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PROJECT COMPLETION REPORT FOR THE ABOVE-GRADE DISMANTLEMEN OF THE HIGH AND LOW NITRATE TANKS

03/27/97

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22
REPORT

Department of Energy

Ohio Field Office
Fernald Area Office
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MAR 27 1997

DOE-0741-97

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V-SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

PROJECT COMPLETION REPORT FOR THE ABOVE-GRADE DISMANTLEMENT OF THE HIGH AND LOW NITRATE TANKS

Reference: Letter, Saric to Reising, "High and Low Nitrate Tanks Completion Report," dated February 26, 1997.

We have reviewed your comments provided in the referenced letter on the Project Completion Report for the Above-Grade Dismantlement of the High and Low Nitrate Tanks. Additional information was requested regarding the interim storage and tracking of the material generated from this dismantlement project.

As noted in the Project Completion Report, all of the materials generated during the dismantlement of the high and low nitrate tanks were containerized and the containers placed on the Plant 1 Pad for interim storage prior to final disposition. All relevant information pertaining to these containers (such as the project name and number, container inventory and serial numbers, container type, packaging completion date, Remedial Investigation/Feasibility Study (RI/FS) waste category, weight, Material Evaluation Format (MEF) number, name of certifier, date of certification, current container location, and final destination) has been entered into the Sitewide Waste Information, Forecasting, and Tracking System (SWIFTS) database. As discussed in the Operable Unit 3 (OU3) Integrated Remedial Design/Remedial Action (RD/RA) Work Plan, this material will continue to be tracked in SWIFTS until it is dispositioned. The Department of Energy's (DOE) commitment to track the nitrate tank debris using SWIFTS has been added to the revised Project Completion Report, as enclosed. Also, two relevant SWIFTS reports have been added to the Project Completion Report as an appendix.

As indicated in the "Material Management" section of the Project Completion Report, all eleven boxes of generated wastes are currently stored on the Plant 1 Pad. All of this material can be disposed on-site, with the exception of four small white metal boxes that contain materials that do not meet the waste acceptance criteria for the On-Site Disposal Facility (OSDF) and are therefore, destined for the Nevada Test Site (NTS). Some waste materials may be candidates for decontamination and potential free-release. Final disposition of the materials will be noted in the final RA report for OU3.

If you or your staff have any questions, please contact John Trygier at (513) 648-3154.

Sincerely,

Susan M Peter

for Johnny W. Reising
Fernald Remedial Action
Project Manager

FEMP:Trygier

Enclosures: As stated

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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

PROJECT COMPLETION REPORT FOR THE ABOVE-GRADE DISMANTLEMENT OF THE HIGH AND LOW NITRATE TANKS

March 24, 1997

Revision 1

U.S. DEPARTMENT OF ENERGY

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OPERABLE UNIT 3 PROJECT COMPLETION REPORT FOR THE ABOVE-GRADE DISMANTLEMENT OF THE HIGH AND LOW NITRATE TANKS

This report summarizes the field activities performed and completed in accordance with the Operable Unit 3 (OU3) Implementation Plan for the Above-Grade Dismantlement of the High and Low Nitrate Tanks (Final, May 3, 1996). That implementation plan summarized the project-specific design and the implementation strategies for preparatory actions, dismantlement activities, and management of waste materials associated with the removal of the above-grade portions of the Low Nitrate Tank (18K) and the High Nitrate Tank (18L). This project was completed in accordance with the approved implementation plan. Significant work practice improvements to the dismantlement procedures and changes found during field implementation are presented. At- and below-grade components, which are limited to associated piping and two pump pads, were not included within the scope of this project and were left in place to be removed as part of below-grade remediation (a coordinated project activity between OU3 and OU5).

INTRODUCTION

The High and Low Nitrate Tanks were located approximately 450 feet west of the Elevated Water Storage Tank (26B), as shown in Figure 1. Each tank measured approximately 180 feet by 180 feet by four feet high, had a potential volume of one million gallons, and had two geomembrane liners and a floating membrane cover. The High and Low Nitrate Tanks were used for temporary wastewater storage during the reconstruction of the Biodenitrification (BDN) Surge Lagoon (18A) in 1987. Historically, the contents of the tanks were pumped directly to the BDN Towers (18D) for treatment.

The two tanks were initially scheduled for remediation in 2001 as part of the Liquid Storage Complex, as described in the OU3 Remedial Design Prioritization and Sequencing Report (PSR, June 1995). However, the planning of OU1 and OU2 remediation had identified the need to accelerate the dismantlement schedule for these two tanks. Specifically, the Low Nitrate Tank was in the footprint of the OU1 Waste Treatment Facility and the High Nitrate Tank was in the path of the OU2 Haul Road, as shown in Figure 1.

The Low Nitrate Tank was no longer being used in the BDN process and was available for sludge removal and dismantlement at the start of the project. At that time, the High Nitrate Tank was still being used to meter high nitrate filtrate (generated during the treatment of site uranyl nitrate (UNH) inventories under Removal Action 20) into the permanent High Nitrate Storage Tank (18M) for subsequent processing through the BDN system. Therefore, initial field work focused on preparing the Low Nitrate Tank for dismantlement.

The remediation approach of the High and Low Nitrate Tanks consisted of the following activities: characterization; preparatory action (sludge removal); above-grade dismantlement; and material management. These activities are discussed in further detail in the following sections.

CHARACTERIZATION AND MONITORING

Data from samples of the sediment taken in July 1995, which were considered representative of the material in the tanks, showed uranium concentrations of 174 ppm in the High Nitrate Tank and 61 ppm in the Low Nitrate Tank. Barium was the only constituent regulated under the Resource Conservation and Recovery Act (RCRA) that was detected (0.414 mg/L), but was well below the regulatory level of 100 mg/L.

