

# Y-12

**OAK RIDGE  
Y-12  
PLANT**

**MARTIN MARIETTA**

RCRA FACILITY INVESTIGATION PLAN  
TANK 2064-U (S-205)  
Y-12 PLANT  
OAK RIDGE, TENNESSEE

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S. H. Welch  
Program Manager

November 1987

Environmental Management Department  
Health, Safety, Environment,  
and Accountability Division

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TANK 2064-U (S-205)

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RCRA FACILITY INVESTIGATION PLAN  
TANK 2064-U (S-205)

## SECTION 1

## INTRODUCTION

Within the confines of the Oak Ridge Y-12 Plant are both active and inactive hazardous waste treatment, storage, and disposal facilities. These solid waste management units (SWMUs) are subject to assessment by the U.S. Environmental Protection Agency, as required by the 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA). RCRA Facility Investigation (RFI) Plans for SWMUs at the Y-12 Plant are scheduled to be submitted during the calendar years 1987 through 1990. The RCRA Facility Investigation Plan-General Document includes information applicable to all SWMU's and serves as a reference document for the site-specific RFI Plans.

This document is the site-specific RFI plan for Tank 2064-U and contains historical information, operational information, and sampling data for this tank. The potential for release of contamination through the various media and potential receptors is addressed.

A sampling and analysis plan is proposed to determine the extent, if any, of contaminant releases to the surrounding environment. Included are health, safety, quality assurance, and quality control procedures to be followed when implementing the sampling plan.

## SECTION 2

## OBJECTIVES OF RCRA FACILITY INVESTIGATION PLANNING

## 2.1 OBJECTIVES

This RFI Plan will identify actions necessary to determine the nature and extent of releases of hazardous and/or radioactive contamination from Tank 2064-U. The Plan summarizes existing unit information and includes a plan for evaluating the extent of contamination, if any, through soils, groundwater, surface water, and air pathways.

## 2.2 EVALUATION CRITERIA

To prepare and implement a comprehensive sampling plan and to effectively evaluate analytical sampling results, evaluation criteria must first be established. Criteria for evaluating the extent of contamination is based on existing State and Federal regulatory guidance and best technical judgment.

The primary media of interest for this underground tank are surface water, groundwater, and soils. Existing information was used to assist in determining whether this unit required remedial investigation and possible remedial activities. Samples will be collected as a part of the RCRA Facility Investigation and analyzed for constituents as described in Section 8 of this document. The sampling methodology and analytical procedures are designed to characterize the contaminants of interest.

### **2.3 SCHEDULE FOR SPECIFIC RFI ACTIVITIES**

The sampling and analysis activities may require a two-phase approach. Phase I activities are designed to characterize the contaminant source and extent of contamination without expending resources unnecessarily. Phase II sampling activities are contingent upon the results of the initial activities. Details of the Phase I sampling strategy are included in Section 8 of this document. A list of RFI activities for the sampling and analysis that will be performed and the duration of each activity are shown in Table 2.1.

### **2.4 FEASIBLE ALTERNATIVES**

Knowledge of feasible response actions has been used in preparing the RCRA Facility Investigation Plan. Based on existing information, response actions for the tank have been identified and are shown in Table 2.2. These response actions will be re-evaluated following the RFI report.

TABLE 2.1  
SCHEDULE OF RFI ACTIVITIES FOR TANK 2064-U

Sampling and Analysis

<u>Activities</u>	<u>Duration</u>
<b>PHASE I</b>	
1. Survey of Sampling Locations	1 day
2. Collection of water, soil, and sludge samples	5 days
3. Analysis of samples	45 days
4. Compilation of data	10 days
5. Evaluation of results and recommendations	1 week
<b>PHASE II</b>	
Items 1.-5. for Phase II contingent on results of Phase I	
1. Survey of Sampling Locations	1 day
2. Collection of water and soil samples	TBD*
3. Analysis of samples	TBD
4. Compilation of data	TBD
5. Evaluation of results and recommendations	1 week
6. Preparation of RFI report and submittal to EPA	TBD
* TBD - to be determined	

TABLE 2.2  
POTENTIAL RESPONSE ACTIONS

General Response Action	Technologies
Monitoring	Monitoring and analysis may be performed.
Decontamination	Tank decontamination.
Removal	Contaminated soil removal and disposal. Contaminated equipment removal and disposal.

