



State of Ohio Environmental Protection Agency

Southeast District Office

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George V. Voinovich
Governor

40-8948

May 19, 1994

RE: SHIELDALLOY METALLURGICAL
GUERNSEY COUNTY
MSL #: 430-1072
DERR CORRESPONDENCE

Mr. Chad Glenn, Project Manager
Regulatory Issues Branch Section
Office of Nuclear Materials Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chad:

Per your request, please find attached the Verified Complaint Investigation Report for the Shieldalloy Metallurgical Corporation site in Guernsey County, Ohio. As you are aware Ohio EPA received a verified complaint from a citizen in Guernsey County concerning activities at the Shieldalloy site near Cambridge, Ohio. The attachments to the investigation report can be reviewed at one of three locations: Ohio EPA Central Office, 1800 Watermark Drive, Columbus, Ohio; Ohio EPA Southeast District Office, Logan, Ohio; and the Byesville Branch of the Cambridge, Ohio Public Library. Questions regarding the investigation report can be directed to David Hunt (Division of Emergency & Remedial Response) at 614-385-8501 or Catherine Stroup (Legal) at 614-644-3037.

Sincerely,

David Hunt

David Hunt
Site Coordinator
Division of Emergency & Remedial Response

Attachment

cc: Jenifer Kwasniewski, DERR-SEDO
Catherine Stroup, Legal-CO
Bob Karl & Jim Payne, Attorney General Office-EES

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INVESTIGATION REPORT
Verified Complaint #: 93-DERR-01 - Confidential Memorandum

In the Matter of: Verified Complaint ID#: 93-DERR-01

Alleged Violator: Shieldalloy Metallurgical Corporation

Complainant: Mr. Sherwood H. Fauman

District Contact: David Hunt, OEPA-SEDO-DERR

Investigation Team: Richard Stewart, OEPA-SEDO-DHWM
Ryszard Lecznar, OEPA-SEDO-DSW
David Greenwood, OEPA-SEDO-DDAGW
Nancy Tock, OEPA-SEDO-DDAGW
Dan Canter, OEPA-SEDO-DAPC
Jerry Roberts, OEPA-SEDO-DSIWM
Larry Pennington, OEPA-SEDO-DSW
Linda Merchant, OEPA-CO-DSW
Dan Harris, OEPA-CO-DSIWM
David Hunt, OEPA-SEDO-DERR

Date Complaint Received: September 28, 1993

Date of Completion: February 24, 1994

Document Preparer: David Hunt
David Hunt

D.O. Group Leader of Preparer: Brian Blair
Brian Blair

D.O. Supervisor of Preparer: Ken Dewey
Ken Dewey

District Chief: Stuart Bruny
Stuart Bruny

1. Statement of the Complaint:

On September 28, 1993 Ohio EPA Southeast District Office received a Verified Complaint (93-DERR-01) from Mr. Sherwood H. Bauman of Cumberland, Ohio concerning the Shieldalloy Metallurgical (SMC) site in Cambridge, Ohio (Attachment 1). The verified complaint raised six issues that were evaluated by Ohio EPA during this investigation. A summary of each raised issue is provided below. These summaries are based upon the complaint itself and phone conversations with the complainant. Two other issues have been added to this complaint. The issues were raised by the complainant in a separate letter received by Central Office on October 8, 1993 (Attachment 2). Ohio EPA has elected to include these additional two issues with this investigation.

1. The first issue was the allegation that surface water bodies (Chapman Run and Wills Creek) near and downstream of the site have been impacted by metal contamination. The complainant referenced a 1989 USEPA study performed on Chapman Run and Wills Creek.
2. The second issue raised was that air quality near the site has been affected by fugitive dust from a baghouse dust pile and from the east and west slag piles, which the complainant contends are open, mixed waste piles.
3. The third issue alleges that potential sources for ground water contamination exist at the site. The complaint did not mention specific sources.
4. The fourth issue was the presence of a baghouse dust pile which is being handled by Ohio EPA's Division of Hazardous Waste Management (DHWM) and the impact that the pile could have on the environment.
5. The complaint raises a fifth issue with the presence of two slag piles (aka landfills) in wetlands and in the one-hundred year floodplain of Chapman Run. The complainant is also concerned with the impact of the slag piles on surface water quality and how that could impact the city of Cambridge's water supply, located 1.7 miles downstream of the SMC site.
6. Issue six alleges that leachate is produced from the landfills, or slag piles, at the site and that the leachate is not properly contained to protect surface water near the site.

OCTOBER 8, 1993 ISSUES RAISED BY THE COMPLAINANT

7. How will Senate Bill 130 affect on-site closure of the waste piles at the site?
8. Do solid waste regulations apply to on-site disposal?

2. Compliance History of the Shieldalloy Site which the Complaint Addresses:

The Cambridge facility began ferroalloys operations in 1953. Vanadium Corporation of America and Foote Mineral have been previous owners/operators. SMC purchased the Cambridge facility in 1987. Some of the compliance issues outlined in this section of the report may pertain to Foote Mineral, which owned and operated the facility from 1970 to 1987.

SMC notified as a large quantity generator of RCRA waste on December 21, 1992.

For this investigation the Division of Air Pollution Control (DAPC) determined that violations of OAC 3745-17-08(B) have not been reported at the SMC facility (Attachment 3). Residents living near the SMC facility stated that air problems did occur under Foote Mineral ownership and that air releases have become much less frequent. Any remedial action taken at the facility will have to have the necessary dust control measures implemented.

The Division of Surface Water (DSW) determined that existing and potential pollution problems involve the placement of waste materials (slag piles, baghouse dust) in wetland areas, and contamination of storm water runoff by these materials (Attachment 4). The DSW has been involved with the SMC site in the past for possible 6111 violations. These violations included the operation of an unlicensed solid waste facility and improper containment of leachate emanating from the disposal area. Also, DSW cited SMC for a milky white discharge in an unnamed tributary at the site. SMC does not have an effective NPDES discharge permit. The facility's process waters are discharged to the local sanitary sewer system (Cambridge).

SMC submitted an individual storm water permit application on October 7, 1992, but a permit has not been issued at this time (Attachment 4). SMC has been issued a PTI for the dechlorination system used for scrubber water discharged to the POTW. The City of Cambridge regulates SMC's discharges through their local pretreatment program. The city issued a fine to SMC in 1990 for the discharge of excessive chlorine and chromium to the POTW (Attachment 5).

The Division of Drinking and Ground Water (DDAGW) was also involved with this investigation. DGW has found that the ground water monitoring network at the site is insufficient to evaluate the impact of the potential source areas on ground water (Attachment 6). SMC has installed additional wells at the site; the total number of wells is 18 wells. OEPA-Drinking Water determined that the Cambridge water supply, which has its surface water intakes approximately 1.5 miles downstream of the SMC site on Wills Creek, has

currently not been adversely affected by the SMC site (Attachment 7). Radiological data and metal data for the water supply show no current impact on the water supply. This does not, however, relieve the potential future threat to the water supply.

The Division of Solid and Infectious Waste Management (DSIWM) cited Foote Mineral in 1985 and 1986 for violations of solid waste laws at the site (Attachment 8). DSIWM stated that Ohio EPA approved a closure plan in 1989 for the slag piles. This plan was a decontamination and decommissioning plan for the two waste piles at the site. The OEPA Director did not cite solid waste regulations in granting concurrence and the decommissioning plan does not meet solid waste facility closure requirements under OAC 3745.27. This is discussed in more detail in Section (4) (E) and (4) (F) of this report.

The Division of Water Quality, Planning and Assessment (DWQPA) (now included with DSW) reviewed the USEPA 1993 sampling results of sediments in Chapman Run and tributaries near the SMC site. DWQPA concluded that the results of the 1993 study, discussed later in this report, reveal serious contamination and accumulation of heavy metals has occurred in the stream and tributaries over the years during the operations at the facility (Attachment 9). DWQPA expressed that the concentration of metals found in the sediments pose a potentially serious impact to the aquatic community that exists at the site. The results of the USEPA studies conducted at this site are discussed in more detail in Section 3 of this report.

The Division of Hazardous Waste Management (DHWM) has been actively involved with the SMC facility during the 1980's and the 1990's. In April 1983, an OEPA Hazardous Waste Inspector observed several waste management problems at the Cambridge facility, including the disposal of slag, solid wastes, and waste solvents on-site. A complaint inspection was conducted at the facility on March 14, 1986 (Attachment 10). It was determined at that time that the wastes generated from the alloy production operations (specifically baghouse dust) were excluded from the hazardous waste regulations pursuant to OAC 3745-51-04(B)(7), which excluded wastes generated from "beneficiation of ores and minerals". This exclusion was narrowed to include only certain, specified industries effective February 11, 1992, and therefore no longer applies to SMC's alloy production wastes. The slag that is generated by SMC, and that generated prior to their ownership, is excluded from Ohio's solid waste laws.

Another complaint was received by DHWM on April 28, 1993 and the resulting inspection was conducted on May 4, 1993 (Attachment 10). A Notice of Violation (NOV) letter was issued to SMC on June 2, 1993 which cited several violations

regarding SMC's management of containers which had held vanadium pentoxide (P120). Additionally, information was requested regarding the management of baghouse dust (D007) in an on-site waste pile. Based on the information received in response to the NOV, a compliance evaluation inspection was conducted by DHWM on October 13, 1993. Another NOV letter was then sent on November 9, 1993, citing violations regarding the storage of the baghouse dust (D007) in a regulated waste pile and returning SMC to compliance on all other violations cited in the June 2, 1993 letter (Attachment 10).

