PB97-964015
EPA/541/R-97/066
June 1998

EPA Superfund Record of Decision:

Oak Ridge Reservation (USDOE) (Sludge Removal from the Gunite & Associated Tanks Operable Unit, Waste Area Grouping 1) Oak Ridge, TN 9/2/1997

DOE/OR/02-1591&D2

Record of Decision for Interim Action: Sludge Removal from the Gunite and Associated Tanks Operable Unit, Waste Area Grouping 1, Oak Ridge National Laboratory, Oak Ridge, Tennessee

DOE/OR/02-1591&D2

Record of Decision for Interim Action: Sludge Removal from the Gunite and Associated Tanks Operable Unit, Waste Area Grouping 1, Oak Ridge National Laboratory, Oak Ridge, Tennessee

Date Issued—August 1997

Prepared by
Jacobs EM Team
125 Broadway Avenue
Oak Ridge, Tennessee
under contract DE-AC05-93OR22028

Prepared for
U.S. Department of Energy
Office of Environmental Management

PREFACE

This *Record of Decision for Interim Action: Sludge Removal from the Gunite and Associated Tanks Operable Unit, Waste Area Grouping 1, Oak Ridge National Laboratory, Oak Ridge, Tennessee* (DOE/OR/02-1591&D2) was prepared in accordance with requirements under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and documents selection of the interim action. This work was performed under Work Breakdown Structure 1.4.12.6.1.01.41.19.18 (Activity Data Sheet 3300, "ORNL WAG 1 Treatability Studies"). This document identifies sludge removal as the selected interim action for the Gunite and Associated Tanks Operable Unit. This document summarizes information from the feasibility study/proposed plan (DOE/OR/02-1509/V1&D2, and V2&D2).

ACRONYMS AND ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BVEST	Bethel Valley Evaporator Service Tanks
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	*Code of Federal Regulations*
Ci	curie
Cs	cesium
CY	calendar year
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
FFA	Federal Facility Agreement
FS	feasibility study
ft	foot
FY	fiscal year
GAAT	Gunite and Associated Tanks
gal	gallon
kg	kilogram
km	kilometer
L	liter
lb	pound
LLW	low-level (radioactive) waste
LSS	laboratory shift superintendent
m	meter
MVST	Melton Valley Storage Tanks
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NTF	North Tank Farm
NTS	Nevada Test Site
OHF	Old Hydrofracture Facility
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OU	operable unit
PP	proposed plan
Pu	plutonium
RME	reasonable maximum exposure
ROD	record of decision
Sr	strontium
STF	South Tank Farm
STP	site treatment plan
TDEC	Tennessee Department of Environment and Conservation
Th	thorium
TRU	transuranic
U	uranium

ACRONYMS AND ABBREVIATIONS (continued)

WAG	waste area grouping
WIPP	Waste Isolation Pilot Plant

PART 1. DECLARATION

STUDY AREA/OPERABLE UNIT NAME AND LOCATION

U.S. Department of Energy
Oak Ridge Reservation
Waste Area Grouping 1
Gunite and Associated Tanks Operable Unit at the Oak Ridge National Laboratory
Oak Ridge, Tennessee

STATEMENT OF BASIS AND PURPOSE

This record of decision (ROD) presents the selected interim remedial action for removing mixed transuranic (TRU) waste sludge from eight tanks in the Gunite and Associated Tanks (GAAT) Operable Unit (OU). The tanks are located in Oak Ridge National Laboratory (ORNL) Waste Area Grouping (WAG) 1. The U.S. Department of Energy (DOE) has assigned a high priority to the remediation of this OU because of its high contaminant inventory and the age of the tanks. The objective of this interim action is to reduce the potential for on- and off-site risk from the tank contents.

The interim action was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 *United States Code*, Sect. 9601 et seq.) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) [40 *Code of Federal Regulations* (CFR) 300]. The ROD is based on the Administrative Record for this site.

DOE issues this document as the lead agency for environmental restoration (ER) activities on ORR. The U.S. Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC) are supportive agencies as parties to the Federal Facility Agreement (FFA) for this response action. They concur with the selected remedy.

ASSESSMENT OF THE STUDY AREA/OU

A baseline risk assessment was conducted to determine whether remedial actions are necessary to protect human health and the environment if current institutional controls are removed. The scenarios considered include (1) dome failure resulting in direct exposure to workers and on-site residents and (2) failure of the tank shell resulting in contamination of

groundwater with the associated pathway to a resident of nearby White Oak Creek. The risk assessment clearly demonstrates that without institutional controls the GAAT tanks pose an unacceptable risk to human health and the environment now and in the future. Thus, a remedial action is required to address the GAAT OU. The objective of this interim action is to reduce the potential for on- and off-site risk from the tank contents.

Actual or threatened releases of hazardous substances from this OU, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, and the environment.

DESCRIPTION OF SELECTED REMEDY

The selected interim remedial action includes removal of the sludge and subsequent transfer to the Melton Valley Storage Tanks (MVST). The plans for removing GAAT sludge will be included in the remedial design and remedial action documentation. However, the basic equipment and methodology are being demonstrated in an ongoing treatability study and have been successfully demonstrated in a test facility. The most likely approach uses a remotely controlled arm and vehicle combination to complete the sludge removal. High-pressure water jet equipment attached to the arm or vehicle will remove sludge from the walls and floors and pump it out of the tank. Where disposal options are available, equipment and debris will be removed from the tanks, packaged, and disposed. Any remaining debris will be rinsed, sampled, placed into retrievable containers, and positioned in the tanks for later retrieval and disposition. The slurried waste from the tanks will be pumped to a consolidation tank and conditioned as necessary (i.e., adjustment of water content or particle size) to facilitate pumping this material through existing transfer lines to MVST. All MVST wastes will be prepared for eventual disposal in another action.

The selected remedy was developed considering the TRU waste strategy [i.e., consolidate, treat, and ship waste to the Waste Isolation Pilot Plant (WIPP) or the Nevada Test Site (NTS)] and the strategy to evaluate residual contamination in the OU after waste removal as part of the Bethel Valley Watershed remediation. After removal of sludge, samples of the tank shell will be collected to provide contaminant levels for consideration during future closure evaluations, as part of the Bethel Valley Watershed remediation.

STATUTORY DETERMINATIONS

This interim action protects human health and the environment, complies with federal and state applicable or relevant and appropriate requirements (ARARs) directly associated with this action, and is cost-effective. This action uses permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, given the limited scope of the action. This action does not constitute the final remedy for the OU; therefore, the statutory preference for remedies that employ treatment for reduction of toxicity, mobility, or volume as a principal element will not be satisfied by this interim action. Treatment of the MVST waste, including the GAAT sludge, will be performed as part of another action. This interim action addresses the principal threat posed by this OU and ensures that the liquid and sludge will not increase future groundwater contamination. Removal of the wastes will permit the remaining structures (i.e., tanks, piping, and associated equipment) to be included in a later sitewide action. Because this is an interim action ROD, review of this site and of this remedy will continue as DOE develops final remedial alternatives for this OU and the overall site.