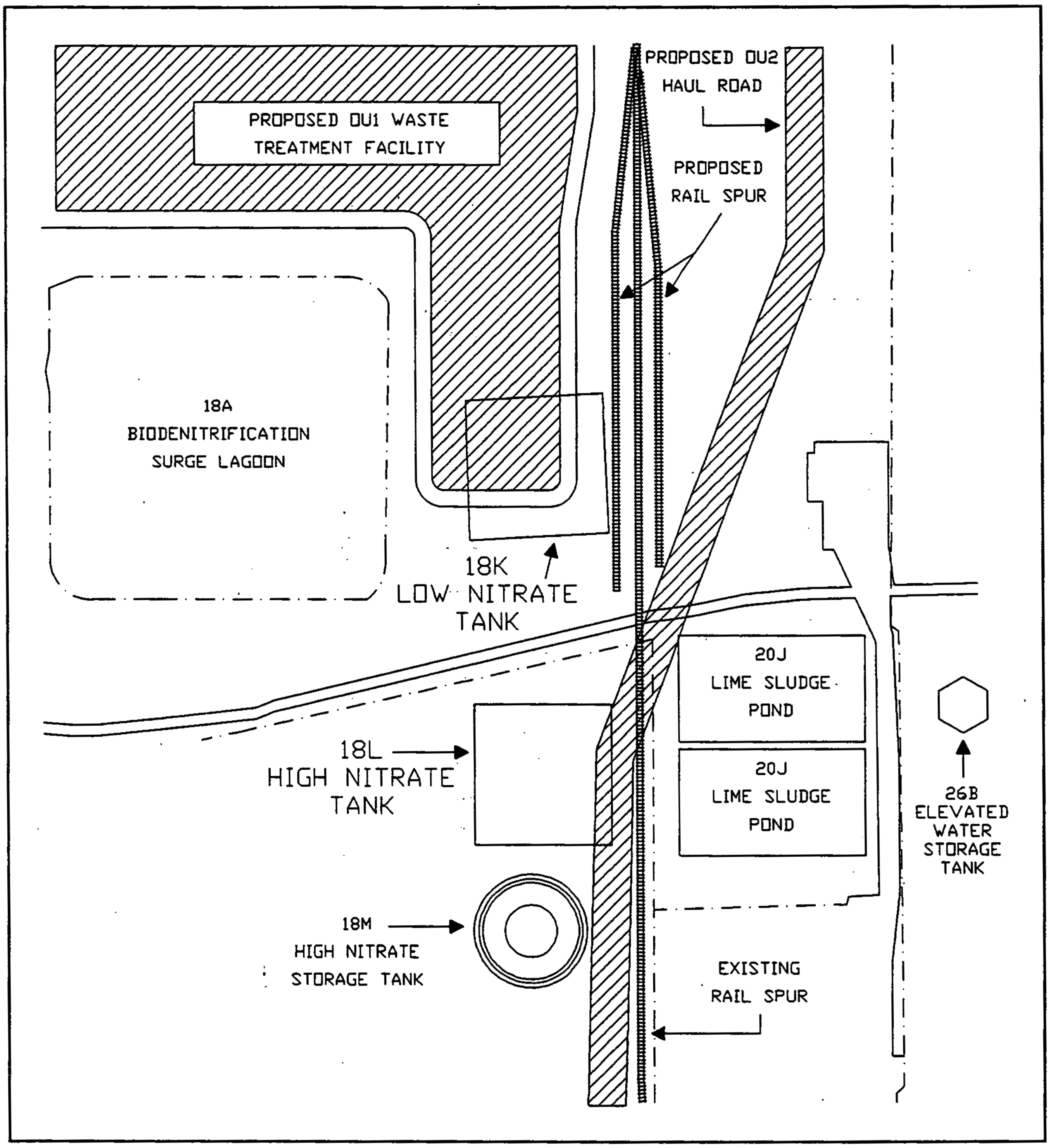

FIGURE 1 Location of High and Low Nitrate Tanks

An evaluation of thorium and uranium concentration data collected from follow-up sampling (performed on June 20, 1996) on the sediment in the Low Nitrate Tank indicated that thorium-230 was the isotope of concern for controlling worker exposures and for controlling the spread of contamination, resulting in the need for additional and more stringent radiological controls for worker protection. However, this data indicated a high ratio of uranium activity relative to the thorium activity (approximately 20:1). This ratio was used for setting area, equipment, and personnel monitoring requirements, but was not used in adjusting the derived air concentration (DAC) that was implemented for airborne control.

The DAC for Th-230 was conservatively applied and used to control potential airborne emissions. The DAC for Class W Th-230 is 3×10^{-12} microcuries/ml, as listed in Appendix A of 10 CFR 835. Lapel samplers were worn by all personnel for entry into the tanks during sludge removal and for hands-on dismantling activities. The lapel samples were counted on a low-background gas proportional counter. Measured concentrations on collected lapel samples were routinely less than the minimum detectable activity.

Contact dose-rates on the sludge were less than 0.5 mrem/hour. There was no detectable radiological contamination on the exterior surfaces of the tank walls or support braces.

PREPARATORY ACTIONS

Several prerequisite tasks were performed to prepare the nitrate tanks for dismantlement. These tasks were governed by site standard operating procedures as routine activities and, as stated in the implementation plan, were not considered to be included within the scope of this dismantlement action. However, they are described here for information purposes since difficulties associated with performing these prerequisite tasks resulted in impacts to the dismantlement schedule.

The accelerated schedule called for emptying the Low Nitrate Tank during the Spring and early Summer of 1996. Since the ground is generally muddy in the Spring, additional traction was expected to be necessary for the heavy equipment (i.e., industrial vacuum truck) required to empty residual sludge from the tanks. Therefore, a gravel driveway was installed on the west side of the Low Nitrate Tank.

