LOS ALAMOS NATIONAL LABORATORY
ENVIRONMENTAL RESTORATION PROJECT
VOLUNTARY CORRECTIVE ACTION PLAN

for

SOLID WASTE MANAGEMENT UNIT
3-022
DIELECTRIC OIL CONTAINMENT SUMP

TA-3

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1.0 INTRODUCTION

The following potential release site (PRS) at Los Alamos National Laboratory (LANL) has been selected for voluntary corrective action (VCA) because its remedy is obvious and easily implemented. The tasks in this action plan include assessing possible contamination in a secondary containment for two above ground mineral oil tanks, and removal of the liner, concrete sump structure and a steel support structure. Figure 1 shows the location of Solid Waste Management Unit (SWMU) 3-022.

2.0 SITE TYPE AND DESCRIPTION

SWMU 3-022 includes a concrete sump and a steel beam support structure that were part of an above ground mineral oil storage and pumping system. The system supported the operation of a generator in Building TA-3-316 (Figure 2). Two above ground steel storage tanks that were part of the storage system were removed in early 1995. The electrical supply, pumps and above ground piping associated with the tanks were also removed. It was apparent that the electrical pump system had been leaking. However, there have been no reports of any spills or leaks from the tanks. Additionally, the site is currently posted as a confined space entry.

A design drawing of the concrete sump is available (Drawing ZT-4519) that shows that the secondary containment structure is made of reinforced concrete walls. There was no concrete placed on the floor of the sump. The bottom of the containment is sloped to a low point at the center of the sump that is about 3-inches below the level grade. Approximately 3-inches of sand was placed over the tuff surface and an oil resistant liner was placed over the sand. The liner extends approximately 6-inches up the interior concrete walls to prevent oil seepage into the sand backfill. There is no drain for the containment other than pumping as needed to control rainfall in the catchment. The steel support structure comprises twenty-eight 14-inch steel beams with short steel stabilizers welded between them. The beams span the width of the sump and are bolted into beam pockets in the concrete sump.

The mineral oil stored in the tanks was Shell Diala Oil AX, which is described in the Material Safety Data Sheet (MSDS) (see Annex) as a mixture of refined hydrotreated middle distillates (30-40%) and severely hydrotreated light napthenic distillates (60-70%). The product does not contain detectable levels (<1 ppm) of polychlorinated biphenyls (PCBs). The product is reportedly classified as an oil under Section 311 of the Clean Water Act. Based upon data available to Shell, the product is not regulated by SARA Title III.

A sample of the mineral oil taken on July 23, 1991, failed to detect PCBs above 5 ppm (west tank), and 10 ppm (east tank). A Waste Profile Form completed on January 21, 1993, states that the water in the sump was analyzed for toxic metals, PCBs, reactivity, ignitability and corrosivity and did not detect any of these parameters. Recycling manifests from Mesa Oil, Inc. indicate that 6195 gallons of used oil was removed from the east tank, 874 gallons of used oil was removed from the west tank, as well as 945 gallons of oily water removed from the sump in August of 1993.

3.0 PROPOSED REMEDY; INCLUDING CLEAN UP LEVELS AND LAND USE ASSUMPTIONS

This PRS is not listed in Table A of the Laboratory's Hazardous and Solid Waste Amendments (HSWA) permit. The site has been proposed for voluntary corrective action since the remedy is obvious and the contaminants involve only non-hazardous chemicals. Based upon the analytical results from samples of the oil, water and sediment, it is assumed that any contaminated soil and
Figure 1

