**DEPARTMENT OF THE ARMY**
**U.S. ARMY GARRISON WHITE SANDS**
**100 Headquarters Avenue**
**WHITE SANDS MISSILE RANGE, NEW MEXICO 88002-5000**

October 27, 2005

REPLY TO
ATTENTION OF

Environment and Safety Directorate

RECEIVED
NOV 2005
NMED Hazardous
Waste Bureau

Mr. James Bearzi
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

**Subject: Submittal of the Final Voluntary Corrective Action Report for the AMRAD Underground Storage Tank (UST) Site (SWMU 164) dated September 2004.**

Dear Mr. Bearzi:

Enclosed you will find a hard copy and an electronic copy of the *Final Voluntary Corrective Action Report for the AMRAD UST Site (SWMU 164)*, dated September 2004 for your review and approval.

The enclosed report summarizes final closure activities conducted during August 2, 2004 of the UST tank located adjacent to the Anti-Missile radar (AMRAD) Facility (Building 25900). The work was completed in accordance with the *Voluntary Corrective Measure Work Plan (VCM) for the AMRAD UST Site (SWMU 164)*, dated March 2003, which was submitted to your office for review on 26 May 2004.

WSMR considers the site to have been remediated in accordance with current applicable state regulations, and the available data indicating that contaminants pose an acceptable level of risk under current and projected future land use. The document enclosed is intended t o be a final report and will also serve as a proposal for no further action at the AMRAD Site (SWMU 164).

We remain actively committed to meeting our environmental compliance responsibilities and practicing good environmental stewardship and appreciate your understanding and support on these issues.

Copies of this letter are being provided to Mr. Chuck Hendrikson, EPA Region VI; Mr. Larry King, EPA Region VI; Mr. Glenn von Gonten, NMED-HWB; Mr. Steve Pullen, NMED-HWB; Ms. Cheryl Frischkorn, NMED-HWB; Mr. James Pigg, CSTE-DTC-WS-SJA; and WTS Systems, WSMR's environmental services contractor.

Mr. Joaquin Rosales remains the overall action officer for this effort and he may be reached at 505-678-1007 for further discussion on this subject.

Sincerely,

Thomas A. Ladd

Thomas A. Ladd
Director, Environment and Safety Directorate

Enclosure

White Sands Missile Range Environmental Document
Report WS-ES-EC-0444

# FINAL

# AMRAD FACILITY VOLUNTARY CORRECTIVE ACTION REPORT FOR AMRAD UST SITE (SWMU 164)

## White Sands Missile Range

September 2004

BAE SYSTEMS

**White Sands Missile Range**
Environment and Safety Directorate
White Sands Missile Range, New Mexico 88002

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# AMRAD FACILITY
# VOLUNTARY CORRECTIVE ACTION REPORT
# FOR AMRAD UST SITE (SWMU 164)

**Submitted to:**

**US Army**
**White Sands Missile Range**
**Directorate of Environment and Safety**
**White Sands Missile Range, New Mexico 88002-5048**

**September 2004**

**Submitted by:**

**BAE SYSTEMS**
**Building 126**
**White Sands Missile Range, New Mexico 88002**

## EXECUTIVE SUMMARY

This report summarizes final closure activities conducted during 2 August 2004 of the underground storage tank (UST) that was located at the Anti-Missile Radar (AMRAD) Facility (Building 25900). White Sands Missile Range (WSMR) has been investigating the AMRAD Site in accordance with the Resource Conservation and Recovery Act (RCRA), as administered by the New Mexico Environment Department (NMED), Hazardous Waste Bureau (HWB). This site was first discovered in 1997 in a range wide UST survey. An investigation was conducted in February 1998 to determine whether the tank had leaked. As-built facility drawings indicated that the UST was to be used for storage of waste transformer oil generated at the site, presumably from operation of a large radar dish near the UST location. Soil sampled from directly adjacent to, and beneath the tank, indicated that an oil release had occurred. The concentration of the motor oil range organics ranged from less than the detection limit (50 mg/kg) to 16,000 mg/kg according to analysis conducted by Hall Environmental Analysis Laboratory (Albuquerque, NM). Diesel range organics, gasoline range organics, polychlorinated biphenyls and volatile organic compounds were not detected in any of the samples. Once it was concluded that the UST had leaked, it was then reported to the NMED HWB on 3 March 1998.

More thorough investigations were conducted from April 1998 to April 2000 to determine the vertical and horizontal extent of contamination. The extent of contamination was limited to the backfill immediately surrounding the tank and extended to a depth of less than 40 feet. Evaluation of the analytical data showed that motor oil range organics was the only detected analyte. The concentration of motor oil range organics was less than the detection limit (5 mg/kg) in 54 of the 57 samples analyzed by Assaigai Analytical Laboratory, Inc. (Albuquerque, NM). The three detections were 2 mg/kg, 51 mg/kg and 600 mg/kg. Concentrations of semi-volatile organics were all below detection limits. The metal concentrations were compared against background concentrations and found to be at naturally occurring levels. Following the completion of the field investigation in April 2000, the NMED HWB listed the site in the White Sands Annual Unit Audit (June 2000) as Solid Waste Management Unit (SWMU) Number 164.

In determining standards for TPH in development of the Voluntary Corrective Measure (VCM), WSMR used the then current New Mexico Department of Energy, Minerals, and Natural Resources Oil Conservation Division (OCD) criteria for TPH due to no RCRA regulated constituents having exceeded HWB cleanup levels. Utilizing the ranking scheme established by the OCD, the TPH cleanup level at this site would be 5,000 mg/kg. Estimation of the 95% upper confidence limit using the standard bootstrap method provided a concentration for the contaminated soil of 1,433 mg/kg.

Based on the results of the previous investigations, WSMR believes that this site does not pose a serious or imminent threat to human health or the environment. The concentrations of the motor oil range contaminants present do not warrant further consideration since no other analysis revealed detectable concentrations of pollutants. Furthermore motor oil range organics are relatively immobile and the contamination is limited to the backfill immediately surrounding the tank. Exposure to groundwater beneath the site is not directly impacted by the release due to the small size of the spill and sufficient separation between contamination and groundwater. Other exposure pathways such as air and soil are not considered relevant due to the current and future

land use and the low volatility of the transformer oil. As a result, there were no contaminants of potential concern identified during the evaluation of human health and ecological risk.
WSMR believes that the in-place closure of the UST is the appropriate closure action for this site. Excavation of the tank was not feasible since it would have created an unsafe condition by undermining a major support structure for the adjacent radio frequency fencing (See Sec. 1.2, Location and Site Description). The VCM Workplan for the AMRAD UST site SWMU 164, dated March 2003, described the planned in place closure of the UST. The VCM Workplan was submitted to NMED on July 08, 2004. Following this submittal, WSMR waited 14 days before closing the tank using the methods provided in the New Mexico Petroleum Storage Tank regulations (20 New Mexico Administrative Code, Chapter 5, Part 8).

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# LIST OF ACRONYMS

| | |
|---|---|
| ABRES | Advanced Ballistics Re-Entry System |
| AMRAD | Anti Missile Radar/Athena Measurement Radar |
| AST | Above Ground Storage Tank |
| bgs | Below Ground Surface |
| CSM | Conceptual Site Model |
| DU | Dune Land-Dona Ana complex |
| ft | Feet |
| GRO | Gasoline Range Organics |
| GWQB | Groundwater Quality Bureau |
| mg/L | milligrams per liter |
| NED | Nuclear Effects Directorate |
| NFA | No Further Action |
| NMED | New Mexico Environment Department |
| NURE | National Uranium Resource Evaluation |
| OB | Onite-Bluepoint Wink |
| PCBs | Polychlorinated Biphenyls |
| PSTB | Petroleum Storage Tank Bureau |
| QA | Quality Assurance |
| QA | Quality Assurance |
| RCRA | Resource Conservation and Recovery Act |
| REC | Record of Environmental Consideration |
| RPPBA | Real Property Planning Board Action |
| SVOCs | Semi-volatile organic compounds |
| SWMU | Solid Waste Management Unit |
| TDS | Total Dissolved Solids |
| TPH | Total Petroleum Hydrocarbons |
| UCL | Upper Confidence Level |
| UST | Underground Storage Tank |
| VCA | Voluntary Corrective Action |
| VCM | Voluntary Corrective Measure |
| VOCs | Volatile Organic Compounds |
| WSMR | White Sands Missile Range |

# AMRAD FACILITY
# VOLUNTARY CORRECTIVE ACTION REPORT
# FOR AMRAD UST SITE (SWMU 164)

## 1.0 INTRODUCTION

A 3,000-gallon underground storage tank (UST) was discovered near Building 25900 at the Anti-Missile Radar (AMRAD) Facility in 1997. As-built facility drawings indicated that the tank was used for storage of waste oil generated at the site, presumably from operation of a large radar dish near the tank location. Due to existing infrastructure at the site, removal of the tank and surrounding contaminated soil was not feasible. White Sands Missile Range (WSMR) completed a site investigation and initiated in-place closure activities including removal of the contents and triple rinsing of the tank. WSMR believes that this site does not pose a serious or imminent threat to human health or the environment.

A Voluntary Corrective Measure (VCM) Workplan for the AMRAD UST site SWMU 164, dated March 2003, described the planned in place closure of the UST. The VCM Workplan was submitted to NMED on July 08, 2004. Following this submittal, WSMR waited 14 days before closing the tank using the methods provided in the New Mexico Petroleum Storage Tank regulations (20 New Mexico Administrative Code, Chapter 5, Part 8).

### 1.1 Objectives and Scope

The purpose of this report is to document the closing of the UST as an appropriate VCM to prevent future use of the UST and to document the level of risk to human health and the environment posed by the remaining contamination.

### 1.2 Location and Site Description

The AMRAD Facility is located within the WSMR, approximately 27 miles east of the White Sands Main Post Headquarters (see Figure 1-1) in Otero County. The site contains an operations building, a smaller fire suppression building and a large radar dish. A radio frequency fence constructed on a 107-foot (ft) steel frame, almost entirely surrounds the facility. (Photograph 1-1). A chain link fence secures the only opening in the steel frame.

### 1.3 Regulatory Background

The UST was originally scheduled for in-place closure during the second quarter of Fiscal Year 1998. Several initial hand auger investigations performed at the site during 1998 (see Section 3.0) indicated soil contamination of unknown size adjacent to and potentially beneath the UST. White Sands subsequently notified the New Mexico Environment Department (NMED) Petroleum Storage Tank Bureau (PSTB) (formerly the UST Bureau) of the release. Inspection of the site by the NMED PSTB field inspector revealed that the UST was not regulated by the New Mexico UST Regulations (20 New Mexico Administrative Code, Chapter 5, Part 1), and therefore fell under purview of the NMED Ground Water Quality Bureau (GWQB).

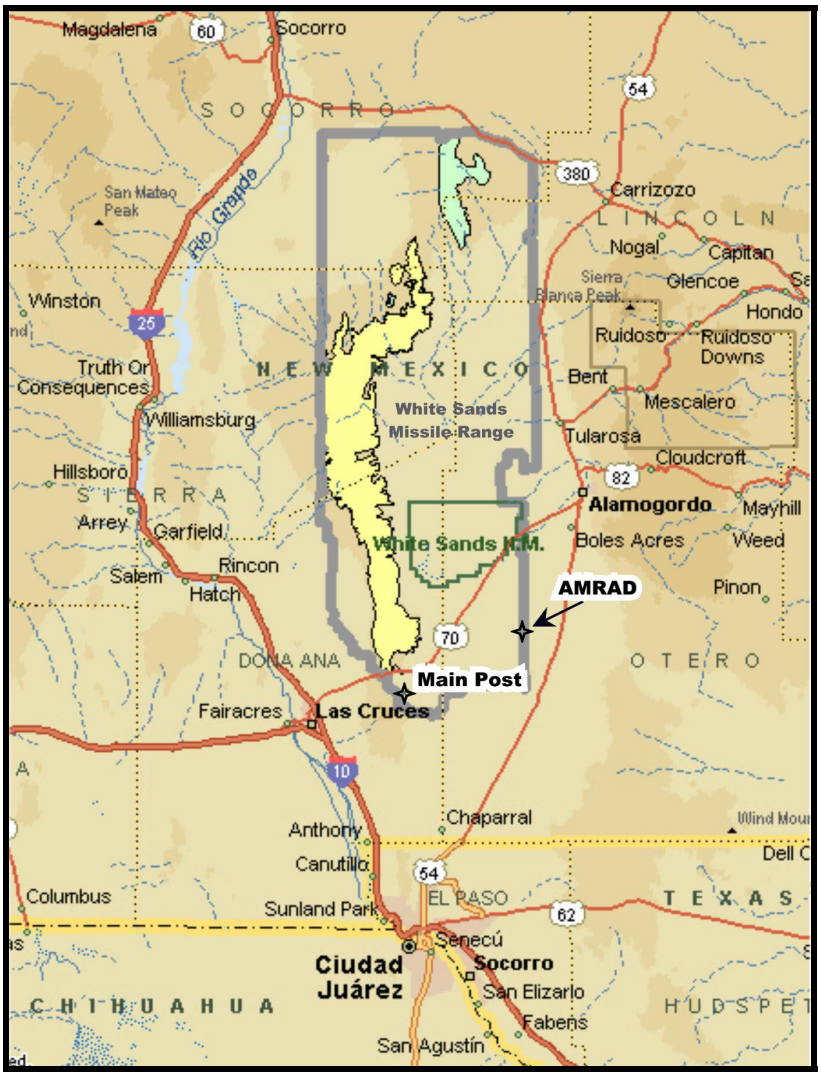


**Figure 1-1. Location of AMRAD.**

**Photograph 1-1. Project Site – AMRAD Facility (Building 25900).**

White Sands completed all subsequent site assessment activities (as described in Section 4.0) under NMED GWQB guidance.

Following completion of the field investigation in April 2000, the NMED Hazardous Waste Bureau (HWB) listed the site in the White Sands Annual Unit Audit (June 2000) as Solid Waste Management Unit (SWMU) Number 164.

This document was prepared in accordance with the regulations established under the Hazardous Waste Act (NMSA 1978, sections 74-4-1 through 14), Title 20 of the New Mexico Administrative Code, Chapter 4.1, Title 40 of the Code of Federal Regulations Parts 260-273 and the guidance published by the New Mexico Environment Department.

## 2.0 ENVIRONMENTAL SETTING

### 2.1 Climate

The climate at WSMR is typical of the arid southwestern United States. Days are generally sunny, dry, and warm with occasional spring dust storms and rains during the summer months. The average temperature is 92° Fahrenheit (F) in the summer with an average range of 21° to 34° F in the winter. Annual precipitation at WSMR averages 10 inches in the basin. The relative humidity of WSMR region averages 35 percent. The prevailing wind direction throughout the year is from the west, except in July and August, when it is from the south. Wind speed averages 5.7 miles per hour (WSMR 1998).

### 2.2 Biological Resources

Based on field reconnaissance and literature review, the predominant habitat at the AMRAD site is Chihuahuan Desert scrub or mesquite dunes. Six ecological receptor types near the site were identified. These include flora, invertebrates, amphibians, reptiles, birds, and mammals.

### 2.3 Geology

#### 2.3.1 Regional Geology

WSMR lies within the Mexican Highland Section of the Basin and Range Province, characterized by a series of tilted fault blocks forming longitudinal, asymmetric ridges or mountains and broad intervening basins. The major portion of WSMR property lies within the Tularosa Basin, which is bounded on the west by the Organ, San Agustin, and San Andres Mountains. The eastern limit of the Tularosa Basin lies outside of the range, and is formed from north to south by the Jicarilla, Sierra Blanca, and Sacramento Mountains.

The Tularosa Basin contains thick sequences of Tertiary and Quaternary age alluvial and bolson fill deposits. These sediments, more than 5,000 ft thick in some areas, consist mainly of silt, sand, gypsum and clay weathered from the surrounding mountain ranges. The average elevation of the basin floor is 4,000 ft above mean sea level and surface features consist of flat sandy areas, sand dunes, basalt flows, and playas (dry lake beds). Average elevation of mountains range from 5,700 ft at St. Agustin Pass to more than 9,000 ft at Salinas Peak, the tallest peak at WSMR.

