		
Tons Broken	39,216	12,278		
Broken Reserve	4,750	4,933		
Working Days	21			
Tons Ore Obtained Per Day	2,520		2,600	
Men on Payroll (Hourly, Mine)	192		200	
Percent Attendance (Salary & Hourly)	91.61			
Total Mine Shifts Worked (Hourly)	3,595			
Stope Production Shifts (Hourly) (Drilling, breaking & loading ore out of stopes)	1,512			
Tons Ore Obtained Per Hourly Shift	14.72		15.00	
Tons Ore Obtained Per Production Shift (Stope ore production only)	35.01		36.00	
	Austv.	Ivan.	Austv.	Ivan.
Tons Obtained Per Drilling Shift (Stope ore production only)	48.07	48.65	55.00	46.00
Tons Obtained Per Pound of Explosives	1.94	1.05	2.00	1.40
Tons of Waste Removed	929	1,048		
Fill Placed in Stopes	--	--		
Development and/or Deadwork				
Feet Advanced	463	147	467	183
Diamond Drilling - Underground	967	432	1,540	580
Diamond Drilling - Surface	180	--		
Deep-Hole Drilling - Feet	--	--		

Pumping

	Austv.	Ivan.
Average Gal./Min. Pumped	6,940	1,130

Stoping - Ore Extraction

Production Summary

Method	Level	Tons
Room and Pillar	Total	50,943
" " "	4th	7,072
" " "	5th	6,286
" " "	6th	2,688
" " "	7th	11,079
" " "	11th	10,341
" " "	Ivan.	13,354
Drifts, Crosscuts, Raises	Deadwork	2,110

Zinc feed grade was well below target and crude tonnage, although improved was also less than forecast. Lead feed grade was on target.

Production from Ivanhoe and the 6th and 7th levels at Austinville were well above target.

Fourth level production improved but did not reach target. Further improvement is anticipated.

Eleventh level production improved but did not reach forecast due, in part, to back-making operations in some stopes and also continuing haulage difficulties resulting from diesel locomotive outage. Both diesels were operative at the end of the month.

Fifth level production continued to be well below target tonnage. Recently completed reserve studies indicate that the depletion rate for this level may be unrealistic.

General deterioration of grade in Austinville stopes resulted in the below forecast zinc feed grade. Major improvement is not anticipated until mining of many remnant stopes is completed and better grade reserve blocks can be brought into production.

Number of Stopes Working	51
Number of Stopes Available	60

Development and/or Deadwork

	Austv.	Ivan.
Drifts and Crosscuts	198	120
Raises	265	27
Stripping and Slabbing	20,414 cu. ft.	1,094 cu. ft.

Development work proceeded at a satisfactory pace with a lighter vacation load.

The 11-48-91 Drift NE was advanced 49 feet in competent, relatively dry ground. Slabbing for a loading chute was completed and the chute raise started. This raise will constitute part of the initial ventilation connection to the 7th level.

Drainage of water from the deep pilot hole in the face of the 11-48-91 Drift SW is still effecting a drawdown of the water table, but at a slower rate. Additional test holes are planned.

The 11-09-70 XC was advanced 49 feet and slabbing for the turn to the Southwest commenced.

At Ivanhoe, the Simmerman drive was advanced 60 feet. Minor grouting work was required on the bulkhead and further testing is in progress.

Underground diamond drilling at Austinville was hampered by the absence of members of the skilled crews.

Cleaning of the 5th level sumps was completed.

Precipitation

Total	0.91 inches
Maximum	0.26 inches

Ventilation

Ventilation was satisfactory throughout the mine.

Dust counts of samples taken from the main air stream coursing through the Austinville-Ivanhoe tunnel on the 11th level were well within permissible limits. These samples were taken during periods of maximum concentration.

The use of a water spray in the tunnel to reduce dust concentrations was tested with positive results. Experimentation with this procedure will be continued as the availability of manpower permits.

Capital Authorizations

46-55 Rock Drills

This appropriation will be closed next month.

46-65 Mine Scraper Bucket

Late receipt of invoice deterred closing of this appropriation. It will be closed next month.

46-47 Mine Locomotive Battery

Late receipt of invoice prohibited closing this appropriation. It will be closed next month.

46-68 Mine Scraper Buckets

This equipment is on order.

Mine Geology

Diamond Drill Summary

	No. of Holes	No. of Shifts	Feet Cored	Feet Non-Cored
Underground				
Austinville	6	38½	967	0
Ivanhoe	4	16	432	0
Total	10	54½	1399	0
Surface				
Austinville	1	----	180	----
Ivanhoe	----	----	--	----

AUSTINVILLE MINE

Underground Cored Holes - Summary

Area	No. of Ore Holes*	No. of Non-Ore Holes	No. of Holes Completed	Total Length
SW	0	2	2	355
NE	0	3	4	612

*Mineable

Underground Cored Holes - Detail

Hole No.	Area	Lev	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
U-1635	NE	5	117.4	45	205	continuing 29' Barren
U-1637**(5)	NE	5	15 P	120	303	continuing 48' Barren
U-1638	NE	5	117.4	165	165	103' Barren
U-1639	SW	4	50.2	155	155	0' Barren (drilled parallel to bedding)
U-1640	NE	5	117.4	200	200	65' Barren (130'-200' not seen)
U-1641	SW	4	50.2	200	200	0' Barren (drilled parallel to bedding)
U-1642	NE	5	23 P	82	Inc.	75' Barren

**(5) New mineralization. No reserve change.

Underground Non-Cored Holes

None

Surface Exploration Holes

A surface diamond drilling program has begun, to help decide and to guide a possible open pit mining venture SW from the Van Mater Shaft. The E. J. Longyear Company is doing this under contract. A map will be attached each month to this report to locate the current drilling.

Hole No.	Area	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
A-687	Aust. SW	04	180	180	6' Est. 1.5% Zn, Trace Pb 24' Est. 0.2% Zn, Trace Pb 24' Est. 0.5% Zn, 0.2% Pb 8' Est. 8% Zn, 0.1% Pb

IVANHOE MINE

Underground Cored Holes - Summary

Area	No. of Ore Holes*	No. of Non-Ore Holes	No. of Holes Completed	Total Length
Rdl-Sharp	2	2	4	432'

Underground Cored Holes - Detail

Hole No.	Area	Lev	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
J-567	Sharp O.B.	5	17.4	Assay Data Only		0-6' 7.2 Zn, 0.6 Pb 9' 0.7 Zn, Tr Pb 15' 5.4 Zn, 0.4 Pb
J-568**(3)	Sharp O.B.	6	17 P	105'	180'	17'-59' 1.5 Zn, 1.0 Pb (40' Est. True Thickness) 66' Est. Tr Zn, Scat Tr Pb
J-569**(4)	Sharp O.B.	6	33 P	112'	112'	0-30' Est. 4½% Zn, 1½% Pb 6' Est. Tr Zn, Nil Pb 18' Est. 1½% Zn, ½% Pb 11' Est. 0.2% Zn, Tr Pb 8' Est. Nil Zn, Tr Pb 6' Est. ½% Zn, Tr Pb

**(3) Defines and Increases Known Ore.
**(4) New Ore Lens - Increases Reserve.

* Mineable

Hole No.	Area	Lev	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
J-570**(5)	Sharp O.B.	6	33 P	60'	60'	0-24' Barren 4' Est. Nil Zn, 1% Pb
J-571	Sharp O.B.	6	31 P	90'	90'	Barren (1' Pb Min @ 74')
J-572	Sharp O.B.	6	29 P	65'	Inc.	0-43' Barren 43-65' Not seen; will be included on Dec. Report

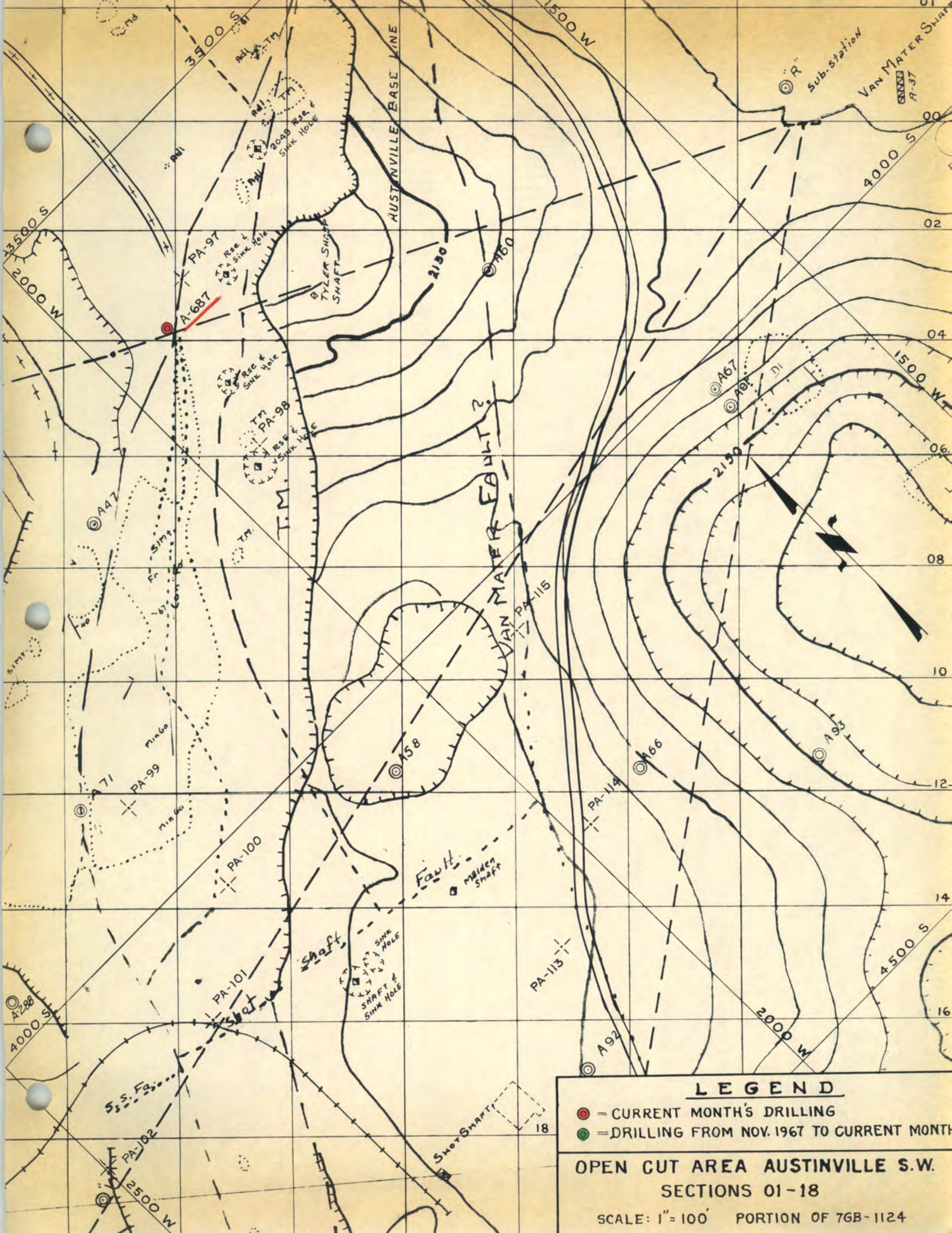
**(5) New Mineralization - No Reserve Change.

Underground Non-Cored Holes

None

Surface Exploration Holes

None


LEGEND
= CURRENT MONTH'S DRILLING
= DRILLING FROM NOV. 1967 TO CURRENT MONTH
OPEN CUT AREA AUSTINVILLE S.W.
SECTIONS 01-18
SCALE: 1" = 100'
PORTION OF 7GB-1124
AUSTINVILLE BASE LINE
VAN MATER FAULT
VAN MATER SHAFT
A-37
"R" Sub-station
TYLER SHAFT
Maiden Shaft
SHOT SHAFT
Fault
S.S. Fault
T.M.
3500 S
4000 S
4500 S
2000 W
1500 W
2500 W
2130
2150
A-687
PA-97
PA-98
PA-99
PA-100
PA-101
PA-102
PA-113
PA-114
PA-115
A47
A71
A58
A60
A66
A67
A92
A93
A288
Rse & Sink Hole
2049 Rse & Sink Hole
Sink Hole
Shaft & Sink Hole
Shaft
Shot
Mingo
Slmt
01
02
04
06
08
10
12
14
16
18

MILLING

Statistical Summary

Production Data	November 1967	Work Program Forecast
Tons of Ore Milled	52,930	54,600
Days Worked	21	
Tons Per Day	2,520	2,600
Tons Per Operating Hour	115.6	
Tons of Concentrates		
Zinc	2,604	
Lead	348	
Concentration Ratio for Total Concentrates	17.9	
Metallurgical Comparison		
Feed - % Zinc	3.3	3.7
% Lead	.60	.60
% Oxidized Zinc	.14	
Zinc Concentrate - % Zinc	61.8	61.5
% Lead	.33	
% Zinc Recovery	92.7	92.4
% Sulfide Zinc Recovery	96.8	
Lead Concentrate - % Zinc	2.1	
% Lead	76.5	76.0
% Lead Recovery	84.4	76.9
Tailings - % Zinc	.24	
% Lead	.08	
Operating Time		
Hours Operated	455.21	
Hours Unscheduled	241.00	
Hours Lost	48.79	

Composite Screen Analysis of Flotation Feed

Mesh	Cumulative % Retained
On 48	6.9
65	17.7
100	32.1
150	44.2
200	55.7
270	60.9
Minus 270	39.1

Mill Operation

Zinc metallurgy was normal except for a lower-than-forcast feed grade.

Lead metallurgy was good, a higher than forecast recovery was achieved with a slightly higher than forecast concentrate grade.

Six unit shifts were lost waiting for ore to accumulate.

Major Mill Maintenance

No major mill maintenance was necessary during November.

Engineering and Maintenance

Ivanhoe Rock Plant - Approp. 46-09

The rail car loading ramp was essentially completed and the appropriation for the rock plant was closed at the end of November.

Yard Track Extension

Little progress was made on this project. Some ties were placed and treated with creosote preservative.

Additional Air Compressor - Approp. 46-66

The form for the foundation was ready for pouring concrete at the end of November.

Limestone & Waste Rock

Limestone

Tons, Production	41,982
Tons Sold, Unprocessed	72,646
Tons Sold, Dried	3,524
Total Tons Sold	76,170

Production was from the 14-inch and 6-inch cyclones in combination. Except for 850 tons stocked in the Austin Meadows site during pipeline repairs all stocking was in the lower plant for damp limestone shipments or for use at the drying plant.

Waste Rock

Production	3,485
Tons Sold	1,265

Limestone Sales

Total sales for the month, amounting to 76,170 tons, represent a decrease of approximately 12,000 tons less than was sold during the same month last year. Orders on hand that could not be filled because of the railroad car shortage far exceeded the tonnage needed to equal sales in November, 1966.

Cumulative sales, January through November, are the largest tonnage sold during any similar period in the past. If the car shortage does not become more severe, a new record for total tons sold in any one year, January through December, may be established in 1967.

Sales of both dry bulk and bagged limestone through November have exceeded the total tonnage sold during the entire year of any previous year.

Except for the last few days of the month, ideal weather for the operation of spreader trucks on the field prevailed throughout our sales area. Most of the customers' stockpiles are depleted, thus orders for limestone will continue to be placed regardless of weather conditions.

Personnel Department

Employee Relations

One meeting was held with the Union during November. This meeting was for the purpose of discussing two grievances in Step 4.

Grievances

The Company has given Step 4 answers for the John E. Dean Grievance and the Ira J. Poole Grievance to the Union. They have requested an extension of time to reply to these grievances.

The Glen I. Ingo Grievance is tentatively scheduled for arbitration January 5, 1968.

Visitors

Date	Name	Company Affiliation	Location
11/21/67	Dr. Henry S. Brown and group of students	Department of Geoscience North Carolina State University	Raleigh, N. C.
11/13/67 and 11/14/67	Mr. J. J. Guin, Jr.	Employee Relations Department The New Jersey Zinc Company	New York

Real Estate

The real estate account showed a gain of $1,488.10 for the month of November with an accumulative gain of $2,735.08 for the first four months of the fiscal year.

Of the 96 rental units available, 85 are occupied.

Safety

The Company-Union Safety Committee meeting was held on November 22, 1967.

There were no departmental safety meetings held in November.

COST SUMMARY

	COST PER TON OF ORE			
	AUSTINVILLE		IVANHOE	
	NOVEMBER 1967	FORE-CAST	NOVEMBER 1967	FORE-CAST
Mining				
Development	$ .43	$ .40	$ .33	$ .44
Stoping	.91	.86	.87	.86
Loading and Hauling	.36	.28	.23	.23
Hoisting	.17	.17	.33	.31
Drainage	.29	.27	.14	.16
Ventilation	.00	.01	.01	.01
Compressed Air	.08	.09	.07	.05
Equipment Maintenance	.15	.12	.40	.19
Rock Drilling	.22	.15	.13	.14
General Mining Expense	.45	.41	.32	.31
Total Mining	$ 3.06	$ 2.76	$ 2.83	$ 2.70

	COST PER TON OF ORE	
	NOVEMBER 1967	FORE-CAST
Mining (Combined)	$ 3.00	$ 2.75
Milling		
Crushing Primary	$ .03	$ .03
Crushing Secondary	.07	.08
Grinding	.15	.20
Flotation	.22	.18
Filtering & Drying	.04	.05
Loading Concentrates	.01	.01
Tailings Disposal	.03	.01
General Milling Expense	.13	.13
Total Milling	$ .68	$ .69
General Indirect		
General	$ .10	$ .10
Clerical	.12	.12
Personnel	.12	.09
General Plant Maintenance	.11	.09
Fixed Charges	.36	.38
Total General Indirect	$ .81	$ .78
Total Cost Per Ton of Ore	$ 4.49	$ 4.22
Total Cost Per Ton of Zinc Conc.	$ 80.47	$ 68.37
Delivered Cost Per Pound of Zinc	$ .045	$ .046

Crude ore production and grade were below the forecast; however, the former improved substantially over the previous month. Until the higher grade ore reserves currently tied up by waste removal, between the 2nd and 3rd levels Southwest, and by 3rd and 4th level haulage requirements can be released, it is anticipated that crude ore grade from Austinville will remain below target.

Unit costs were generally above target at Austinville as a result of the reduced crude tonnage. In addition roof control requirements in Section 100 Ore Body, cleaning of the 5th level sump, and major overhaul of one diesel locomotive contributed to unit and concentrate costs which were above target.

Limestone sales were seasonably good, especially the dried bulk product. However the credits from limestone and lead concentrate sales, although most satisfactory, were unable to reduce the net cost of zinc concentrates and/or metal to target.

ORIGINAL SIGNED
By K. R. Winslow

K. R. Winslow
Superintendent

Attachments:
Status of Capital Expenditures
Real Estate Report
Monthly Labor Report
Comparative Accident Records
Supply Balances

cc: Mr. W. T. Pettijohn, N. Y. (4)
Austinville (3)✓

STATUS OF CAPITAL EXPENDITURES

November, 1967

Project & No.	Authorized	Current Expense	Year to Date	Total to Date	Unexpended Balance
(b) 46-09 Rock Plant	$86,250	$ 281	$ 1,192	$86,230	$ 20
(b) 46-55 Rock Drills	96,000	11,250	50,625	95,625	375
(a) 46-63 Yard Track Extension	8,500	227	4,472	4,472	4,028
(b) 46-64 Pulverizer-Mixer	16,000	123	14,906	14,906	1,094
(b) 46-65 Mine Scraper Bucket	980	--	980	980	70
(a) 46-66 Air Compressor	35,000	1,032	1,032	1,032	33,968
(b) 46-67 Mine Locomotive Battery	4,300	4,121	4,121	4,121	179
(a) 46-68 Mine Scrapers	3,300	--	--	--	3,300

(a) Equipment on order - installation in progress
(b) Expected to be closed next month
(c) Appropriation closed this month

Mill Notes - November, 1967

Miscellaneous Data

Shifts Worked	63
Mill Feed % Moisture	1.96

Meterological Observations

Outside air temperature, degrees F. at 7:00 A.M.

Average	37°
Maximum	53°
Minimum	22°

Precipitation, Inches

Total	0.91 in.	
Maximum	0.26 in.	Date 11/22/67

Power for Grinding

Symons Crushers	.238
Gyrasphere Crushers	.242
8 x 12 Marcy Rod Mills	4.782
Tricone Ball Mill	2.152
4 x 10 Marcy Regrind Mills	.222
Totals	7.636

Mobile Equipment Maintenance

Replaced the tires on the pulverizer-mixer and partially completed installation of the cab for the operator.

Overhauled the right track adjustment on the No. 2 angle dozer.

Completely overhauled the engine in No. 1 mine locomotive and replaced both axles and all four wheels.

Replaced the timing gear cover on the engine of No. 2 mine locomotive.

Miscellaneous

Coe and Sons painting contractors completed painting of the Van Mater Shaft headframe.

