UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

PA:33-2

August 28, 1973

Memorandum to Files

TRANSFER OF THE PALMERTON URANIUM ORE STOCKPILE

Introduction

For background please refer to the Palmerton ore stockpile file and particularly to J. W. Gabelman's memoranda of January 29, 1973, June 7, 1973, and June 15, 1973.

Pretransfer Activities

The stockpile was visited June 19, 1973, with Dr. Arthur A. Socolow, State geologist of Pennsylvania, for the purpose of selecting specimens for university research and museum display. Dr. Socolow will serve as the distributing agent to interested organizations. He collected approximately 1,300 pounds of high-grade ore. I collected approximately 300 pounds for local and other distribution.

June 20, gamma measurements were made with Mt. Sopris and Eberline scintillation counters to establish background for the area (attachment A). Selected key points included the city park in the center of Palmerton across the street from the New Jersey Zinc Company laboratory, the Main Gate parking lot for the East Plant, and the gravel flood plain of Aquashicola Creek--a mile and 2.2 miles east of the plant. The highest reading recorded was 90 counts per second (Mt. Sopris) and 12.7k counts per minute (Eberline) at ground level in the Palmerton park. This is equivalent to about 0.016 milleroentgens per hour. This reading was used as the standard for comparison during cleanup operations.

Transfer of the Stockpile

The loading operations were attended and witnessed by Mr. R. G. Mercer, Coordinator of Production and Planning, New Jersey Zinc Company; Mr. R. E. Allen, Division of Operational Safety (OS); Dr. J. W. Gabelman, Division of Production and Materials Management (PMM); Mr. Connie Shelloc, Superintendent of Aggregates, Inc., a subsidiary of the New Jersey Zinc Company; the front-end loader operator; and three laborers.

Six gondola railroad cars of greater than 70-ton capacity each were placed on the siding alongside the stockpile the morning of June 21. The ore was loaded into the cars with a rubber-tired front-end loader with a smooth cutting edge bucket of 6-ton capacity. The average load capacity was twice determined at 6 tons by weighing the loader empty

and then full at the company scales about one-half mile distant. The load for each car was arbitrarily placed at 10 buckets as a precaution against overloading the cars. The remainder was distributed among the cars.

Loading began at 10:00 a.m. and was completed by 1:00 p.m. During loading, the operator was instructed to include underlying floor slag 6 inches deep; the undercut area extended at least 6 feet outward from the ore area. As undercutting progressed, however, a cut approached 1 foot deep in the middle of the area.

Upon completion of loading, the area was surveyed cursorily with three radiation detection instruments--(1) the Mt. Sopris scintillation counter, (2) the Eberline scintillation counter, and (3) a Nuclear Chicago geiger counter. Much of the area was above 60 microroentgens per hour over the Palmerton Park background of less than 20. The maximum acceptable residual radioactivity had been established arbitrarily at 40 microroentgens above the natural background at Palmerton Park (see McCool's memo., 6/7/73; attachment E). Examination proved that virtually all this radioactivity was caused by chunks of ore which had been pushed by the loader into the muddy soil beneath the slag, or had been pushed aside. Before undercutting the area further, a radiometric search was made for all such pieces. These were picked up and thrown into the cars by hand. A further radiometric check following this operation disclosed that a segment about 50 feet long at the east end of the area was still unacceptably radioactive. The chunks causing this radioactivity were not visible and must have been pushed further down into the mud. At that point the loader was released for the day, and Mr. Mercer was requested to deepen the excavation at a later date.

June 22 the ore in the cars was covered with 10-foot wide strips of 10-mill (thick) plastic cut to approximately car length. Edges of the plastic were wrapped in 2 x 6 or 4 x 4 wood planks averaging 6 feet long to anchor the load. The cars were then released for shipment.

Postremoval - Preliminary Cleanup

The plan mutually agreed upon by PMM and OS was to scrape only 6 inches beneath the stockpile for loading and transfer to Ohio. Any additional unacceptably radioactive substrata were to be placed on the company's slag dump and rolled down the 100 foot slope for maximum distribution at the site where the dump is being extended eastward at the rate of 50 railroad cars of slag per day.

