

Y/ER-58 R.1

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**RESOURCE CONSERVATION  
AND RECOVERY ACT  
CLOSURE PLAN FOR THE  
Y-12 9409-5 TANK STORAGE  
FACILITY**

February 1995

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for  
Environmental Restoration Division  
Oak Ridge Y-12  
Oak Ridge, TN 37831-8247

Managed by  
Martin Marietta Energy Systems, Inc.  
for the  
U.S. Department of Energy

under contract DE-AC05-84OR21400

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# Y-12

## OAK RIDGE Y-12 PLANT

**MARTIN MARIETTA**

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## ACRONYMS

BMP	best management practices
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	U.S. Department of Energy
DWS	drinking water standard
EPA	U.S. Environmental Protection Agency
ESPQCP	Environmental Surveillance Procedures, Quality Control Program
MCLs	maximum contaminant levels
PCBs	polychlorinated biphenyls
PID	Photoionization Detector
ppm	parts per million
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
TCLP	toxicity characteristic leachate procedure
TDEC	Tennessee Department of Environment and Conservation
VOCs	volatile organic compounds

## 1. INTRODUCTION

This closure plan has been prepared for the 9409-5 Tank Storage Facility (S-017) at the Oak Ridge Y-12 Plant. This plan outlines the actions required to achieve the closure of the S-017 facility and is being submitted in accordance with TN Rule 1200-1-11-.05(7) and 40 *CFR* Sect. 265.110. The 9409-5 facility has been used to store mixtures of liquid wastes containing spent solvents, and radioactive materials, and may have contained polychlorinated biphenols (PCBs).

This closure plan outlines the steps that will be taken to meet the closure performance standards specified in TN Rule 1200-1-11-.05(7)(a) and 40 *CFR* Sect. 265.11.

### 1.1 FACILITY DESCRIPTION

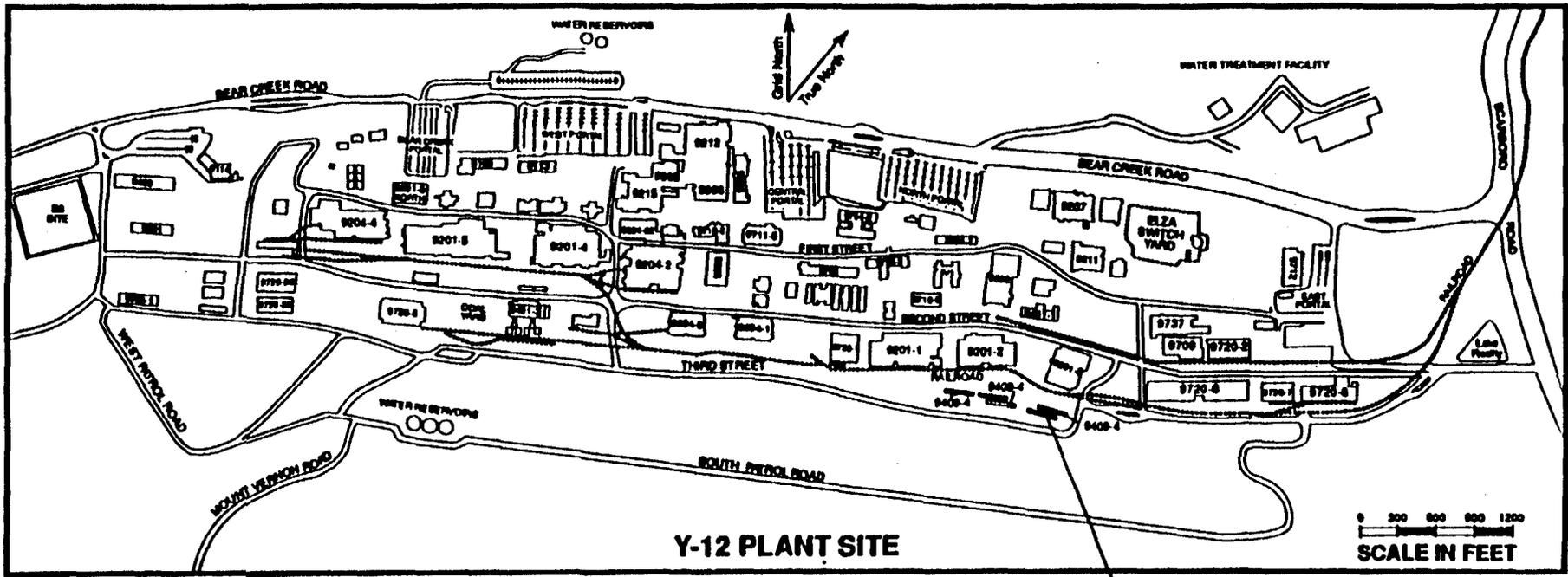
The 9409-5 Tank Storage Facility (S-017) consists of a Resource Conservation and Recovery Act (RCRA) concrete diked area located in the southeast portion of the Oak Ridge Y-12 Plant (Fig. 1).

