# REVISED DRAFT

## DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

## DECOMMISSIONING OF THE SHIELDALLOY METALLURGICAL CORPORATION'S CAMBRIDGE, OHIO, FACILITY

U.S. NUCLEAR REGULATORY COMMISSION
ROCKVILLE, MARYLAND

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# 1. INTRODUCTION

## 1.1 THE PROPOSED ACTION

The proposed action is to approve onsite stabilization and disposal of radioactive waste containing elevated concentrations of thorium and uranium and their radioactive decay products at the Cambridge, Ohio, Shieldalloy facility as proposed by the licensee.

## 1.2 THE PURPOSE AND NEED FOR FEDERAL ACTION

Under the Atomic Energy Act, the Nuclear Regulatory Commission (NRC) has the statutory responsibility for protection of public health and safety and the environment related to the use of source, byproduct, and special nuclear material. One portion of this responsibility is to assure safe and timely decommissioning of the nuclear facilities it licenses. This responsibility can be partially fulfilled by providing guidance to licensees on how to plan for and prepare their sites for decommissioning. Decommissioning, as defined in the NRC's regulations in 10 CFR 40.4, means to remove nuclear facilities safely from service and to reduce residual radioactivity to a level that permits release of the property for unrestricted use and termination of the license. Once licensed activities have ceased, licensees are required by NRC regulations to decommission their facilities so that their licenses can be terminated.

The criteria for allowing release of sites for unrestricted use are listed in NRC's Action Plan to Ensure Timely Cleanup of Site Decommissioning Management Plan (SDMP) (57 FR 13389; April 16, 1992). These criteria require that radioactivity in buildings, equipment, soil, groundwater, and surface water resulting from the licensed operation be reduced to acceptably low levels. Licensees must then demonstrate by a site radiological survey that residual contamination in all facilities and environmental media has been properly reduced or eliminated and that, except for any residual radiological contamination found to be acceptable to remain at the site, radioactive material has been transferred to authorized recipients. Confirmatory surveys are conducted by NRC, where appropriate, to verify that sites meet NRC radiological criteria for decommissioning.

Shieldalloy Metallurgical Corporation (Shieldalloy) holds an NRC license (Number SMB-1507) for the possession of source material at its Cambridge, Ohio, facility and has been preparing to decommission the site and request a termination of the license. (The source material is a contaminant in slag from previous alloy furnace operations.) In September 1993, Shieldalloy and its parent company, Metallurg, Inc., filed for protection from creditors under Chapter 11 of the Bankruptcy Code. Decommissioning the Cambridge facility and another licensed site in Newfield, New Jersey, represents two of Shieldalloy's largest and unquantified liabilities, which must be resolved as part of the company's restructuring activities under Chapter 11. To complete restructuring in a timely manner, Shieldalloy has requested that NRC approve onsite stabilization and disposal of radioactive waste for completing the decommissioning of the Cambridge facility. The information and analyses presented in this environmental impact statement (EIS) will be used by the Commission in deciding whether, or under what conditions, to approve Shieldalloy's decommissioning proposal.

## 1.3 BACKGROUND

Shieldalloy owns a ferroalloy plant near the city of Cambridge, Ohio (Fig. 1). The 49-ha (120-acre) facility is located south of Interstate 70, approximately 130 km (80 miles) east of Columbus, Ohio. Approximately 8 ha (20 acres) of the site is used for plant operations (Fig. 2). The facility itself is located within the valley of Wills Creek, the major stream in the area. The surface topography is gently rolling hills, with an average elevation of about 240 m (790 ft) above mean sea level. Land use in the vicinity includes open lands, an industrial park, flood plains, a country club, and two schools. Surface water in the immediate area consists of Chapman Run, Wills Creek, and an unnamed meandering stream which is an intermittent tributary of Chapman Run and Wills Creek. The site is situated in and immediately adjacent to a wetlands area. Groundwater at the site is fairly shallow and flows from east to west in the direction of Chapman Run.

Electric furnace smelting operations at the facility occur within the Mill Building, which is located within a fenced area near the center of the site. Chemical products [including vanadium oxytrichloride ($VOCl_3$)] are produced in the Pilot Plant, which is located in the southwest corner of the property. Also onsite are a number of support structures and facilities such as baghouses, a roaster, electrical substations, cooling towers, a network of small drainage streams, an analytical laboratory, and railroad tracks (Fig. 2).

In the early 1950s, operations at the Cambridge site were initiated by Vanadium Corporation of America, which merged with Foote Mineral Company in 1967. One process at the facility involved the use of niobium (previously called columbium) ores that contained licensable quantities of radioactive materials (i.e., uranium and/or thorium in concentrations in excess of 0.05%; 10 CFR 40.13). During those operations, the radionuclides from the ores were incorporated into slag (i.e., the glassy mass left as a residue by the smelting of metallic ore) which was stored in several large piles on the site. The production of ferroniobium (ferrocolumbium) continued from 1953 to 1973 under an Atomic Energy Commission license. Since that time, no NRC-licensed material has been processed at the Cambridge facility. In 1975, the operating license expired and was not renewed.

In 1987, Shieldalloy purchased the facility from Foote Mineral Company, and applied for and received its NRC license. At that time, the NRC retired the Foote Mineral license. Metallurgical operations performed by Shieldalloy since it purchased the facility consist primarily of production of ferrovanadium alloy and its slag, neither of which contain licensable quantities of radionuclides. Shieldalloy has been engaged in decommissioning the site since 1988 in preparation for requesting the NRC to terminate the license and release the site for unrestricted use in accordance with NRC's requirements. Because the Cambridge site has inactive waste piles containing a large amount of radioactively contaminated soil and slag, NRC included the Cambridge site in the Site Decommissioning Management Plan (SDMP) (NUREG-1444). Shieldalloy has not processed and does not intend to process NRC-licensed ores at this site.

At the time of Shieldalloy's purchase of the Cambridge facility, the majority of the stored wastes was contained in the West Slag Pile, 258,000 metric tons (284,000 tons); the East Slag Pile, 40,000 metric tons (44,000 tons); and the Grainal (a titanium-silicon alloy) Slag Pile,

