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Operable Unit 1 (OU-1)
Mound 2000 Core Team Technical Memorandum

May 6, 2005

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Acronyms

AS/SVE - Air Sparge/Soil Vapor Extraction
BVA - Buried Valley Aquifer
CEARP - Comprehensive Environmental Assessment and Response Program
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
COPC - Contaminants of Potential Concern
CSM - Conceptual Site Model
CTE - Central Tendency Exposure
D&D – Deconstruction and Decommissioning
DNAPL – Dense Non-Aqueous Phase Liquids
ESD – Explanation of Significant Difference
HI - Hazard Index
IC – Institutional Controls
ITRD - Innovative Technology Remediation Demonstration
MCL - Maximum Contaminant Level
MCP - Miamisburg Closure Project
MESH - Miamisburg Environmental Safety and Health
MMCIC - Miamisburg Mound Community Improvement Corporation
MNA – Monitored Natural Attenuation
MRC - Mound Reuse Committee
NCP - National Contingency Plan
NFA - No Further Assessment
NPDES - National Pollutants Discharge Elimination System
NPL - National Priorities List
OEPA - Ohio Environmental Protection Agency
OU-1 - Operable Unit-1
P&T - Pump and Treat
PCB - Polychlorinated Biphenyls
PCE - Tetrachloroethene
PRS - Potential Release Site
RA - Response Action
RI/FS - Remedial Investigation/Feasibility Study
RI – Remedial Investigation
RIR –Remedial Investigation Report
RME - Reasonable Maximum Exposure
ROD - Record of Decision
SRNL - Savannah River National Laboratory
SVE - Soil Vapor Extraction
TCE - Trichloroethylene
USEPA - United States Environmental Protection Agency
VOC - Volatile Organic Compounds
ppb – Parts Per Billion
ug/L – Micrograms per liter
pCi/g – Pico Curies per gram

Operable Unit-1 (OU-1) Technical Memorandum

1.0 Purpose

This technical memorandum serves as the tool to be used by the Mound 2000 Core Team in evaluating the remedy in place for the area known as Operable Unit-1 (OU-1) (also known as Area B). This technical memorandum was generated by the Core Team to support the re-evaluation of Potential Release Sites (PRS) 8-12 and the evaluation of uncertainties identified within the Final OU-1 Technical Team Evaluation Report, dated June 2004. The Technical Team was chartered by DOE and made up of representatives from the Department of Energy (DOE); United States Environmental Protection Agency (USEPA); Ohio Environmental Protection Agency (OEPA); City of Miamisburg, Ohio, Miamisburg Mound Community Improvement Corporation (MMCIC);and Miamisburg Environmental Safety and Health (MESH). This document also provides the Core Team recommendation for clarifying requirements associated with the OU-1 remedy and resolving previously identified uncertainties.

2.0 Site Description

Operable Unit-1, formerly referred to as Area B, occupies approximately four acres of land located in the southwestern part of the original Mound Plant property (Attachment 1, Figures 1 & 2). Operable Unit-1 is an historic landfill site that was used by the Mound Plant from 1948-1974. Plant waste materials that were routinely disposed of in OU-1 included general trash and liquid wastes. During the mid-1950s, potentially contaminated Dayton Unit salvage materials consisting of residual steel and metal debris and about 2,500 empty, crushed 55-gallon drums that had contained thorium were buried in the southwest corner of OU-1.

An over flow pond was constructed during 1977-1978, partially covering the historic landfill site. A portion of the historic landfill waste was excavated during construction of the pond and was relocated and/or encapsulated in an adjacent sanitary landfill constructed at the same time. After 1974, waste was no longer disposed of in OU-1.

There are known releases of volatile organic compounds (VOC) from OU-1 into the Great Miami River buried valley aquifer (BVA). In addition, tritium was detected in water samples taken from wells in OU-1, although the concentrations have been consistently below the Safe Drinking Water Act Maximum Contaminant Level (MCL).,

3.0 Operable Unit-1 (OU-1) Chronology

<u>1947</u>
During Mound Plant construction, mining of gravel deposits in the OU-1 area left several depressions. (Attachment 1, Figure 3)

<u>1948</u>
Open burning and dumping of solid and liquid wastes in the Historic Landfill area began. (Attachment 1, Figure 4)

1954
The first burial in the OU-1 historic landfill area occurred when salvage material from an old Dayton Unit was disposed of along the southern boundary of the old gravel quarry. (Attachment 1, Figure 5)

1955 and potentially parts of 1954 and 1956
The second burial in the OU-1 landfill area occurred along the southern boundary of the old gravel quarry (Attachment 1, Figure 5) when 2,500 empty crushed drums, contaminated with Thorium (Th)-232, were buried with 1-2 feet of soil cover and re-graded

1965
The third burial in the OU-1 landfill area occurred when polonium (Po)-210-contaminated sand from WD building was buried in the southwest corner of OU-1, along with previously buried thorium drums, and re-graded. (Attachment 1, Figure 5)

1969
Open burning was banned by the State of Ohio. Hazardous liquid wastes were then collected and disposed of off-site.

Solid waste was placed in east-west trending disposal trenches cut by a bulldozer. (Attachment 1, Figures 6 & 7)

Solid waste was dumped in the middle of OU-1 and moved by bulldozer to the trenches, where it was compressed and covered by a few inches of soil cover. Approximately 4 feet of soil cover was placed over the filled trenches to complete the landfill cells.

Solid waste typically consisted of plastic bags containing paper, plastic, glass, cloth, food scraps from the cafeteria, plastic vials containing urine, bioassay samples and liquid scintillation "cocktails", and other general office and lab trash.

1971 to 1976
Low-level radioactive sediments dredged from the former flow monitoring station on the lower reach of the plant drainage ditch were routinely placed within the OU-1 area.

1972 or 1973
Sometime in 1972 or 1973, soil materials (most likely natural fill and some burned and solid waste) were excavated from the west-central portion of OU-1 and relocated to a ravine (PRS-66) along the upper reach of the plant drainage ditch to serve as fill material and facilitate the construction of a parking lot behind the firehouse.

1974
Open dumping ends in the OU-1 landfill area.

1977 and 1978
The sanitary landfill and overflow pond were constructed within the historic landfill area (OU-1). The sanitary landfill was constructed to provide containment of solid waste removed from the historic landfill area. The volume excavated was limited by the volume required for the overflow pond construction.