For each tank, the wastewaters were drained and the tank cover was removed to provide access to the sludge that had settled to the bottom. Any exposed sludge was kept moist during the removal process to avoid creation of airborne material. An industrial vacuum truck was used to remove the sludge from the tanks using a suction hose. The truck then transported the sludge to Plant 8 for vacuum filtration (i.e., dewatering). After the bulk of the sludge was removed, any remaining sludge was directed to a corner of the tank in order to maximize sludge removal by the industrial vacuum truck.

The detection of thorium contamination in the solids had a much greater schedule impact than was originally expected. Radiological controls at both nitrate tanks and in Plant 8 caused operational delays. Thorium contamination zones, established in both areas, required additional monitoring (which could not be performed during or immediately after rainfall) of personnel, trucks, and equipment prior to leaving these areas. The additional personal protective equipment (PPE) required by the thorium, especially during summer months, invoked safety limitations (e.g., stay times) to prevent heat stress. Stay times as short as 45 minutes were enforced in both areas during hot weather.

Another unforeseen factor that delayed the completion of sludge removal was the volume of sludge itself. The original estimate for the total volume of sludge was based on measurements taken at the four corners of the Low Nitrate Tank. An average estimate of six inches of sludge was measured at the four corners and was used as a basis to extrapolate the total volume of material requiring treatment. The level of water covering the sludge and the tank covers made it infeasible to take multiple depth measurements throughout the tanks. After the covers had been removed and the water decanted, peaks of solids, some as high as 2½ feet, were exposed above the water level in the Low Nitrate Tank. These peaks not only showed that the solids had not settled evenly across the tank, but also caused delays in sludge removal. Emphasis was placed on removing these sporadic sludge peaks before the sludge could dry and potentially become an airborne concern.

Due to the higher volume of sludge and the negative schedule impacts imposed by the thorium concerns, the sludge removal from the Low Nitrate Tank threatened to impact the OU1 Waste Treatment Facility construction schedule. Therefore, when the scheduling became a critical issue, a hose was connected between the two nitrate tanks and the remaining sludge in the Low Nitrate Tank was pumped into the High Nitrate Tank. This allowed the dismantlement of the Low Nitrate Tank to proceed without adversely impacting the OU1 construction schedule and also concentrated remediation efforts on one tank rather than two. This process did, however, increase the schedule for sludge removal in the High Nitrate Tank.

The total quantity of sludge removed from the High and Low Nitrate Tanks equated to approximately 485,000 gallons (rather than the initial estimate of 150,000 gallons). As a result of dewatering the sludge in Plant 8, approximately 544,100 pounds of residues were generated and containerized in 1,352 55-gallon drums. As stated in the implementation plan, these residues will be sampled and analyzed (in accordance with site standard operating procedures for waste characterization and management) for the presence of RCRA-regulated metals prior to off-site disposition.

DISMANTLEMENT

The top liner was visually inspected to ensure it was sufficiently cleaned to meet the waste acceptance criteria (WAC) for the On-Site Disposal Facility (OSDF) and was cut into small sections, which were then folded. A forklift placed these liner sections into Sea/Land containers for interim storage. Once the entire top liner was removed, the same process occurred for the bottom liner.

The galvanized metal tank walls, metal support braces, and wooden footers (connected between the metal support braces for added structural stability) were then removed, followed by the tension wires that criss-crossed the bottom of the tank. Finally, all above-grade piping was removed and the remaining below-grade piping was capped to prevent release of contaminants to the environment from the system. Also, the Advanced Wastewater Treatment Facility Phase II was temporarily shut down so that the other ends of the below-grade piping could be disconnected from the piping mains in the K-65 trench. The attached photos (Appendix A) depict the various stages of tank dismantlement.

The removal of the double liners and dismantlement of the tank walls, piping, and pumps took two to three weeks per tank, though the schedule impacts resulting from the preparatory actions caused an overall greater schedule for completion of field activities. More details regarding the project schedule are provided in the Project Schedule section below.

MATERIAL MANAGEMENT

The debris generated during the dismantlement of the High and Low Nitrate Tanks has been and will be managed in accordance with the provisions of the OU3 ROD for Final Remedial Action and the OU3 Integrated Remedial Design/Remedial Action Work Plan, once approved. As discussed further in Appendix B, information pertaining to this debris has been entered into the FEMP Sitewide Waste Information, Forecasting, and Tracking System (SWIFTS) database and will be tracked until final disposition.

A variety of materials were generated during dismantlement activities. Category A materials (Accessible Metals) consisted primarily of galvanized steel tank sides and support braces. Category B materials (Inaccessible Metals) included some above-grade piping, electrical items, and miscellaneous conduits and wiring. Category C materials (Process-Related Metals) included four pumps and the bulk of the above-grade piping. Finally, Category I (Miscellaneous) materials included the tank covers, double liners, non-asbestos-containing piping insulation, PPE, wood tank footers, and a wood staircase used to access the tanks during sludge removal.

Since the liners had been in direct contact with the sludge, more stringent thorium release criteria would have had to be met to reuse the liners. Therefore, the liners were not deemed salvageable and were containerized for eventual disposition in the OSDF. The tank walls and support braces were also containerized for easier transportation until a final disposition decision can be made (i.e., on-site reuse, OSDF disposal, or alternate disposition in accordance with future Category A decisions). These walls and braces were packaged to be easily unpacked once a final disposition decision is made.

As summarized in Table 1, the dismantlement of the nitrate tanks generated seven Sea/Land containers and four small white metal boxes (SWMBs), having a total net weight of approximately 57.5 tons. The SWMBs contain transfer hoses used during sludge removal operations and the pumps and process piping that do not meet the OSDF WAC. These items were containerized separately for off-site disposal at the Nevada Test Site (NTS). All containers have been moved to the Plant 1 Pad for interim storage prior to final disposition.

