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FROM: Chad Glenn, Project Manager
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SUBJECT: NOTES FROM NRC REGION III OCTOBER 6-8,
 1993 INSPECTION OF SHIELDALLOY
 METALLURGICAL CORPORATION FACILITY

Enclosed for your information are my notes of an NRC Region III inspection of the Shieldalloy Metallurgical Corporation's facility in Cambridge, Ohio. Photographs taken during this inspection are also available upon request.

If you have any questions regarding this information, please let me know.

ISI

Chad Glenn, Project Manager
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Enclosure: As stated

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NOTES FROM NRC REGION III INSPECTION OF
SHIELDALLOY METALLURGICAL CORPORATION'S (SMC's) FACILITY IN
CAMBRIDGE, OHIO

Inspection Conducted: October 6-8, 1993

October 6, 1993

Entrance Meeting

- Participants:
 - Scott Eves, SMC, V.P. Environmental Services
 - James Valenti, SMC, Environmental Manager
 - Charles Montague, SMC, Plant Manager
 - Dwain Baer, Ohio Department of Health (ODH)
 - Don Sreniawski, NRC Reg. III
 - Chad Glenn, NRC

- Nature of Discussion in Entrance Meeting
 1. NRC inspector provided overview of planned inspection:
 - survey direct radiation exposures around East and West Slag Piles

 - collect soil and water samples to evaluate potential for any spread of contamination from East and West Slag Piles

 - investigate allegations regarding the offsite release of contaminated slag, and the control of contaminated slag from West Slag Pile

 2. SMC representatives indicated that ferrocolumbian slag production started around 1957 and ended around 1972. Over this period of time SMC's current Plant Manager, who worked at this facility in various capacities since 1959, was not aware of offsite release of ferrocolumbian slag. Some ferrovandium slag (non-radiological residual from metal smelting) was sold/given away beginning around 1980 timeframe. In 1980, slag was dumped onsite into ponds where the hot slag became friable on contact with water breaking down into a gravel-like form. This gravel-like form increased the utility of the slag for capping, roadfill, and other industrial uses. The offsite release of slag apparently started around 1980 when the form of the slag resembled gravel. SMC purchased this facility from Foote Mineral in 1987.

 3. An ODOH representative stated that some slag was sold to the Ohio Department of Transportation (ODOT). However, a timeframe for this transaction was not provided. The material was apparently used for the construction of roads. According to the DOH, ODOT stopped using the slag after they became aware that the slag was contaminated.

4. In the course of this discussion, SMC noted that their use of security guards is presently limited to weekend hours from 11 P.M. Friday to 11 P.M. Sunday, and Holidays. Based on this schedule, it was not clear how SMC can restrict unauthorized access to the West Slag Pile.

After the entrance meeting, the direct radiation exposure levels on the East Slag Pile were measured. The East Slag Pile is enclosed with an 8 foot high steel fence and posted "Caution Radioactive Materials." The access gate to this slag pile is locked. The following direct gamma exposure measurements on the East Slag Pile are keyed to numbered locations on NRC Inspector's site map: (1) 1,600 cpm (surface), 100 μ R/h (waist); (2) 400 cpm (surface), 45 μ R/h (waist); (3) 600 cpm (surface), 95 μ R/h (waist); (4) 700 cpm (surface), 85 μ R/h (waist); (5) 700 cpm (surface), 105 μ R/h (waist); (6) 700 cpm (surface), 70 μ R/h (waist); (7) 700 cpm (surface), 130 μ R/h (waist); (8) 600 cpm (surface), 135 μ R/h (waist); (9) 600 cpm (surface), 125 μ R/h (waist); (10) 800 cpm (surface), 120 μ R/h; (11) 700 cpm (surface), 150 μ R/h (waist); (12) 700 cpm (surface), 70 μ R/h (waist); (13) 800 cpm (surface), 150 μ R/h (waist); (14) 400 cpm (surface), 25 μ R/h (waist); (15) 120 cpm (surface), 20 μ R/h (waist); (16) 250 cpm (surface), 25 μ R/h (waist).