APPROVALS

Rodney R. Nelson, Assistant Manager
U.S. Department of Energy
Oak Ridge Operations

8/26/97
Date

Earl C. Leming, Director
U.S. Department of Energy Oversight Division
Tennessee Department of Environment and Conservation

8/27/97
Date

Richard D. Green, Acting Director
Waste Management Division
U.S. Environmental Protection Agency, Region 4

9/2/97
Date

PART 2. DECISION SUMMARY

DECISION OVERVIEW

This ROD describes the interim remedial action decision for the GAAT OU. The GAAT OU comprises 16 tanks located in or near the North and South Tank Farms at ORNL WAG 1, Oak Ridge Reservation (ORR), Oak Ridge, Tennessee. DOE assigned remediation of these tanks a high priority because of the high contaminant inventory and the age of the tanks. The GAAT OU includes the tanks, residual waste materials in the tanks, and the operating equipment associated with the tanks. A baseline risk assessment was conducted to determine whether current or future remedial actions are necessary to protect human health and the environment if existing institutional controls are removed. The risk assessment clearly demonstrates that without institutional controls the tanks pose an unacceptable risk to human health and the environment both now and in the future. Therefore, a remedial action is required to address the GAAT OU. The objective of this interim action is to reduce the potential for on- and off-site risk from the tank contents.

The interim action proposed in this ROD is removal of liquid and sludge wastes from eight tanks (W-3 through W-10) and transfer of the wastes to MVST. Seven other tanks (W-1, W-1a, W-2, W-11, W-13, W-14, and W-15) in the GAAT OU contain no recoverable sludge, have low contaminant levels, and do not pose a significant threat to human health or the environment either now or in the future. Tank TH-4 is also part of the GAAT OU and contains sludge; however, its contents are very different from the contents of the other sludge-containing tanks and do not pose a significant threat to human health and the environment. DOE is deferring action on the contents of these eight tanks (seven nonsludge-bearing tanks plus Tank TH-4) and any residual contamination left in Tanks W-3 through W-10 after waste removal. At that time, the need for any further remedial action will be evaluated as part of the Bethel Valley Watershed remediation decision process.

The Gunite tanks were originally constructed in the 1940s with a projected operational life of 1 year. Although monitoring data have not indicated that any tanks are leaking, remote visual inspections of the tanks have revealed some degradation on the interior surface of Tanks W-5 and W-6. The results of these inspections and the age of the tanks have raised concerns about their long-term integrity. Liquid and solid materials stored in the tanks include mixed wastes containing radionuclides, organics in trace amounts, and heavy metals. Solids in some of the tanks contain U, Pu, Th, and other long-lived (thousands of years) isotopes that meet the criteria for TRU waste. These wastes also contain high concentrations of ^{137}Cs and ^{90}Sr, which have relatively short half-lives (approximately 30 years), in addition to other radionuclides with half-

lives of a few days. The high radiation levels in the tanks will require "remote operation" to control exposures to workers performing the waste removal operations.

Approximately 1.32 million L (350,000 gal) of liquid and 189,000 L (50,000 gal) of sludge remain in the tanks. The estimated radionuclide inventory ranges from 40,000 Ci, based on the most recent analytical results, to over 100,000 Ci, based on previous estimates for the eight tanks addressed by this interim action.

DOE evaluations of cleanup options for the Gunite tanks indicate that the best current action is to remove the tank liquid and sludge wastes, which could be released easily by a tank failure, and transfer these wastes to a permitted storage facility. Treatment will occur as part of another action. The decision to remove these wastes from the Gunite tanks was made concurrently with the need to manage similar wastes located in other tanks at ORNL. DOE manages an inventory of more than 757,000 L (200,000 gal) of TRU waste at ORNL facilities, including GAAT, MVST, the Bethel Valley Evaporator Service Tanks (BVEST), and the Old Hydrofracture Facility (OHF). As part of a separate, nationwide effort, DOE is procuring services to treat and dispose of this inventory at WIPP and NTS (DOE 1996a). The activities at ORNL are also being conducted in compliance with the TDEC Commissioner's Order on the site treatment plan (STP). Treatment and shipment of ORNL wastes are scheduled to coincide with the window for receiving remote-handled TRU waste at WIPP, starting near the end of fiscal year (FY) 2002. This limited window places a high priority on completing waste accumulation and treatment activities at ORNL.

To support efficient treatment, DOE plans to accumulate all TRU tank waste, including the Gunite tank wastes, at MVST. This will allow the treatment contractor sufficient time to mobilize, build needed facilities, and begin treating and shipping the wastes to WIPP or NTS by the end of FY 2002. MVST is comprised of eight, approximately 50,000 gal underground storage tanks within a stainless-steel-lined concrete vault. These tanks meet FFA specified secondary containment standards and are part of the permitted National Pollutant Discharge Elimination System. These tanks are currently in use and contain TRU waste from previous process and restoration activities.

MVST's capacity to receive wastes is limited until an ongoing project that will add six new tanks to the MVST is completed in late calendar year (CY) 1998. DOE has developed a strategy that allows all three of the waste removal projects (GAAT, BVEST, and OHF) to proceed in parallel and meet the goal of accumulating the TRU tank waste at MVST by the end of FY 2000. This strategy calls for the transfer of BVEST and OHF waste to MVST from late CY 1997 to early CY 1999. During this period, DOE plans to use one or two of the existing

Gunite tanks to temporarily hold, or "consolidate," the wastes that will be produced by the GAAT interim action. This will allow several of the Gunite tanks to be cleaned while wastes from BVEST and OHF are being transferred to MVST. The wastes are scheduled to be removed from the consolidation tanks and transferred to MVST starting in early CY 1999. The consolidation tanks will be emptied by March 2001.

DOE has thoroughly investigated the integrity of the Gunite tanks and has selected Tank W-9 to be the primary consolidation tank. DOE selected W-8 to be the backup consolidation tank. Analysis of the structural integrity of these two tanks indicates they are sound, and analysis of internal liquid level data from the tanks indicates that W-8 and W-9 are liquid tight within the statistical uncertainties inherent in the analysis (ORNL 1997a). In addition to these analyses, the electrical conductivity of the groundwater is being monitored in the dry wells associated with each of the tanks. This method can easily detect releases from the Gunite tanks on the order of 0.5 gal/hour. The method has been thoroughly evaluated by conducting simulated (high conductivity) liquid release tests on the Gunite tanks in the North Tank Farm (NTF) and South Tank Farm (STF). Testing has been successfully completed in the NTF (ORNL 1997a), and testing of the method for Tank W-9 in the STF was recently completed (ORNL 1997b). Testing is in progress for Tank W-8 and other STF tanks. Results will be represented in subsequent reports. The dry well conductivity monitoring method is being used to provide rapid real time release detection for Tanks W-3 and W-4 in the NTF and will be used for real time release detection for the consolidation tanks in the STF.

The overall responsibility for responding to emergencies at ORNL rests with the laboratory shift superintendent (LSS). The office of the LSS is housed in the Laboratory Emergency Response Center which has the responsibility, personnel, and equipment to respond around-the-clock. The GAAT Spill/Leak Response Plan was developed in coordination and in conjunction with the LSS and describes actions to be taken in the event of a release from the tanks.

The GAAT Remediation Project has a trailer-mounted Moyno pump, hoses and fittings, absorbent, and storm drain covers at its disposal. Covers will be placed over selected storm drains and surrounded with absorbent, placed prior to transfers between tanks. Project and selected support personnel will perform drills with the Spill/Leak Response Plan in coordination with the LSS on an annual basis. Spills and leaks will be pumped into the active waste management system or into a sound Gunite tank as conditions warrant. The LSS will assist the GAAT Project in responding to any situations that require additional personnel and equipment.