TABLE 1 Generated Materials

Container Inventory #	Description of Contents	Container Type	Net Weight (pounds)
W126839	cover and liners of Low Nitrate Tank	S/L	29,040
W156008	wood and liners of High Nitrate Tank	S/L	8,160
W160582	liners of High Nitrate Tank	S/L	12,340
W160586	metal walls, support braces, wood, and tension cables of High Nitrate Tank	S/L	21,390
W156010	PPE and High Nitrate Tank cover	S/L	6,170
W158047	wood and misc. metal	S/L	10,920
W153791	metal walls, support braces, and tension cables of Low Nitrate Tank	S/L	21,390 [a]
W153204	flexible vacuum truck hoses and non-salvageable tools	SWMB	560
W153205	flexible vacuum truck hoses	SWMB	390
W160627	above-grade piping and pumps	SWMB	2,612
W160624	above-grade piping and pumps	SWMB	2,054
Total			**115,026**

Notes:
(a) container has not yet been weighed, but has been estimated based on the weight of container # W160586.

PROJECT SCHEDULE
The actual timeline of activities for this project, including implementation plan submittal and approval, preparatory actions, dismantlement, and the submittal of this project completion report is provided in Figure 2.

The Operable Unit 3 (OU3) Implementation Plan for the Above-Grade Dismantlement of the High and Low Nitrate Tanks (Final, May 3, 1996) included milestones for Certification of Construction Completion (December 2, 1996) and submittal of the draft Remedial Action Report to EPAs (January 31, 1997). Due to project delays that were based on unexpected conditions encountered in the field (as described herein), the Certification of Construction Completion milestone was missed. A request for extension for the Certification of Construction Completion and the submittal of the draft Remedial Action Report milestone dates was submitted to the EPAs on December 11, 1996 and was subsequently approved on December 18, 1996. The new (extended) milestone dates are February 28, 1997 for Certification of Construction Completion and March 31, 1997 for submittal of the draft Remedial Action Report (which has been renamed to Project Completion Report per the OU3 Integrated Remedial Design/Remedial Action Work Plan). Although EPA granted the extension for the Remedial Action Report (Project Completion Report), every effort was made to complete field activities and submit this report by the initial milestone date of January 31, 1997.

ACTIVITY START	ACTIVITY FINISH	1996: FEB – DEC / 1997: JAN – FEB
	13FEB96	◆ SUBMIT DRAFT IMPLEMENTATION PLAN TO EPAs
13FEB96	4APR96	EPA REVIEW AND CONDITIONALLY APPROVE IMPLEMENTATION PLAN
4APR96	3MAY96	REVISE IMPLEMENTATION PLAN/RESPOND TO EPA COMMENTS
	3MAY96	◆ ISSUE FINAL IMPLEMENTATION PLAN
26FEB96	15JUL96	LOW NITRATE TANK SLUDGE REMOVAL
20JUN96	15JUL96	TRANSFER RESIDUAL SLUDGE TO HIGH NITRATE TANK
16JUL96	31JUL96	DISMANTLE LOW NITRATE TANK
16JUL96	15DEC96	HIGH NITRATE TANK SLUDGE REMOVAL
16DEC96	24DEC96	DISMANTLE HIGH NITRATE TANK
	7JAN97	CERTIFICATION OF CONSTRUCTION COMPLETION ◆
24DEC96	30JAN97	PREPARE PROJECT COMPLETION REPORT
	30JAN97	SUBMIT PROJECT COMPLETION REPORT TO EPAs ◆

FIGURE 2 Actual Timeline of Nitrate Tank Dismantlement Activities

CONCLUSION

In summary, except for the work enhancements and schedule impacts noted in this report, the characterization, sludge removal, above-grade dismantlement, and material management of the High and Low Nitrate Tanks project was completed in accordance with the approved implementation plan. There was no impact to the OU1 Waste Treatment Facility construction schedule or the OU2 Haul Road schedule. During the project, approximately 485,000 gallons of sludge were removed from the two tanks and dispositioned in a manner that was safe and protective of human health and the environment. The debris generated during the dismantlement of these tanks has been and will be managed in accordance with the provisions of the OU3 ROD for Final Remedial Action. There were no personnel contamination events or reportable safety incidents and there was no spread of contamination as a result of this project.