After the May 4, 1993 and October 13, 1993 inspections and subsequent correspondence from SMC, dated November 29, December 9, and December 15, 1993, the following violations still remain to be addressed: ¹⁾OAC 3734.02 (E)(F) Prohibitions; ²⁾OAC 3745-52-11, Hazardous Waste Evaluation; ³⁾OAC 3745-66-12, Closure Plan; ⁴⁾OAC 3745-65-16, Personnel Training; ⁵⁾OAC 3745-65-51 through 56, Contingency Plan; ⁶⁾OAC 3745-65-33 (A)(B), Preparedness and Prevention; ⁷⁾OAC 3745-65-15, General Inspection Requirements; ⁸⁾OAC 3745-65-73, Operating Record; ⁹⁾OAC 3745-65-5, Annual Report; ¹⁰⁾OAC 3745-65-13(B)(1) through (B)(4), Waste Analysis Plan; and, ¹¹⁾OAC 3745-59-50, Prohibitions on Storage of Restricted Wastes. Violations four through eleven are issues that can be addressed under a closure plan (Attachment 10).

The Division of Emergency & Remedial Response (DERR) has been working with the NRC, USEPA and ODH and other Ohio EPA divisions to address the human health and environmental concerns at this site. DERR has reviewed several documents submitted by SMC. Most of SMC's responses to the OEPA's comments insufficiently addressed the concerns raised. At the time of this report, SMC has not responded to Ohio EPA's June 30, 1993 comments (Attachment 11) on the Technical Basis Document for Decommissioning (Attachment 19).

3. Summary of Previous Studies Conducted at the Site:

Several environmental studies have been performed at the site since the early 1980's. The first study was performed by Engineering Science during Foote Mineral's ownership in 1981 and is titled Groundwater Monitoring Program for Foote Mineral Company, Cambridge, Ohio (Attachment 12). This study was performed without Ohio EPA's review or approval. The study included the installation of four monitoring wells three of which were thought to be down-gradient of potential source areas of ground water contamination. One of the four wells exhibited a chromium concentration of 1.0 mg/L, while the MCL for chromium is 0.05 mg/L. Even with the chromium concentration twice the MCL, the study concluded that ground water at the site had not been impacted and that the disposal practices employed at the site were acceptable.

Results of ground water sampling events conducted by Foote Mineral are provided in Table 1 and Attachment 13.

Table 1 - Ground water monitoring results from sampling events performed by Foote Mineral (See Attachment 13).

Compound	MCL* (mg/L)	Date	WELLS			
			1 Plant 1	2 Pilot Plt.	3 Sub.Sta	4 Slag Dump
Arsenic	0.05	2/28/82	0.046	0.066	0.060	0.028
		6/16/82	<0.1	0.02	0.01	0.06
		9/23/82	0.02	0.04	<0.001	0.110
		7/26/84	<0.01	<0.01	<0.01	<0.01
		8/27/85	<0.01	<0.01	<0.01	<0.01
Chromium	0.100	2/28/82	0.14	0.03	<0.01	<0.01
		3/23/82	0.02	0.01	-----	-----
		6/16/82	<0.01	0.02	0.01	0.06
		9/23/82	<0.01	0.015	<0.01	0.01
		7/26/84	<0.01	<0.01	<0.01	<0.01
		8/27/85	<0.01	<0.01	0.01	<0.01
Lead	Action Level 0.015	2/28/82	0.86	0.17	0.045	0.010
		3/23/82	0.021	0.015	-----	-----
		6/16/82	0.03	0.01	0.01	0.03
		9/23/82	0.03	0.025	0.025	0.02
		7/26/84	0.006	0.003	0.004	0.007
		8/27/85	0.007	0.004	0.004	0.008
Mercury	0.002	2/28/82	<0.002	<0.002	<0.002	<0.002
		6/16/82	0.001	0.013	0.002	0.003
		9/23/82	0.0006	0.002	0.001	0.005
		7/26/84	<0.002	<0.002	<0.002	<0.002
		9/27/85	<0.002	<0.002	<0.002	<0.002

* The 1994 Maximum Contaminant Level per OAC 3745-81-11 for arsenic, chromium, and mercury.

On February 28, 1982, arsenic, chromium and lead exhibited concentrations in at least one of the four wells above the 1994 MCLs for the three metals. The highest lead concentration was 0.86 mg/L in well 1 at the site. The concentration decreased in subsequent sampling events but in four of the six sampling events the concentration for lead was above the current action level of 0.015 mg/L. Based on the Foote Mineral sampling results arsenic, chromium, lead and mercury all have been found to exceed current MCLs for the metals.

In July 1981 Foote Mineral also sampled surface water near the west slag pile (Attachment 14). Foote Mineral noted that brown, tan, and yellow colored leachate was emanating from the waste pile into the wetland. The Foote Mineral surface water results showed elevated pH, and total chromium at 4.48 mg/L and 2.25 mg/L at two locations. Foote Mineral also reported a hexavalent chromium concentration of 0.38 mg/L and 0.15 mg/L at two locations.

In April 1987 a second ground water monitoring program was implemented at the site. The study, titled Groundwater Investigation: Foote Mineral Company, Cambridge, Ohio for Shieldalloy Corporation, included the installation of six additional monitoring wells and the sampling of all ten wells located at the site (Attachment 15). All ten wells exhibited chromium concentrations of non-detect (less than 10 ug/L). One of the ten wells was found to have a nickel concentration almost six times the MCL for nickel (0.100 ug/L).

The DGW-SEDO found the initial monitoring program at the site to be insufficient because of the well construction and the lack of wells hydraulically down gradient of the potential source areas (Attachment 7). At the time of this writing eighteen monitoring wells have been installed at the site. The adequateness of this monitoring network to fully characterize the ground water at the site needs further review. SMC sampled the eighteen wells for metals in December 1993 and plan an additional sampling in the Spring 1994.

U.S. EPA performed an environmental site evaluation in 1990 (Attachment 16). The study entailed surface water and sediment sampling of an unnamed stream on the plant property and Chapman Run. For surface water, selenium, thallium, zinc and silver were found to exceed water quality standards provided for the constituents in OAC 3745-1. At five locations vanadium was found to be at concentrations greater than six times background, including a concentration of 44 ppm. Arsenic, chromium, copper, selenium and vanadium were all found to be three times background levels at four sampling locations down stream of the facility. In the stream sediment, chromium was found to be three times background at four sampling locations on Chapman Run, and

vanadium was three times background at five locations. Elevated levels of metals were also found in the wetlands to the west of the site and at the confluence of Chapman Run and Wills Creek. Wills Creek is the water supply for city of Cambridge. The radiological results for surface water and sediments were elevated, but U.S. EPA determined that quality control errors may have occurred during the radiological sampling that may have resulted in the elevated readings. The study concluded that the SMC site posed a threat to the surrounding community.

In April 1993, USEPA performed another environmental sampling event for the initial procedures for placement of the Shieldalloy site on the National Priorities List (NPL) (Attachment 17). The study included the sampling of surface water sediments and soil samples on the west slag pile and in the unregulated former baghouse dust area for metals, and sampling of ground water monitoring wells for metals and volatile organic compounds. Sediment samples of Chapman Run and the wetland adjacent to the site demonstrated that the site has impacted the surface water at the site. Background concentrations for vanadium had an average of 47.6 mg/kg. One sediment sample location, directly to the southwest of the west slag pile on a tributary of Chapman Run, exhibited a vanadium concentration of 16,000 mg/kg. This same location had a concentration of 626 mg/kg for nickel, 23,800 mg/kg for magnesium, 129 mg/kg of chromium and 59.8 mg/kg for beryllium. All of the sediment sampling locations showed concentrations for vanadium above background. The average vanadium concentration in the nine samples taken was 4,014 mg/Kg. This concentration was much higher than the average for background of 47.6 mg/kg. The study concluded that a release of contaminants to on-site ditches, wetlands and Chapman Run has occurred from the Shieldalloy site.

The USEPA study concluded that arsenic, barium, iron, and vanadium have been released to ground water at the site. The monitoring wells were not sampled for chromium. The study also concludes that soils sampled at the site, which were primarily comprised of baghouse dust, are contaminated. Please refer to attachment 17 for a more detailed discussion of the USEPA sampling results.

In November 1992, Foote Mineral, the previous owner of the site, provided Ohio EPA a 1985 study, entitled Environmental Risk Assessment Survey of Foote Mineral Company Facility at Cambridge, Ohio, by Versar Inc. in fulfillment of an information request (Attachment 18). Based on discussions with a representative of Versar Inc. during this complaint investigation, it was revealed that Versar was contracted by American Insurance Group (AIG), a subsidiary of Commerce Insurance Incorporated, to evaluate the environmental conditions existing at the Cambridge facility. The report was based on observations by Versar representatives during site visits, interviews with Foote Mineral employees and

discussions with Ohio EPA representatives.

The Versar report reveals that slag materials were being disposed on-site in 1985 in what Versar described as non-regulated landfills. Versar stated that prior to 1985 garbage was generated in small quantities and was disposed in the on-site landfills. The west slag pile covers 15 acres and was estimated to be 60 feet deep by Foote Mineral personnel. SMC contends that the west pile is only 13 feet thick (Attachment 19). Both the east and west slag piles are located in wetlands (Attachments 16, 17, 18). Versar representatives witnessed empty chemical bags, shipping pallets, and hundreds of "empty steel" drums in the west slag pile. Versar also reported areas where trash was being burned. Leachate seeps were also seen along the perimeter of the west slag pile and Versar estimated that ten (10) acres of trees and wetlands had been impacted in vicinity to the slag pile.

The Versar report also states, based on discussions with Foote Mineral personnel, that prior to 1984, waste solvents and waste oils were disposed on the ground behind the maintenance shop at the facility. Currently, the maintenance shop is located on the south side of the main manufacturing building. Versar estimated that 4,800 gallons of waste solvents were dumped on the ground and approximately 11,000 gallons of waste oil was dumped on the ground over a 32-year period. Dumping of solvents ceased in 1984 when Foote Mineral contracted Safety Kleen to supply and recycle the solvents. Based on the Versar report the waste oils apparently were still being dumped on the ground past 1985.