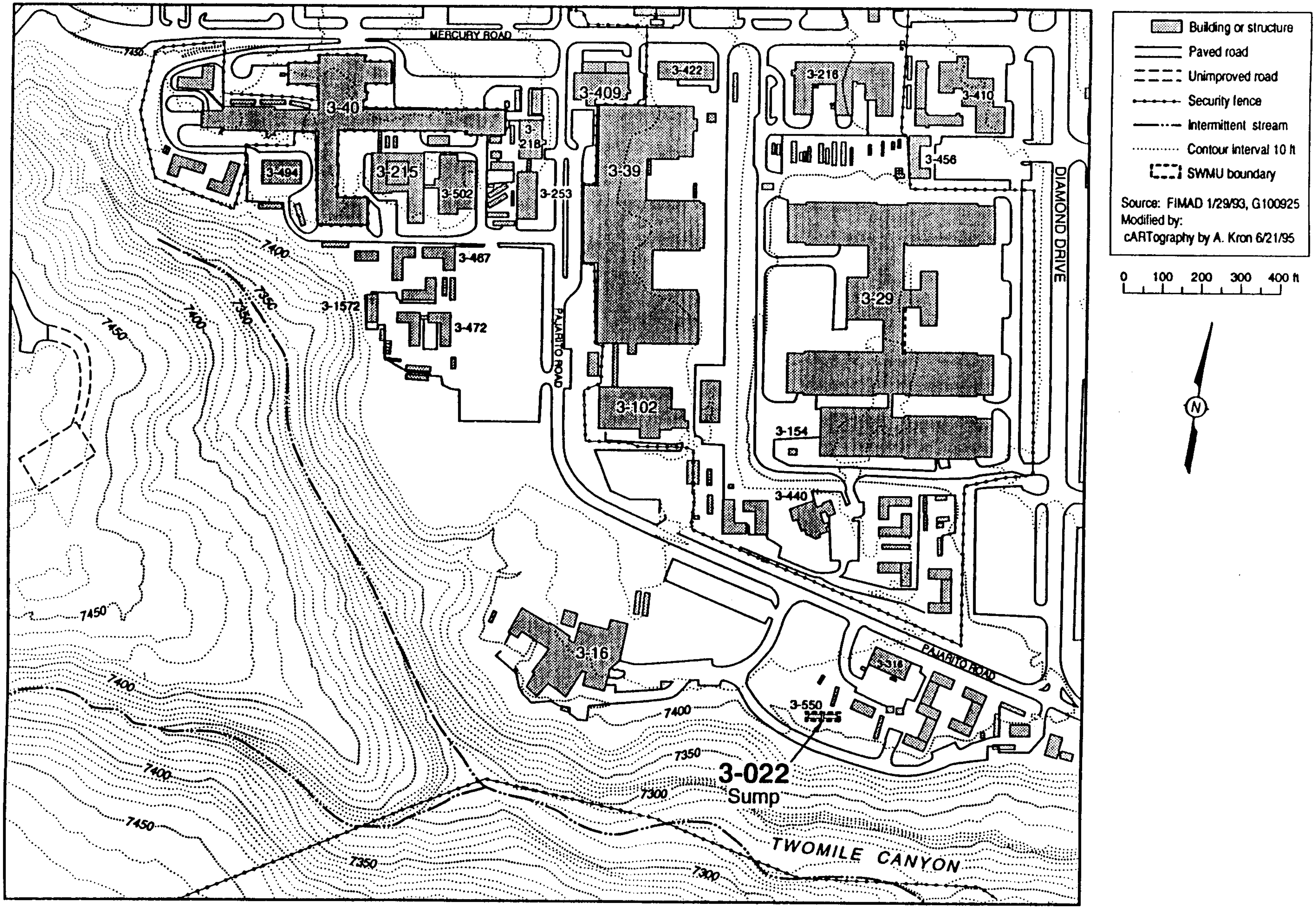

Figure 1. Location of SWMU 3-022 at TA-3.