APPENDIX A

SELECTED PROJECT PHOTOS

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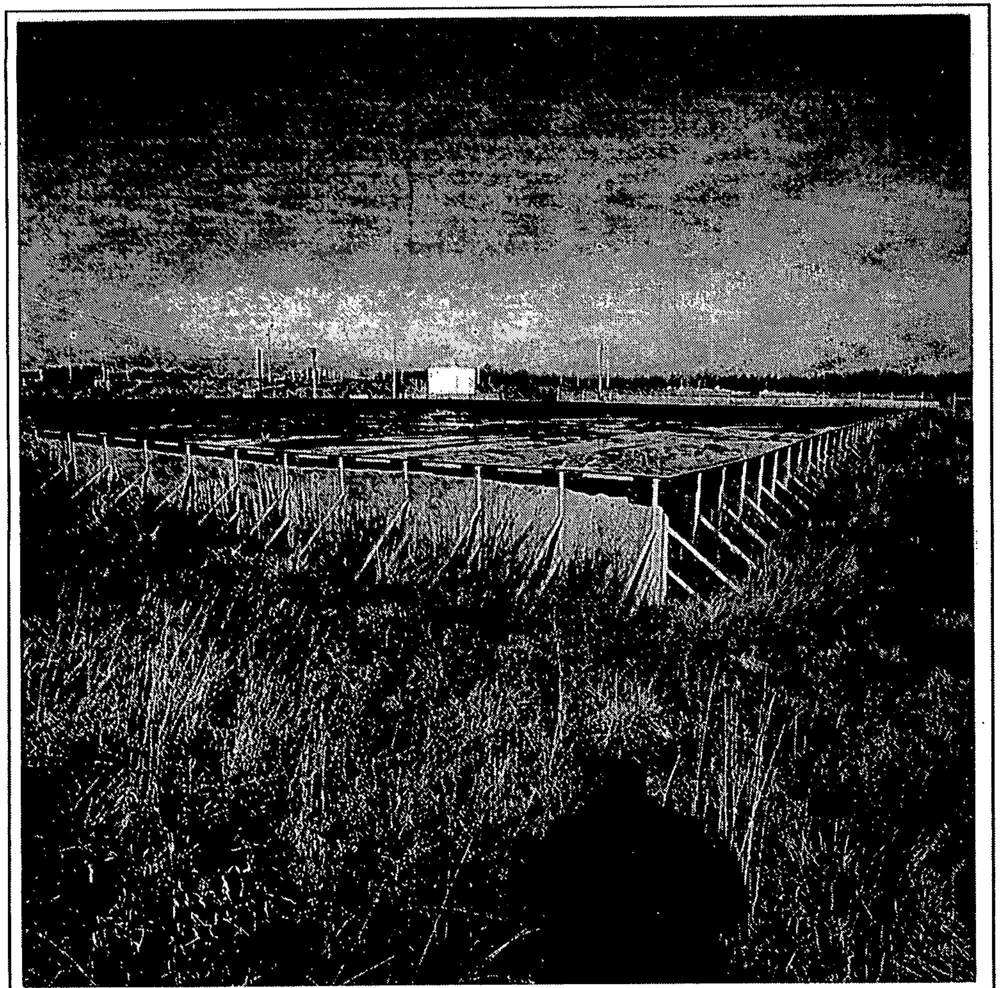

PHOTO 1 Neg. #5299-32

Photo of the southeast corner of the High Nitrate Tank prior to initiation of field activities. The tank contained high nitrate wastewaters generated during treatment of site UNH inventories.

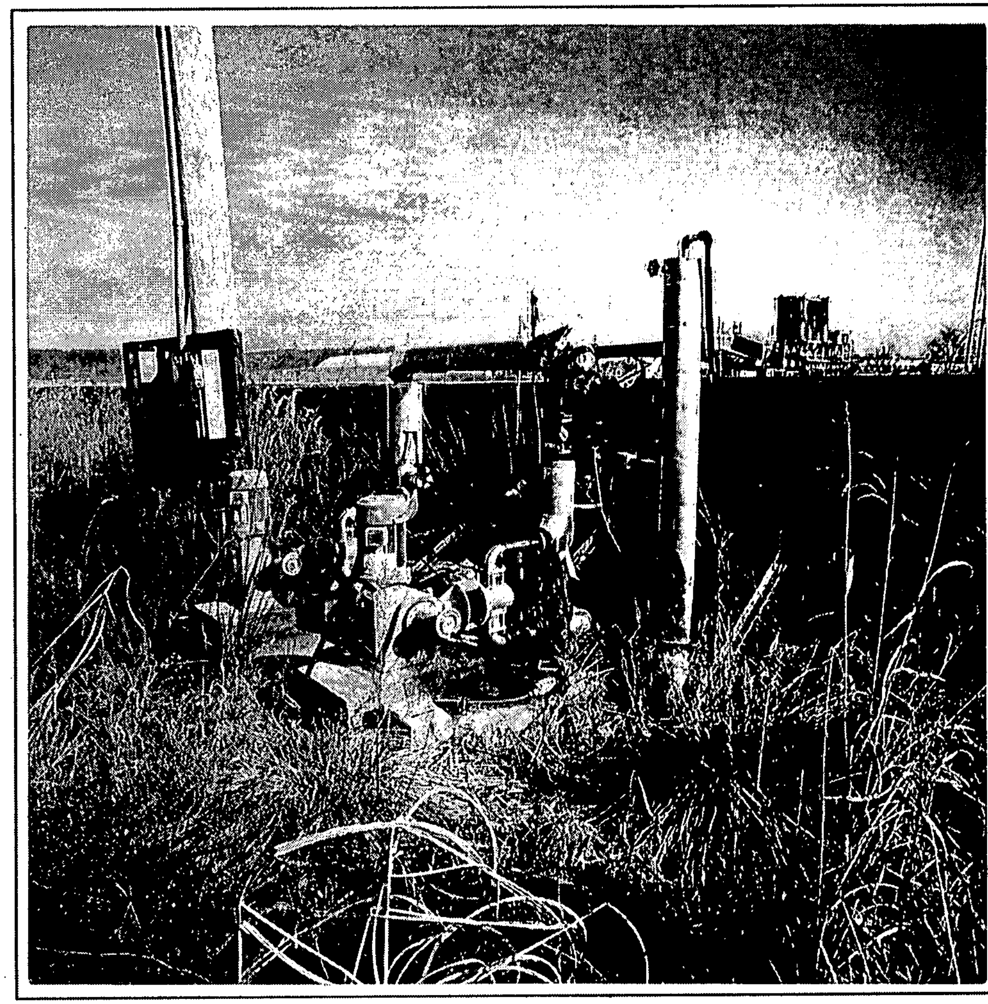

PHOTO 2 Neg. #5299-30

Photo of the pumps and bulk of above-grade piping associated with the High Nitrate Tank, facing northeast.

PHOTO 3 Neg. #6349-25

Photo of sludge removal operations in the Low Nitrate Tank. The flexible hose is connected to an industrial vacuum truck.