Versar also detailed the unregulated discharge of 150 gallons per day of non-contact cooling water, containing biocides, algicides and chromate additives, to an on-site ditch which flows to Chapman Run.

The Versar report outlined fourteen negative factors that existed at the site in 1985. The negative factors included, but are not limited to: the presence of several potential sources for ground water contamination at the site (the open waste slag piles, the unregulated former baghouse dust pile, and the dumping of solvents on the ground); the ground water monitoring program is inadequate; the baghouse dusts exhibit total chromium levels above EP toxicity standards; the baghouse dusts and slag contain other toxic metals at lower concentrations; the open landfills are located on floodplains and are in close proximity to surface water; the landfills are located in wetlands and Foote Mineral did not have a dredge-fill permit from the Army Corps; leachate from the landfills is not properly contained and treated; impact of contaminants from the facility on the surface water and wetlands biota have not been characterized; and fugitive dusts originating from the open slag dump, the baghouse

pile, and the raw material stockpiles could affect storm water runoff.

In February 1990, during excavation of the unregulated baghouse dust three men working for a construction/ excavation company were hospitalized and treated for chemical inhalation (Attachment 21). The release report states that the Byesville Emergency Squad Chief had heard many reports concerning buried chlorine cylinders on site. It was reported that heavy excavation equipment ruptured an underground container of vanadium oxychloride (AKA vanadium oxydichloride, vanadyl chloride). The spill report described the release as 15 pounds of gunk accompanied with the release of an orange gas, suspected to be chlorine gas. The spill report also suggested that 1500 cylinders containing this substance could be buried on site. SMC denies that other cylinders are buried on the site and a retired SMC/Foote employee has stated that there are no cylinders buried at the site (Attachment 21).



4. Statement of the Current facts discovered during the investigation:

a. Current Conditions of the facility and site

The site is 130 acres in size (Figure 1) and is located on State Route 209 between Cambridge and Byesville, Ohio. The facility still produces ferroalloys and employs approximately 90 people. Besides the production of ferroalloys, SMC produces various vanadium chemicals at a pilot plant that exists at the site. From 1953 to approximately 1970, the Cambridge facility produced ferrocolumbium alloy. The production of the ferrocolumbium alloys created a slag material having concentrated uranium and thorium at levels that meet the criteria for low level radioactive waste. Currently, SMC holds an NRC license for the on-site storage of the low level radioactive slag. To terminate the license, SMC must decontaminate and decommission the site, such that the site can be released for unrestricted use.

Two slag piles exist at the site: the west slag pile and the east slag pile (Figure 2). The east slag pile is approximately two to three acres in size. Based on available information the east slag pile is comprised of an estimated 50,000 tons of low level radioactive ferrocolumbium slag, ferroalloy slag and grainal slag material (Attachment 19). The east slag pile has not been

covered, but it is fenced. The slag pile has been sited in wetlands and is on the 100-year floodplain.

The west slag pile comprises approximately 12 to 15 acres in size and 500,000 tons of material. SMC estimates that there is currently 430,000 tons of slag material in the west pile. The west pile is comprised of low level radioactive slag, non-radiological slag, untreated and treated baghouse dust and various solid wastes (For further discussion on the composition of the west pile please refer to section 4d). Prior to the radiological decontamination of the site, there was an estimated 287,000 tons of slag in the west slag pile. During radiological decontamination procedures an additional 139,000 tons of radiologically elevated slag and material was added to the west slag pile (Attachment 20). The west slag pile has been partially capped. The top of the west pile and the east, southeast and the east-northeast sides of the pile have been covered with the capping material (Photographs 1 & 2). The non-capped slopes of the west slag pile are comprised of predominantly slag material, along with treated and untreated baghouse dust, metal fragments and weathered drums (Photographs 3 & 4).

In 1989, SMC began implementing the Decommissioning and Decontamination plan to meet the NRC's unrestricted use criteria for the site. To cap the west pile, SMC applied treated baghouse dust (which leached chromium above EP Toxicity levels and contained hexavalent chromium prior to treatment), then a geotextile layer to prevent root penetration and downward migration of rocks. On top of the geotextile layer SMC placed sand. In early 1990, SMC ceased the decommissioning process prior to finishing the cap with a vegetative cover (Attachment 20). The NRC had discovered that SMC had incorrectly averaged the radionuclide concentrations for the west pile (Attachment 20). The NRC could not terminate the license because the radiological concentrations in the west pile would not meet the NRC's unrestricted use criteria.

The wetland area, through which Chapman Run flows, is adjacent to the west slag pile on the northern, western and southwestern boundaries of the pile. The wetland is also adjacent to the east pile. In April 1993, surface water in the wetland areas was in contact with both slag piles (Photograph 5). Since decommissioning activities were ceased in 1990, erosion of the partial cap has ensued. The wetland area to the north and southwest of the west pile have been impacted from the deposition of eroded material from the west slag pile (Photographs 6, 7,). The material filling the wetlands appears to be similar to the materials comprising the unfinished cap on the west pile.

On the southeast boundary of the west slag pile is the area where Foote Mineral and SMC stored 14,000 tons of ferrovon baghouse dust, which leached chromium, in an unregulated

baghouse dust area. With Ohio EPA's general concurrence, SMC implemented a chromium treatment operation to reduce the amount of leachable chromium in the baghouse dust, stabilize the dust and then used it for capping procedures. The former unregulated baghouse dust area is approximately two (2) acres in size. Buff colored baghouse dust is present in the unregulated area and very little vegetation is growing in the two acre area (Photograph 8). A small stream flows past the unregulated baghouse dust area and the west slag pile and then to Chapman Run. One soil sample taken by USEPA in April 1993 in this area exhibited a chromium concentration of 521 mg/kg, vanadium at 5,120 mg/kg, nickel at 724 mg/kg and magnesium at 55,900 mg/kg.

No visible staining can be seen in the suspected area of solvent and waste oil dumping (Photograph 9). This area is adjacent to the maintenance shop. Soils in this area were excavated and placed on the west slag pile in 1990 based on radiological monitoring only, pursuant to the Decontamination and Decommissioning Plan. Currently, a concrete loading dock covers this area.

The regulated baghouse dust waste pile (Photographs 10, 11) is located in the southeast corner of the SMC property. The baghouse dust was removed from this area in December 1993 in response to the violations cited by DHWM. This hazardous waste management unit (waste pile) is pending closure under Ohio Hazardous Waste Regulations.

Standing water near the regulated baghouse dust waste pile was visibly stained a bright orange color (Photograph 12). SMC sampled standing surface water in November 1993 and Ohio EPA is currently waiting for the results. Directly south of the regulated baghouse dust waste pile is a small wetland area. In April 1993 the wetland had standing water that was visibly stained anti-freeze green (Photograph 13). The surface water has not been sampled but further evaluation is required.

b. USEPA, NRC, ODH, and COE Involvement

Since 1989, USEPA has been involved with this site. USEPA performed a Site Screening Inspection (SSI) study at the site in 1993 - initiating the National Priorities List Placement (NPL) procedures (Attachment 17). Ohio EPA has reviewed and commented on the SSI report. The SSI report has been finalized and is now going through QA/QC review.

[REDACTED]

In the meantime, USEPA has assigned a Remedial Project Manager (RPM) and Regional Counsel representative for the site. USEPA is reviewing the applicability of the Superfund Accelerated Conceptual Model (SACM) program to

address some of the immediate problems at the site.

The NRC has been involved with this site since 1987, when SMC purchased the facility from Foote Mineral, and the NRC renewed the license for the storage of the low radioactive material (slag) at the Cambridge plant. The NRC has been recognized by all participating agencies and SMC as the "lead" agency for the radiological problems that exist at this site.

[REDACTED]. An existing Memorandum of Understanding (MOU) between NRC and USEPA specifies that no currently NRC-licensed site would be placed on the NPL.

[REDACTED]. NRC would prefer the USEPA and OEPA to maintain a cooperating agency status.

In 1990, NRC informed SMC that SMC had miscalculated the concentrations for the radionuclides disposed in the west slag pile (Attachment 20). The addition of the 139,000 tons of decontaminated material to the west slag pile increased the concentrations of the radionuclides to levels which would not meet the NRC's unrestricted use criteria (Attachment 20).

After further evaluation, SMC submitted a Technical Basis Document for Decommissioning in 1993 (TBD) (Attachment 19). Based on the NRC's review of the TBD, the document demonstrated that decommissioning the piles on-site could not meet NRC's decommissioning radiological criteria for on-site closure and unrestricted use, and the document was unacceptable to Ohio EPA (Attachment 11).

[REDACTED]

The NRC is now planning to perform an Environmental Impact Statement (EIS) to evaluate four options for decommissioning (Attachment 22). The four options are: No Action, on-site stabilization and disposal, off-site disposal, on-site separation processing with off-site disposal, and on-site dilution processing and disposal. The NRC has stated that when decommissioning is completed all environmental concerns related to the slag piles should be addressed (i.e. radiological and non-radiological). On January 14, 1994 Ohio EPA sent comments on the EIS process to the NRC (Attachment 23). The Ohio EPA letter stressed that if all

of the environmental problems are going to be evaluated during the EIS then the NRC, USEPA and the State of Ohio need to work together on the issues.

The Army Corps of Engineers (COE) became aware of this site in 1985 when a COE inspector noted the filling of wetlands at the Cambridge facility. COE has maintained, however, that since the filling of wetlands at this site was for disposal purposes, rather than construction fill purposes, USEPA has the authority to respond and enforce wetland regulations.

[REDACTED]. Ohio EPA reviews applications for any federal permit or license for projects that result in a discharge of dredged or fill material to any surface water, including wetlands. If a federal permit or license will be required for previous or proposed discharges of fill to surface waters at this site (either from USEPA or NRC), then that license or permit application must be reviewed by the State for a section 401 certification.