SECTION 3  
DESCRIPTION OF CURRENT CONDITIONS

3.1 GEOGRAPHICAL INFORMATION

Tank 2064-U is located within the Oak Ridge Y-12 Plant near the northwest corner of Building 9766, which fronts on First Street to the north, with Copper Drive to the south and Calcium Drive to the east. Figure 3.1 is a Plant Location Map and Figure 3.2 is a Unit Location Map. Figure 8.1 in Section 8 of this document is a plot plan for the area to be sampled.

3.2 HISTORICAL INFORMATION

Building 9766 was originally constructed in the late 1950's as a machine shop. According to information from Y-12 Plant personnel, the principal materials machined there were beryllium, which is a hazardous constituent under RCRA, and thorium. The machining operations were discontinued about 1965. The building has since been remodeled and currently houses administrative offices.

3.3 OPERATIONAL INFORMATION

The machine shop used an overhead exhaust system to control dust and contamination from operations. Exhaust system filters were washed in a separate attached structure. Floor drains in the filter washing house drained to a 500-gallon underground tank, which has been designated as Tank 2064-U. The filter washing house has been demolished, and all that remains is a concrete pad and the tank. The tank has not been used for at least 20 years. There is no current information on the contents of the tank.

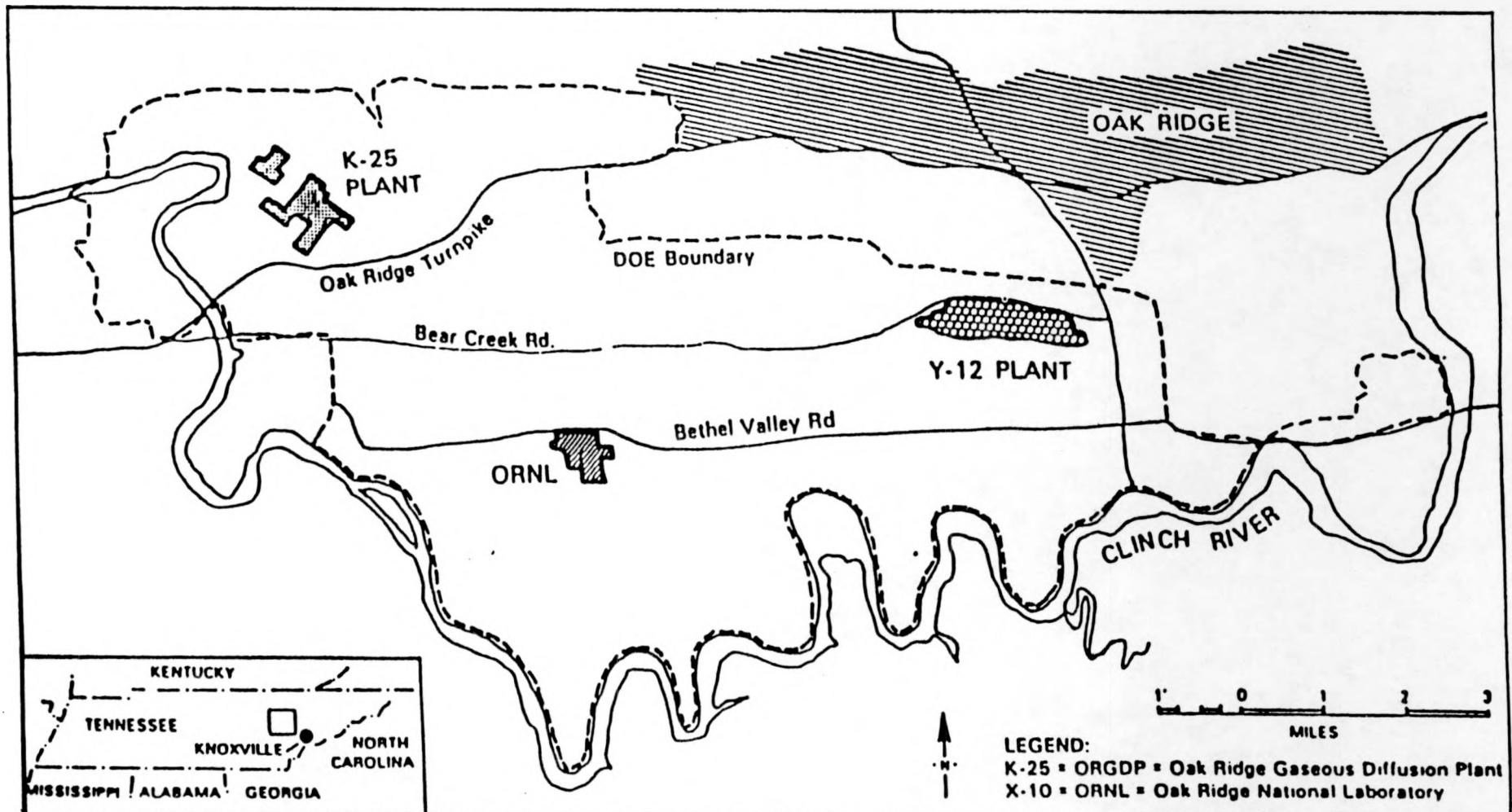


FIGURE 3.1 Plant Location Map

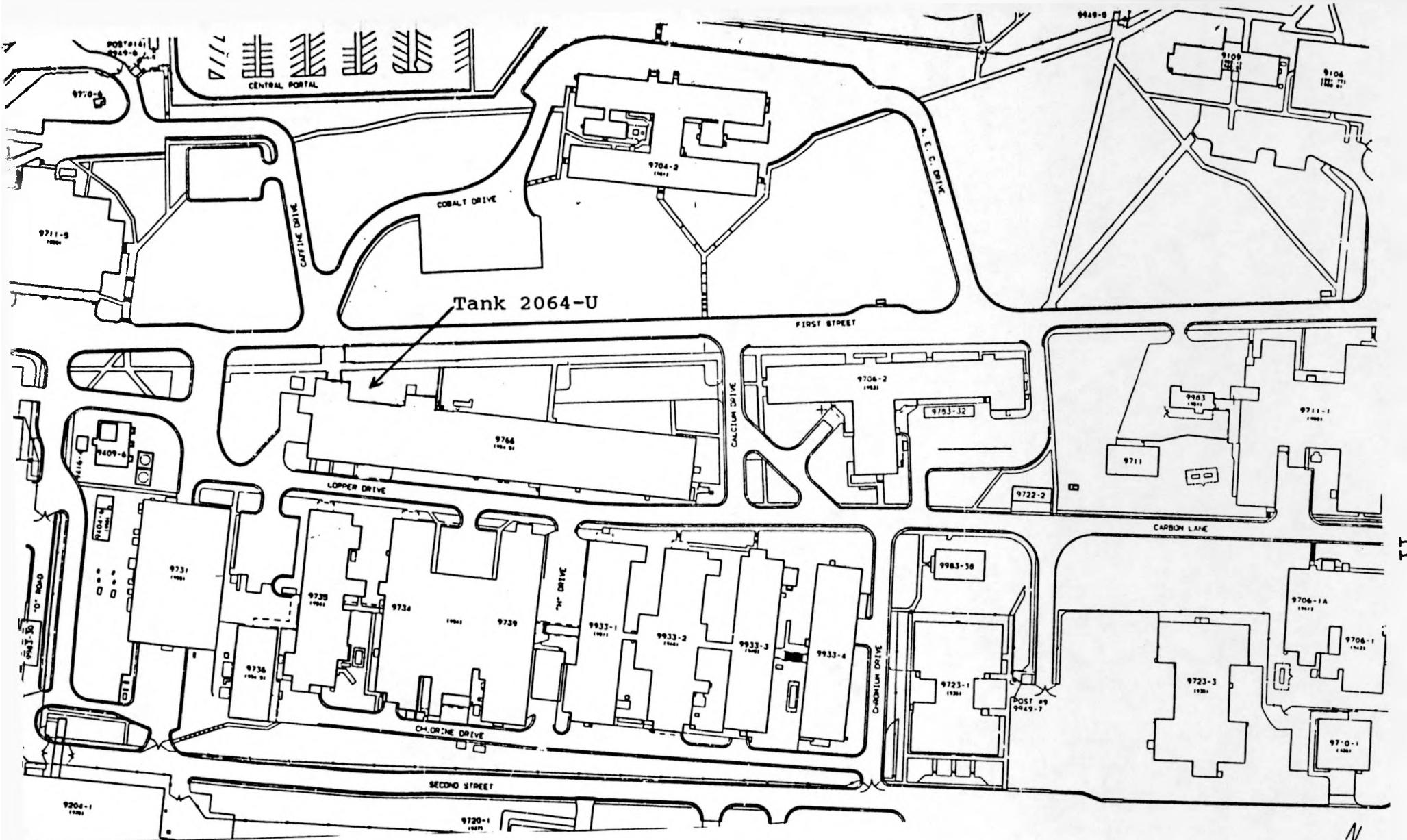


FIGURE 3.2 Location Map for Tank 2064-U (S-205)

SECTION 4  
CHARACTERIZATION OF THE CONTAMINANT SOURCE

4.1 WASTE CHARACTERIZATION

There are no known records on the quantity or composition of the waste water that was collected in Tank 2064-U. The tank has not been opened recently to determine its present contents.