The nature of the bolson-fill deposits varies both laterally and vertically throughout the Main Post Area. Coarse-grained, poorly sorted sediments deposited near mountain fronts grade into fine-grained, well sorted sediments toward the center of the basin (Kelly, 1973). Sediments further from the mountain fronts also contain a greater percentage of clay and gypsum. Vertically, the sediments are reported to become finer-grained and more consolidated until reaching a laterally continuous clay unit at about 1,000 ft below ground surface (bgs) (Kelly and Hearne, 1976).

### 2.3.2 Local Geology

The AMRAD facility is located in the southeastern corner of WSMR in the Tularosa Basin off the northwestern flank of the Jarilla Mountains. Elevation at the site is approximately 4,000 ft above mean sea level.

The site investigation determined that the local geology is characteristic of the type of sediments found in the Tularosa Basin. Sedimentary units are typically poorly sorted and consist of sand, silt, or clay or a combination of these sediments. These sediments include alternating layers of clay, silt, sand, and gravel with a thin layer of gravel constituting the initial 2.5 ft of the borehole. Most layers of sediment are between 2-5 ft in thickness, with the exception of a fairly thick layer of fine-grained, well sorted sands occurring at the 30-47 ft interval.

Alternating and interfingering lenses of clay, silt, sand, and gravel are typical of the alluvial and bolson-fill deposits of the Tularosa Basin. These sediments are interpreted as being deposited in a fluvial environment of deposition. Sands that are fine to medium-grained, well sorted, fairly unconsolidated, and contain less than 5 percent silt/clay may be interpreted as being deposited in an eolian environment.

### 2.3.3 Soils

Soils in the area are from the Dune Land-Dona Ana complex (Nehr and Bailey, 1976). The Dona Ana series consists of very deep, well drained soils that formed in alluvial sediments derived from sedimentary rocks. Depth to calcic horizon is 2 to 20 inches. Texture ranges from loamy fine sand through sandy clay loam. Runoff is moderate.

## 2.4 Hydrogeology

### 2.4.1 Surface Water

Very little surface water exists in the Tularosa Basin due to low rainfall and high evaporation rates. Surface water near AMRAD is limited to playas and arroyos during intermittent precipitation events. No surface water exists at the site due to the high permeability of the soils and the absence of drainage channels.

### 2.4.2 Regional Hydrogeology

The AMRAD facility receives its water supply thru a 6-inch supply line off the WSMR Main Post water distribution system. The Main Post obtains its potable water supply from the aquifer located in the upper bolson deposits adjacent to the Organ Mountains. The majority of

the groundwater recharge to this bolson aquifer occurs through the coarse, unconsolidated Tertiary/Quaternary alluvial fan deposits and arroyos along the eastern flank of the Organ, San Agustin and San Andres Mountains. This aquifer consists of a wedge-shaped belt of potable water more than 30-miles long (from north to south), and 3-5 miles east from the mountain front. Groundwater in the vicinity of the Main Post is of sufficient quality, less than 1,000 milligrams per liter (mg/L) total dissolved solids (TDS), for human consumption. McClean (1970) reported this freshwater zone extends down to about 1,800 ft bgs.

Recharge to the regional aquifer is from precipitation falling on the mountain ranges and alluvial fans, which border the bolson on the west. This precipitation infiltrates the unconsolidated, relatively coarse deposits of the alluvial fans, and the resultant groundwater flows toward the center of the Tularosa Basin, generally to the east-southeast. However, groundwater flow direction within the western Tularosa Basin region is presumed to discharge to the south as underflow into the contiguous, northern Hueco Basin of western Texas. No surface expressions of groundwater discharge have been reported within the western Tularosa Basin. Dissolved constituents in groundwater increase with distance eastward from the mountain front, reflecting the increased residence time of groundwater moving from the western bolson margin toward the center of the Tularosa Basin.

### 2.4.3 Local Hydrogeology

The depth to groundwater at the site is not known. Neither groundwater nor saturated soil was encountered during the drilling investigation, which extended to a maximum depth of 81.5 ft bgs. The groundwater quality in the area is also unknown but is suspected to be only moderately saline due to the proximity of the alluvial deposits along the Jarilla Mountains.

The two nearest known wells were used to estimate the depth and quality of groundwater. These locations are at the Lincoln-Otero Landfill, located approximately 7 miles. northeast of the AMRAD Facility, and the Nuclear Effects Directorate East (NED-East), located approximately 7 miles. southwest of the AMRAD Facility. Table 2-1 identifies the depth to groundwater and TDS levels at both these locations. The depth to groundwater beneath the AMRAD Facility is estimated to be between 200-250 ft bgs and the TDS level of the groundwater is estimated to be approximately 7,000 mg/kg.

**Table 2-1. Groundwater Depth and Quality at nearby wells.**

| Location | Depth to Groundwater | TDS Level of Groundwater |
|---|---|---|
| Lincoln-Otero Landfill | 200 ft bgs | 7,000 mg/kg |
| NED-East | 250 ft bgs | 7,000 mg/kg |

## 2.5 Land Use

The AMRAD Facility was constructed to support the Advanced Ballistics Re-Entry System (ABRES) Program during the 1960s. The large radar dish at the site was used to track incoming missiles launched from the Green River Launch Complex, Green River, Utah. Upon completion of the ABRES Program, the AMRAD Facility was used to support various other programs at WSMR. These included programs to measure the performance and limitations of electro-optical/guided weapon systems and related components in countermeasures

environments, involving laser and pyrotechnic environments. The facility remains active at present time, but the radar dish is no longer used. The number of personnel working at the site is estimated to be ten or less.

## 3.0 SUMMARY OF PREVIOUS SITE WORK

Three hand auger and one drilling investigation were conducted to define the nature and extent of contamination. A brief summary of those investigations, as contained in the Release Assessment for Leaking Underground Storage Tank Located at the AMRAD Facility, January 2002, is described below. All original laboratory data was provided previously in the above stated report and therefore is not duplicated herein. Assessment document was submitted to the NMED in 2002 for review and approval. An outline of previous work done at the site is below:

- 1997 Found during Range wide UST survey
- 1998 Feb, Hand auger investigation #1 performed to determine if there had been a leak
  Analytical results revealed motor oil (transformer oil) in soils
- 1998 March, first reported to NMED HWB
- 1998 April, Hand auger investigation #2 performed to determine the extent of the oil leak.
  Analytical results revealed motor oil (transformer oil) in soils was the only analyte of concern and it was limited to backfill surrounding the tank
- 1998 April, Hand auger investigation #3 performed additional soil samples to determine if solvents were in the soil
  Analytical results revealed no VOCs (solvents)
- 1998 December, Structural analysis of Fence and Anchor system
  Analysis results revealed that excavation of the tank was not feasible
- 2000 April, Drilling investigation performed to gather soil samples at greater depths to determine motor oil range organics, total RCRA metals and SVOCs.
  Analytical results revealed that motor oil range organics, and SVOCs were all below detection limits. The total RCRA metals were found to be naturally occurring.
- 2002 March, Risk assessment and Closure action document was submitted to the NMED for review and approval.
- 2003 March, The VCM Workplan Document was submitted to NMED HWB
- 2003 October, Prepared and submitted documentation for WSMR Real Property Planning Board Action (RPPBA) and Record of Environmental Consideration (REC)
- 2004 April, Prepared Utility Clearances documentation
- 2004 July, Submitted VCM Workplan to NMED
- 2004 August, Closed UST as described in VCM work plan

### 3.1 Hand Auger Investigation on 3-4 February 1998

On 4 February 1998, the water/oil mixture within the UST was removed and properly disposed, and the UST triple rinsed. The decontamination water was analyzed and found to contain only trace organic contaminants consistent with oil residue. The results are provided in the

assessment document (MEVATEC, 2002). As part of the proposed in-place closure activities, eight soil samples were collected (3-4 February 1998) from various locations and depths surrounding the UST to determine if the contents of the UST had leaked to the surrounding soil. The vertical extent of the hand auger investigation was limited to approximately 10 ft bgs due to a large concrete anchor located beneath the UST. The anchor is illustrated in Figure 3-1 as well as the location of the borings.

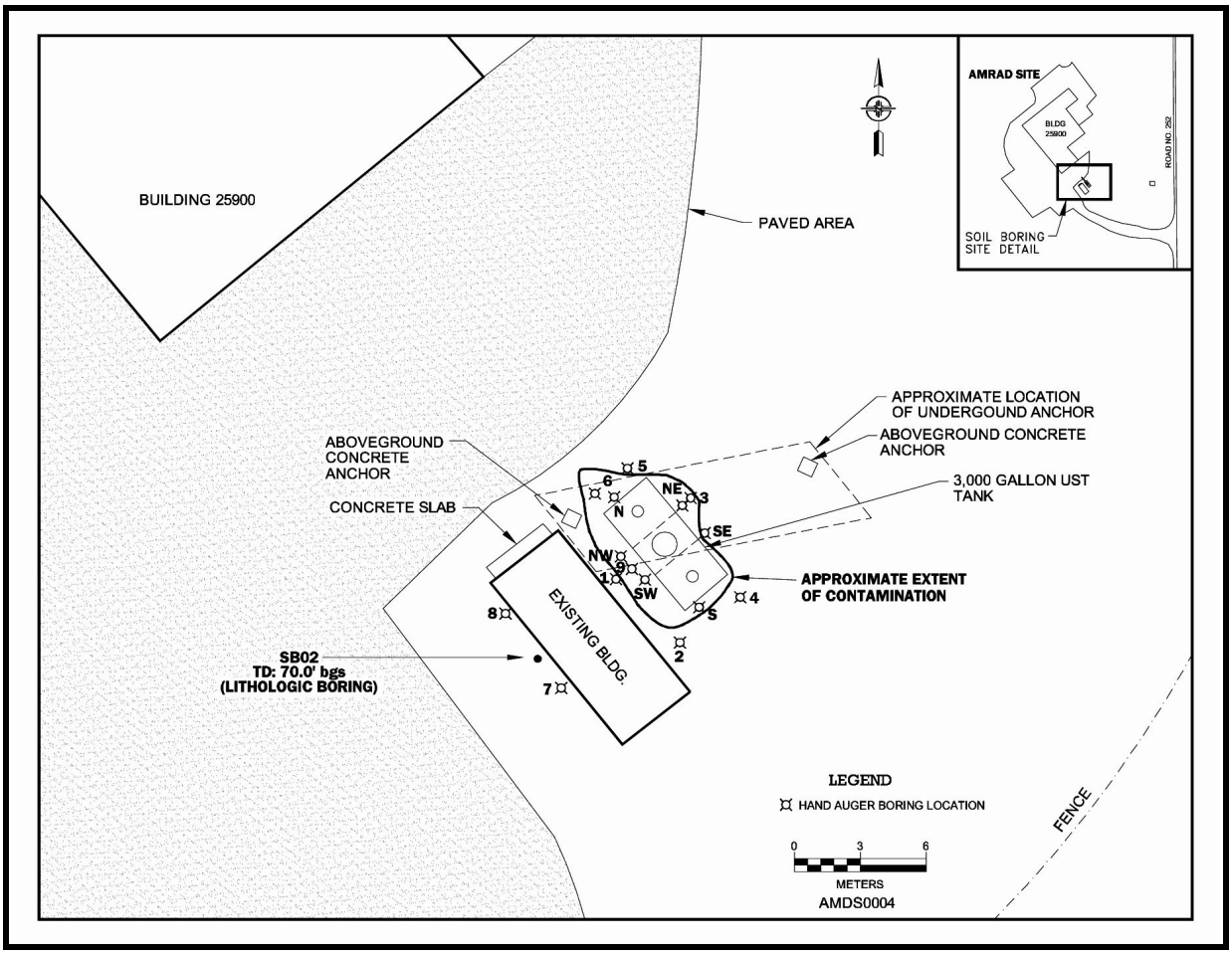


**Figure 3-1.**
**Extent of Contamination Determined by the Hand Auger Investigation.**

Soil samples were submitted to Hall Environmental Analysis Laboratory (Albuquerque, NM) for total petroleum hydrocarbons in the diesel and motor oil ranges by U.S. EPA Method 8015. The results are summarized in Table 3-1. The concentrations ranged from less than the detection limit of 50 mg/kg to 16,000 mg/kg for motor oil. Diesel Range Organics were not detected. Several of the more heavily contaminated soil samples were also tested for gasoline range organics (GRO) and polychlorinated biphenyls (PCBs). PCBs and GRO were not detected in any of the samples.

**Table 3-1. Analytical Results of Hand Auger Investigations.**

| Boring ID | Depth (ft) | Date Collected | DRO (mg/kg) | GRO (mg/kg) | Motor Oil (mg/kg) | PCBs (mg/kg) | VOCs (mg/kg) | OCD TPH criteria (mg/kg) |
|---|---|---|---|---|---|---|---|---|
| ***Detection Limit →*** | | | **5** | **5** | **50** | **0.010 – 0.050** | **0.010 – 0.030** | **NA** |
| S | 8 | 2/3/98 | ND | NA | 3,400 | NA | NA | 5,000 |
| SE | 8.67 | 2/3/98 | ND | NA | ND | NA | NA | 5,000 |
| SW | 3 | 2/4/98 | ND | NA | **9,400** | NA | NA | 5,000 |
| SW | 8.33 | 2/4/98 | ND | ND | **16,000** | ND | NA | 5,000 |
| North | 8.33 | 2/4/98 | ND | NA | **5,400** | NA | NA | 5,000 |
| NE | 8.33 | 2/4/98 | ND | NA | 3,900 | NA | NA | 5,000 |
| NW | 3.5 | 2/4/98 | ND | ND | 3,100 | ND | NA | 5,000 |
| NW | 8.33 | 2/4/98 | ND | ND | **7,900** | ND | NA | 5,000 |
| 1 | 7.5 | 4/28/98 | ND | NA | ND | NA | NA | 5,000 |
| 1 | 9.5 | 4/28/98 | ND | NA | ND | NA | NA | 5,000 |
| 2 | 9.42 | 4/28/98 | ND | NA | ND | NA | NA | 5,000 |
| 3 | 5.83 | 4/28/98 | ND | NA | ND | NA | NA | 5,000 |
| 3 | 9 | 4/28/98 | ND | NA | 130 | NA | NA | 5,000 |
| 4 | 10 | 4/28/98 | ND | NA | ND | NA | NA | 5,000 |
| 5 | 3.75 | 4/28/98 | ND | NA | ND | NA | NA | 5,000 |
| 5 | 10 | 4/28/98 | ND | NA | ND | NA | NA | 5,000 |
| 6 | 5.5 | 4/28/98 | ND | NA | ND | NA | NA | 5,000 |
| 6 | 10 | 4/28/98 | ND | NA | 8.8 | NA | NA | 5,000 |
| 8 | 5 | 4/28/98 | ND | NA | ND | NA | NA | 5,000 |
| 9 | 5.67 | 5/18/98 | ND | NA | **7,300** | NA | ND | 5,000 |
| 9 | 8.17 | 5/18/98 | ND | NA | **13,000** | NA | ND | 5,000 |

Notes:
PCBs – Polychlorinated Biphenyls
ND – Not Detected
Bolded font results exceed the OCD TPH criteria.
VOCs – Volatile Organic Compounds
NA – Not Analyzed
ft – feet
BH – Borehole

## 3.2 Hand Auger Investigation on 28 April 1998

On 28 April 1998, eleven additional soil samples (Boreholes 1 – 8) were collected from various locations and depths surrounding the UST using a hand auger to further define the horizontal and vertical extent of hydrocarbon contamination. The vertical extent of the hand auger investigation was again limited to 10 ft bgs due to a large concrete anchor located beneath the UST. Soil samples were analyzed for total petroleum hydrocarbons in the diesel and motor oil ranges by U.S. EPA Method 8015. The results are summarized in Table 3-1. The concentrations ranged from less than the detection limit of 50 mg/kg to 130 mg/kg for motor oil. Diesel Range Organics were not detected.