The Ohio Department of Health - Radiological Health Unit (ODH) has played a similar role as Ohio EPA on this site. ODH has reviewed reports submitted by SMC and submitted comments to the NRC.

d. Composition of the Slag Piles

[REDACTED]

In reviewing the files for DERR, DHWM and DSIWM information was gathered pertaining to the composition of the slag piles. Most of the information found pertained to the composition of the west slag pile. Very little information is available concerning the east slag pile. Please refer to attachment 26 for the documentation of the composition of west slag pile.

Ohio EPA has determined that the west slag pile is composed of solid wastes, including common household trash, plant trash, tires, wooden pallets and metal banding.

The west slag pile also contains untreated baghouse dust (co-disposed with slag), 14,000 tons of treated/stabilized baghouse dust for capping material and steel drums which COE

and the Versar report document. Besides the presence of hundreds of drums in the west slag pile, the Versar report also documents the presence of chemical bags in west slag pile. It is possible that the drums and the bags were vanadium pentoxide (P120) containers which are listed hazardous waste. Ohio EPA is trying to gather photographs from Versar and COE which may provide information on whether the drums were empty and what the contents were. In April 1993, Ohio EPA-DERR participated in the USEPA sampling at the SMC site. During the inspection, drums and drum fragments were visible in the sides of the west pile (Photographs 3 & 4).

SMC has estimated the amount of radionuclides in the west and east piles. Based on the 1987 Decontamination and Decommissioning Plan, the east pile contained 662 pounds of uranium and 31,700 pounds of thorium. Prior to facility decontamination procedures, the west slag pile contained 6,461 pounds of thorium and 249 pounds of uranium. In a 1993 NRC inspection of the SMC facility, it was determined that the maximum millirem per month (mrem/mon) for the east pile is 22.4 mrem/mon to 418 mrem/mon and for the west pile the maximum is 5.5 mrem/mon to 66 mrem/mon (Attachment 30).

During the October 1993 RCRA inspection at the SMC facility, the Ohio EPA RCRA inspector discovered that SMC had excavated the area where waste solvents and waste oils were disposed on-site. SMC has informed the RCRA inspector in January and February 1994 that the excavation was based solely on radiological criteria not chemical, and that the excavated material was not evaluated prior to disposal in the west pile (Attachment 32). SMC did not evaluate the excavated area even though this area was used for waste oil and waste solvent disposal at the facility. The excavated material may have been a hazardous waste. If the excavated material was contaminated with waste oil and non-hazardous waste solvents, it would constitute a solid waste.

e. Director Shank's February 21, 1989 Concurrence letter for the Decommissioning of the Slag Piles

In 1987, at the time of the purchase of the Foote Mineral facility by SMC, 14,000 tons of ferrovan baghouse dust existed at the site. The baghouse dust contained 2,100 mg/kg chromium and 16,000 mg/kg vanadium. The baghouse dust leached chromium, much of which was hexavalent chromium, above the EP Toxicity standard of 5 mg/L. However, because of provisions in 40 CFR 261.4(b)(6)(i) and OAC 3745-51-04(B)(7), the baghouse dust was excluded from hazardous waste laws and regulations (Bevill exclusion).

From 1987 through 1988 Ohio-SEDO and SMC held several meetings to discuss the decommissioning of the two waste

slag piles at the site and SMC's proposal of using 14,000 tons of ferrovan baghouse dust as capping material. Initially, Ohio EPA-SEDO staff raised concerns about using baghouse dust as capping material and supported on-site closure only if performed in compliance with solid waste closure requirements (Attachments 26 & 27). SMC proposed to treat and stabilize the baghouse dust to reduce the hexavalent chromium to trivalent chromium, a less mobile and less toxic form of chromium, and to stabilize the treated baghouse dust to aid in creating a low permeability capping layer.

On July 29, 1988, SMC's consultant sent Ohio EPA a copy of the Decontamination and Decommissioning Plan for the Cambridge plant. The plan proposed to excavate the areas at the site that were used for low radioactive slag disposal and dispose of the material on the west pile. The plan further proposed treating and stabilizing the 14,000 tons of baghouse dust using the material as shielding and to smooth out the pile. The treated baghouse dust would be used in conjunction with natural clay-rich soils to form a low permeability layer 4 feet thick; and this layer would be covered with a vegetative layer 18 inches thick. The decommissioning plan stated that decommissioning of the west and east piles would meet the radionuclide concentration criteria acceptable for unrestricted use.

On February 23, 1989, the Director of Ohio EPA concurred with the Decommissioning and Decontamination Plan proposals, including the use of the Ferrovan baghouse dust as cover material (Attachment 28). The letter did not cite any specific regulations or authority under which the concurrence was given. The letter stated that the concurrence by Ohio EPA does not release SMC from the obligation to correct any future contamination to surface water and/or ground water. The letter also called for the preparation of a surface and ground water monitoring plan to be submitted for Agency approval after decommissioning is completed.

The Decommissioning plan that was concurred with by the Director in 1989 was not fully implemented or followed. There are several differences between what was implemented by SMC and what was concurred with by the Director in 1989.

f. Differences Between the Decommissioning & Decontamination Plan and What SMC Implemented

The Decommissioning and Decontamination plan specified that during the Decontamination procedures of the site, the decontaminated material would be added to the west slag pile. The plan stated that the addition of the decontaminated material to the west pile would still meet

NRC's Option 1 radiological criteria for on-site closure (Page 3-31 of the 1987 Decontamination and Decommissioning Plan).

After decontamination, SMC added 139,000 tons of low level radioactive material to the west pile. The additional material contained Th-232, U-238 and Ra-226, varying in concentration from 0.3 to 180 pCi/g, 2.1 to 180 pCi/g and 3.1 to 68 pCi/g, respectively. The NRC determined that the additional material raised the SMC-calculated radiation exposure levels over the entire pile and that SMC had incorrectly calculated the concentrations for the west pile (Attachment 20). The NRC determined that the added material to the west pile would prevent Option 1 Decommissioning criteria from being achieved with on-site decommissioning. Thus, decommissioning was postponed to give SMC the time to collect information to further evaluate the exposure levels over the west pile and to determine if on-site closure would meet the NRC's Option 1 criteria for future unrestricted use (Attachment 20). After review of the 1993 Technical Basis Document, unrestricted use criteria still could not be achieved for on-site decommissioning of the slag piles (Attachment 11).

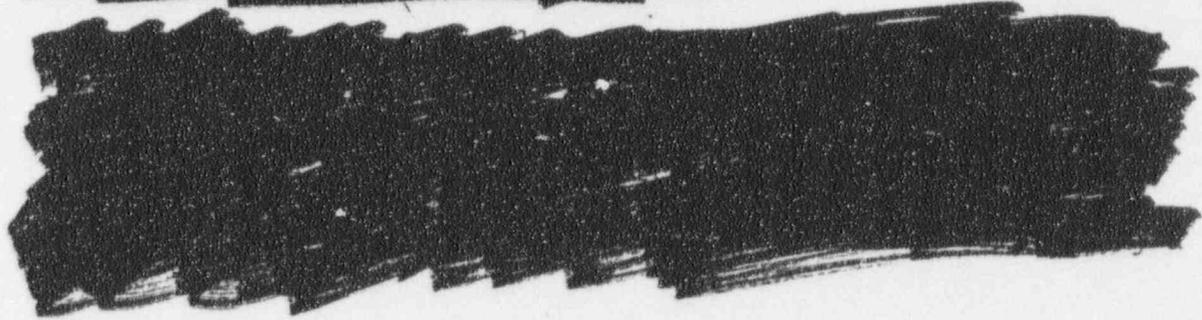
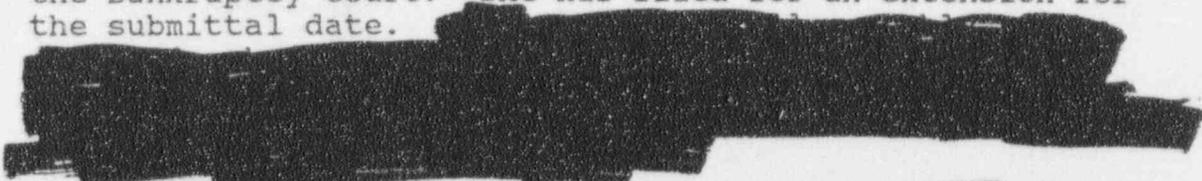
The Decommissioning Plan outlined that the treated/stabilized dust would be applied first, followed by a low permeability clay-rich soil and lastly, a topsoil and vegetative layer applied. In SMC's 1993 Technical Basis Document (Attachment 19), the partial cap that has been applied to the west pile is described as: baghouse dust, geotextile layer for root penetration, and then sand. The original Decommissioning plan did not outline sand or a permeable geotextile layer being used for the cap. The original plan called for a clay layer on top of the treated baghouse dust and this was not applied. A vegetative cover has not been applied to the partial cap as proposed. Also, the Decommissioning plan called for the entire west pile to be capped. At the time of this writing only the top, southeastern, eastern and northeastern sides of the pile are capped. Erosion of the unfinished cap is affecting wetlands to the southwest, west and northwest sides of the west pile.

Also, SMC stated in 1989 that Decommissioning activities would take 18 months to complete. It has been four (4) years and the Decommissioning is still not completed.