The diked area was originally constructed for cooling towers that were installed in 1942. However, the cooling towers became obsolete and consequently were taken out of service and dismantled.

The diked area was modified and placed back in service in 1980. It was used as a two-compartment containment structure for above-ground storage tanks containing RCRA-regulated liquid coolant and waste oil/solvent mixtures (cells 1 and 2). A partially contained area was used as a temporary storage area for drums and 600-gal portable tanks (cell 3). In addition, just north of the cooling tower basin structure is a sump that receives stormwater overflow from the containment dike (cell 4). Four 5700-gal tanks were located in cell 1 to store liquid coolant. In 1982 two 30,000-gal tanks were installed in cell 2 for the storage of waste oil, possibly contaminated with PCBs, and solvent mixtures. In 1985 two 10,000-gal tanks were installed in cell 2. One of these storage tanks was for waste oil spent solvent mixtures which differed from the waste in the larger tanks. The other tank was dedicated to long-term storage of waste oil solvent mixtures containing greater than 32 pCi/g of uranium and greater than 5.0 ppm beryllium.

All of the facility structures have been designated as a regulated RCRA unit(s) and will be closed as such. However, the only areas in which hazardous waste was stored are cells 1 and 2. All of the tanks and associated piping have been decontaminated and removed from the area.

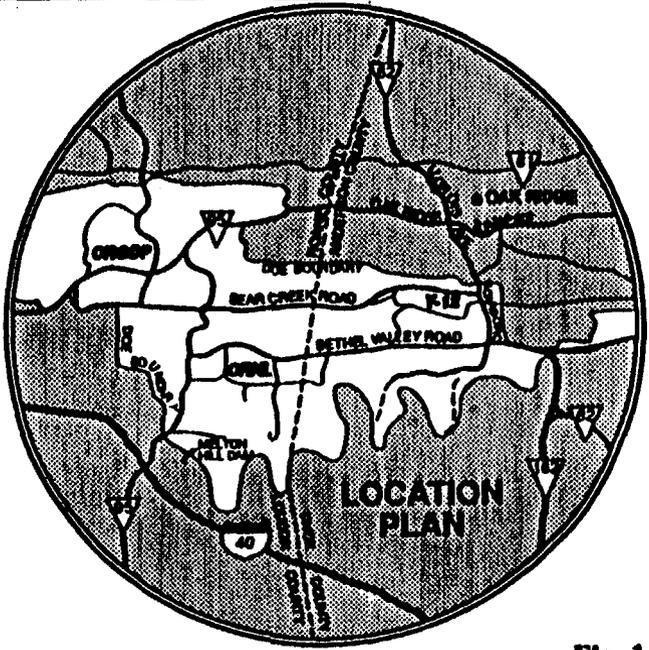
The hazardous constituents stored in the tanks included, chlorinated and nonchlorinated solvents, beryllium, and waste oil solvent mixtures containing perchloroethylene, methylene chloride, 1,1,1-trichloroethane, and trichlorotrifluoroethane, and may have included PCBs. In



**Y-12 PLANT SITE**

0 200 400 600 800 1000 1200  
**SCALE IN FEET**

**9409-5 STORAGE FACILITY (S-017)**



**Fig. 1. 9409-5 Tank Storage Facility (S-017) at the Y-12 Plant.**

addition, chromium has been identified as a possible contaminant from previous cooling tower operations.

Preliminary sampling of the soils on the north and east sides of cell 1 and 2 and the north side of cell 4 adjacent to the containment structures has been performed. The investigation involved drilling in 10 locations to a depth of 5.5 ft with a little beaver auger and obtaining samples at this depth (Fig. 2). Analysis results are presented in Table 1. More specific preliminary sampling information can be found in *Preliminary Soil Sampling and Analysis for the 9409-5 Storage Facility (S-017)* (Stone 1989).