DOE believes that any inefficiencies involved in double-handling the waste in the consolidation process are outweighed by several important benefits.

The consolidation process provides the capability to even out the flow from the waste removal equipment and accumulate large enough batches of waste for efficient transfer to MVST. Excess water generated during the waste removal process can be extracted and sent to BVEST for concentration, thereby minimizing the liquids generated during Gunite tank waste removal and managing utilization of the limited space available at MVST. Most importantly, the consolidation approach will facilitate the eventual transfer of the waste to MVST. Waste removed from the Gunite tanks must be "conditioned" (particle size and water content adjusted) before it can be transferred to MVST through the mile-long pipeline between Bethel Valley and Melton Valley. DOE plans to install a conditioning system in the consolidation tanks similar to that used in the 1982 waste removal campaign that successfully avoided plugging the only route for transfer of radioactive liquid waste from the main plant of ORNL to MVST (ORNL 1984).

A CERCLA treatability study was initiated to determine the effectiveness and cost of technologies that could remove liquid and sludge wastes from the GAAT. A phased program was developed to minimize risks to workers and the public during remediation. This program started with "cold tests" that were designed to ensure the proper operation of waste removal equipment. The cold tests, completed in May 1997, demonstrated that the equipment is able to remove surrogate waste from a simulated tank as well as clean waste from the interior surface of a simulated tank shell. "Hot tests" with the lower contaminant concentration wastes in Tanks W-3 and W-4 will be performed in the summer and fall of 1997; these tests are designed to confirm that the waste removal equipment operates safely and effectively for actual radioactive tank waste. This demonstration will increase confidence in the waste removal equipment's ability to safely remove the much more radioactive wastes from Tanks W-5 through W-10 and will help define how much waste can be removed from the tanks.

When waste removal operations in this interim action are complete, contamination remaining in the tanks will be limited to small quantities of sludge, contaminants in the tank shells, and contaminated debris (equipment, rocks, plastic, and Gunite pieces) collected during the cleaning operation. Some residual liquid and sludge is likely to remain in pockets and low points. A total of approximately 229 m (750 ft) of small diameter process piping with a combined volume of approximately 1.3 m^3 (45 ft^3) will remain embedded in the concrete or attached to walls of the tanks. The amount of contamination remaining in the tank shells after waste removal will be determined through a combination of in situ measurements and sample analysis. Solid debris collected to facilitate sludge removal will be packaged for subsequent characterization and disposal in accordance with available disposal options.

Approximately 16.8 m^3 (600 ft^3) of wiring, piping, and other debris have been removed from these tanks to provide access for waste removal equipment. Approximately 13,608 kg (30,000 lb) of surface equipment has been removed and recycled, and 33.6 m^3 (1,200 ft^3) of contaminated LLW material was removed and shipped to an off-site contractor for disposal. Disposal or remediation of any remaining equipment and debris collected during waste removal, as well as potentially contaminated soils and tank appurtenances external to the tank shells, will ultimately be evaluated as part of the Bethel Valley watershed remediation decision process. Approximately 16.8 m^3 (600 ft^3) of mixed wastes are currently held in a process pit in the STF and remain candidates for later waste consolidation. Moving this material as part of this interim action is impractical because no better defined or permitted facilities are available locally for this class of wastes.

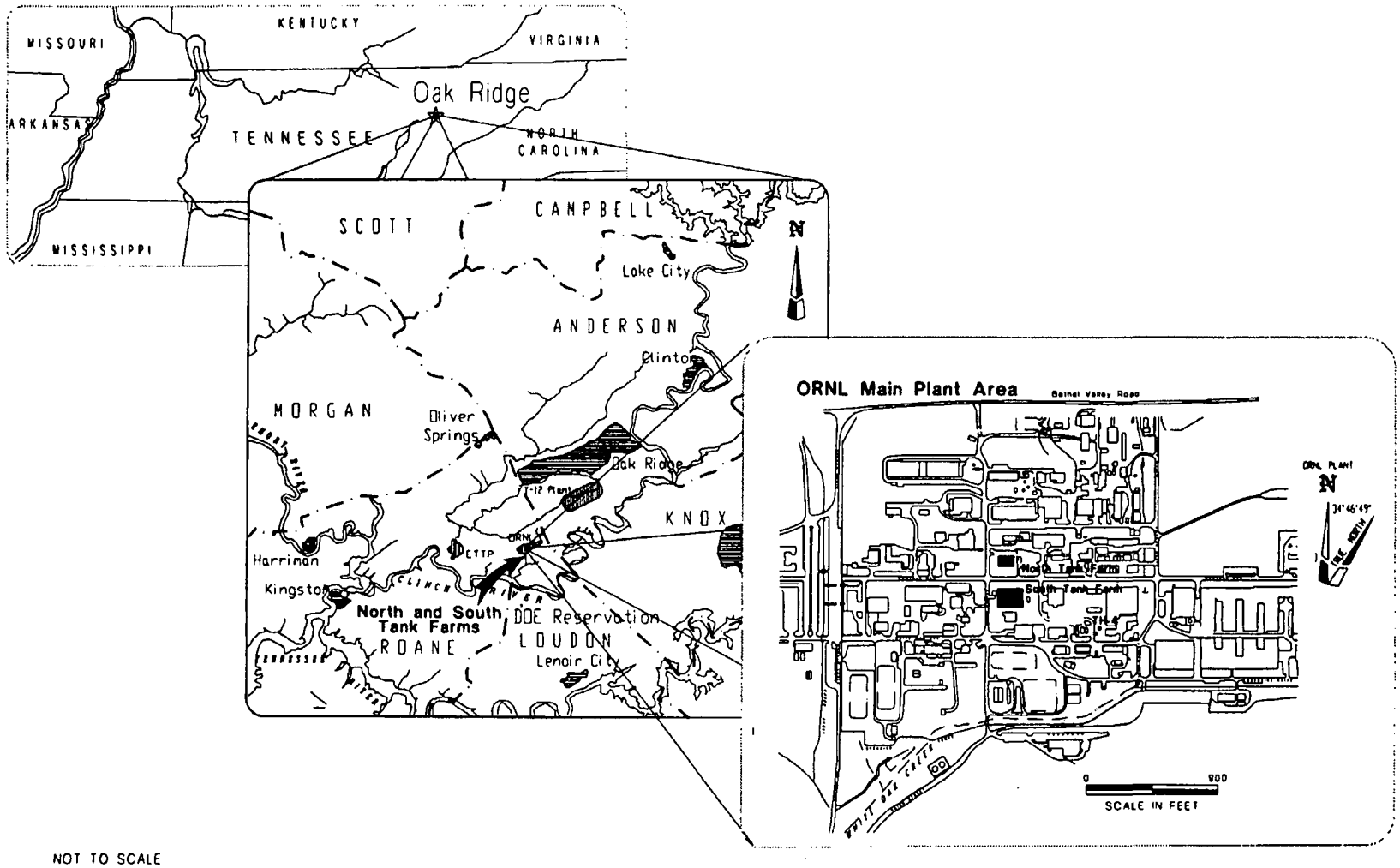
SITE NAME, LOCATION, AND DESCRIPTION

The GAAT OU is located within ORNL on the DOE ORR, approximately 24 km (15 miles) west of Knoxville, Tennessee, and 16 km (10 miles) southwest of the Oak Ridge, Tennessee, business center (Fig. 2.1). The ORNL main plant area is located in Roane County adjacent to Bethel Valley Road, approximately 2.5 km (1.5 miles) east of the intersection with State Highway 95.