1984
The Mound Plant began a periodic groundwater reconnaissance sampling program for VOC.

1986
Since 1986, VOC have been detected and monitored in the groundwater beneath OU-1.

1987
DOE initiates the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Remedial Investigation/Feasibility Study (RI/FS) process.
Throughout the RI/FS process, a total of 280 soil samples, both surface and subsurface, were analyzed for VOC, semi-volatile organic compounds, pesticides, polychlorinated biphenyls (PCB), metals, and radionuclides. Additionally, subsurface soil samples were analyzed for dioxin/furan.

1989
The Mound Site is placed on the USEPA National Priorities List (NPL) as a result of VOC in groundwater.

1994
Five PRS's; PRS-8 - Site Sanitary Landfill, PRS-9 - Site Sanitary Landfill Cover, PRS-10 - Historical Landfill, PRS-11 – Thorium and Polonium-contaminated waste area, and PRS-12 – Drum Storage Area were all identified as PRSs in the OU-9 Site Scoping Report, Volume 12. These PRSs are also recognized in CERCLA documents as Area 2, Area B, and OU-1 (Attachment 1, Figure 7). The Feasibility Study and Proposed Plan for OU-1 were released to the public on November 15, 1994. An extended public comment period was held from November 15, 1994 through January 31, 1995, with a public meeting being held on December 8, 1994.

1995 - CERCLA Record of Decision (ROD) signed.
On June 12, 1995, a ROD was signed selecting Collection, Treatment, and Disposal of groundwater as the remedy for OU-1. The goal of this remedy was to control or reduce (to remediation goals) the contaminant concentrations in the aquifer beneath OU-1, thus preventing contaminant movement into the BVA to ensure that the BVA remains a safe drinking water source. The ROD states that "treatment of soil at the site was not found to be practicable. The fact that the source of contamination is diffuse and that no substantive onsite soil hot spots exist precludes a remedy consisting of excavation and treatment of contaminants in soil."

Initiated the Innovative Technology Remediation Demonstration (ITRD) pilot study to evaluate alternate technologies for the purpose of augmenting the groundwater pump and treat system.

1996
PRSs 8-12 are "binned" No Further Assessment (NFA) under the newly adopted Mound 2000 process. Mound 2000 is a "decision based" team approach to implementing CERCLA. The Mound 2000 process established a "Core Team" consisting of DOE, US EPA, and Ohio EPA. The Core Team receives input from technical experts as well as the general public and/or public interest groups. Thus, all stakeholders have the opportunity to express their opinions or suggestions involving each potential problem area or PRS. This five PRS "NFA" decision was based on the 1995 OU-1 ROD Statutory Determination, which stated that "the selected remedy is protective of human health and the environment. It complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action and is cost effective. This is a final action ROD."

February 1997
The OU-1 Pump & Treat (P&T) system begins operation pursuant to the ROD (Attachment 2, plume maps January 97).

Summer 1997
PRSs 409 (Stoddard solvent) and 410 (hydrocarbons), located adjacent to OU-1, are "binned" Response Action (RA).

Thorium concentrations higher than previously expected are identified at PRS-11.

December 1997
DOE voluntarily installs the Air Sparge/Soil Vapor Extraction (AS/SVE) system recommended by the Innovative Technology Remediation Demonstration (ITRD) pilot study and begins operation to augment the P&T system. (Attachment 2, plume maps December 97)

February 1999
The Mound 2000 Work Plan restructuring the CERCLA clean-up approach is finalized. The Work Plan also underwent a 30 day public comment period to solicit public input on the Mound 2000 process.

September 2001
A CERCLA Five-Year Review is conducted.
The Five-Year Review concluded that:

- The remediation systems in OU-1 are functioning as intended by the ROD and as designed. The continued drop in the influent VOC concentrations and declining concentrations at the boundary of compliance support this conclusion. Furthermore, data reported on a monthly basis indicate hydraulic containment of the area of concern,
- The clean-up criteria set forth by the ROD are still appropriate for the site and no new information has come to light which would call into question the protectiveness of the implemented remedy,
- The next five-year review of the OU-1 remedy will be performed in the summer of 2006, and
- Based upon the review of data acquired to-date, remediation efforts may succeed and be terminated prior to the next five-year review.

October 2001
The Core Team agrees to re-evaluate the NFA binning decision for PRSs 8-12. According to the October 17, 2001, Core Team minutes, "PRSs 8-12 were binned NFA on October 19, 1995. Because of information obtained since that time, the Core Team wants to reconsider that decision. The additional information mentioned during the meeting included the discovery of crushed thorium drums during the installation of the OU-1 remedy, amounts of contaminants collected by the OU-1 remedy, site reuse plans."

Fall 2002
Mound Site southern access road opened at the Mound production wells, which are located in OU-1.

February 2003
Attachment 2, plume maps February 03.

May 2003
The OU-1 P&T system is shut off and a "Rebound Test" scheduled for 12 months was started. The decision to initiate this test was based on:

- Continued groundwater monitoring at OU-1 shows that VOC concentrations have fallen below MCLs in most monitoring wells for three consecutive months and are remaining at near constant levels. Two wells within the compliance boundary and three monitoring points down gradient (south) of the OU-1 compliance boundary and on the eastern edge of the BVA continue to show sporadic levels above MCLs. (Attachment 2, plume maps February 03)
- Over 4,000 pounds of solvents removed by the SVE system to date.
- VOC mass reduction rates have decreased to asymptotic levels.

August 2003
USEPA raised concerns regarding the adequacy of existing access controls as required by the ROD.

August 2003 to December 2003
OU-1 Technical Team meets monthly to identify post ROD uncertainties and produce recommendations for Core Team review. The Mound 2000 process was used in the tech team re-evaluation of the OU-1 area. Technical uncertainties fell into three categories: 1) source term nature and extent (e.g., contaminated soils and landfill debris), 2) groundwater contamination nature and extent, and 3) remedy performance.

November 2003
PRS-11 is re-evaluated and formally "binned" a RA by the Core Team. This decision was based on residual thorium concentrations identified during the installation of the SVE system in 1997.