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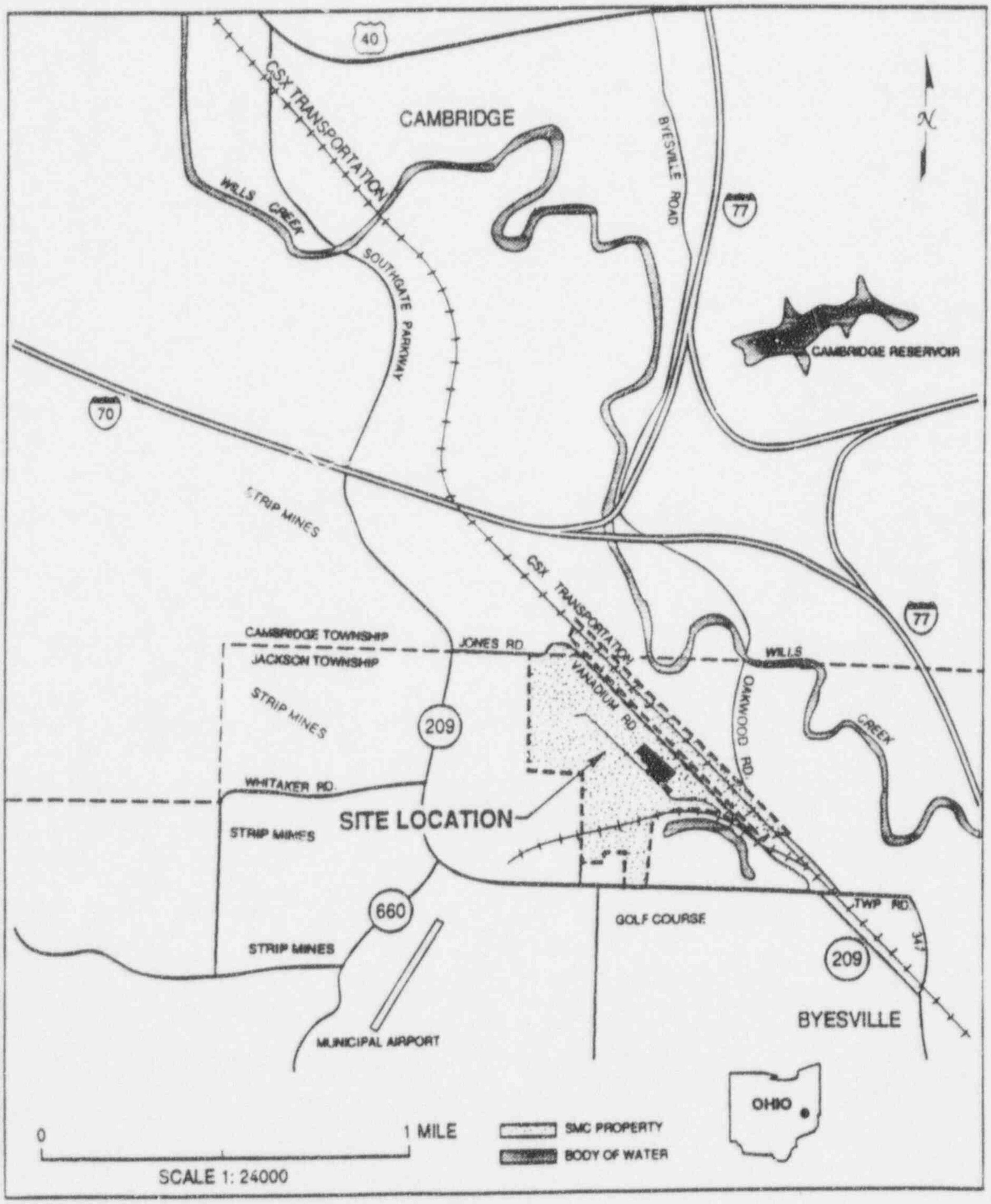



**Fig. 1. Site location of the Shieldalloy Metallurgical Corporation facility, Cambridge, Ohio.**

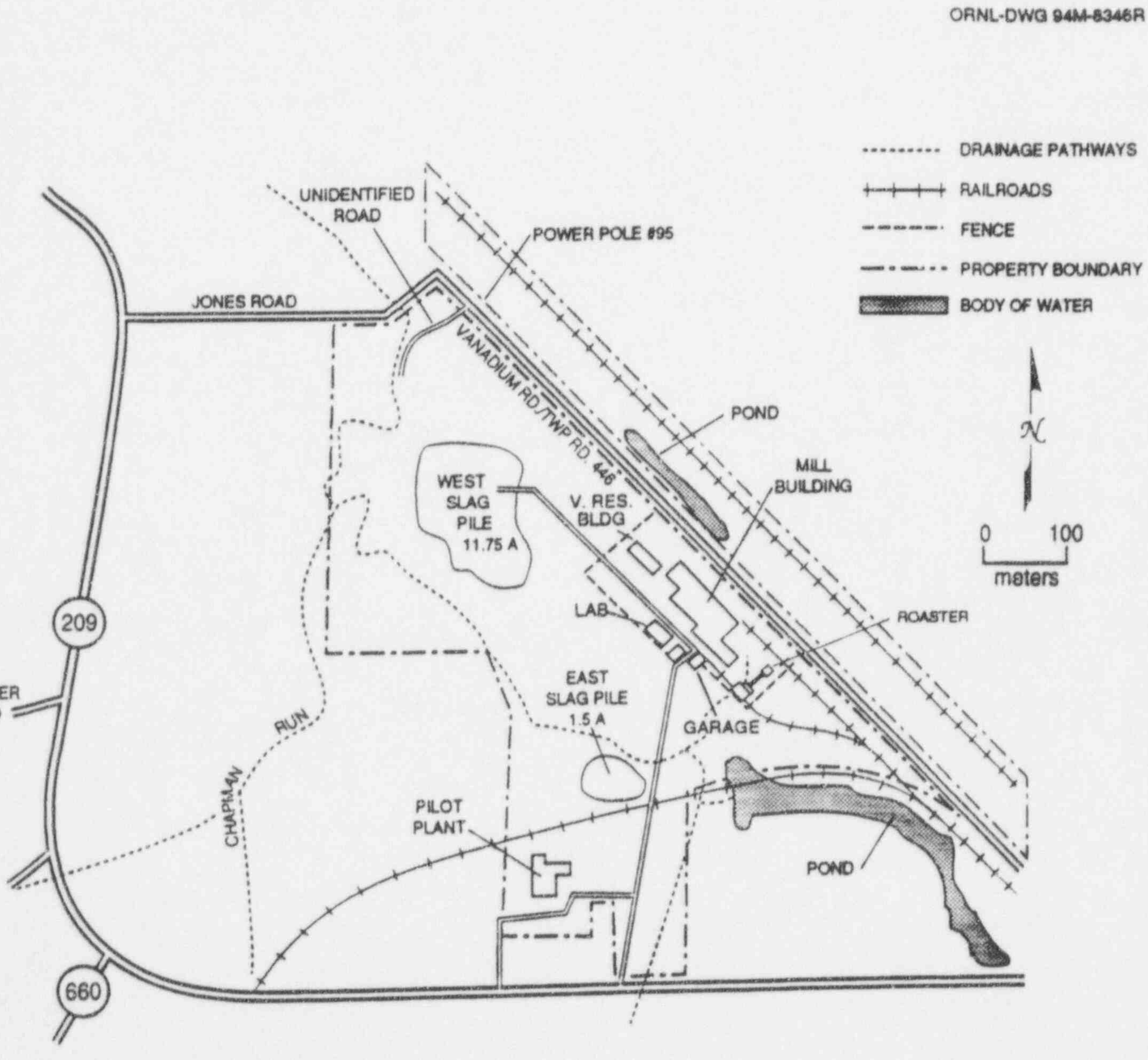



Fig. 2. Shieldalloy Metallurgical Corporation facility, Cambridge, Ohio.