In the 1940s, DOE placed in service 12 Gunite tanks as part of the liquid waste treatment system. Four smaller, steel tanks were constructed in the late 1940s and early 1950s. All 16 tanks are located underground in the main plant area. Eight of these tanks (W-3 through W-10) are located at the intersection of Central Avenue and Third Street in the North and South Tank Farms and are included in the scope of this interim action ROD.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

ORNL, one of three major plants on ORR, opened in 1943 as the Clinton Laboratories to support defense activities for the Manhattan Project. It evolved into a premier research facility with a diverse range of programs. On November 21, 1989, EPA placed ORR on the National Priorities List under CERCLA. On January 1, 1992, DOE, EPA, and TDEC entered into an FFA to provide a procedural framework and schedule for evaluating, prioritizing, and managing ER activities on ORR. The agreement also specifies that CERCLA procedures will be followed to evaluate and remediate contamination problems.



NOT TO SCALE

JE	**Fig. 2.1**	**Location of ORNL and the North and South Tank Farms** DOE - ORNL, WAG 1 Gunite and Associated Tanks - Oak Ridge, Tennessee	DOCUMENT ID 35H830 0058-85 / FS PP	DRAWING ID 96-12928 DWG	DRAWING DATE 16 June 97, WaM

The Gunite tanks were originally constructed in the 1940s with a projected operational life of 1 year. Mixed-TRU waste generated by operations of ORNL's processing and research facilities was stored in a network of underground tanks as part of the Manhattan Project. The tanks were removed from service beginning in the 1950s, with all tanks out of service by the 1970s. Most of the liquid and sludge waste was removed from the tanks between 1982 and 1984, and staged temporarily in the MVST. Waste was mixed with grout and injected into a deep shale formation.

A more detailed discussion of the remaining tank contents and characteristics is presented in the remedial investigation/baseline risk assessment for the GAAT OU (DOE 1994) and the addendum to that report (DOE 1996b). These and other documents are available as part of the Administrative Record. A treatability study associated with this action is currently underway. The feasibility study (FS)/proposed plan (PP) evaluated potential interim actions in accordance with the requirements of CERCLA and the NCP, presented DOE's determination that liquid and sludge removal is necessary in eight of the tanks, and solicited public comment on the determination (DOE 1997). Part 3 of this ROD documents public comments on the FS/PP and DOE's response to those comments.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The FS/PP for the GAAT OU was released to the public May 2, 1997. This document is part of the Administrative Record for the OU and is maintained at the DOE Information Resource Center, 105 Broadway Avenue, Oak Ridge, Tennessee. The notice of availability for this plan and other documents in the Administrative Record was published in *The Knoxville News-Sentinel* May 2, 1997, *The Oak Ridger* May 1, 1997, and *The Roane County News* May 2, 1997. A public meeting to discuss the FS/PP was held June 2, 1997. A public comment period scheduled for May 2, 1997, through June 2, 1997, was extended to June 13, 1997. Oral and written comments received from three members of the public are responded to in Part 3 of this ROD.

SCOPE AND ROLE OF OU AND THE REMEDIAL ACTION

Under CERCLA, an OU is a discrete area that is part of a larger area or response action. At ORNL, WAG 1 was divided into separate OUs. GAAT, an OU within WAG 1, comprises 16 tanks located in or near the North and South Tank Farms at ORNL. DOE assigned remediation of these tanks a high priority because of the high contaminant inventory and the age

of the tanks. The GAAT OU includes the tanks, residual waste materials in the tanks, and the operating equipment associated with the tanks. For purposes of this action, all the tanks and their contents are being considered as one area of contamination.

To support efficient treatment, DOE plans to accumulate all TRU tank waste, including the Gunite tank wastes, at MVST. This will allow the treatment contractor sufficient time to mobilize, build needed facilities, and begin treating and shipping the wastes to WIPP or NTS by the end of FY 2002. MVST's capacity to receive wastes is limited until an ongoing project that will add six new tanks to MVST is completed in late CY 1998. DOE has developed a strategy that allows all three of the waste removal projects (GAAT, BVEST, and OHF) to proceed in parallel and meet the goal of accumulating the TRU tank waste at MVST. This strategy calls for the transfer of BVEST and OHF waste to MVST from late CY 1997 to early CY 1999. During this period, DOE plans to use one or two of the existing Gunite tanks to temporarily hold, or "consolidate," the wastes that will be produced by the GAAT interim action. This will allow several of the Gunite tanks to be cleaned while wastes from BVEST and OHF are being transferred to MVST. The wastes are scheduled to be removed from the consolidation tanks and transferred to MVST starting in early CY 1999. The consolidation tanks will be emptied by March 2001.

The scope of this interim remedial action for the GAAT OU is limited to the contents of Tanks W-3 through W-10. Discussions of groundwater and surface water were included in this ROD only to identify potential sources of contamination and receptor pathways. Removal of the liquid and sludge waste substantially reduces any future risk of release or exposure. The remaining tank contamination (and the surrounding tank farm areas) will be evaluated as part of the Bethel Valley Watershed remediation decision process. Appropriate follow-on actions will be conducted at a later date if necessary. The selected interim remedy does not preclude any future remedial actions at the site that may be implemented.

SUMMARY OF SITE CHARACTERISTICS

Liquid and solid materials stored in the tanks include mixed wastes containing radionuclides, organics in trace amounts, and heavy metals. Solids in some of the tanks contain U, Pu, Th, and other long-lived (thousands of years) isotopes that meet the criteria for TRU waste. These wastes also contain high concentrations of ^{137}Cs and ^{90}Sr, which have relatively short half-lives (approximately 30 years), in addition to other radionuclides with half-lives of a few days. The high radiation levels in the tanks will require "remote operation" to control exposures to workers performing the waste removal operations.

Approximately 1.32 million L (350,000 gal) of liquid and 189,000 L (50,000 gal) of sludge remains in the tanks. The estimated radionuclide inventory ranges from 40,000 Ci, based on the most recent analytical results, to over 100,000 Ci, based on previous estimates for the eight tanks addressed by this interim action.

SUMMARY OF SITE RISKS

DOE enforces strict institutional controls at the GAAT OU to mitigate uncontrolled exposures because of contaminants in the tanks. Institutional controls, along with administrative controls, comply with regulatory limits for exposures to on-site workers and visitors, minimize chances for direct contact with the tank contents, and ensure that off-site receptors are protected if a tank leaks. An evaluation of tank level monitoring data indicates the tanks are not currently leaking. The North and South Tank Farms each include a groundwater collection system that lowers the ambient groundwater below the base of the tanks and directs the collected groundwater to a pump station for transfer to the Process Waste Treatment Plant, where low concentrations of radionuclides are reduced to a level that meets the requirements of DOE Order 5400.5, "Radiation Protection of the Public and the Environment."

A baseline risk assessment (DOE 1994 and 1996b) was conducted to determine and document the risk levels if institutional controls are removed. The evaluation was based on Tank W-10 because this tank contains the highest radionuclide volume and concentrations for those tanks that contain sludge. The pathways of concern are direct radiation exposure in the event of a dome collapse and ingestion of contaminated drinking water by future residents. The source release/groundwater transport model assumed that the tank shell immediately failed and contaminants of concern in the liquid and sludge (primarily ^{90}Sr and ^{137}Cs) were released or leached into groundwater. The contaminated groundwater was assumed to follow a nondispersive, direct path into White Oak Creek at a point approximately 370 m (1,200 ft) south of the NTF.