After surveying the East Slag Pile, the inspection team visited a private residence in the vicinity of Cambridge, Ohio. This visit was arranged in advance of the SMC inspection. The purpose of this visit was to investigate the home owner's concern about the possible use of contaminated slag in the construction of an addition to his home. According to the home owner, slag from Foote Mineral was used in the construction of an addition to the house in 1982. Exposure rate measurements around and inside the foundation of the addition are noted in Figure 1. A sample of the slag used in the foundation for the addition was obtained for analysis.

After departing this private residence, NRC's inspection team drove down Vanadium Road, immediately north and northeast of the West Slag Pile, to evaluate existing controls to restrict public access to the West Slag Pile. This slag pile is not fenced. However, it is capped with approximately 4 feet of cover. Signs reading "Notice No Trespassing On This Property Under Penalty Of Law" were posted approximately every 100 feet between SMC's West Slag Pile and Vanadium Road, and these postings appeared to extend around the slag pile. There were no "Radioactive Materials" postings noted between Vanadium Road and the West Slag Pile. Access to the West Slag Pile from SMC's Mill area is controlled by a 8 foot steel fence. The fence is posted "Caution Radioactive Materials" and the access gate is locked.

October 7, 1993

NRC inspection team interviewed a number of SMC employees who were former Foote Mineral employees. The purpose of these interviews was to determine how Foote Mineral handled slag prior to SMC's purchase of the site in 1987. These interviews focused on information related to the release of slag from this facility.

After completing these interviews, the inspection team returned to the East Slag Pile to obtain soil samples around the perimeter of this pile. The location of these samples were also keyed to the NRC Inspector's site map. The railroad and entrance road to plant formed an embankment on the south and east side of East Slag Pile. The direct exposure measurements (cpm) at soil sample locations around the East Slag Pile are noted below:

- East 8.5, 140 cpm (surface)
- East 21, 100 cpm (surface)
- North 7, 110 cpm (surface)
- North 15, 60 cpm (surface)
- South 10, 180 cpm (surface)
- South 25, 300 cpm (surface)
- West 10, 100 cpm (surface)

After collecting soil samples around the East Slag Pile, two slag samples were collected from SMC's current ferrovanadium slag pile adjacent to the Mill Building. Direct radiation exposure rates at these two sampling points were in the range of 60-80 cpm. A sample was also obtained from a zirconium sand which was formerly used in the production of an alloy which resulted in a "Grainal" slag. Direct exposure rates at this sampling point were in the range of 70-90 cpm. The licensee possesses approximately 6,000 pounds of this material.

The NRC's inspection included the collection of biased soil and surface water samples around the West Slag Pile to detect any evidence of radiological contamination from this slag pile. The following sample locations and exposure rate measurements were keyed to NRC's inspector's site map:

- Sample 1: soil sample, 60 cpm (surface); water sample collected
- Sample 2: soil sample, 70-80 cpm (surface); water sample collected
- Sample 3: soil sample, 70 cpm (surface); water sample collected
- Sample 4: soil sample, 80 cpm (surface); water sample collected
- Sample 5: soil sample, 70 cpm (surface); no water available
- Sample 6: soil sample, 100 cpm (surface); water sample collected

In the course of the inspection, a defective sewage lift pump was noted immediately north-northwest of the West Slag Pile. Sewage was noted flowing from this sewage lift station at a rate of approximately 100 gallons per minute into Chapman Run approximately 200 feet north of the slag pile. The point of this sewage discharge is approximately two miles upstream from the drinking water intake for the city of Cambridge. SMC immediately notified the city of Cambridge and the city dispatched a crew to repair the defective sewage lift pump.

October 8, 1993

NRC staff visited the Water Treatment Plant for the City of Cambridge because of the proximity the city's drinking water intake to the SMC site. Surface water at the SMC site flows generally to the north and west toward Chapman Run and ultimately to Wills Creek. The city of Cambridge draws its drinking water from Wills Creek approximately 2 miles downstream from the SMC site and this

water is pumped to Cambridge Reservoir. Water from Cambridge Reservoir is gravity fed to the Cambridge Water Department where fluoride, lime, aluminum sulfate are added and the water is then run through sand filters before being discharged to the public drinking water system.

