U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	040-08948
License No:	SMB-1507
Report No:	040-08948/97001(DNMS)
Licensee:	Shieldalloy Metallurgical Corporation
Facility:	Cambridge, Ohio
Location:	Route 209 South Cambridge, OH 43725
Dates:	August 20, 1997 May 1, 1998
Inspector:	John E. House, Senior Radiation Specialist
Approved By:	Bruce L. Jorgensen, Chief Decommissioning Branch Division of Nuclear Materials Safety

EXECUTIVE SUMMARY

Shieldalloy Metallurgical Corporation
NRC Inspection Report 040-08948/97001(DNMS)

This was a routine inspection of the Shieldalloy Metallurgical Corporation facility located in Cambridge, Ohio. All licensed material was contained in the East and West slag piles. No decommissioning activities were underway as there has been no regulatory decision on the disposition of the radioactive material contained in the piles. A staging area, for the temporary storage of slag/soil from the remediation of residential properties which had received potentially contaminated slag, had been established adjacent to the west pile. The area encompassed approximately 60,000 square feet and was enclosed by a chain link fence with locked gates and barbed wire at the top.

Observations made during an inspection of the piles and the staging area indicated that security would prevent inadvertent intrusion, and that radiological postings, thermoluminescent dosimetry placement, and cap erosion repair were being adequately maintained.

Sixty-eight soil samples, collected by the Ohio Department of Health from locations throughout the community, were analyzed in the Region III Laboratory. All of the samples were consistent with natural background radiation levels.

Report Details

1.0 Background

Foote Mineral Company (FMC), formerly the Vanadium Corporation of America, held an Atomic Energy Commission (AEC) and NRC source material licensee (Docket No. 040-07397, License No. SMB-00850 - expired). FMC occupied an industrial site south of Cambridge, Ohio from the 1950's to 1987, at which time the 120 acre site was purchased by Shieldalloy Metallurgical Corporation (SMC). With the purchase, SMC assumed license responsibility (License No. SMB-01507) for the low level radioactive slag remaining on the site from the previous owner's operations. After purchasing the site, SMC decontaminated the manufacturing facilities and most of the grounds, and consolidated the radioactive material into the two slag piles, East and West. FMC subsequently became Cyprus Foote Mineral Company (CFM).

FMC was authorized to possess licensable quantities of uranium and thorium contained in columbium (niobium) ores which were used to produce ferro-niobium (columbium) alloys. The radionuclides from the ore processing became incorporated into waste slag which is currently stored in two separate piles (West and East) on the site. The ferro-niobium (columbium) production started approximately in 1957 and ended approximately in 1972.

After 1972, FMC was engaged in the production of ferro-vanadium alloys. The raw material for the ferro-vanadium process was not source material, as defined in 10 CFR 40.4, and therefore, not licensed under the Atomic Energy Act. At some point, FMC began to distribute slag from its operations to local commercial, public, and private entities for use as fill material in construction.

In the fall of 1993, the NRC identified that slag from the former FMC site may have been used as fill at offsite locations. In October 1993, NRC inspectors reviewed the potential use of slag at offsite locations during a routine inspection at SMC [Report 040-08948/93001(DRSS)]. SMC employees who had worked for FMC indicated that the use of slag as fill at offsite locations had been common practice, and that some of them had themselves used the slag. These employees were not aware of any differentiation as to whether it was ferro-niobium (columbium) or ferro-vanadium slag. However, these employees reported that the ferro-niobium (columbium) slag was produced in massive buttons that would not have been amenable for offsite use and that FMC stopped using ferro-niobium (columbium) ore in the early 1970's.

According to these interviews, it appeared that most of the slag was sold or given away beginning in the early 1980's. At this time, as hot ferro-vanadium alloy was produced, the molten slag was poured into shallow ponds which caused fracturing and resulted in a gravel-like consistency. The gravel-like slag reportedly was useful as fill for construction purposes. This water quenching of hot slag was terminated after several years.

Subsequent inspections indicated that FMC slag with elevated levels of radionuclides had been used as fill in commercial and residential applications. From October 1993 through July 1994, NRC inspectors interviewed numerous local residents and contractors regarding the use of FMC slag at offsite locations. Some of this slag contained low levels

of uranium/thorium and daughter isotopes. The offsite slag issue and the results of radiological surveys and sampling, many of which were conducted by the Oak Ridge Institute for Science and Education (ORISE) were documented in NRC Inspection Reports 999-90003/94038(DRSS), 999-90003/94044(DRSS) and CYP95001.DSS.