13,000 metric tons (14,000 tons). Additional slag, which had been used in a variety of facility construction applications, was identified throughout the operational area of the site.

Between 1988 and 1990, Shieldalloy consolidated radiologically contaminated material in the East Slag Pile and consolidated and stabilized (provided a partial cap for) the West Slag Pile. In 1989, Shieldalloy excavated approximately 126,000 metric tons (139,000 tons) of the soil and slag in the operational areas and consolidated it onto the West Slag Pile. The West Slag Pile was then re-shaped for erosion control, and the exposed base was protected from seasonal flooding. The re-shaped pile was capped with treated and Chemfix-stabilized ferrovanadium (baghouse) dust (a synthetic clay mixture) and covered with a porous geotextile barrier and a layer of sand. The total mass of the capping material was 101,000 metric tons (111,000 tons). The Chemfix material included approximately 1,270 metric tons (1,400 tons) of dust produced from the Ferovan (a three-step iron-vanadium alloy) process. It is also estimated that approximately 1,400 metric tons (1,600 tons) of baghouse dust from other processes was placed without treatment into the West Slag Pile. The total material in the West Slag Pile is estimated to be 484,000 metric tons (533,000 tons). The West Slag Pile covers about 4.8 ha (11.8 acres) (see Fig. 2). Shieldalloy planned to place a layer of topsoil or loam over the sand and establish vegetation on the surface for further erosion control. Shieldalloy terminated stabilization activities in 1991 when NRC indicated that concentrations of radioactive material in the West Slag Pile were too high to allow ultimate release of the site for unrestricted use.

The current West Slag Pile may also contain nonradiological hazardous waste. This nonradiological waste may be the source of metals contamination identified in sediments of the ditch surrounding the West Slag Pile (USEPA 1993). However, based on available information, it is assumed that no hazardous wastes are located in the West Slag Pile.

In 1989, Shieldalloy also combined the contents of the Grainal Slag Pile, 13,000 metric tons (14,000 tons), with the East Slag Pile, 40,000 metric tons (44,000 tons), for a total of 53,000 metric tons (58,000 tons), after receiving authorization to do so from the NRC. Based upon production records, the weight of slag in the pile is estimated to be 54,000 metric tons (60,000 tons). There is approximately 42,000 metric tons (46,000 tons) from operations from 1958 to 1972 and 13,000 metric tons (14,000 tons) from the Grainal Pile. The East Slag Pile covers about 0.6 ha (1.5 acres) (see Fig. 2). There is a locked chain-link fence surrounding the East Slag Pile.

Beginning in 1982, slag was sold as clean fill material from the Cambridge facility. It is estimated that the amount of material sold was approximately 7,600 $m^3$ (10,000 $yd^3$) (Shieldalloy 1995). **[The status of the offsite investigation would be appropriate here]**

## 1.4 SCOPING PROCESS

On November 26, 1993, the NRC published in the *Federal Register* (58 FR 62384) a Notice of Intent (NOI) to prepare an EIS for NRC's approval of Shieldalloy's proposed stabilization of the slag piles and to conduct scoping for the EIS. The scoping process for the EIS was held in accordance with 10 CFR Part 51. The scoping process included the public scoping meeting held at Meadowbrook High School in Byesville, Ohio, on December 13, 1993. About 125 people (not

including people who represented government agencies) attended the meeting, and 28 gave oral comments. The NRC also invited the public and interested agencies, organizations, and individuals to submit their written suggestions and comments no later than January 15, 1994, for consideration in the scoping process.

All comments and suggestions received during the scoping meeting, as well as those submitted to the NRC during the scoping period, were considered. Oral comments at the scoping meeting were transcribed by a certified court reporter, and the meeting transcript was supplemented by materials submitted by the speakers.

The transcript and all written material received were reviewed, and individual comments were identified. Comments were then consolidated and categorized by topic areas. In May 1994, NRC published *Summary Report: Environmental Impact Statement Scoping Process, Shieldalloy Metallurgical Corporation Facility, Cambridge, Ohio*, which identifies the significant issues, presents the comments and suggestions received, provides responses to the comments, and summarizes the conclusions reached during the scoping process.

## 1.5 SCOPE OF THE EIS

Under NEPA, all federal agencies must consider the effect of their actions on the environment. Sect. 102(1) of NEPA requires that the policies, regulations, and public laws of the United States be interpreted and administered in accordance with the policies set forth in NEPA. It is the intent of NEPA to have federal agencies incorporate consideration of environmental issues into their decision-making processes. NRC regulations implementing NEPA are contained in 10 CFR Part 51. The NRC has determined that approval of onsite stabilization and disposal of the radioactive waste constitutes a major federal action and may involve significant impacts. Concentrations of uranium, thorium, and their radioactive decay products in the waste piles exceed NRC's criteria for allowing release of sites for unrestricted use (see Sect. 1.2).

Consequently, if NRC approves onsite stabilization of the radioactive material, land use restrictions or other institutional controls may be necessary to ensure long-term protection of the public and the environment. NRC expects that Shieldalloy would have to apply for and obtain an exemption from NRC's current requirements (i.e., requirements that do not allow for land use restrictions).

To fulfill NRC's responsibilities under NEPA, the NRC is preparing this EIS to analyze the environmental impacts and costs of the proposed action and alternatives to the proposed action, including the "no action" alternative. The scope of the EIS includes consideration of both radiological and nonradiological impacts associated with the alternative actions.

This EIS will address the environmental impacts of the proposed action and the reasonable alternatives. The impacts to be examined include

- land use implications of stabilizing the wastes onsite and of removing them from the site;
- social, economic, and aesthetic impacts, including impacts to archaeological and historic resources, as well as environmental justice considerations;
- visual impacts of the capped waste piles;

- human health impacts including both workers and the public in both the short and long terms;
- geological stability of the waste piles and potential for groundwater and surface water contamination;
- air quality impacts of site remediation;
- impacts on biological resources, particularly those associated with the wetlands on and near the site; and
- impacts to water quality including groundwater, surface water, and wetlands.

The EIS will address cumulative impacts to each of the above resources. In addition, the EIS will identify potential mitigation measures, unavoidable adverse environmental impacts, the relationship between short-term uses of the environment and long-term productivity, and irreversible and irretrievable commitments of resources.

During the initial planning for the EIS and during the public scoping process (Sect. 1.4), several issues were judged not to be significant and, therefore, will not be analyzed in detail in the EIS. These issues include

- impacts of past exposures to radioactive materials;
- permit violations unrelated to the proposed action (e.g., liquid effluents discharged to the municipal sewage treatment system);
- pending and current legal actions against Shieldalloy;
- siting of low-level radioactive waste disposal facilities; and
- monitoring, oversight, and approval by the public of activities associated with the proposed action.