A substantial amount of information appears to be available on the quality of drinking water for the city of Cambridge due to the routine water testing and analysis conducted by the city over the years. Water Treatment Plant employees invited NRC staff to look over these water analysis reports. These reports appear to provide water analysis information for a host of drinking water contaminants, including inorganics, organic chemicals, trihalomethanes, volatile organic chemicals, and radiological parameters. The following gross alpha and gross beta concentrations were noted from these water analysis reports:

| | <u>Gross Alpha</u> (pCi/l) | <u>Gross Beta</u> (pCi/l) |
|-----------------|-------------------------------|------------------------------|
| • February 1980 | < 1 | not reported |
| • August 1984 | < 3 | not reported |
| • April 1987 | < 3 | 5 |
| • August 1989 | 4 | < 4 |
| • May 1990 | < 3 | < 4 |
| • August 1990 | < 3 | 5 |
| • November 1990 | < 3 | < 4 |
| • February 1991 | < 3 | 5.1 |
| • July 1991 | < 3 | 5 |
| • January 1992 | < 3 | < 4 |
| • February 1993 | < 3 | < 4 |

A February 1993 water analysis reported the following inorganic contaminant concentrations for the city's drinking water:

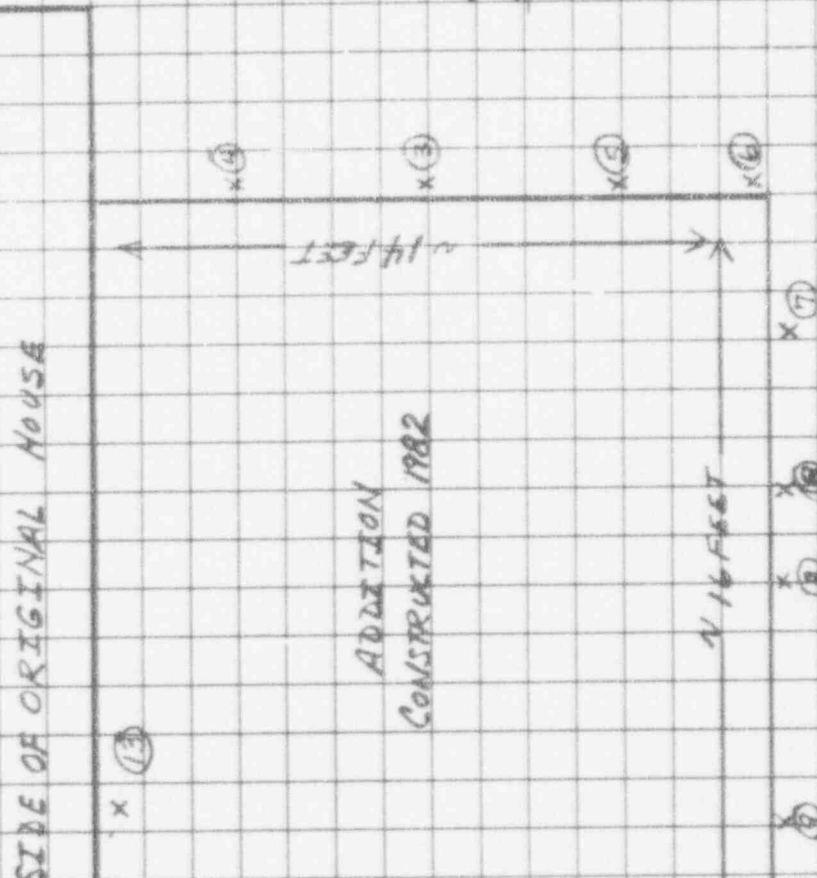
| | <u>(μg/l)</u> |
|-------------|------------------------------|
| • Arsenic | < 5.0 |
| • Barium | < 100 |
| • Beryllium | < 0.05 |
| • Cadmium | < 1.0 |
| • Chromium | < 2.0 |
| • Mercury | < 0.2 |
| • Nickel | < 40 |
| • Antimony | < 5.0 |
| • Selenium | < 5.0 |
| • Thallium | < 2.0 |

The NRC staff obtained a water sample from Wills Creek at the intake point for the city of Cambridge drinking water. A water sample was also taken just east of SMC's East Slag Pile where an unnamed drainage ditch passes under the railroad tracks. One final water sample was obtained from Chapman Run at the intersection of Route 209 a short distance east of the entrance to SMC.