Maintenance Notes - November, 1967

Mill

10/30 - Replaced two outer and two inner wear shoes on the West Wemco classifier. Rebuilt the West Symons crusher feed chute. Replaced the north end wear plate on the West apron feeder. Replaced west side wear plate in the Rock House apron feeder discharge chute.

11/ 1 - Replaced suction bell liner in the lead filtrate pump. Repaired the West middling thickener spray water pipe line. Installed 120' of 6" 901 plastic coated schedule 10 aluminum pipe in tailing line to the bottom.

11/ 3 - Repaired the East lead froth pump. Installed a new suction bell liner, suction sleeve, impeller, engine bell liner, clamp plate and seal rubber.

11/ 6 - Repaired 7-B tailing pump. Installed a new impeller and suction shell half liner. Replaced the East 8x12 Marcy Mill trommel screen and rebuilt screen frame. Replaced the east side wear plate in the Rock House apron feeder discharge chute. Replaced bottom wear rubber in the East 8x12 Marcy Mill discharge chute. Replaced wear plate in the East Tricone Mill feed chute.

11/ 7 - Repaired the West middling pump. Installed a new suction sleeve, suction bell liner, impeller and shell liner.

11/10 - Repaired the West zinc concentrate pump. Installed a new suction sleeve, suction bell liner, shell liner and a rebuilt suction bell.

11/13 - Installed a new feed plate on the West Symons Crusher. Replaced a 6' section of cover over the return side of the West weightometer conveyor belt. Replaced feed pipe line to the West 4x10 Marcy Mill. Replaced three outer wear shoes on the West Wemco Classifier.

11/14 - Replaced 24' of 3" pipe in the zinc sump pump discharge line.

11/15 - Extended the 24" concrete underdrain pipe 100' on the west end of the Bunker Hill tailing pond.

11/20 - Replaced two outer wear shoes on the East Wemco Classifier. Replaced a 3' section of cover over the return side of the East weightometer conveyor belt. Installed a new feed hopper cone in the East Symons Crusher. Replaced the north side wear rubber and back wear plate under the East Gyrasphere Crusher.

Maintenance Notes - November, 1967

Machine Shop

10/26 - Installed new gland water tubing on #7F1 mine pump.

10/28 - Cleaned inter-coolers on numbers 1, 2, 3, 4 and 5 air compressors.

10/30 - Repaired leaking tubes in numbers 2 and 4 air compressor inter-coolers. Installed new gland water tubing on #5D mine pump.

11/ 1 - Repaired leaking tubes in the #3 air compressor inter-coolers. Cleaned tubes in heating-boilers in main plant and change houses at Austinville, Flatwoods and Ivanhoe.

11/ 4 - Cut 14 feet, 9 inches from the Ivanhoe hoist cables and removed 1 wrap from the cage drum, the job requiring a total of 45 man-hours to complete.

11/ 8 - Cleaned the inter-cooler tubes in the #7 and #8 air compressors at Ivanhoe. Repaired the hydraulic pump on the Ivanhoe deads truck. Began preparations for foundation work for installation of #8 air compressor.

11/10 - Made a gasket of 3/16" x 6" rubber and installed it on the 1100' level bulkhead door at Ivanhoe to stop a leak.

11/11 - Installed 7 new bottom liner rails in the car-dump hopper on 1100 ft. level.

11/16 - Due to mechanical water seal failure, the shaft assembly of #5C mine pump was removed and a rebuilt assembly installed. The assembly which was removed had run a total of 67 hours and was rebuilt at a cost of $25.75 for parts and $22.15 for labor, making a total cost of $47.90 for the job.

11/20 - Ditto above for #5C pump, the assembly running a total of 6 hours and both mechanical seals and bearings failing. This assembly was rebuilt at a cost of $131.72 for parts and $25.52 for labor, making a total cost of $157.24 for the job.

Ditto above for #5C pump, this assembly being removed due to a broken shaft which caused the seals and bearings to be damaged. This assembly had run 1 hour and was rebuilt at a cost of $118.23 for parts and $24.37 for labor, making a total cost of $142.60 for the job.

11/21 - Due to a broken shaft, the assembly of #2A Industrial water pump on the 200 ft. level was removed and replaced with a rebuilt shaft assembly. The assembly which was removed had run a total of 1304 hours and was rebuilt at a cost of $143.84 for parts and $22.15 for labor, making a total cost of $165.99 for the job.

Tightened foundation bolts on the #6 air compressor at Ivanhoe.

Repaired leaks in the change house heater at Ivanhoe.

11/24 - Checked and corrected alignment of #5C mine pump after installation of new foot valve.

Due to a general worn-out condition, the shaft assembly of #5B mine pump was removed and replaced with a rebuilt assembly. The assembly which was removed had run a total of 477 hours and was rebuilt at a cost of $211.95 for parts and $27.84 for labor, making a total cost of $239.79 for the job.

Maintenance Notes - November, 1967

Electric Shop

10/26 - Installed wiring for slusher on 11th level. Repaired controller on locomotive at Ivanhoe Shaft. Replaced rectifier on vibrator control at damp bulk limestone loading site in bottom area. Repaired wiring on rakes drive motor at zinc dryer.

10/27 - Replaced locomotive battery 46 on 11th level with new battery. Replaced cell in battery in 7th level substation. Replaced overload cut out assembly on 7F1 pump starter. Cleaned and checked motor on limestone dryer drive motor.

10/30 - Repaired two mine air lights. Cleaned and checked controls on Vulcan hoist. Replaced street lamps in New Town and bottom area. Replaced lamps in change house.

10/31 - Replaced coil on Vulcan hoist. Cleaned and checked controls on service hoist. Repaired switch on chute at 12th level loading station. Repaired mine blasting machine. Removed starter for slusher from 11th level.

11/ 1 - Repaired light circuit in Mill. Replaced plugs on locomotive at Ivanhoe Shaft. Repaired headlight on locomotive on 11th level at Van Mater Shaft. Replaced baking unit in electric range at staff boarding house.

11/ 2 - Repaired telephone on 5th level. Oiled all plant heaters. Replaced 2A pump motor. Repaired contactor for mine locomotive motor.

11/ 3 - Relocated power cable for slushers on 8th level at Ivanhoe Shaft. Replaced plugs on slusher on 11th level at Van Mater Shaft. Repaired controller on locomotive on 7th level. Replaced field coil in locomotive motor.

11/ 6 - Cleaned and checked controls on Vulcan hoist. Installed wiring for grinder in shop at Ivanhoe Shaft. Repaired contactor on Greensburg locomotive. Repaired wiring on conveyor at limestone dryer.

11/ 7 - Repaired welding plug on 11th level. Relocating slusher on 9th level at Ivanhoe Shaft. Repaired vibrator on box car loader at limestone damp bulk loading site. Repaired controller on locomotive on 5th level.

11/ 8 - Repaired controller on locomotive on 11th level. Repaired wiring on slusher at 100 Section on 11th level. Repaired vibrator at limestone reconditioning plant. Replaced lights on Van Mater Shaft headframe.

11/ 9 - Repaired wiring on slusher on 11th level. Replaced contactor on locomotive on 11th level. Installed wiring for slusher at Ivanhoe Shaft.

11/10 - Repaired controller on locomotive on 11th level. Replaced breaker and outlet in house No. 217. Cleaned and checked controls on mine pumps at Van Mater Shaft. Changed wiring on furnace controls at house Nos. 6, 7, 8, 10 and 12.

11/11 - Replaced brushes and repaired wiring on service hoist. Repaired light switch in Mill. Replaced disconnect on line feeding street lights and staff boarding house. Relocated wiring for slushers at Ivanhoe Shaft. Cleaned and checked controls on Ivanhoe hoist and Nos. 6 and 7 air compressors.

11/13 - Cleaned and checked all motor control equipment at limestone dryer. Repaired cap lamp charging rack. Repaired vibrator for box car loader at damp bulk limestone loading site.

11/14 - Relocated wiring for slusher on 7th level. Replaced motor on screen at limestone dryer. Replaced breaker on slusher on 7th level. Replaced plug on locomotive on 5th level.

11/15 - Repaired telephone on 11th level at Ivanhoe Shaft. Cleaned and checked controls on mine pumps at Ivanhoe Shaft. Repaired wiring on mine crusher. Made up two flood lights for loading chutes at Ivanhoe Shaft. Repaired two meters for mine locomotives.

11/16 - Repaired wiring on locomotive on 7th level. Repaired wiring on heater at rock plant at Ivanhoe. Replaced street lamps in bottom area. Replaced motor on heater in change house. Replaced meter on locomotive on 5th level.

11/17 - Replaced lamps at recreation hall. Replaced lamps in pump station at Van Mater Shaft. Replaced motor on screen at limestone dryer. Repaired wiring on locomotive on 11th level. Replaced pump at flume supplying water to Flat Woods Shaft.

11/20 - Extended wiring on slusher on 11th level. Repaired shop welder. Repaired wiring on locomotive on 7th level. Repaired controller on locomotive on 11th level.

11/21 - Repaired wiring on slusher at Ivanhoe Shaft. Installing conduit for #8 air compressor. Repaired wiring on locomotive on 11th level. Repaired mine air light. Repaired controls on 7F pump.

11/22 - Repaired controller on locomotive on 5th level. Repaired relay on 5D pump. Replaced brushes in #7 air compressor

generator. Repaired wiring on locomotive at Ivanhoe Shaft. Repaired mine air light.

11/24 - Repaired wiring on slusher on 4th level. Read all plant kilowatt hour meters. Cleaned and checked Gyrasphere crusher oil filter pump motor. Removed #7 air compressor generator for repair. Repaired controller for mine locomotive.

JLV
NCS

02-153

Month of - November 1967

AGRICULTURAL LIMESTONE STOCKING RECORD

Lower Plant Site No. 2,4,6&8

Tons Stocked. 31,484

Total Tons Stocked, to Date. 132,355 .

Lower Plant Site No. 10&11

Tons Stocked. 9,649

Total Tons Stocked to Date. 15,018

Austin Meadows Site No. 5

Tons Stocked. 849

Total Tons Stocked to Date. 32,414

_____

Tons Stocked. _____

Total Tons Stocked to Date. _____

_____

Tons Stocked. _____

Total Tons Stocked to Date. _____

TOTAL TONS STOCKED. 41,982

849

41,133

JAV

MONTHLY REPORT

Austinville-Ivanhoe
October, 1967

Summary Overall Operation

Production	Obtained	Quarterly Forecast
Crude Ore		
Zinc-Tons	51,886	57,200
Grade Zn	3.60	3.70
Pb	.60	.60
Zinc Concentrates - Tons	2,760	3,181
Lead Concentrates - Tons	336	347
Costs		
Per Ton Crude Zinc Ore	$ 4.56	$ 4.20
Per Ton Zinc Concentrates	$ 76.45	$ 68.03
Less Credits	27.01	17.04
Net Cost of Zinc Concentrates	49.44	50.99
Plus Freight Cost	5.88	5.88
Net Cost of Zinc Conc. Delivered	$ 55.32	$ 56.87
Delivered Cost Per Pound of Zinc	$ .044	$ .046
Payroll	331	
Tons Per Total Man Shifts Worked		
Total Tons Crude Ore 51,886 / Total Man Shifts Worked 6,507	7.97	8.35
Accident Record		
Frequency Rate	57.39	
Severity Rate	1224.0	

MINING

Statistical Summary

	October, 1967		Work Program Forecast	
Production & Operating Efficiencies	**Austv.**	**Ivan.**	**Austv.**	**Ivan.**
Tons of Ore from Stoping	36,142	13,165	44,000	13,200
Tons of Ore from Development	2,579			
Total Tons of Ore Hoisted and/or Produced	38,721	13,165		
Tons Broken	37,142	14,781		
Broken Reserve	3,000	6,132		
Working Days	22			
Tons Ore Obtained Per Day	2,358		2,600	
Men on Payroll (Hourly, Mine)	190		200	
Percent Attendance (Salary & Hourly)	91.36			
Total Mine Shifts Worked (Hourly)	3,639			
Stope Production Shifts (Hourly) (Drilling, breaking & loading ore out of stopes)	1,528			
Tons Ore Obtained Per Hourly Shift	14.26		15.00	
Tons Ore Obtained Per Production Shift (Stope ore production only)	33.96		36.00	

	Austv.	**Ivan.**	**Austv.**	**Ivan.**
Tons Obtained Per Drilling Shift (Stope ore production only)	47.52	47.43	55.00	46.00
Tons Obtained Per Pound of Explosives	1.96	1.39		
Tons of Waste Removed	1167	821		
Fill Placed in Stopes	--	--		
Development and/or Deadwork				
Feet Advanced	526	195	467	183
Diamond Drilling - Underground	830	475	1,540	580
Diamond Drilling - Surface	--	--		
Deep-Hole Drilling - Feet	34	--		

Pumping

	Austv.	Ivan.
Average Gal./Min. Pumped	5,963	1,096

Stoping - Ore Extraction

Production Summary

Method	Level	Tons
Room and Pillar	Total	49,573
" " "	4th	7,219
" " "	5th	6,875
" " "	6th	3,346
" " "	7th	8,696
" " "	11th	10,006
" " "	Ivan.	13,165
Drifts, Crosscuts, Raises	Deadwork	2,579

Although lead feed grade was on target, zinc feed grade was below and tonnage was considerably below forecast.

Production from Ivanhoe and the sixth and seventh levels at Austinville were on or above target.

Austinville fourth level production showed some improvement and is expected to be at target next month. On the fifth level a second stope was brought into production in A625 Ore Body in an effort to compensate for lower efficiencies of remnant mining tributary to this level. As stated last month, production from this level is not expected to achieve target tonnage.

An outage of one diesel locomotive on the eleventh level necessitated two shift haulage from Ivanhoe for eighteen days, resulting in lower haulage capability on this level. Production from Austinville eleventh level, which was far below target, should improve next month.

Number of Stopes Working	48
Number of Stopes Available	60

Development and/or Deadwork

	Austv.	Ivan.
Drifts and Crosscuts	229	182
Raises	297	13
Stripping and Slabbing	14,516 cu. ft.	2,784 cu. ft.

The amount of development work accomplished was increased materially with a lighter vacation load this month.

On eleventh level the 11-48-91 Drift NE was advanced 37' and slabbed in preparation for cutting a loading chute. Priority will be given to establishing a ventilation connection to the

seventh level in Brown Ore Body as soon as possible. No advance has been made in the 11-48-91 Drift SW where in drawdown is still being accomplished but with less noticeable effect.

The 11-09-70 XC has been advanced 73' this month. This is a priority drift to establish a ventilation connection to the Section 100 ore body.

At Ivanhoe the Simmerman drive will be continued pending final testing of the bulkhead which is now completed.

Precipitation

Total	4.06 inches
Maximum 9/28/67	85 inches

Ventilation

Ventilation was satisfactory throughout the mine.

Capital Authorizations

46-55 Rock Drills

The last ten units were delivered this month and this appropriation will soon be closed.

46-65 Mine Scraper Bucket

This appropriation will be closed next month.

46-47 Mine Locomotive Battery

The battery was received the last of this month. The appropriation will be closed upon receipt and payment of invoices next month.

Mine Geology

Diamond Drill Summary

	No. of Holes	No. of Shifts	Feet Cored	Feet Non-Cored
Underground				
Austinville	3	27	573'	146'
Ivanhoe	6	20	475'	--
Total	9	47	1048'	146'
Surface				
Austinville	--	--	--	--
Ivanhoe	--	--	--	--

AUSTINVILLE MINE

Underground Cored Holes - Summary

Area	No. of Ore Holes*	No. of Non-Ore Holes	No. of Holes Completed	Total Length
NE	0	2	2	573'

*Mineable

Underground Cored Holes - Detail

Hole No.	Area	Lev	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
U-1634**(1)	NE	5	117.4	111	166	Continuing. 111' Barren
U-1635	NE	5	117.4	160	Inc.	50' Barren 4' Est. 2% Zn, Nil Pb 17' Barren 3' Est. 2½% Zn, Nil Pb 21' Barren
U-1636	NE	4	15	230	230	150' Barren
U-1637	NE	4	15	183	Inc.	40' Barren 5' Est. ½% Zn, Tr Pb 4' Est. 2½% Zn, Tr Pb 4' Est. 3½% Zn, 1% Pb 15' Barren

**(1) Defines known ore. No reserve change.

Underground Non-Cored Holes

Hole No.	Area	Lev	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
NC-527	100 O.B.	11	86.4	76	125	Both NC holes drilled for cable access to stopes
NC-528	100 O.B.	11	80	70	70	

Surface Exploration Holes

None

IVANHOE MINE

Underground Cored Holes - Summary

Area	No. of Ore Holes*	No. of Non-Ore Holes	No. of Holes Completed	Total Length
Rdl-Sharp	1	5	7	475'

*Mineable

Underground Cored Holes - Detail

Hole No.	Area	Lev	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
J-561	Sharp O.B.	6	39	20'	90'	Barren
J-562	Sharp O.B.	6	35	50'	50	Barren
J-563**(5)	Sharp O.B.	6	35	80'	80'	0-7' Est. Loc Tr Zn, Nil Pb 3' Est. ½% Zn, Tr Pb
J-564**(5)	Sharp O.B.	6	37	120'	120'	0-4' Barren 6' Est. 0.3% Zn, Nil Pb
J-565**(2)	Sharp O.B.	5	19#1	40'	40'	0-12' Barren 7' Est. Tr Zn, ½% Pb
J-566**(2)	Sharp O.B.	5	17#4	40'	40'	0-10' Barren 4' Est. Tr Zn, ½% Pb
J-567**(3)	Sharp O.B.	5	17#4	50'	50'	0-30' Est. 2½% Zn, 1½% Pb
J-568	Sharp O.B.	6	17	75'	Inc.	0-11' Barren 7' Est. ½% Zn, Tr Pb 9' Est. 1% Zn, 2% Pb 14' Est. Tr Zn, Tr Pb 7' Est. 2% Zn, ½% Pb 49-75' not seen - To be included in Nov. report.

**(2) Defines and decreases known ore
**(3) Defines and increases known ore
**(5) New mineralization - no reserve change

Underground Non-Cored Holes

None

Surface Exploration Holes

None

MILLING

Statistical Summary

Production Data	October 1967	Work Program Forecast
Tons of Ore Milled	51,886	57,200
Days Worked	22	
Tons Per Day	2,358	2,600
Tons Per Operating Hour	115.4	
Tons of Concentrates		
Zinc	2,760	
Lead	336	
Concentration Ratio for Total Concentrates	16.8	

Metallurgical Comparison			
Feed -	% Zinc	3.6	3.7
	% Lead	.60	.60
	% Oxidized Zinc	.21	
Zinc Concentrate -	% Zinc	61.3	61.5
	% Lead	.33	
	% Zinc Recovery	91.7	92.4
	% Sulfide Zinc Recovery	97.4	
Lead Concentrate -	% Zinc	2.4	
	% Lead	75.5	76.0
	% Lead Recovery	81.4	76.9
Tailings -	% Zinc	.30	
	% Lead	.10	

Opeating Time

Hours Operated	449.50
Hours Unscheduled	192.00
Hours Lost	78.50

Composite Screen Analysis of Flotation Feed

Mesh	Cumulative % Retained
On 48	6.3
65	17.1
100	31.9
150	44.3
200	55.5
270	60.7
Minus 270	39.3

Mill Operation

Zinc metallurgy was normal for the month. Lead metallurgy was uneventful for the month. A total of fourteen and one-half unit shifts were lost waiting for ore to accumulate.

Major Mill Maintenance

No major mill maintenance was necessary during October.

Engineering and Construction

Ivanhoe Rock Plant - Approp. 46-09

Construction of the retaining wall and rock fill for the railroad car loading ramp was begun. Shop work on the steel chute was completed.

Yard Track Extension - Approp. 46-63

Grading work and laying of the stone base course was completed. Delivery and placement of ties was begun.

Additional Air Compressor - Approp. 46-66

An order was placed for the compressor and preliminary plans for the installation were made.

Limestone & Waste Rock

Limestone

Tons, Production	40,984
Tons Sold, Unprocessed	61,122
Tons Sold, Dried	3,363
Total Tons Sold	64,485

Production was from the 14-inch and 6-inch cyclones in combination. Virtually all production was stocked in the lower plant for rail shipment.

1,000 tons were hauled from the upper plant stock pile to the lower plant for shipment in boxcars.

Waste Rock

Production	3,183
Tons Sold	2,252

Operating time lost as a result of a breakdown of equipment caused a drop in production.

Limestone Sales

Cumulative sales, January through October, amount to over 490,000 tons. This represents an increase of 57,000 tons over the same period last year and is the largest tonnage sold during any similar period in the past. Also, the 51,403 tons of damp bulk limestone shipped by rail is an all-time record for an October.

Sales for the month exceed those for October, 1966, by approximately 12,000 tons. Excellent weather conditions for the operation of spreader trucks on the fields permitted our dealers to spread limestone throughout the month. The large majority of dealers report a greater number of orders being placed by farmers who formerly waited until spring to order limestone, thus accounting for the large tonnage being shipped this month. Weather permitting, the remaining two months of 1967 could very well set an all-time record for the number of tons shipped in any one calendar year.