January 2004
The Savannah River National Lab (SRNL) Technical Support Team conducts an OU-1 groundwater strategy study to assist the MCP in developing a comprehensive, technically sound

strategy for remediation of groundwater contaminated with TCEs and other VOCs in the vicinity of the OU-1 landfill. (Attachment 2, plume maps January 2004)

February 2004
The Rebound Test is terminated three months earlier than scheduled due to an exceedance of the Rebound Test Plan criteria at well 418.

Results of the OU-1 Rebound Test (nine months) identified several wells with an increasing trend and one well (418) outside the compliance boundary exceeding its pre-established threshold value per the Rebound Test Plan.

Blackhawk Geoservices conducts a surface and borehole geophysical investigation in the area of PRS-11.

April 2004
MCP obtains independent OU-1 cost estimates for various excavation and capping scenarios from DOE headquarters.

The initial SRNL Technical assistance Groundwater Study Report finalized.

April/May 2004
Several OU-1 focused Core Team sessions are held to evaluate concerns/new information since the 1995 ROD and 2001 CERCLA Five-Year Review.

June 2004
Construction fencing is installed around the OU-1 area to control access.

First phase of sampling recommended by the SRNL Technical Assistance Team is conducted. This effort consisted of leachate pipe, soil gas, and geochemical sampling.

The OU-1 Tech Team Report and Soft Earth Associates Inc. Geophysical Report were finalized. The Technical Team was briefed on the SRNL OU-1 Groundwater Strategy Report finalized in April 2004.

Ninety-seven (95) samples at approximately 35 locations are collected at PRSs 409 & 410 to assist in work planning efforts. The majority of samples were non-detect for the areas in question. All detections were well below established action levels.

July 2004
Soft Earth Associates, Inc., briefed the Technical Team on the Geophysical Survey Report based on the Blackhawk Geoservices geophysical investigation. At the same meeting, Hydro-Log, as a consultant to MESH, presented their interpretation of the geophysical data associated with the OU-1 area.

August 2004
The Core Team begins holding regular focused OU-1 sessions with DOE, US EPA and OEPA management.

September 2004
The second phase of sampling recommended by the SRNL Technical Assistance Team was conducted. This effort consisted of cocoon gas, vadose zone gas and sediment, and BVA water and sediment sampling.

Additional samples were taken by the site contractor using a roto-sonic drill rig at PRS-409 to obtain data in previously inaccessible areas.

November 2004
The MCP briefed the Mound Reuse Committee (MRC) on the status of OU-1.

The OU-1 Technical Team was briefed on the SRNL follow-on investigations/results from the two phases of sampling conducted in June and September of 2004.

December 2004
PRS-410 is "Binned" NFA by the Core Team.
PRS-414 is retired by the Core Team as an independent PRS, to be treated as a manifestation of the OU-1 groundwater plume.

All occupied buildings on site were tied into the City of Miamisburg Municipal water distribution system. Drinking water onsite is no longer supplied by the Mound Site production wells adjacent to OU-1.

January 2005
The Core Team "binned" PRS-409 NFA.
The SRNL team briefed the MRC on their groundwater study and explained how the results would be factored into the determination of the overall OU-1 closure strategy.

February 2005
OU-1 Meeting held at the OEPA Southwest District Office between the City of Miamisburg, MMCIC, DOE, CH2M Hill, USEPA, and OEPA. The goal of this meeting was for all parties to gain a common understanding of the definitions and assumptions associated with OU-1.

The Core Team briefs the OU-1 Technical Working Group on status of the OU-1 area fieldwork and the Core Team re-evaluation effort.

March 2005
OU-1 Technical Working Group meeting held to brief status of the Core Team recommendation on the OU-1 area and the path forward. Additionally, the SRNL Report was finalized with public comment responses discussed.

April 05
The final OU-1 Rebound Test Report was approved by the Core Team.

4.0 Pre-Record of Decision (ROD) Summary

Beginning in 1974, the Mound Plant became aware of impacts on groundwater from plant operations with the discovery of off-site tritium in the BVA. In 1976, Dames & Moore completed an Evaluation of the BVA Adjacent to Mound Laboratory for Monsanto Research Corporation. The Mound Plant began a periodic water-sampling program for VOCs in 1984. In 1986, the DOE Albuquerque Operations Office implemented the Comprehensive Environmental Assessment and Response Program (CEARP). During Phase I of the CEARP Installation Assessment, Area B was identified for Phase II studies. The VOC contamination was found during CEARP Phase II. As a result of the VOC groundwater contamination found in OU-1, DOE initiated a remedial investigation (RI) under CERCLA in 1987 focusing on groundwater contamination. A total of 280 soil samples, both surface and subsurface, were analyzed for: VOCs, semi-VOCs, pesticides, PCBs, metals, and radionuclides. Additionally, subsurface soil samples were analyzed for dioxin/furans. The RI concluded, "a single source of contamination has not been detected and is not believed to exist. Rather, it is believed that a random pattern of dispersed contamination is the source of the compounds found in the OU-1 area."

As a result of historic disposal practices and contaminant releases to the environment, the Mound Plant was placed on the CERCLA NPL in 1989. DOE signed a CERCLA section 120 Federal Facility Agreement (FFA) with USEPA, effective October 1990. In 1993, this agreement was modified and expanded to include OEPA.

The CERCLA RI conducted at OU-1 ultimately led to the decision that contaminants in the groundwater necessitated a remedy of collection, treatment and disposal. This decision was memorialized in the 1995 ROD for OU-1.

5.0 Conceptual Site Model (CSM) at Time of Record of Decision (ROD)

The pathway of concern consists of leaching of contaminants from site soils or waste; entrainment in the groundwater flow; and withdrawal by the Mound Plant production wells or by other, future wells. (See Summary of Contaminants of Potential Concern (COPC) and CSM Attachment 3)

6.0 Record of Decision (ROD) (Remedy)

The selected remedy for OU-1 is collection and treatment of contaminated groundwater and disposal of treated water. Per the ROD, the precise method for treating the contaminated water will be determined during the remedial design phase of the project. Additionally, the common remedy components described below are required to be defined and implemented at the time the facility is transferred from DOE ownership. All extracted groundwater will be treated to levels that comply with the requirements of the Mound Plant National Pollutant Discharge Elimination System (NPDES) Permit. This remedy was selected using the remedial evaluation criteria set

forth in the National Contingency Plan (NCP), 40 CFR Part 300.