Some of the area residents who had used this slag conducted a class action suit against CFM. This action has been concluded and CFM remediated a number of properties in the Cambridge area as was agreed to in the settlement. SMC and CFM developed an agreement which allows CFM to store material, which was removed from those remediated properties and may contain low levels of radioactive isotopes, in steel containers located on the SMC site.

2.0 Inspection Activities

a. Inspection Scope (87104, 83822)

The inspection consisted of a walkdown of the East and West slag piles, a review of postings and the placement of thermoluminescent dosimetry (TLD) around the piles. The area leased from SMC by CFM was surveyed. In addition 68 soil samples taken from residential sites that had undergone remediation were counted in the Region III Laboratory.

b. Observations and Findings

The West slag pile covers approximately 7.6 acres and contains low levels (picocuries per gram) of the isotopes thorium-232 (Th-232), uranium-238 (U-238) and radium-226 (Ra-226). The top of the pile is composed of at least 1-3 meters of cover material consisting of Chemfix (a clay-like material), a geotextile biobarrier cover material, and approximately 15-20 centimeters of sand. The complete cap, composed of all three constituents, covers only the top of the West Pile.

Most of the West Slag Pile was accessible by foot from adjacent properties and via Vanadium Road. A gate with an adjoining cable fence had been erected at the dirt road that extends from Vanadium Road to the Cambridge Municipal sewerage pumphouse. The pile was bounded by a fence and a ditch to the east and northeast, and by Chapman Run and a marshy area around the remainder. There was also a double synthetic barrier around the southern portion of the pile to hold back silt run-off.

The East slag pile is uncovered and covers approximately 2.6 acres with low levels (picocuries per gram) of Th-232, U-238 and Ra-226. The East Slag Pile was completely enclosed within a chain-link security fence with a locked gate.

The inspector toured both slag piles with a licensee representative. There was no evidence of human activity on either pile and the radioactive material signs were in place. The licensee's thermoluminescent dosimetry (TLD) badges for the West Pile, that could be accessed, were in place. Two TLDs from the East Pile were missing and the plastic bags that had contained the TLDs had been torn open. This appeared to be a random act of vandalism. A licensee representative stated that the TLDs had been inspected the previous week and were in place at that time, and that the missing TLDs would be replaced. The implementation of the surveillance program appeared to be adequate.

The NRC inspector observed that the radiological postings of both slag piles were adequate.

The licensee (SMC) had made available to CFM a small portion of the site, adjacent to the West Pile, for the storage of potential low level waste generated during the remediation of offsite residential properties. Since this material (low level waste slag) had originated from the licensed activities of FMC at this site, it was being returned to the site. Although final disposition of this material has not been determined, permanent storage of this material on site is discussed in the draft Environmental Impact Statement (NUREG-1543) for the Shieldalloy site.

The storage area is approximately 60,000 square feet. The ground is covered with a gravel layer about one foot thick and is enclosed by a chain link fence with barbed wire on top and is secured with a locked gate. The area is posted as containing radioactive material. The soil/slag was contained in large steel boxes with liners and covers. No TLDs were in place and the licensee stated that they did not plan to use TLDs as dose rates would not require them in this area. A survey of the area with a Ludlum Model 19 meter, which measures dose rate, indicated that radiation levels were consistent with background readings in that area.

During the remediation of private residences by CFM, in accordance with the class action settlement, representatives from the Ohio Department of Health were in the community to collect soil samples. A total of 68 samples were collected and shipped to the NRC Region III Laboratory for analysis. This sampling and analysis program was undertaken to determine if those residential sites, that were part of the remediation program specified in the settlement of the class action lawsuit, had been remediated to levels less than the NRC's release guidelines for unrestricted use. These guidelines are found in the NRC's, *Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material*, dated August 1987. All of the samples were below the unrestricted release criteria, consistent with natural background levels.

c. Conclusions

The slag piles had not changed since the previous inspection. No concerns were noted other than the apparent vandalism regarding the TLDs. The area used by CFM for temporary storage of the soil/slag removed during the remediation of the private residences was well controlled and no concerns were noted.

3.0 Exit Meeting Summary

At the conclusion of the inspection on August 20, 1997, the inspector met with a licensee representative to discuss the preliminary results of the inspection. The licensee did not identify any of the information provided during the inspection as proprietary. A telephone discussion was held with Mr. James Webb of the Ohio Department of Health on May 1, 1998, to discuss the results of the soil analyses.

PARTIAL LIST OF PERSONS CONTACTED

*James P. Valenti, Environmental Manager, SMC
James Webb, Ohio Department of Health

*Denotes individual present during the exit meeting August 20, 1997

INSPECTION PROCEDURES USED

IP 83822: Radiation Protection
IP 87104: Decommissioning Inspection Procedure For Materials Licensees