County Agricultural Stabilization and Conservation Service offices in North Carolina are releasing funds for agricultural limestone use throughout the state. This is in accordance with past practice although the consensus of opinion in September was that the release of funds would be much later this year. Virginia ASCS offices are usually a few weeks later than those in North Cardina.

Personnel Department

Employee Relations

There were no meetings held with the Union during the month of October.

Grievances

The Union withdrew the Union Committee Grievance--Hard Hats from arbitration proceedings.

The Glen I. Ingo Grievance has been advanced to arbitration; however, no impartial arbitrator has been selected as yet.

Visitors

Date	Name	Company Affiliation	Location
10/3/67	Mr. W. T. Pettijohn	Manager of Mines The New Jersey Zinc Company	New York
10/25/67	Prof. W. E. Foreman and Mineral Dressing Class	Virginia Polytechnic Institute	Blacksburg, Va.

Real Estate

The real estate account showed a gain of $310.84 for the month of October with an accumulative gain of $1,246.98 for the first three months of the fiscal year.

Of the 96 rental units available, 87 are occupied.

Safety

The Company-Union Safety Committee meeting was held October 26, 1967.

The Plant Department scheduled a series of safety meetings for all personnel in that department. A film, "Lifting, Man's Age Old Problem," was obtained from Aetna Life Insurance Company for use in these meetings.

COST SUMMARY

	COST PER TON OF ORE			
	AUSTINVILLE		IVANHOE	
	OCTOBER 1967	FORE-CAST	OCTOBER 1967	FORE-CAST
Mining				
Development	$ .39	$ .40	$ .40	$ .44
Stoping	.99	.86	.86	.86
Loading and Hauling	.39	.28	.26	.23
Hoisting	.24.	.17	.37	.31
Drainage	.32	.27	.16	.16
Ventilation	.00	.01	.01	.01
Compressed Air	.08	.09	.06	.05
Equipment Maintenance	.20	.12	.31	.19
Rock Drilling	.18	.15	.15	.14
General Mining Expense	.43	.41	.33	.31
Total Mining	$ 3.22	$ 2.76	$ 2.91	$ 2.70

	COST PER TON OF ORE	
	OCTOBER 1967	FORE-CAST
Mining (Combined)	$ 3.14	$ 2.75
Milling		
Crushing Primary	$ .03	$ .03
Crushing Secondary	.06	.08
Grinding	.17	.20
Flotation	.19	.18
Filtering & Drying	.05	.05
Loading Concentrates	.01	.01
Tailings Disposal	.01	.01
General Milling Expense	.13	.13
Total Milling	$ .65	$ .69
General Indirect		
General	$ .09	$ .10
Clerical	.13	.12
Personnel	.10	.09
General Plant Maintenance	.07	.09
Fixed Charges	.38	.38
Total General Indirect	$ .77	$ .78
Total Cost Per Ton of Ore	$ 4.56	$ 4.22
Total Cost Per Ton of Zinc Conc.	$ 76.45	$ 68.37
Delivered Cost Per Pound of Zinc	$ .044	$ .046

Crude ore production remained well below the target and thus was the prime contribution to the high unit and concentrate costs.

Mining costs were also affected by an accumulation of non-recurring costs among which were:

Charge out of slushing cable - $1600
Receipt of 40# track accessories for 7th and 11th shaft station replacement - $580
Replacement of cable on ore hoist - $3000
Replacement of pump parts - $1000
Receipt of back ordered slusher and scraper parts - $2250
Major maintenance of mine locomotives and cars

Limestone sales were very good during the month, which combined with the lead credit resulted in a net cost of zinc concentrate and/or metal which was essentially as forecast.

ORIGINAL SIGNED
By K. R. Winslow

K. R. Winslow
Superintendent

Attachments:
Status of Capital Expenditures
Real Estate Report
Monthly Labor Report
Comparative Accident Records
Supply Balances

cc: Mr. W. T. Pettijohn, N. Y. (4)
Austinville (3)

STATUS OF CAPITAL EXPENDITURES

October, 1967

Project & No.	Authorized	Current Expense	Year to Date	Total to Date	Unexpended Balance
(f) 46-09 Rock Plant	$86,250	$ 715	$ 911	$85,949	$ 301
(a) 46-55 Rock Drills	96,000	11,250	39,375	84,375	11,625
(a) 46-63 Yard Track Extension	8,500	4,065	4,245	4,245	4,255
(b) 46-64 Pulverizer-Mixer	16,000	84	14,784	14,784	1,216
(b) 46-65 Mine Scraper Bucket	980	980	980	980	70
(a) 46-66 Air Compressor	35,000	--	--	--	--
(a) 46-67 Mine Locomotive Battery	4,300	--	--	--	4,300

(a) Equipment on order - installation in progress
(b) Expected to be closed next month
(c) Appropriation closed this month
(f) Partially closed. Only remaining work is construction of loading ramp on rail site.

MILL NOTES - OCTOBER 1967

Miscellaneous Data

Shifts Worked	66
Mill Feed % Moisture	1.83

Meterological Observations

Outside air temperature, degrees F. at 7:00 A.M.

Average	48°
Maximum	62°
Minimum	33°

Precipitation, Inches

Total	4.06 inches	
Maximum	.85 inches	Date - 9/28/67

Power for Grinding

	KWH Per Ton
Symons Crushers	.243
Gyrasphere Crushers	.244
8 x 12 Marcy Rod Mills	4.901
Tricone Ball Mill	2.209
4 x 10 Marcy Regrind Mills	.234
Totals	7.831

Real Estate Maintenance

Replaced roofing on house Nos. 215 and 242.

Mobile Equipment Maintenance

The engine in No. 2 mine locomotive was completely overhauled by Southwest Diesel at Salem. Replaced the head, pistons, rings, rod and main bearings, firing chambers, camshaft bearings, valves and injectors, ground the crankshaft journals to .020 in. undersize and overhauled the starter and generator.

Replaced the rotor drive chain on the right side of the pulverizer-mixer.

The engine in No. 1 Chevrolet plant truck was repaired by B & L Motors with a rebuilt short block assembly and overhaul of the valves.

Maintenance Notes - October, 1967

Shop

9/27 - Installed one new jack bolt in the mine crusher.

10/2 - Prepared the #49 Dodge Crewcab and the #3 GMC pickup shop trucks for winter operation.

10/5 - Due to bearing failure, the shaft assembly of #5A mine pump was removed and replaced with a rebuilt assembly. The assembly which was removed had run a total of 527 hours and was rebuilt at a cost of $76.67 for parts and $23.20 for labor, making a total cost of $96.87 for the job.

Installed a new 8" Smolensky check valve on the #5D mine pump. The used valve was brought to the shop where it was reconditioned and is to be kept for use as a spare.

10/7 - Adjusted the bearings on #3 Sullivan air compressor to eliminate knocks.

10/9 - Installed two new 1 1/8" x 1700' cables on the Vulcan hoist. Repaired #4 air compressor unloader.

10/12 - Due to a broken shaft the assembly of #5C mine pump was removed and a rebuilt assembly installed. The assembly which was removed had run a total of 13 hours and was rebuilt at a cost of $349.80 for parts and $35.44 for labor, making a total cost of $385.24 for the job.

Due to a worn-out casing it was necessary to remove the #5B mine pump from service and install a reconditioned casing which had been built up with Necco-wear. This job was done at a cost of $327.50 (the cost of the Necco-wear job) and $32.48 for labor, making a total cost of $359.98.

10/19 - Due to mechanical seal and bearing failure, the shaft assembly of #5C mine pump was removed and replaced with a rebuilt assembly. The assembly which was removed had run a total of 6 hours and was rebuilt at a cost of $144.34 for parts and $22.15 for labor, making a total cost of $166.49 for the job.

10/24 - Due to bearing failure the shaft assembly of #5C mine pump was removed and replaced with a rebuilt assembly. The assembly which was removed had run a total of 6 hours and was rebuilt at a cost of $65.42 for parts and $23.20 for labor, making a total cost of $88.62 for the job.

Installed a reconditioned spring rod in the mine crusher and replaced the safety toggles which had dropped when the spring rod broke.

10/25 - Set up the mine crusher ½", making a total of 2" of shims.

Maintenance Notes - October, 1967

Electric Shop

9/26 - Repaired controller on locomotive on 11th level. Repaired holes in poles on Ivanhoe line and cut tree out of right-of-way. Cleaned and checked controls on mine pumps at Van Mater Shaft.

9/27 - Repaired telephones on 6th and 11th levels. Replaced signal switch at crusher station. Relocating slusher at 100 Section on 11th level. Changed oil in service hoist motors.

9/28 - Relocating slusher at 100 Section on 11th level. Replaced bearing on #5 air compressor generator. Repaired controls on locomotive on 11th level. Replaced motor on screen at limestone dryer.

9/29 - Replaced pryometer on limestone dryer control. Replaced bearing on shop heater motor. Replaced motor on mine locomotive. Repaired two mine air lights.

10/2 - Replaced lamps at skip loading station on 12th level. Repaired wiring on locomotive on 4th level. Repaired light circuit on 11th level. Repaired wiring on slusher on 7th level.

10/3 - Repaired telephone on 5th level at Fisher Field. Repaired two vibrators on limestone loading equipment at damp bulk loading site. Replaced plug on slusher on 7th level.

10/4 - Installed welding receptacle and lights at Brown Ore Body. Installed light at 50 H.P. slusher on 3rd level. Repaired controller for vibrator at damp bulk limestone loading site.

10/5 - Repaired two mine locomotive meters. Cleaned and checked circuit breakers at 7th level substation at Van Mater Shaft. Installed outlet for x-ray machine at doctor's office. Repaired mine blasting machine.

10/6 - Installed outlet in house No. 238. Repaired controller on locomotive at Ivanhoe Shaft. Replaced motor on stoker timer at zinc dryer. Replaced motor on locomotive on 7th level.

10/9 - Repaired microphone on Van Mater Shaft phone. Cleaned and checked mine crusher starter. Cleaned and checked controls on Vulcan hoist.

10/10 - Repaired wiring on locomotive on 11th level. Repaired mine air light. Replaced signal lights on 11th level. Replaced coil on Vulcan hoist.

10/11 - Oiled all heaters in change house and lower plant area. Repaired cable and relocated starter for slusher on 11th level. Replaced lamps in building #503.

10/12 - Repaired wiring on conveyor at damp bulk loading site in bottom area. Replaced starter on slusher on 11th level. Greased hoist motors at Ivanhoe Shaft.

10/13 - Repaired controller on 2½ ton locomotive. Repaired wiring on slusher on 11th level. Changed oil in all york heater motors. Repaired furnace at Staff House.

10/16 - Cleaned and checked controls on Vulcan hoist. Changed oil and greased all mine pump motors at Van Mater Shaft. Repaired recording meter on light feeder in substation. Cleaned and checked pump starters at Ivanhoe Shaft. Replaced motor on locomotive on 11th level.

10/17 - Cleaned and checked controls on Ivanhoe hoist. Relocated slusher on 11th level. Installed heater on grease rack for mine cars. Cleaned and checked mine pump controls at Van Mater Shaft.

10/18 - Replaced field coil in mine locomotive motor. Changed oil in pump motors at Ivanhoe Shaft. Cleaned and checked switch gear in 7th level substation at Ivanhoe Shaft.

10/19 - Installed two outlets in house No. 216. Replaced entrance switch at house No. 213. Repaired light circuit on 11th level. Repaired light circuit in mill. Repaired mine locomotive meter.

10/20 - Repaired controller on locomotive at Ivanhoe Shaft. Tightened guy wires on 13,000 volt line feeding bottom area. Replaced breaker on line feeding equipment at limestone reconditioning plant. Repaired controls for vibrator at limestone reconditioning plant.

10/23 - Replaced switches on loading chutes on 12th level at Van Mater Shaft. Cleaned and checked contacts on Vulcan hoist. Cleaned and checked controls on #5 air compressor. Cleaned and checked controls on mine crusher.

10/24 - Relocated slusher on 7th level. Replaced motor on screen at limestone dryer. Replaced controller on locomotive at Ivanhoe Shaft.

10/25 - Read all plant kilowatt hour meters. Installed wiring for slusher on 7th level. Repaired foot switch on locomotive at Ivanhoe Shaft. Replaced lamps in mill and mine engineers office.

Maintenance Notes - October, 1967

Mill

9/28 - Replaced check valve body and ball in the zinc thickener ODS pump suction side.

10/ 2 - Built up discharge end flights on the West Wemco classifier. Moved support rails in one set of holes on the West apron feeder. Rebuilt three of the 6" tailing cyclone classifier. Replaced the West gyrasphere conveyor speed reducer with a spare. Installed a new stainless steel feed orfice in #2, 14" tailing cyclone classifier. Replaced one shell liner plate in the West 8x12 Marcy Mill with a used plate.

10/ 3 - Repaired the East circulating water pump. Installed a new suction side plate, wear ring, suction head and impeller.

10/ 6 - Installed a new timer clock on the zinc dryer stoker feed control.

10/ 9 - Installed a stainless steel feed orfice in #1, 14" tailing cyclone classifier. Built up discharge end flights and arms on the East Wemco classifier. Installed a new launder on the east end of the East zinc cleaner flotation cell. Repaired the Rock House apron feeder discharge chute.

10/11 - Replaced diaphragm in the lead thickener ODS pump.

10/13 - Repaired tailing booster pump. Installed a new suction sleeve, suction bell liner and rebuilt suction bell.

10/16 - Replaced one troughing idler on the Rock House main conveyor belt. Relined the West tricone ball mill scoop housing. Replaced the south side wear rubber under the West gyrasphere crusher. Replaced two 6" tailing cyclone classifier bodys. Installed a new feed end trunion liner in the West 8x12 Marcy Mill. The liner removed had carried a total of 1,079,976 tons of feed.

10/19 - Replaced one valve in the zinc vacuum pump.

10/23 - Replaced rubber feed seal on the East 8x12 Marcy Mill. Replaced north side skirt on the East gyrasphere conveyor belt. Replaced three outer wear shoes on the East Wemco classifier. Installed a new A. C. F. plug valve in the tailing line to the bottom. Replaced north side wear plate under the East gyrasphere crusher. Replaced 20' of 4" pipe in the zinc concentrate pipe line to the bottom.

Repaired the East screen conveyor belt cleaner sump discharge pipe line.

10/25 - Installed a rebuilt shaft assembly in the West lead froth pump.

JLV
NCS
02-153

Month of - October 1967

AGRICULTURAL LIMESTONE STOCKING RECORD

Lower Plant Site #2,4,6,8

Tons Stocked. 31,677

Total Tons Stocked, to Date. 100,871.

Lower Plant Site #1,3,5,7

Tons Stocked. 3,122

Total Tons Stocked to Date. 239,915 (Finished)

Lower Plant Site #10

Tons Stocked. 5,369

Total Tons Stocked to Date. 5,369

Austin Meadows Site #5

Tons Stocked. 816

Total Tons Stocked to Date. 31,565

_____

Tons Stocked. _____

Total Tons Stocked to Date. _____

TOTAL TONS STOCKED. 40,984

J.L.U.

MONTHLY REPORT

Austinville-Ivanhoe
September, 1967

Summary Overall Operation

		Obtained	Quarterly Forecast
Production			
Crude Ore			
Zinc-Tons		47,226	52,000
Grade	Zn	3.70	3.70
	Pb	.66	.60
Zinc Concentrates - Tons		2,670	2,892
Lead Concentrates - Tons		336	316
Costs			
Per Ton Crude Zinc Ore		$4.54	$4.35
Per Ton Zinc Concentrates		$71.37	$70.45
Less Credits		18.64	14.25
Net Cost of Zinc Concentrates		52.73	56.20
Plus Freight Cost		5.88	5.88
Net Cost of Zinc Conc. Delivered		58.61	62.08
Delivered Cost Per Pound of Zinc		.048	.050
Payroll		329	335
Tons Per Total Man Shifts Worked			
Total Tons Crude Ore	47,226	8.00	8.35
Total Man Shifts Worked	5,900		
Accident Record			
Frequency Rate		41.36	
Severity Rate		207.00	

MINING

Statistical Summary

	September, 1967		Work Program Forecast	
	Austv.	Ivan.	Austv.	Ivan.
Production & Operating Efficiencies				
Tons of Ore from Stoping	31,363	12,879	40,000	12,000
Tons of Ore from Development	2,984	--		
Total Tons of Ore Hoisted and/or Produced	34,347	12,879		
Tons Broken	31,313	11,868		
Broken Reserve	2,000	4,782		
Working Days	20			
Tons Ore Obtained Per Day	2,361			2,600
Men on Payroll (Hourly, Mine)	190			200
Percent Attendance (Salary & Hourly)	93.22			
Total Mine Shifts Worked (Hourly)	3,329			
Stope Production Shifts (Hourly) (Drilling, breaking & loading ore out of stopes)	1,452			
Tons Ore Obtained Per Hourly Shift	14.19			15.00
Tons Ore Obtained Per Production Shift (Stope ore production only)	32.52			36.00

	Austv.	Ivan.	Austv.	Ivan.
Tons Obtained Per Drilling Shift (Stope ore production only)	43.74	47.88	55.00	46.00
Tons Obtained Per Pound of Explosives	1.52	1.47	2.00	1.40
Tons of Waste Removed	463	695		
Fill Placed in Stopes	--	--		
Development and/or Deadwork				
Feet Advanced	227	47	467	183
Diamond Drilling - Underground	1,366	551	1,540	580
Diamond Drilling - Surface	--	--		
Deep-Hole Drilling - Feet	30	--		

Pumping

	Austv.	Ivan.
Average Gal./Min. Pumped	6,862	1,156

Stoping - Ore Extraction

Production Summary

Method	Level	Tons
Room and Pillar	Total	44,194
" " "	4th	6,036
" " "	5th	6,107
" " "	6th	2,966
" " "	7th	7,442
" " "	11th	8,812
" " "	Ivan.	12,879
Drifts, Crosscuts, Raises	Deadwork	2,984

Feed grades were on target, but crude production was well below forecast.

Production from Ivanhoe and the sixth and seventh levels at Austinville were on or above target.

Fourth level production should improve materially with resumption of breaking in the Shot Shaft pillar recovery and the addition of working places tributary to this level. Shot Shaft pillar contributed little tonnage during the month as long-hole drilling for a large single blast was necessary.

Haulage difficulties greatly hampered eleventh level production. Outage of one Ivanhoe diesel locomotive forced two-shift hauling from Ivanhoe. In addition, one Austinville battery locomotive was out of service awaiting repair parts. Production from this level should improve with an accumulation of ore in the stopes available.

Fifth level production continued to be hampered by the majority of the stopes tributary to this level being in either cleanup or starting status. In addition, one large producer was lost due to bad ground and Shot Shaft piller ore is currently breaking to the fourth and sixth levels. Production from this level is not expected to improve in the near future.

Number of Stopes Working	52
Number of Stopes Available	61

Development and/or Deadwork

	Austv.	Ivan.
Drifts and Crosscuts	91'	47'
Raises	136'	--
Stripping and Slabbing	14,931 cu.ft.	10,738 cu.ft.

All development and deadwork continued to be hampered by the heavy vacation schedule. Vacation loads will be lighter for the near future, excepting the Thanksgiving and Christmas periods.

Long diamond-drill pilot holes were drilled in each of the mining drifts advancing from the 11-18-91 XC. The hole in the 11-48-91 Drift NE produced a total of 130 gpm at 195 psi over its entire length of 435 feet. This drift was advanced 35 feet during the month. The hole in the 11-48-91 Drift SW produced an estimated 350 gpm at 215 psi, with the major quantity encountered 63 feet in the 405-foot hole. This drift was advanced 14 feet before drilling the pilot hole. Present plans are to advance the NE drift without grouting, but test-drilling. The water is being permitted to run in the SW drift and advance abated pending outcome of this attempted drawdown. Both holes are definitely effecting a drawdown as evidenced by drying up of water sources on the seventh level.

The bulkhead in the 11-09-70 XC was tested during the month. The crosscut is now ready to advance.

Precipitation

Total	0.83 inches
Maximum - 9/9/67	0.35 inches

Ventilation

Ventilation was satisfactory throughout the mine.

Capital Authorizations

46-55 Rock Drills

Twenty drills were received and placed in service. Ten more units, completing this order, are expected to be delivered next month.

46-65 Mine Scraper Bucket

This item was received. The appropriation will be closed upon receipt and payment of invoice.

46-67 Mine Locomotive Battery

Delivery of this unit is expected early in the second fiscal quarter.