Four other issues have been eliminated from detailed analysis because they have been considered in a previous Generic EIS (NUREG-0586) and included in an earlier rulemaking (53 FR 24018). These issues are: (1) the planning necessary to conduct decommissioning operations in a safe manner, (2) assurance that sufficient funds are available to pay for decommissioning, (3) the time period in which decommissioning should be completed, and (4) whether facilities should be remediated to appropriate levels rather than abandoned. In addition, the extent to which the bankruptcy filing by Shieldalloy will be covered in the EIS is uncertain. Although the bankruptcy has no environmental impacts, its relationship to environmental issues will need to be determined during EIS preparation.

## 1.6 PARTICIPATING AGENCIES

In addition to the issues that fall within NRC's jurisdiction, there are other environmental issues associated with decommissioning the Cambridge site that are regulated by state and other federal agencies, including the U.S. Environmental Protection Agency (USEPA), the Ohio Environmental Protection Agency (OEPA), and the Ohio Department of Health (ODOH). The scoping process and EIS will not only aid NRC in reaching decisions about the decommissioning of the Cambridge site but should also be useful to these other agencies in discharging their respective duties.

# 2. ALTERNATIVES INCLUDING THE PROPOSED PROJECT

The proposed project is to stabilize and cap the radioactive wastes in the manner proposed by Shieldalloy, as described in Sect. 2.1. The no action alternative is to leave the waste piles in their current configuration and take only those actions necessary to control erosion or correct problems that may develop. A third alternative is identical to the proposed project except that approximately 7,600 $m^3$ (10,000 $yd^3$) of radioactively contaminated slag that was previously sold for fill would be added to the West Slag Pile before it is capped. A fourth alternative is to ship all of the slag from the East and West Slag Piles to the Envirocare low-level waste (LLW) disposal facility in Utah.

Two alternatives, dilution of slag with clean fill until it meets the NRC 10 pCi/g release limit and segregating slag that exceeds the 10 pCi/g limit from the slag that does not exceed the limit, have been determined to be technically infeasible and have been eliminated from detailed consideration.

## 2.1 ONSITE STABILIZATION AND DISPOSAL (PROPOSED PROJECT)

Radioactively contaminated materials at the Cambridge site have been consolidated into two piles (West and East Slag Piles) (see Figs. 3 and 4). The piles would be stabilized, capped, and graded onsite. The capping and grading would be designed to provide long-term protection against wind and water erosion and minimize groundwater contamination, to reduce the radiation dose to an intruder onto the piles and to establish an intrusion barrier. It is assumed that there are no chemically hazardous wastes in either slag pile.

The cap for the West Slag Pile would be of multiple-layer construction designed to minimize vertical infiltration of water through the covered area and to provide adequate radiation shielding and an intruder barrier. The cap would consist of the following elements proceeding from the interior of the cap to the surface:

- 8,400 $m^3$ (11,000 $yd^3$) of clay (including the existing baghouse dust and soil);
- 10,200 $m^2$ (12,200 $yd^2$) of geotextile fabric;
- 2,400 $m^3$ (3,100 $yd^3$) of silty sand;
- 8,000 $m^3$ (10,500 $yd^3$) of topsoil;
- 840 $m^3$ (1,100 $yd^3$) of rip rap for erosion control (see Fig. 5); and
- vegetation.

The area of the capped West Slag Pile would be approximately 33,000 $m^2$ (359,000 $ft^2$). The height of the capped pile would be about 12 m (40 ft) at the highest point, and the volume would be about 400,000 $m^3$ (530,000 $yd^3$). Transportation of the cap materials for the West Slag Pile would require about 1,300 dump truck loads if 15-$m^3$ (20-$yd^3$) capacity dump trucks are used.

The cap for the East Slag Pile would be of multiple-layer construction designed to provide adequate radiation shielding and an intruder barrier. Because the slag in the East Pile is in a relatively unleachable form, the cap would not be intended to prevent infiltration of water into the pile. The cap would consist of the following elements proceeding from the interior of the cap to the surface:

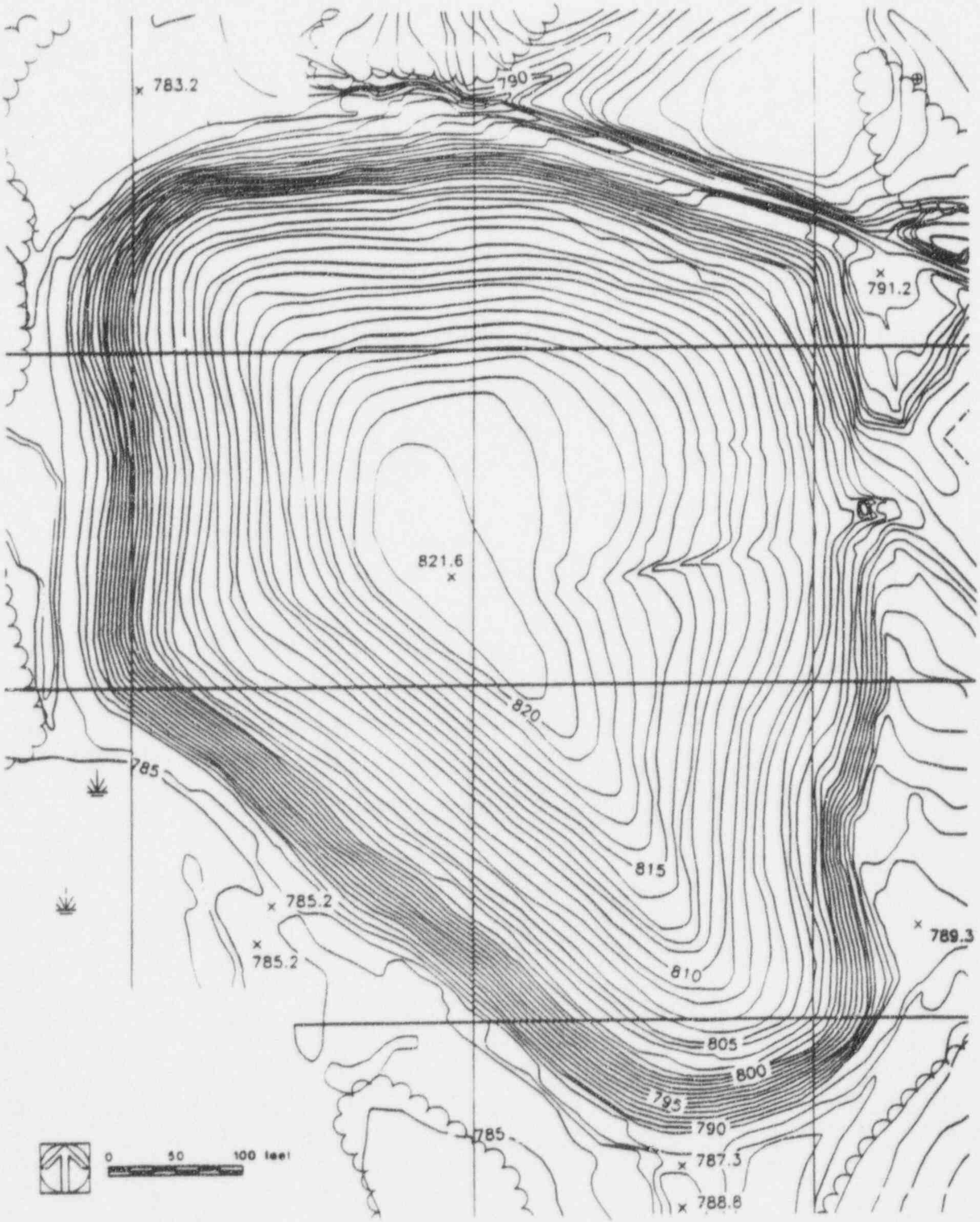



**Fig. 3. Plan view of the West Slag Pile.** *Source*: Shieldalloy 1995.

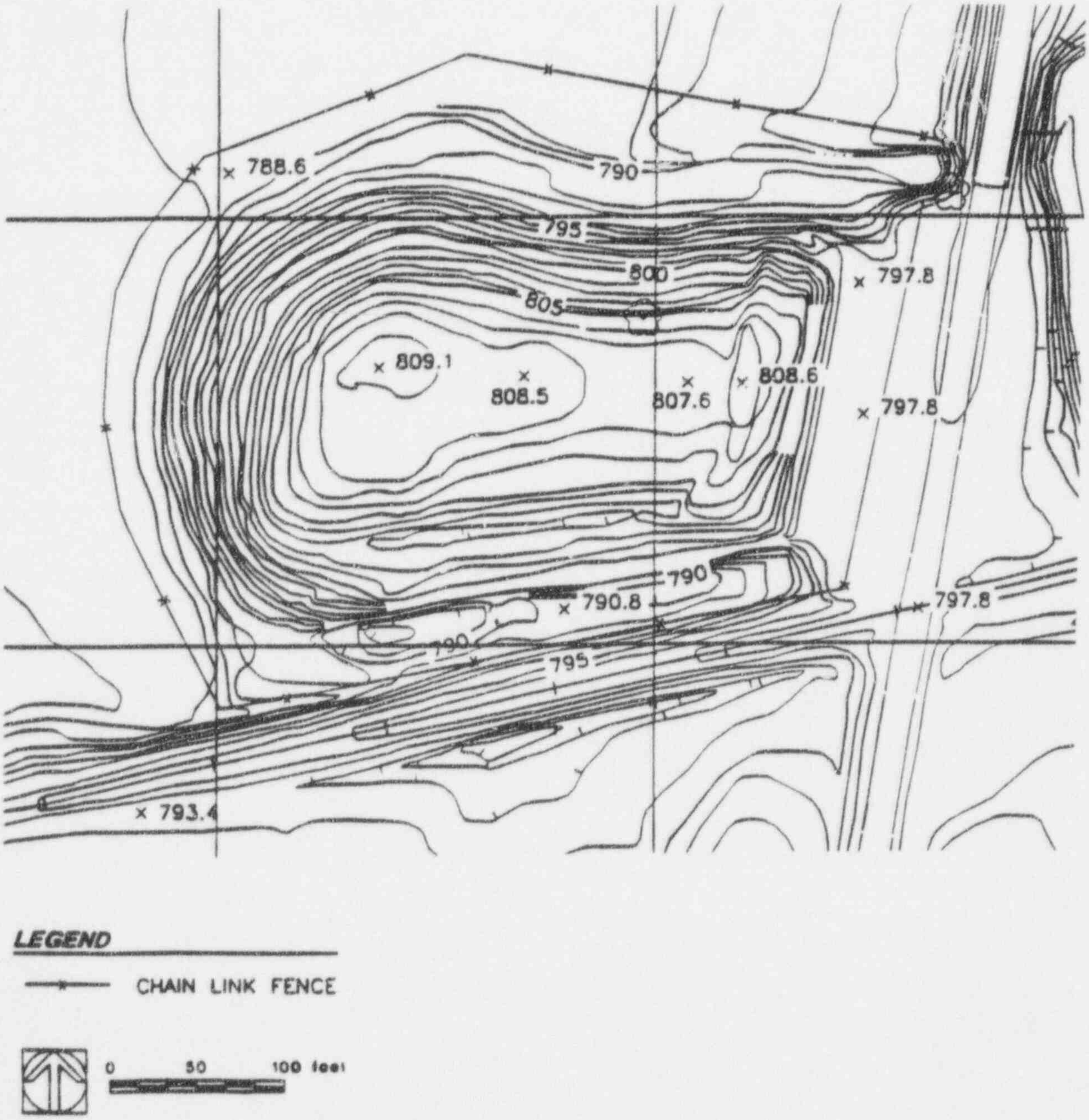



**Fig. 4. Plan view of the East Slag Pile.** *Source*: Shieldalloy 1995.

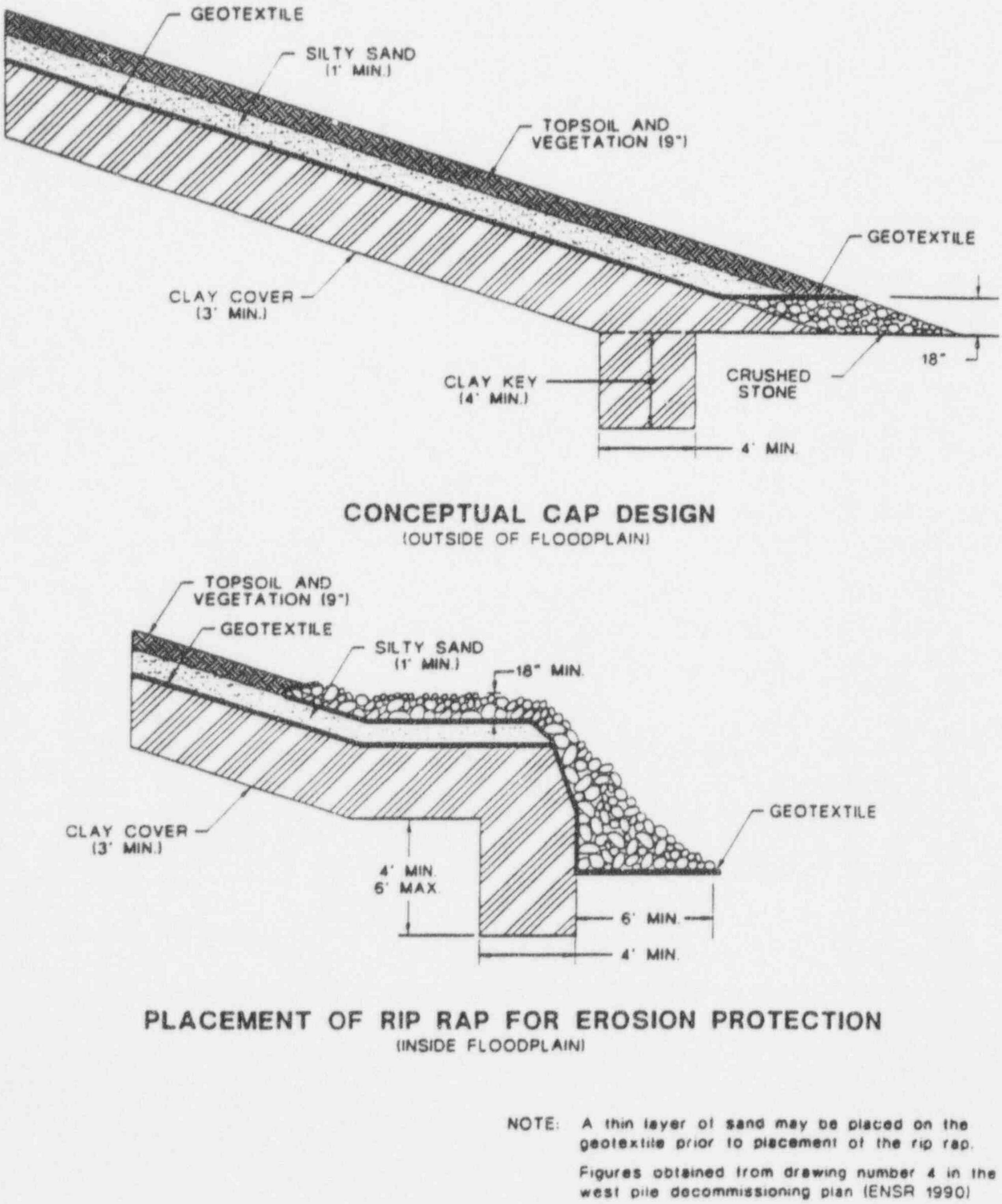



**Fig. 5. Cap and erosion control design for the West Slag Pile.** *Source*: Shieldalloy 1995.

- 12,000 $m^2$ (14,000 $yd^2$) of geotextile fabric;
- 5,600 $m^3$ (7,350 $yd^3$) of soil;
- 1,500 $m^3$ (2,000 $yd^3$) of topsoil;
- 340 $m^3$ (450 $yd^3$) of rip rap for erosion control (see Fig. 6); and
- vegetation.

The area of the capped East Slag Pile would be approximately 9,800 $m^2$ (105,000 $ft^2$). The height of the capped pile would be about 6 m (20 ft) at the highest point, and the volume would be about 59,000 $m^3$ (78,000 $yd^3$). Transportation of the cap materials for the East Slag Pile would require roughly 500 loads in 15-$m^3$ (20-$yd^3$) capacity dump trucks.

The proposed project has several common elements for both slag piles. These common elements include the slope of the caps and auxiliary vehicles. The slope of the caps on the lower portion of both slag piles would be approximately 30%. A grader would be used to maintain the haul roads and a water truck would be used as needed to suppress windblown dust.

Shieldalloy (1995) estimates that capping the West and East Slag Piles would be completed within a 7-month construction season (probably May to October). Approximately 12 to 24 workers would be needed to carry out onsite capping activities. The labor categories would be construction foreman, truck drivers, heavy equipment operators, and general laborers.

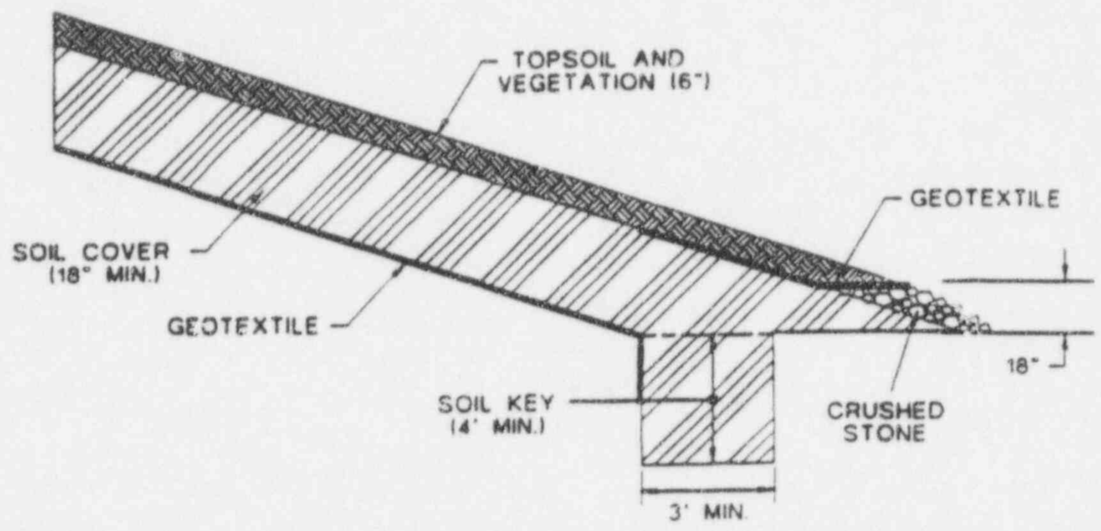