6.1 Common Components Considered for All Alternatives

All alternatives considered for the site included several common components:

Surface controls
The implementation of Institutional Controls (IC) to limit access to the site
Long-term groundwater monitoring

Surface Controls, such as grading and lining of existing ditches, will manage the surface water run-on and run-off and reduce infiltration. Reducing infiltration will slow the rate, at which contaminants migrate from the unsaturated soil into the groundwater,

Institutional Controls will be designed to control land and groundwater use. Such controls can take the form of access restrictions and fencing around the site to minimize contact with soils, and,

Deed Restrictions, to prevent groundwater usage onsite and down gradient on property currently owned by DOE. Appropriate deed restrictions will be obtained at the time the facility is transferred from DOE ownership. Monitoring activities will be conducted to document the effectiveness of the selected remedy.

6.2 Major Components of the Selected Remedy

Major components of the selected remedy include:

- Installing two groundwater extraction wells within OU-1, using standard equipment and procedures.
- Treating the extracted groundwater to remove VOCs and other constituents, as required, using cascade aeration, UV oxidation, conventional air stripping, or other suitable treatment units.
- Discharging the treated groundwater to the Great Miami River through the existing plant NPDES outfall or a new outfall.

Following installation and operation of the groundwater extraction wells, the chemical properties and hydraulic behavior of the groundwater system will be monitored to verify the adequacy of the remedy.

6.3 Statutory Determination

The selected remedy is protective of human health and the environment. It complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action and is cost effective. This is a final action ROD.

This remedy uses permanent solutions and alternative treatment technologies to the maximum extent practicable for this site and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal

element. While the remedy calls for treatment of contaminated groundwater, treatment of soil at the site was not found to be practicable. The fact that the source of contamination is diffuse and no substantive onsite soil hot spots exist precludes a remedy consisting of excavation and treatment of contaminants in soil.

Because this remedy may result in hazardous substances remaining on site above health-based levels, a review will be conducted within five years after commencement of this remedial action and at five-year intervals thereafter to ensure that the remedy continues to adequately protect human health and the environment.

6.4 Remedial Action Objectives

GROUNDWATER – The OU-1 remedial action is the first of several actions planned as part of the overall remedial action for the Mound Plant Site. The function of the selected remedial action is to control groundwater contamination (primarily dilute volatile organic compounds [VOCs]), to prevent migration of contamination toward the Mound Plant production wells and to minimize exposure to potential receptors. The pathway of concern consists of leaching of contaminants from site soils or disposed waste; entrainment in the groundwater flow; and withdrawal by the Mound Plant production wells or by other, future wells. This remedial action is not the final remedial action for the Mound Plant Site, but is intended to be a final remedial action for OU-1.

To protect human health, the remedial action objective will be to prevent ingestion of water with contaminant concentrations in excess of remediation goals ($1x10^{-4}$ aggregate cancer risk for chemical risk and radiological risk combined). To protect human health (environment), the objective will be to control or reduce (to remediation goals) the contaminant concentrations in the aquifer adjacent to OU-1. This will prevent contaminant movement into the BVA and ensure that the BVA remains a safe drinking water source. The point of compliance for groundwater is outside (south and west) of the road bounding the site sanitary landfill.

SOIL – While the remedy calls for treatment of contaminated groundwater, treatment of soil at the site was not found to be practicable. The fact that the source of contamination is diffuse and no substantive onsite soil hot spots exist precludes a remedy consisting of excavation and treatment of contaminants in soil.

To protect human health, the remedial objective will be to prevent or reduce infiltration and migration of contaminants that would result in groundwater contamination in excess of remediation goals. Additionally, soil contaminants should not lead to an aggregate excess cancer risk greater than $1x10^{-5}$ or a Hazard Index (HI) greater than one for occupational exposures.

7.0 Summary of Risks

7.1 Selected Future Use: Industrial use scenario

7.2 Baseline Risk Assessment Assumptions:

The Baseline Risk Assessment assumes no corrective action will take place and that no site use restrictions or ICs, such as fencing, groundwater use restrictions, or construction restrictions, will be imposed. The risk assessment determines actual or potential carcinogenic risks and/or toxic effects that the contaminants at the site pose under current and future land use assumptions.

7.3 Risk Scenarios Evaluated:

Future resident farmer scenario
Future indoor industrial park worker
Future outdoor industrial park worker

7.4 Assumptions for Onsite Industrial Park Worker:

- Working within Area B location for 25 years [reasonable maximum exposure (RME)-worst case]
- Worker is employed on site for 9 years [central tendency exposure (CTE) - average case]
- Worker performs job duties within a structure/building 8 hours a day/250 days a year
- Future worker scenarios assume that exposures take place within Area B and that drinking and domestic water supply is exclusively from contaminated onsite wells within Area B.

7.5 Baseline Risk Assessment results for the Selected Future Use Scenario

Table 7.5.1 OU-1 Carcinogenic Risk

Exposure Scenario	Overall	Groundwater	Soil	External Radiation	Risk Drivers
Future Resident Farmer	1×10^{-4} (Child RME) 5×10^{-4} (Adult RME) 4×10^{-5} (Child CTE) 1×10^{-4} (Adult CTE)	6×10^{-4} (RME) 1×10^{-4} (CTE)	More than 1 order of magnitude less than those for ground-water	$< 1 \times 10^{-7}$	Ingestion and inhalation pathways contribute more than 80 % of the risk with the remainder attributable to dermal.
Future Indoor Industrial Worker	2×10^{-4} (RME) 5×10^{-5} (CTE)	Groundwater contaminants contributed > 99% of the risk	$< 1 \times 10^{-6}$	N/A	PCE is driver (RME of 8×10^{-5})
Future Outdoor Industrial Worker	1×10^{-4} (RME) 2×10^{-5} (CTE)	Groundwater contaminants contributed 95% of the risk	*	N/A	PCE is driver (RME of 7×10^{-5}) Ingestion and dermal contact pathways contribute 83 % of risk.