Mine Geology

Diamond Drill Summary

	No. of Holes	No. of Shifts	Feet Cored	Feet Non-Cored
Underground				
Austinville	6	48½	395	976
Ivanhoe	4	20	551	0
Total	10	68½	946	976
Surface				
Austinville	0	--	0	0
Ivanhoe	0	--	0	0

AUSTINVILLE MINE

Underground Cored Holes - Summary

Area	No. of Ore Holes*	No. of Non-Ore Holes	No. of Holes Completed	Total Length
SW	0	3	3	280
NE	0	0	0	55
625 O.B.	0	0	1	60

*Mineable

Underground Cored Holes - Detail

Hole No.	Area	Lev	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
U-1624	625 O.B.	5	63.4	Assay data only		17' 1.5% Zn,0.1%Pb
U-1626	625 O.B.	5	55	60	220	74' Barren
			Assay data & Continuing			8' Est.1% Zn,Nil Pb
						10' Barren
						16' 2.7% Zn,0.1% Pb (+0.4% sol. Zn)
						37' Barren
U-1631**(2)	SW	6	58	85	85	14' Scat. Tr
						5' Est. 2% Zn,1% Pb
						2' Barren
U-1632	SW	4	46	180	180	Barren
U-1633**(2)	SW	6	58	15	15	Barren
U-1634	NE	5	117.4	55	Inc.	42' Barren
						5' Est. ½% Zn,Tr.Pb
						8' Barren

**(2) Defines and decreases known ore.

Underground Non-Cored Holes

Hole No.	Area	Lev	Sect	Feet Drilled	Bottom	Remarks (Est. True Thickness)
U-1217	100 O.B.	11	80	82	--	Redrilled grout. For drainage.
NC-525	B.O.B.	11	89.4	410	405	Drilled 5' grouted, drilled 405' Fa 34'-35' 10 GPM. Fa 60'-65' 50 GPM Total 350 GPM @215# static pressure
NC-526	B.O.B.	11	91+50' NE	435	435	2 GPM @ 52', Fa 330'-340'. Total 130 GPM @ 195# static pressure.
NC-527	100 O.B.	11	86.4	49	Inc.	

Surface Exploration Holes

None

IVANHOE MINE

Underground Cored Holes - Summary

Area	No. of Ore Holes*	No. of Non-Ore Holes	No. of Holes Completed	Total Length
Rdl-Main NE	2		2	330'
Rdl-Sharp		2	1	221'

* Mineable

Underground Cored Holes - Detail

Hole No.	Area	Lev	Sect	Feet Drilled	Bottom	Remarks (Est. True Thickness)
J-553	Rdl-Main NE	7	39#4	Assay Data Only		17' 1.0% Zn,0.7% Pb 28' Barren 50' 2.6% Zn,0.8% Pb
J-554	Rdl-Main NE	7	39#4	Assay Data Only		50' 5.7% Zn,0.7% Pb
J-555	Rdl-Main NE	7	39#2	Assay Data Only		34' 9.3% Zn,0.5% Pb
J-556		8	23#3	Assay Data Only		8' 0.9% Zn,Nil Pb 6' 2.0% Zn, 0.2% Pb 11' 0.3% Zn, Tr Pb
J-558**(3)	Rdl Main NE	6	OOP	140'	210'	5' Est 7% Zn, Nil Pb (only 2' recovery) 75' Barren 11' 2.9% Zn, Tr Pb

IVANHOE MINE

Underground Cored Holes - Detail

Hole No.	Area	Lev	Sect	Feet Drilled	Bottom	Remarks (Est. True Thickness)
J-559**(3)	Rdl-Main NE	6	C1P	190'	190'	3' Est Scat Tr Zn and Pb 12' 3.4% Zn, Tr Pb 73' Barren 10' 1.5% Zn Tr Pb 9' 4.1% Zn Tr Pb
J-560	Sharp OB	6	39	151'	151'	Barren
J-561	Sharp OB	6	39	70	Inc.	Barren to Date 63'-70' not seen

**(3) Defines and increases known ore.

Underground Non-Cored Holes

None

Surface Exploration Holes

None

MILLING

Statistical Summary

	September 1967	Work Program Forecast
Production Data		
Tons of Ore Milled	47,226	52,000
Days Worked	20	
Tons Per Day	2,361	2,600
Tons Per Operating Hour	116.7	
Tons of Concentrates		
Zinc	2,670	
Lead	336	
Concentration Ratio for Total Concentrates	15.7	
Metallurgical Comparison		
Feed % Zinc	3.7	3.7
% Lead	.66	.60
% Oxidized Zinc	.15	
Zinc Concentrate % Zinc	61.0	61.5
% Lead	.37	
% Zinc Recovery	93.2	92.4
% Sulfide Zinc Recovery	97.2	
Lead Concentrate % Zinc	2.3	
% Lead	76.8	76.0
% Lead Recovery	82.7	76.9
Tailings % Zinc	.25	
% Lead	.10	
Operating Time		
Hours Operated	404.58	
Hours Unscheduled	264.00	
Hours Lost	75.42	

Composite Screen Analysis of Flotation Feed

Mesh	Cumulative % Retained
On 48	7.2
65	18.5
100	32.9
150	44.9
200	55.9
270	60.3
Minus 270	39.7

Mill Operation

Zinc metallurgy was normal for the month.

Lead metallurgy was good for the month. A higher than forecast recovery and concentrate grade were achieved.

Thirteen unit shifts were lost waiting for ore to accumulate.

Major Mill Maintenance

Two major repair jobs were done during September.

The feed headliners and the feed trunnion liner were replaced in the East 8x12 Rod Mill.

The zinc filter cloths and undercover cloths were replaced.

Engineering and Construction

Ivanhoe Rock Plant - Approp. 46-09

Construction of the chute for the railroad loading ramp was begun.

Yard Track Extension - Approp. 46-63

Materials were received and grading of the road bed continued.

Limestone & Waste Rock

Limestone

Tons, Production	37,145
Tons Sold, Unprocessed	38,625
Tons Sold, Dried	3,365
Total Tons Sold	41,990

Production was from the 14-inch and 6-inch cyclone classifiers. Stocking was almost wholly in the lower plant for rail shipments.
Hauled 900 tons from screening plant for box car shipments.

Waste Rock

Production	4,280
Tons Sold	4,908

Limestone Sales

Sales for the month exceeded those for the same month last year by approximately 4,000 tons. Despite extremely wet weather during about one half the month, customers shipped limestone due to an excessive number of orders on hand from farmers. The majority of the limestone shipped was stockpiled as fields were far too wet to permit the operation of spreader trucks.

County Agricultural Stabilization and Conservation Service offices continue to be somewhat reluctant or slow in approving practices that require the use of limestone. Apparently they are first attempting to encourage farmers to carry out other practices, knowing that limestone can be spread as late as December 15 or even later. This may be a false assumption if adverse weather should occur the latter days or weeks of the year.

Complaints regarding the poor condition of railroad cars in which limestone is being shipped are becoming more numerous. Only because of a car shortage have we been able to partially satisfy customers who complain but if the condition of cars tends to worsen in the future, some steps to alleviate the problem will have to be taken regardless of the severity of a car shortage.

Personnel Department

Employee Relations

There was one meeting held with the Union during the month of September. This meeting was for the purpose of discussing a grievance in Step 4.

Grievances

The Harold M. Dunford Grievance was scheduled for arbitration on September 21. Just prior to the impartial arbitrator's convening the hearing, the Union withdrew the case.

The Howard D. Akers Grievance, which had been advanced to arbitration, was withdrawn by the Union.

The Union has advanced the Union Committee Grievance--Hard Hats to arbitration; however, no impartial arbitrator has been selected.

Visitors

Date	Name	Company Affiliation	Location
9/6/67	Mr. Mayne	Mill Foreman The New Jersey Zinc Company	Ogdensburg, N. J.
9/19/67 - 9/21/67	Mr. J. J. Guin, Jr.	Employee Relations Department The New Jersey Zinc Co.	New York, N. Y.

Real Estate

The real estate account showed a gain of $109.31 for the month of September with an accumulative gain of $936.14 for the first two months of the fiscal year.

Of the 96 rental units available, 87 are occupied.

Safety

The Company-Union Safety Committee meeting was held September 28, 1967.

The Plant Department is being assisted in gathering safety materials for a series of meetings to be held in October.

COST SUMMARY

	COST PER TON OF ORE			
	AUSTINVILLE		IVANHOE	
	SEPTEMBER 1967	FORE-CAST	SEPTEMBER 1967	FORE-CAST
Mining				
Development	$ .32	$ .40	$ .32	$ .44
Stoping	.97	.86	.77	.86
Loading and Hauling	.35	.28	.20	.23
Hoisting	.18	.17	.30	.31
Drainage	.34	.27	.18	.16
Ventilation	.01	.01	.03	.01
Compressed Air	.10	.09	.06	.05
Equipment Maintenance	.15	.12	.18	.19
Rock Drilling	.18	.15	.12	.14
General Mining Expense	.48	.41	.31	.31
Total Mining	$ 3.08	$ 2.76	$ 2.47	$ 2.70

	COST PER TON OF ORE	
	SEPTEMBER 1967	FORE-CAST
Mining (Combined)	$ 2.91	$ 2.75
Milling		
Crushing Primary	$ .03	$ .03
Crushing Secondary	.07	.08
Grinding	.25	.20
Flotation	.20	.18
Filtering & Drying	.05	.05
Loading Concentrates	.01	.01
Tailings Disposal	.01	.01
General Milling Expense	.15	.13
Total Milling	$ .77	$ .69
General Indirect		
General	$ .13	$ .10
Clerical	.14	.12
Personnel	.09	.09
General Plant Maintenance	.07	.09
Fixed Charges	.43	.38
Total General Indirect	$ .86	$ .78
Total Cost Per Ton of Ore	$ 4.54	$ 4.22
Total Cost Per Ton of Zinc Conc.	$ 71.37	$ 68.37
Delivered Cost Per Pound of Zinc	$ .048	$ .046

Crude ore production was approximately ten percent below target and crude grade essentially as forecast. The deficite in crude tonnage was primarily at Austinville where the productive balance between breaking, handling and hauling continues to be out of phase. It is hoped that a production balance can be attained in the near future which will provide a satisfactory quantity and quality of crude ore.

In addition to the low productivity, periodically and cumulative maintainence requirements on haulage and pumping equipment contributed to higher unit mining costs at Austinville. A paid holiday during September also contributed to higher overall unit costs.

The less than target production of zinc concentrate resulted in total concentrate costs which were above target. Credits from lead concentrate and agricultural limestone reduced the total cost substantially and resulted in a net cost of zinc concentrate and/or metal which was below the estimate.

ORIGINAL SIGNED
By K. R. Winslow

K. R. Winslow
Superintendent

Attachments:
Status of Capital Expenditures
Real Estate Report
Monthly Labor Report
Comparative Accident Records
Supply Balances

cc: Mr. W. T. Pettijohn, N. Y. (4)
Austinville (3)

STATUS OF CAPITAL EXPENDITURES

September, 1967

Project & No.	Authorized	Current Expense	Year to Date	Total to Date	Unexpended Balance
(f) 46-09 Rock Plant	$86,250	$ 196	$ 196	$85,234	$ 1,016
(a) 46-55 Rock Drills	96,000	11,250	28,125	73,125	22,875
(c) 46-61 Pneumatic Dust Conveyor	6,000	1,193	1,193	6,001	(1)
46-63 Yard Track Extension	8,500	180	180	180	8,320
(b) 46-64 Pulverizer-Mixer	16,000	14,700	14,700	14,700	1,300
(a) 46-65 Mine Scraper Bucket	1,050	--	--	--	1,050
(a) 46-67 Mine Locomotive Battery	4,300	--	--	--	4,300

(a) Equipment on order - installation in progress
(b) To be closed next month
(c) Appropriation closed this month
(f) Partially closed. Only remaining work is construction of loading ramp on rail site.

MILL NOTES - SEPTEMBER, 1967

MISCELLANEOUS DATA

Shifts Worked	60
Mill Feed % Moisture	1.86

METEROLOGICAL OBSERVATIONS

Outside air temperature, degrees F. at 7:00 A.M.

Average	55°
Maximum	70°
Minimum	38°

PRECIPITATION, INCHES

Total 0.83 in.
Maximum .35 in. Date 9/9/67

POWER FOR GRINDING	KWH PER TON
Symons Crushers	.263
Gyrasphere Crushers	.230
8 x 12 Marcy Rod Mills	4.878
Tricone Ball Mill	2.220
4 x 10 Marcy Regrind Mills	.253
TOTALS	7.844

REAL ESTATE MAINTENANCE

Completed painting of garages on Staff Row. Replaced half the roofing on house No. 242.

MOBILE EQUIPMENT MAINTENANCE

Replaced head gaskets in the No. 2 Angle dozer. Installed a new starter in the No. 3 Angle dozer.

Replaced the crankshaft, rod and main bearings, pistons and rings in the No. 2 mine locomotive engine after dismantling revealed the piston rings stuck due to overheating.

MISCELLANEOUS

On September 3, watchman service in the lower plant was curtailed.

Maintenance Notes - September, 1967

Electric Shop

8/28 - Repaired cable on vent fan for Fisher Field. Replaced two start-stop buttons on slushers on 8th level at Ivanhoe Shaft. Checked and cleaned 75 kw generator. Replaced street lights in bottom area. Repaired telephone on 11th level.

8/29 - Replaced coil in vibrator at limestone reconditioning plant. Replaced cells in 2½ ton locomotive battery. Replaced lightning arrester on line feeding #2 transformer in 7th level substation at Van Mater Shaft. Checked 13,000 volt line to Ivanhoe Shaft for bad insulators.

8/30 - Changed motor on locomotive on 11th level. Repaired wiring on slusher on 2nd level. Cleaned and checked switch gear at Flatwoods Shaft Substation. Repaired light circuit on headframe. Checked 13,000 volt line to Flatwoods Shaft for borken insulators.

8/31 - Installed two lights and outlet in doctor's office. Repaired wiring on slusher on 11th level. Tightened overhead wires to river pumps in bottom area. Repaired 2½ ton locomotive motor.

9/ 1 - Replaced motor on 7D pump. Interlocked air conditioner units at main office. Replaced vibrator at limestone reconditioning plant.

9/ 5 - Repaired wiring on slusher on 4th level. Cleaned and checked controls on Vulcan hoist. Cleaned and checked controls on mine crusher. Repaired telephone on 5th level.

9/ 6 - Removed electric hoist from 11th level. Repaired light circuit in mill. Repaired wiring on slusher on 4th level. Repaired telephone on 11th level. Repaired light circuit on 6th level. Replaced lamps in Substation Building No. 503.

9/ 7 - Repaired holes in poles and replaced four insulators on 13,000 volt line feeding Flatwoods Substation. Replaced light switches in house numbers 246 and 275. Replaced switch on battery charger in Chemical Laboratory. Repaired controller on locomotive on 11th level.

9/ 8 - Replaced bearings in vent fan for 625 ore body. Installed outlets in house numbers 258 and 232. Repaired wiring on locomotive on 11th level. Repaired controller on locomotive on 5th level. Replaced brushes in #3 air compressor motor.

9/11 - Repaired cage phone at Ivanhoe Shaft. Repaired wiring on slusher on 10th level at Ivanhoe Shaft. Replaced coil on Vulcan hoist. Repaired wiring on slusher on 4th level. Repaired light circuit on 2nd level.

9/12 - Repaired wiring on street lights in New Town. Installed vibrator on hopper at limestone reconditioning plant. Replaced entrance switch at house No. 258. Installed two outlets in house No. 242. Repaired meter for mine locomotive motor.

9/13 - Replaced resistor on locomotive on 7th level. Repaired wiring on locomotive on 4th level. Installing wiring for pump at sewage disposal plant. Repaired mill sample motor.

9/14 - Replaced motor on locomotive on 4th level. Installing wiring for pump at sewage disposal plant. Repaired two mine air lights.

9/15 - Checked all locomotive batteries. Replaced brushes in #4 air compressor generator. Repaired wiring on slusher on 4th level. Disconnected cell from circuit on battery at 7th level substation.

9/18 - Repaired wiring on 2½ ton locomotive. Cleaned and checked controls on Vulcan hoist. Replaced lamps in change house. Replaced stack switch on furnace at house No. 407.

9/19 - Repaired telephone on 11th level. Repaired wiring on slushers on 4th and 11th levels. Cleaned and checked controls on Ivanhoe hoist. Repaired Ivanhoe cage phone.

9/20 - Installing cable for vent fan at Ivanhoe Shaft. Replaced motor on locomotive on 11th level. Repaired controller on 2½ ton locomotive. Repaired control wiring at 7th level substation.

9/21 - Replaced contactor on sampler in mill. Replaced wiring on slusher on 4th level. Repaired float switch on water tank at filter plant.

9/22 - Installing wiring for vent fan at Ivanhoe Shaft. Removed lights at skip loading station at 12th level to make room for repair work. Repaired telephone on 11th level. Removed #5 air compressor generator for repair.

9/25 - Replaced pump at pumping station for Flatwoods Shaft. Repaired wiring on vibrator at damp bulk limestone loading site in bottom area. Repaired telephone on 11th level. Cleaned and checked controls on Vulcan hoist. Read all plant kilowatt hour meters.

Maintenance Notes - September, 1967

Machine Shop

9/1 - Installed new gland water tubing on numbers 7B and 7C mine pumps. Changed crankcase oil and lubricated the 1967 Model Dodge crew-cab truck at 2057 miles.

9/5 - Performed the regular 4-week servicing of the Ford Diesel Tractor which is used by the toplander at V. M. Shaft.

9/8 - Due to mechanical water seal failure, the shaft assembly of #7A2 mine pump at Ivanhoe was removed and a rebuilt shaft assembly installed. The assembly which was removed had run a total of 6,782 hours and was rebuilt at a cost of $108.84 for parts and $26.58 for labor, making a total cost of $135.42 for the job.

9/12- Changed the air filters on numbers 6 and 7 air compressors at Ivanhoe. Completed cleaning and preparing the Flatwoods hoist room change house boiler for winter service. Began the regular annual checkup of all Staff House furnaces.

9/14 - Due to mechanical seal and bearing failure, the shaft assembly of #5B mine pump was removed and replaced with a rebuilt assembly. The assembly which was removed had run a total of 431 hours and was rebuilt at a cost of $47.33 for parts and $24.37 for labor, making a total cost of $71.70 for the job.

9/18 - Due to a broken shaft, the shaft assembly of #5B mine pump was removed and a rebuilt assembly installed. The assembly which was removed had run a total of 24 hours and was rebuilt at a cost of $363.03 for parts and $44.30 for labor, making a total cost of $407.33 for the job.

9/20 - Set up the mine crusher ¼", making a total of 1 3/4 inches of shims.

Maintenance Notes - September, 1967

Mill

8/26 - Replaced feed headliners in East 8x12 mill. The liners had ground 1,115,909 tons. The job required 136 man hours exclusive of preparation and cleanup. The liners were backed with Nordbak. The feed trunnion liner and feed chute liner were replaced at the same time.

Replaced zinc filter cloths. The old cloths were removed by a dryer operator and helper on C/25/67, working 8 hours. The screen and channels were welded on A/26/67 8 hours by two mechanics. The cloths were replaced on B/25/67 by two mill operators and one dryer helper.

8/28 - Replaced tail skirts on East weightometer and screen conveyors. Replaced 2 6" cyclone bodies.

8/29 - Repaired mill tails sampler.

9/ 5 - Rebuilt one return idler on the West Gyrasphere conveyor belt. Installed a new pulsating valve on the zinc filter. Replaced trommel screen on the West 8x12 Marcy Mill. Installed new inner and outer grids in the West Tricone Mill low speed shaft coupling.

Installed a used rubber lined scoop with a new tip on the West Tricone Mill. This scoop was in use on the East Tricone Mill from 10/10/64 to 1/3/67. The scoop removed was in service from 7/12/65 to 9/5/67 feeding a total of 700,517 tons of ore.

9/ 8 - Repaired the level control valve on the West lead rougher cell.

9/11 - Replaced eight outer wear shoes on the East Wernco classifier. Installed a new ni-hard scoop tip on the East Tricone Ball Mill. Replaced the north side wear plate on the East apron feeder. Rebuilt one return idler on the East weightometer conveyor belt. Repaired lagging on Rock House main conveyor head pulley. Replaced one troughing idler on Rock House main conveyor belt. Built up discharge end flights on the East Wernco classifier.

9/12 - Replaced the north side tail shaft bearing on the zinc concentrate elevator.

9/18 - Replaced feed chute liners on the West 8x12 Marcy Mill. Replaced stainless steel feed orifice in #8-14" tailing cyclone classifier. Replaced two 6" tailing cyclone classifier bodies. Built up discharge end flights on the West Wernco classifier. Inspected and repaired the zinc thickener. Found two bent flights and outer scrapers broken off. Rebuilt a 5'x12' section of the north side of the West ore bin with oak blocks.

9/21 - Replaced feed end rubber gasket on the East 8x12 Marcy Mill.

9/25 - Tightened the East apron Feeder 1". Replaced one cross wear plate in the East Symons screen. Replaced two outer and two inner wear shoes on the East Wernco classifier. Replaced the back wear plate under the East Gyrasphere crusher. Moved the East apron feeder support rails in one set of holes.

JLV
NCS

02-153

Month of - September 1967

AGRICULTURAL LIMESTONE STOCKING RECORD

Lower Plant (site No. 1, 3, 5 & 7)

Tons Stocked. 11,657

Total Tons Stocked, to Date. 236,793 .