Mr. Mercer was requested to remove an additional foot of slag and clay-rich soil from the east end of the pile area and transfer it to the slag dump. This removal was performed June 22. The area at the east end of the stockiple, which was most radioactive because of buried chunks, was

excavated to a total depth of 2 to 2-1/2 feet. This excavated area became a sump during ensuing heavy rains and never completely dried out. The additional material removed and the slag for backfill were hauled by the Wilson Putt Trucking Company, another NJZ subsidiary.

Postremoval Survey

I returned to the area July 5, 1973, and performed the postremoval survey. An isorad gamma map was prepared and six radon samples were taken and sent to the AEC Health and Safety Laboratory in New York for analysis. The results of this survey are reported in attachment D.

The entire stockpile area and margins were found to be below the maximum selected radioactivity of 60 microroentgens per hour. However, a radon anomaly of 20 times background was found at the railroad gate about 200 feet east of the stockpile area. The radon levels in the pit beneath the stockpile area were less than the background radon concentration in Palmerton City Park.

The actual stockpile area is thus at acceptable radioactivity and backfilling of the pit was approved by OS. However, OS requested an investigation of the radon anomaly at the railroad gate. I believe this radon is being exhauled from the ground in a strip 10 to 20 feet wide circumferential to the excavated stockpile area and drifting down wind. Much of this strip was included in the gamma isorad survey and is at acceptable gamma levels. However, further measurements will be made at a later date. Any further removal of slag and soil from this marginal strip will involve lifting and relaying the rails and ties.

July 12 I informed Mr. Mercer that the company could proceed to backfill the pit. Slag will be used. I requested that the edges of the filled area be sufficiently marked to distinguish the pit area from the circumferential strip in case further removal is necessary. Upon completion of this backfilling, the company will present Grand Junction an invoice for disposal cost to date. Further activities will have to be covered by a new purchase order.

Transport of the Ore

All six gondolas were supplied by the Lehigh Valley Railroad. The ore itinerary was as follows: Out of the plant on the New Jersey Zinc Co.-owned Chestnut Ridge Railroad; to Allentown, Pa., by Lehigh Valley Railroad; to Cumberland, Md., by Reading Railroad; to Cincinnati by Baltimore & Ohio Railroad; and to Fernald, Ohio, probably by Chesapeake & Ohio Railroad. The cars were retrained by humping at these exchange points. Five of the cars arrived without incident at Fernald, Ohio.

During humping at Rutherford (Harrisburg), Pa., Lehigh Valley car No. 33485 was broken upon impact. The top rail on one side broke about in the middle of the car and the 1/4 inch gauge steel side buckled outward. A space 12 feet long and a maximum of 3-1/2 inches wide opened between the side and the wooden floor. Ore fell through this opening onto a steel ledge which was part of the bottom support of the car. Later inspections showed that the top rail had broken in this location several times previously; and according to the Reading Railroad car shop foreman, had never been repaired in accordance with accepted standards. The car had been inspected and passed by the Reading line prior to humping. Its damaged condition was noted in passing by a shop worker. The yard staff did not know the contents of the car, but reasoned that the plastic cover indicated the need to maintain containment and the car was held for investigation. The car shop foreman later estimated that 10 or more tons of ore could have been lost during further transport.

Reading railroad officials contacted National Lead of Ohio, who in turn contacted Oak Ridge through Grand Junction. The decision was made to reload the ore into an acceptable car and decontaminate the Lehigh Valley car and loading equipment under AEC supervision.

I was contacted at Palmerton, Pa., on July 5. Returning from Palmerton, Pa., July 6 and 7, I examined the car and the site of the accident at Rutherford, Pa.