Based on analytical results from the 3-4 February 1998 and 28 April 1998 hand auger investigations (Table 3-1), contamination appeared to be concentrated within sandy backfill material located immediately surrounding the UST, and potentially surrounding the adjacent concrete anchor system. The approximate horizontal extent of contamination is shown in Figure 3-1. The vertical extent of contamination could not be determined using hand augers.

## 3.3 Collection of Additional Soil Samples on 18 May 1998

On 18 May 1998, additional soil samples (Borehole 9) were collected from known hydrocarbon contaminated soil adjacent to the UST for volatile organic compound (VOC) analysis by U.S. EPA Method 8260, to determine if solvents were present in the surrounding soil. Soil samples were also analyzed for total petroleum hydrocarbons in the diesel and motor oil ranges

by U.S. EPA Method 8015. The results are summarized in Table 3-1. Based on analytical results, solvents and diesel range organics were not present in the contaminated soil, but motor oil range hydrocarbons were detected at up to 13, 000 mg/kg.

## 3.4 Structural Analysis of the Radio Frequency Fence and Associated Anchor System

On 22 December 1998, a structural engineer from The Land Group (Las Cruces, NM) visited AMRAD facility to assess the anchor system located beneath the subject UST. The ensuing report (contained in the assessment report, previously submitted) recommended that a new anchor system, in excess of 158,000 pounds in mass, should be installed at a new location (to be determined), and all guy wires transferred to the new anchor prior to removal of the UST. However, construction of a new anchor system per the specifications of the structural engineer was determined by WSMR to be prohibitively expensive, thus triggering the requirement for a drilling investigation, per NMED GWQB guidelines, to support in-place closure.

## 3.5 Drilling Investigation on 3-6 April 2000

A total of seven soil borings were drilled surrounding the UST between April 3 and April 6, 2000. The location of each soil boring is shown in Figure 3-2. All borings were drilled using a CME 75 continuous-flight, hollow-stem auger drill rig. Soil samples were collected using a split-barrel sampler.

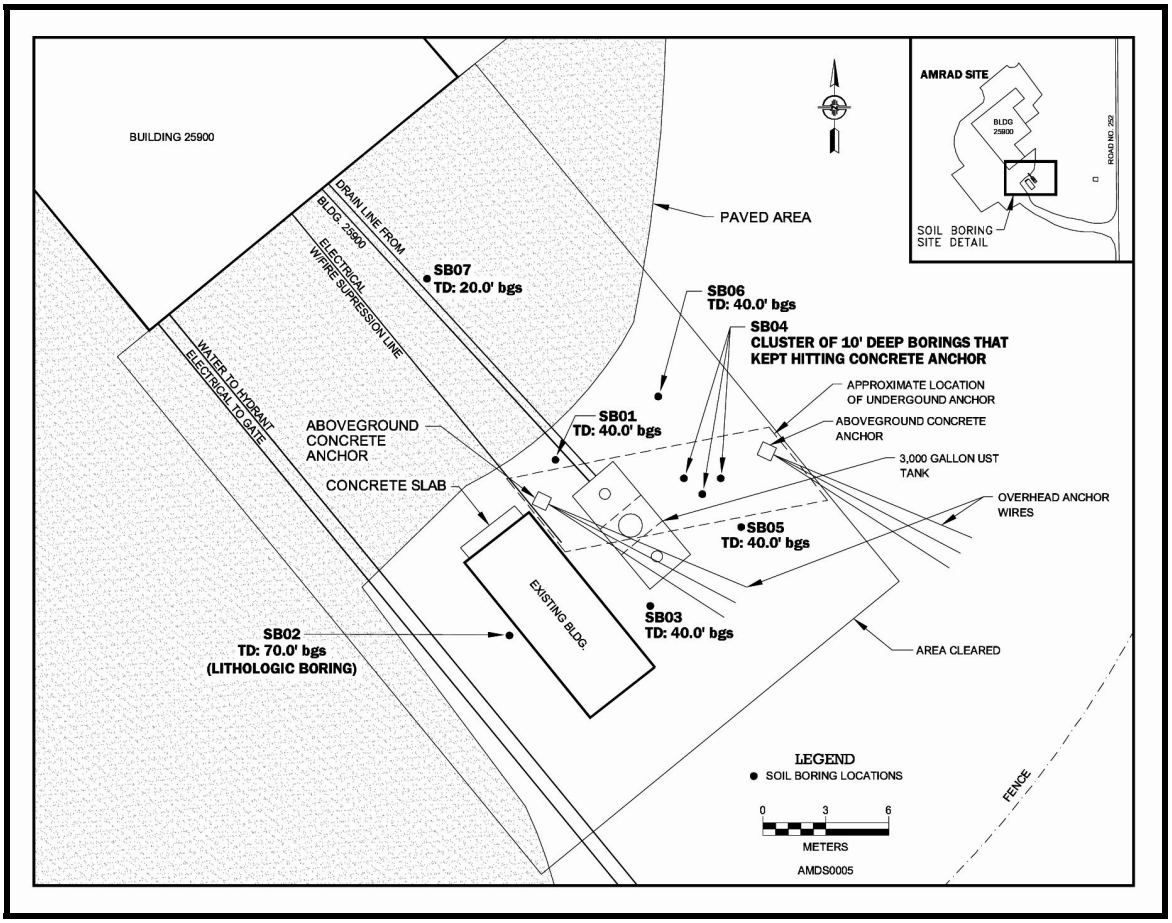


**Figure 3-2. Location of Soil Borings from the Drilling Investigation.**

The investigative depth of soil boring SB04 was limited to 10 ft bgs due to the concrete anchor system beneath and adjacent to the east side of the UST. Lithologic soil samples were collected from soil boring SB02 for inclusion in the WSMR Lithologic Library.

Soil samples were submitted to Assaigai Analytical Laboratory, Inc. (Albuquerque, NM) for hydrocarbon analysis by U.S. EPA Method 8015, Modified for Motor Oil Range Organics. Selected samples were additionally analyzed for Total Resource Conservation and Recovery Act (RCRA) Metals by U.S. EPA Method 6010A and semi-volatile organic compounds (SVOC) by U.S. EPA Method 8270. Approximately 10 percent of the soil samples were split and sent to second lab for quality assurance (QA) analysis.

Table 3-2 presents the analytical results for motor oil range organics, total RCRA metals and SVOCs. SVOCs were not detected in any of the soil samples collected.

**Table 3-2. Analytical Results of Drilling Investigation.**

| Location | Labcode | Depth (ft) | Date Collected | Motor Oil (mg/kg) | Arsenic (mg/kg) | Barium (mg/kg) | Chromium (mg/kg) | Lead (mg/kg) | Selenium (mg/kg) | SVOCs (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Detection Limit --->** | | | | **5** | **3** | **0.5** | **1** | **2** | **2.5** | **varies** |
| SB01 | 4069-01 | 4.5-6.5 | 4/3/00 | **600** | NA | NA | NA | NA | NA | NA |
| SB01 | 4069-02 | 9.5-11.5 | 4/3/00 | ND | NA | NA | NA | NA | NA | ND |
| SB01 | 4069-03 | 14.5-16.5 | 4/3/00 | ND | ND | **88.8** | **8.3** | **6.3** | **7.9** | NA |
| SB01 | 4069-04 | 19.5-21.5 | 4/3/00 | ND | NA | NA | NA | NA | NA | NA |
| SB01 | 4069-05 | 24.5-26.5 | 4/3/00 | ND | NA | NA | NA | NA | NA | NA |
| SB01 | 4069-06 | 29.5-31.5 | 4/3/00 | ND | NA | NA | NA | NA | NA | NA |
| SB01 | 4069-07 | 34.5-36.5 | 4/3/00 | ND | NA | NA | NA | NA | NA | NA |
| SB01 | 4069-08 | 39.5-41.5 | 4/3/00 | ND | ND | **36** | **2** | ND | **4.2** | ND |
| SB01 | 4069-09 | 44.5-46.5 | 4/3/00 | ND | NA | NA | NA | NA | NA | NA |
| SB01 | 4069-10 | 49.5-51.5 | 4/3/00 | ND | NA | NA | NA | NA | NA | NA |
| SB01 | 4069-11 | 54.5-56.5 | 4/4/00 | ND | NA | NA | NA | NA | NA | NA |
| SB01 | 4069-12 | 59.5-61.5 | 4/4/00 | ND | NA | NA | NA | NA | NA | NA |
| SB01 | 4069-13 | 64.5-66.5 | 4/4/00 | ND | NA | NA | NA | NA | NA | NA |
| SB01 | 4069-14 | 69.5-71.5 | 4/4/00 | ND | NA | NA | NA | NA | NA | NA |
| SB01 | 4069-15 | 74.5-76.5 | 4/4/00 | ND | NA | NA | NA | NA | NA | NA |
| SB01 | 4069-16 | 79.5-81.5 | 4/4/00 | ND | **4.1** | **317** | **10.6** | **18.3** | **11.2** | ND |
| SB02 | 4069-17 | 4.5-5.0 | 4/4/00 | ND | NA | NA | NA | NA | NA | NA |
| SB02 | 4069-18 | 9.5-10.0 | 4/4/00 | ND | NA | NA | NA | NA | NA | NA |
| SB02 | 4069-19 | 14.5-15.0 | 4/4/00 | ND | NA | NA | NA | NA | NA | ND |
| SB02 | 4069-20 | 19.5-20.0 | 4/4/00 | ND | **4.5** | **50.6** | **5.0** | **6.5** | **5.0** | NA |
| SB02 | 4069-21 | 24.5-25.0 | 4/4/00 | ND | NA | NA | NA | NA | NA | NA |
| SB02 | 4069-22 | 29.5-30.0 | 4/4/00 | ND | NA | NA | NA | NA | NA | NA |
| SB02 | 4069-23 | 34.5-35.0 | 4/4/00 | ND | NA | NA | NA | NA | NA | NA |
| SB02 | 4069-24 | 39.5-40.0 | 4/4/00 | ND | NA | NA | NA | NA | NA | NA |

| Location | Labcode | Depth (ft) | Date Collected | Motor Oil (mg/kg) | Arsenic (mg/kg) | Barium (mg/kg) | Chromium (mg/kg) | Lead (mg/kg) | Selenium (mg/kg) | SVOCs (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Detection Limit --->** | | | | **5** | **3** | **0.5** | **1** | **2** | **2.5** | **varies** |
| SB02 | 4069-25 | 44.5-45.0 | 4/4/00 | ND | NA | NA | NA | NA | NA | NA |
| SB02 | 4069-26 | 49.5-50.0 | 4/4/00 | ND | ND | **25.5** | ND | **25.5** | ND | ND |
| SB02 | 4069-27 | 54.5-55.0 | 4/4/00 | ND | NA | NA | NA | NA | NA | NA |
| SB02 | 4069-28 | 59.5-60.0 | 4/4/00 | ND | NA | NA | NA | NA | NA | NA |
| SB02 | 4069-29 | 64.5-65.0 | 4/4/00 | ND | NA | NA | NA | NA | NA | NA |
| SB02 | 4069-30 | 69.5-70.0 | 4/4/00 | ND | ND | **118** | **7.5** | **13.9** | **2.5** | ND |
| SB03 | 4086-01 | 9.5-10.0 | 4/5/00 | ND | NA | NA | NA | NA | NA | NA |
| SB03 | 4086-02 | 14.5-15.0 | 4/5/00 | ND | NA | NA | NA | NA | NA | ND |
| SB03 | 4086-03 | 19.5-20.0 | 4/5/00 | ND | ND | **28.2** | **4.2** | **6.4** | **2.6** | NA |
| SB03 | 4086-04 | 24.5-25.0 | 4/5/00 | ND | NA | NA | NA | NA | NA | NA |
| SB03 | 4086-05 | 29.5-30.0 | 4/5/00 | ND | NA | NA | NA | NA | NA | NA |
| SB03 | 4086-06 | 34.5-35.0 | 4/5/00 | ND | NA | NA | NA | NA | NA | NA |
| SB03 | 4086-07 | 39.5-40.0 | 4/5/00 | ND | ND | **11.4** | **1.6** | ND | **4.6** | ND |
| SB04 | 4086-08 | 9.5-10.0 | 4/5/00 | **51** | NA | NA | NA | NA | NA | NA |
| SB05 | 4071-1 | 10-10.5 | 4/6/00 | ND | NA | NA | NA | NA | NA | NA |
| SB05 | 4071-2 | 14.5-15.0 | 4/6/00 | ND | NA | NA | NA | NA | NA | ND |
| SB05 | 4071-3 | 19.5-20.0 | 4/6/00 | ND | **4.5** | **122** | **5.7** | **6** | **7.4** | NA |
| SB05 | 4071-4 | 24.5-25.0 | 4/6/00 | ND | NA | NA | NA | NA | NA | NA |
| SB05 | 4071-5 | 29.5-30.0 | 4/6/00 | ND | NA | NA | NA | NA | NA | NA |
| SB05 | 4071-6 | 34.5-35.0 | 4/6/00 | ND | NA | NA | NA | NA | NA | NA |
| SB05 | 4071-7 | 39.5-40.0 | 4/6/00 | ND | ND | **6.8** | **1.4** | ND | **4.1** | ND |
| SB06 | 4071-8 | 4.5-5.0 | 4/6/00 | ND | NA | NA | NA | NA | NA | NA |
| SB06 | 4071-9 | 9.5-10.0 | 4/6/00 | ND | NA | NA | NA | NA | NA | NA |
| SB06 | 4071-10 | 14.5-15.0 | 4/6/00 | ND | NA | NA | NA | NA | NA | ND |
| SB06 | 4071-11 | 19.5-20.0 | 4/6/00 | ND | **3.1** | **67.2** | **6.9** | **8.1** | **5.6** | NA |
| SB06 | 4071-12 | 24.5-25.0 | 4/6/00 | ND | NA | NA | NA | NA | NA | NA |
| SB06 | 4071-13 | 29.5-30.0 | 4/6/00 | ND | NA | NA | NA | NA | NA | NA |
| SB06 | 4071-14 | 34.5-35.0 | 4/6/00 | ND | NA | NA | NA | NA | NA | NA |
| SB06 | 4071-15 | 39.5-40.0 | 4/6/00 | **2** | ND | **46.6** | **1.5** | ND | **3.3** | ND |
| SB07 | 4071-16 | 4.5-5.0 | 4/6/00 | ND | NA | NA | NA | NA | NA | NA |
| SB07 | 4071-17 | 9.5-10.0 | 4/6/00 | ND | **3.4** | **121** | **8** | **16.3** | **6.6** | ND |
| SB07 | 4071-18 | 14.5-15.0 | 4/6/00 | ND | NA | NA | NA | NA | NA | NA |
| SB07 | 4071-19 | 19.5-20.0 | 4/6/00 | ND | **3.9** | **54.4** | **8.2** | **13.9** | **6.9** | ND |

SVOCs – Semi-Volatile Organic Compounds
ft – feet
ND – Not Detected
NA – Not Analyzed
Bolded font results exceed the Detection Limit

# 4.0 HUMAN HEALTH RISK ASSESSMENT

## 4.1 Nature and Extent of Contamination

The site investigations indicate that a release had occurred from the 3,000-gallon UST. Motor oil range organics have been detected, however no VOCs or SVOCs are present in the soil at the site. The small size of the spill and limited horizontal and vertical extent of the oil suggests that the tank overflowed its contents on to the ground surface.

The volume of oil lost to the environment could not be determine, but the evidence from the site investigations suggests that the volume was very small and is limited to the sand backfill material immediately surrounding the tank. Figures 4-1, 4-2, and 4-3 present the approximate horizontal and vertical extent of contamination, as determined from all investigations performed at the site.