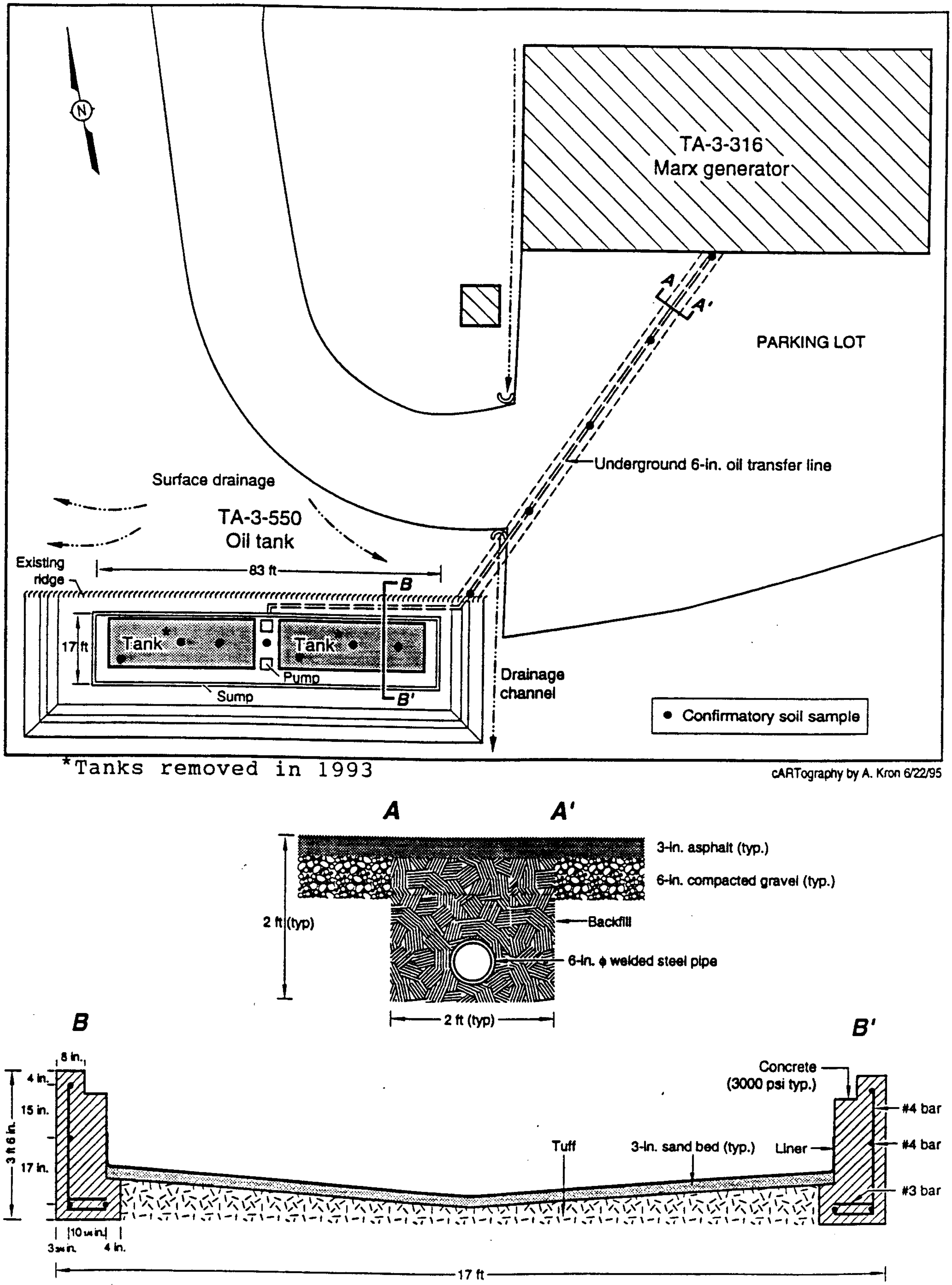

Figure 2. Plan view and cross sections of Sump 3-550 showing locations of confirmatory samples.

water from the SWMU can be managed as a non-hazardous waste under the Resource Conservation and Recovery Act (RCRA) regulations.

SWMU 3-022 lies entirely on DOE-owned land. The area is removed from public access roads. In the foreseeable future, the land is anticipated to be used exclusively for LANL (industrial) operations, as stated in the Site Development Plan Annual Update 1994 (LANL 1994, 1171).