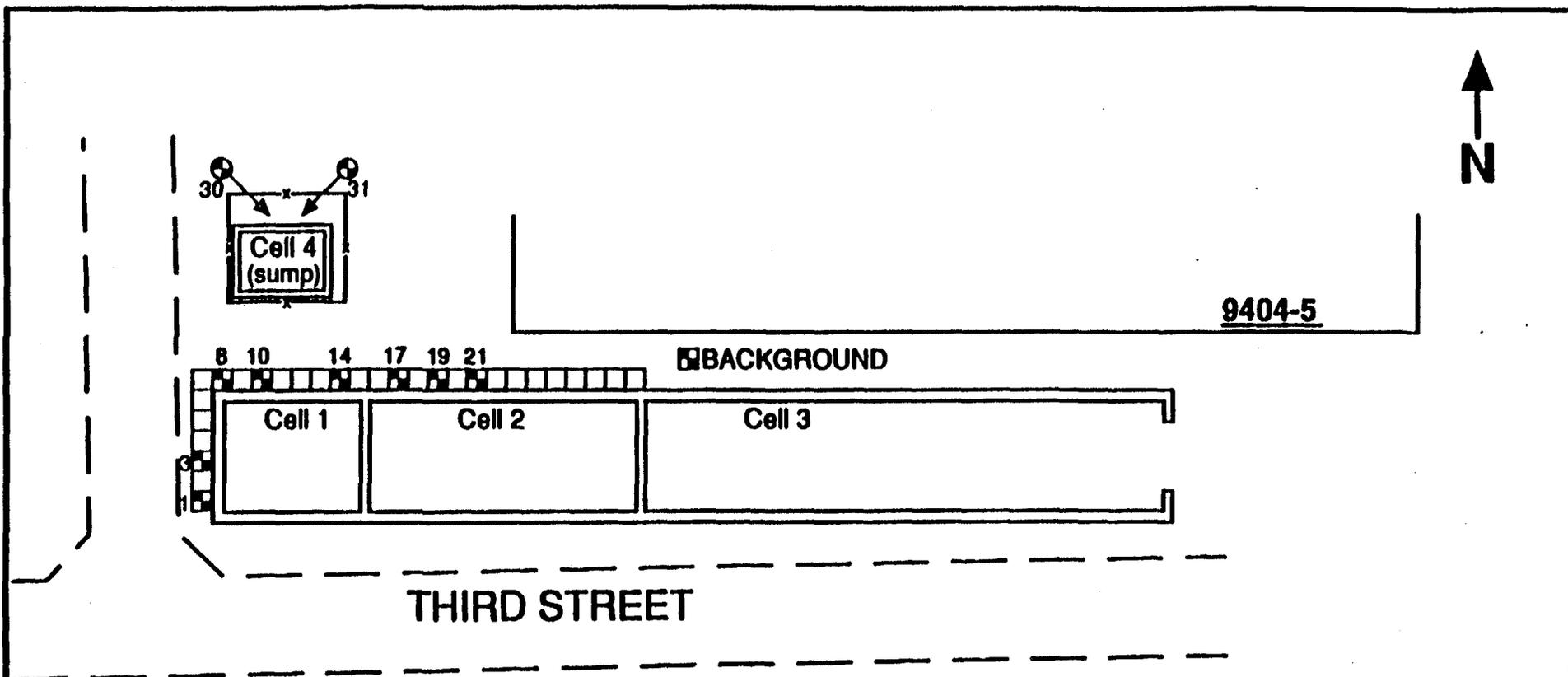
## 1.2 CLOSURE HISTORY

The 9409-5 facility was taken completely out of service in 1991. All tanks have been steam cleaned and removed. The concrete secondary containment structure was also decontaminated by steam cleaning when the last tanks were removed. The decontamination activities conducted at the time of decommissioning addressed all portions of the tank system. The remaining closure requirements consist of the sampling of soils below and surrounding the 9409-5 facility for purposes of determining whether contaminant release occurred. These activities are discussed further in Sect. 5.

## 2. CLOSURE PERFORMANCE STANDARD

The closure performance standard for the 9409-5 Tank Storage Facility may require the removal of any accumulated rainwater in the containment structures. All eight tanks have been previously steam cleaned and removed from the storage area. In addition, the concrete containment area was steam cleaned. These activities resulted in the removal of hazardous waste and hazardous waste residues from the facility.

The postclosure plan in Sect. 7 will be implemented if sampling around the storage facility measures contaminant concentrations above the levels specified in Table 2. Closure performance standards for soils are listed in Table 2. These levels are intended to protect human health and the environment. If analysis of soil samples show that these criteria are met the facility will be deemed closed.



**NOTES:**

1. 17 - RANDOMLY SELECTED 5'X5' SAMPLING GRIDS.  
30 - AUTHORITY SAMPLING LOCATION
2. AT EACH SAMPLING LOCATION COLLECT SOIL SAMPLES AT A DEPTH 6' BELOW TOP OF BASIN WALLS. COLLECT ADD'L SAMPLES AT VISIBLY CONTAMINATED DEPTHS.
3. ANALYZE SAMPLES FOR PCBs, TOTAL U, % U 235, VOLATILE ORGANICS (PERK).