HUMAN HEALTH RISKS

The human health risks reported in the baseline risk assessment (DOE 1994) considered current and future scenarios for potential impacts of a tank dome collapse and failure of a tank shell. For the current use scenario, there is no evidence of contaminant release from the tanks to a pathway for an off-site receptor. The existing institutional controls adequately protect workers by limiting access to the site and monitoring exposure.

For the future use scenario, risks to an on-site resident, an employee, a nearby resident, and a child wading in White Oak Creek were considered. The EPA risk value of concern is 1×10^{-4} or greater, which was exceeded for all but the last of the following:

- For an on-site resident, the greatest potential risk comes from direct radiation that might be released if the tank dome collapsed. The total risk from all pathways is 6×10^{-1} for the reasonable maximum exposure (RME) and 9×10^{-2} for the mean exposure.

- The potential risk to an employee from direct exposure associated with tank dome collapse could reach 9×10^{-2} for the RME and 1×10^{-2} for the mean exposure.

- For a nearby resident, ingestion of contaminated drinking water from White Oak Creek poses the greatest risk. The total risk is 1×10^{-3} for the RME and 3×10^{-4} for the mean exposure.

- The calculated risk for a child wading in White Oak Creek (4×10^{-6} for the RME and 1×10^{-7} mean exposure) does not exceed the EPA target risk value of 1×10^{-4}.

ENVIRONMENTAL HEALTH RISKS

The GAAT OU is located in a highly developed industrial area with few ecological receptors. Although the risk assessment for the GAAT OU did not calculate ecological effects of this interim action, ecological issues will be addressed in a future sitewide study, as required under the FFA.

DESCRIPTION OF ALTERNATIVES

Although several alternatives were initially considered for a full range of remedial actions, an agreement among DOE, TDEC, and EPA for an interim action to remove only the tank contents eliminated from consideration all but one action alternative. Thus, the only alternatives considered in the FS/PP were:

- Alternative 1—No Action
- Alternative 2—Sludge Removal

ALTERNATIVE 1—NO ACTION

The NCP requires inclusion of a no action alternative for use as a baseline in comparing and considering other remedial alternatives. The no action alternative assumes that existing institutional controls—such as monitoring, removing water from the tanks, and restricting access to the tank farms—would be maintained 30 years. No action would be taken to remediate the tank shell.

Without removal of the liquid and sludge, eventual release of the waste following collapse of the tank dome or failure of the tank shell could endanger human health and the environment. As indicated in the "Summary of Site Risks" portion of this ROD, the risk of direct exposure could be as high as 6×10^{-1} for a future on-site resident and as high as 9×10^{-2} for a future employee. The risk to a nearby resident from the ingestion of contaminated drinking water from White Oak Creek could reach 1×10^{-3}, but calculations indicate that the risk for a child wading in the water would not exceed EPA's target value of 1×10^{-4}.

ALTERNATIVE 2—REMOVAL/TRANSFER OF TANK CONTENTS TO MVST

This alternative includes removal of the liquid and sludge and subsequent transfer to MVST. All MVST wastes will be prepared for eventual disposal in another action. Sludge from the GAAT OU would be included in that effort.

The selected interim alternative will include removal of the liquid and sludge and subsequent transfer to MVST. The approach for removing GAAT waste will be included in the remedial design and remedial action documentation. However, the basic equipment and methodology being evaluated in the treatability study have been successfully demonstrated in a test facility. The most likely approach uses a remotely controlled arm and robotic vehicle combination to complete the sludge removal. High-pressure water jet equipment attached to the arm or vehicle will remove waste from the walls and floors and pump it out of the tank. Debris, collected to facilitate sludge removal, will be rinsed, sampled, placed into retrievable containers, and positioned in the tanks for later retrieval and disposition. Waste will be pumped to a consolidation tank for conditioning (i.e., adjusting the water content, particle size) and transferred by existing pipelines to MVST.

DOE plans to transfer GAAT wastes to MVST as part of the ORNL TRU waste strategy. The treatability study will determine technical limits of the remediation technology and establish an initial goal for waste removal. DOE will attempt to dislodge and remove all sludge materials from the tanks and clean the walls and floor of each tank. The ability of the waste removal

system to accomplish this goal will not be completely known until the project is actually underway. The FFA parties will determine when the waste removal system's practical limit has been reached if the initial goal developed during the treatability study proves technically impractical or cost-inefficient. Results will be documented in a project completion report.

DOE will maintain responsibility for treatment and final disposition of the GAAT wastes after transfer to MVST, a permitted storage facility for mixed waste that contains wastes from other OUs within the ER Program as well as non-ER wastes. Mixed wastes on ORR are being managed under a modified STP as directed by the TDEC Commissioner's Order (October 2, 1995) and as provided for in Section 105 of the Federal Facilities Compliance Agreement (January 1992). The GAAT wastes, as part of the MVST wastes, will be treated in a permitted facility to meet all regulatory and DOE requirements as well as disposal facility waste acceptance criteria. Final disposition of the wastes will be at WIPP, NTS, or another appropriately permitted facility.

The GAAT OU is located in the ORNL historic district. DOE Oak Ridge Operations and the State Historic Preservation Office signed a memorandum of agreement for the GAAT OU, which the Advisory Council on Historic Preservation accepted January 31, 1995. This agreement ensures that the site's aesthetics will be maintained to the extent practicable for the duration of the action.

ARARs specific to Alternative 2 are listed in Table 2.1.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Of seven action alternatives originally conceived, only one met the specifics of the agreement among DOE, TDEC, and EPA to completely remove the sludge from the eight tanks. This alternative and the mandated no action alternative were evaluated using the nine EPA criteria (40 CFR 300.430). Table 2.2 summarizes this evaluation.

Alternative 2, removal and transfer of tank contents to MVST, removes and safely stores the contaminant source to prevent exposure before final treatment and disposal, thus providing both short- and long-term protection of human health and the environment.

Table 2.1. ARARs and TBC guidance for the preferred alternative for the GAAT Interim Remedial Action, WAG 1, ORNL, Oak Ridge, Tennessee

Resource/Action	Requirement	Prerequisite	Citation
	Location-specific		
Presence of federally owned, administered, or controlled historic properties	Action(s) that will affect such resources must be identified and alternatives to the action(s) examined and considered	Action which will impact such resources—**applicable**	National Historic Preservation Act Sections 106 and 110 (16 USC 470 et seq.); 36 CFR 800; EO 11593 (TBC only)
	When alteration or destruction of the resource is unavoidable, steps must be taken to minimize or mitigate the impacts and to preserve records and data of the resource		
	Steps must be taken to consider the historical, architectural, or archaeological significance of sites, structures, and objects and to consult with the SHPO		
	Action-specific		
Control of fugitive dust	Take reasonable precautions to prevent particulate matter from becoming airborne; no visible emissions are permitted beyond the property boundary lines for more than 5 minute/hour or 20 minute/day	Nonpoint source air emissions from construction/remediation activities—**applicable**	Rules of the TDEC 1200-3-8-.010
Control of radionuclide emissions	Exposures to members of the public from all radiation sources released into the atmosphere shall not exceed an EDE of 10 mrem (0.1 mSv)/year	Release of radionuclide emissions to the air from DOE facilities—**applicable**	40 CFR 61.92; Rules of the TDEC 1200-3-11-.08
	Radiological emission measurements required at all release points that have a potential to discharge radionuclides in quantities which could cause an EDE in excess of 1% of the standard (0.1 mrem/year)		40 CFR 61.93(b)(4)(i); Rules of the TDEC 1200-3-11-.08(4)(b)4.(i)