I determined that the impact had occurred on westbound hump track No. 13 at approximately the middle of the half mile length of this track. Twenty-three cars had been humped ahead of it, and the track holds 50 cars. I examined two-thirds of the length of this track carefully with the Mt. Sopris scintillation counter and determined that no ore had spilled onto the right-of-way during or after impact. Highest radioactivity noted was that of coal slack in the road bed at 100 counts per second compared with the background of 60. This increase is attributed to a small amount of uranium in the coal and shale.

Car 33485 had been spotted on a siding with Reading Gondola No. 31622 alongside for transfer of the ore. Examination showed no spillage beneath Lehigh Valley 33485 along the siding, but a considerable quantity of ore was piled along the lower ledge mentioned earlier. Reading 31622 was full of holes and then unacceptable for use.

July 9 I arranged details of the transfer with Ralph E. Houser, General Foreman of Car Inspectors, at the Rutherford yard. He preferred to use the car already placed because of its all-steel bottom and larger capacity and promised to patch all holes with an acceptable tape. I inspected and approved the patches during loading. I instructed him to save the plastic cover off the Lehigh Valley car, to place canvas between

the cars to catch most of the spillage, and to hose down thoroughly with water the railroad crane bucket used and the Lehigh Valley car.

I observed most of the ore transfer which began at 4:00 p.m., July 10, and was completed by 8:00 p.m. The morning of July 11 I supervised the cleanup of the ore spilled between the cars. I assured with the Mt. Sopris scintillation counter that the resulting radioactivity did not exceed 1-1/2 times background. This was done by hand shoveling up sand- and gravel-sized pieces of ore and the underlying railroad bed.

The crane and both cars were then moved to a siding where a water hose was available. The crane was washed and assured to be at background. The Lehigh Valley car was washed and brush-scrubbed thoroughly and all ore fragments removed from the crevices, particularly along the lower ledge mentioned. The resulting radioactivity of the car did not exceed 1-1/2 times background at any point. The railroad bed at the site of washing was excavated by hand and all ore-contaminated material loaded into the Reading car. Between 1/3 and 1/2 tons of railroad bed was removed. The resulting radioactivity of the bed did not exceed 1-1/2 times background at any point. The cars and crane were then released for normal service. The Reading car containing the ore moved out at approximately 7:00 p.m., July 11. The Lehigh Valley car was returned empty to the Lehigh Valley shop.

John W. Gabelman

John W. Gabelman
Staff Geologist
Division of Production
and Materials Management

PMM:JWG

Attachments:
A. Background Gamma Radioactivity.
B. Index Map of Palmerton East Plant.
C. Isorad Map of the Stockpile Area.
D. Radon-222 Analyses.
E. McCool's memo., June 7, 1973.

cc. R. D. Nininger, PMM
F. K. Pittman, WMT
R. J. Catlin, EA
R. E. Allen, OS
B. M. Robinson, OR
E. A. Youngberg, GJ
F. E. McGinley, GJ
J. C. Westbrook, GJ
W. W. Wright, Nat. Lead Co. of Ohio
R. G. Mercer, New Jersey Zinc Co., Pa.

BACKGROUND GAMMA RADIOACTIVITY

East Plant Area

Palmerton, Pennsylvania

(Measured June 20, 1973 by J. W. Gabelman)

(Mt. Sopris Model SC-131 Scintillation Counter and Eberline Model PRM-4 Scintillation Counter, SPA-2 Probe)

	Mt. Sopris Counter Per Second		Eberline K(1000) Counts Per Minute	
Station	Ground Level	3 Ft. Above Ground	Ground Level	3 Ft. Above Ground
1	90 (11)	88 (11)	12.7 (16)	12.2 (15)
2	70 (9)	70 (9)	10.0 (12)	9.7 (12)
3	74 (9)	74 (9)	10.2 (13)	10.0 (12)
4	90 (11)	84 (10)	12.4 (16)	12.2 (15)
5	88 (11)	86 (11)	10.2 (13)	10.4 (13)

(Figures in (X) are equivalent microroentgens per hour.)

Station 1: In city park across street from NJZ Co. Laboratory entrance, on black soil and grass.