**Table 1. Summary of preliminary soil analytical results for the 9409-5 Tank Storage Facility**

Sampling parameter	Maximum value (sampling location)	Minimum value (sampling location)
Uranium activity (pCi/g)	0.28 (10)	0.12 (14)
Total PCBs (ug/g)	ND (all)	
Methylene chloride (ug/kg)	144 (19)	14 (3)
Tetrachloroethane (ug/kg)	13 (14)	ND (8, 31)
Acetone (ug/kg)	244 (3) *	ND (30, 31)

\* estimated value

Table 2. Parameters, procedures, and established cleanup levels\*

Parameter	Method	Cleanup Level
Metals: Chromium VI	TCLP	5 mg/kg
VOC: Methylene chloride <sup>b</sup>	SW 8240	5000 mg/kg
Tetrachloroethane <sup>b</sup>	SW 8240	35 mg/kg
Acetone <sup>b</sup>	SW 8240	8000 mg/kg
Methyl ethyl ketone <sup>b</sup>	SW 8240	4000 mg/kg
Perchloroethylene <sup>b</sup>	SW 8240	800 mg/kg
1,1,1-Trichloroethane <sup>b</sup>	SW 8240	7000 mg/kg
Trichlorotrifluoroethane <sup>c</sup>	SW 8240	20,000 mg/kg
PCBs	SW 8080 <sup>a</sup>	25 mg/kg

\*Table 2 has been compiled from previously established and approved information from the most recent regulatory standards and guidance.

Acronyms: DWS - drinking water standard

TCLP - toxicity characteristic leachate procedure

VOC - volatile organic compound

Source: <sup>a</sup>EPA 1989

<sup>b</sup>EPA 1990

### 3. PARTIAL CLOSURE

No partial closure is planned. Final closure of the S-017 facility will be performed as described in this document.

### 4. MAXIMUM WASTE INVENTORY

The total volume of the tanks used to store hazardous waste in the 9409-5 Tank Storage Facility was 102,800 gal. No wastes are currently stored at this unit.

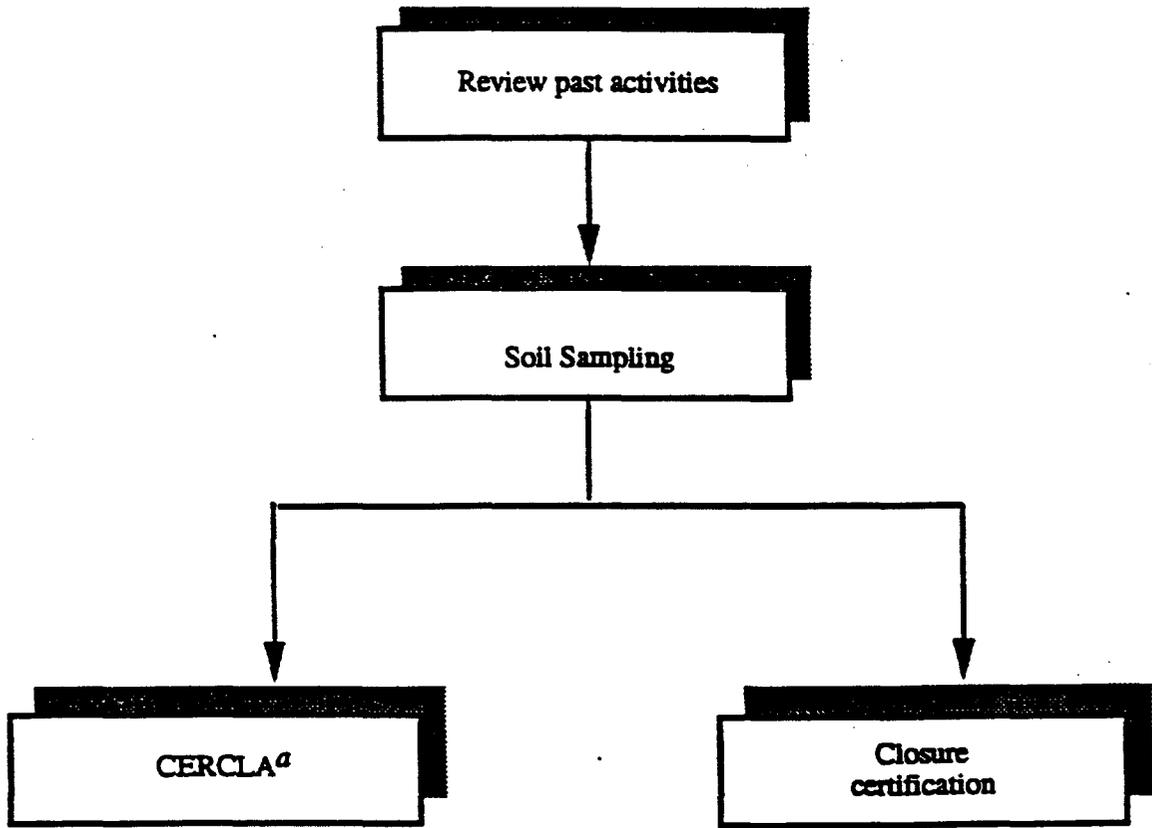
### 5. CLOSURE ACTIVITIES

All waste stored in the Tank Storage Facility has been removed. The tanks and piping have been decontaminated and removed. Closure activities for the 9409-5 Tank Storage Facility will be conducted in the following phases and steps (see Fig. 3).