4.2 UNIT CHARACTERIZATION

This unit is a 500-gallon underground steel tank 4 feet in diameter and 6 feet long, with approximately 4 feet of fill over it. The tank has a bolted manhole cover accessible from the surface through a 24-inch concrete pipe. All that remains of the filter washing house is a concrete pad and a concrete block wall. The concrete pad that remains is approximately 2 feet 4 inches below the ground surface above the tank. Figure 8.1 is a plot plan of the unit and Figure 8.2 is a cross-sectional drawing.

## SECTION 5

## CHARACTERIZATION OF THE ENVIRONMENTAL SETTING

## 5.1 HYDROGEOLOGY

The hydrogeology of the Y-12 Plant is described in the RFI Plan-General Document. The tank was installed over 25 years ago. The fill material around the tank is of unknown origin. Because of the relatively small size of this unit, the general hydrogeology of the Y-12 Plant would probably not be significantly affected; therefore, a detailed study of the hydrogeology specific to this unit is not planned at this time.

## 5.2 SURFACE WATER

No significant surface water features would be directly affected by this unit. Stormwater runoff from the area is routed through a series of underground storm drains approximately 1250 feet before discharging to Upper East Fork Poplar Creek (UEFPC). This network of storm drains transports surface runoff from approximately one-fourth of the plant site, and will also have a considerable infiltration of groundwater. Surface runoff or shallow groundwater flow from the area near Tank 2064-U will eventually reach UEFPC through these storm drains; however, contaminants would not be easily traceable to this unit. For more background information on surface water, refer to the RFI Plan-General Document.

### 5.3 AIR

Air data for the Y-12 Plant is addressed in the RFI Plan-General. There is no evidence that any volatile materials have been handled at this unit; however, the sample analysis will include VOC's, and if any are present, characterization of the air will be reconsidered.

## SECTION 6

## IDENTIFICATION OF POTENTIAL PATHWAYS AND RECEPTORS

RCRA Section 3004(u) requires corrective action for all releases of hazardous waste or constituents from any SWMU. To meet this requirement, each SWMU must be evaluated to determine the potential for releases that could threaten human health or the environment. The evaluation of potential releases of contaminants from this unit is based upon: (1) interviews with Y-12 Plant personnel having direct knowledge of the operation of the unit; (2) Y-12 engineering plans and drawings; and (3) general environmental reports related to Y-12 Plant. The potential pathways evaluated for this unit are groundwater, soil, surface water and air.

## 6.1 POTENTIAL PATHWAYS OF MIGRATION

6.1.1 Groundwater

Tank 2064-U is approximately 6 feet underground at its bottom. It is at least 25 years old and may have leaked. Groundwater in this area is shallow; therefore, it is a potential pathway for migration. Subsurface flow could be intercepted by the storm water drain system and transported to UEFPC.

#### **6.1.2 Soils**

In the routine handling of the tank contents, some spillage may have occurred. If this were the case, it would be isolated and would not be a significant pathway for contamination. If the tank has leaked, then the underground soils could be contaminated.

#### **6.1.3 Surface Water**

Surface water would not be directly affected by this unit since none passes through the area and surface soils appear not to be a major pathway. Surface water would become the most significant pathway if contaminated shallow groundwater intercepts a storm drain and ultimately is discharged to UEFPC. This is the only pathway that would lead movement of constituents to receptors outside the plant site. The surface water of the area is discussed in the RFI Plan-General Document.

#### **6.1.4 Air**

Air is not considered a potential pathway for this unit; however, VOC's will be included in the sample analysis, and if any are present, air as a pathway will be reconsidered. The ambient air at the Y-12 Plant is discussed in the RFI Plan-General Document.

#### **6.1.5 Conclusions**

Surface water is the most significant ultimate pathway for offsite transport of constituents from Tank 2064-U; however, sampling and analysis of surface water is considered to be of limited value for the Tank 2064-U RFI because there are other potential sources of releases to surface water in the area.