Lower Plant (site No. 2, 4, 6 & 8)

Tons Stocked. 24,617

Total Tons Stocked to Date. 69,194

Austin Meadows (site No. 5)

Tons Stocked. 871

Total Tons Stocked to Date. 30,749

_____

Tons Stocked. _____

Total Tons Stocked to Date. _____

_____

Tons Stocked. _____

Total Tons Stocked to Date. _____

TOTAL TONS STOCKED. 37,145

JRU

MONTHLY REPORT

Austinville-Ivanhoe
August, 1967

Summary Overall Operation

Production	Obtained	Quarterly Forecast
Crude Ore		
Zinc-Tons	58,091	59,800
Grade Zn	4.0	3.70
Pb	.80	.60
Zinc Concentrates - Tons	3,509	3,327
Lead Concentrates - Tons	492	364
Costs		
Per Ton Crude Zinc Ore	$ 3.97	$ 4.11
Per Ton Zinc Concentrates	$ 57.63	$66.65
Less Credits	15.76	10.82
Net Cost of Zinc Concentrates	41.87	55.83
Plus Freight Cost	5.88	5.88
Net Cost of Zinc Conc. Delivered	47.75	61.71
Delivered Cost Per Pound of Zinc	$ .039	$ .050
Payroll	338	
Tons Per Total Man Shifts Worked		
Total Tons Crude Ore 58,091 / Total Man Shifts Worked 6,795	8.56	
Accident Record		
Frequency Rate	18.23	
Severity Rate	109	

MINING

Statistical Summary

	August, 1967		WORK PROGRAM FORECAST	
	Austv.	Ivan.	Austv.	Ivan.
Production & Operating Efficiencies				
Tons of Ore from Stoping	40,643	14,137	46,000	13,800
Tons of Ore from Development	2,338	973		
Total Tons of Ore Hoisted and/or Produced	42,981	15,110		
Tons Broken	38,649	15,686		
Broken Reserve	2,050	5,745		
Working Days	23			
Tons Ore Obtained Per Day	2,526		2,600	
Men on Payroll (Hourly, Mine)	195		200	
Percent Attendance (Salary & Hourly)	93.46			
Total Mine Shifts Worked (Hourly)	3,870			
Stope Production Shifts (Hourly) (Drilling, breaking & loading ore out of stopes)	1,642			
Tons Ore Obtained Per Hourly Shift	15.01		15.00	
Tons Ore Obtained Per Production Shift (Stope ore production only)	35.38		36.00	

	Austv.	Ivan.	Austv.	Ivan.
Tons Obtained Per Drilling Shift (Stope ore production only)	55.89	44.50	55.00	46.00
Tons Obtained Per Pound of Explosives	1.96	1.49	2.00	1.40
Tons of Waste Removed	1.43	556		
Fill Placed in Stopes	---	---		
Development and/or Deadwork				
Feet Advanced	200	24	467	183
Diamond Drilling - Underground	1,003	622	1,540	580
Diamond Drilling - Surface	--	--	--	--
Deep-Hole Drilling - Feet	--	--	--	--

Pumping

	Austv.	Ivan.
Average Gal./Min. Pumped	6,851	1,123

Stoping - Ore Extraction

Production Summary

Method	Level	Tons
Room and Pillar	Total	54,671
" " "	4th	6,932
" " "	5th	7,684
" " "	6th	3,632
" " "	7th	10,858
" " "	11th	11,537
" " "	Ivan.	14,137
Drifts, Crosscuts, Raises	Deadwork	3,311

Crude production was below forecast, but, with feed grades well above target, concentrate production exceeded estimates. Some reduction in feed grade is anticipated, but target grade should be achieved.

Production from Ivanhoe and the sixth and seventh levels at Austinville was well above target.

Fourth level production improved, but did not achieve the new target set for this level. Further improvement is expected.

Eleventh level production neared target, but expected improvement was not realized due in part to minor mining problems, but mainly due to a minor water problem in one stope which prevented loading from the chute.

Fifth level production was well below target as the majority of the stopes were in final or new mining status with attendant lower efficiencies.

Heavy summer vacation schedules continued to hamper production.

Number of Stopes Working	51
Number of Stopes Available	63

Development and/or Deadwork

	Austv.	Ivan.
Drifts and Crosscuts	155'	24'
Raises	45'	--
Stripping and Slabbing	22,968 cu. ft.	5,928 cu. ft.

The turnout curves in 11-18-91 XC were advanced and permanent track installed. The 11-48-91 Drift NE was advanced 33 feet and the 11-48-91 Drift SW was advanced 27 feet. With the SW curve completed, the NE curve will be completed before the long diamond drill pilot holes are drilled. Water encountered was minimal.

Although considerable slabbing, stripping and track work was accomplished, all development and deadwork was hampered by the heavy vacation schedules. With the loss of temporary summer employees, this situation will continue at least through September.

Precipitation

Total	5.70 inches
Maximum 8/22/67	1.43 inches

Ventilation

Ventilation was improved in the 100 Section Ore Body through the installation of additional auxiliary fan vent tubing and brattices.

Ventilation throughout the mine was satisfactory during the month. Studies are in progress to determine the feasibility of further improvement.

Capital Authorizations

46-55 Rock Drills

Of the 45 additional F1-53 Jackleg drills on order, 15 were received and placed in service. Delivery of ten more units is scheduled in each of the next three months.

46-65 Mine Scraper Bucket

This item is on order, with delivery expected in September.

46-67 Mine Locomotive Battery

An order was placed for this large mine haulage locomotive battery. Delivery is expected early in the second fiscal quarter.

Mine Geology

Diamond Drill Summary

	No. of Holes	No. of Shifts	Feet Cored	Feet Non-Cored
Underground				
Austinville	10	45	1003	--
Ivanhoe	3	23	620	--
Total	13	68	1623	-0-
Surface				
Austinville	--	--	--	--
Ivanhoe	--	--	--	--

AUSTINVILLE MINE

Underground Cored Holes - Summary

Area	No. of Ore Holes*	No. of Non-Ore Holes	No. of Holes Completed	Total Length
SW	3	2	5	204
625 O.B.	4	2	5	799

*Mineable

Underground Cored Holes - Detail

Hole No.	Area	Lev	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
U-1620**(1)	SW	5	02	30	80	Continuing 30' Barren
U-1621**(3)	625 O.B.	5	65.1	68	68	20' 15.5% Zn, 3.3% Pb
U-1622**(3)	625 O.B.	5	65.1	70	70	4' 11.0% Zn, 3.5% Pb 11½' 0.5% Zn, 0.1% Pb 7' 2.6% Zn, 0.8% Pb
U-1623**(2)	625 O.B.	5	63.4	165	165	165' Barren
U-1624**(5)	625 O.B.	5	63.4	193	193	17' Est. 1⅛% Zn, ⅛% Pb
U-1625**(1)	625 O.B.	5	57	143	143	117' Barren
U-1626**(4)	625 O.B.	5	55	160	Inc.	74' Barren 8' Est. 1% Zn, Nil Pb 14½' Est. 4% Zn, ⅛% Pb

AUSTINVILLE MINE

Underground Cored Holes - Detail

Hole No	Area	Lev	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
U-1627**(2)	SW	2	20+72' NE	27	27	12' Barren 4' Est ½% Zn, 1% Pb 4' Est Tr Zn, 1% Pb 3' Est 3% Zn, 1% Pb 4' Est 11% Zn, 1% Pb
U-1628**(2)	SW	2	20+30' NE	82	82	63' Barren 3' Est 2% Zn, 7% Pb 5½' Est 20% Zn, 3% Pb 4' Est 1% Zn, 3% Pb 3½' Est 2% Zn, 3% Pb 3' Barren
U-1629**(2)	SW	2	20+50'NE	35	35	31' Est Tr Zn, Nil Pb 4' Barren
U-1630**(3)	SW	2	20+90'NE	30	30	24' Est Tr Zn, Tr Pb 6' Est 2½% Zn, 3% Pb

**(1) Defines known Ore---No reserve change
**(2) Defines and decreases known ore
**(3) Defines and increases known ore
**(4) New ore lens---Increases reserve
**(5) New mineralization---No reserve change

Underground Non-Cored Holes

None

Surface Exploration Holes

None

IVANHOE MINE

Underground Cored Holes - Summary

Area	No. of Ore Holes*	No. of Non-Ore Holes	No. of Holes Completed	Total Length
Adl				
Rdl-Main NE	2	1	4	620
Rdl-Main SW	-	-	-	-
Rdl-Sharp	-	-	-	-
Rdl-1-197 (SW)	-	-	-	-

Underground Cored Holes - Detail

Hole No.	Area	Lev	Sect	Feet Drilled	Bottom	Remarks (Est. True Thickness)
J-546	Rdl-Main N.E.	8	00#1	Assay Data Only		11' 12.8% Zn 3.8% Pb
J-550	Rdl-Main N.E.	10	05#2	Assay Data Only		13' 1.9% Zn 0.5% Pb
						10' 1.0% Zn 0.2% Pb
J-552	Rdl-Main N.E.	7	39#4	Assay Data Only		4' 11.8% Zn 0.2% Pb
						7' Barren
						11' 10.8% Zn Tr Pb
						15' 7.4% Zn 0.7% Pb
J-554**(1)	Rdl-Main N.E.	7	39#4	80	160	20' Est 2½% Zn Tr Pb
J-555**(1)	Rdl-Main N.E.	7	39#2	100	100	10' Est 3% Zn, 2% Pb
						24' Est 8% Zn, Tr Pb
						45' Est Tr Zn, Nil Pb
J-556**(2)	Rdl-Main N.E.	8	23#3	150'	150	12' Est Tr Zn, Nil Pb
						3' Est ½% Zn, Tr Pb
						69' Est Tr Zn
						8' Est ½% Zn Tr Pb
						6' Est 2% Zn ½% Pb
						11' Est ½% Zn Tr Pb
J-557	Rdl Main N.E.	7	25P	220'	220'	Barren
J-558	Rdl Main N.E.	6	00	70	Inc.	Barren To Date

**(1) Defines known ore - No reserve change
**(2) Defines and decreases known ore

IVANHOE MINE

Underground Non-Cored Holes

None

Surface Exploration Holes

None

MILLING

Statistical Summary

Production Data	AUGUST 1967	Work Program Forecast
Tons of Ore Milled	58,091	59,800
Days Worked	23	
Tons Per Day	2,526	2,600
Tons Per Operating Hour	115.4	
Tons of Concentrates		
Zinc	3,509	
Lead	492	
Concentration Ratio for Total Conc.	14.5	
Metallurgical Comparison		
Feed - % Zinc	4.0	3.70
% Lead	.80	.60
% Oxidized Zinc	.21	
Zinc Concentrate - % Zinc	61.5	61.5
% Lead	.34	
% Zinc Recovery	92.5	92.4
% Sulfide Zinc Recovery	97.6	
Lead Concentrate - % Zinc	2.8	
% Lead	76.0	76.0
% Lead Recovery	81.0	76.9
Tailings - % Zinc	.30	
% Lead	.14	
Operating Time		
Hours Operated	503.43	
Hours Unscheduled	192.00	
Hours Lost	48.57	

Composite Screen Analysis of Flotation Feed

Mesh	Cumulative% Retained
On 48	6.7
65	17.8
100	32.2
150	44.2
200	55.4
270	60.0
Minus 270	40.0

Mill Operation

Zinc metallurgy was normal. A higher than forecast zinc feed grade was experienced.

Total lead in the feed was over the forecast level. Lead recovery was over the forecast level.

Four unit shifts were lost while waiting for ore to accumulate.

Major Mill Maintenance

No major mill maintenance was required during July.

Engineering and Construction

Ivanhoe Rock Plant - Approp. 46-09

No progress was made on this project.

Limestone Dryer Plant Dust Conveyor - Approp. 46-61

This project was completed in August.

Yard Track Extension - Approp. 46-63

Some materials were ordered and grading for the road bed was begun.

Limestone & Waste Rock

Limestone

Tons, Production	45,436
Tons Sold, Unprocessed	23,657
Tons Sold, Dried	1,621
Total Tons Sold	25,278

Virtually all production was stocked in the lower plant for rail shipments. Production was from the 14-inch and 6-inch cyclones in combination. Hauled 560 tons from screening plant for box car shipments.

Waste Rock

Production	4,653
Tons Sold	6,340

Limestone Sales

Sales for the month failed by 3,396 tons to equal sales for the same month last year. The majority of customers report heavy stockpiling in June and are awaiting the placement of orders by farmers before purchasing more limestone.

Farmers appear to be well satisfied with both quality and quantity of crops. Ideal weather conditions throughout the growing season favored most crops, and if prices received by farmers equal or improve over those of last year, the sale and use of limestone should be as great this fall as in the spring.

Agricultural Stabilization and Conservation Service officials at the county level in both Virginia and North Carolina appear to be more reluctant than usual to approve requests by farmers for limestone this fall. The ASCS does this each fall in an effort to encourage farmers to carry out other practices such as drainage, planting of trees, and terracing. Those farmers who fail to complete approved practices by October 15 to October 30 are then encouraged to use the money for limestone. Limestone is the only practice the farmer can carry out under ASCS regulations right up to the last day of the year.

Personnel Department

Employee Relations

There was one meeting held with the Union during the month of August. Two grievances were discussed in Step 4 at this meeting.

Grievances

The Harold M. Dunford Grievance is scheduled for arbitration September 21. No date has been selected for the Howard D. Akers Grievance which has been advanced to arbitration.

Visitors

Date	Name	Company Affiliation	Location
7/26/67	Mr. J. H. Lampkin	Inspector Virginia Department of Labor and Industry Division of Mines and Quarries	Big Stone Gap Virginia
8/7/67	Mr. G. W. Wunder	Executive Vice President	The New Jersey Zinc Company
	Mr. S. S. Goodwin	Vice President - Mining and Exploration	New York
	Mr. W. T. Pettijohn	Manager of Mines	

Real Estate

The real estate account showed a gain of $826.83 for the month of August. It is anticipated that a slight loss will occur for the month of September due to major maintenance being performed on staff row garages.

Of the 96 rental units available, 87 are occupied.

Safety

The regularly scheduled Company-Union Safety Committee meeting was held on August 17, 1967.

COST SUMMARY

	COST PER TON OF ORE			
	AUSTINVILLE		IVANHOE	
	AUGUST 1967	FORE-CAST	AUGUST 1967	FORE-CAST
Mining				
Development	$ .36	$ .40	$ .32	$ .44
Stoping	.81	.86	.70	.86
Loading and Hauling	.32	.28	.19	.23
Hoisting	.17	.17	.33	.31
Drainage	.23	.27	.20	.16
Ventilation	.01	.01	.01	.01
Compressed Air	.08	.09	.05	.05
Equipment Maintenance	.12	.12	.18	.19
Rock Drilling	.13	.15	.09	.14
General Mining Expense	.41	.41	.26	.31
Total Mining	$ 2.64	$ 2.76	$ 2.33	$ 2.70

	COST PER TON OF ORE	
	AUGUST 1967	FORE-CAST
Mining (Combined)	$ 2.56	$ 2.75
Milling		
Crushing Primary	$ .03	$ .03
Crushing Secondary	.08	.08
Grinding	.17	.20
Flotation	.19	.18
Filtering and Drying	.05	.05
Loading Concentrates	.01	.01
Tailings Disposal	.01	.01
General Milling Expense	.12	.13
Total Milling	$ .66	$ .69
General Indirect		
General	$ .09	$ .10
Clerical	.11	.12
Personnel	.10	.09
General Plant Maintenance	.10	.09
Fixed Charges	.35	.38
Total General Indirect	$ .75	$ .78
Total Cost Per Ton of Ore	$ 3.97	$ 4.22
Total Cost Per Ton of Zinc Conc.	$ 57.63	$ 68.37
Delivered Cost Per Pound of Zinc	$ .039	$ .046

Crude ore production was essentially as forecast with deadwork ore contributing substantially to the total. The grade of crude ore was well above the estimate, which, with good metallurgical recoveries, resulted in above target concentrate production of both zinc and lead.

Unit mining costs reflected unusually heavy repairs to chutes and grizzlies under Loading and Hauling, and hoisting costs were adversely affected by an accumulation of hoist rope cutting plus skip loading and other minor, though cumulatively substantial repairs.

Seasonally poor limestone sales were further depressed by extremely heavy rains during the month in Virginia and North Carolina. However the production and sale of lead concentrates was good resulting in credits which reduced the net cost of zinc concentrates and/or metal to a most acceptable level.

ORIGINAL SIGNED
By K. R. Winslow

K. R. Winslow
Superintendent

Attachments:
Status of Capital Expenditures
Real Estate Report
Monthly Labor Report
Comparative Accident Records
Supply Balances

cc: Mr. W. T. Pettijohn, N. Y. (4)
Austinville (3)

STATUS OF CAPITAL EXPENDITURES

August, 1967

Project & No.	Authorized	Current Expense	Year to Date	Total to Date	Unexpended Balance
(f) 46-09 Rock Plant	$ 86,250	$ --	$ --	$ 85,038	$ 1,212
(a) 46-55 Rock Drills	96,000	16,875	16,875	61,875	34,125
(b) 46-61 Pneumatic Dust Conveyor	6,000	1,193	1,193	6,001	(1)
46-63 Yard Track Extension	8,500	--	--	--	8,500
(b) 46-64 Pulverizer-Mixer	16,000	14,700	14,700	14,700	1,300
(a) 46-65 Mine Scraper Bucket	1,050	--	--	--	1,050
(a) 46-67 Mine Locomotive Battery	4,300	--	--	--	4,300

(a) Equipment on order - installation in progress
(b) To be closed next month
(f) Partially closed. Only remaining work is construction of loading ramp on rail site.

cc: Mr. W. T. Pettijohn, N. Y. (4)
Austinville (3)

Mill Notes - August, 1967

Miscellaneous Data

Shifts Worked	23
Mill Feed-% Moisture	1.85

Meterological Observations

Outside air temperature - °F @ 7:00 A.M. -	Average	64°
	Maximum	70°
	Minimum	52°

Precipitation, Inches

Total	5.70 in.
Maximum (8-22-67)	1.43 in.

Power for Grinding

	KWH Per Ton
Symons Crushers	.282
Gyrasphere Crushers	.230
8 x 12 Marcy Rod Mills	4.830
Tricone Ball Mill	2.201
4 x 10 Marcy Regrind Mills	.249
Total	7.792

Real Estate Maintenance

Began painting garages for all houses on Staff Row except No. 403.

Replaced the roofing on house No. 203.

Miscellaneous

Coe and Sons, contractors, continued the painting of the Van Mater Shaft headframe.

Maintenance Notes - August, 1967

Electric Shop

7/26/67 - Repaired wiring at limestone reconditioning plant. Replaced integrator in weightometer and checked it out. Repaired controller on 2½ ton locomotive. Relocated conduit and horn at limestone dryer to make room for new equipment.

7/27/67 - Installing control equipment for blower at limestone dryer. Repaired wiring on slusher on 4th level. Repaired controller on 2½ ton locomotive.

7/28/67 - Repaired wiring on locomotive on 11th level. Repaired controller on locomotive on 5th level. Replaced timer motor on hot plate in chemical laboratory. Installed ventilation fan in 7th level pumping station.

7/31/67 - Repaired contactor on locomotive on 11th level. Replaced overloads on 12B pump. Checked and cleaned controls on mine crusher. Cleaned and checked controls on mine pumps. Repaired blasting machine.

8/ 1/67 - Moved battery charger from 8th to 11th level at Ivanhoe Shaft. Cleaned and checked pump controls at Ivanhoe Shaft. Repaired two lights at house No. 146. Replaced light switch in filter plant building. Cleaned and checked controls on hoist at Ivanhoe Shaft.

8/ 2/67 - Repaired controller on crusher motor at Ivanhoe Rock Plant. Made up twenty ground straps for hole loading equipment for blasting. Repaired wiring on slusher on 11th level. Repaired microphone for cage phone.

8/ 3/67 - Repaired wiring and replaced light breaker on slusher on 4th level. Replaced handle on controller on locomotive on 5th level. Repaired wiring on locomotive on 7th level. Installing wiring for pneumatic conveyor equipment at limestone dryer.

8/ 4/67 - Replaced wiring on 2½ ton locomotive. Replaced light on locomotive on 11th level. Installing wiring for pneumatic conveyor equipment at limestone dryer.

8/ 7/67 - Replaced plug on locomotive on 5th level. Replaced coil and fuse on river pump controls. Repaired wiring on locomotive on 11th level.

8/ 8/67 - Repaired wiring on slusher on 4th level. Replaced pump in subway at Ivanhoe Shaft. Completed wiring for pneumatic conveyor equipment at limestone dryer.

8/ 9/67 - Repaired wiring on slusher motor on 7th level. Repaired two trip lights. Repaired foot switch on 2½ ton locomotive.

8/10/67 - Replaced plug on locomotive on 11th level. Repaired solenoid valve on air cylinder at limestone dryer. Replaced light switch in house #273. Changed oil in Lidgerwood hoist motors. Repaired mine air lamp.

8/11/67 - Repaired blasting meter. Repaired light circuit on 4th level. Repaired float on tank at Flatwoods Shaft. Replaced vibrator at limestone reconditioning plant.

8/14/67 - Cleaned and checked controls on Vulcan hoist. Repaired wiring on 5B pump motor. Installed new bearings in mill conditioner motor. Repaired Van Mater Shaft cage phone.