The proposed remedy for this site is to:

- pump any free-standing water from sump;
- remove steel I-beam structure;
- (possible) removal of concrete sump walls;
- removal of Hypalon liner;
- excavation of contaminated soil;
- (possible) excavation of below grade pipeline;
- collect verification samples;
- backfill excavation with clean fill and perform site restoration; and
- collect samples for waste disposal.

It is important to note that these activities may not occur in the order written and that, wherever possible, will occur simultaneously to expedite the cleanup process. Work will follow the provisions of the Site-Specific Health and Safety Plan (SSHASP) (see Annex), and the Waste Characterization Strategy Form (see Annex). The Field Work Approval Form will be completed prior to initiating work.

The excavation will proceed by removing all visually contaminated soil. Once that has been accomplished samples will be collected from the site and analyzed for TPH concentrations in a mobile chemical analysis laboratory. Soil will continue to be excavated until the chem van results indicate the cleanup level has been reached.

Clean backfill will be placed in the sump after verification sample analytical results are available. The fill material will be compacted and the finished surface at the former sump will be graded as needed for drainage and erosion control. All excavation activities will follow the Spill Prevention, Control, and Countermeasures (SPCC) Plan and Storm Water Pollution Prevention Plan (SWPPP).

The MSDS (see Annex) was used to identify chemical components for the purpose of calculating cleanup levels for the soil. The dielectric fluid is composed of 30-40% solvent refined hydrotreated middle distillate petroleum (CAS # 64742-46-7) and 60-70% severely hydrotreated light naphthenic distillate (CAS # 64742-53-6). Less than 0.2% of the product is butylated hydroxy toluene (CAS # 128-37-0), which is present at such low concentrations that it will not be considered in setting a cleanup level.

The cleanup level for this product in soil was developed based on the toxicology of the middle distillate petroleum and light catalytically cracked naphtha. The toxicity criteria for each of these petroleum products is based on different toxic end points; middle distillate petroleum is a suspected carcinogen, and its toxicity criteria is based on carcinogenic effects, while light catalytically cracked naphtha is not a suspected carcinogen, and its toxicity criteria is based on noncarcinogenic effects. To establish a cleanup level for the dielectric fluid, which contains both of these petroleum products, cleanup levels will be calculated for both products, and the lower cleanup level will be adopted for the dielectric fluid.

Cleanup level calculations contained in the Annex, were performed for the middle distillate petroleum and for the catalytically cracked naphtha. Each of the cleanup levels assumes that

100% of the petroleum product present is the product for which the cleanup level was derived. In reality, the dielectric fluid is 60-70% light naphtha and 30-40% middle distillate. However, since the toxic end point of these petroleum products is different, the cleanup level for the dielectric fluid must be based on the most toxic petroleum product present. Therefore, the cleanup level for the dielectric fluid is 2600 mg/kg, based on the toxicity of the middle distillate petroleum product.

4.0 JUSTIFICATION/RATIONALE FOR THE ACTION

The concrete sump and steel support structure are the remaining components of an oil storage system that is no longer in service. The above ground storage tanks and other mechanical systems have already been removed. The proposed removal and disposal of the sump and buried pipeline do not involve hazardous waste and it is believed that the proposed activities to complete the demolition of the oil storage system constitute a best management practice for the site.

5.0 ESTIMATED WASTE VOLUMES BY TYPE

Soil excavated from the sump and possibly from the pipeline trench will be managed separately from the other waste streams. Soil from the sump is expected to be contaminated with trace quantities of mineral oil and will be sampled and disposed of accordingly. Soil excavated from the sump will be stockpiled in roll off containers at the site until the results of laboratory analyses are available to complete the waste profile. Two roll off containers may be needed for the sump soil. Oil contaminated waste will be disposed at a municipal landfill as a solid waste or as a special waste under New Mexico Solid Waste Regulations, Part 708.

Any water in the sump will be tested and a Waste Profile Form completed prior to disposal. The oily wastewater will be properly disposed of by a certified waste contractor. All steel will be recycled and concrete hauled directly to the municipal landfill or left in place.

Table 5.1 describes each waste type, description, estimated volume and anticipated disposal destination.