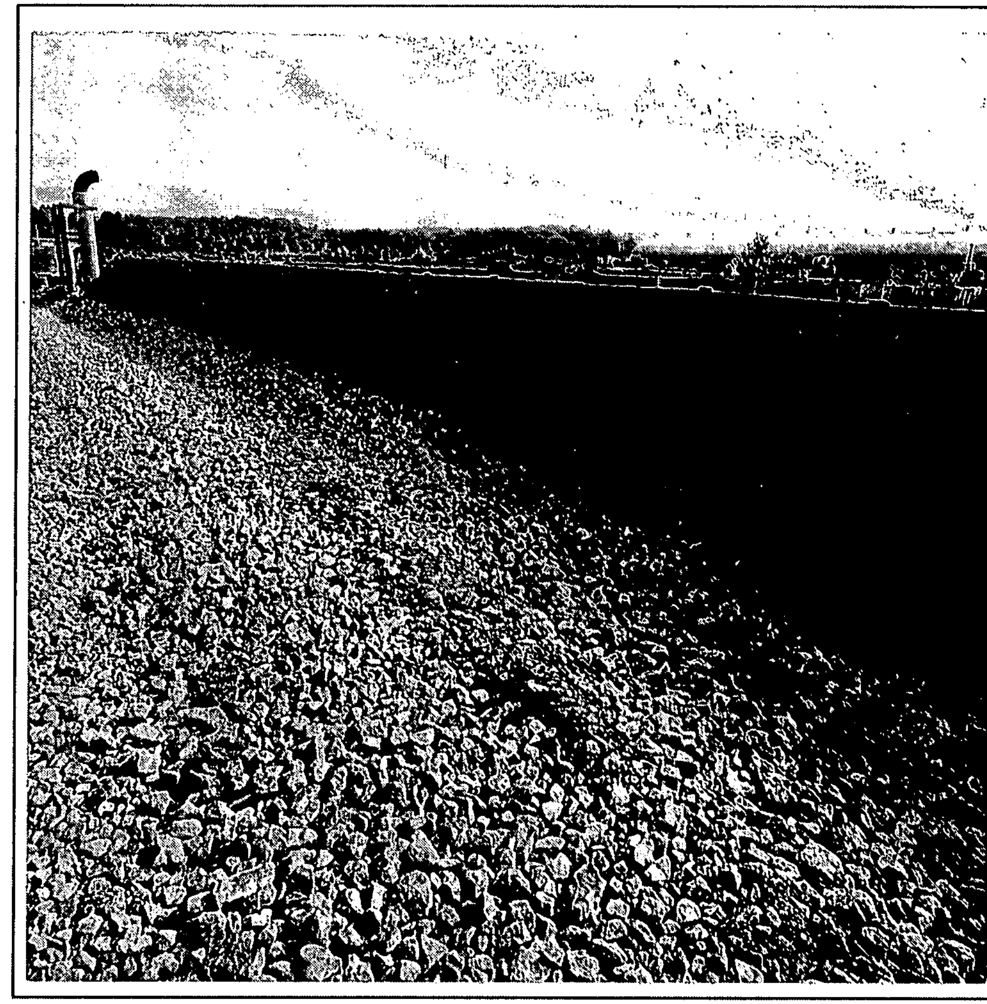

PHOTO 4 Neg. #6339-19

Photo of the gravel driveway laid on the west side of the Low Nitrate Tank to provide improved traction for the industrial vacuum truck during rainy weather. Note that numbers were spray-painted on each tank panel to facilitate radiological survey record-keeping.