* The conclusion in the Remedial Investigation Report (RIR) was that the future outdoor industrial worker shows two of the contaminants having RME lifetime excess cancer risks above 1×10^{-6} (combined carcinogenic risk of 4×10^{-6}). Because the NCP specifies a target cancer risk range of 1×10^{-4} to 1×10^{-6}, and because this risk is already near the lower end of this range, the soil pathway does not need further consideration. Because groundwater would contribute most of the risk, it is the focus of the remedial efforts.

Table 7.5.2 OU-1 Non-Carcinogenic Risk or Hazard Index (HI)

Exposure Scenario	Overall	Groundwater	Soil	Risk Drivers
Future Resident Farmer	21 (Child RME) 18 (Adult RME) 12 (Child CTE) 11 (Adult CTE)	Groundwater contaminants contribute > 99% of the risk.	RME and CTE are 2 orders of magnitude less than unity	TCE, PCE, and Tetrachloromethane were only contaminants exceeding unity and contributed 90% of the risk; Tetrachloromethane was highest (31 RME and 20 CTE). Inhalation pathway contributes 80% of the risk.
Future Indoor Industrial Worker	17 (RME) 11 (CTE)	Groundwater contaminants contributed almost 100% of the risk.	10 orders of magnitude less than unity	Tetrachloromethane is driver (15 RME and 10 CTE) and the only contaminant exceeding unity. Inhalation pathway contributes 96% of the risk;
Future Outdoor Industrial Worker	15 (RME) 9 (CTE)	Groundwater contaminants contributed almost 100% of the risk.	3-4 orders of magnitude less than unity	Tetrachloromethane is driver (14 RME and 9 CTE) and the only contaminant exceeding unity. Inhalation pathway contributes 95% of the risk;

The conclusion in the RIR was that the HI was less than one for soil, indicating that non-carcinogenic health effects are not of concern. Because groundwater would contribute most of the risk, it is the focus of the remedial efforts.

8.0 Major Studies - Post Record of Decision (ROD)

8.1 Technical Memorandum on a Fate and Transport Groundwater Model for Operable Unit 1 at the Mound Plant in Miamisburg, Ohio, August 24, 1995

Conclusion(s): From this modeling project, the following statements about the groundwater remediation project in OU-1 can be made:

The affect of retardation by the organic carbon matter in the aquifer greatly decreases the mobility of the contaminants and will render the proposed remediation wells to act as a containment system as the wells will not significantly withdraw contaminants from the aquifer.

Natural attenuation of the contaminants is the major physical pathway for remediation of these compounds.

Validation of the porosity and conductivity of the BVA are necessary before any concrete model predictions can be utilized.

Since the majority of the contaminant plume is underneath the site sanitary landfill, an evaluation of methods to install production wells in this area should be made to determine whether remediation wells could be placed closer to the areas of highest contamination.

8.2 Design Study - Innovative Technology Remediation Demonstration (ITRD) pilot study, November 1995 through December 1997

The selected remedy in the OU-1 ROD is collection and treatment of contaminated groundwater and disposal of treated water. One major component of the selected remedy included: Treating the extracted groundwater to remove VOCs and other constituents, as required, using cascade aeration, UV oxidation, conventional air stripping, or other suitable treatment units.

The USEPA, OEPA and DOE agreed in a November 1995 conference call, that since the groundwater contamination was beyond the OU-1 compliance boundary, this issue should be presented to the ITRD project to look at other suitable treatment units.

Spanning an approximate five month period, ITRD studies of approximately 20 innovative technologies addressing both water and soils media led to the conclusion that augmentation with an AS/SVE system would enhance the P&T selected remedy.

Both USEPA and OEPA participated in the ITRD meetings and selection of the SVE enhancement for OU-1 remediation. A 30-day trial operation of the AS/SVE system started in mid-December 1997. This ITRD effort was documented in OU-1 Annual Report – Pump & Treat, Air Sparge, and Soil Vapor Extraction Systems Start through December 1998. This annual report was distributed to the OEPA and USEPA and placed in the public reading room as part of the project design file.

8.3 Operable Unit-1 Interim Groundwater Modeling Report: Fate and Transport of Chemicals from Historical Sources, June 1996

Conclusion(s): "This study suggests that 280 kg of TCE were released to the aquifer during the relocation of the historic landfill and the subsequent construction of the overflow pond."... "This study predicts that biodegradation of chemicals in the

subsurface anaerobic conditions will be the dominant removal pathway for most chlorinated contaminants found in the BVA."

8.4 Potential Release Site (PRS)-69 Data Package, October 1998

Potential Release Site (PRS)-69 was "binned" Further Assessment by the Core Team in September of 2001. Due to the fact that PRS-69 is a collection point for site run-off, the further assessment was placed on hold until the majority of site remediation was complete.

8.5 Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Five-Year Review, September 2001

Conclusion(s): The remediation systems in OU-1 are functioning as intended by the ROD and as designed, as evidenced by the continued drop in the influent contaminant concentrations as well as declining concentrations at the boundary of compliance. Furthermore, data reported on a monthly basis indicates hydraulic containment of the area of concern. The clean-up criteria set forth by the ROD are still appropriate for the site, and no new information has come to light, which would call into question the protectiveness of the implemented remedy. The next five-year review of the OU-1 remedy will be performed in the summer of 2006. "Based upon the review of data acquired to-date, remediation efforts may succeed and be terminated prior to the next five-year review."

8.6 Potential Release Site (PRS)-11 Data Package, December 2003

The Core Team "re-binned" PRS-11 for a response action in November 2003, based on residual thorium levels in soil. The Core Team approved removal plan for PRS 11 does not involve breaching the sanitary landfill liner if contamination is found to be present beneath the sanitary landfill footprint.

8.7 Groundwater Strategy for the OU-1 Landfill Area, Miamisburg Closure Project (MCP), Ohio January 2004 (Conducted by Savannah River National Laboratory)

Conclusion(s): "A principal consensus of the technical assistance team was that the concentrations of VOC in the groundwater underlying OU-1 are low (generally less than 20 to 30 μg/L (ppb) even after a period of rebound following SVE and P&T). The team agrees that these levels of VOCs in the groundwater, in this setting, pose minimal risk. In general, groundwater concentrations have declined over time, both prior to and during the period of active remediation. Thus the team believes that the aggressiveness of the response action should be balanced and appropriate to the low concentrations at the site. Each of the individual remediation technologies examined by the team had positives and negatives, but none was ideal when used alone. Instead, a few combinations of technologies emerged as promising. Typically, the groupings of promising technologies consisted of limited action directed at the low levels of residual VOC being released into soil and groundwater ("sources" that remain after groundwater P&T and SVE), supplemented by natural attenuation, monitoring and leading toward no further action."