Table 5.1 Estimated Waste Volumes by Type

Waste Type	Waste Description	Estimated Volume	Disposal Container	Anticipated Disposal
Hydrocarbon Special Waste from the Sump	Oily soil from the sump (est. 24 tons)	16 cu yds	Stockpiled in roll off containers, then to landfill	Municipal Landfill
Oily Water	Water from the sump	550 gallons	Vacuum truck	Licensed Waste Hauler
Recycle Steel Scrap	14-in. Steel I-Beams	140 cu ft	Cut apart and placed directly on trucks	Recycle Scrap Dealer
Solid Waste	Concrete (est. 54 tons)	27 cu yds	Broken up and placed directly into trucks or left in place	Municipal Landfill

For waste disposal purposes, one composite sample will be prepared from the soil by mixing equal parts by volume from four locations within each roll-off container. The composite sample will be analyzed for the following parameters:

- Free liquid by the Paint Filter Test, EPA 9095 (if required by disposal site);
- Ignitability, corrosivity, reactivity by SW 846 (if required by disposal site); and
- On site screening for radioactivity (gross alpha, beta and gamma).

A portion of the soil from each grab sample from each roll-off container will be subjected to a head space analysis using an organic vapor meter (OVM). If volatile organic vapors are detected, a second grab sample will be collected from the location with the highest concentrations and analyzed for benzene, toluene, ethylbenzene and xylene (BTEX) and total petroleum hydrocarbons (TPH) by modified EPA Method 8015. If BTEX constituents and/or radioactive contaminants are identified, additional samples may be collected and analyzed for a larger range of contaminants as determined by the field team leader and FU1 personnel.

Table 5.2 summarizes the samples that are proposed to be collected from the stockpiled soil for waste disposal determination.

Table 5.2 Samples Collected for Waste Disposal Determination

Material to be Sampled	Number of Samples	Proposed Analyses
Soil excavated from the sump	1 grab/container if OVM detects volatile organics	BTEX by modified 8015 (if volatile vapor is detected by field screening)
Soil excavated from the sump	1 composite per container	TPH, Free liquids[1], ICR[1], Radioactivity screening

[1] Requirements to be identified by disposal site

6.0 DESCRIPTION OF CONFIRMATORY/VERIFICATION SAMPLING

Verification samples will be collected from the excavation, and from the soil beneath the transfer line, if excavated. Samples collected will be analyzed to verify that TPH concentrations do not exceed the cleanup levels that were defined by the risk assessment. Three verification samples will be collected from the areas under each of the former tank locations for a total of six samples in the sump. If the below-grade pipeline is excavated, five samples will be taken from the bottom of the excavated trench. The soil surrounding any verification sample whose TPH concentration exceeds the cleanup-up level will be excavated in 12-inch lifts and resampled.

Samples will be analyzed for TPH by the field laboratory using modified EPA Method 8015. Results from the laboratory verification samples will be used to calculate the 99% upper confidence limit (UCL) to compare to the established cleanup level. The site cleanup objectives will be obtained when the calculated UCL is less than the established cleanup levels. The sump will remain open until the cleanup objectives are attained.

Table 6.1 Description of Verification Sampling

Location	Number of Samples	Depth	Analyses
Sump	6	0-6 inches	TPH by modified Method 8015
Transfer Line	5	0-6 inches	TPH by modified Method 8015

7.0 ESTIMATED TIME AND ASSOCIATED COST TO COMPLETE THE ACTION

The estimate of costs assumes that the soils, concrete and steel excavated from SWMU 3-022 can be managed as special wastes or solid wastes and that these categories of waste can be disposed at municipal landfills. Based on this provision, the estimated total cost of this action is $ 66,210, including waste disposal at the county landfill at $2,000.