It is assumed that the edges of the capped piles would extend about 20 m (65 ft) beyond their current boundaries. In addition, heavy equipment would disturb most of the land within about 90 m (300 ft) of the edges of the capped piles. A land area of about 17 ha (41 acres) is assumed to be disturbed during the construction period.

During construction, the principal source of radiation doses for the workers would be exposure to gamma emissions from radioactive materials in the slags and soils and inhalation of radioactively contaminated dusts. An ALARA program would be instituted for construction workers to assure no worker would receive more than ___ mrem during the 7-month construction period. The total construction worker radiation exposure is expected to be less than ___ person-rem.

Onsite capping and disposal of the East Slag Pile is estimated to cost about $1 million. Onsite capping and disposal of the West Slag Pile is estimated to cost about $1.8 million (Shieldalloy 1995).

The highest portion of West Slag Pile would be about 12 m (40 ft) above grade and the highest portion of the East Slag Pile would be about 6 m (20 ft) above grade. The areas covered by the slag piles, including erosion protection barriers, would be roughly 4.6 ha (11.4 acres) and 1.8 ha (4.5 acres) for the West and East piles respectively. Fences would be maintained around the capped piles.

Following capping, institutional controls including site access restrictions, maintenance, monitoring (visual inspections, radiation surveys, and groundwater and surface water sampling), and deed restrictions would be implemented. Maintenance would include mowing the vegetation on the pile and repairing any cracks that might appear in the cap. The groundwater monitoring wells would be maintained and redeveloped every 5 years over a 30-year period.