Exit Interview:

- Participants (See Enclosure 1)
- Nature of Discussion in Exit Interview
 1. Security of East Slag Pile
 - fencing in good condition
 - radiation posting adequate
 - no signs of intrusion or other problems noted
 2. Security of West Slag Pile
 - shotgun shells noted at the base of the pile (west side)
 - white building material apparently dumped (north side of pile)
 - Vanadium Road provides access to pile; however, public access to contaminated slag is limited by 4 feet of soil cover over the slag
 - "No Trespassing" signs posted prominently; however, noted only one posting for "Radiation Materials" on south entrance to pile from Mill area
 - silt barrier is up around the pile
 - cover appeared to be in good shape except in one 5 X 50 foot area where geotextile material is exposed
 - one bike-like set of tracks noted on southeast side of pile
 3. Slag Usage
 - ferrocolumbian, ferrovanadium, and grainal are the 3 types of slag that have been produced at this site (current production limited to the latter two)
 - SMC has not produced ferrocolumbian slag since it purchased the facility in 1987, ferrovanadium slag is non-radioactive, grainal slag represents a small fraction of current slag production
 - NRC will evaluate the radiological concentration of zirconium sand used in grainal production
 - since purchase of facility in 1987, SMC has not sold/given away slag to private citizens or employees
 - SMC's sale of ferrovanadium slag is limited to industrial applications
 4. Private Citizen Residence Surveyed
 - resident constructed an addition to home in 1982
 - slag from Foote Mineral used in foundation
 - radiological survey of foundation performed and slag sample from foundation obtained for analysis
 5. SMC was asked about the status of their 1992 Ground Water and Surface Water Monitoring Program. SMC committed to implement their 1992 Ground Water and Surface Water Monitoring Program for the East and West Slag Piles. SMC will install the ground water wells identified in this plan before the end CY 1993. Water sampling from these wells to follow shortly after these wells are installed.

FIGURE 1 - PLAIN VIEW OF ADDITION



- SAND FOLLOWED BY 4-5 INCH CONCRETE CAP OVER SLAG (13) X
- SLAG USED AS FILL OVER FOOTER INSIDE CINDER BLOCK WALL (10) X
- CINDER BLOCK WALL (3 FEET HIGH ON FOOTER) (11) X
- CONCRETE FOOTER (2) X (BASE)

BACKGROUND EXPOSURE RATE AT SITE
 9-10 μ R/A
 80 CPM

- EXPOSURE RATES (CPM)
- ① 80 CPM (SURFACE)
 - ② 80-90 CPM (SURFACE)
 - ③ 80-90 CPM (SURFACE)

- EXPOSURE RATES (μ R/A)
- ④ 12 μ R/A (SURFACE)
 - ⑤ 10 μ R/A
 - ⑥ 10 μ R/A
 - ⑦ 10 μ R/A
 - ⑧ 10 μ R/A
 - ⑨ 10 μ R/A (SURFACE)
 - ⑩ 10 μ R/A
 - ⑪ 10 μ R/A
 - ⑫ 10 μ R/A
 - ⑬ 16 μ R/A

NOTE: EXPOSURE RATE MEASURED AT LOCATION # (13) INSIDE CINDER BLOCK ON CONTACT WITH SLAG

NRC EXIT MTG

10-8-93

12:00

| <u>NAME</u> | <u>COMPANY</u> | <u>TELE. #</u> |
|---|----------------|----------------|
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| Scott Eves | SMC | 609-692-4200 |
| Charles E. Montague | SMC | 614-432-6345 |
| Jon A. Secor | SMC | 614-679-2016 |
| Mike McCann ^{USNRC Fuel} chief, Facilities & Decommissioning sect. | | 708 790 575 |
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| Dwain C. Baer | ODH | 1-614-644-2727 |
| Tom Matthews - SMC | | 1-614-432-6345 |
| Don Sreniawski - NRC | | 708-790-5611 |