Table 2.1. (continued)

Resource/Action	Requirement	Prerequisite	Citation
	All radionuclides which could contribute greater than 10% of the standard (1 mrem/year) for a release point shall be measured		40 CFR 61.93(b)(4)(i); Rules of the TDEC 1200-3-11-.08(4)(b)4.(i)
	Exposures to members of the public from all radiation sources shall not cause an EDE to be > 100 mrem (1 mSv)/year	Release of radionuclides into the environment—**TBC**	DOE Order 5400.5(II.1a); 10 CFR 834.101 (proposed)
	DOE will carry out all DOE activities to ensure that radiation doses to individuals will be ALARA		DOE Order 5400.5(I.4); 10 CFR 834 (proposed)
Control of surface water runoff	Implement good site planning and best management practices to control stormwater discharges, including: • document best management practices in a stormwater control plan or equivalent document • use minimal clearing for grading • remove vegetation cover only within 20 days of construction • perform weekly erosion control inspections and maintenance • implement control measures to detain runoff • prevent discharges from causing erosion	Stormwater discharges associated with construction activities at industrial sites that result in a disturbance of 5 acres or greater of total land area—**relevant and appropriate**	Rules of the TDEC 1200-4-10-.05; 40 CFR 122

Table 2.1. (continued)

Resource/Action	Requirement	Prerequisite	Citation
Removal/transfer of tank contents to MVST system, characterization and disposal of treatment residuals and decontamination fluids	A person who generates solid waste must determine whether that waste is hazardous using various methods, including application of knowledge of the hazardous characteristics of the waste based on information regarding the materials or processes used	Generator of solid waste—**applicable**	Rules of the TDEC 1200-1-11-.03(1)(b); 40 CFR 262.11; 40 CFR 268.7
	All tank systems, conveyance systems, or other ancillary equipment (does not include containers) used to transport RCRA-hazardous wastewater for treatment are exempt from RCRA Subtitle C requirements if the wastewater is sent to an on-site wastewater treatment facility subject to regulation under Sections 402 or 307(b) of the CWA (i.e., NPDES-permitted)	Storage/transfer of any RCRA-hazardous wastewater including decontamination water—**applicable**	40 CFR 260.10; 40 CFR 264.1(g)(6); 40 CFR 270.1(c)(2)(v); Rules of the TDEC 1200-1-11-.06(1)(b)2.(v)
	Management of TRU waste shall be conducted in such a manner as to provide reasonable assurance that the combined annual dose equivalent to any member of the public in the general environment resulting from discharges of radioactive material and direct radiation from such management shall not exceed 25 mrem/year to the whole body and 75 mrem/year to any critical organ	Handling/management of TRU waste—**relevant and appropriate**[a,b]	40 CFR 191.03(b)
	Must meet waste acceptance criteria of receiving facility for storage/disposal of LLW/TRU waste at ORR	Storage/disposal of any LLW/TRU waste or wastewater generated—**TBC**	DOE Order 5820.2A

Table 2.1. (continued)

Resource/Action	Requirement	Prerequisite	Citation
Institutional controls for contaminated tanks left in place	Controls include, but are not limited to: periodic monitoring, as appropriate; appropriate shielding; physical barriers (i.e., fences, warning signs) to prevent access; inspection and repair of coverings; temporary dikes; drainage courses; appropriate radiological safety measures to ensure protection during activities at the site	Long-term management of residual radioactive material above guidelines left in inaccessible locations—**TBC**	DOE Order 5400.5 (IV.6c)

[a]10 CFR 834.109 (proposed rule) requires that management of radioactive waste not exceed an EDE of 25 mrem/year from all pathways. When promulgated, this rule will be legally applicable.

[b]DOE Order 5400.5, Chapter II.1(c)(1), requires that TRU waste management and storage activities at facilities other than disposal facilities not cause members of the public to receive in a year a dose equivalent > 25 mrem to the whole body or a committed dose equivalent > 75 mrem to any organ.

ALARA = as low as reasonably achievable
ARAR = applicable or relevant and appropriate requirement
CFR = *Code of Federal Regulations*
CWA = Clean Water Act of 1972
DOE = U.S. Department of Energy
EDE = effective dose equivalent
EO = Executive Order
FR = *Federal Register*
> = greater than
GAAT = Gunite and Associated Tanks
LLW = low-level (radioactive) waste
mrem = millirem
mSv = millisievert
MVST = Melton Valley Storage Tanks
NPDES = National Pollutant Discharge Elimination System
ORNL = Oak Ridge National Laboratory
ORR = Oak Ridge Reservation
% = percent
RCRA = Resource Conservation and Recovery Act of 1976
SHPO = State Historic Preservation Office
TBC = to be considered
TDEC = Tennessee Department of Environment and Conservation
TRU = transuranic
USC = *United States Code*
WAG = waste area grouping

Table 2.2. Summary of alternative evaluation, GAAT OU, WAG 1, ORNL, Oak Ridge, Tennessee

CERCLA criteria	No action alternative	Removal and storage
Protection of human health and the environment	Poor. Tanks will eventually fail and release contents	Good. Removal and safe storage of sludge will remove major risk of OU
Compliance with ARARs	Not applicable	Complies with all ARARs
Long-term effectiveness and permanence	Poor. Tanks will eventually fail and release contents	Good. Removes principal threat from this OU
Short-term effectiveness	Fair. Assuming tank failure is not imminent	Moderate. Some risk associated with removal and transport of radioactive sludges
Reduction of toxicity, mobility, or volume through treatment	Poor. Does not reduce toxicity, mobility, or volume through treatment	Poor. Does not reduce toxicity, mobility, or volume through treatment
Implementability	Good. Alternative is already in place	Good. Treatability study in progress will determine the most effective, cost efficient design for removal devices
Cost	Water removal with treatment, maintenance: $4.2 million	Total capital costs*: $35.1 million Total postremoval operation and maintenance costs (5 years): $1.7 million Total project present worth: $34.3 million
State acceptance	TDEC has expressed its desire that the waste be removed from the tanks	Regulators have reviewed and commented on documents during scheduled review periods. Deadline for public comments on this document extended from June 2, 1997, to June 13, 1997. Stakeholders also participated in the review of documents
Community acceptance	No public support, through written comments or at the public meeting June 2, 1997, was received regarding this alternative.	Public comments and DOE responses are summarized in Part 3 of this document. At the June 2 meeting, the public strongly supported removal of the waste from these tanks.

*Actual cost will vary depending on the results of the treatability study, subsequent waste transfer costs, and the actual engineering options selected. Regardless, DOE believes that this selected alternative will be a cost-effective remedy for removing GAAT sludge.

ARAR = applicable or relevant and appropriate requirement
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980
$ = dollar
DOE = U.S. Department of Energy
GAAT = Gunite and Associated Tanks
ORNL = Oak Ridge National Laboratory
OU = operable unit
WAG = waste area grouping

THE SELECTED REMEDY

This selected interim remedy complies with all ARARs. Based on consideration of the requirements of CERCLA, the detailed analysis of the alternatives using the nine criteria and public comments, DOE, EPA, and TDEC have determined that the preferred alternative, removal and transfer of tank contents to MVST, provides the most appropriate remedy for Tanks W-3 through W-10. As described in Alternative 2, the liquid and sludge will be removed, the tank walls and floors cleaned, and the resulting waste pumped to MVST. Any remaining debris will be sampled and containerized for future removal if necessary. The tank shells will be characterized to support the Bethel Valley Watershed remediation decision process.