#### 5.1 PHASE 1 - MOBILIZATION

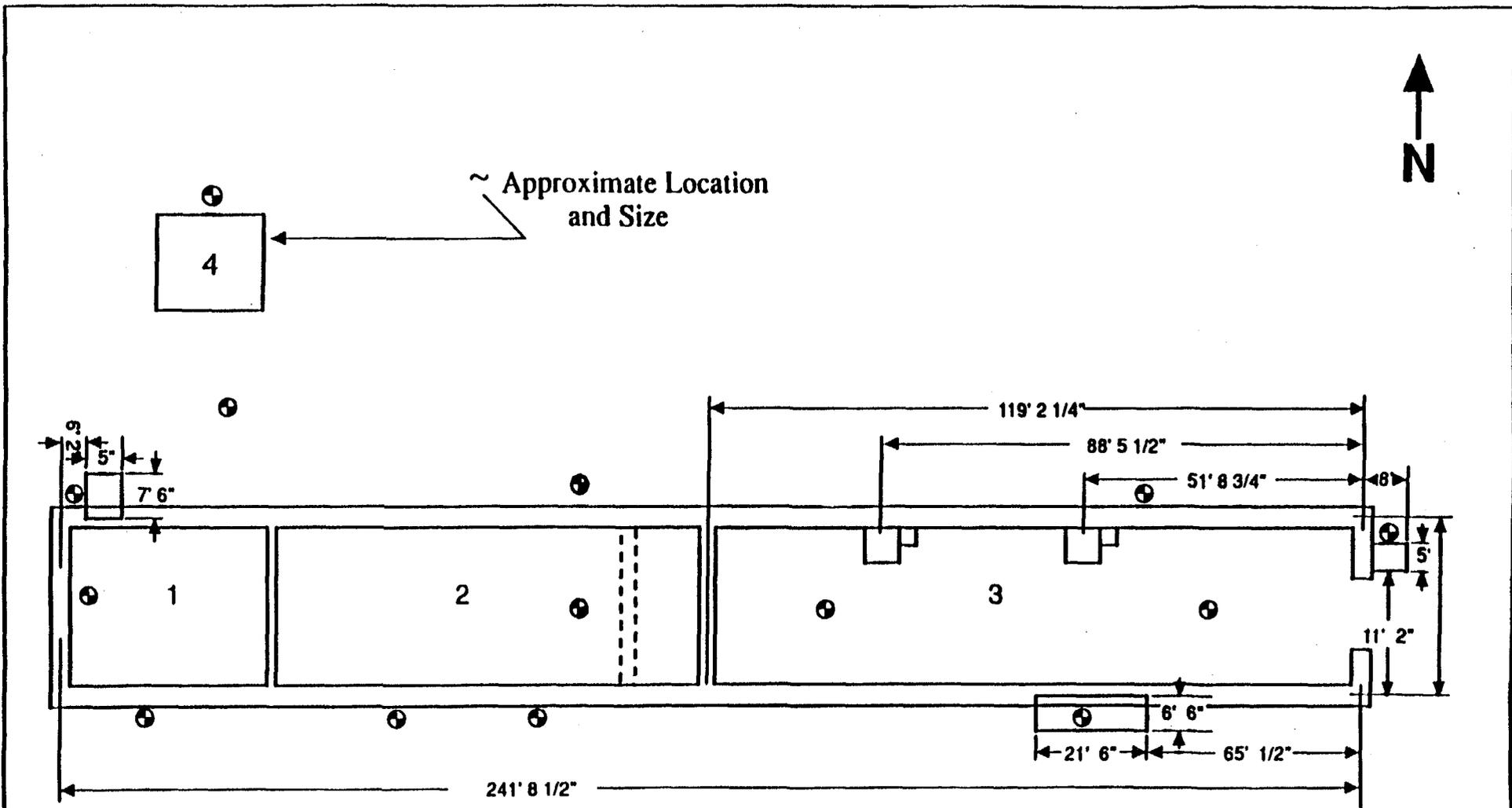
The mobilization phase will consist of verification of previous decontamination and removal actions and preparation of the site for closure activities. The actions under this phase will include, but not be limited to, the following:

- visit the site to assure tank, waste, and piping removal and determine extent of rainwater accumulation;
- survey the site for health and safety purposes;
- determine accessibility of the facility to sampling equipment; and
- identify sampling locations (Fig. 4) and mark locations.



<sup>a</sup> CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act.

**Fig. 3. Closure plan decision flowchart for the 9409-5 Tank Storage Facility (S-017).**



Legend:

⊕ Boring Locations

Fig. 4. 9409-5 Tank Storage Facility.