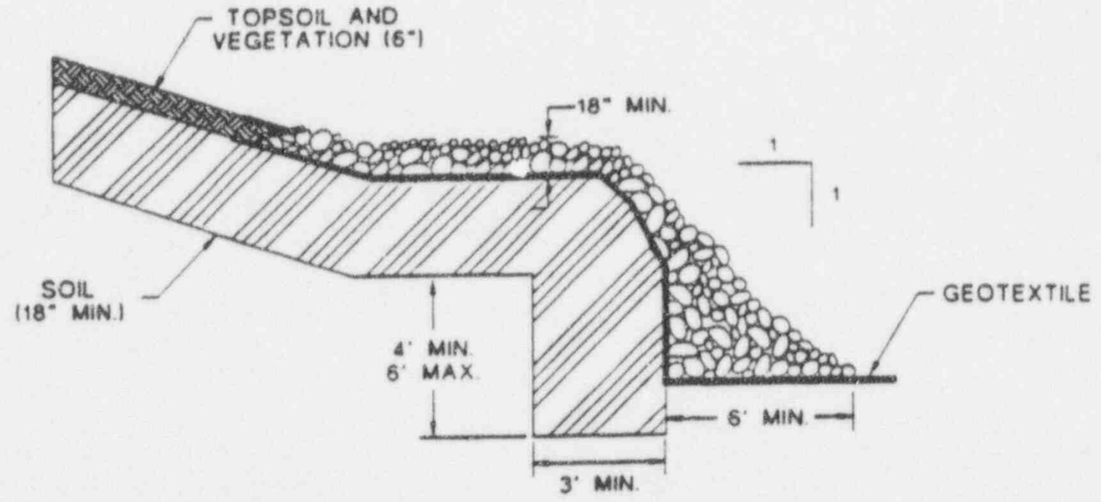




**Fig. 6. Cap and erosion control design for the East Slag Pile.** *Source*: Shieldalloy 1995.

*Note: [It is anticipated that the PAWG will describe the details and assumptions that were used to develop the long-term human health impact estimates.]*

## 2.2 NO ACTION

The no action alternative would be to retain the site in its current configuration without any additional processing or stabilization. The East and West Slag Piles would remain in their present condition and location. Only those actions required to correct problems that occur (e.g., erosional damage to the West Slag Pile cap) would be taken. This alternative would not comply with NRC's responsibility under the Atomic Energy Act, nor would it be expected to meet the interests of the public, the State of Ohio or of Shieldalloy. Consideration of the no action alternative is required by the regulations implementing the National Environmental Policy Act in order to provide a baseline for comparison with the other alternatives.

Under this alternative, the only increase in the number of workers at the Shieldalloy property would be 2 to 4 people monitoring the site on an intermittent basis. Implementation of the no action alternative would only require expenditure of those funds needed to monitor the waste piles, report on the results of that monitoring, and take undefined corrective actions should problems occur. The waste piles would not be decommissioned and Shieldalloy's license for possession of source material would not be terminated.

## 2.3 ONSITE STABILIZATION AND DISPOSAL OF ONSITE AND OFFSITE SLAG

This alternative would include the licensee's proposed project (Sect. 2.1) combined with the disposal of about 7,600 $m^3$ (10,000 $yd^3$) of radioactive slag material retrieved from offsite locations. The slag would be hauled onsite, placed immediately adjacent to the east side of the West Slag Pile (see Fig. 7) and capped in place using the same cap design as the West Slag Pile (see Fig. 3). The estimated area needed for the additional slag is 0.7 ha (1.7 acres). The average thickness of the pile of offsite slag would be 1.5 m (5 ft).

The cap for the offsite slag would be constructed of about 30,000 $m^3$ (37,000 $yd^3$) of clay, silty sand, topsoil, and rip rap, plus 16,000 $m^2$ (20,600 $yd^2$) of geotextile fabric. The volume of the West Slag Pile would be increased by about 11,000 $m^3$ (14,000 $yd^3$) by addition of the offsite slag and additional capping material. Transportation of these materials would require about 1,980 dump truck loads if 15-$m^3$ (20-$yd^3$) capacity dump trucks are used.

Recovery of the offsite materials would require approximately 500 dump truck loads assuming 15-$m^3$ (20-$yd^3$) capacity dump trucks are used. A bulldozer would be needed to spread the recovered material over the disposal site.

Construction would proceed as described in Sect. 2.1. The number of construction workers, labor categories, and duration of construction are expected to be approximately the same as those of the proposed action. Capping the offsite slag would be accomplished during the period of construction for the West Slag Pile cap.