8.8 Operable Unit 1 (OU-1) Technical Team Evaluation, Recommendations to the Mound Core Team, Final June 2004

Conclusion(s): NFA for PRSs 71, 81, 282, 346, 354, 355, 418 and 419; FA for PRSs 8, 9, 10, 12 and 69; and RA for PRSs 11, 410, 409 and 414. An uncertainties matrix was developed as part of this Technical Team Evaluation. The evaluation of these uncertainties is discussed in section 10.0 of this report.

8.9 Mound Potential Release Site (PRS)-11 Borehole Geophysics, Presentation and Interpretation by Hydro-Log LLC, July 2004

Conclusion(s): The report identified two areas, one probable and the other extremely likely, to have radiological contaminated waste above clean-up standards within the sanitary landfill footprint.

8.10 Softearth Associates Inc. Jeffrey J. Daniels, Ph.D., Geophysical Survey of Buried Drum Area Mound OU-1, October 6, 2004

Conclusion(s): "The geophysical surveys clearly indicate that the barrels are confined to the slope area on the southwest side of the landfill. Furthermore, the maximum boundary of this area for the drums can be clearly delineated by the geophysical well logs as being outside of the maximum possible extent of the landfill."

8.11 Groundwater Strategy for the OU-1 Landfill Area: Results and Recommendations, Miamisburg Closure Project, Ohio, November 2004 (Conducted by Savannah River National Laboratory)

Conclusion(s): The data from the OU-1 area, both historical and the information collected and reported herein, support a consistent conceptual model related to the current status of VOCs at this site. This conceptual model (Figure 19 below) can be broken down into three sub domains: 1) the Vadose Zone, 2) the Cocooned Waste, and 3) the Groundwater – BVA.

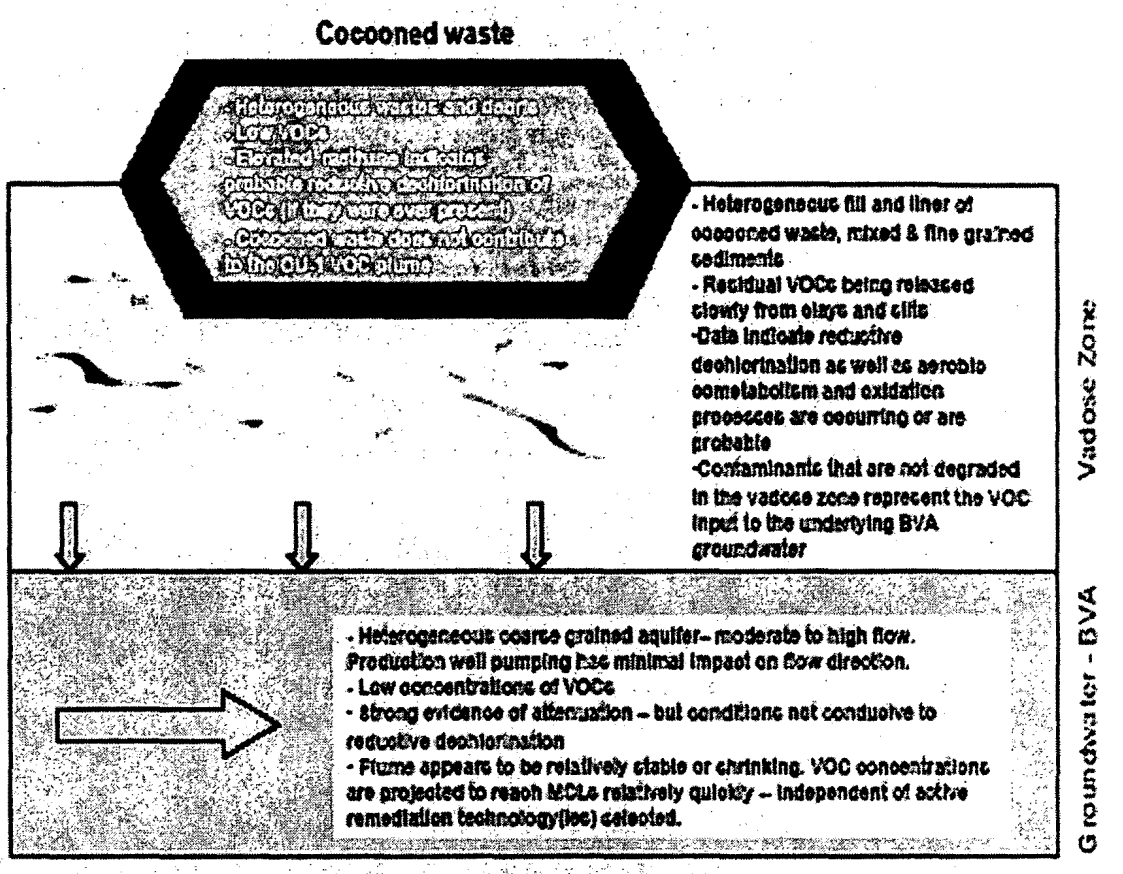


Figure 19 – Simplified and Consolidated Conceptual Model of VOCs beneath OU-1

Vadose Zone – The data suggest that the vadose zone sub domain upgradient and beneath the cocooned waste is the primary residual source of VOCs "trapped" in silts and clays and a process of slow release and subsequent downward migration. In the vadose zone the presence of significant levels of reductive daughter products, electron donors and cometabolites (e.g., toluene), and profile of decreasing VOC concentration as a function of depth all indicate active attenuation processes in this sub-domain. Based on observed steadily declining groundwater concentrations beneath the suspect sources, the release rate of VOCs from the vadose zone is likely to continue to decline over time.