Surface and subsurface soils and groundwater are the primary immediate pathways for migration of releases and are addressed in this RFI plan.

## 6.2 POTENTIAL RECEPTORS

### 6.2.1 Human Population

Because of the limited access to the Y-12 Plant, the only potential receptors for contamination would be surface water users downstream of the Y-12 Plant on East Fork Poplar Creek (EFPC). There are no drinking water supplies on EFPC nor within several miles downstream which would be affected. This unit is not situated in a geologic formation which has any drinking water wells to receive residual contamination. EFPC is currently posted by the Tennessee Department of Health and Environment for limited use because of the historical releases of contaminants from the plant. Based on the current environmental surveillance and monitoring data for EFPC and its environs, there is no current risk to receptors that would require immediate action.

### 6.2.2 Terrestrial Flora and Fauna

The RFI Plan-General Document discusses plant and animal species that inhabit the area. Since this unit is within the boundaries of the Y-12 Plant, no plants or animals are directly influenced by residual contamination. There is no evidence that any contamination in the EFPC environs is traceable to this unit. EFPC and its floodplain are the subject of a separate RFI plan.

SECTION 7  
EXISTING DATA

Two bore holes were installed at this unit in January 1987 and soil samples were obtained. Documentation for these samples is not sufficient to consider the data definitive; however, the data are still useful and will be briefly discussed.

Four soil samples were analyzed for total metals by ICP and for volatile organics. The metals analysis showed beryllium levels ranging from .8 ug/kg to 1.3 ug/kg and thorium ranging from less than 6.5 ug/kg to 9 ug/kg. These levels do not indicate major contamination at these particular locations. For the volatile organics analysis, only methyl ethyl ketone and bromoform were above detection limits. Bromoform ranged from 32 ug/kg to 56 ug/kg and methyl ethyl ketone ranged from 16 ug/kg to 63 ug/kg, indicating are that there are some volatile organics present at this site, but no major contamination at these particular locations.

SECTION 8  
SAMPLING PLAN

8.1 SAMPLING AND ANALYTICAL STRATEGY

A description of the purpose, objectives, design, and methodology of the sampling plan and the sample collection and analysis methodology are included in the RCRA Facility Investigation Plan-General Document, Volume II: Quality Assurance Project Plan (QAPP). Since defensible data on this unit does not exist, a phased sampling and analysis program will be conducted to characterize the extent, if any, of releases. As explained in Section 6, contaminated groundwater is considered the most probable pathway for a continuous release of contamination which would be considered a potential threat to human health or the environment. The subsurface soils around the tank are considered the main pathway for movement of contamination to groundwater.

Based on the information about the activities at this unit, the main constituents of concern are beryllium and thorium. Sampling and analysis for oil and grease and volatile organics will also be performed since the building was used as a machine shop and degreasing of equipment may have taken place. There is no information to indicate that any other sources of contamination have ever been associated with this unit, therefore no other parameters will be considered.

In Phase I samples of water and/or sediment from the tank, will be used to characterize its contents. The site soils will be sampled by coring to determine if there is contamination as a result of leaks

from the tank. This data will be used to assess the need for monitoring wells. If soils and/or water are found to have contamination, a Phase II sampling may be required. The details of a Phase II sampling plan will be based on the results of Phase I.

## 8.2 SOIL SAMPLING PLAN

A 15-foot by 15-foot grid enclosing the contamination source is shown in Figure 8.1. Soil sampling, analysis, and data evaluation will occur in phases. The first phase of sampling is designed to be a worst case sampling effort to provide estimates of contaminant levels in areas where it is thought spills could have occurred or migration from the tank would be most probable. The remains of all samples will be archived for future reference.

### 8.2.1 Phase I Surface Soil Sampling

To determine areas of any historical spills, surface soil sampling is proposed for each of the nine locations within the initial grid system. This area is currently covered with decorative landscaping gravel, and there are no visible signs of any contamination.

### 8.2.2 Phase I Subsurface Soil Samples

Four cores samples to a depth of 10 feet will be taken, one on each side of the tank, if possible. In the event that the drilling equipment has difficulty operating in this area, the sampling locations will be adjusted as necessary. The documentation will include plot plans and cross-sections of the final sampling locations. At each location, a soil sample will be taken from the surface before

any disturbance, and split spoon samples will be taken from each 2-foot interval in the last 6 feet of core (see Figure 8.2). Table 8.1 outlines the sampling plan for Phase I. If additional samples are found to be necessary, they will be chosen on a random basis within the grid system. The grid may be expanded if necessary.

