



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

FEB 07 1991

Docket No. 40-8948

Mr. David Smith
Shieldalloy Metallurgical Corporation
P.O. Box 768
Newfield, New Jersey 09344

Dear Mr. Smith:

SUBJECT: WEST PILE DECOMMISSIONING

REFERENCE: Letter from Gary C. Comfort to David Smith dated September 20, 1990.

The purpose of this correspondence is to provide additional comments to those contained in the referenced letter and to request site-specific information and propose a site-wide groundwater, surface water, and sediment sampling and analysis program.

In addition to providing responses to the attached questions (Enclosure 1), the thorium, radium, and uranium concentration levels and inventories reported in the West Pile Decommissioning Plan suggest that Shieldalloy Metallurgical Corporation should perform a more detailed site-specific pathways analysis than what is presented in the Plan. A decision on the decommissioning of the West Pile cannot be taken otherwise. The concern is directly related to the additional 139,550 tons of material added to the original pile following site decontamination activities. Since, as shown in Table 2.2 of the Plan, the radionuclide concentrations in this added layer are highly variable and far greater as a whole than those contained in the original pile, it is suggested that a realistic approach be taken and concentration averages that could result in unconservative doses should not be used. Similarly, current disposal site performance should not be assumed for an indefinite time period. Another reason for doing a detailed site-specific dose assessment is that the Branch Technical Position does not include the groundwater pathway for any option nor the radon inhalation pathway for option 2, and its intent is to provide average concentration limits for individual grid squares of about 10 m by 10 m, rather than for very large radioactively contaminated sites with highly variable concentrations.

A report (Enclosure 2) titled "Site Assessment for Shieldalloy Metallurgical Corporation" and prepared for the U.S. Environmental Protection Agency, Region V, by Weston-Major Programs Technical Assistance Team under contract number 68-C1-7367, was published in September 1990. It provides analytical results of ten surface water and nine sediment samples obtained from the vicinity of the site. According to the report four surface water samples exceeded the 15 pCi/L gross alpha limit and eight exceeded the 50 pCi/L gross beta limit. Certain sediment samples also reflected abnormally high radioactivity levels. Even though the sampling and analysis performed does not adequately characterize the

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surface water and sediments in the vicinity of the site, it does raise concern. It is highly recommended that Shieldalloy establish a sampling and analysis program to adequately characterize groundwater, surface water and sediments in and around the site. A statistically adequate number of samples should be obtained and isotopically analyzed for radioactivity. Seasonal variations should also be taken into consideration. If much higher than background levels are measured, or if the reference level water concentrations provided in Table 2 of Appendix B of the revised 10 CFR Part 20 are exceeded, then the source of the contamination should be determined and measures should be taken to reduce the concentrations to values below the reference levels.

Please inform the NRC, as soon as possible your intent regarding the proposed characterization. Please also provide responses to the attached comments as well as to those contained in the referenced letter by the end of May 1991. If you have difficulties in satisfying the proposed schedule or need clarifications for the attached questions, please contact our Project Manager Yawar H. Faraz, at (301) 492-0669.

Sincerely,

Original Signed by

Jerry J. Swift

Jerry J. Swift, Section Leader
Advanced Fuel and Special
Facilities Section
Fuel Cycle Safety Branch
Division of Industrial and
Medical Nuclear Safety

Enclosures:

1. Questions
2. Weston report

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[YF/LTR TO SHIELDALLOY]

*see previous concurrence

DFC	:IMAF*	:IMAF*	:IMIF*	:IMAF*	:IMSB*	:
NAME	:YFaraz:jc	:GComfort	:FBrown	:JSwift	:CChaughney	:
TE	:02/06/91	:02/06/91	:02/06/91	:02/06/91	:02/07/91	:

Questions for Shieldalloy Metallurgical Corporation (SMC)
Regarding Decommissioning of the West Slag Pile

1. Waste Density

What are the average densities and volumes after in situ disposal in the West Slag Pile of (1) the original slag pile, (2) the additional excavated slag and (3) the additional excavated soil?

2. Dimension of Layer Containing Highest Contamination Levels

What are the average and maximum thicknesses in the West Pile of the excavated material from decontamination activities? What is the length of this layer in the direction of aquifer flow? What is the width of this layer?

3. Solubility, Kd and Infiltration Rate

What are the solubilities of uranium, thorium, and radium in the disposed slag as well as in the disposed contaminated soil generated following site decontamination activities? What are the Kds for uranium, thorium, and radium in the unsaturated zone as well as in the saturated zone? What is the expected infiltration rate through the cover? What is the natural infiltration rate in the vicinity of the site?

4. Reduction in Cover Protection

Is the topsoil/sand cover expected to remain intact for hundreds of years? What is the expected soil erosion rate? Is further subsidence of the cover expected after the 5 year proposed maintenance period? Is the formation of gullies expected beyond the 5 year maintenance period?

5. Bathtub Effect

Per reported values in the West Pile Decommissioning Plan, on the average, the permeability of the clay cover ($4.9-9.5 \times 10^{-8}$ cm/s) is lower than the permeability of the underlying clay layer ($1.6-491 \times 10^{-8}$ cm/s). However, can the clay cover be expected to deteriorate some time in the future so as to cause its permeability to become larger than the underlying clay?

6. Life of Geotextile Material

What is the expectant life of the geotextile material? For how long can it prevent root penetration? What is the expectant life of the warning tape?

7. Overland to Surface Water Pathway

Is surface drainage more likely to lead to Wills Creek or Chapman Run following removal of the rail road track? What is the flow rate of the river downstream from the site and at a location where enough potable water can be drawn on an annual basis for use by an individual? What is the distance from the nearest edge of the waste unit to the stream?

8. Densities of Clay Cover and Subsurface Soil

According to Appendix H of the West Pile Decommissioning Plan, the densities of the clay cover material measured by Mid-Eastern GeoTech and GZA are 1.41 g/cm³ and 1.68 g/cm³, respectively. The value provided in Table 3-3 is 1.65 g/cm³. Provide the correct value that should be used along with the basis for its selection. What are the densities of the unsaturated and saturated zones?

Saturation and Residual Saturation Fractions

What are the fraction of saturation (S) and the residual fraction of saturation (S_r)? S is used to calculate the vertical retardation in the unsaturated zone. S_r may be used to calculate S from the following equation:

$$S = S_r + (1 - S_r)(P)(SNO)/(K_h)$$

Where

P = annual percolation of water through the waste (m/yr)

K_h = vertical zone saturated hydraulic conductivity (m/yr)

SNO = soil index

10. Groundwater Transport Properties

What are the horizontal velocities of the shallow and deep aquifers? What are the porosities of the saturated and unsaturated zones? What are the average distances from the bottom layer of the slag to the shallow and deep aquifers? Provide a figure showing the various subsurface geological formations (as Figure 3-4 of the West Pile Decommissioning Plan) with an overlay of the regional groundwater flow system under the closed West Slag Pile. What are typical perforation widths used in well casings for shallow and deep wells? What are the average thicknesses of the shallow and deep aquifers? Could it be assumed that groundwater flow in the aquifers is essentially horizontal?