8/15/67 - Repaired telephone on 11th level. Replaced coded station on fire alarm system at river pumps. Repaired cage phone at Ivanhoe Shaft. Removed wiring from old boarding house in bottom area.

8/16/67 - Repaired shop electric welder. Replaced meter on locomotive on 11th level. Repaired wiring on locomotive on 7th level. Checked safety devices on Vulcan hoist. Replaced street lamps.

8/17/67 - Cleaned and checked controls on all pump starters at Van Mater Shaft. Repaired wiring on slusher on 2nd levels. Replaced motor and wiring on West 8X12 Marcy Mill.

8/18/67 - Repaired telephone line on 4th level. Repaired two mine air lights. Replaced fuse on 13,000 Volt line feeding flume pumps. Replaced motor on heater in supply house. Repaired telephone on 11th level.

8/21/67 - Repaired electric heater in substation building #503. Cleaned and checked controls on mine crusher. Cleaned and checked controls on Vulcan hoist. Replaced two signal horns on fire alarm system.

8/22/67 - Repaired vibrator on lime loading equipment in bottom area. Repaired wiring on Van Mater Shaft telephones. Cleaned and checked controls on Ivanhoe Shaft pumps. Cleaned and checked controls on hoist at Ivanhoe Shaft.

8/23/67 - Removed wiring for slusher from 72-22 stope. Installed speaker for phone in Mill. Repaired wiring on slusher on 7th level. Replaced speaker in pager at Crusher Station on 11th level.

8/24/67 - Repaired wiring on slusher on 8th level at Ivanhoe Shaft. Repaired vibrator on limestone loading equipment in bottom area. Cleaned and checked controls on pumps at sewage pumping station. Cleaned and checked controls on No's 1, 2, 3, and 4 air compressors.

8/25/67 - Repaired float switch on water tank in Mill. Repaired wiring on flume pumps. Repaired light circuit in storage building No. 503. Read all plant kilowatt hour meters.

Maintenance Notes - August, 1967

Mill

7/26/67 - Installed a used feed plate on the West Symons crusher.

7/27/67 - Installed rebuilt valves in the zinc vacuum pump. Installed a used casing body on the lead thickener ODS pump.

7/31/67 - Installed a rebuilt motor on the West zinc cleaner cell unit #52. Replaced rubber side skirt on East Gyrasphere conveyor belt. Tightened the East apron feeder 1". Replaced level control valve in #2 East lead rougher cell.

Checked alignment of the East 8x12 Marcy Mill gear and pinion. Pinion gear tooth back lash was checked at three places. Found south side top of tooth .054, bottom .017, root .173. North side top of tooth .063 back lash, root .170. On the 1/3 turn north top of tooth back lash .033, bottom .025, root .162. On the 3/4 turn, top back lash .055, bottom .016, root .175. North side top back lash .072, bottom .002, root .164. Speed reducer side coupling pinion half top high .008, west side .006, speed reducer half gap-top .290, east side .295, west side .295, bottom .296, motor coupling gap-top .168, east side .171, west side .165, bottom .165. Alignment O. K.

8/ 1/67 - Repaired the West Symons screen. Installed a discharge end crossbar, and one #55 and two #56 rubber spacers. Installed a Model CV, size 35, Vibrolator ball type vibrator on the zinc concentrate filter discharge chute.

8/ 7/67 - Rebuilt the East zinc cleaner froth paddle shaft. Installed guards on all cleaner cell froth paddle shaft drives. Replaced rubber side skirts on the West weightometer conveyor belt. Installed a rebuilt submerged bearing on the West Wimco classifier. Tightened Rock House apron feeder.

8/ 8/67 - Repaired the East middling pump. Installed a new shaft sleeve, suction bell liner, suction sleeve, packing, engine bell liner, shell liner and centering washer. Replaced a broken crank shaft bearing in the lead vacuum pump.

8/10/67 - Repaired the spare middling pump. Installed a new suction bell liner and suction sleeve.

8/14/67 - Installed new weightometer conveyor belt. Ebonite grade, 3/16" top and 1/32" bottom covers. Replaced impeller on 52A East zinc cleaner. Rebuilt 3 lead rougher cells and 2 zinc rougher cells. Installed rebuilt submerged bearing on the East Wemco classifier.

8/15/67 - Installed new discharge nipple and packed 7B pump.

8/17/67 - Replaced diaphram in lead ODS pump. Replaced the 350 HP motor on the West 8x12 mill due to burned motor leads.

8/18/67 - Repaired leak in 6" tailings line to bottom.

8/21/67 - Replaced 2 broken shell liners in West 8x12 mill. Repaired chute lining under Gyrasphere and Symons crushers. Replaced side skirts on weightometer conveyor belt. Removed loose wood blocks and tied in lining on West ore bin. Replaced the 18" belt from elevator to storage bin at the zinc dryer. Replaced check valve body in zinc ODS pump.

8/22/67 - Replaced suction side bell liner 7A tailings pump. Repaired zinc concentrate elevator belt, added 1' new belt at splice. Replaced air pipe from dust fan to West Gyrasphere conveyor belt. Repaired several leaks in 6" cyclones.

8/25/67 - Installed new integrator belt and tilting wheel on zinc dryer transportometer.

Maintenance Notes - August, 1967

Machine Shop

7/28/67 - Completed testing all fire hoses. Inspected and O.K.'d manhole in the New Town sewage system.

Due to mechanical seal and bearing failure, the shaft assembly of #7B1 mine pump, Ivanhoe Mine Shaft, was removed and replaced by a reconditioned shaft assembly. The assembly which was removed had run a total of 4172 hours and was rebuilt at a cost of $180.34 for parts, and $13.29 for labor, making a total cost of $193.63 for the job.

8/1/67 - The Ivanhoe and Van Mater Shaft hoist cables were tested by McPharr's representative.

The Lidgerwood man hoist was out of service for approximately one hour due to the necessity of cutting a piece out of the North cable to eliminate a kink. A 7-foot length was cut from the cable.

Relieved air lock in the #12B water pump in the Van Mater Shaft.

Due to a broken shaft, the shaft assembly of #2A industrial water pump was removed and replaced with a rebuilt assembly. The assembly which was removed had run a total of 453 hours and was rebuilt at a cost of $246.77 for parts and $17.72 for labor, making a total cost of $264.49 for the job.

8/3/67 - Due to worn-out mechanical water seals, the shaft assembly of #11A1 mine pump, Van Mater Shaft, was removed and replaced with a rebuilt assembly. Records show that this was the first major repair job on this pump since it was installed, 10/13/53. It was rebuilt at a cost of $136.69 for parts and $31.01 for labor, making a total cost of $167.70 for the job.

8/5/67 - Cleaned and inspected the 50,000 gallon industrial water tank at Ivanhoe. Approximately 12 inches of mud was washed out of the tank. The tank was found in good condition except for a few rust spots which were cleaned and painted.

Inspected the Ivanhoe headframe, tightened all loose bolts, replaced missing bolts and removed all rocks which were lodged on the eyebeams, channels, etc.

Replaced a blown high-pressure cylinder head gasket in the #3 Sullivan Air Compressor.

8/7/67 - Cut 5 feet from each of the Vulcan Ore Hoist cables.

8/8/67 - Changed oil in the Ivanhoe hoist speed reducers, bearings and couplings; also installed two sets of new grids in the couplings.

8/9/67 - Lubricated the Vulcan Hoist cables.

8/10/67 - Due to mechanical water seal failure the shaft assembly of #5C mine pump was removed and replaced with a rebuilt assembly. The assembly which was removed had run a total of 263 hours and was rebuilt at a cost of $127.32 for parts and $20.48 for labor, making a total cost of $147.80 for the job.

8/11/67 - Due to bearing failure, the shaft assembly of #7B1 mine pump, Ivanhoe Shaft, was removed and replaced with a rebuilt assembly. The assembly which was removed had run a total of 4159 hours and was rebuilt at a cost of $14.23 for parts and $42.09 for labor, making a total cost of $56.32 for the job.

8/15/67 - Due to a broken impeller shaft, the shaft assembly of #2A, industrial water pump was removed and replaced with a rebuilt assembly. The assembly which was removed had run a total of 182 hours and was rebuilt at a cost of $140.20 for parts and $23.20 for labor, making a total cost of $163.40 for the job.

8/16/67 - Started cleaning and painting the flocculation tank in the drinking water plant, the job being completed on 8/18.

8/22/67 - Tightened the anchor bolts of the #6 Ingersoll-Rand XLE Air Compressor at Ivanhoe to eliminate vibration.

8/23/67 - Set up the mine crusher ¼", making a total of 1½" of shims.

Installed a new 6" 125 lb. pressure check valve in the industrial water line on the 200 foot level.

Installed a new rear spring in the Ivanhoe Mine deads truck.

Due to mechanical water seal failure, the shaft assembly of #11B2 mine pump, Ivanhoe Shaft, was removed and replaced with a rebuilt assembly. The assembly which was removed had run a total of 1373 hours and was rebuilt at a cost of $32.60 for parts and $30.16 for labor, making a total cost of $62.76 for the job.

Due to a broken shaft, the shaft assembly of #2A industrial water pump was removed and replaced with a rebuilt shaft assembly and a new casing. The assembly which was removed had run a total of 89 hours and was rebuilt at a cost of $920.21 for parts and $53.28 for labor, making a total cost of $974.19 for the job.

8/25/67 - Built up the wear plates on the mine crusher above the grizzly fingers with hard-weld electrodes, the job requiring a total of 24 man hours for completion.

JLV
NCS

02-153

Month of - August 1967

AGRICULTURAL LIMESTONE STOCKING RECORD

LOWER PLANT SITE #1,3,5&7

Tons Stocked. 23,172

Total Tons Stocked, to Date. 225,136.

LOWER PLANT SITE #2,4&6

Tons Stocked. 22,109

Total Tons Stocked to Date. 44,577

AUSTIN MEADOWS SITE #5

Tons Stocked. 155

Total Tons Stocked to Date. 29,878

_____

Tons Stocked. _____

Total Tons Stocked to Date. _____

_____

Tons Stocked. _____

Total Tons Stocked to Date. _____

TOTAL TONS STOCKED. 45,436

MONTHLY REPORT

Austinville-Ivanhoe
July, 1967

Summary Overall Operation

Production	Obtained	Quarterly Forecast
Crude Ore		
Zinc-Tons	49,361	54,600
Grade Zn	4.0	3.70
Pb	.91	.60
Zinc Concentrates - Tons	3,007	3,037
Lead Concentrates - Tons	458	332
Costs		
Per Ton Crude Zinc Ore	$ 4.48	$ 4.18
Per Ton Zinc Concentrates	$ 63.76	$ 67.69
Less Credits	9.84	11.72
Net Cost of Zinc Concentrates	$ 53.92	$ 55.97
Plus Freight Cost	5.88	5.88
Net Cost of Zinc Conc. Delivered	$ 59.80	$ 61.85
Delivered Cost Per Pound of Zinc	$ .049	$ .051
Payroll	338	
Tons Per Total Man Shifts Worked		
Total Tons Crude Ore 49,361 / Total Man Shifts Worked 6,253	7.90	
Accident Record		
Frequency Rate	0	
Severity Rate	586	

MINING

Statistical Summary

	JULY, 1967		WORK PROGRAM FORECAST	
	Austv.	Ivan.	Austv.	Ivan.
Production & Operating Efficiencies				
Tons of Ore from Stoping	36,105	11,621	42,000	12,600
Tons of Ore from Development	1,260	375		
Total Tons of Ore Hoisted and/or Produced	37,365	11,996		
Tons Broken	35,814	11,994		
Broken Reserve	4,044	4,087		
Working Days	21			
Tons Ore Obtained Per Day	2,351		2,600	
Men on Payroll (Hourly, Mine)	195		200	
Percent Attendance (Salary & Hourly)	94.90			
Total Mine Shifts Worked (Hourly)	3,589			
Stope Production Shifts (Hourly) (Drilling, breaking & loading ore out of stopes)	1,490			
Tons Ore Obtained Per Hourly Shift	13.75		15.00	
Tons Ore Obtained Per Production Shift (Stope ore production only)	33.13		36.00	

	Austv.	Ivan.	Austv.	Ivan.
Tons Obtained Per Drilling Shift (Stope ore production only)	55.86	44.09	55.00	46.00
Tons Obtained Per Pound of Explosives	2.13	1.19	2.00	1.40
Tons of Waste Removed	902	564		
Fill Placed in Stopes	-	-		
Development and/or Deadwork				
Feet Advanced	317	126	467	196
Diamond Drilling - Underground	915	550	1,550	610
Diamond Drilling - Surface	-	-		
Deep-Hole Drilling - Feet	-	-		

Pumping

	Austv.	Ivan.
Average Gal./Min. Pumped	6,882	1,167

Stoping - Ore Extraction

Production Summary

Method	Level	Tons
Room and Pillar	Total	49,116
" " "	4th	5,924
" " "	5th	7,692
" " "	6th	3,094
" " "	7th	10,189
" " "	11th	9,206
" " "	Ivan.	11,621
Drifts, Crosscuts, Raises	Deadwork	1,635

Despite well-below-forecast crude production, concentrate production was near forecast for zinc and well above forecast for lead with well-above-forecast grades.

Fourth level production was essentially on target. Seventh level production was well above target, but fell short of offsetting the tight ore availability on the sixth level.

Roof bolting operations in eleventh level stopes were completed late in the month. Production from this level is expected to improve next month.

Fifth level production approached target, but was somewhat hampered with some stopes in final or new mining stages and consequently lower efficiencies.

Ivanhoe production was hampered with a tight breaking situation in a number of stopes and increased haulage requirements due to the mining of more upper level stopes.

Heavy vacation schedules during the summer months also contributed to the inability to achieve target production and will continue to be a factor for at least two more months.

Number of Stopes Working	53
Number of Stopes Available	64

Development and/or Deadwork

	Austv.	Ivan.
Drifts and Crosscuts	70'	73'
Raises	247'	53'
Stripping and Slabbing	19,081 cu. ft.	8,732 cu. ft.

The 11-18-91 XC was advanced to the location of the mining drifts. Slabbing was completed for both turnouts and the NE mining drift advanced twenty feet. Water encountered was minor, consisting mainly of very small flows from minor fractures and vugs, some of which showed grout from the final cover. Current plans entail advancing the turnout curves to completion at which time long diamond drill pilot holes will be drilled.

The heavy vacation schedules hampered all development and deadwork.

One of the fifth level sumps was cleaned during the month.

Precipitation

Total	3.43 inches
Maximum 7/17/67	1.00 inches

Ventilation

A minor ventilation difficulty was encountered in the 100 Section Ore Body. It was temporarily resolved by scheduling development and stoping work on the same shift. Final resolution will result upon completion of planned development.

Ventilation throughout the remainder of the mine was satisfactory during the month.

Capital Authorizations

46-55 Rock Drills

The 15 of the 45 additional FL-53 Jackleg drills expected to be delivered in July were not received. Delivery is still expected in the near future.

Mine Geology

Diamond Drill Summary

	No. of Holes	No. of Shifts	Feet Cored	Feet Non-Cored
Underground				
Austinville	6	41	916	--
Ivanhoe	4	20	550	--
Total	10	61	1,466	0
Surface				
Austinville	-	-	-	-
Ivanhoe	-	-	-	-

AUSTINVILLE MINE

Underground Cored Holes - Summary

Area	No. of Ore Holes*	No. of Non-Ore Holes	No. of Holes Completed	Total Length
SW	0	1	1	107
NE	0	4	4	809

*Mineable

Underground Cored Holes - Detail

Hole No.	Area	Lev	Sect.	Feet Drilled	Bottom	Remarks (Est. True Thickness)
U-1615	NE	11	95P	334	Inc.	Barren Proposed 900 ft. but stopped @ 334' due to high water pressure
U-1616	NE	5	47.4	180	180	Barren
U-1617	NE	5	47.4	140	140	Barren
U-1618	NE	5	47.4	155	155	2' Est. 7% Zn, Nil Pb 95' Barren 2' Est. 2% Zn, Nil Pb
U-1619						
**(1)	SW	5	02P	57	57	Barren
U-1620	SW	5	02P	50	Inc.	3' Est. 4% Zn, Nil Pb 47' Barren

**(1) Defines known ore - no reserve change

Underground Non-Cored Holes

None

Surface Exploration Holes

None

IVANHOE MINE

Underground Cored Holes - Summary

Area	No. of Ore Holes*	No. of Non-Ore Holes	No. of Holes Completed	Total Length
Rdl-Main NE	3	0	2	340
Rdl-Main SW	0	1	1	210

*Mineable

Underground Cored Holes - Detail

Hole No.	Area	Lev	Sect	Feet Drilled	Bottom	Remarks (Est. True Thickness)
J-547	Rdl-Main NE	8	05P	Assay data only		3' 3.2% Zn, 3.1% Pb 22' Barren 8' 2.5% Zn, 0.5% Pb
J-549	Rdl-Main NE	10	09#3	"	" "	25' 0.6% Zn, Tr Pb 12' Barren 11' 5.0% Zn, 0.1% Pb 7' Barren 8' 6.4% Zn, 1.5% Pb
J-551 **(5)	Rdl-Main SW	10	08	210'	210'	24' Est. Tr Zn, Nil Pb 33' Barren 25' Est. Tr Zn, Nil Pb 31' Barren 12' Est. ½% Zn, Nil Pb
J-552 **(2)	Rdl-Main NE	7	39#4	140	140	4' Est. 18% Zn, Nil Pb 7' Barren 11' Est. 8% Zn, Nil Pb 15' Est. 3% Zn, Tr Pb
J-553 **(2)	Rdl-Main NE	7	39#4	120	120	3' Est. 6% Zn, Tr Pb 15' Est. ½% Zn, ½% Pb 28' Barren 5' Est. 4% Zn, Nil Pb 15' Est. ½% Zn, Tr Pb 8' Est. 2% Zn, Tr Pb 13' Est. 4% Zn, ½% Pb
J-554 **(2)	Rdl-Main NE	7	39#4	80	Inc.	16' Scat. Tr Zn, Pb 15' Est. 8% Zn, 1% Pb 25' Est. 5% Zn, Tr Pb

**(2) Defines and decreases known ore
**(5) New mineralization - no reserve change

Underground Non-Cored Holes

None

Surface Exploration Holes

None

MILLING

Statistical Summary

Production Data	JULY 1967	Work Program Forecast
Tons of Ore Milled	49,361	54,600
Days Worked	21	
Tons Per Day	2,350	2,600
Tons Per Operating Hour	114.7	
Tons of Concentrates		
Zinc	3,007	
Lead	458	
Concentration Ratio for Total Conc.	14.2	
Metallurgical Comparison		
Feed - % Zinc	4.0	3.70
% Lead	.91	0.60
% Oxidized Zinc	.19	
Zinc Concentrate - % Zinc	61.4	61.5
% Lead	.47	
% Zinc Recovery	92.5	~~92.5~~ 92.4
% Sulfide Zinc Recovery	97.1	
Lead Concentrate - % Zinc	3.5	
% Lead	75.3	76.0
% Lead Recovery	76.5	76.9
Tailings - % Zinc	.29	
% Lead	.20	
Operating Time		
Hours Operated	430.42	
Hours Unscheduled	216.00	
Hours Lost	73.58	

Composite Screen Analysis of Flotation Feed

Mesh	Cumulative % Retained
On 48	6.4
65	17.5
100	32.0
150	44.1
200	55.1
270	58.5
Minus 270	41.5

Mill Operation

Zinc feed grade was higher than forecast during July. Higher than normal oxidized zinc in the feed held zinc recovery at forecast level.

Lead recovery was lower than forecast due to high oxidized lead content in the feed.

Ten unit shifts were lost while waiting to accumulate ore.

Major Mill Maintenance

The head and shell liners in the West Hardinge Tricone Mill were replaced.

Bearing failure and subsequent shaft scoring in the West Hardinge Tricone Mill speed reducer necessitated a complete replacement of internal parts. The old parts will be rebuilt and kept for spares.

Engineering and Construction

Ivanhoe Rock Plant - Approp. 46-09

No progress was made on this project.

Limestone Dryer Plant Dust Conveyor - Approp. 46-61

The major items of equipment were received, the discharge pipeline was installed and electrical work was begun.

Main Office Air Conditioning - Approp. 46-62

This project was completed.

Limestone & Waste Rock

Limestone

Tons, Production	38,553
Tons Sold, Unprocessed	17,056
Tons Sold, Dried	1,045
Total Tons Sold	18,101

Except for a small amount stocked at Austin Meadows, all production was stocked in the lower plant for rail shipment. Production was from the 14-inch and 6-inch cyclones in combination.
Hauled 420 tons from the screening plant for boxcar loading

Waste Rock

Production	3,731
Tons Sold	3,548

Limestone Sales

Total sales for the month approximated those of July, 1966. An increase was expected but did not materialize. Most customers this spring expressed a desire to stockpile during the summer months due to the rather severe car shortage experienced over the past two lime seasons; however, they feel it is more economical to stockpile only two or three weeks prior to the limestone season and apparently will begin placing orders the second or third week in August.