Appropriate statistical methods as outlined in the QAPP will be used for evaluating the analytical results.

TABLE 8.1  
TANK 2064-U SAMPLING PLAN

TYPE OF SAMPLE	NUMBER OF SAMPLES	LOCATION OF SAMPLE
Surface soil	9	area N of building
Liquid, grab (if present)	1	inside tank
Sediment	1	inside tank
Soil core	4	around tank

#### 8.3 SITE PREPARATION

To accurately locate sampling and drilling locations, the site will be surveyed. A detailed map of the area will be drawn indicating the sampling points and their coordinates.

#### 8.4 SAMPLING PROCEDURES

Surface soil samples will be taken with a bucket auger. All samples from soil cores will be taken with a split spoon. Both sampling procedures are described in the QAPP.

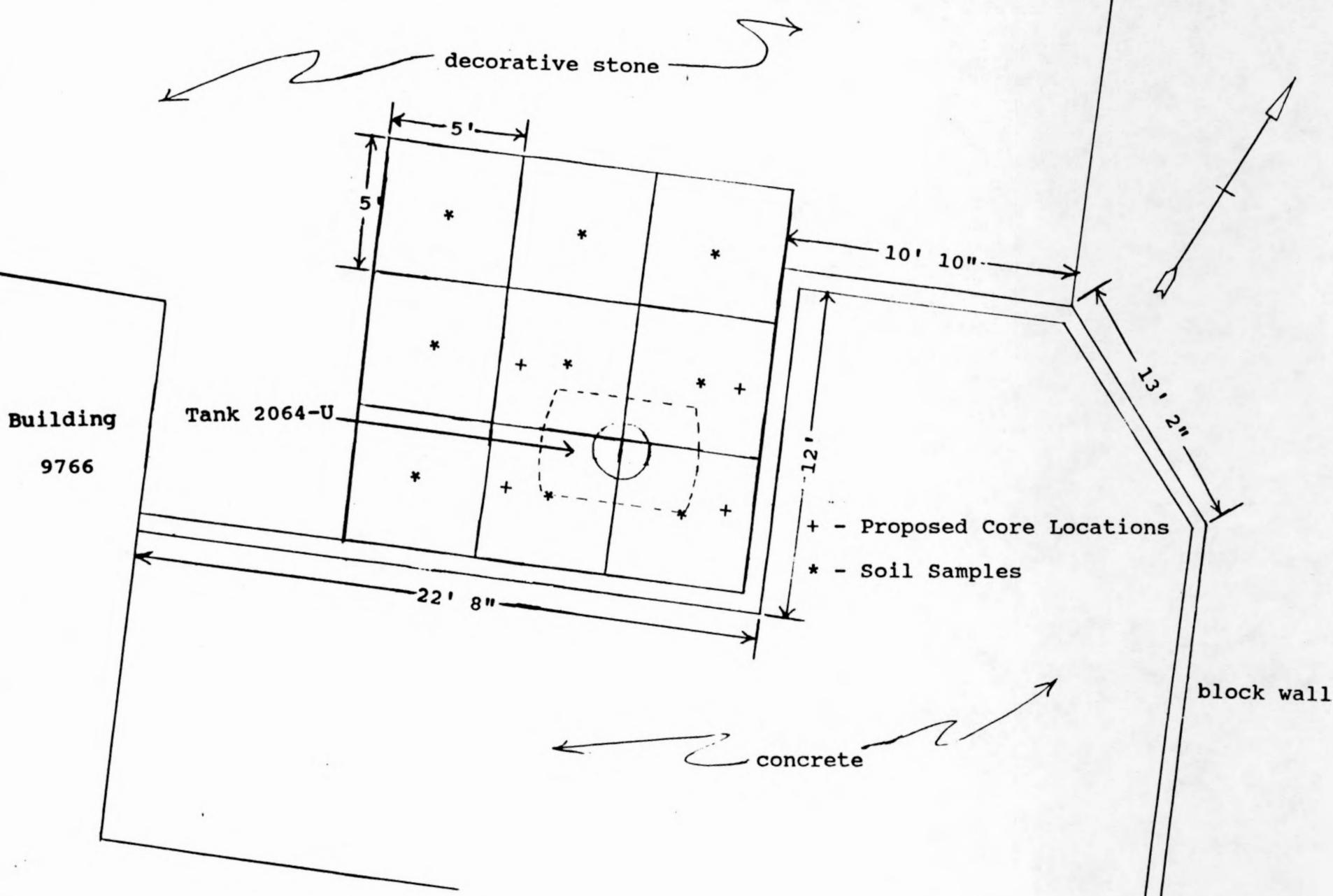


FIGURE 8.1 Sampling Grid for Tank 2064-U

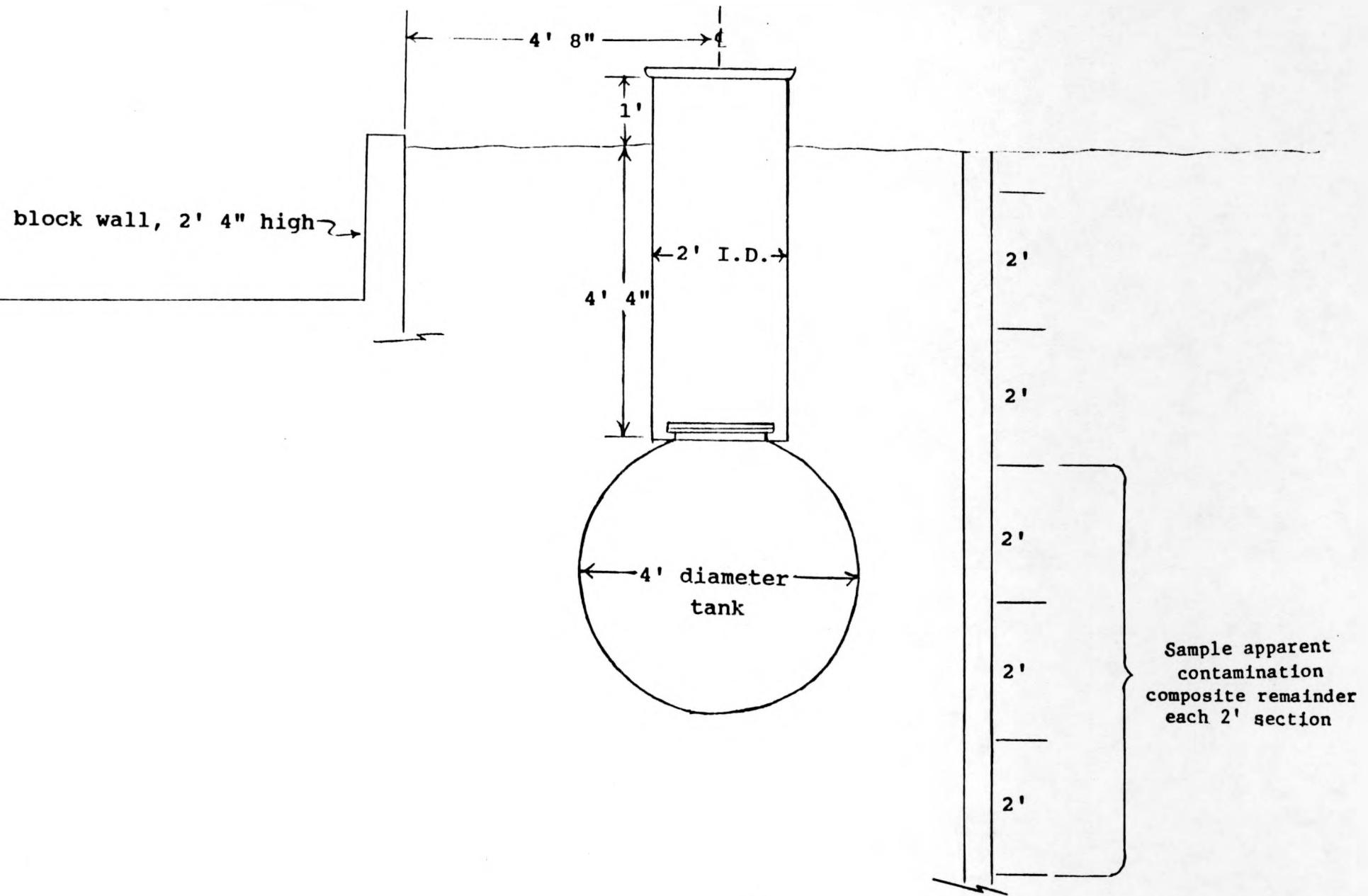


FIGURE 8.2 Cross-section of Tank 2064-U

## 8.5 ANALYTICAL PROTOCOL

The samples for surface soils, soil cores, water, and sediments will be analyzed for beryllium, thorium, oil and grease, and VOC's. All analyses will follow the methods given in the QAPP. Table 8.2 lists method numbers and references for the analytes of concern.