Table 7.1 Estimated Schedule to Complete the VCA

Activity	Start Date	Finish Date
Sample Water in Sump and Dispose	3 August 1995	18 August 1995
Remove and Recycle Steel Structure	3 August 1995	7 August 1995
Demolish and Dispose of Concrete	8 August 1995	10 August 1995
Excavate and Dispose of Soil in Sump	11 August 1995	14 August 1995
Collect and Analyze Excavation Guidance Samples	14 August 1995	14 August 1995
Collect and Analyze Verification Samples	15 August 1995	15 August 1995
Restore and Grade Site	17 August 1995	18 August 1995
Write Draft VCA Report	16 August 1995	21 August 1995

SITE-SPECIFIC HEALTH AND SAFETY PLAN

for

Solid Waste Management Unit

3-022

To Be Attached Upon Approval

CLEANUP LEVEL CALCULATIONS

for

Solid Waste Management Unit

3-022

The site where the decommissioned secondary containment is located is a LANL facility, and will likely remain as such in the future. Therefore, cleanup levels were based on the long-term worker exposure scenario, soil ingestion pathway, using input parameters described in the LANL Technical Assumptions Document.

Development of a Soil Cleanup Level Based on the Toxicology of Middle Distillate Petroleum

Millner et al. (1992) conducted a comprehensive study of tumor development data from studies in mice exposed to 13 refinery streams, including middle distillate petroleum. The carcinogen assessment guidelines developed by EPA (1986) for calculating cancer slope factors was used to develop a range of slope factors for middle distillate petroleum. Millner calculated the geometric mean of the resulting slope factors and reported it as the cancer slope factor for middle distillate. The cancer slope factor is 1.09E-03 kg-day/mg.

The soil cleanup action level based on the slope factor and a target cancer risk of 1E-06 can be calculated as follows, using the soil ingestion pathway for the long term worker exposure scenario (LANL, 1993):

SCAL = (TR x BW x AT)/(SF x EF x ED x IR x CF)

where:

SCAL	=	soil cleanup action level (mg/kg)
TR	=	target risk level (1E-06)
BW	=	adult body weight (70 kg)
AT	=	averaging time (25550 days)
SF	=	slope factor (1.09E-03 kg-day/mg)
EF	=	exposure frequency (250 days/year)
ED	=	exposure duration (25 years)
IR	=	soil ingestion rate (100 mg/day)
CF	=	conversion factor (1E-06 kg/mg)

Using the above parameters, the SCAL for the middle distillate is 2600 mg/kg.

Development of a Soil Cleanup Level Based on the Toxicology of Light Catalytically Cracked Naphtha

Toxicity information of light catalytically cracked naphtha was obtained from a comprehensive study of the toxicity of 13 refinery streams, conducted by Mobile Environmental and Health Sciences Laboratory (Feuston et al. 1994). An oral reference dose (RfD) can be developed based on the Feuston et al. data following EPA methodology. The No Observable Adverse Effects Level (NOAEL) for light catalytically cracked naphtha was reported to be 300 mg/kg/day. This NOAEL is then divided by a series of modifying and safety factors, which account for the uncertainty in the data, to arrive at an oral RfD using the following equation:

Oral RfD (mg/kg/day) = NOAEL/(UF-1) x (UF-2) x (MF)

where:

NOAEL	=	No Observable Effects Level reported in the Fueston et al data
UF-1	=	uncertainty factor #1, which accounts for variation in the general population (10)
UF-2	=	uncertainty factor #2, which accounts for extrapolation from animal data to human effects (10)
MF	=	a modifying factor to account for other uncertainties not specifically accounted for (10)

The resulting oral RfD is 0.3 mg/kg/day. The soil cleanup level for this product can then be calculated using the following equation:

SCAL = (THI x BW x AT)/[(IR x EF x CF)/(RfD)]

where:

SCAL	=	soil cleanup action level (mg/kg)
THI	=	target hazard index (1)
BW	=	adult body weight (70 kg)
AT	=	averaging time (10950 days)
IR	=	soil ingestion rate (100 mg/day)
EF	=	exposure frequency (250 days/year)
ED	=	exposure duration (25 years)
CF	=	conversion factor (1E-06 kg/mg)
RfD	=	oral reference dose (0.3 mg/kg/day)

Using the above parameters, the SCAL for light catalytically cracked naphtha is 365,000 mg/kg.