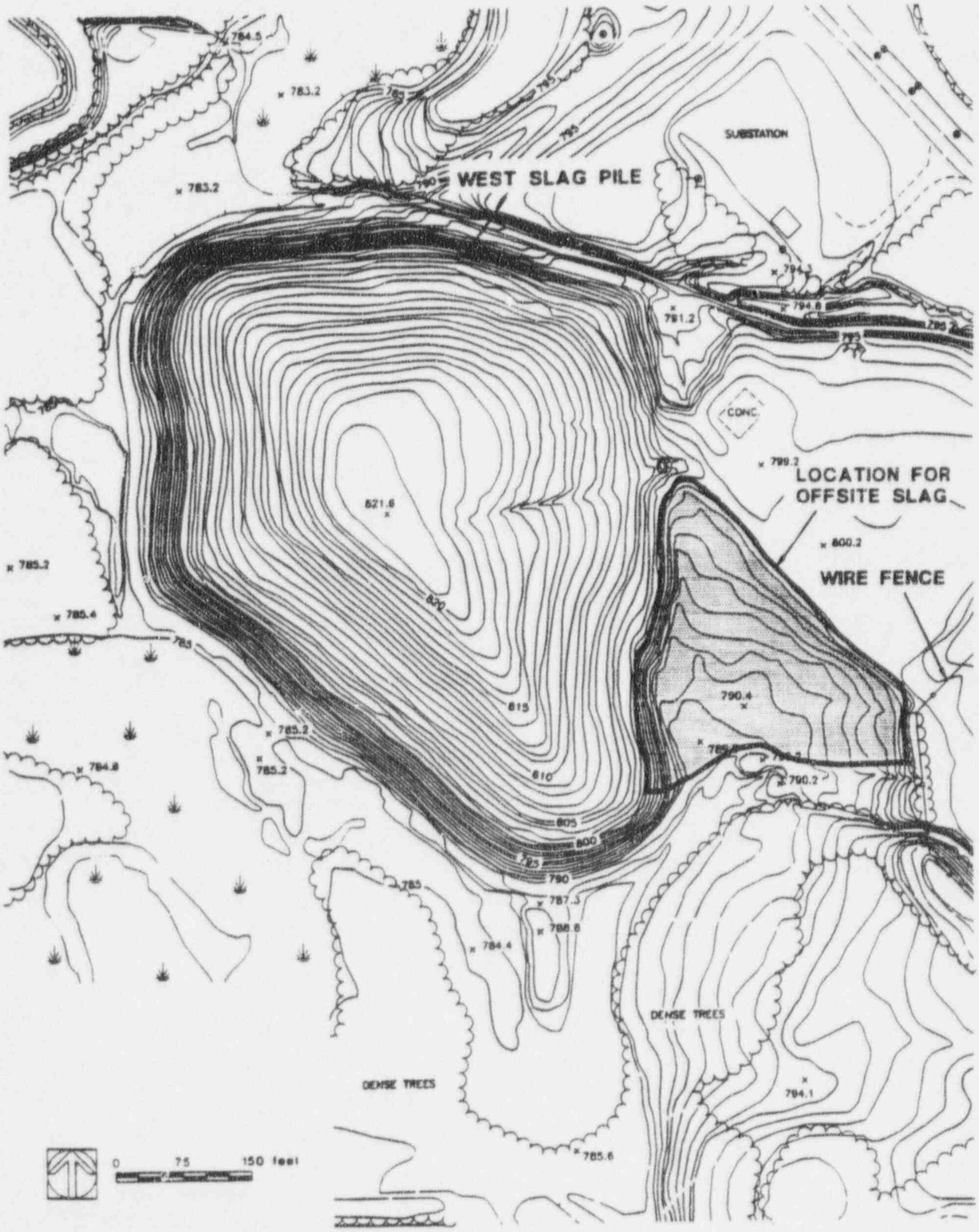



**Fig. 7. Offsite slag location, adjacent to the West Slag Pile.** *Source:* Shieldalloy 1995.

The area covered by the West Slag Pile after adding the offsite slag and cap is shown in Fig. 7. The areas covered, including erosion protection barriers, would be roughly 5.6 ha (14 acres) and 1.8 ha (4.5 acres) for the West and East piles, respectively. In addition, heavy equipment would disturb most of the land within about 90 m (300 ft) of the edges of the capped piles. The affected area for the total activity of stabilizing and capping the East and West Slag Piles and recovering and capping the offsite slag could be as large as 23 ha (58 acres). An incremental area (beyond that described in Sect. 2.1) of about 2 ha (5 acres) would be affected by construction of the cap for the offsite slag.

The principal source of radiation doses for construction workers would be inhalation of radioactively contaminated dusts and exposure to gamma emissions originating from decay of radioactive materials in the offsite slags during excavation and transport to the site and during capping activities. It is expected that an ALARA program would be instituted for the construction workers and no worker would receive more than ___ mrem during the 7-month construction period. The total construction worker radiation exposure would be less than ___ person rem. Based on the available information, it is assumed that no hazardous wastes are located in the West Slag Pile. The institutional controls described in Sect. 2.1 would also be applied following completion of this alternative.

Excavating, transporting, and spreading the offsite slag and constructing the cap at the disposal location, are estimated to cost $1 million (Shieldalloy 1995).

*Note: [We anticipate that the PAWG will add a detailed description of the source terms and the slag cap to the extent that it is necessary to support its analysis.]*

## 2.4 OFFSITE DISPOSAL OF RADIOLOGICAL AND HAZARDOUS WASTE

Under the offsite disposal alternative, radioactive contamination would be removed from the site and disposed of at the Envirocare of Utah facility near Clive, Utah. Radioactive contamination onsite would be reduced to levels considered acceptable for release for unrestricted use. The acceptable level for natural thorium ($^{232}Th$ in secular equilibrium with $^{228}Th$ and decay products) is 10 pCi/g and for natural uranium ($^{238}U$ in secular equilibrium with $^{234}U$ and decay products) is 10 pCi/g provided the total activity (uranium, thorium, and radium) is less than 10 pCi/g. The total amount of slag material that would be disposed of offsite would be approximately 483,000 metric tons (533,000 tons) from the West Pile and 54,000 metric tons (60,000 tons) from the East Pile. Approximately 6,600 covered railroad cars, each with an 80-metric ton (90-ton) capacity, would be used for the offsite transport of material from both piles. A staging area would be established in the vicinity of the East Slag Pile to serve as a temporary stockpile and loading area for the slag. The slag of the East Slag Pile would be removed first and then the footprint of that pile would serve as the staging area for stockpiling and loading the slag from the West Slag Pile.

Moving the material from the West Slag Pile would be loaded into trucks and moved to the staging area. On the order of 20,000 1-km (0.6-mile) round trips would be required to move the slag from the West Slag Pile to the staging area. Moving and loading the materials is expected to require 12 to 24 individuals during a 7-month period, probably May through October.

Hazardous waste within the West Slag Pile, if any, would be shipped to a licensed hazardous waste disposal facility to be determined by the remedial investigation/feasibility study process. The impacts of removal and disposal of hazardous waste will be addressed by the remedial investigation/feasibility study process.

Removal and offsite disposal of the East Pile material is estimated to cost $46 million. Removal and offsite disposal of the West Pile material is estimated to cost $247 million (Shieldalloy 1995).

## 2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Appendix A of Shieldalloy (1995) discusses separation processing and onsite dilution technologies and concludes that these technologies are not technically feasible.

*Note: Technical infeasibility is an appropriate reason for excluding potential alternatives from detailed consideration in an environmental impact statement; however, the conclusions presented in Appendix A do not adequately show that the alternatives are infeasible. Better supporting evidence is needed to keep these alternatives from detailed study. While awaiting the requested information, these alternatives will be assumed to be infeasible.*

### 2.5.1 Onsite Dilution Processing and Disposal

Onsite slag would be crushed blended with clean fill to reduce average concentrations of uranium and thorium to levels considered to be acceptable for release for unrestricted use (see Sect. 2.1.3). The capping material presently on the West Slag pile along with an additional estimated 948,000 $m^3$ (1,240,000 $yd^3$) of clean soil would be necessary to result in a mixture of soil and slag that would meet disposal criteria. Diluted contaminated material would be sold for offsite use or graded onsite and the site would be released for unrestricted use. Hazardous waste material (if any) within the West Slag Pile would be disposed of offsite in accordance with Ohio EPA guidelines.

Onsite dilution is considered to be infeasible because slag would have to be ground to less than 2.5-cm (1-in.) diameter so that it could mix well with clean fill. It would be expensive to transport the required 948,000 $m^3$ of fill to the site. The clean soil and the slags may separate over time.

### 2.5.2 Onsite Separation Processing with Offsite Disposal

Shieldalloy (1995) reports that only 1.7% of the slag would require disposal as low-level waste. This estimate suggests that very great gains could be achieved by separation. If sampling uncertainties led to disposal of 5% of the slag as LLW instead of the entire volume of the piles, the cost could be much lower and the potential adverse environmental impacts could be considerably reduced.

Segregation of materials based on their radiological constituents could be used to reduce the quantity of material that would exceed NRC levels acceptable for release for unrestricted use. Segregation is considered to be infeasible because the "slags do not have a consistent radiation signature, especially with respect to gamma emission. Since the detectors that would be used in

mechanical sorting operation are sensitive to gamma radiation, there is a low probability that the slag thought to be 'clean' will indeed meet the release criteria."

## 3. REFERENCES

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