DOE believes that this selected alternative will be a cost-effective remedy for removing the GAAT sludge. The unacceptable level of risk associated with tank failures will be reduced or eliminated when the sludge in the tanks is removed.

STATUTORY DETERMINATIONS

Section 121 of CERCLA requires that remedial actions must (1) protect human health and the environment, (2) comply with ARARs (or justify a waiver), (3) be cost effective, and (4) use permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. Additionally, CERCLA Section 121 establishes a preference for remedial actions including, as a principal element of the remedy, treatment that permanently and significantly reduces the volume, toxicity or mobility of hazardous substances, pollutants, and contaminants. However, for interim remedial actions, these requirements apply only within the limited scope of the action. For example, interim remedial actions are required to comply with only those ARARs specific to the interim action itself.

This interim action provides short- and long-term protection of human health and the environment through removal of a contaminant source and limitation of the potential spread of contamination. This action will comply with all ARARs. The action is cost-effective. DOE believes the selected interim action represents the maximum extent to which an interim action can be used and provides the best balance of trade-offs in terms of short-term effectiveness, implementability, and cost. The action does not use treatment and is not permanent within the scope of the action. The proposed action also reduces the potential contaminant release and is, therefore, appropriate for an interim purpose.

EXPLANATION OF SIGNIFICANT CHANGES

A review of all comments resulted in no significant changes to the remedy as originally identified in the FS/PP.

REFERENCES

DOE (U.S. Department of Energy). 1997. *Feasibility Study/Proposed Plan for Sludge Removal from the Gunite and Associated Tanks Operable Unit, Waste Area Grouping 1, Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/02-1509/V1&D2, and V2&D2. Oak Ridge, TN.

DOE. 1996a. *Waste Isolation Pilot Plant Disposal Phase Draft Supplemental Environmental Impact Statement*, DOE/EIS-0026-S-2. DOE Carlsbad Area Office, Carlsbad, NM.

DOE. 1996b. *Addendum to the Remedial Investigation/Baseline Risk Assessment for the Gunite and Associated Tanks Operable Unit at Waste Area Grouping 1 at the Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/02-1275&D2/A1. Oak Ridge, TN.

DOE. 1994. *Remedial Investigation/Baseline Risk Assessment for the Gunite and Associated Tanks Operable Unit at Waste Area Grouping 1, Oak Ridge, Tennessee*, DOE/OR/02-1275&D2. Oak Ridge, TN.

ORNL (Oak Ridge National Laboratory). 1997a. *Evaluation and Monitoring Plan for Consolidation Tanks: Gunite and Associated Tanks Operable Unit, Waste Area Grouping, Oak Ridge National Laboratory, Oak Ridge, Tennessee*, ORNL/ER-396. Oak Ridge, TN.

ORNL. 1997b. *Baseline Monitoring and Simulated Liquid Release Test Report for Tank W-9, Oak Ridge National Laboratory, Oak Ridge, Tennessee*, ORNL/ER-410. Vista Research, Inc., Oak Ridge, TN.

ORNL. 1984. *Sluicing Operations At Gunite Waste Storage Tanks*, ORNL/NFW-84/72. Oak Ridge, TN.

PART 3. RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY

The public comment period, originally scheduled for May 2, 1997, to June 2, 1997, was extended to June 13, 1997. DOE received written comments from three individuals or groups. A letter supporting the project from the Site Specific Advisory Board along with DOE's responses to these comments are included at the end of Section 3. During the public meeting June 2, 1997, DOE responded to questions from four individuals in the audience. For purposes of this Responsiveness Summary, all public comments have been combined into four discrete comments with DOE responses.

Comment 1. At the public meeting on June 2, 1997, several individuals indicated they felt the FS/PP lacked a clear description of the overall strategy and details of this particular action.

Response: In response to the request for a clearer description of the overall remediation strategy, an additional section entitled "Decision Overview" has been added to the ROD. Also, the descriptions of the approach to tank cleaning and overall waste treatment and disposal have been expanded in the ROD.

Comment 2. Several individuals questioned pumping the waste from each Gunite tank to a consolidation tank rather than directly to MVST.

Response: A consolidation tank is necessary to properly prepare the waste for batch transfer to MVST and allow concurrent cleanup of the GAAT OU with other ORNL sites containing TRU wastes. MVST volume considerations, aggravated by schedule constraints for the waste's final disposal at WIPP, require that consolidation and waste volume reduction be accomplished before transfer to MVST. Details of this approach have been added under the "Decision Overview" section.

The consolidation process provides the capability to even out the flow from the waste removal equipment and accumulate large enough batches of waste for efficient transfer to MVST. Excess water generated during the waste removal process can be removed and sent to BVEST for concentration, thereby maximizing the limited space available at MVST. Most importantly, the consolidation approach will facilitate the eventual transfer of the waste to MVST. Waste removed from the Gunite tanks must be "conditioned" (particle size and water content adjusted) before it can be transferred to MVST through the mile-long pipeline between Bethel Valley and Melton Valley. DOE plans to install a conditioning system in the consolidation tanks similar to

that used in the 1982 waste removal campaign which successfully avoided plugging the *only route* for transfer of radioactive liquid waste from the main plant of ORNL to MVST (ORNL 1984). DOE has thoroughly investigated the integrity of the Gunite tanks and has selected Tanks W-8 and W-9 as the best candidates for use as consolidation tanks. Additional tests of these tanks are underway to confirm their integrity and demonstrate the effectiveness of a new leak monitoring system that has been installed for the tanks.

Comment 3. Several individuals expressed interest in specific details concerning conditioning of the waste before transfer to MVST and the transfer of the wastes through an underground pipeline.

Response: Available information on waste conditioning and transfer was discussed at the public meeting on June 2, 1997. However, final details of this process will be developed during the ongoing treatability study. When these details are developed they will be made available to the public through the Information Resource Center.

Comment 4. One individual expressed concern that the total activity of the radioactive material remaining in the tanks might be higher than the estimate used in the risk assessment.

Response: The risk assessment narrative's figure of 40,000 Ci was based on the most recent sampling event at the time the estimate was prepared. Previously, estimates in excess of 100,000 Ci have been advanced by parties with substantial experience and knowledge of the tank's contents. However, because the waste inventory is being removed, differences in this range will not exclude the selection of this remedy.

AK RIDGE RESERVATION

Environmental Management

June 17, 1997

Mr. Rod Nelson
Assistant Manager for Environmental Management
DOE/ORO
P.O. Box 2001
Oak Ridge, TN 37831

Dear Mr. Nelson:

At our June 11, 1997 meeting, the Oak Ridge Reservation Environmental Management Site Specific Advisory Board (ORREMSSAB) reviewed and approved the enclosed recommendations for the Feasibility Study Proposed Plan (FS/PP) for Sludge Removal from the Gunite and Associated Tanks Operable Unit Waste Area Group 1, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

We look forward to receiving your written responses to our recommendations. Thank you for your continued support of the ORREMSSAB.