Weather conditions permitting, the demand for limestone this fall will in all probability exceed any previous fall season. Agricultural officials in North Carolina and limestone spreaders in both Virginia and North Carolina indicate an increase in limestone use this fall and next year. Virginia agricultural officials feel that more emphasis will have to be placed on the profitability of limestone use before any increase can be expected in Virginia.

A limestone promotional program is being organized in the State of North Carolina at the present time. According to North Carolina State University Extension Service officials the use of limestone in the state will increase by at least 55% beginning in the fall of 1968. As a member of the Steering Committee for the promotional program, our limestone sales representative is recommending our complete support of the program. If the program is only half as successful as predicted, an increase in the sale of limestone from Austinville will be substantial.

The Agricultural Extension Service of North Carolina State University is proposing a meeting with Agricultural Stabilization and Conservation Service officials in the state in an effort to encourage them to require all farmers using limestone under the federal program to take a soil sample before becoming eligible for financial help from the U. S. Department of Agriculture. If such a requirement were adopted by the ASCS, limestone sales are certain to be adversely affected at least for the first two or three years. Although no direct approach has been made, efforts have been made to implicate the Company in such a meeting. Every effort will be made to avoid becoming involved in what could become an embittered controversy between the ASCS and Extension Service.

Personnel Department

Employee Relations

There were no meetings held with the Union during the month of July.

Grievances

There are two grievances currently being prepared for arbitration--the Howard D. Akers Grievance and the Harold M. Dunford Grievance.

Visitors

Date	Name	Company Affiliation	Location
7/24/67 and 7/25/67	Mr. J. J. Guin, Jr.	Employee Relations Department The New Jersey Zinc Company	New York

Real Estate

The real estate account showed a loss of $14.06 for the month of July with an accumulative gain of $2,275.15 for the year ending July 25.

Of the 96 rental units available, 86 are occupied.

Safety

The regular monthly meeting of the Company-Union Safety Committee was held on July 20.

COST SUMMARY

	COST PER TON OF ORE			
	AUSTINVILLE		IVANHOE	
	JULY 1967	FORE-CAST	JULY 1967	FORE-CAST
Mining				
Development	$ .37	$ .44	$ .37	$ .41
Stoping	.80	.79	.88	.76
Loading and Hauling	.30	.30	.21	.21
Hoisting	.24	.15	.27	.32
Drainage	.48	.38	.19	.17
Ventilation	.01	.01	.01	.02
Compressed Air	.08	.09	.06	.06
Equipment Maintenance	.12	.12	.19	.12
Rock Drilling	.17	.15	.15	.14
General Mining Expense	.46	.38	.32	.33
Total Mining	$ 3.03	$ 2.81	$ 2.65	$ 2.54

	COST PER TON OF ORE	
	JULY 1967	FORE-CAST
Mining (Combined)	$ 2.94	$ 2.74
Milling		
Crushing Primary	$ .03	$ .03
Crushing Secondary	.06	.07
Grinding	.30	.20
Flotation	.20	.18
Filtering and Drying	.04	.05
Loading Concentrates	.01	.01
Tailings Disposal	.01	.04
General Milling Expense	.14	.12
Total Milling	$ .79	$ .70
General Indirect		
General	(.02)	.10
Clerical	.17	.11
Personnel	.10	.09
General Plant Maintenance	.08	.09
Fixed Charges	.42	.41
Total General Indirect	$ .75	$ .80
Total Cost Per Ton of Ore	$ 4.48	$ 4.24
Total Cost Per Ton of Zinc Conc.	$ 63.76	$ 68.84
Delivered Cost Per Pound of Zinc	$ .049	$ .049

Crude ore production was substantially below the forecast, being plagued primarily by ground control problems in the Section 100 Ore Body and an unusually large number of stopes, both at Austinville and Ivanhoe, being simultaneously in a low productivity phase of the mining cycle.

All unit costs were adversely affected by the low tonnage figure as well as by the paid holiday which occurred during the month. Other unit costs reflected roof bolting in Section 100, painting of the Van Mater Shaft headframe, receipt of the final Cementation Company invoice, and heavy supervisory vacations.

At Ivanhoe the cyclic charge for wire rope had an adverse effect upon slushing costs and water control costs reflected work on a 7th level bulkhead door.

Unit grinding costs in the mill reflected replacement of a speed reducer and liners in the West Hardinge Tricone Mill.

General Indirect Costs were affected by receipt of the invoice for major repairs performed in June on the National Cash Register payroll machine.

As a result of well-above-target crude ore grade, combined concentrate production was essentially as forecast. Limestone sales were seasonably slow, and with the performance of heavy routine maintenance on limestone preparation and loading equipment, little credit was realized. However, above-target lead production and shipments provided credits which reduced the cost of zinc concentrate and/or metal to a point which was competitive with purchased ore.

ORIGINAL SIGNED
By K. R. Winslow

K. R. Winslow
Superintendent

Attachments:
Status of Capital Expenditures
Real Estate Report
Monthly Labor Report
Comparative Accident Records
Supply Balances

cc: Mr. W. T. Pettijohn, N. Y. (4)
Austinville (3)

STATUS OF CAPITAL EXPENDITURES

July, 1967

Project & No.	Authorized	Current Expense	Year to Date	Total to Date	Unexpended Balance
(f) 46-09 Rock Plant	$ 86,250	$ -	$ 5,310	$ 85,038	$ 1,212
(a) 46-55 Rock Drills	96,000	-	45,000	45,000	51,000
(a) 46-61 Pneumatic Dust Conveyor	6,000	4,752	4,809	4,809	1,191
(e) 46-62 Office Air Conditioning	10,000	7,550	7,994	7,994	2,006

(a) Equipment on order - installation in progress
(e) Appropriation closed this month
(f) Partially closed May, 1967

cc: Mr. W. T. Pettijohn, N. Y. (4)
Austinville (3)

Mill Notes - July, 1967

Miscellaneous Data

Shifts Worked	21
Mill Feed - % Moisture	1.90

Meteorological Observations

Outside Air Temperature - °F @ 7:00 A.M. -	Average	64
	Maximum	72
	Minimum	54

Precipitation, Inches

Total	3.43"
Maximum (7/17/67)	1.00"

Power for Grinding

	KWH Per Ton
Symons crushers	.236
Gyrasphere crushers	.228
8x12 Marcy Rod Mills	4.882
Tricone Ball Mill	2.240
4x10 Marcy Regrind Mills	.294
Total	7.880

Mobile Equipment Maintenance

Cleaned and repainted No. 4 Michigan front end loader.

Installed a used hour meter on No. 2 bulldozer. Replaced pins and bushings in the tracks and replaced blade cutting edges on No. 2 bulldozer.

Real Estate Maintenance

Poured concrete porch floors for House Nos. 220 and 223.

Repaired floors and outside trim on House No. 247.

Replaced roofing on House No. 203.

Miscellaneous

The Austinville fire department answered a call to Harry Viars' residence.

Coe & Sons, contractors, continued painting of Van Mater Shaft headframe.

Maintenance Notes - July, 1967

Mill

6/26/67 - Relined the West 8x12 Marcy Mill discharge chute with used conveyor belting.

Turned the West 8x12 Marcy Mill trommel screen.

Replaced flexible oil lines on the West Gyrasphere crusher.

Replaced 12 liner bolts in the West Tricone Mill.

Replaced 8 outer wear shoes on the West Wemco classifier.

Repaired cover over the return side of the west screen conveyor belt.

Replaced north side wear rubber under the West Gyrasphere crusher.

6/29 - Repaired the east feed sampler.

6/30 - Installed a new casing body on the lead thickener ODS pump.

7/3 - Replaced thimble in Symons crusher feed chute.

Replaced one troughing idler on the weightometer conveyor belt.

Replaced south side wear rubber under Gyrasphere crusher.

7/5 - Repaired the West Tricone Mill speed reducer. Due to a burned out bearing and scored high speed pinion shaft, it was necessary to change the high speed pinion shaft pinion, bearings, low speed shaft, low speed gear, and bearings.

7/10 - Replaced yoke on the west zinc middling thickener.

Replaced an 8-foot section of cover over the return side of the west weightometer conveyor belt.

Replaced 6" 90° Ni-Hard ell in the West 8x12 Marcy Mill discharge pipeline.

Built up discharge end flights on the West Wemco classifier with hardweld.

7/12 - Replaced check valve body in suction side of the zinc thickener ODS pump.

7/17 - Installed new bearings in the west high pressure water pump.

Installed a rebuilt feed screw in the zinc concentrate dryer. The screw removed had carried a total of 21,473 tons of concentrate.

Built up discharge end flights on the East Wemco classifier with hardweld.

Replaced two outer wear shoes on the East Wemco classifier.

Rebuilt one return idler on the East weightometer conveyor belt.

Cleaned oil ways and changed oil in the East Tricone mill speed reducer.

7/18 - Installed a rebuilt shaft assembly in 7A tailing pump.

7/19 - Repaired the zinc sump pump. Installed used parts, casing, shaft, thrust bearing, packing gland and impeller.

7/21 - Replaced the north side wear plate on the West apron feeder.

Replaced two #55 and two #56 spacer rubbers on the West Symons screen.

Replaced 22' of 6" pipe in the west feed line.

7/24 - Tightened the west apron feeder 2".

Replaced the south side wear rubber under the West gyrasphere crusher.

Relined the West Tricone Mill. Replaced all shell and head liners with new Ni-Hard liners. The old liners removed had been in service since 8/10/63. During this period the west unit had ground 1,332,543 tons of ore. Weight of old liners removed was 9,295 lbs., with a wear loss of 53.6%. The new liners were installed in 2-1/2 shifts with approximately 120 man hours being expended for installation. This does not include preparatory or cleanup work. The old plastigum was left on the shell.

Checked the alignment of the West 8x12 Marcy Mill gear and pinion.

Pinion gear tooth backlash was checked at three places. Found north side top of tooth .000, bottom .077, root .182. South side top of tooth .069, bottom .002, root .177 on the 1/4 turn. Top of tooth .047, bottom .016, root .173 on the 1/2 turn. North side top of tooth .019, bottom .048, root .175. Speed reducer side coupling east side .322, west .315, top .318, bottom .318. Speed reducer coupling .006, east motor side coupling gap .200.

Maintenance Notes - July, 1967

Electric Shop

6/26/67 - Repaired float on water tank for Flatwoods. Cleaned and checked #5 air compressor. Repaired fan for Van Mater Shaft substation. Repaired control wiring on mine crusher.

6/27 - Replaced drive motor on limestone dryer. Relocated wiring for slusher on 4th level. Replaced contactor on 2-1/2 ton locomotive. Installed headlight on 2-1/2 ton locomotive.

6/28 - Repaired wiring on slusher on 11th level. Replaced motor on locomotive on 4th level. Removed welding switch from 7th level. Repaired light on locomotive on 5th level.

6/29 - Repaired wiring on locomotive on 4th level. Repaired stop-start switch on slusher on 11th level. Replaced plugs on slusher on 11th level. Repaired reagent motor for mill.

6/30 - Repaired wiring on hot plate in chemical laboratory. Replaced antenna on cage phone. Repaired two mine air lights. Replaced ballast in light at main office.

7/3 - Replaced motor on slusher on 7th level. Cleaned and checked contacts on Vulcan hoist. Repaired controller on locomotive on 7th level. Replaced motor on locomotive on 4th level. Replaced light breaker at House No. 248.

7/5 - Replaced light switch at House No. 243. Repaired wiring on slusher on 4th level. Cleaned and repaired locomotive motor. Replaced transformer on light circuit on 2nd level. Repaired heater in lunch room on 2nd level.

7/6 - Repaired wiring on slusher on 4th level. Replaced stop-start switch on slusher on 11th level. Removed vibrator from limestone reconditioning plant for repair.

Repaired wiring on slusher on 6th level at Van Mater shaft. Replaced stop-start switch on slusher on 11th level.

7/7 - Repaired wiring on slushers on 4th and 11th levels. Replaced lamps on headframe. Repaired controller on locomotive on 7th level at Ivanhoe shaft. Replaced fluorescent light in Main Office.

7/10 - Replaced wiring on West 8x12 Marcy Mill. Replaced insulator on 13,000 volt line feeding bottom area. Installed coil and replaced vibrator at limestone reconditioning plant. Repaired controller on locomotive on 11th level.

7/11 - Repaired flow switch on 12A pump. Installed breaker at House No. 251. Removed fire alarm equipment from old Supply House building so it can be torn down. Replaced fire alarm horn at Flatwoods shaft. Repaired radio on shop truck.

7/12 - Replaced lamps at softball field. Repaired mine telephone on 5th level. Replaced lights on Yard in bottom area. Cleaned and checked #5 air compressor. Replaced lamps at Flatwoods shaft.

7/13 - Repaired wiring on vent fan on 11th level. Replaced wiring on 2-1/2 ton locomotive. Installed photoelectric control on street lights in bottom area. Replaced thermostat on Ozalid Machine at Main Office. Repaired two mine air lights.

7/14 - Relocated cable for fire alarm system in bottom area. Replaced bearings in high pressure water pump in mill. Repaired wiring on Vulcan hoist. Repaired wiring on conveyor at limestone reconditioning plant.

7/17 - Removed integrator from mill for overhaul. Cleaned and checked contacts on Vulcan hoist. Replaced contacts on brake relay on Vulcan hoist. Repaired wiring on light circuit on 11th level. Repaired wiring in House No. 403.

7/18 - Repaired recording meter on Vulcan hoist. Replaced plugs on locomotive on 11th level. Repaired breaker on slusher on 11th level. Repaired heater in lunch room on 2nd level.

7/19 - Replaced coil in vibrator at limestone reconditioning plant. Replaced transformer on light circuit on 2nd level. Repaired vibrator on lime loading equipment in bottom area. Relocated wiring in House No. 220. Replaced 12A pump and motor.

7/20 - Repaired wiring on slusher at Ivanhoe shaft. Repaired controller on locomotive on 5th level. Repaired wiring on slusher on 11th level. Spliced cable feeding slusher on 4th level.

7/21 - Repaired wiring on slusher on 11th level. Repaired wiring on slusher on 4th level. Repaired control wiring on locomotive on 11th level. Repaired two mine air lights.

7/24 - Repaired wiring on locomotive on 11th level. Replaced lamps in substation. Replaced lamps on Yard at upper plant. Checked and cleaned controls on Vulcan hoist.

7/25 - Relocated telephone on 2nd level. Cleaned and repaired weightometer integrator knife edges and painted cabinet. Replaced light switch in House No. 230. Read all plant kilowatthour meters.

Maintenance Notes - July, 1967

Machine Shop

6/29/67 - Cleaned and made the necessary repairs to the main plant heating boiler, cleaned the flues, stack, etc.

7/3 - Due to mechanical water seal and bearing failure, the shaft assembly of #5B mine pump was removed and replaced with a rebuilt assembly. The assembly which was removed had been in service a total of 550 hours and was rebuilt at a cost of $225.48 for parts and $22.20 for labor, making a total cost of $247.68 for the job.

7/6 - Completed cleaning and making the necessary repairs to the Flatwoods heating boiler, cleaned the flues, stack, etc.

7/10 - Replaced old drive belts on the Allen-Sherman-Hoff water pump on the 300 level V. M. Shaft with 5 new #B-60 V-belts.

7/11 - Completed cleaning and making the necessary repairs to the Ivanhoe plant heating boiler, cleaned the flues, stack, etc.

7/12 - Cleaned and inspected the flocculation tank in the drinking water plant. Found the paint in bad condition and reported as needing a paint job this year.

Set up the mine crusher 1/4 inch, making a total of 1 inch of shims, this being the first setup since February 15, 1967.

7/12 - Completed cleaning and making the necessary repairs to the Van Mater change house heating boiler, cleaned the flues, stack, etc.

7/13 - Completed cleaning and making the necessary repairs to the chemical laboratory boiler, cleaned the flues, stack, etc.

7/17 - Installed a reconditioned starter on the truck which is used for hauling deads from the Van Mater Shaft.

7/18 - Checked and repaired the emergency light plant in the main plant substation.

7/19 - The #12A mine pump, V. M. Shaft, had been reported as losing prime and would not pick up water. After several attempts to obtain proper operation, a rebuilt pump was installed. The pump which was removed had run a total of 114 hours and the job was completed at a cost of $39.12

7/20 - The above-mentioned pump again lost its prime and upon inspection the foot valve was found to be badly worn. It was replaced with a new valve which corrected the trouble.

The No. 5B mine pump was reported as having a cracked shaft sleeve and leaking badly, but upon inspection the trouble was found to be caused by the shaft sleeve nut backing off and leaving the sleeve loose. The same trouble was found in the #5C pump also. The sleeve nuts were tightened and the trouble was eliminated in both 5B and 5C pumps.

Lubricated the Ivanhoe hoist cables; also greased the cage dogs.

7/21 - Replaced a blown gasket on the #3 air compressor intercooler with a new gasket; also removed and checked the intercooler for leaks.

JLV
NCS

02-153

Month of - July 1967

AGRICULTURAL LIMESTONE STOCKING RECORD

Lower Plant Site # 1,3, 5, & 7

Tons Stocked. 29,031

Total Tons Stocked, to Date. ~~202,414~~ 201,964

Lower Plant Site # 2,4,6 & 8

Tons Stocked. 9,037

Total Tons Stocked to Date. ~~56,028~~ 22,468

Austin Meadows Site # 5

Tons Stocked. 485

Total Tons Stocked to Date. 29,723

_____

Tons Stocked. _____

Total Tons Stocked to Date. _____

_____

Tons Stocked. _____

Total Tons Stocked to Date. _____

TOTAL TONS STOCKED. 38,553

ANNUAL REPORT

Austinville, Virginia
Fiscal 1967

Summary Overall Operation

Production	Obtained	1967 Work Program Forecast
Crude Ore		
Tons	641,938	660,400
Grade Zn	3.50	3.70
Pb	.68	.60
Zinc Concentrates - Tons	33,247	36,728
Lead Concentrates - Tons	4,823	4,008
Costs		
Per Ton Crude Zinc Ore	$ 4.31	$ 4.24
Per Ton Zinc Concentrates	$ 72.63	$ 68.84
Less Credits	21.31	13.98
Net Cost of Zinc Concentrates	$ 51.32	$ 54.86
Plus Freight Cost	5.88	5.88
Net Cost of Zinc Conc. Delivered	$ 57.20	$ 60.74
Delivered Cost Per Pound of Zinc	$ .047	$ .049
Payroll	338	
Tons Per Total Man Shifts Worked		
Total Tons Crude Ore	641,938	8.38
Total Man Shifts Worked	76,759	
Accident Record		
Frequency Rate	51.37	
Severity Rate	1180.00	

MINING

Statistical Summary

	Fiscal 1967		Work Program Forecast	
	Austv.	Ivan.	Austv.	Ivan.
Production & Operating Efficiencies				
Tons of Ore from Stoping	461,827	158,592	508,000	152,400
Tons of Ore from Development	16,739	4,420		
Total Tons of Ore Hoisted and/or Produced	478,566	163,372		
Tons Broken	459,786	160,216		
Broken Reserve	4,044	4,087		
Working Days	253			
Tons Ore Obtained Per Day	2,537		2,600	
Men on Payroll (Hourly, Mine)	190		200	
Percent Attendance (Salary & Hourly)	92.89			
Total Mine Shifts Worked (Hourly)	43,063			
Stope Production Shifts (Hourly) (Drilling, breaking & loading ore out of stopes)	17,522			
Tons Ore Obtained Per Hourly Shift	14.91			
Tons Ore Obtained Per Production Shift (Stope Ore Production Only)	36.64			
	Austv.	Ivan.	Austv.	Ivan.
Tons Obtained Per Drilling Shift (Stope Ore Production Only)	55.94	47.04		
Tons Obtained Per Pound of Explosives	2.05	1.34		
Tons of Waste Removed	10,604	7,973		
Fill Placed in Stopes	-	-		
Development and/or Deadwork				
Feet Advanced	6,021	2,623	5,300	2,100
Diamond Drilling - Underground	15,752	6,762	18,500	6,500
Diamond Drilling - Surface	-	-		
Deep-Hole Drilling - Feet	1,124	-		

Pumping

	Austv.	Ivan.
Average Gal./Min. Pumped	6,914	1,161

Stoping - Ore Extraction

Production Summary

Method	Level	Tons
Room and Pillar	Total	620,419
" " "	4th	67,227
" " "	5th	97,240
" " "	6th	52,089
" " "	7th	122,733
" " "	11th	122,538
" " "	Ivan.	158,592
Drifts, Crosscuts, Raises	Deadwork	21,159

Production from Ivanhoe and the 5th and 7th levels at Austinville was on or well above target. The 4th level production improved, approaching target, but was hampered by curtailment of production from the Chiswell Hole ore body due to hydrologic difficulties. The major deterrents to the achievement of target production were the lack of ore available for 6th level extraction and ground control problems encountered in establishing sound backs in the 11th level stoping areas. Development scheduling will help to alleviate the 6th level shortage with increased production from the 7th level. Improved roof-bolting techniques and materials are expected to result in target 11th level production in the future.

An illegal work stoppage in October caused a loss of two operating days.