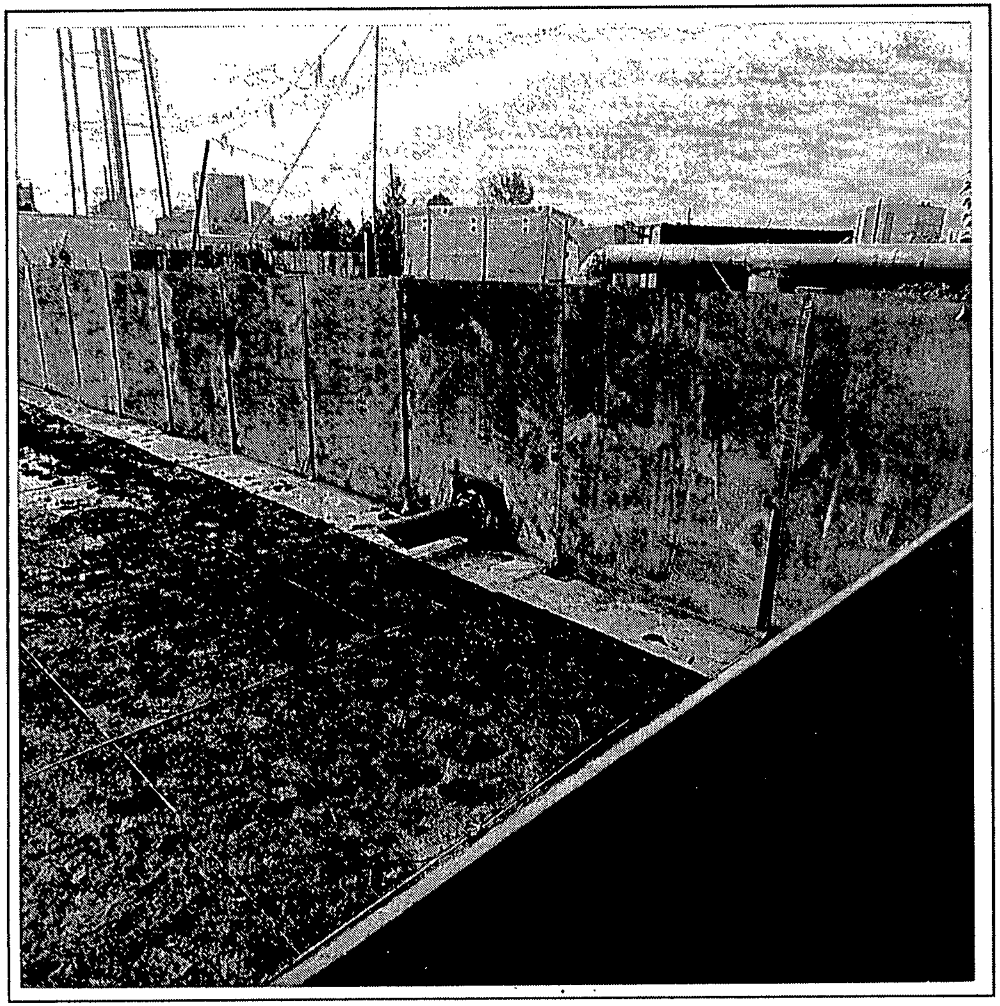

PHOTO 5 Neg. #6339-16

Photo of the inside of the Low Nitrate Tank after removal of the two bottom liners. Note the inlet pipe and the 4x4-foot grid of tension wires.

PHOTO 6 Neg. #6508-48

Photo of the High Nitrate Tank area during dismantlement activities, following a rain. Various components of the tank (tank walls, support braces, and liners) have been manually piled up for the forklift to load into the appropriate containers.

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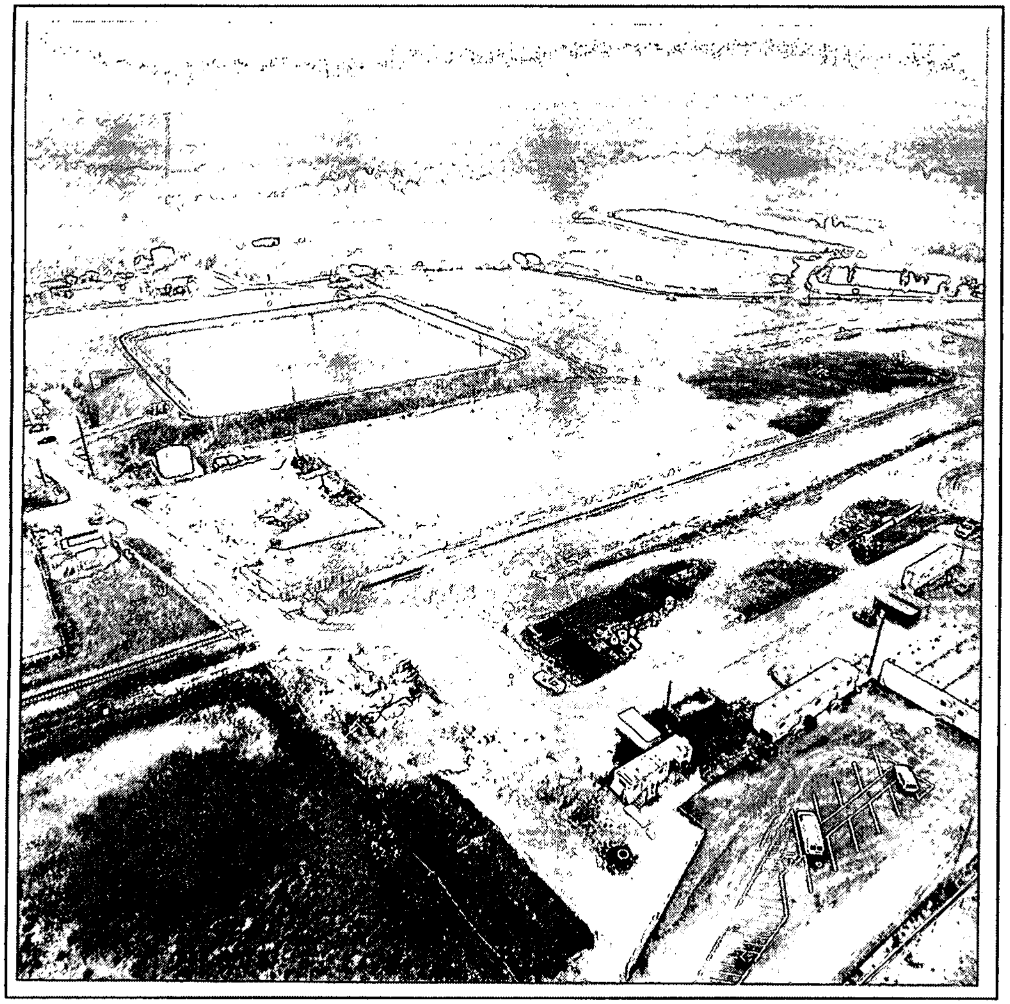

PHOTO 7 Neg. #6349-235

Photo of the area where the Low Nitrate Tank had been located. The area has been prepared and graded for the construction of the OU1 Waste Treatment Facility. This photo was taken from the West Water Tower facing northwest.