The quality assurance requirements outlined in the QAPP will be adhered to for all analysis.

TABLE 8.2  
ANALYTICAL METHODS

PARAMETER	MEDIUM	METHOD NUMBER*
Oil & Grease	water	9070
	soil	9071
	sludge	9071
Beryllium	oil & sludge	7090
	water	6010
Volatile Organics	water, soil and sludge	8240

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\*Reference : Test Methods for Evaluating Solid Wastes,  
USEPA, SW-846, July 1982.

## SECTION 9

## DATA MANAGEMENT PROCEDURES

Analytical results will be presented in a clear and logical format, so as to best illustrate any patterns in the data. These will include tabular, graphical, and other appropriate visual displays as described in the QAPP.

Statistical analysis will be provided for treatment of duplicate sampling, duplicate laboratory analysis, results which are reported as less than detection limit, and for examination for statistical outliers. These methods will be applied where appropriate.

SECTION 10  
HEALTH AND SAFETY PROCEDURES

10.1 INTRODUCTION

Specific requirements and procedures to protect the health and safety of the investigating personnel, the Y-12 Plant site personnel and the general public during the RCRA Facility Investigation (RFI) of Tank 2064-U are addressed in this section.

The RFI Plan-General Document discusses the Health, Safety, Environmental, Security, Plant Protection, and Emergency Response organizations at the Y-12 Plant. These organizations provide the support to the Y-12 line organizations to assure that health and safety requirements are met during the RFI's. They provide the communications, response, and reporting for any plant emergency. On-site medical facilities provide medical surveillance, treatment, monitoring and periodic physical examinations. Health Physics and Industrial Hygiene provide surveillance for hazard evaluation and control. Operational Safety promotes accident prevention and control. Other departments provide routine plant security and visitor control.

In addition, the general document identifies the organizational responsibilities for health and safety at the solid waste management unit sites during RCRA Facility Investigations. The document includes the methodology for establishing the work zones of each site, the level of protection required in the exclusion zone, decontamination procedures, personnel exposure limits, monitoring requirements, and respiratory protection.

#### 10.2 KNOWN HAZARDS AND RISKS

The RFI plan for the site is based upon requirements described in Volume I, Section 6 of the draft document, RCRA Facility Investigation Guidance, dated October 1986. Supplementary information has been gained from Y-12 reports and interviews with plant personnel. Based on the guidelines and the supplementary information, beryllium is the primary constituent of concern from a health standpoint. Beryllium and compounds of beryllium are a suspected human carcinogen and are toxic. Beryllium should not be inhaled and contact with the skin should be avoided. The lungs, skin, eyes, and mucous membranes are susceptible to harmful effects. If VOC's are present, they could also pose a health hazard.

#### 10.3 LEVEL OF PROTECTION

The level of personnel protection and monitoring is designated below:

<u>Level Designation</u>	<u>Monitoring Parameters</u>
A _____	Airborne Pollutants <u>VOC's</u>
B _____	Explosion Potential _____
C _____	Radiation _____
D <u>X</u>	

#### 10.4 DESIGNATION OF WORK AREA ZONES

The three zones (Exclusion, Contamination Reduction, and Support) will be established for the sampling program as necessary and in accordance with the methodology developed in the RFI Plan-General Document. The safety equipment required for the designated level of protection and the decontamination procedures are also covered in the General Plan.

#### 10.5 EXPOSURE LIMITS

Standard precautions will be used for investigations of this SWMU, such as requesting the Industrial Hygiene Department to survey the tank, should access be necessary, for explosive or noxious gases prior to personnel access. The personnel protection recommended for work activity in the exclusion zone is Level D. Personnel should wear half face respirators with particulate canisters.

The responsibility for limiting exposure of the workers to non-hazardous levels of pollutants resides with the Site Health and Safety Officer (SHSO) using procedures and instruments as outlined in the RFI Plan-General Document. The SHSO will request the presence of industrial hygiene and/or health physics personnel on-site to assess the potential hazards of any unusual conditions that occur during the sampling process and determine whether or not work should continue.

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