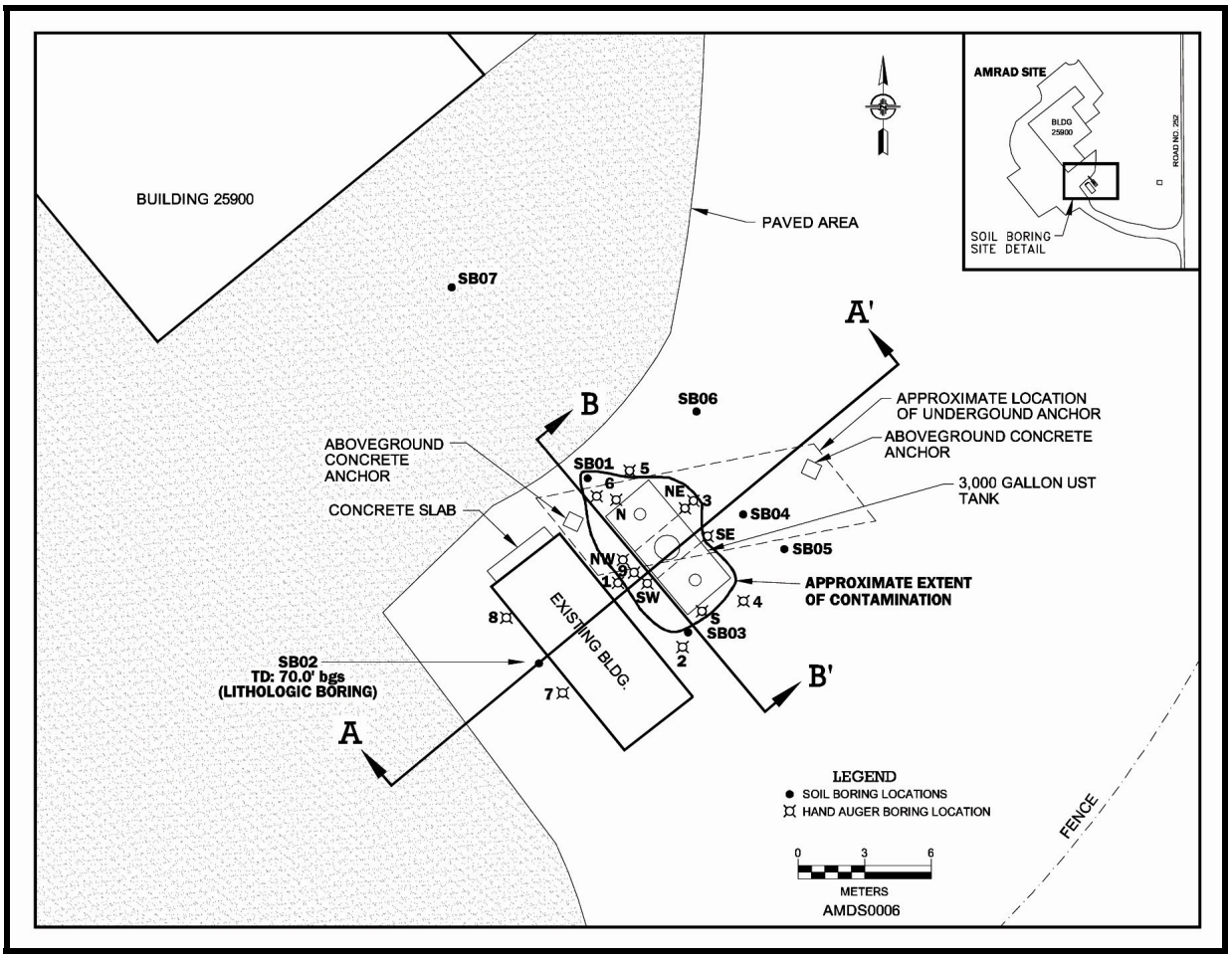


**Figure 4-1.**
**Map showing estimated extent of contamination and cross-sections A-A and B-B.**

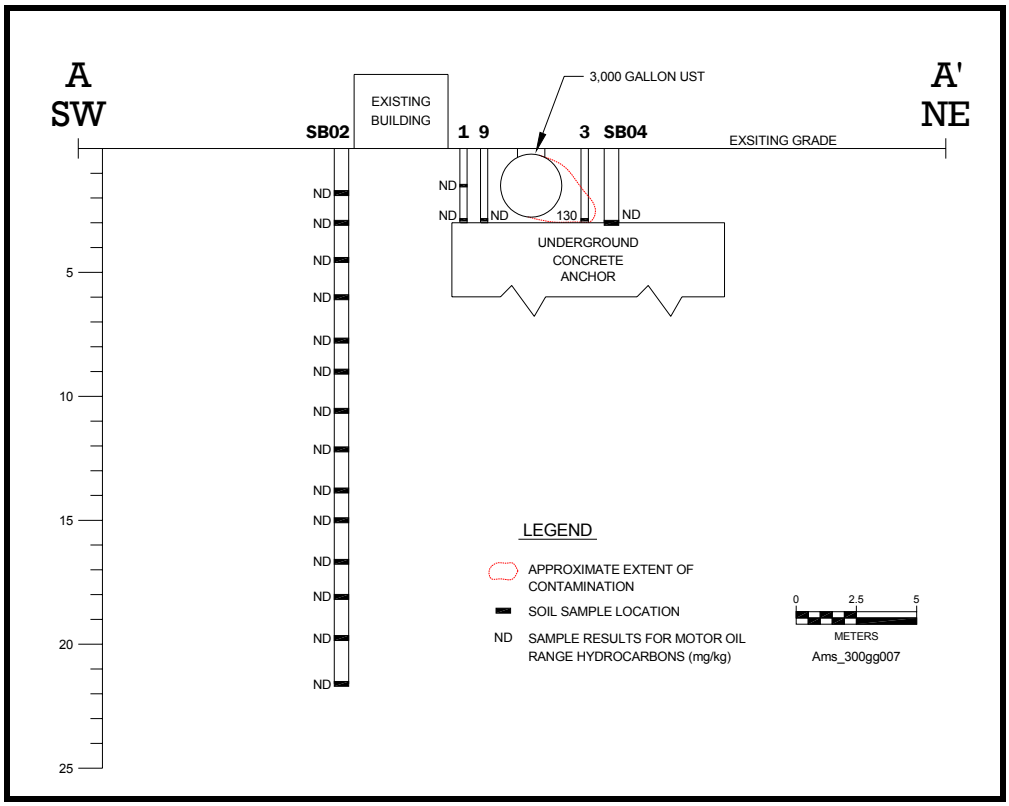


**Figure 4-2. Estimated Vertical Extent of Contamination along Section A-A.**

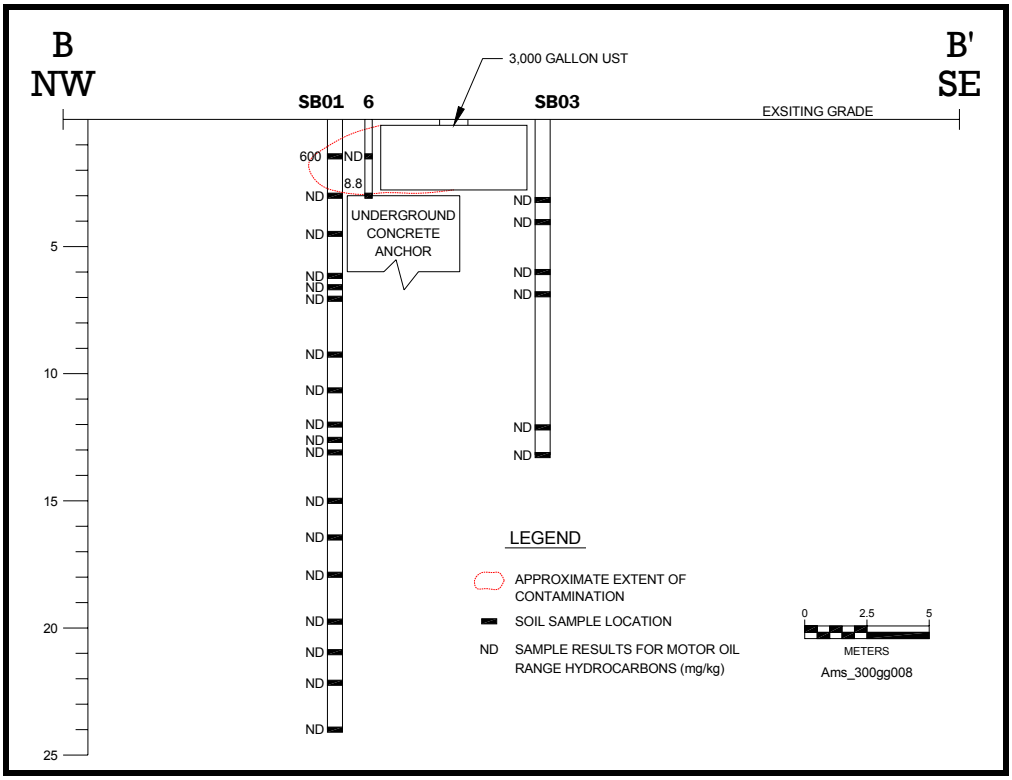


**Figure 4-3. Estimated Vertical Extent of Contamination along Section B-B.**

## 4.2 Conceptual Site Model

A conceptual site model (CSM) for exposure was developed for the site and is provided in Figure 4-4. The CSM is a schematic representation of the chemical source areas, chemical release mechanisms, environmental transport media, potential exposure routes, and potential receptors. The purpose of the CSM is to represent chemical sources and exposure pathways that may result in human health or ecological risks and to aid in identifying significant contaminant sources and exposure pathways.

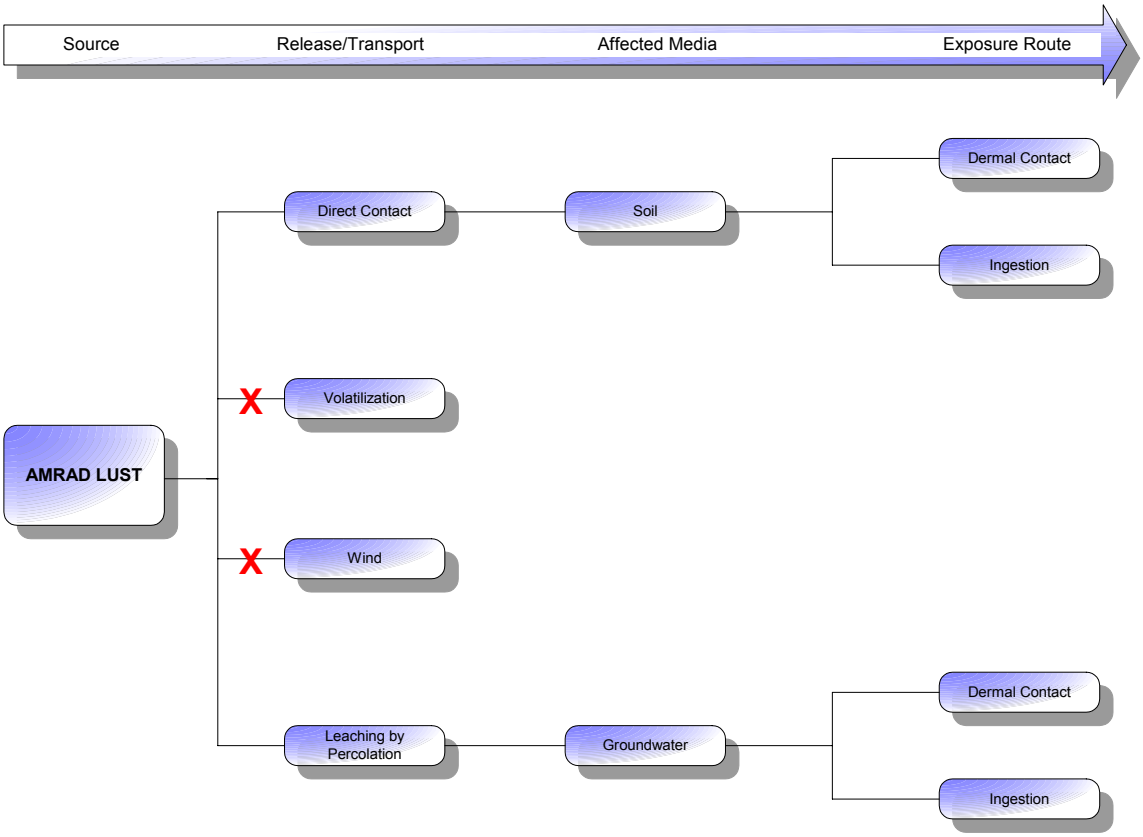


**Figure 4-4. Conceptual Site Model.**

Only potentially complete and significant exposure pathways are evaluated in risk assessment. A complete exposure pathway includes all of the following elements:

- A source and mechanism of contaminant release.
- A transport or contact medium (e.g., air or soil).
- An exposure point where humans can contact the contaminated medium.
- An exposure route (e.g., ingestion or inhalation).

The absence of any one of these elements results in an incomplete exposure pathway. Where there is no potential human exposure, there is no potential human health risk. A pathway may be potentially complete but insignificant if the transport process is considered to result in insignificant concentrations of chemicals in the exposure media, or if the amount of exposure to the media is considered to be insignificant.

## 4.3 Exposure Assessment

The source of the contaminants detected during the site investigation is the used oil once contained in the 3,000-gallon underground storage tank. The oil was most likely released by overfilling of the tank.

The environmental media directly impacted by the release is the soil surrounding the tank. The vertical extent of soil contamination was less than 10 feet beneath the ground surface. Although groundwater was not impacted directly by the release, it is possible that groundwater could be affected through leaching by percolation and will be considered in the assessment. Air is not considered to be an affected media, since the only contaminants detected have a low tendency to volatilize. Release of contaminants into the air through wind erosion is considered unlikely since the affected area is very small and is covered with gravel.

Workers are potentially exposed to the release of chemicals in an industrial setting at this facility. However, for the purposes of addressing human exposure in the most conservative manner, residential exposure scenarios will be used. As such, the following potentially complete and significant exposure routes will be considered:

- Ingestion of groundwater;
- Dermal contact with groundwater;
- Incidental ingestion of soil; and
- Dermal contact with soil

## 4.4 Naturally Occurring Contaminants

Background samples were not obtained during the AMRAD site investigations. However, there is much chemical data available for the area through the National Uranium Resource Evaluation Program (NURE). NURE collected approximately 260,000 samples throughout the continental U.S. and analyzed stream, lake, pond, spring and playa sediments and soils for Barium (Ba), Cerium (Ce), Chromium (Cr), Copper (Cu), Iron (Fe), Hafnium (Hf), Sodium (Na), Lead (Pb), Thorium (Th), Titanium (Ti), Uranium (U), and Zinc (Zn) among others.

The NURE Program collected many soil samples in New Mexico but not all have been analyzed nor have results been published. Chemical data available for the AMRAD site included Barium (Ba), Chromium (Cr) and Lead (Pb). Arsenic (As) and Selenium (Se) have not been analyzed for soils near AMRAD thus, NURE data was not available. Therefore Barium (Ba), Chromium (Cr) and Lead (Pb) were compared and deductions as to the nature of the Arsenic (As) and Selenium (Se) concentrations were made.

The NURE data was screened and selected based on the soil classification of the material sampled. As described earlier, the soils in the area of AMRAD are Dune Land-Dona Ana complex (DU). Onite-Bluepoint-Wink associations (OB) are comparable to DU and are subjected to similar source materials and soil forming processes. The NURE samples obtained from the two soil mapping units (DU and OB) were used for development of background metal concentrations at AMRAD. Figure 4-5 shows the distribution of NURE samples in the two soil mapping units surrounding AMRAD. The legend shows the color code for the mapping units.

The map was developed using two soil surveys, which used different nomenclature for the same soils. The key indicates the synonymous abbreviations (ie. BOA and OB).