## **5.2 PHASE 2 - SAMPLING**

The sampling phase will consist of soil sampling to determine whether environmental media at the unit have been effected by operation. This phase will be conducted in accordance with Soil Sampling and Analysis Plan in Appendix A. The following steps will be performed during this phase.

1. Sample and analyze accumulated rainwater (if present). Previous samples of rainwater accumulated within the secondary containment have not exhibited contamination. If no contamination is found the liquid will be discharged. If the samples indicate the rainwater is contaminated the water will be disposed of in accordance with standard plant procedures in an appropriately permitted facility or offsite.

2. Initiate soil sampling in and out of the diked area. Best management practices (BMP) will be exercised to ensure potentially contaminated material does not escape the sample or site area.

3. Decontaminate drilling equipment between drilling locations and obtain rinsate samples for analysis. At the completion of each day, pack samples for shipment to the analytical laboratory following proper procedures.

## **5.3 PHASE 3 - DECONTAMINATION AND CERTIFICATION**

The decontamination and certification phase will consist of sample analysis evaluation and subsequent actions necessary to fulfill the closure objectives. The following steps will be performed during this phase.

1. Soil sampling analytical results will be reviewed. If contamination above cleanup levels is found at any location, the postclosure care activities outlined in Sect. 7 will be implemented. If the soil samples are not contaminated above cleanup levels, the facility will be closed without implementation of the postclosure care provisions for the surrounding area.

2. A closure certification package will be prepared based on the activities described above. Any area found to be contaminated after these steps are completed will be subject to the postclosure care requirements. The owners and operators of the 9409-5 Tank Storage Facility will submit a closure certification, in writing and by registered mail, to the Tennessee Department of Environment and Conservation (TDEC) Commissioner within 60 days of final closure. This certification will verify that closure has been completed in accordance with the required closure plan. The certification will be signed by the owner or an authorized representative and an independent registered professional engineer.

#### **5.4 PHASE 4 - POSTCLOSURE CARE**

If soil sampling indicates that the contaminants listed in Table 2 are not present, or, are present at concentrations below closure standards, after the above activities are completed the unit will be deemed clean closed, and postclosure activities will not be implemented. Should any of these contaminants be found in concentrations above the specified cleanup levels, the postclosure care section of the closure plan will be implemented.

### **6. SCHEDULE**

The closure activities associated with the 9409-5 Tank Storage Facility shall be conducted in accordance with the closure schedule found in Table 3. These activities may exceed the 180 days allowed by the regulations found at TN Rule 1200-1-11-.05(7)(d) and 40 *CFR* Sect. 265.113. The additional time for closure will be required only if further decontamination activities occur.

### **7. POSTCLOSURE CARE**

Contamination of the environment above closure performance standards from the activities associated with the operation of the 9404-5 Tank Storage Facility is not expected. However, should contamination of the surrounding media be found, the U.S. Department of Energy (DOE) proposes to conduct any investigatory or remedial actions necessary under the authority of the existing Federal Facilities Agreement between DOE, TDEC, and the U.S. Environmental Protection Agency (EPA). Subsequent investigations or other pertinent environmental activities will be conducted by the Environmental Restoration program as a part of the ongoing CERCLA activities at the Y-12 Plant. These actions will be conducted (if required) in lieu of the requirements found in 40 *CFR* Sect. 265.117 and TN Rule 1200-1-11-.057(h).

Table 3. Closure schedule

Activity	Days required	Cumulative completion time - days
<b>Phase 1 Mobilization</b>		
a. Preliminary site visit and Health and Safety Plan development	15	15
b. Identify sampling locations and prepare site for sampling	10	25
<b>Phase 2 Sampling</b>		
a. Sampling of secondary containment and soil sampling	45	70
b. Sample analysis	60	130
<b>Phase 3 Decontamination and Certification</b>		
a. Review sample analysis	10	140
b. Prepare closure Certification Package	40	180
c. Certify closure*		240

\*Days elapsed depends upon decontamination activities.

**REFERENCES**

- Energy Systems (Martin Marietta Energy Systems, Inc.) 1986. *Martin Marietta Energy Systems Environmental and Effluent Analysis Manual*, Oak Ridge, Y-12 Plant, Oak Ridge, Tennessee.
- EPA (U.S. Environmental Protection Agency) 1982. *Test Methods for Evaluating Solid Waste (SW-846)*, July.
- EPA 1989. RCRA Facility Investigation (RFI) Guidance, Vol. I of IV, EPA 530/SW-89-031.
- EPA 1990. 55 Federal Register, page 30798, *Corrective Action for Solid Waste Management Units at Hazardous Waste Management Facilities*, July 27, 1990.
- EPA 1992. *Code of Federal Regulations*. 40 CFR 261.25 "Toxicity Characteristic."
- Stone, J.E. 1989. *Preliminary Soil Sampling and Analysis for the 9409-5 Storage Facility (S-017), Y/TS-545, Oak Ridge Y-12 Plant, Oak Ridge, Tennessee*, September.