The Decommissioning plan that was concurred with by Ohio EPA in 1989 was not fully implemented by SMC.

g. Bankruptcy Issue

In September 1993, the Shieldalloy Metallurgical Corporation filed for bankruptcy under the provisions of Chapter 11 of the U.S. Bankruptcy Code. In a meeting on December 13, 1993, SMC outlined how the price of ferrovanadium alloys has fallen drastically and that the company has had four consecutive years of losses. The company filed for voluntary bankruptcy under the provisions of Chapter 11 for protection and to restructure. The company is in the process of developing a Restructuring Plan for submittal to the Bankruptcy Court. SMC has filed for an extension for the submittal date.



h. Community Concerns Raised About This Site

During the investigation the filer of the verified complaint raised many concerns with the environmental conditions existing at this site. Concerns regarding wetlands, effects on Chapman Run and Wills Creek, the effects on the Cambridge water supply were all raised in the verified complaint. The complainant has raised concerns regarding people to the east of the plant using drinking water wells. Also, the possibility of the radiological slag being used for fill in areas off-site has been a concern of the complainant. In December 1993, the NRC discovered that it is possible that ferrocolumbium slag was used at unknown off-site locations prior to SMC's ownership.

A citizen to the east of the plant raised concerns about the site in October 1993. The citizen stated that there used to be significant air problems from the plant and that the residents organized a petition against Foote Mineral. The air releases ceased. The citizen stated that air releases have been rare since the petition, but they still happen from time to time. The citizen expressed concern for human health and the environment and stated that it is probably too late to do anything.

Another citizen called in December 1993 and expressed concerns for the Cambridge public water supply and human health.

On December 13, 1993 the NRC held a public meeting in Byesville, Ohio to explain the Environmental Impact Statement process and to get the public's input. At this meeting many environmental groups expressed concerns over the decommissioning of the slag piles on site. However, many SMC workers expressed concern over the loss of jobs if SMC is forced to perform off-site disposal, which SMC claims would cause them to liquidate. Many local elected officials also stated that the loss of jobs is an extremely important issue and that they would support on-site closure of the slag piles, if it would save jobs.

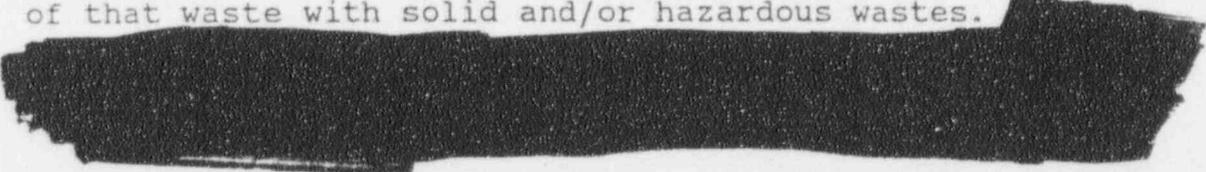
State Representative Greg DiDonato was present at the meeting and spoke. State Senator Burch's office and U.S. Senator Glenn's office were represented at the meeting. State Rep. DiDonato stated that to solve the problems at this site we all need to move slowly and use common sense. He stated that to drive SMC out of business did not seem to make sense and that Superfund would not solve the problems at this site.

Lastly, this site has received media attention in the Columbus Dispatch and the Zanesville and Cambridge newspapers.

i. Additional Information

In December 1993 Ohio EPA sent a letter to Foote Mineral requesting information, reports and photographs generated by Versar Inc. during the 1985 Environmental Risk Assessment performed by Versar on the Foote Mineral facility (Attachment 29). Foote Mineral has responded to the request with a summary of the 1985 Versar Report which is all Versar Inc. had in its possession regarding the Foote Mineral facility. It appears that the appendices, photographs and field notes generated by the Versar representatives may no longer exist. Ohio EPA-SEDO will continue its efforts to obtain pertinent information regarding the 1985 assessment and other historical documentation concerning the SMC site.

On October 8, 1993 the complainant sent a letter to the Director of Ohio EPA requesting clarification on how S.B. 130 will be implemented at this site and whether solid waste laws will be applied at this site. Senate Bill 130 affects the disposal of low level radioactive waste and the mixing of that waste with solid and/or hazardous wastes.



[REDACTED]

[REDACTED]

j. Potentially Responsible Parties

There are three potentially responsible parties (PRPs) for this site. Vanadium Corporation of America (VCA) began operations at the site in 1953. In 1970, VCA merged with Foote Mineral, a subsidiary of Newmont Mining Corporation. In 1987, Foote Mineral sold the Cambridge facility to Shieldalloy Metallurgical Corporation (SMC). In 1988, Cypress Mineral purchased Foote Mineral from Newmont Mining Corporation. Foote Mineral is now called Cypress Foote Mineral. Newmont Mining is a solvent company, with total revenues of 622.77 million dollars, and is listed on the New York Stock Exchange.

Shieldalloy Metallurgical Corporation
West Boulevard P.O. Box 768
Newfield, New Jersey 08344
ATTN: Nils Schooley, President
Phone: 609-692-4200

Cyprus Foote Mineral Company
Suite 301
301 Lindenwood Drive
Malvern, Pennsylvania 19355-1740
ATTN: Stephen Hooper, Manager-Technical Services
Phone: 215-889-9605

Newmont Mining Corporation
1700 Lincoln Street
Denver, Colorado 80203
ATTN: T. Peter Philip, President
Phone: 303-863-7414

5. Statement of Laws and/or Regulations which have been or will/could be violated:

The following are the Ohio Laws/Regulations that have been or will be or could be violated based on this investigation. The laws and regulations include:

Hazardous Waste (Attachment 10)

The following violations involve the management of hazardous wastes at the SMC site.

1. ORC 3734.02 (E) & (F), Prohibitions
2. OAC 3745-52-11, Waste Evaluation
3. OAC 3745-65-16, Personnel Training
4. OAC 3745-65-51 through 56, Contingency Plan
5. OAC 3745-65-33, Preparedness and Prevention
6. OAC 3745-65-15, General Inspection Requirements
7. OAC 3745-66-12, Closure Plan
8. OAC 3745-67-51, Protection from Wind
9. OAC 3745-65-73, Operating Record
10. OAC 3745-65-75, Annual Report
11. OAC 3745-65-13 (B)(1) through (B)(4), Waste Analysis Plan
12. OAC 3745-52-34, Accumulation Time of Hazardous Waste
13. OAC 3745-66-73(B), Management of Containers
14. OAC 3745-66-74, Inspections

SMC claims it excavated the waste oil waste solvent disposal area, as discussed in Section 4d, based upon radiological criteria only and then disposed of the material on the west slag pile. The following are the laws and/or regulations that could have been or have been violated from this activity (See Attachment 32):

1. OAC 3745-52-11, Waste Evaluation: Since SMC has notified OEPA that the area of excavation coincided with the area of past disposal of waste solvent and oil, under this regulation the excavated material had to be evaluated prior to disposal to determine if it was a hazardous waste. If the excavated material added to the west slag pile was a hazardous waste, then hazardous waste facility standards would apply. (If the material was found not to be a hazardous waste it would be a solid waste, and solid waste facility standards would apply).

Surface Water (Attachment 4)

1. ORC 6111.04, "No person shall cause pollution or place or cause to be placed any sewage, industrial waste, or other wastes in a location where they cause pollution of any waters of the State,...".
2. ORC 3734.02, ORC 3734.11 and ORC 6111.04 - Unlawful placement or disposal or threatened placement or disposal of wastes into the waters of the State.

3. ORC 6111.45 - Approval of plans for disposal of industrial waste.
4. ORC 3745-1-04 - All waters of the State shall be free from: objectional suspended solids, floating debris, oil and scum, materials that create a nuisance, toxic, harmful, or lethal substances, and nutrients that create nuisance growth.

Solid & Infectious Waste (Attachment 8)

1. ORC 3734.02 (C), Operating an unpermitted solid waste facility
2. ORC 3734.03, Open dumping and open burning of solid waste
3. ORC 3734.05 (A), Operating an unlicensed solid waste facility.
4. OAC 3745-27-11, final closure requirements for a sanitary landfill facility

- 
6. OAC 3745-27-10, Solid waste requirements. These requirements apply if the determination is made that no hazardous wastes have been disposed in the two piles at the SMC facility (See Attachment 6).

Air Pollution Control

1. No current or past violations of OAC 3745-17-08 (B) (Fugitive Dust Emission Limits) by the presence of the waste piles were found.

Drinking Water & Ground Water

1. ORC 6111.04 - Arsenic, chromium, lead, mercury and nickel have been found in monitoring wells at the site above the MCLs. The 1993 USEPA study concluded that the SMC site has impacted ground water, which is "Water of the State".
2. OAC 3745-81-11 - MCLs for arsenic, chromium, lead, mercury and nickel, which have been found to exceed the MCL in monitoring wells on one or more occasions. Also, this is only a violation if a drinking water well is installed at the site and the MCL is exceeded.