Cocooned Waste – The data suggests that the levels of VOCs currently in the cocoon are low. Further, the data suggest that if VOCs were entombed with the waste and debris, they would have been subject to breakdown because conditions within the cocoon are conducive to degradation processes such as reductive dechlorination. Based on the data, the cocooned waste does not appear to be a significant contributor to VOCs in the subsurface beneath OU-1.

Groundwater – BVA – There is clear evidence for significant attenuation mechanisms in groundwater (but not traditional reductive dechlorination because of the presence of oxygen and other electron acceptors). Likely attenuation mechanisms include cometabilism, anaerobic and aerobic oxidation, and abiotic degredation. Further elucidation of the specific mechanism is a potentially costly research effort and not be particularly useful in this case with the low concentrations, short time frames, and many possible configurations of viable and reasonable remedial options. Data suggests that concentration in all monitoring wells would attenuate to levels below MCL in approximately 10-15 years irrespective of other actions that are taken at the site.

8.12 Potential Release Site (PRS)-414 Data Package Addendum 1, December 2004

After review of the PRS-414 Package Addendum 1, dated December 2004, the Core Team retired PRS-414, determining that it should be treated as a manifestation of the OU-1 groundwater plume. As such, any continued monitoring or remediation will be addressed as part of the remedy for OU-1.

8.13 Potential Release Site (PRS)-409 & 410 Data Package Addendum 1, December 2004

Ninety-seven soil samples were collected at 35 separate locations associated with PRSs 409 and 410. The results showed that all concentrations were below action levels or non-detect for Stoddard solvent and fuel oil components. PRS-410 was "binned" NFA on 12/1/04. PRS-409 was "binned" NFA on 1/11/05.

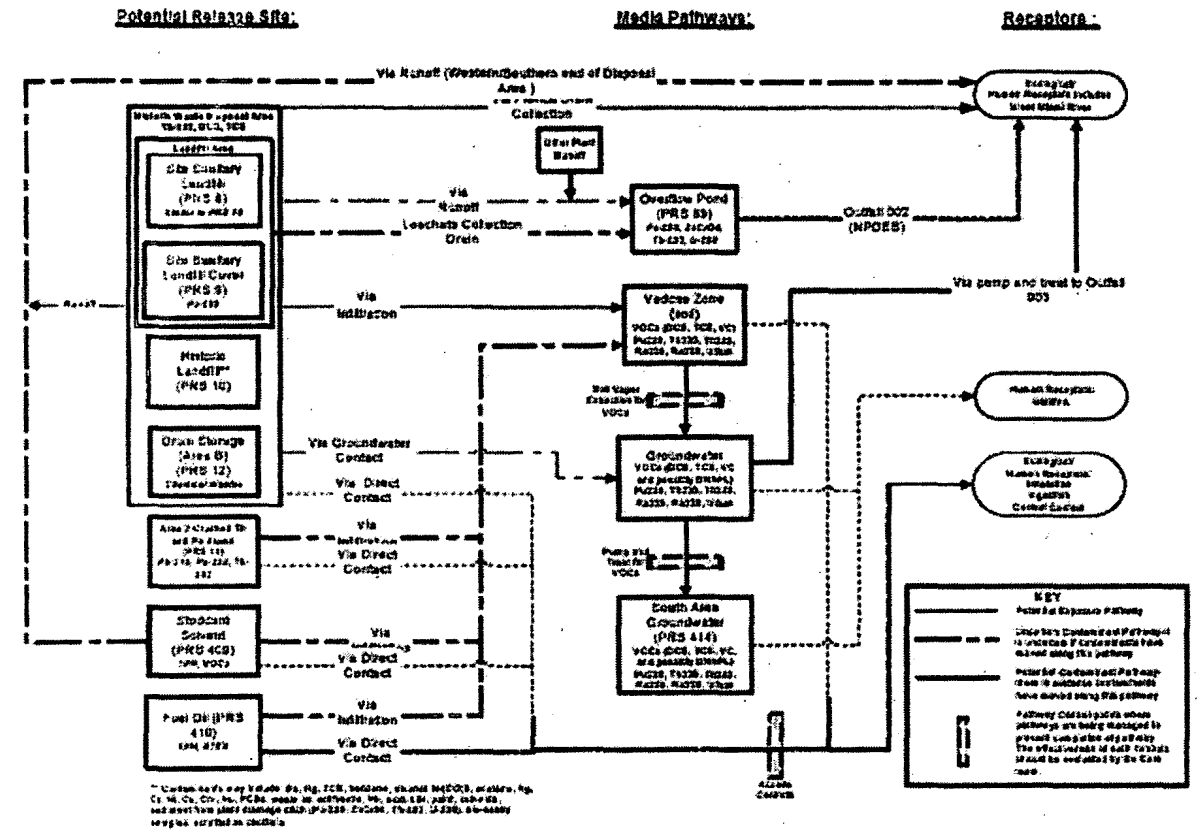
8.14 Rebound Test Final Report, April 2005

A Rebound Test was conducted for OU-1 from May 2003 to February 2004. The up gradient and interior well VOC concentrations remained relatively stable throughout the rebound test. Additionally, the down gradient and production wells showed very stable VOC concentrations throughout the test.

Midsection, west edge, and east edge wells showed variable VOC concentrations throughout the test. In some cases concentrations increased substantially in percentage terms from initial concentrations (although still by only a few parts per billion). The increased VOC concentrations observed in these wells are not related to rebound in the classic sense, but were observed to be more a function of significant transient increases in the water table elevation during the test period. These significant transient events are rare based on historical water table elevation plots.