Station 2: On north bank of Aquashicola Creek, 100 yards west of Main Gate to East Plant. Quartzite gravel.

Station 3: In parking lot along north margin of creek at Station 2. Paved with loose smelter slag over gravel.

Station 4: On north flood plain of Aquashicola Creek, 1 mile east of Main Gate to East Plant, along highway. Black soil overlying tan quartzite river gravel and sand.

Station 5: North flood plain of Aquashicola Creek, 2.2 miles east of Main Gate, along highway. Ten-fifteen feet higher in elevation than creek. Tan quartzite river gravel and sand.

Calibration Factors:

1. Mt. Sopris: 0.1 mr/hr. = 800 cps.
2. Eberline: 0.1 mr/hr. - 80 K cpm.

PALMERTON-EAST
P1-B2C-1-R0
CHESTNUT
W 1,000
E 10,000
E 9,000
Cold Coal
Residues
Steeling Furnace
Residues
Dust Coal
Pond #1
Alluvial
Soil
Sample
Site
Residue
Pond
West Plant
Slag Refuse
Barium Residues
Coal Pile
Utility Line
Railroad
Lehigh Valley
Railroad
Lehigh Valley
Road
Bridge
Stream
Pond
Wooded Area
Building
Water Co Wells
Uranium Site
Residues
Site
Line to Site
Alluvial
Soil
Sample
Site
Dust Coal
Pond #1
Steeling Furnace
Residues
Cold
Coal
Residues
Site
Barium Residues
West Plant
Slag Refuse
Coal Pile
Utility Line
Railroad
Lehigh Valley
Road
Bridge
Stream
Pond
Wooded Area
Building
Water Co Wells
Uranium

UNITED STATES
ATOMIC ENERGY COMMISSION
HEALTH AND SAFETY LABORATORY
376 HUDSON STREET
NEW YORK, N. Y. 10014

Attachment D

212-620-3643

July 10, 1973

Dr. John W. Gableman, Division of Production
and Materials Management, HQ

RADON-222 ANALYSES

We have completed the radon-222 analyses of the six air samples collected at Palmerton, Pennsylvania. The sample descriptions are from the note accompanying each sample. The results of the measurements are shown below.

Sample	Collection Date and Time		pCi Rn-222/liter*
Palmerton 1 - Park (W end) directly across from NJ 2 Co. lab - Background 3' above ground	5 July 73	1120 EST	0.29 ± .01
Palmerton 3 - Stu 1½ - line 2	5 July 73	1300 EST	0.15 ± .01
Palmerton 2 - At RR gate in fence at extreme E end of stockpile area - 3' off ground	5 July 73	1345 EST	6.4 ± .04
Palmerton 4	5 July 73	1602 EST	0.20 ± .01
Palmerton 5	5 July 73	1608 EST	0.18 ± .01
Palmerton 6 - Taken at 6" off ground (others at 3' off ground)	5 July 73	1615 EST	0.15 ± .01

* Corrected to Collection Date and Time.

As we discussed in our phone conversation, any future samples should be collected early in the week to avoid shipment and measurement delays.

Isabel M. Fisenne

Isabel M. Fisenne, Chemist
Radiochemistry Division, NY

cc: G. A. Welford, HSC
A. J. Breslin, HSH

Attachment E

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

JUN 7 1973

J. W. Gabelman, PMM

DISPOSAL OF ORE STOCKPILE AT PALMERTON, PENNSYLVANIA

This division concurs with the disposal methods proposed in your report to Dr. Nininger. It is noted that the plan does not indicate the levels of radioactive contamination that will remain at this site after cleanup. For this purpose, we recommend that after cleanup of this site the beta-gamma radiation levels at three feet above the surface should not exceed 40 microroentgens per hour above background, and the radon concentrations, including all of the daughter products ordinarily found in unfiltered air, should not exceed twice the background levels determined in areas surrounding this site.

Whittier J. McCool

W. J. McCool, Deputy Director
Division of Operational Safety