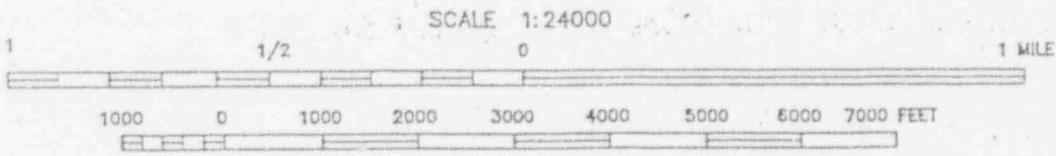
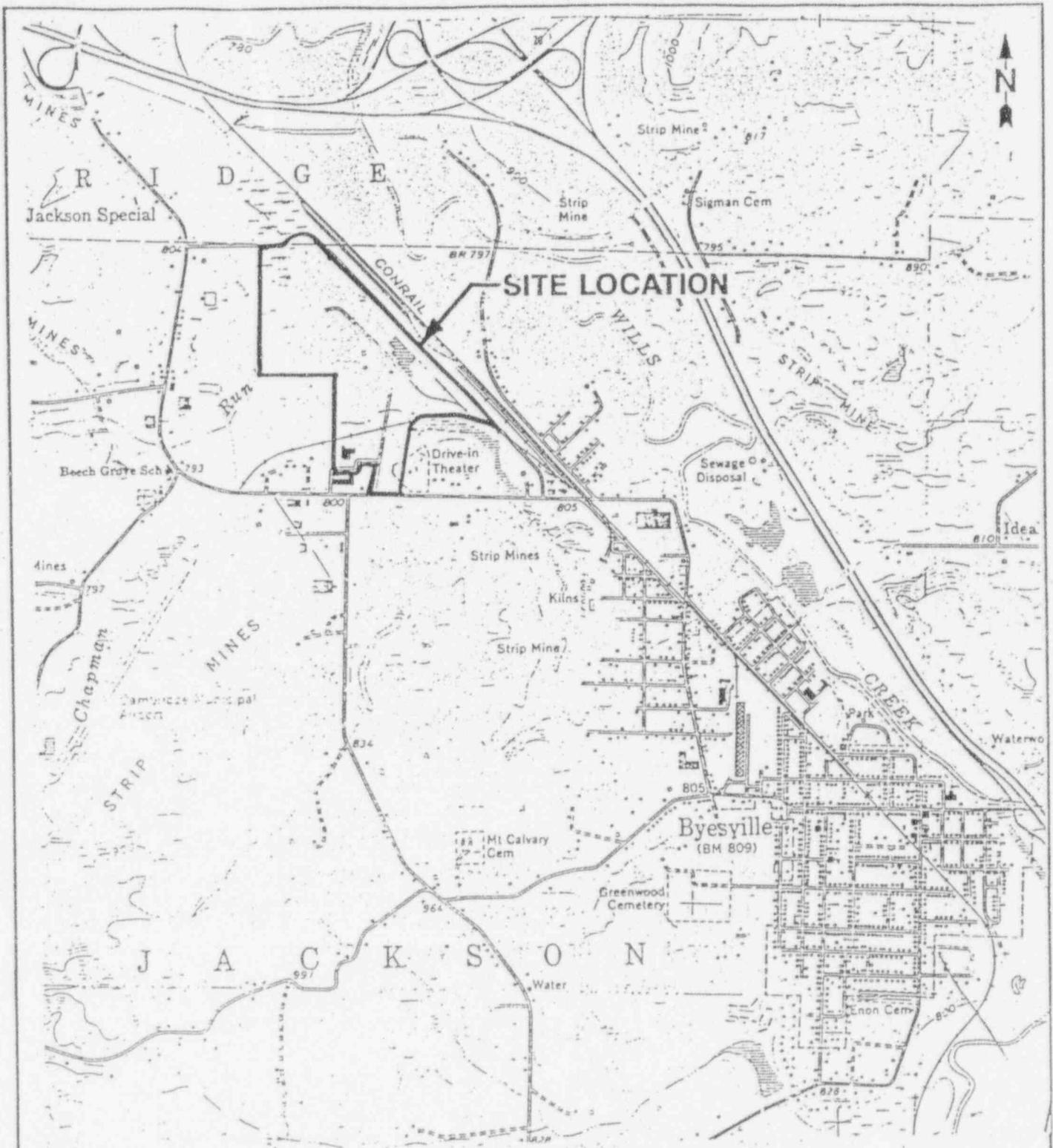
Remedial Response

1. ORC 3734.20(B) - The placement of the waste piles in the wetlands on a 100-year floodplain, the former baghouse dust pile, and the disposal of solvents and waste oil at the site, meets the definition of disposal, as provided in ORC 3734.01(F) and constitutes a threat to public health or safety, or is causing or contributing to, or threatening to cause or contribute to air or water pollution or soil contamination within the meaning of ORC 3734.20(B).

8. Figures

Figure 1 - Location Map of the Shieldalloy site in Cambridge, Ohio.

Figure 2 - Detailed map of the SMC site showing the location of the wetlands, the waste piles, the former baghouse dust area, and the existing baghouse dust area.



SCALE: 1" = 2,000'



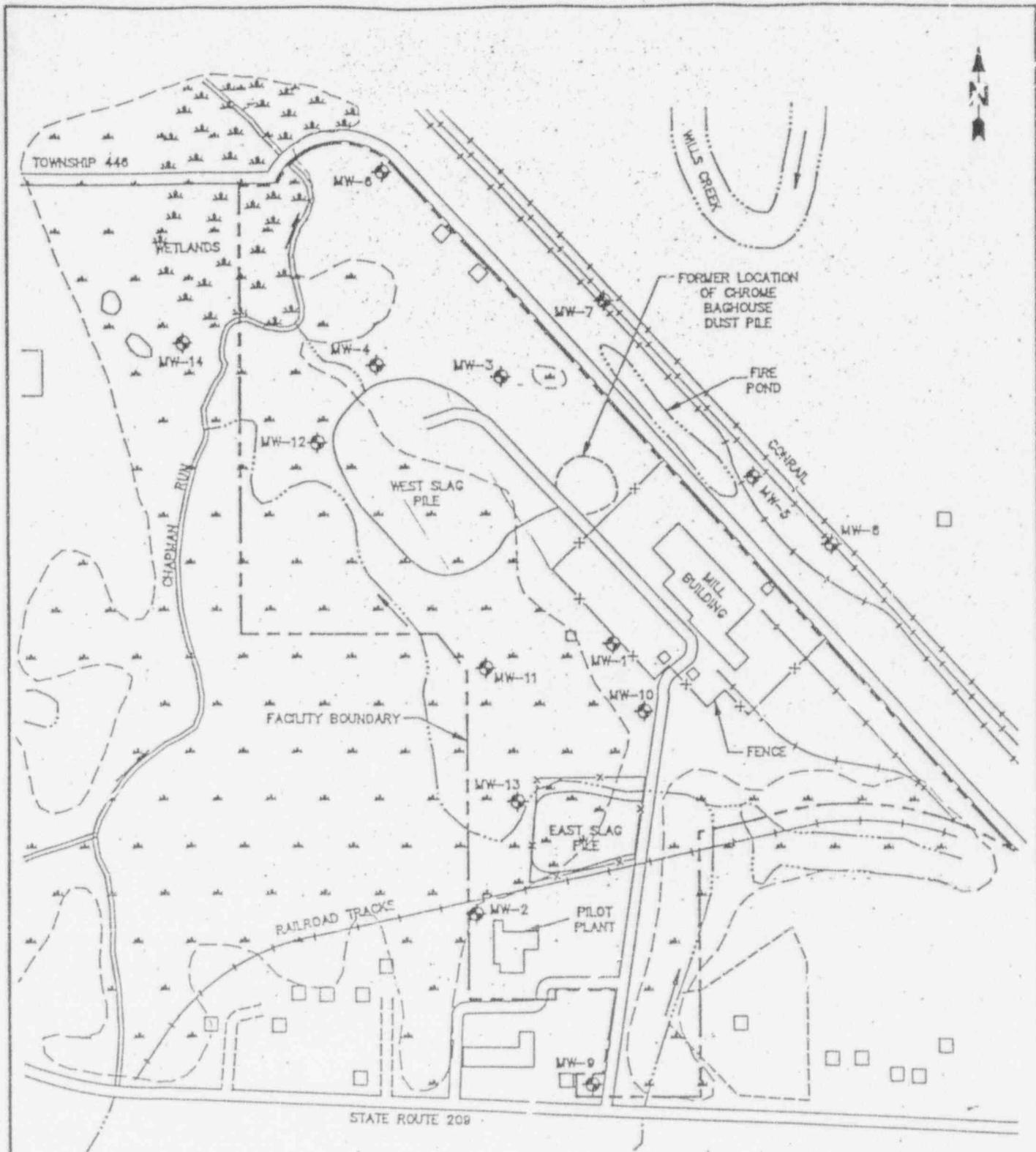
QUADRANGLE LOCATION

SHIELDALLOY METALLURGICAL CORPORATION
JACKSON TOWNSHIP, OHIO

FIGURE 1
SITE LOCATION

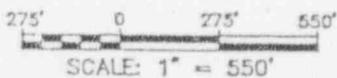
PRC ENVIRONMENTAL MANAGEMENT, INC.

SOURCE: MODIFIED FROM USGS, BYESVILLE, OHIO, QUADRANGLE, 1961 (PHOTOREVISED 1972 AND 1975)



LEGEND

- MW-9 MONITORING WELL LOCATION
- DIRECTION OF FLOW
- WETLAND AREA



SHIELDALLOY METALLURGICAL CORPORATION JACKSON TOWNSHIP, OHIO
FIGURE 2 SITE FEATURES
EMC ENVIRONMENTAL MANAGEMENT, INC.