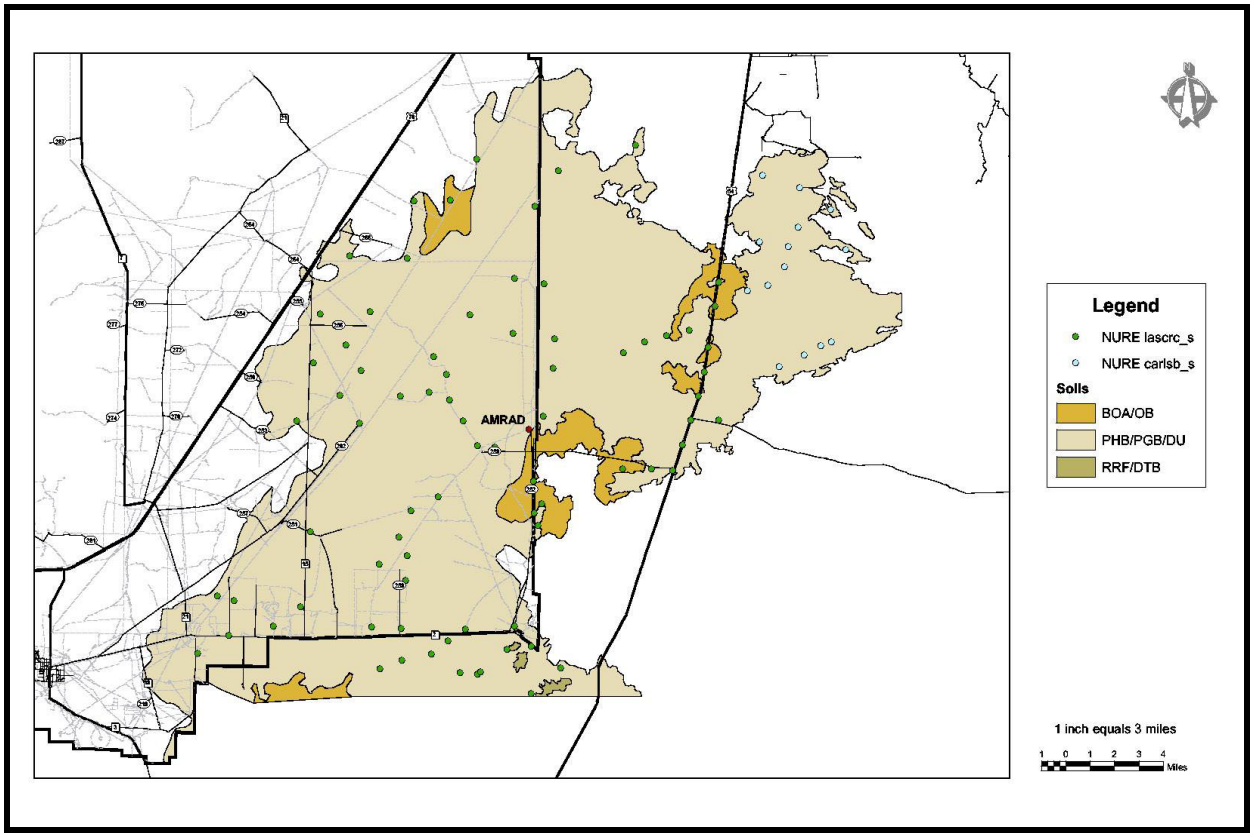


**Figure 4-5. NURE sample locations relative to AMRAD.**

There were 91 NURE samples that were collected near AMRAD from soils with similar source materials and soil forming processes. The background metal concentrations were compared to the investigation results by performing some basic statistical analysis.

A concentration term was developed for each of the detected metals in the NURE and investigation samples using the EPA guidance, "Calculating Exposure Concentrations at Hazardous Waste Sites (EPA, 2002). The concentration term, expressed as the 95% upper confidence limit (UCL) was calculated using the software ProUCL v 2.0 and the methods referred to in the EPA guidance document. Since all of the data was non parametric, the standard bootstrap method was used to calculate the 95% UCL as provided in the EPA guidance. The statistical analysis results are provided in Tables 4-1.

The background concentration of Barium (Ba), Chromium (Cr) and Lead (Pb), expressed as the UCL95, all exceed the UCL95 value of the investigation samples. Although NURE data was not available for Selenium (Se) or Arsenic (As) in the study area, they are also to be assumed to be naturally occurring, since neither is known to be associated with the oil and the highest detections of each had corresponding concentrations of motor oil range total petroleum hydrocarbons below the detection limit.

**Table 4-1. Statistical Comparisons of Metal Results.**

| | Investigation Samples | | | | | Background Data | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | UCL95 | Max | Min | Number of Data | Mean | UCL95 | Max | Min | Number of Data |
| Arsenic | 2.64 | 3.17 | 4.5 | <3 | 15 | NA | NA | NA | NA | NA |
| Barium | 94.03 | 236.9 | 317 | 6.8 | 15 | 492.3 | 503.6 | 619 | 216 | 91 |
| Chromium | 5.45 | 6.83 | 10.6 | <1 | 15 | 21.89 | 23 | 54 | 10 | 91 |
| Lead | 9.57 | 13.06 | 25.5 | <2 | 15 | 14.77 | 15.89 | 32 | < 5 | 91 |
| Selenium | 5.62 | 6.97 | 11.2 | <2.5 | 15 | NA | NA | NA | NA | NA |

### 4.5 Screening Evaluation

All of the metals detected in the confirmation samples have been shown to be present at naturally occurring concentrations for the area. The only other analyte detected was motor oil range total petroleum hydrocarbons (TPH). In determining standards for TPH in development of the VCM work plan, WSMR used the then-current New Mexico Department of Energy, Minerals, and Natural Resources Oil Conservation Division (OCD) criteria for TPH due to no RCRA regulated constituents having exceeded HWB cleanup levels. Utilizing the ranking scheme established by the OCD, the TPH cleanup level at this site would be 5,000 mg/kg. Estimation of the 95% upper confidence limit provided a concentration for the contaminated soil of 1,433 mg/kg.

Therefore, it is presumed that the motor oil range contaminants present do not warrant further consideration since they are relatively immobile and are isolated in the fill material surrounding the UST. As a result, there were no contaminants of potential concern identified during the screening evaluation in the human health risk assessment.

## 5.0 ECOLOGICAL RISK ASSESSMENT

An ecological site visit was performed and the corresponding report and assessment checklist are included in the VCM Workplan. The report found that a complete exposure pathway does not exist at the site. The small size of the spill and the lack of any sensitive habitats or species of concern limit the potential for this spill site to have any measurable detrimental affect to the environment or environmental receptors. Therefore, an ecological risk assessment was not further evaluated.

## 6.0 PREPARATORY WORK PRIOR TO CLOSURE OF THE TANK

The sections below describe the preparatory work prior to filling the tank.

### 6.1 Notification of Closure to NMED

WSMR sent a notification letter dated on 03 July 2004 to the NMED HWB indicating the intent to permanently close the AMRAD UST (Appendix A).

### 6.2 RPPBA and Record Environmental Consideration

All necessary documentation required to complete the Real Property Planning Board Action (RPPBA) and Record of Environmental Consideration (REC) for the proposed action was submitted and approved by WSMR on 08 October 2003 (Appendix B).

### 6.3 Utility clearance

All utility clearances (gas, water, electric, & Communications) were obtained on 04 April and 14 April 2004. Copies of the signed clearances are provided in (Appendix C).

## 7.0 TANK CLOSURE ACTIONS

### 7.1 Closure Actions

It is known the 3,000-gallon UST released oil into the soil immediately around the tank. Normally, the tank would be removed and the contaminated soils would be excavated and disposed due to their shallow depth and limited extent. This option is not practical due to the presence of an anchor for the massive radio frequency fence located beneath the tank.

Therefore, WSMR proposed in the VCM work plan that the tank be closed according to the Petroleum Storage Tank Rules for in-place closure of a tank (20.5.8.801). During 02 August 2004, the UST located at AMRAD Facility (Building 25900) was closed by filling with flowable fill and sealing all openings shut. The tank had previously been emptied and triple rinsed on 4 February 1998.

WSMR completed the closure of the tank 14 days after submittal of the VCM work plan to the NMED HWB.

The sections below outline the action taken in the closure of the UST.

### 7.2 Site inspection on 30 June 2004 (Preparation for Closure)

A site inspection occurred on 30 June 2004. Preparations for closure began with the removal of gravel that was covering the vent, fill pipe and main opening. Excavation around the main opening revealed a concrete vault. The outside dimension of the concrete vault, are approximately 4 feet (ft) by 4-ft [1.2 meters (m) x 1.2-m]. The original concept was that the tank had only one main opening coming out of the ground when in fact there were two openings (Photograph 7-1). The external opening into the vault is 17.5 inches wide [44.5 centimeter (cm)] and the second open within the vault leading into the tank is 16.5 inches wide [41.9 centimeters (cm)]. The internal dimensions of the concrete vault are approximately 22 inches in height by 30 inches in width [55.9 centimeters (cm) by 76.2 (cm)]. Appendix D is a conceptual drawing of the UST. It was concluded that to seal the tank, flowable fill would need to be poured into the tank first, and then fill the concrete vault, and finally fill the vent and fill pipes. The vent pipe was above ground level, therefore it would need to be cut below ground level and filled to seal it off. During the site inspection, the vent pipe was measured to be from ground level to 22 inches in height [55.9 centimeters (cm)], whereas the fill pipe was a few inches below ground level. Both pipes are 3 inches in diameter. It was decided that the vent pipe would need to be cut before the tank was sealed off. Before leaving the site all openings into the tank were covered to ensure that there were no conduits leading from the surface into the tank.

**Photograph 7-1. The two opening into the concrete vault.**

## 7.3 Return to Site on 29 July 2004 (Preparations for Closure)

The site was again visited on 29 July 2004 to prepare the site for filling of the tank. Activities included the removal of more gravel and soil from around the openings. Once gravel and soil was removed from around the vent pipe, a pipe cutter was used to cut the vent pipe approximately 6 inches bgs (Photograph 7-2). Before leaving the site, the vent pipe opening was covered with sheet metal to prevent any debris falling into the tank. All other openings were covered.

**Photograph 7-2. Cutting vent pipe.**

## 7.4 Filling and Closure of Tank on 08 August 2004

As previously discussed all contents from the UST were emptied and triple rinsed prior to sealing the tank. On 08 August 2004, closure of the UST began. The White Sands Environment and Safety Directorate's (WS-ES) environmental contractor, BAE Systems, oversaw all activities. Closure of the UST was accomplished by filling the tank with approximately 15 cubic yards of flowable material (a mixture of sand, concrete, fly ash and water) provided by JOBE Inc of El Paso, Texas to the top of the interior opening (Photograph 7-3). The vent and fill pipes were then filled to ensure that the material was filling the tank sides and to seal off the pipes from the surface (Photograph 7-4). The vault was last to be sealed off (Photograph 7-5). The tank was closed for approximately one month for the flowable material to cure. On 24 August 2004 the tank was checked to ensure that the flowable fill material had set properly.

**Photograph 7-3. Flowable fill being poured into main opening.**

**Photograph 7-4. Flowable fill being poured into fill pipe.**

**Photograph 7-5. Vault opening sealed.**

The 3,000-gallon UST located near Building 25900 at the AMRAD Facility was closed in-place per the methods provided in the New Mexico Petroleum Storage Tank regulations (20 New Mexico Administrative Code, Chapter 5, Part 8) on 08 August 2004. Due to existing infrastructure at the site, removal of the tank and surrounding contaminated soil was not feasible.

## 8.0 NO FURTHER ACTION PROPOSAL

On the basis of the site investigation results no further action is proposed. The following paragraphs provide the rationale and criterion for this proposal.

### 8.1 Rationale

The results of the site investigations at the AMRAD UST site (SWMU 164) indicate that the release of oil from the UST is limited to the fill material immediately surrounding the tank. The tank and contaminated soils cannot be removed without endangering the radio frequency fence that surrounds the facility. There were no contaminants of concern identified in the human health risk assessment. The low mobility of the oil through soil and the limited size of contamination preclude the danger of groundwater becoming contaminated. Although a release to the ground surface occurred at the site, the potential for exposure via the soil, air, and surface water pathways is considered incomplete. An ecological assessment excluded the need for further evaluation since there was no viable ecological habitat impacted by the release.

### 8.2 Criterion

The criterion applied to this site is **NFA Criterion 5** as described by the NMED:

"The SWMU has been characterized in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use" (HRMB, 1998).

### 8.3 Conclusion

Based on the results of the site investigations, WSMR believed that the AMRAD UST does not pose a serious or imminent threat to human health or environment. The most appropriate action was to closed UST in-place using the methods provided in the New Mexico Petroleum Storage Tank regulations (20 New Mexico Administrative Code, Chapter 5, Part 8).

The extent of the contamination from the release of the oil was held in surface tension by the soil surrounding the tank. Evaluation of the analytical data showed that motor oil range organics was the only detected analyte. The metal concentration were compared against background concentrations and found to be at naturally occurring levels. The motor oil range contaminants present did not warrant further consideration since no other analysis revealed detectable concentration of pollutants. Furthermore motor oil range organics are relatively immobile and the limited size of contamination, groundwater beneath the site is not in danger of becoming contaminated as a result of the release. Although a release to the ground surface occurred at the site, the potential for exposure via the soil, air, and surface water pathways is considered incomplete.

Excavation of the tank and contaminated soils cannot be removed without endangering the radio frequency fence that surrounds the facility. Construction of a new anchor system was determined by WSMR to be prohibitively expensive. Therefore, WSMR maintains that in-place closure of the UST is the most appropriate closure action for this site. Following in-place closure of the UST, the minor amount of contaminated soil remaining should not be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or the use of property.

## REFERENCES

BAE Systems, 2003. Final Voluntary Corrective Measures Workplan for AMRAD UST Site.

EPA, 2002. Calculating Exposure Point Concentrations at Hazardous Waste Sites – Draft, OSWER 9285.6-10.

HRMB, 1998. *HRMB Standard Operating Procedures Manual, Volume 1 – External.*

Kelly, T.E. 1973. Summary of Groundwater Data, Post Headquarters and Adjacent Areas, White Sands Missile Range: U.S. Geological Survey Open File Report 72-308.

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McClean, J.S., 1970. Saline Groundwater Resources of the Tularosa Basin, New Mexico: Department of the Interior, U.S. Office of Saline Water Research and Development Progress Report 561, 128 p.

MEVATEC Corporation, 2002. Release Assessment for Underground Storage Tank Located at the AMRAD Facility (Building 2590).

Neher, R.E. and Bailey, O.F., 1976. *Soil Survey of White Sands Missile Range, New Mexico*: U.S. Department of Agriculture.

New Mexico Environment Improvement Board, June 2000. *New Mexico Hazardous Waste Management Regulations (20 NMAC 4.1)*. Sante Fe, New Mexico.

White Sands Missile Range 1998. White Sands Missile Range Range-wide Environmental Impact Statement. Directorate of Environment and Safety, Environmental Services Division, White Sands Missile Range, New Mexico.

# APPENDIX A

Confirmation of submittal of VCM work plan to NMED

**DEPARTMENT OF THE ARMY**
**U.S. ARMY GARRISON WHITE SANDS**
**100 Headquarters Avenue**
**WHITE SANDS MISSILE RANGE, NEW MEXICO 88002-5000**

REPLY TO
ATTENTION OF
Environment and Safety Directorate

May 26, 2004

RECEIVED
JUN 2004
NMED Hazardous
Waste Bureau

Mr. James Bearzi
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

**SUBJECT: Initiation of Voluntary Corrective Measure at the AMRAD UST Site.**

Dear Mr. Bearzi:

White Sands Missile Range (WSMR) has been investigating the spill of motor oil at the AMRAD Site in accordance with the Resource Conservation and Recovery Act (RCRA), as administered by the New Mexico Environment Department (NMED), Hazardous Waste Bureau. This site was first discovered and reported to the NMED Hazardous Waste Bureau on March 3, 1998. Following completion of the field investigation in April 2000, the NMED Hazardous Waste Bureau (HWB) listed the site in the White Sands Annual Unit Audit (June 2000) as Solid Waste Management Unit (SWMU) Number 164.