Grade was improved materially, but was still short of target. Dilution from roof control work and the mining of low grade in order to recover adjacent higher grade zones were primary factors. However, greater operational flexibility was achieved through the development of alternate working places which should contribute toward better production and grade control in the near future.

Average Number of Stopes Working	53
Average Number of Stopes Available	61

Development and/or Deadwork

	Austv.	Ivan.
Drifts and Crosscuts	3,128	1,054
Raises	2,893	1,569
Stripping & Slabbing	146,544 cu. ft.	61,250 cu. ft.

At Ivanhoe, development progressed at a satisfactory rate with the main achievements consisting of 354 feet of advance in the Simmerman ore body drive, installation of the bulkhead door for this drive, and the development of Sharp ore body and 7th level SW stopes. Manpower shortages curtailed advance of the 10th level to the northeast.

Manpower shortages hampered development work at Austinville, primarily affecting the 70 Section development and interconnection with the 100 Section ore body. Progress on this project was limited to installation of the bulkhead door. Deadwork necessary for remnant mining and pillar recovery was accomplished at a satisfactory pace. Development of the A-625 and 100 Section ore bodies also moved at a satisfactory rate.

With the services of Cementation Company of America, progress in the 11-18-91 crosscut was good with 612 feet of advance which successfully penetrated both the Stamping Ground and Van Mater fault zones. Approximately 20 feet of concrete liner was installed through the Stamping Ground fault zone. The Van Mater fault zone was tight and in competent ground. Cementation Company of America's services were discontinued upon completion of the crosscut. At year end, the slabbing for both the northeast and southwest mining drifts was completed and the northeast face advanced 20 feet. Expenditures this year total $113,144 bringing cost to date for this project to $243,066. In grouting, 37,896 feet of drilling and redrilling were required and the following materials used: 24,173 bags of cement, 9,398 bags of limestone, 58,729 pounds of calcium chloride, and 35,394 pounds of bentonite.

Cementation Company of America was also employed in an attempt to grout off the water source which flooded the 7-26-181 stoping area. Although some restriction of the flow was achieved, the project was abandoned for economic reasons.

Water encountered in the Chiswell Hole ore body stoping required cementing off. This water was directly connected to the New River. The project was successful and stoping was resumed.

One of our 5th level sumps was cleaned during the year. Very effective use was made of a diaphragm pump with the sand deposited in a mined-out stope.

Precipitation

Total	37.03 inches
Maximum - 9/13/66	3.36 inches

Ventilation

Ventilation of the A-625 ore body was obtained through a fan installed on a surface borehole which intersected the ore body.

Ventilation throughout both mines was satisfactory, with some minor difficulties in the 100 Section ore body requiring auxiliary ventilation. Final resolution of the ventilation of the 100 Section ore body will be obtained through the 70 Section crosscut development interconnection.

Capital Authorizations

46-30 Austinville Bulkhead Door

This 11th level, Section 70 door was installed and the appropriation closed.

46-47 Ivanhoe Bulkhead Door

This 7th level, Summerman drift, door was installed and the appropriation closed.

46-48 A-625 Ore Body Ventilation

A 12-inch diameter borehole was drilled from the surface into the A-625 ore body and a ventilation fan was purchased and installed on the hole. Operation has been satisfactory. The appropriation was closed.

46-49 Jackhammers and Feed Legs

This equipment was received and has been operating satisfactorily. The appropriation was closed.

46-50 Slusher and Scraper

These units were received and have performed very satisfactorily. The appropriation was closed.

46-51 Locomotive Batteries

Two large batteries were purchased and put into service. Performance has been satisfactory. The appropriation was closed.

46-52 Oxy-Acetylene Unit

A portable back-pack unit was purchased. It has contributed greatly to the safety and performance of many mine repair and installation tasks. The appropriation was closed.

46-54 Austinville Surface Locomotive

The surface locomotive at the Van Mater Shaft was replaced with an industrial tractor. Operation has been highly satisfactory. The appropriation was closed.

46-55 Rock Drills

Authorization was granted to purchase 85 of these replacement units. A total of 40 units was received and placed in service. Operation has been very satisfactory to date. The remaining units are on order, with delivery scheduled throughout the first quarter of fiscal 1968.

46-56 Small Locomotive Battery

This battery was purchased to serve with the new locomotive purchased under Appropriation 46-58. The appropriation was closed.

46-58 Small Locomotive

This unit was purchased to replace two obsolete locomotives. With the spare battery purchased under Appropriation 46-56, it has performed very satisfactorily for both development and auxiliary production haulage. The appropriation was closed.

46-59 Atmospheric Sampling Equipment

Equipment was purchased in order to initiate a program of atmospheric sampling. One engineer has been trained in its use. The program will be initiated when manpower permits. The appropriation was closed.

Mine Geology

DIAMOND DRILLING SUMMARY

Underground	No. of Holes	Shifts	Feet Cored	Feet Non-Cored
Austinville	88	551	10,304	5,361
Ivanhoe	48	234	6,042	714
Totals	136	785	16,346	6,075

Surface

None

AUSTINVILLE DIAMOND DRILLING

Underground Cored Holes

Area	No. of Holes	Total Length	Average Length	No. With Ore
Brown Ore Body	12	1,887	157'	5
Flatwoods	7	1,319	188	2
100 Ore Body	2	505	253	0
Mine NE	24	4,011	167	3
Mine SW	16	2,582	161	7
	61	10,304	169	17

Underground Non-Cored Holes

Flatwoods	26	5,203	200
100 Ore Body	1	158	158
Totals	27	5,361	198

Surface Exploration Holes

None

IVANHOE DIAMOND DRILLING

Underground Cored Holes

Area	No. of Holes	Total Length	Average Length	No. With Ore
Austinville Member	0	-	-	-
Mine NE	20	2,728	136	15
Mine SW	11	1,898	173	4
A-197 Ore Body	1	150	150	0
Sharp	12	1,266	106	9
Totals	44	6,042	137	28

Underground Non-Cored Holes

Mine NE	3	664	221	-
Sharp	1	50	50	-
Totals	4	714	178	-

Surface Exploration Holes

None

OTHER AREAS

None

MILLING

Statistical Summary

	FISCAL YEAR 1967	WORK PROGRAM FORECAST
Production Data		
Tons of Ore Milled	641,938	662,400
Days Worked	254	
Tons Per Day	2,527	2,600
Tons Per Operating Hour	116.3	
Tons of Concentrates		
Zinc	33,247	
Lead	4,823	
Concentration Ratio for Total Conc.	16.9	
Metallurgical Comparison		
Feed - % Zinc	3.5	3.7
% Lead	.68	.60
% Oxidized Zinc	.16	
Zinc Conc. - % Zinc	61.5	61.5
% Lead	.40	
% Zinc Recovery	92.2	92.4
% Sulfide Zinc Recovery	96.7	
Lead Conc. - % Zinc	2.7	
% Lead	74.3	76.0
% Lead Recovery	81.7	76.9
Tailings - % Zinc	.27	
% Lead	.11	
Operating Time		
Hours Operated	5,515.18	
Hours Unscheduled	2,664.00	
Hours Lost	580.82	

Composite Screen Analysis of Flotation Feed

Mesh	Cumulative % Retained
On 48	6.7
65	18.3
100	33.0
150	45.4
200	56.5
270	61.3
Minus 270	38.7

Mill Operation

Zinc metallurgy was satisfactory although overall recovery was below the forecast figure. This is attributed to an increase in oxidized zinc content. Recovery of lead in the zinc concentrates was low.

Lead recovery continued at a high level. Lead concentrate grade declined below that forecast as a consequence of contamination of the ore. An accompanying increase in loss of zinc to lead concentrates was experienced.

Mill operation continued with little change in 1967. Relining of the East rod mill in February caused a decrease in throughput rate in the East unit. Some operating time was lost while waiting to accumulate ore.

Mill Maintenance

The following major maintenance jobs were performed:

1. Installed new wearing parts in the mine jaw crusher.

2. Replaced the shell liners in the East rod mill with new liners.

3. New head and shell liners were installed in the East and West Hardinge ball mills.

Engineering and Construction

Ivanhoe Rock Plant - Approp. 46-09

This project was completed except for construction of a rail car loading ramp.

Limestone Dryer Plant Dust Conveyor - Approp. 46-61

At year's end, installation work had just begun and all equipment had been received.

Main Office Air Conditioning - Approp. 46-62

This project was completed.

Lower Plant Improvements - Approp. 46-19

Erection of the equipment storage building was deferred. The fire alarm system and other installations were completed.

Protective Fence for Ivanhoe - Approp. 46-57

Installation of the fence was completed.

Mobile Equipment

In May a new Rex Model HDS Pulvi-mixer was acquired on a rental basis with the expectation that it will be purchased as a replacement for the old Seaman Model DS-47 pulverizer mixer.

Limestone & Waste Rock

Limestone

Tons, Production	507,421
Tons Sold, Unprocessed	587,023
Tons Sold, Dried	42,394
Total Tons Sold	629,417

Of the 629,417 tons shipped, 459,977 tons was by rail as damp limestone, 127,046 tons by truck as damp limestone, and 42,394 tons by rail and truck as dried bulk and bagged limestone.

After allowances are made for losses, a total of 461,000 tons was produced and available for shipment as damp and dried products from the lower plant stockpiles. Since approximately 502,000 tons were shipped from the lower plant, a further reduction in stockpile inventory of 41,000 tons was obtained in 1967.

Shipments from the drying plant continued to increase with a large part of the increase being accounted for by the dried bulk product.

Waste Rock

Production	32,571
Tons Sold	39,854

Approximately two months' production of rock was lost during the period from October, when the old Austinville plant was closed, to December when the new Ivanhoe plant began operation.

Limestone Sales

Total tons sold increased by approximately 3% over the same twelve-month period prior to this fiscal year. Of more significance is that dry limestone sales increased by 50% during the same period, although part of the increase will not be repeat business.

Employees of the American Limestone Company, Mascot, Tennessee, were on strike for approximately six months, which accounts for a large part of the increase in our dry sales. Two relatively new producers, U. S. Steel, Jefferson City, Tennessee, and Campbell Limestone Company, Blacksburg, South Carolina, were ideally located to supply American Limestone Company customers with damp limestone, but neither company produces a dry product. Employees of American Limestone Company returned to work in late spring.

In general, weather conditions favored the operation of limestone spreader trucks as well as the production of crops. Prices received by farmers for most products exceeded those of the previous year.

The competition proved to be more active than in any other twelve-month period. Both the Campbell Limestone Company and Rocky Dale Quarries, Starkey, Virginia, expanded production of agricultural limestone. Also, Rocky Dale substantially reduced the price of their damp bulk limestone. U. S. Steel made an all-out effort to establish themselves as one of the major suppliers of agricultural limestone in North Carolina. Texas Gulf Sulphur is producing an agricultural limestone near Aurora, North Carolina, but due to a lack of magnesium have not as yet obtained approval of the North Carolina Department of Agriculture to market their product.

A severe shortage of railroad cars hampered sales greatly in both the fall and spring seasons. At times the delay in shipments exceeded thirty days. Many customers placed orders with other producers.

A price increase effective October 24, 1966, had no great effect on overall sales. A few customers turned to other suppliers for part or all of their limestone needs, but such losses were more than offset by a substantial increase in limestone use.

Agricultural officials in both North Carolina and Virginia cooperated fully with all members of the limestone industry in an effort to increase the use of limestone in both states. The Agricultural Stabilization and Conservation Service removed several restrictions detrimental to an increase in limestone use.

Again Congress passed the farm bill with the same amount of money appropriated for the operation of the 1968 Agricultural Conservation Program as in the past, although a recommendation was made by both the Johnson Administration and Budget Bureau to curtail the funds necessary for the operation of ACP. If the recommended reduction had been adopted, the use and sale of limestone would have been drastically reduced, as approximately 70% of the limestone sold is used under the program.

Annual Report - 1966 - Austy Va

Personnel Department

Employee Relations

Nine meetings were held with the Union during the year. Two of these meetings were for completing negotiations for labor, insurance, and pension agreements. The other seven were for discussing grievances in Step 4.

Negotiations resulted in 10 cents per hour across-the-board wage increase effective July 26, 1966; 10 cents per hour increase effective July 26, 1967; and 9 cents per hour increase effective July 26, 1968. Insurance and pension agreements resulted in improved benefits for all bargaining unit employees. All agreements will expire October 26, 1969.

Personnel

The per cent of labor turnover during the year was exceedingly high and is expected to continue so for some time. Employment of personnel remains increasingly difficult due to the high rate of employment throughout the immediate area and, particularly, at the U. S. Government Ordnance Plant at Radford, Virginia.

Grievances

Sixteen grievances were filed during the year with two being carried over from the previous year. Of these, ten were settled in favor of the Company and three in favor of the Union. Two of the settled grievances were arbitrated, with one decision in favor of the Company and one for the Union. Five of the grievances filed during the year will be carried over into the next year.

Real Estate

The real estate account showed a gain of $2,275.15 for the year. Scheduled interior painting and repairs were completed, and extensive repairs to the bathrooms in seven Staff Row dwellings were carried out.

Safety

Both the Mine and Plant Departments held two series of safety meetings. The Personnel Department assisted in obtaining materials for all of these meetings.

Health and Welfare

Plans are complete for the purchase of a portable x-ray unit for the doctor's office with installation expected by the end of October, 1967.

COST SUMMARY

	COST PER TON OF ORE			
	AUSTINVILLE		IVANHOE	
	FISCAL 1967	FORE-CAST	FISCAL 1967	FORE-CAST
Mining				
Development	$ .36	$ .44	$ .40	$ .41
Stoping	.83	.79	.76	.76
Loading and Hauling	.28	.30	.21	.21
Hoisting	.16	.15	.28	.32
Drainage	.54	.38	.15	.17
Ventilation	.01	.01	.01	.02
Compressed Air	.09	.09	.06	.06
Equipment Maintenance	.12	.12	.17	.12
Rock Drilling	.16	.15	.13	.14
General Mining Expense	.42	.38	.29	.33
Total Mining	$ 2.97	$ 2.81	$ 2.46	$ 2.54

	COST PER TON OF ORE	
	FISCAL 1967	FORE-CAST
Mining (Combined)	$ 2.84	$ 2.74
Milling		
Crushing Primary	$ .03	$ .03
Crushing Secondary	.08	.07
Grinding	.20	.20
Flotation	.18	.18
Filtering and Drying	.05	.05
Loading Concentrates	.01	.01
Tailings Disposal	.01	.04
General Milling Expense	.13	.12
Total Milling	$ .69	$ .70
General Indirect		
General	$ .10	$ .10
Clerical	.12	.11
Personnel	.09	.09
General Plant Maintenance	.10	.09
Fixed Charges	.37	.41
Total General Indirect	$ .78	$ .80
Total Cost Per Ton of Ore	$ 4.31	$ 4.24
Total Cost Per Ton of Zinc Conc.	$ 72.63	$ 68.84
Delivered Cost Per Pound of Zinc	$ .047	$ .049

Crude ore production and grade were below target primarily as a result of mining difficulties in the 6th and 11th Level stoping areas and a two-day work stoppage in October, 1966.

Unit crude mining costs were adversely affected by the extended efforts of the Cementation Company of America in 11-18-91 crosscut and the increased cost of supervision resulting from long-term supervisory illnesses and additional staff fringe benefits granted during the year.

Zinc and lead concentrate production were below and above the target, respectively, and total concentrates approximately 7% below target. However, limestone sales were well above the previous year and this, together with good lead concentrate production and sales, reduced the net cost of zinc concentrate and/or zinc metal to a satisfactory level.

ORIGINAL SIGNED
By K. R. Winslow

K. R. Winslow
Superintendent

Attachments:
Status of Capital Expenditures
Real Estate Report
Monthly Labor Report
Comparative Accident Records
Supply Balances

cc: Mr. W. T. Pettijohn, N. Y. (4)
Austinville (3)

cc: Mr. W. T. Pettijohn, N. Y. (4)
Austinville (3)

Austinville, Virginia
Status of Capital Expenditures

Project & Job No.	Amount Authorized	Fiscal Year Ending 7/25/67 1967 Expenditures	Total Expenditures to 7/25/67	Unexpended Balance
(b) 46-09 Rock Plant - Addl.	$ 86,250	$ 5,310	$ 85,038	$ 1,212
(a) 46-19 Lower Plant Security	27,500	1,850	24,467	3,033
(a) 46-30 Austv. Bulkhead Door	18,000	1,083	14,051	3,949
(a) 46-38 Circuit Breaker	1,300	320	1,327	(27)
(a) 46-44 Shelter & Feed Barn	5,000	2,480	5,017	(17)
(a) 46-45 Staff Houses - Bathrooms	3,000	619	2,840	160
(a) 46-47 Ivanhoe Bulkhead Door	7,500	7,461	7,461	39
(a) 46-48 A-625 Orebody Ventilation	2,000	1,651	1,659	341
(a) 46-49 Four Jackhammers	1,200	1,200	1,200	-
(a) 46-50 Slusher-Scraper	8,000	7,945	7,945	55
(a) 46-51 Locomotive Batteries	8,000	7,992	7,992	8
(a) 46-52 Oxy-Acetylene Unit	325	308	308	17
(a) 46-54 Surface Tractor (V. M. Shaft)	4,500	4,498	4,498	2
46-55 Rock Drills	96,000	45,000	45,000	51,000
(a) 46-56 3-1/2 Ton Battery Locomotive	3,500	3,238	3,238	262
(a) 46-57 Ivanhoe Fence Extension	3,000	2,822	2,822	178
(a) 46-58 3-1/2 Ton Battery Loco. & Battery	11,500	11,250	11,250	250
(a) 46-59 Atmospheric Sampling Equip.	2,500	975	975	1,525
(a) 46-60 Motor Vehicle (Limestone)	2,000	1,979	1,979	21
46-61 Pneumatic Dust Conveyor	6,000	4,809	4,809	1,191
(a) 46-62 Office Air Conditioning	10,000	7,994	7,994	2,006

(a) Closed during year
(b) Partially closed during year

cc: Mr. W. T. Pettijohn, N. Y. (4)
Austinville (3)

ANNUAL REPORT - 1967 (7/26/66 - 7/25/67)

PURCHASING AND SUPPLY DIVISION COMMENTS

EQUIPMENT AND BUILDINGS

The Olivetti-Underwood, Model D24GT, calculator mentioned in our report of July 25, 1966, as being purchased only a few weeks prior, has proven to be a well worthwhile investment in convenience and as a time-saver in our stock record control work.

PROCEDURES AND INVENTORIES

The use of blanket orders is continually being expanded upon where advantageous and as occasions arise.

Close surveillance in the placement of orders is maintained at all times in an effort to minimize inventories to a practical safe working stock. Surveillance is also exercised throughout Supplies and Spare Parts for possible obsolescence.

During this period, obsolete Supplies in the amount of $40.25 and obsolete Spare Parts totaling $193.34 were charged off.

A comparison of inventories at the beginning and ending of the fiscal year reflect the following changes:

	SUPPLIES	SPARE PARTS
Balance 7/25/66	$ 90,938	$ 154,132
Balance 7/25/67	93,278	149,777
Change	+ $ 2,340	- $ 4,355

As of December 26, 1966, the "Departmental" section (explosives, mill reagents, grinding media, etc.) was combined and distributed into "General" Supplies by code classification.

PERSONNEL

The employee mentioned in our last report as having been placed in the Supply House on a training program was used a considerable part of the year, partially due to a three months' illness of the regular clerk. This employee has proven to be very capable and can operate the Supply House with very little administrative advice. He has also been trained for other plant clerical work and is utilized in these capacities at various times.

MILL NOTES - YEAR OF 1967

(August, 1966 - July, 1967)

Miscellaneous Data

Shifts Worked	762
Mill Feed - % Moisture	1.89

Meteorological Observations

Outside Air Temperature - °F @ 7:00 A.M. -	Average	49
	Maximum	80
	Minimum	4

Precipitation, Inches

Total	37.99
Maximum (9/13/66)	3.36

Power for Grinding

	KWH Per Ton
Symons Crushers	.252
Gyrasphere Crushers	.227
8x12 Marcy Rod Mills	4.897
Tricone Ball Mill	2.289
4x10 Marcy Regrind Mills	.252
Total	7.917

JLV
NCS

02-153

Year of 1967

AGRICULTURAL LIMESTONE STOCKING RECORD

Lower Plant Site # 1,3,5 &7

Tons Stocked. _____

Total Tons Stocked, to Date. 262,706.

Lower Plant Site #2,4,6 &8

Tons Stocked. _____

Total Tons Stocked to Date. 182,257

Lower Plant Site # 11

Tons Stocked. _____

Total Tons Stocked to Date. 51,878

Austin Meadows Site # 5

Tons Stocked. _____

Total Tons Stocked to Date. 10,580

_____

Tons Stocked. _____

Total Tons Stocked to Date. _____

TOTAL TONS STOCKED. 507,421

(6" & 14" Cyclones .84 Factor)

Limestone production for December is estimated since there is no record for that month. RCS

459,977
42394
502,371
461

507,421
10,580
496,941 x .93 = 461,000