Sincerely,

Randy Gordon, Chair
ORREMSSAB

ER/RG/sb

Enclosure

cc: Mr. John Hankinson, USEPA Region IV
Mr. Earl Leming, TDEC/DOE/ORO

P.O. Box 2001 • Mail Stop EW-91 • Oak Ridge, TN 37831 • (423) 241-3665

Comments on the Feasibility Study/Proposed Plan (FS/PP) for Sludge Removal from the Gunite and Associated Tanks Operable Unit Waste Area Group 1, Oak Ridge National Laboratory Oak Ridge, Tennessee

The Oak Ridge Reservation Environmental Management Site Specific Advisory Board (ORREMSSAB) is in general accord with the second alternative described in the FS/PP to remove the bulk of the liquid and sludge from the gunite and associated tanks. The no action alternative would be entirely unsatisfactory and quite problematic. Piping the activity to the more modern Melton Valley Storage Tanks to mix with similar wastes seems the correct course.

The document describes the removal of sludges as an interim action and states that it is expected that the removed sludges will be sent to the Waste Isolation Pilot Plant (WIPP). Since the WIPP facility is not yet an operational facility, there should be discussion about the safety of storing the gunite tank waste in the Melton Valley Storage Tanks for an unknown interim period. Either in this document or elsewhere, there should be contingency plans in case postponement of the WIPP continues indefinitely or WIPP does not open at all.

The document also discusses that remedial action on the contents of TH-4 is being deferred until a later date. However, the program under which TH-4 will be addressed is not identified. Similarly, the remedial actions to address the tank shells, appurtenances, surrounding soils, and groundwater have not been identified, although it is our understanding that these actions will be addressed in the Bethel Valley Record of Decision. The public needs to be informed as to when and how deferred actions will be addressed.

We assume that the most efficient time to determine the post-transfer residual contamination of each tank is just after the sludge and liquids have been removed from that tank. The initial sampling plan outlined in the section describing alternatives (p. 11) will likely be too sparse unless video observations suggest that tank inner surfaces appear to be uniform and clean. The ORREMSSAB recommends that the Record of Decision explicitly outline a more comprehensive minimum sampling plan which will determine the nature of irregular features. This information will allow for dependable plans to be developed for the future tank closures.

Department of Energy

Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831—
August 6, 1997

Mr. Randall R. Gordon
3602 River Road
Ten Mile, Tennessee 37880

Dear Mr. Gordon:

RESPONSES TO SITE SPECIFIC ADVISORY BOARD COMMENTS ON GUNITE TANKS REMEDIATION FEASIBILITY STUDY/PROPOSED PLAN D2

Thank you for your comments on the subject document. Our response to your comments are enclosed. We appreciate your input on this important Comprehensive Environmental Response, Compensation, and Liability Act document to help ensure that the basis for our decisions is explained and understood. Many of the comments you raised will be addressed in the Record of Decision which is currently being prepared and in the Remedial Design Report/Remedial Action work plan which will be prepared later this Fiscal Year.

If you have any questions, please call Sandy Perkins at (423) 576-1590.

Sincerely,

Rodney R. Nelson
Assistant Manager for
Environmental Management

Enclosure

PRINTED ON RECYCLED PAPER

Responses to Site Specific Advisory Board Comments
On Gunite Tanks Remediation Feasibility Study/Proposed Plan D2

Comment 1. The document describes the removal of sludges as an interim action and states that it is expected that the removed sludges will be sent to the Waste Isolation Pilot Plant (WIPP). Since the WIPP facility is not yet an operational facility, there should be discussion about the safety of storing the Gunite tank waste in the Melton Valley Storage Tanks (MVST) for an unknown interim period. Either in this document or elsewhere, there should be contingency plans in case postponement of the WIPP continues indefinitely or WIPP does not open at all.

Response The consolidation of all Oak Ridge National Laboratory (ORNL) Transuranic sludges in the MVST for treatment and shipment to WIPP is a central component of the Site Treatment Plan submitted under the provisions of the Federal Facilities Compliance Agreement. The Plan calls for sludge transfers of 50,000 gallons from Gunite Tanks, 20,000 gallons from the Old Hydrofracture Facility, and 30,000 gallons from the Bethel Valley Evaporator Service Tanks to be consolidated with the 100,000 gallons of sludge currently located in the MVST. Specific contingency plans have not been developed for the possibility that WIPP may not open and that longer storage of the sludges in MVST might be required. The MVST are fully permitted, "state of the art," tanks which are expected to have continued service lives in excess of twenty five years. This would provide sufficient time for the development and implementation of an alternative approach to the long-term management of the sludges in the MVST should the need arise.

Comment 2. The document also discusses that remedial action on the contents of TH-4 is being deferred until a later date. However, the program under which TH-4 will be addressed is not identified. Similarly, the remedial actions to address the tank shells, appurtenances, surrounding soils, and groundwater have not been identified, although it is our understanding that these actions will be addressed in the Bethel Valley Record of Decision. The public needs to be informed as to when and how deferred actions will be addressed.

Response The Bethel Valley Watershed Record of Decision will include remedial action plans for TH-4, several other smaller Gunite tanks, the eight large tank shells, appurtenances, surrounding soils, and groundwater, in addition to the remainder of the Bethel Valley area. The current plans call for the D1 Remedial Investigation/Feasibility Study to be issued June, 1998, the D1 Proposed Plan to be issued November, 1998, and the D1 Record of Decision to be issued April, 1999.

Comment 3. We assume that the most efficient time to determine the post-transfer residual contamination of each tank is just after the sludge and liquids have been removed from the tank. The initial sampling plan outlined in the section describing alternatives (p. 11) will likely be too sparse unless video observations suggest that the tank inner surfaces appear to be uniform and clean. The Oak Ridge Reservation Environmental Management Sites Specific Advisory Board recommends that the Record of Decision explicitly outline a more comprehensive minimum sampling plan which will determine the nature of irregular features. This information will allow for dependable plans to be developed for the future tank closures.

Response The Department of Energy (DOE) plans to obtain the data to characterize the residual contamination in the tanks shells at the completion of the waste removal and wall cleaning activities. The details of the shell characterization are being developed as part of the on-going Treatability Study, and are planned to be reflected in the Remedial Design Report/Remedial Action Work Plan.

Based on information currently in hand, DOE expects that the sampling and analysis required for the tank shells will be generally as described in the Feasibility Study/Proposed Plan. Based on analyses performed in the "Risk Assessment Pathway/Transport Modeling for the Gunite and Associated Tanks (GAAT), ORNL" (DOE/OR/02-1454&D1, March 1996) there is no reasonable scenario that would result in the GAAT shells being a risk after sludge removal, a "washing" of the wall, and then filling the tank with grout/concrete. The controlling mechanism for any radionuclides to contact groundwater around the exterior of the tanks is by diffusion. The rate of diffusion for ^{90}Sr, coupled with the relatively short half-life of ^{90}Sr, is such that a remaining shell inventory after tank cleaning of billions of curies would be required for the ^{90}Sr levels at the exterior of the tank to approach any risk level for ^{90}Sr. The diffusion rates for other radionuclides are slower than for ^{90}Sr and these radionculides are not mobile in the environment. Even if the GAAT shell disintegrates in 300 years, these non-mobile radionuclides will be immediately captured by surrounding soil, 20 plus feet underground. The small ^{90}Sr inventory remaining after clean out would have decayed through ten half-lives during this 300 period. There is nothing in our experience or the literature to refute this logic. During the Treatability Study we will investigate the logic and provide data to confirm this conclusion.