Based on the concentrations of the motor oil at the different levels below the surface and the distance from the ground water table, WSMR believes that this site does not pose a serious or an imminent threat to human health or the environment. However the site requires remediation and closure if we are going to use it in the future to support our military mission. Further WSMR has funding available to carry the work forward. Therefore, WSMR intends to carry out the in place closure as described in the attached, *Voluntary Corrective Measure Work-plan (VCM) for AMRAD UST Site SWMU 164*, dated March 2003. WSMR will provide your office with an appropriate report upon completion of the VCM.

We remain actively committed to meeting our environmental compliance responsibilities and appreciate your understanding and support on this issue.

Copies of this letter are being provided to Mr. James Harris, EPA Region VI; Mr. Larry King, EPA Region VI; Mr. Glenn von Gonten, NMED HWB; Mr. Steve Pullen, NMED HWB; Ms. Cheryl Frischkorn, NMED HSB; Mr James Pigg, SJA; and BAE SYSTEMS.

Mr. Joaquin A. Rosales remains the overall action officer for this effort and he may be reached at (505) 678-1007 for further discussion on this subject. Mr. Fred Bourger of BAE Systems is the assigned technical manager for the project. He may be reached at (505) 678-3426.

Sincerely,

Thomas A. Ladd

Thomas A. Ladd
Director, Environment and Safety Directorate

Enclosure

# APPENDIX B

Request for Real Property Planning Board Action at AMRAD UST Site
and Record of Environmental Consideration

SFIM-SW-WS-IS-A (210-20)

S: 17 Feb 04
FEB 03 2004

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Limited WSMR Real Property Planning Board Action 014-04, Siting for the Closure of an Underground Storage Tank and Associated Work at AMRAD UST Site

1. Signature on this sheet constitutes Limited WSMR Real Property Planning Board concurrence and/or approval of this action as shown on enclosed sheets.

2. Nonconcurrence should be stated in an endorsement to this memorandum.

3. Concurrences:

| ORG | SIGNATURE | DATE | ORG | SIGNATURE | DATE |
|---|---|---|---|---|---|
| IS-O | | | NR | | |
| ES | Peggy Hoffer For TA Ladd | 2/12/04 | CCM | | |
| CA | | | TGOR | | |
| SD | | | IS-E | | |
| AMSRL | | | NASA | | |
| ST | | | DOD-AFC | | |
| ATRC-W | | | PHD-WS Det | | |
| IO | | | IS-C | | |
| NR-F | | | IG | | |
| IS-M | | | IS-A (RE) | | |
| IS-A | | | | | |

4. Limited WSMR Real Property Planning Board Action is processed in accordance with DF dated, 5 Apr 84, subject: Appointment of WSMR Real Property Planning Board.

5. Request concurrence/nonconcurrence NLT 17 Feb 04. If additional time is needed for response, please call IS-A, 678-1125/2252

6. Point of contact for this action is Lee D. Trujillo, IS-A, 678-2252.

FOR THE DIRECTOR OF INSTALLATION SUPPORT:

Stephen P. Zediak

STEPHEN P. ZEDIAK, P.E.
Chief, Master Planning Division

Encls

SFIM-SW-WS-IS-A (210-20)
SUBJECT: Limited WSMR Real Property Planning Board Action 014-04, Siting for the Closure of an Underground Storage Tank and Associated Work at AMRAD UST Site

DISTRIBUTION:

| | | | | |
|---|---|---|---|---|
| NR-F | AMSRL | *IS-O | *ST | *SD |
| DOD-AFC | CA | CCM | TGOR | ATRC-W |
| PHD-WS Det | *NR | *IG | *IO | *ES |
| *IS-C | *IS-E | IS-M | NASA | *IS-A (RE) |
| *IS-A | | | | |

IS-EM
IS-A

SFIM-SW-WS-ES

26 JAN 2004

MEMORANDUM THRU Director, IS

FOR IS-EM

SUBJECT: Request for Real Property Planning Board Action – AMRAD UST Site

1. Request a Real Property Planning Board Action for the AMRAD UST Site. The proposed activity will involve the filling of a former underground storage tank (UST) and the capping of associated drains in building number 25900. Additional details are provided in the enclosed *RPPBA Submittal Form.*

2. Point of Contact is Mr. Gene Forsythe who remains the overall action officer for this effort and he may be reached at 678-1007. Mr. Joaquin Rosales is the assigned technical inspector for this project, and he may be reached at 678-6470 for further discussion on this subject.

Thomas A. Ladd
THOMAS A. LADD
Director, Environment and Safety Directorate

Encl

RPPBA 014-04
ENCLOSURE

**RPPBA Submittal Form**
White Sands Missile Range, NM

Requester's Office Submittal: -WS-ES-EC Date: 23 January 2004

POC's Name: Joaquin Rosales Phone No. 678-6470

Project Title: AMRAD UST Diesel Spill Investigation UDS NO. _____ CWE: $30 $ (000)

Work Request No. EWS : n/a Type of Funds: n/a

Specific location of project site: AMRAD (example, Main Post)

Project Location: In Cantonment Area Outside Cantonment Area ■

Recommendation to ES-S that a UXO Survey be done: YES ☐ NO ■

**Type of proposed construction:** (Please check appropriate boxes)

BUILDINGS: *(additional forms req.)
- ☐ New
- ☐ Addition
- ☐ Portable
- ☐ Remodel/Alter
- ☐ Demolition

- ☐ UTILITIES:
- ☐ Gas
- ☐ Water
- ☐ Sanitary Sewer
- ☐ Wells
- ☐ Lighting
- ☐ Elec. (OH)
- ☐ Elec. (UG)
- ☐ Storm Sewer
- ☐ Commo

- ☐ OTHER STRUCTURES:
- ■ Tanks
- ☐ Helicopter Pad
- ☐ Tower
- ☐ Other, Monitor wells

- ☐ ROADS:
- ☐ Paved
- ☐ Gravel
- ☐ Graded

- ☐ FENCING:
- ☐ Building site
- ☐ Boundary

- ☐ LANDSCAPING:
- ☐ Trees and Scrubs
- ☐ Sprinkler system
- ☐ Decks (conc. Wood)
- ☐ Covers
- ☐ Car Ports

- ☐ SITE WORK:
- ☐ Clear and Grub
- ☐ Concrete Pad
- ☐ Berms (earthen)
- ☐ Handicapped Access

- ☐ SIGNS:
- ☐ Facility Info.
- ☐ Road or Street

RPPBA 014-04
ENCL-1 OF ENCL

Brief Description of Project: A 3,000-gallon underground storage tank (UST) was discovered near Building 25900 at the Anti-Missile Radar (AMRAD) Facility in 1997. As-built facility drawings indicated that the tank was a used for storage of waste oil generated at the site, presumably from operation of a large radar dish near the tank location. Due to existing infrastructure at the site, removal of the tank and surrounding contaminated soil was not feasible. White Sands completed a site investigation and initiated in-place closure activities including removal of the contents and triple rinsing of the tank. The proposed scope of work will provide in place closure of the tank by; filling the tank with a light strength concrete and capping all associated drains in Building 25900.

1. UDS number for the action if applicable. **TBD**

2. Real Property Planning Board Action number. **TBD**

3. The proposed action beginning date and the ending date. **30 January 2004 – 31 March 2004**
4. Length of the assessed project at White Sands Missile Range, in weeks (this is the total time the project will be operating at White Sands Missile Range including periods of little or no activity). **16 Weeks**
5. Total operating budget of the assessed project (at White Sands Missile Range) in thousands of dollars. **Approximately $30k**

6. Major Category of project/action to be assessed (see Appendix H for definitions). **Construction**

7. The name, office symbol, phone number, and fax number of the range sponsor. **Joaquin Rosales, WS-ES-EC, Phone Number: 678-6470, Fax: 678-1199, Email: rosalesj@wsmr.army.mil**

8. The name, office symbol, phone number, and fax number of the action proponent. **Joaquin Rosales, WS-ES-EC, Phone Number: 678-6470, Fax: 678-1199, Email: rosalesj@wsmr.army.mil**

9. UTM coordinates of the major actions (launch, impact, booster drop, construction points, etc.) with site names, if available, and short descriptions of what will take place at each site.

**The corrective measure described in the proposed action will take place at the following location;**
**AMRAD**
**Building 25900**
**Northing; 3599028.705 meters**
**Easting: 392739.493 meters**
**Note: The UTM coordinates are in NAD 83, Zone 13**

Justification for Project: Based on the results of the subsurface investigation, White Sands believes that additional work following RCRA Facility Investigation guidelines is not warranted. This drilling investigation verified that the release is generally held in surface tension by the soil surrounding the UST. Due to the low mobility of motor oil range hydrocarbons through soil and the limited size of contamination, groundwater beneath the site is not in danger of becoming contaminated as a result of the release. Other exposure pathways such as air and soil are not considered relevant due to the current and future land use and the low volatility of the motor oil range hydrocarbons. WS-ES-EC maintains that in-place closure of the UST is the most feasible closure action for this site by on the requirements.

*** Required forms attached:**
- ☒ General Site Plan
- ☐ Floor Plan and Elevation Plan
- ☐ Copy of approved Work Request Form EWS 1168
- ☐ Facility Request Form

IS-EM, Form 111-R-E, Rev. 08 Dec 01

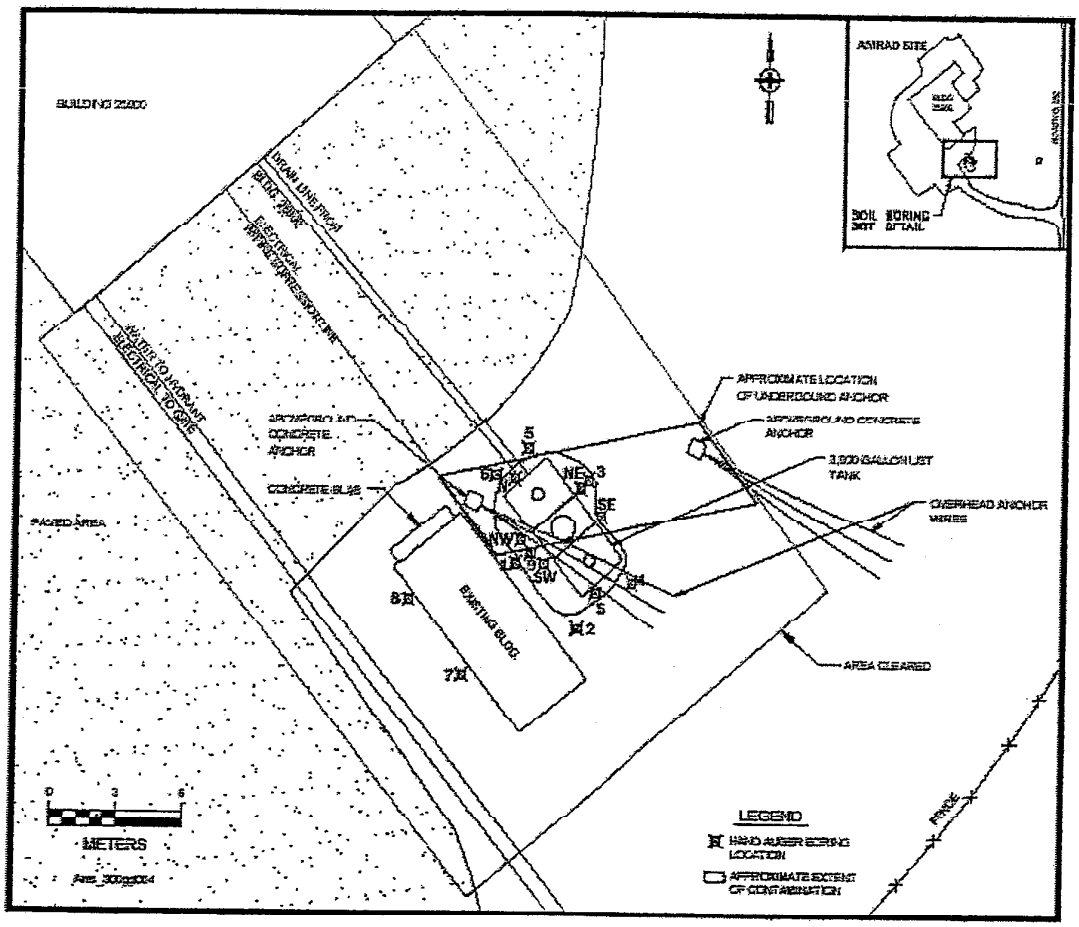


Figure 1 AMRAD UST Site Location

RPPBA 014-04
ENCL-2 OF ENCL

US ARMY WHITE SANDS MISSILE RANGE
WHITE SANDS MISSILE RANGE, NEW MEXICO 88002-5000

ENVIRONMENT AND SAFETY REVIEW
RECORD OF ENVIRONMENTAL CONSIDERATION
CONTROL NUMBER RC04031a

TITLE: Voluntary Corrective Measure for an Underground Storage Tank Closure at AMRAD

This proposed action has been reviewed in accordance with Army Regulation 200-2 and the National Environmental Policy Act. This type of proposed action is categorically excluded under the provisions of CX Section II.H2 (ISCP), AR 200-2, Appendix B and has been assessed in the White Sands Missile Range Range-wide Environmental Impact Statement. This action is supplemented by the analysis contained within this Environment and Safety Review.

CONCUR:

Peggy Hoffer DATE: 2/6/04
Chief, WS-ES-C, 678-7863

"The information contained herein is correct to the best of my knowledge. I agree to follow all specified environmental impact and safety risk reduction procedures. The enclosed description contains no information considered OPSEC sensitive or FOR OFFICIAL USE ONLY. I am aware of the hostile intelligence interest in open source publications and in the subject matter of the information I have reviewed for OPSEC purposes. I certify that I have sufficient technical expertise in the subject matter of this paper and that, to the best of my knowledge, the net benefit of this public release outweighs the potential damage to the essential secrecy of related programs of which I am aware."

CONCUR:

[signature] DATE: 2/6/04
Proponent Name/Office Symbol/Phone Number

APPROVE:

Thomas A. Ladd DATE: 2/10/04
THOMAS A. LADD
Director, Environment and Safety Directorate

WHITE SANDS MISSILE RANGE
ENVIRONMENTAL IMPACT AND SAFETY RISK REDUCTION PROCEDURES

The Proponent of the proposed action, described in this document, pp 1-9 (RC04031a), shall adhere to the following:

1. At this time, WS-ES is not aware of any major environmental concerns. Should any part of the proposed action change, the Proponent shall contact WS-ES-C in writing (c-mail is sufficient to santanalm@wsmr.army.mil).

2. All participants, including observers, visiting White Sands Missile Range shall receive a Safety/UXO Hazards Briefing. A statement shall be provided for each individual to sign, indicating that she/he has received the briefing, and the Proponent shall maintain the statement for follow-up monitoring.

3. The Proponent and the Proponent's contractor(s) shall comply with OSHA 1910 and 1926. If necessary, contact WS-ES-S (678-1211), for a copy of these requirements. All personnel (construction and operational) shall be briefed on the potential hazards and necessary precautions to be taken and procedures to be followed.

4. The use of any device that produces nonionizing radiation (i.e., lasers or radars), or produces ionizing radiation or contains radioactive material (i.e., x-ray machines, soil density gauges, lead paint analyzers, or industrial radiography equipment) must be coordinated with the Test Center Safety Office (678-1019) prior to use on WSMR.

5. All government- and contractor-owned vehicles and motorized heavy equipment shall be equipped with portable fire extinguisher (minimum 2.5-lb. dry chemical) and communications equipment (radio or cell phone).

6. All activities shall be restricted to previously disturbed areas, unless authorized by WS-ES.

7. Off-road/cross-county driving is prohibited. All vehicles shall stay in existing approved areas. This includes pedestrian activity related to this action.