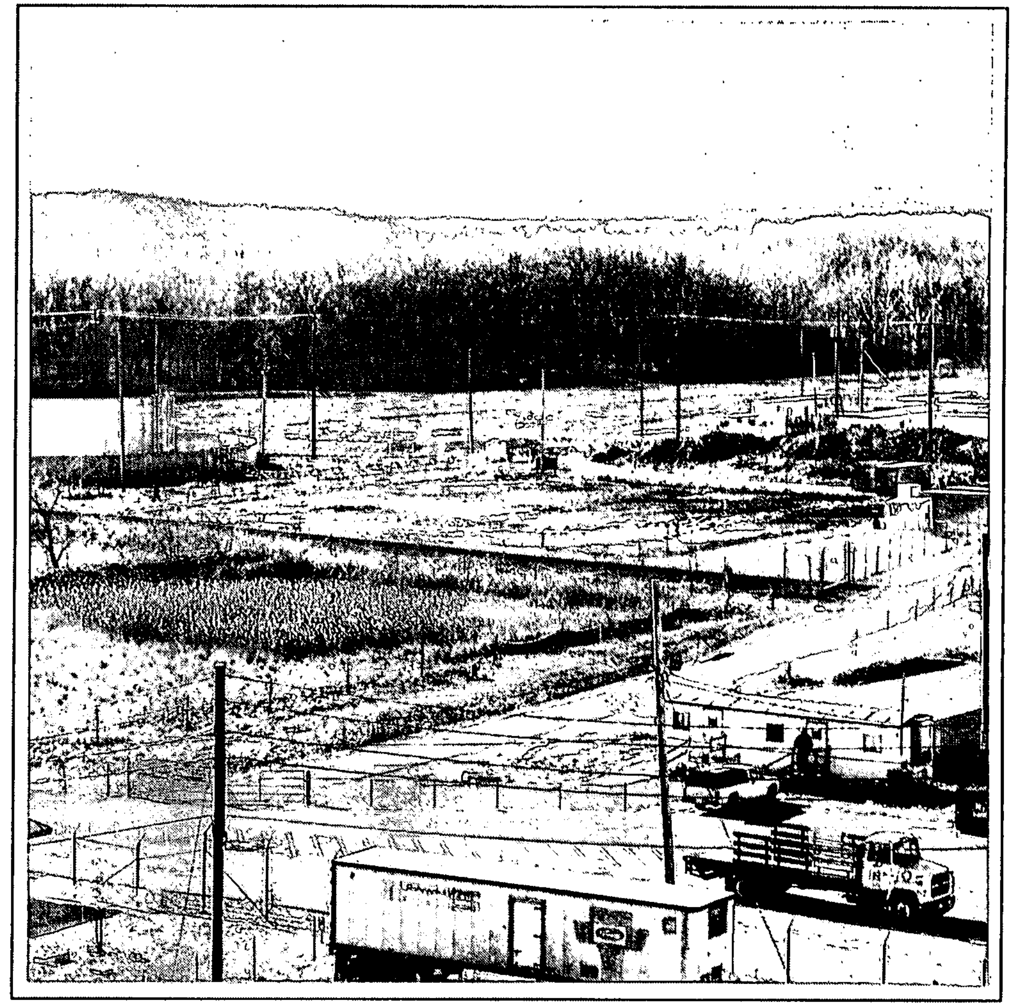

PHOTO 8 Neg. #6080-519

Photo of the High Nitrate Tank area after dismantlement activities have been completed. Note that the Sea/Land containers on the far right have since been moved to the Plant 1 Pad for interim storage. This photo was taken from the top floor of Plant 1 facing southwest.

APPENDIX B

SWIFTS REPORTS

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APPENDIX B - SWIFTS REPORTS

Attached are two typical Sitewide Waste Information, Forecasting, and Tracking System (SWIFTS) reports for materials generated during the dismantlement of the nitrate tanks. The first report contains information on the seven containers of nitrate tank material that are awaiting disposition in the OSDF; the second report contains information on the four containers awaiting shipment to NTS for disposal. Below is a key to aid in interpreting the information contained in these reports.

Report 1 - Materials Destined for OSDF

The first column specifies the project number of 406, which corresponds to the dismantlement of the High and Low Nitrate Tanks. The second and third columns list the current location of the containers; the location code 0001 corresponds to the Plant 1 Pad and areas L and N are container storage areas on the Plant 1 Pad. The fourth column lists the OU3 RI/FS material category that best corresponds to the contents of the container. In the case that a container contains a mixture of several material types, it is coded as Category I (Miscellaneous). The fifth and sixth columns give container-specific inventory and serial numbers that have been printed on the containers. The seventh column lists the container type; codes of 200 and 202 represent end-loading and top-loading Sea/Land containers, respectively. The last column lists the net weight, in pounds, of the containers. If SWIFTS shows the net weight of a container as "0," then that container has not yet been weighed.

Report 2 - Materials Destined for NTS

This SWIFTS report contains similar information for material awaiting shipment to NTS, but also includes material and status fields. The material field corresponds to NTS material codes; a material code of 003 represents non-recoverable trash, including paper, plastic, glass, metal, etc. The status field lists all four nitrate tank containers as "active," which means the containers are in on-site interim storage awaiting shipment. Once these containers have been transported to NTS, the SWIFTS database will be updated to show a status of "shipped." Also, a container code of 340, as listed in the fifth column, refers to a small white metal box (SWMB).

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SiteWide Waste Information, Forecasting, and Tracking System
OSDF Debris Containers in Interim Storage
Awaiting OSDF Disposition from Nitrate Tank D&D

Proj	Location	Area	Category	Inv No	Serial No	Con	Net Weight
406	0001	L	A	W160586	500354	200	21,390
				W153791	500243	200	0
			I	W156010	500288	200	6,170
				W160582	500360	200	12,340
				W158047	500292	200	10,920
				W156008	500298	200	8,160
		N	I	W126839	361526	202	29,040

Total Containers Stored at Location: 7

Total Containers Interim Stored for OSDF from Nitrate Tank: 7

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SiteWide Waste Information, Forecasting, and Tracking System
Container Inventory Awaiting Disposal at NTS from Nitrate Tanks D&D by Location

Proj #	Loc	Area	Mat	Con	Inv_No	Serial_N	Net Weight	Status
406	0001	OUTSIDE OF N AREA	003	340	W153205	420906	390	ACTIVE
			003	340	W160627	482039	2,612	ACTIVE
			003	340	W160624	482050	2,054	ACTIVE
			003	340	W153204	420897	560	ACTIVE

Total Containers Stored at Location: 4

Total Containers from Nitrate Tank D&D for NTS disposal: 4