**APPENDIX A**

**SOIL SAMPLING AND ANALYSIS PLAN FOR THE  
9409-5 TANK STORAGE FACILITY (S-017)  
AT THE Y-12 PLANT**

## 1. PURPOSE

The purpose of this plan is to outline a sampling and analysis program to accomplish the following directives: (1) determine if the inner diked area is contaminated, (2) determine whether contamination of the soil surrounding the facility has occurred, (3) determine the lateral and vertical extent of contaminated soil, (4) provide a baseline for aid in determining the type and method of remediation, if any, and (5) establish compliance with all federal and state regulations regarding residual soil contamination.

## 2. RATIONALE

The sampling program for closure of the 9409-5 Tank Storage Facility will be undertaken in a phased approach:

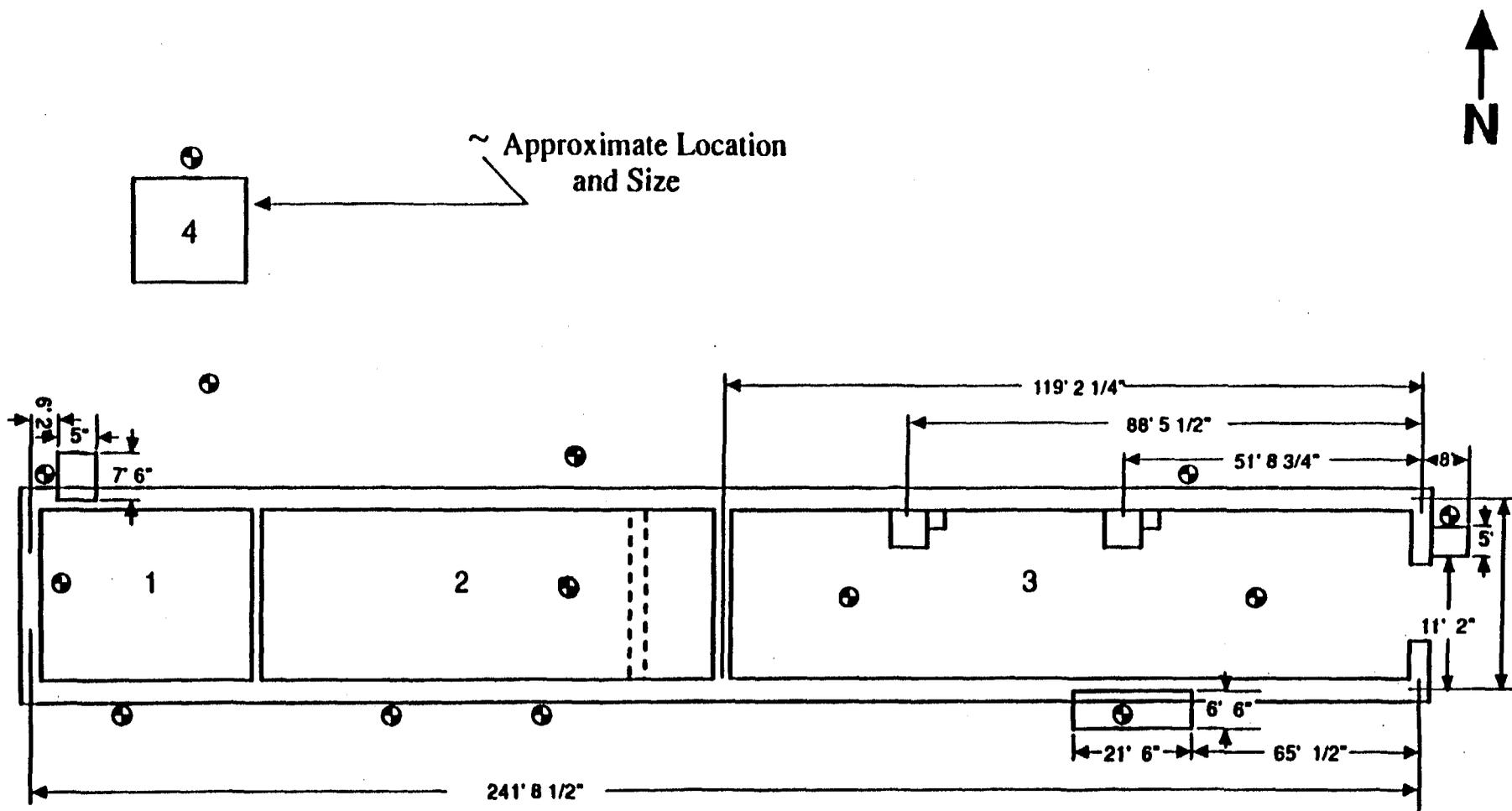
- Mobilization Phase. Preliminary site examination and preparation.
- Sampling Phase Task 1. Suspected and remaining waste characterization.
- Sampling Phase Task 2. Installation and sampling of nine borings outside the storage facility at predetermined locations (Fig. A.1).