8. The Proponent shall be responsible for spill prevention and cleanup. All fuel spills shall be promptly contained and reported (site and amount of spill) by dialing 911, if the spill is more than 25 gallons. If the spill is less than 25 gallons, WS-ES-EC (678-1007) shall be contacted immediately or within the next working day.

9. All project debris shall be removed from the project areas following the action. Cleanup and restoration of the area shall be coordinated with WS-ES-C and other WS-ES personnel, as determined necessary.

10. All construction activities shall employ standard construction dust control methods. These include minimizing soil disturbance, reducing vehicle speed, watering, etc.

11. Oil catch trays shall be placed under all vehicles parked for any long period of time (e.g., longer than a 24-hour period).

12. WS-ES-F (678-0470) shall be notified of water or other utility outages and any road closures for emergency response planning purposes.

13. The following restrictions shall apply to any/all trenching:

a. Avoid leaving trenches open overnight.

b. Where trenches cannot be backfilled immediately, escape ramps shall be constructed at least every 100 yards. Escape ramps shall be short lateral trenches sloping to the surface or wooden planks extending to the surface. The slope shall be less than 45 degrees (100%).

c. Trenches that have been left open overnight shall be inspected and animals removed prior to backfilling.

14. Fill dirt required for this approved construction activity shall be transported to the site from off the Range or from WS-ES approved borrow pits. No fill dirt shall be taken from any non-approved areas.

APPENDIX A

# VOLUNTARY CORRECTIVE MEASURES FOR AMRAD UNDERGROUND STORAGE TANK (UST) SITE (SWMU 164)

## 1. BACKGROUND/PURPOSE

An abandoned underground storage tank located at AMRAD was scheduled for closure in 1998. The tank contained oil from the operation of the large radar dish at the site. An investigation was conducted in February 1998 to determine whether the tank had leaked. Soil samples from directly adjacent to, and beneath the tank, indicated that an oil release had occurred. The concentrations in the motor oil organics range were from less than the analyzing laboratory detection limit of 50 mg/kg and up to 16,000 mg/kg. Diesel range organics, gasoline range organics, polychlorinated biphenyls and volatile organic compounds were not detected in any of the samples submitted for analysis.

A more thorough investigation was conducted in April 2000 to determine the vertical and horizontal extent of contamination. The results indicated that the contamination was limited to the backfill immediately surrounding the tank and extended to a depth of less than 40 feet. Evaluation of the analytical data showed that the range of organics detected indicated that motor oil was the only analyte present. Of 57 samples 55 were below the detection limits and the other two were 51 mg/kg and 600 mg/kg. Concentrations of semi-volatile organics were all below detection limit. The metal concentrations were compared against background concentrations and found to be at naturally occurring levels.

The Hazardous Waste Bureau (HWB) of the NMED does not have a regulatory criteria established for total petroleum hydrocarbons (TPH). They allow the use of the New Mexico Department of Energy, Minerals, and Natural Resources Oil Conservation Division (OCD) criteria for TPH if no RCRA regulated constituents exceed HWB cleanup levels. Utilizing the ranking scheme established by the OCD, the TPH cleanup level at this site would be 5,000 mg/kg. Estimation of the 95% upper confidence limit using the standard bootstrap method provided a concentration for the contaminated soil ***(including reported contaminant concentrations from the initial investigation)*** of 1,433 mg/kg.

Since the analysis revealed no detectable concentrations of pollutants other than motor oil organics and considering the low concentrations of these organics in almost all of the soil samples analyzed, further investigations were not warranted. Furthermore motor oil range organics are relatively immobile and the contamination is limited to the backfill immediately surrounding the tank. As a result, there were no contaminants of potential concern identified during the evaluation of human health and ecological risk.

## 2. NEED

The White Sands Missile Range believes that an in-place closure of the tank at AMRAD is appropriate given the minimal extent of contamination existing at the site. Excavation of the tank is not feasible since it creates an unsafe condition by undermining a major support structure for the adjacent radio frequency fencing. This report presents the basis for a Voluntary Corrective Measure (VCM) action at the site. Upon approval from the New Mexico Environment Department, the tank will be closed in place according to the methods provided in the New Mexico Petroleum Storage Tank regulations.

## 3. PROPOSED ACTION

The existing 3,000-gallon underground storage tank released oil into the soil immediately around the tank. Normally, the tank would be removed and the contaminated soils would be excavated and disposed of because of their shallow depth and limited extent. However, this is not practical because an anchor for the massive radio frequency fence lies beneath the tank. Therefore, it is proposed that the tank be closed according to the Petroleum Storage Tank Rules for in-place closure of a tank (20.5.8.801). This will be accomplished by filling the underground storage tank with a low strength concrete. All drains leading from the facility to the tank will also be plugged. The tank has already been emptied and triple rinsed. The White Sands Missile Range will complete closure of the tank upon acceptance of this Voluntary Corrective Measure Work Plan by the NMED Hazardous Waste Bureau.

## *APPENDIX B*

## *VOLUNTARY CORRECTIVE MEASURES FOR AMRAD UST SITE*
**(SWMU 164)**

1. UDS number for the action if applicable. **TBD**

2. Real Property Planning Board Action number. **TBD**

3. The proposed action beginning date and the ending date. **1 October 2003 – 30 January 2004**

4. Length of the assessed project at White Sands Missile Range, in weeks (this is the total time the project will be operating at White Sands Missile Range including periods of little or no activity). **16 Weeks**

5. Total operating budget of the assessed project (at White Sands Missile Range) in thousands of dollars. **Approximately $30k**

6. Major Category of project/action to be assessed (see Appendix H for definitions). **Construction**

7. The name, office symbol, phone number, and fax number of the range sponsor. **Joaquin Rosales, WS-ES-EC, Phone Number: 678-6470, Fax: 678-4028, Email: rosalesj@wsmr.army.mil**

8. The name, office symbol, phone number, and fax number of the action proponent. **Joaquin Rosales, WS-ES-EC, Phone Number: 678-6470, Fax: 678-4028, Email: rosalesj@wsmr.army.mil**

9. UTM coordinates of the major actions (launch, impact, booster drop, construction points, etc.) with site names, if available, and short descriptions of what will take place at each site.

**The corrective measure described in the proposed action will take place at the following location;**
**AMRAD**
**Building 25900**
**Northing; 3599028.705 meters**
**Easting: 392739.493 meters**
**Note: The UTM coordinates are in NAD 83, Zone 13**

## *APPENDIX C*

VOLUNTARY CORRECTIVE MEASURES FOR AMRAD UST SITE
**(SWMU 164)**

1. Type (gas, diesel, other) and number of government vehicles to be used by the project at White Sands Missile Range (these are government owned or operated vehicles which add to the vehicle count used in normal operations). **(1) GSA Gasoline pickup**

2. Type (gas, diesel, other) and number of contractor vehicles to be used by the project at White Sands Missile Range (these are contractor owned or operated vehicles which add to the vehicle count used in normal operations). **(2) Cement/concrete trucks, (1) Gasoline Pickup**

3. UTM coordinate pair location of all electrical generators. **None.**

4. Type, rating in kw, number of each respective generators. **None.**

5. UTM coordinate locations all noise sources over 85 dba. **None.**

6. Types and dba level for all respective noise emission sources above 85 dba. **None.**

7. Will a sonic boom be generated (yes/no)? **No.**

8. List the frequency (times/day) and time of day increment of any sonic boom(s) (0001-0400, 0401-0800, 0801-1200, 1201-1600, 1601-2000, 2001-2400). **N/A**

9. Names and quantities of chemicals, paints, solvents, oils, etc. utilized. **None.**

10. Will debris result from this action (yes/no)? (if yes, describe type, UTM location/predicted area, and force of impact in ft-lbs). **No.**

11. List the air contaminants emitted and their totals (lbs) and their totals per day and per hour (lbs/day, lbs/hr). **None.**

12. Latrine requirements (number and UTM locations). **None, existing in adjacent facility.**

13. Non-construction water use requirements (gal). **None.**

14. Water sources for drinking and sanitary water. **The contractor and subcontractors will supply their own drinking water.**

15. Does this action involve construction or facility renovation repair? (If yes complete Appendix D). **Yes.**

16. Does this action involve targets? (If yes complete Appendix E). **No.**

17. Does this action involve nonionizing radiation, i.e. any lasers, radar, microwave? (If yes complete Appendix F). **No.**

18. Does this action involve ionizing radiation producing devices, i.e. radiography cameras, soil density gauges, moisture density gauges, lead paint analyzers, x-ray equipment? (If yes, complete Appendix G.) **No.**

APPENDIX D

VOLUNTARY CORRECTIVE MEASURES FOR AMRAD UST SITE
**(SWMU 164)**

1. Estimated total cost of construction and/or repairs. **Approximately $30k**

2. Length of construction/repair, in weeks, start to finish. **16 weeks.**

3. Number of personnel participating in effort. **Four**

4. Types and numbers of specialized construction vehicles to be used (low boys, bulldozers, cranes, etc.). **(2) Cement/concrete trucks**

5. UTM coordinate pair locations of existing and new borrow pits to be used. **None.**

6. Number of cubic yards of soil to be removed from each respective borrow pit and pit dimensions (surface area in acres and depth in feet). **None.**

7. UTM coordinate pair of site location(s).

   **AMRAD**
   **Building 25900**
   **Northing; 3599028.705 meters**
   **Easting: 392739.493 meters**
   **Note: The UTM coordinates are in NAD 83, Zone 13**

8. Building numbers of structures to be effected (i.e. renovation, painting, upgrades, etc.). **None.**

9. Number of surface acres to be disturbed at each respective site. **The site is located within an improved active facility area.**

10. UTM coordinates of construction debris disposal and types of debris to be disposed of at each site. (lead, asbestos, concrete, wood, etc.). **None.**

11. Water sources for this action (location) and estimated volume (in gallons) to be used. **None. Concrete will be premixed offsite, no additional water will be required.**

12. Air pollution sources and UTM coordinates (rock crushing, batch plants, asphalt, etc.). **None, the subcontractor's concrete batch plant is located offsite (WSMR).**

SFIM-SW-WS-ES-C (200-2) 06 FEB 2004

MEMORANDUM FOR Director, WS-ES

SUBJECT: Approval of Record of Environmental Consideration (REC)

1. The WS-ES-C recommends your signature on the enclosed RC04031a for The Voluntary Corrective Measure for an Underground Storage Tank Closure at AMRAD. This action includes the in-place closure of the tank.

2. The point of contact for this action is Lisa Santana, WS-ES-C, at 678-2225/2641.

Encl
as

PEGGY HOFFER
Chief, WS-ES-C

| CONCURRENCES | | |
|---|---|---|
| CDR | INITIALS | DATE |
| -C | | 6 FEB 04 |
| EC | | 6 Feb 04 |

**Santana, Lisa M.**

---

**From:** Pigg, James
**Sent:** Thursday, February 05, 2004 4:11 PM
**To:** Santana, Lisa M.
**Cc:** Rosales, Joaquin; 'Fred.Bourger@baesystems.com'; Forsythe, Gene
**Subject:** FW: (RC04031a) VCM for UST closure at AMRAD

Lisa - the part of answer highlighted in red answered my question.Thanks.
Jim
-----Original Message-----
**From:** Rosales, Joaquin
**Sent:** Thursday, February 05, 2004 4:07 PM
**To:** Santana, Lisa M.
**Cc:** Pigg, James; Forsythe, Gene
**Subject:** FW: (RC04031a) VCM for UST closure at AMRAD

Lisa,

Please, let me know if further clarification is needed.

Thanks,

Joaquin
-----Original Message-----
**From:** Bourger, Fred [mailto:Fred.Bourger@baesystems.com]
**Sent:** Thursday, February 05, 2004 11:46 AM
**To:** Rosales, Joaquin
**Cc:** Forsythe, Gene
**Subject:** RE: (RC04031a) VCM for UST closure at AMRAD

Joaquin, here is some regulatory background on the site that will hopefully answer the mail. I will be in on Friday if y need any additional information. Fred

The UST was originally scheduled for in-place closure during the second quarter of Fiscal Year 1998. Several initial hand auger investigations performed at the site during 1998 indicated soil contamination of unknown size adjacent to a potentially beneath the UST. White Sands subsequently notified the New Mexico Environment Department (NMED) UST Bureau of the release. Inspection of the site by the NMED UST Bureau field inspector revealed that the UST wa not regulated by the New Mexico UST Regulations (20 New Mexico Administrative Code, Chapter 5, Part 1), and therefore fell under purview of the NMED Ground Water Quality Bureau (GWQB).

**Santana, Lisa M.**
**From:** Pigg, James
**Sent:** Tuesday, February 03, 2004 11:47 AM
**To:** Santana, Lisa M.
**Subject:** FW: (RC04031a) VCM for UST closure at AMRAD

A couple of questions to start with. First is this a registered or abandoned UST? Second, it sounds like an UST, if so, why isn't it being closed/remediated under the UST regulations (NMAC 20.5.1 to 20.5.17) rather than "voluntary" measures? I just had a question about a USAF UST, not sure if this is the same one or not. If it is a registered UST, then I would suggest saying the UST is being closed under the UST regulations -- so that would make 20.5.8.801 PERMANENT CLOSURE AND CHANGES-IN-SERVICE, precisely the correct regulation to follow.

I have suggested some editorial changes in the attachment.

20.5.8.799 NOTIFICATION OF TEMPORARY OR PERMANENT CLOSURE OR RETURN TO SERVICE:

A. At least 30 days before beginning either permanent closure, temporary closure, a change-in-service, or removal of a tank pursuant to Subsections B, C, or D of 20.5.8. NMAC, or within another reasonable time period if approved in advance in writing by the department, owners and operators shall notify the department orally or in writing of their intent to close or make the change-in-service, unless such action is in response to corrective action.

20.5.12.1200 GENERAL:

A. Owners and operators of petroleum storage tank systems shall take corrective action to address all releases, including such action as collection and analysis of relevant site-specific data, soil remediation, groundwater and surface water remediation and any other appropriate actions pursuant to this part, in a manner protective of public health, safety and welfare and the environment.

-----Original Message-----
**From:** Santana, Lisa M.
**Sent:** Thursday, January 22, 2004 7:43 AM
**To:** NEPA IPG
**Subject:** (RC04031a) VCM for UST closure at AMRAD

Lisa Santana
Environment and Safety Directorate
Customer Support Division
(505) 678-2641
White Sands Missile Range, NM 88002

All,

Below is the link for the Voluntary Corrective Measure for an Underground Storage Tank Closure at AMRAD due to

**Santana, Lisa M.**
**From:** Hoffer, Peggy
**Sent:** Tuesday, February 03, 2004 2:39 PM
**To:** Santana, Lisa M.; Pigg, James
**Cc:** Rosales, Joaquin; Forsythe, Gene
**Subject:** RE: (RC04031a) VCM for UST closure at AMRAD

Lisa, you sent the comments to the right place. Let Gene and Jim take it and get back to you to complete the NEPA process.

Jim, this action is not the AF request to remove a UST at the RATSCAT (I heard about it this morning from Gene at staff call). Separate actions.

Lisa, you'll start to hear about the AF's request to remove a UST at the RATSCAT...the apparent problem is we (ES-EC) weren't aware it was there, didn't report it to the state, etc. Gene will be working this with Jim AND the AF. Let them work it...it's not a "NEPA" issue, at least right now.

For my information and to double check my memory to see if I need to cut back on my beer intake, Lisa, the EA that HAFB just approved, that we were suppose to be a "cooperator", did NOT say anything about removing a UST, right?

PH

-----Original Message-----
**From:** Santana, Lisa M.
**Sent:** Tuesday, February 03, 2004 2:08 PM
**To:** Pigg, James
**Cc:** Rosales, Joaquin; Forsythe, Gene
**Subject:** RE: (RC04031a) VCM for UST closure at AMRAD

Jim,

Thanks for the comments. Unfortunately, I am not able to answer your questions so I cc:'d Gene and Joaquin. They are the proponents on the actions. Gene/Joaquin, as a customary practice whenever someone has changes to the DOPA....Are you both in agreement with the changes? Please let me know and I'll use this final draft for the REC.