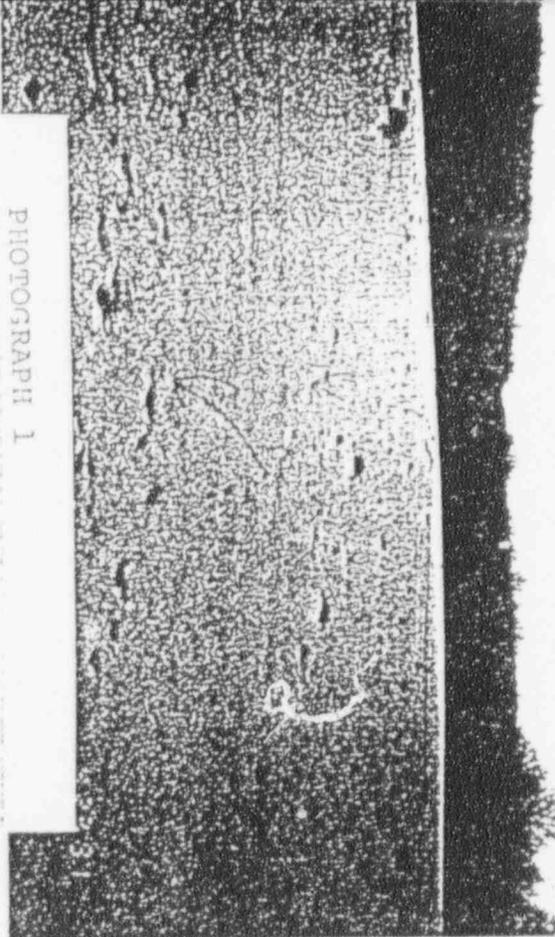
EAC-SITE.DWG - 04/05/83 - RAO - 030-001812

SOURCE: MODIFIED FROM RWT 1992; USDI 1975

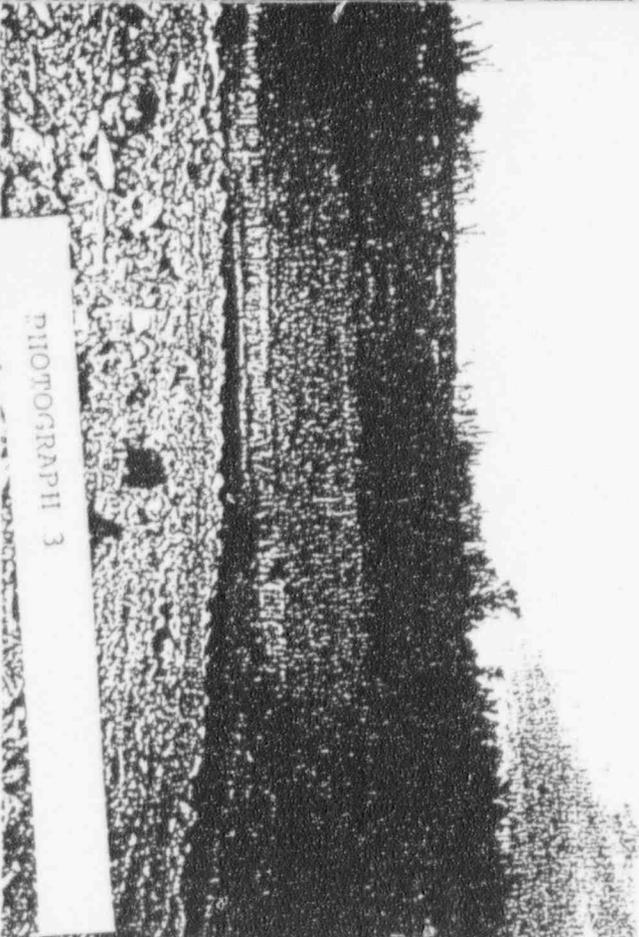
9. Photographs

- Photograph 1 - View of the partial cap on the west pile showing the sand layer.
- Photograph 2 - Partial cap on the western side of the west pile. The light colored material in the center of the photo is the treated baghouse dust.
- Photograph 3 - Western side of the west pile. Drum fragments and various metal fragments can be seen.
- Photograph 4 - Closeup of slag and a buried drum on the western side of the west pile. The soils around the drum were stained.
- Photograph 5 - View is looking north along the west border of the west pile. Standing water in the adjacent wetland was in direct contact with the slag pile.
- Photograph 6 - View is looking north from the west pile. Sediments eroded from the partial west pile cap have been deposited in the wetland.
- Photograph 7 - View is looking southwest from the west pile. Sediments eroded from the partial west pile cap have been deposited in the wetland.
- Photograph 8 - View looking east near the west pile. This is where 14,000 tons of unregulated baghouse dust was stored before being used as capping material.
- Photograph 9 - View looking northeast on the south side of the SMC property. The area on the left side of the photograph is suspected as being the area where waste solvents and waste oil were disposed on-site.
- Photograph 10 - View is looking to the southeast toward the current regulated baghouse dust waste pile as it appeared in April 1993.
- Photograph 11 - Closeup view of the regulated baghouse dust waste pile. Note the stained water near the waste pile.
- Photograph 12 - Stained water near the regulated baghouse dust waste pile on the south side of the site.
- Photograph 13 - Water stained green located directly south of the regulated baghouse dust waste pile.