The objective of this phased approach is to systematically determine the presence or absence of contamination in and adjacent to the 9409-5 Tank Storage Facility.

Mobilization Phase, preliminary site examination and preparation, will be undertaken (1) to determine the accessibility of the storage facility and surrounding area, (2) to identify the existence of obvious contamination for suspect area investigations, and (3) to locate and mark the boring locations.

Sampling Phase 1, suspected and accumulated waste (rainwater) characterization, removal, and disposal, will be performed (1) to characterize and quantify any accumulated waste, (2) to remove the waste (if necessary), and (3) to eliminate the potential for accidental releases.

Sampling Phase 2, boring installations inside and outside of the diked area, will be performed (1) to determine whether soil contamination exists at the storage facility, (2) to determine the lateral and vertical extent of contamination, and (3) to provide baseline data for remediation. Sampling of equipment decontamination wastes will be taken for analysis as well.



Legend:

⊕ Boring Locations

A-4

Fig. A.I. 9409-5 Tank Storage Facility.

**Mobilization Phase. Preparatory site inspection.**

Sampling Phase 1. Suspected and accumulated waste characterization, removal, and disposal will be performed (1) to characterize and quantify any accumulated (rainwater) waste contained in the containment cell, (2) to remove the waste before the removal of the two tanks and cell walls (if necessary) prior to Sampling Phase 2, and (3) to eliminate the potential for accidental releases of contaminants to the environment.

Sampling Phase 2. Soil samples will be obtained from the boring locations shown in Fig. A.1. This sampling plan was based on the operations of the facility and on the EPA SW-846 sampling techniques for tanks and as specified by the *Environmental Restoration Procedures* of Martin Marietta Energy Systems, Inc. As these samples are taken, they will be placed in the appropriate sample container, tagged, sealed, bagged, and placed in an environment that will keep them at 4°C. Chain-of-custody procedures will be maintained throughout sampling, handling, and storage. Soil samples will be taken from 0 to 6 in. and every 6 in. thereafter to 18 in. below existing grade and every 5 ft thereafter to a depth at which groundwater is encountered or auger refusal is reached. Those parameters to be analyzed are contained in Table A.1 along with the analytical procedures and maximum concentration levels. All samples will be analyzed in accordance with the appropriate test method as prescribed by EPA or other regulatory agencies and shown on Table A.1. TCLP analysis for chromium is only required if total chromium levels are greater than 100 ppm by analysis method 6010.

Quality Assurance/Quality Control (QA/QC). To ensure that appropriate QA/QC procedures are followed, trip and field blanks, equipment rinsate samples, and field duplicates will be obtained according to Table A.2.

Table A.1. Parameters, procedures, and established cleanup levels<sup>a</sup>

Parameter	Method	Cleanup Level
Metals: Chromium VI	TCLP	5 mg/kg
VOC: Methylene chloride <sup>b</sup>	SW 8240	5000 mg/kg
Tetrachloroethane <sup>b</sup>	SW 8240	35 mg/kg
Acetone <sup>b</sup>	SW 8240	8000 mg/kg
Methyl ethyl ketone <sup>b</sup>	SW 8240	4000 mg/kg
Perchloroethylene <sup>b</sup>	SW 8240	800 mg/kg
1,1,1-Trichloroethane <sup>b</sup>	SW 8240	7000 mg/kg
Trichlorotrifluoroethane <sup>c</sup>	SW 8240	20,000 mg/kg
PCBs	SW 8080 <sup>d</sup>	25 mg/kg

<sup>a</sup>Table 2 has been compiled from previously established and approved information from the most recent regulatory standards and guidance.

Acronyms: DWS - drinking water standard  
 TCLP - toxicity characteristic leachate procedure  
 VOC - volatile organic compound

Source: <sup>b</sup>EPA 1989  
<sup>c</sup>EPA 1990

Table A.2. Field quality control samples per sampling event

Type of sample	Metal	Organic
Trip blank (for volatiles only)	N/A <sup>a</sup>	1/cooler
Equipment rinsate <sup>b</sup>	1/day	1/day
Field blank	1/source/event for all levels and all analytes	
Field duplicates <sup>c</sup>	10%	10%

<sup>a</sup>NA - not applicable

<sup>b</sup>Samples are collected daily; however, only samples from every other day are analyzed. Other samples are held and analyzed only if evidence of contamination exists.

<sup>c</sup>The duplicate must be taken from the same sample used as a duplicate in inorganic analysis.