Thank you,

Lisa Santana
Environment and Safety Directorate
Customer Support Division
(505) 678-2641
White Sands Missile Range, NM 88002

-----Original Message-----
**From:** Pigg, James
**Sent:** Tuesday, February 03, 2004 11:47 AM
**To:** Santana, Lisa M.
**Subject:** FW: (RC04031a) VCM for UST closure at AMRAD

**Santana, Lisa M.**

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**From:** Rosales, Joaquin
**Sent:** Thursday, February 05, 2004 4:07 PM
**To:** Santana, Lisa M.
**Cc:** Pigg, James; Forsythe, Gene
**Subject:** FW: (RC04031a) VCM for UST closure at AMRAD

Lisa,

Please, let me know if further clarification is needed.

Thanks,

Joaquin
-----Original Message-----
**From:** Bourger, Fred [mailto:Fred.Bourger@baesystems.com]
**Sent:** Thursday, February 05, 2004 11:46 AM
**To:** Rosales, Joaquin
**Cc:** Forsythe, Gene
**Subject:** RE: (RC04031a) VCM for UST closure at AMRAD

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The UST was originally scheduled for in-place closure during the second quarter of Fiscal Year 1998. Several initial hand auger investigations performed at the site during 1998 indicated soil contamination of unknown size adjacent to a potentially beneath the UST. White Sands subsequently notified the New Mexico Environment Department (NMED) UST Bureau of the release. Inspection of the site by the NMED UST Bureau field inspector revealed that the UST was not regulated by the New Mexico UST Regulations (20 New Mexico Administrative Code, Chapter 5, Part 1), and therefore fell under purview of the NMED Ground Water Quality Bureau (GWQB).

White Sands completed all subsequent site assessment activities under NMED GWQB guidance. Following completio of the field investigation in April 2000, the NMED Hazardous Waste Bureau listed the site in the White Sands Annual Unit Audit (June 2000) as Solid Waste Management Unit (SWMU) Number 164.

The VCM report was prepared in accordance with the regulations established under the Hazardous Waste Act (NMSA 1978, sections 74-4-1 through 14), Title 20 of the New Mexico Administrative Code, Chapter 4.1, Title 40 of the Code of Federal Regulations Parts 260-273 and the guidance published by the New Mexico Environment Department.

Removal of the tank was not the best option for closure since the tank sits ontop of a critical anchor for the radar fence associated with the AMRAD facility. This is information documented in the VCM.

---

**From:** Rosales, Joaquin [mailto:rosalesj@wsmr.army.mil]
**Sent:** Tue 2/3/2004 3:26 PM
**To:** Bourger, Fred
**Cc:** Forsythe, Gene
**Subject:** FW: (RC04031a) VCM for UST closure at AMRAD

Fred,

Please e mail me a response to the comments from JAG.

Thanks,

Joaquin
> -----Original Message-----
> From: Santana, Lisa M.
> Sent: Tuesday, February 03, 2004 2:08 PM
> To: Pigg, James
> Cc: Rosales, Joaquin; Forsythe, Gene
> Subject: RE: (RC04031a) VCM for UST closure at AMRAD
>
> Jim,
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> Thanks for the comments. Unfortunately, I am not able to answer your
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> actions. Gene/Joaquin, as a customary practice whenever someone has
> changes to the DOPA....Are you both in agreement with the changes? Please
> let me know and I'll use this final draft for the REC.
>
> Thank you,
>
> Lisa Santana
> Environment and Safety Directorate
> Customer Support Division
> (505) 678-2641
> White Sands Missile Range, NM 88002
>
> -----Original Message-----
> From: Pigg, James
> Sent: Tuesday, February 03, 2004 11:47 AM
> To: Santana, Lisa M.
> Subject: FW: (RC04031a) VCM for UST closure at AMRAD
>

> A couple of questions to start with. First is this a registered or
> abandoned UST? Second, it sounds like an UST, if so, why isn't it being
> closed/remediated under the UST regulations (NMAC 20.5.1 to 20.5.17)
> rather than "voluntary" measures? I just had a question about a USAF UST,
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> I would suggest saying the UST is being closed under the UST regulations
> -- so that would make 20.5.8.801 PERMANENT CLOSURE AND CHANGES-IN-SERVICE,
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> groundwater and surface water remediation and any other appropriate
> actions pursuant to this part, in a manner protective of public health,
> safety and welfare and the environment.
>
> -----Original Message-----
> From: Santana, Lisa M.
> Sent: Thursday, January 22, 2004 7:43 AM
> To: NEPA IPG
> Subject: (RC04031a) VCM for UST closure at AMRAD
>
>
>
> Lisa Santana
> Environment and Safety Directorate
> Customer Support Division
> (505) 678-2641
> White Sands Missile Range, NM 88002
>
>
> All,
>
> Below is the link for the Voluntary Corrective Measure for an
> Underground Storage Tank Closure at AMRAD due to
> a motor oil release. Please send me your comments electronically by
> February 5th.
>
>

> Thanks, Lisa
>
> << OLE Object: Microsoft Word Document >>
>
> If you are unable to open the links above:
>
> 1. Open the Z:drive
> 2. Open the "Environmental Documents" folder
> 3. Open the "IPG Projects" folder
> 4. Open the "RC04029a Green River..." folder Review documents.
>
>
>
>

**Santana, Lisa M.**
**From:** Aspelin, Mark (Contr. TNC)
**Sent:** Monday, January 26, 2004 11:52 AM
**To:** Santana, Lisa M.
**Subject:** RE: (RC04031a) VCM for UST closure at AMRAD

Hi Lisa,

Well it's not exactly a best management practice, but it sounds like they are meeting the letter of the law. Not sure if they will need to do any groundwater/soil monitoring in the future to see if the oil migrates over the long term...I suppose that is up to Gene.

Thanks!
Mark

-----Original Message-----
**From:** Santana, Lisa M.
**Sent:** Thursday, January 22, 2004 7:43 AM
**To:** NEPA IPG
**Subject:** (RC04031a) VCM for UST closure at AMRAD

Lisa Santana
Environment and Safety Directorate
Customer Support Division
(505) 678-2641
White Sands Missile Range, NM 88002

All,

Below is the link for the Voluntary Corrective Measure for an Underground Storage Tank Closure at AMRAD due to
a motor oil release. Please send me your comments electronically by February 5th.

Thanks, Lisa

<< OLE Object: Microsoft Word Document >>

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1. Open the Z:drive
2. Open the "Environmental Documents" folder
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## Santana, Lisa M.

**From:** Yehle, Bill
**Sent:** Thursday, January 22, 2004 7:49 AM
**To:** Santana, Lisa M.
**Subject:** RE: (RC04031a) VCM for UST closure at AMRAD

Lisa:

I have no comment or cultural resource issues for this undertaking.

William D. Yehle, M.A.
Senior Archaeologist
WS-ES-C

-----Original Message-----
**From:** Santana, Lisa M.
**Sent:** Thursday, January 22, 2004 7:43 AM
**To:** NEPA IPG
**Subject:** (RC04031a) VCM for UST closure at AMRAD

Lisa Santana
Environment and Safety Directorate
Customer Support Division
(505) 678-2641
White Sands Missile Range, NM 88002

All,

Below is the link for the Voluntary Corrective Measure for an Underground Storage Tank Closure at AMRAD due to a motor oil release. Please send me your comments electronically by February 5th.

Thanks, Lisa

<< OLE Object: Microsoft Word Document >>

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4. Open the "RC04029a Green River..." folder Review documents.

## Santana, Lisa M.

**From:** Sanchez, Alfredo
**Sent:** Wednesday, February 04, 2004 8:59 AM
**To:** Santana, Lisa M.
**Cc:** Sanchez, Leticia; Adams, Edward R.; Caro, Rene A.; Logan, Barbara J; Davis, Marcia N.
**Subject:** RE: (RC04031a) VCM for UST closure at AMRAD

We have reviewed the NEPA documents for the Underground Storage Tank Closure at AMRAD and found no NR operational issues or concerns.
Thanks.

Al Sanchez
Resources and Plans Division
National Range Directorate
CSTE-DTC-WS-NR-R
WSMR, NM 88002
Phone: 505-678-2019
DSN: 258-2019

-----Original Message-----
**From:** Santana, Lisa M.
**Sent:** Thursday, January 22, 2004 7:43 AM
**To:** NEPA IPG
**Subject:** (RC04031a) VCM for UST closure at AMRAD

Lisa Santana
Environment and Safety Directorate
Customer Support Division
(505) 678-2641
White Sands Missile Range, NM 88002

All,

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Thanks, Lisa

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3. Open the "IPG Projects" folder
4. Open the "RC04029a Green River..." folder Review documents.

## Santana, Lisa M.

**From:** Romero, Ken
**Sent:** Wednesday, February 04, 2004 3:57 PM
**To:** Santana, Lisa M.
**Cc:** Mathews, Bobbye
**Subject:** RE: (RC04031a) VCM for UST closure at AMRAD

Garrison Safety has no comments.

-----Original Message
**From:** Santana, Lisa M.
**Sent:** Thursday, January 22, 2004 7:43 AM
**To:** NEPA IPG
**Subject:** (RC04031a) VCM for UST closure at AMRAD

Lisa Santana
Environment and Safety Directorate
Customer Support Division
(505) 678-2641
White Sands Missile Range, NM 88002

All,

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Thanks, Lisa

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ROUTING AND TRANSMITTAL SLIP

06 FEB 04

| TO: (Name, office symbol, room number, building, Agency/Post) | Initials | Date |
|---|---|---|
| 1. KATHY T. | | |
| 2. PEGGY H. date/call prop./log/send | PH | 6 Feb 04 |
| 3. DOLORES R. | DR | 9 Feb 04 |
| 4. T.A. LADD | TAL | 10 Feb 04 |
| 5. | | |

| | | | | | |
|---|---|---|---|---|---|
| | Action | | File | | Note and Return |
| X | Approval | | For Clearance | | Per Conversation |
| | As Requested | | For Correction | | Prepare Reply |
| | Circulate | | For Your Information | | See Me |
| | Comment | | Investigate | X | Signature |
| | Coordination | | Justify | | |

REMARKS

RC 04031a = Voluntary Corrective Measure for an Underground Storage Tank Closure at Amrad.

04 FEB -9 13 .. 26

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)

LISA SANTANA
WS-ES-C

Room No.-Bldg. 163

Phone No. x 2641

DOD EXCEPTION TO OF41
APPROVED BY GSA/IRMS 4/89

OPTIONAL FORM 41 (Rev. 7-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.206

USAPPC V3.00

# APPENDIX C

Utility Clearance for AMRAD UST Site

MEMORANDUM FOR UTILITIES SERVICES SECTIONS

SUBJECT: UTILITY CLEARANCES

Site Location: AmRAD Bldg 25900
Work Order No:_____

1. Request that individuals locating existing utility lines at the designated site acknowledge identification of the utility by signing and dating next to the appropriate utility section listed below. See attached figure for planned locations of subsurface activities.

| DEPARTMENT | Signature/(Names Printed) | |
|---|---|---|
| GAS (3-2397) | (Ricardo E. Cercerie) | Date: 14 April 04 |
| WATER / SEWER (3-1917) | ( ) | Date: 14 April 04. |
| ELECTRICAL DEPT. (3-2851) | (James Harper) | Date: 4/14/04 |
| COMMO. SECTION (3-2162) | ( ) | Date: 4-15-04 |
| EOD SECTION (3-2035) | ( ) | Date: _____ |

2. Above clearance does not relive the contractor of responsibility to use proper excavation methods and due care working around the approximate locations of utility services.

Requested by:

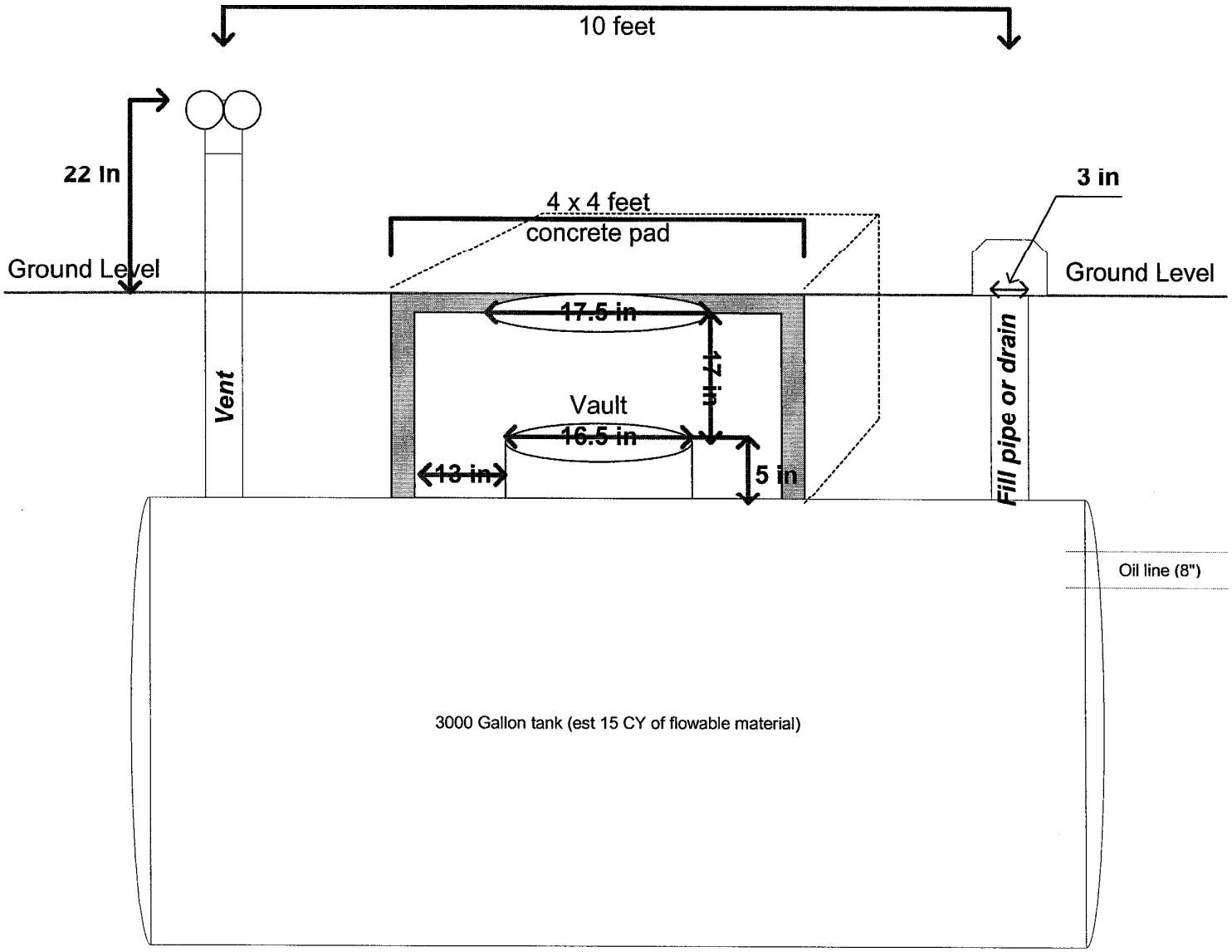
_____ Date: 4-14-04
(BAE Systems )

Technical inspector:

_____ Date:_____
( )

# APPENDIX D

Conceptual Drawing of AMRAD UST


10 feet
22 In
3 in
4 x 4 feet
concrete pad
Ground Level
Ground Level
17.5 in
17 in
Vent
Vault
16.5 in
13 in
5 in
Fill pipe or drain
Oil line (8")
3000 Gallon tank (est 15 CY of flowable material)

*Not To Scale*