PHOTOGRAPH 1



PHOTOGRAPH 3



PHOTOGRAPH 2

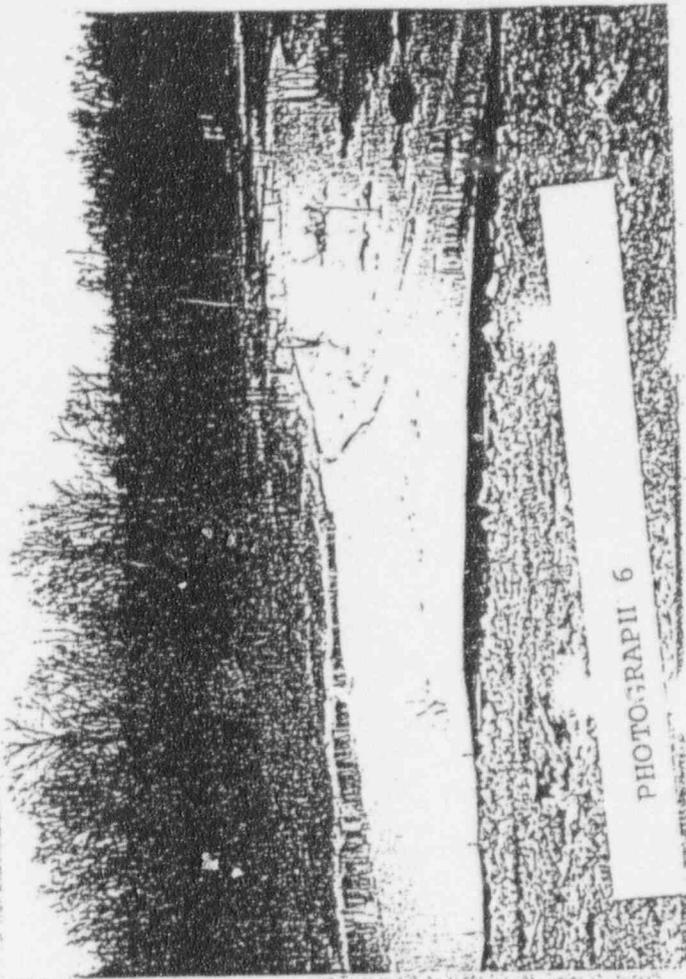


PHOTOGRAPH 4

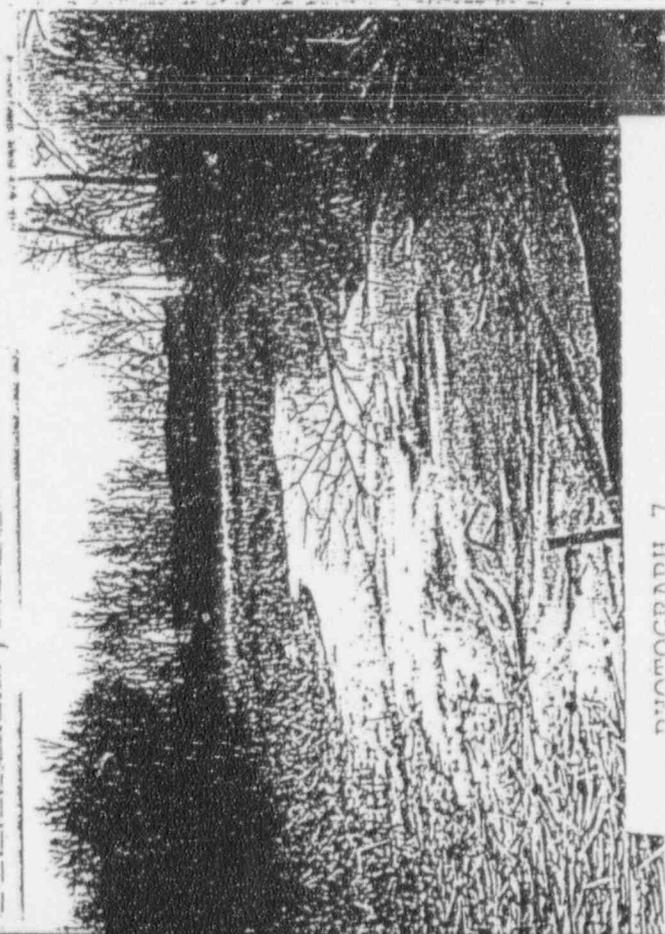




PHOTOGRAPH 5



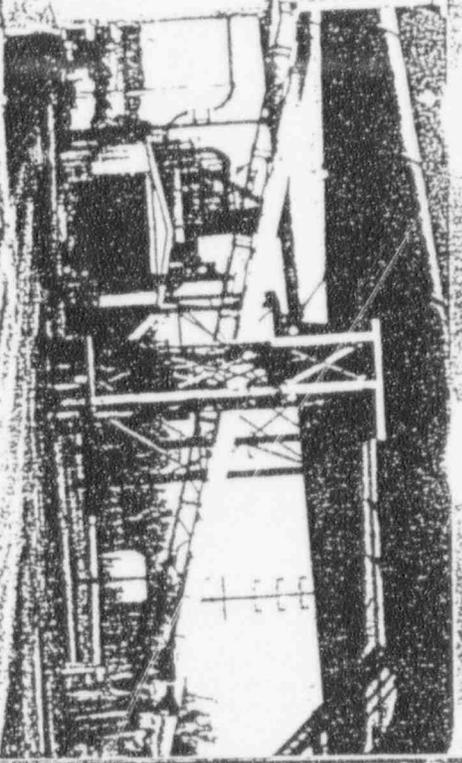
PHOTOGRAPH 6



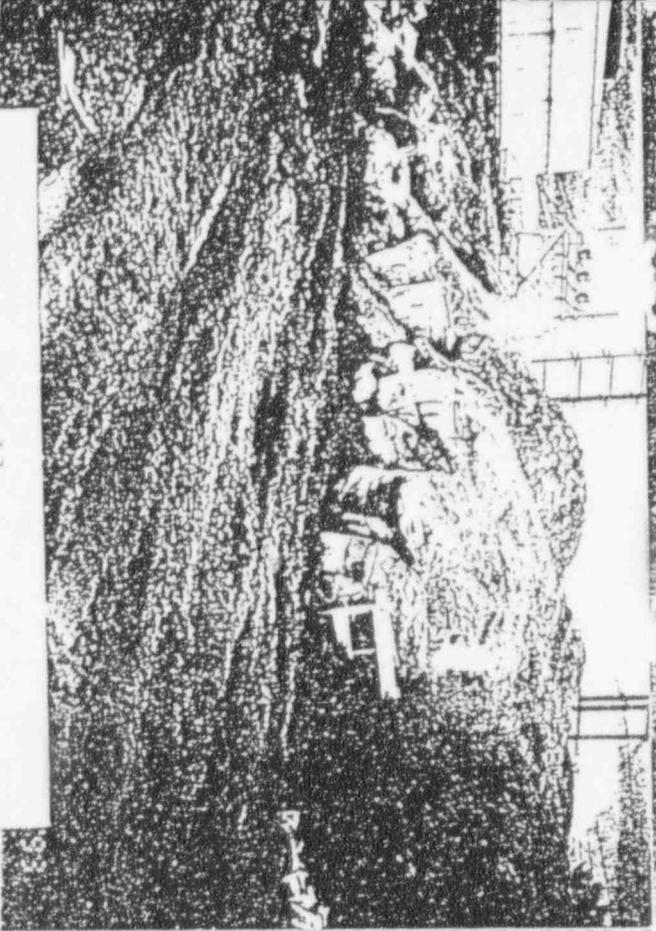
PHOTOGRAPH 7



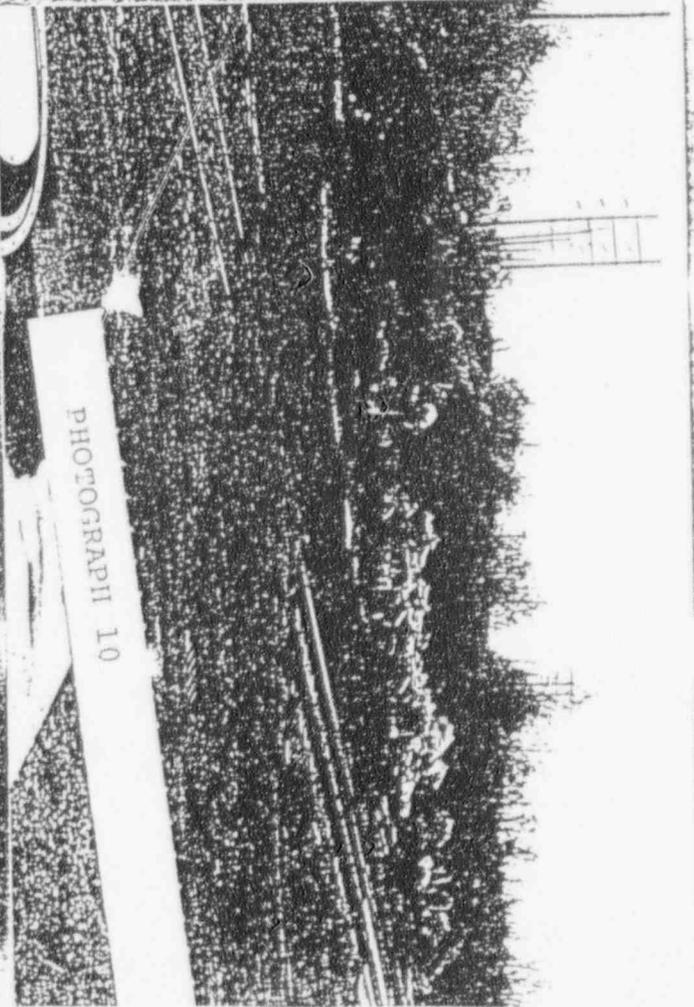
PHOTOGRAPH 8



PHOTOGRAPH 9



93



PHOTOGRAPH 10



PHOTOGRAPH 12

12093



PHOTOGRAPH 13

10. Index of Documents (copies attached):

- Attachment 1 - Verified Complaint 93-DERR-01
- Attachment 2 - Letter from Mr. S. Bauman to the OEPA Director
- Attachment 3 - Verified Complaint Investigation Report from DAPC
- Attachment 4 - Verified Complaint Investigation Report from DSW
- Attachment 5 - April 22, 1992 Letter to SMC from City of Cambridge assessing a fine for SMC discharge violations.
- Attachment 6 - Verified Complaint Investigation Report from Nancy Tock, DDAGW-SEDO
- Attachment 7 - Verified Complaint Investigation Report from David Greenwood, DDAGW-SEDO
- Attachment 8 -
 - a. Verified Complaint Investigation Report from DSIWM;
 - b. July 10, 1985 Notice of Violation to Foote Mineral;
 - c. May 8, 1986 Notice of Violation to Foote Mineral;
 - d. February 23, 1989 OEPA Concurrence letter for the Decommissioning Plan.
- Attachment 9 -
 - a. Verified Complaint Investigation Report from DSW-SEDO (DWQPA-SEDO);
 - b. 11/16/93 Interoffice memo concerning vanadium toxicity criteria.
- Attachment 10 -
 - a. Verified Complaint Investigation Report from DHWM;
 - b. April 23, 1993 Initial Complaint to DHWM;
 - c. June 2, 1993 Notice of Violation (NOV) letter;
 - d. June 30, 1993 SMC's NOV response;
 - e. August 9, 1993 Site Visit Notes;
 - f. September 28, 1993 Verified Complaint;
 - g. October 12, 1993 Telephone Memorandum;
 - h. October 13, 1993 Inspection Notes;
 - i. October 14, 1993 Vanadium Pentoxide Container Management SOP;
 - j. October 15, 1993 Telephone Memorandum;
 - k. October 15, 1993 Telephone Memorandum;
 - l. November 8, 1993 Telephone Memorandum;
 - m. November 9, 1993 NOV Letter.
- Attachment 11 - July 12, 1993 NRC, OEPA, ODH comment package on the SMC Technical Basis Document for Decommissioning.
- Attachment 12 - November 1981 Groundwater Monitoring Program for Foote Mineral Company, Cambridge, Ohio.

- Attachment 13 - Groundwater quality results collected by Foote Mineral from four on-site monitoring wells for the dates 2/28/82, 3/23/82, 6/16/82, 9/23/82, 7/26/84, 9/27/85.
- Attachment 14 - July 3, 1981 & October 21, 1986 sampling result reports produced by Foote Mineral for surface water near the site.
- Attachment 15 - April 1990 Groundwater Investigation Foote Mineral Company, Cambridge, Ohio for Shieldalloy Corporation. Burgess & Niple, LTD.
- Attachment 16 - September 1990 Site Assessment for Shieldalloy Metallurgical Corporation. U.S. EPA. Contract No. 68-01-7367. By Weston-Major Programs.
- Attachment 17 - December 20, 1993, Screening Site Inspection Report, Shieldalloy Metallurgical Corporation. EPA Work Assignment No. 29-5JZZ. By PRC Environmental Management, Inc.
- Attachment 18 - May 1985 Review Draft Environmental Risk Assessment Survey of Foote Mineral Company Facility at Cambridge, Ohio. Versar Job No. 879. Prepared by Versar Inc.
- Attachment 19 - May 1993 Technical Basis for Decommissioning at the Cambridge, Ohio Facility. Shieldalloy Metallurgical Corporation. Report No. IT/NS-93-108.
- Attachment 20 - September 13, 1991 NRC memo titled: Summary of Meeting Between U.S. NRC Staff and Shieldalloy Metallurgical Corporation Held at NRC Headquarters in Rockville, Maryland, on August 14, 1991. Memo written by Yawar H. Faraz, NRC.
- Attachment 21 - a. February 8, 1990 Emergency Response Initial Pollution Incidence Report. Report I.D. 2-30-0748.
- b. November 17, 1992 SMC Response to an Ohio EPA Information Request concerning the February 6, 1990 chemical release.
- Attachment 22 - Federal Register, Vol.58, No.226. Pages 62384-62387. November 26, 1993.
- Attachment 23 - January 14, 1994 Ohio EPA comment letter to the NRC concerning the Environmental Impact Statement.
- Attachment 24 - Interoffice memo from DSW-CO to DERR-SEDO concerning wetland issues at the SMC site.

- Attachment 25 - Memo to the File concerning solid waste and possible hazardous waste issues in the west slag pile.
- Attachment 26 - June 9, 1988 Letter from Ohio EPA-SEDO District Chief to Shieldalloy denying SMC's proposal to use baghouse dust as capping material.
- Attachment 27 - a. February 28, 1989 Interoffice memo from Ohio EPA-SEDO to Vaughn Laughlin (Ohio EPA) concerning the use of baghouse dust as capping material for the west pile.
- b. February 25, 1988 memo from SEDO to DSHWM-CO concerning meetings with SMC on the closure of the slag piles.
- Attachment 28 - February 23, 1989 Letter from the Ohio EPA Director to Shieldalloy giving concurrence to SMC's Decommissioning and Decontamination Plan and the use of treated baghouse dust as cover material.
- Attachment 29 - December 16, 1993 Ohio EPA letter to Foote Mineral concerning documents in the possession of Versar Inc. pertaining to the Shieldalloy site.
- Attachment 30 - February 2, 1994 NRC Inspection Report sent to SMC for the October 1993 NRC inspection.
- Attachment 31 - December 22, 1993 Memo from DERR-SEDO to DSIWM-CO concerning S.B. 130 and the SMC site.
- Attachment 32 - February 9, 1994 memo to the SMC file detailing the findings of the SMC claim that the waste oil and solvent dumping area was excavated and disposed on the west slag pile.
- Attachment 33 - January 21, 1994 NOV letter from Ohio EPA to SMC.