9.0 Current Conceptual Site Model (CSM)

Figure 3: OU-1 Conceptual Site Model



10.0 Core Team Evaluation Summary

After careful review of historical information, soil and groundwater data, and the OU-1 Technical Team (Working Group) Report, the Core Team identified several overarching themes associated with the uncertainties identified for OU-1. These overarching themes, along with the specific uncertainties identified, are as follows:

1) <u>Source term nature and extent (e.g., contaminated soils and landfill debris)</u>
   PRS-11

Nature and extent of source term in Historic Disposal Area (HDA)
Magnetic anomalies (B-2/B-3)
Contamination within sanitary landfill and cover

Risk/Pathway uncertainty
Surface controls
Direct contact

2) Groundwater contamination nature and extent
Well P046
Eastern edge wells
Water table contacting contaminated soils
Dense Non-Aqueous Phase Liquids (DNAPL)
Flow patterns (pumps/production wells offline)

Risk/Pathway uncertainty
French drains (sampling results)
Downgradient groundwater receptors
Migration of plume

3) Remedy Performance
Completion timeframes
Access controls (ICs)
SVE enforceability*
Potential optimization
Capture (eastern edge)*
Control of infiltration*
Sanitary landfill cap maintenance*
Performance criteria development*
Monitored Natural Attenuation capacity (MNA)*

4) Programmatic uncertainties
Transfer issues
OPS determination
ARARs, Cap requirements

5) Consideration of full excavation
Cost estimate of full excavation vs. existing remedy

* Uncertainty addressed in Section 11.0 - Core Team Recommendation

1. Nature and Extent of Contamination in Operable Unit (OU)-1 Soils

History and General Disposal Practices at OU-1-Nature and Extent of HDA and PRS- 11
Operable Unit 1 (OU-1) formerly referred to as Area B occupies approximately four acres of land located in the southwestern part of the original Mound Plant property. Operable Unit-1 includes a historic landfill site that was used by the Mound Plant from 1948 to1974. Plant waste materials that were routinely disposed of in OU-1 included general trash and liquid wastes.

After thorough evaluation of historical documents and disposal practices in the area, the Core Team has found that the information reviewed indicates that from 1948 to 1954 very little liquid chemical wastes were generated at Mound. Urinalysis, radiological and biological research were being conducted in the small part of the Mound Plant that was operational at the time.

For about 15 years from 1954 to 1969 liquid wastes, including solvents, oils, and chemicals, were dumped in OU-1. Residual solvent concentrations in soil have been shown to be present in the subsurface and continue to diffuse from saturated tills at depth into the groundwater. However, the Core Team believes that any direct contact threat associated with these residual solvent concentrations can be managed by the current OU-1 remedy.

Only non-radioactive wastes were disposed of in the OU-1 area from 1948 to1954. Documents indicate that in 1954, the first burial in the OU-1 area occurred along the southern boundary of the old gravel quarry, just north of and parallel to the east-west road that climbs the SM/PP Hill. An irregular shaped trench was excavated to the maximum depth obtainable by the backhoe equipment of the day. Potentially contaminated residual steel and metal debris, such as rebar and pipe, which resulted from a fire that consumed the Dayton Unit salvage materials on another part of the plant, were progressively buried in the trench. After re-grading of the 1954 burial, a depression was left unaffected in the southwest corner of OU-1.

Further review of historical documents indicate that during 1955, and possibly parts of 1954 and 1956, empty drums that had contained thorium were buried in the depression in the southwest corner of OU-1 in the second major burial project (PRS-11). Approximately 2,500 empty 55-gallon drums were crushed with a crane and wrecking ball and then covered with a thin layer (about 1-2 feet) of soil cover. The buried drums and backfill were re-graded to just below the level of the road. The DOE has committed to a removal action in this area (PRS-11) as a means to mitigate uncertainty associated with the thorium concentrations to be managed as part of the 1995 OU-1 remedy. The Core Team has endorsed this decision.

In 1965, sand contaminated with polonium-210 was also documented as being placed in the southwest corner of OU-1 and the site was re-graded to blend with the landfill and burning operations to the north. The sand had come from WD Building and was a residual product of the polonium research and production conducted in the early 1950s. Because of its short half-life (138 days), virtually all of the polonium-210 has decayed to stable lead. Sampling has detected stable lead in this area.

In 1969, the state of Ohio banned open burning, and Mound Plant prohibited open burning of solid and liquid wastes in the OU-1 area. As a result, hazardous liquid wastes were collected and disposed of off-site.

After 1969, residual unburned solid waste was placed in east-west trending trenches cut by a bulldozer. Solid waste from ongoing site operations was dumped in the middle of OU-1 and moved by bulldozer to the trenches, where it was compressed and covered by a few inches of soil cover. This waste typically consisted of plastic bags containing paper, plastic, glass, cloth, food scraps from the cafeteria, and plastic vials containing urine and liquid scintillation "cocktails" and other unknown office and lab trash. Approximately four feet of soil cover was placed over the filled trenches to complete the landfill cells. The southernmost trench was not used before the area was remodeled for the overflow pond and sanitary landfill.

Between 1971 and 1976, low-level radioactive sediments dredged from the former flow monitoring station on the lower reach of the plant drainage ditch were routinely placed in OU-1. The dredged material does not appear to have been distinguished from other contamination and was probably incorporated into the site sanitary landfill when it was built in 1977. Records indicate soil screening was conducted in this area and that no plutonium-238 concentrations exceeding 25 pCi/g were detected in any of the samples collected during the Site Survey Project Report dated June 1993.

Sometime in 1972 or 1973, soil materials (most likely natural fill and some burned and solid waste) were excavated from the west-central portion of OU-1 and relocated to a ravine now identified as PRS-66, along the upper reach of the plant drainage ditch, to serve as fill material and facilitate the construction of a parking lot behind the firehouse. After 1974, waste was no longer disposed of in OU-1.

Prior to construction of the overflow pond and the site sanitary landfill, OU-1 was surveyed for trash using soil boreholes and test pits installed by Dames and Moore and Bowser and Morner. The trash to be excavated was defined in the Bid Invitation Specifications Document as "normally non-nuclear contaminated refuse from laboratory operations." The trash was described as consisting of two types: the first type was "unburned materials consisting of plastic bags containing paper, plastic, glass, cloth, other known office and laboratory trash, food scraps from the cafeteria, and plastic bottles of urine;" the second type of trash to be excavated was described as "burnt materials consisting of residues of metal scraps, tin cans, heavy plastic, wood, wire, short lengths of pipe, smashed drums, sheet metal, and laboratory trash" in well defined layers.

The borehole samples were visually inspected and described, and monitored by Mound Plant health physicists, but samples were not analyzed chemically. Some of the original borehole logs indicate a "strong odor of solvent of some sort," and organic odors and layers were prominent. Distillates from the borehole samples were analyzed for tritium by plant personnel, and tritium concentrations were very low or not detected. During construction, no attempt was made to define trash by any means other than by visual inspection.

Sanitary Landfill and Pond

The overflow pond and site sanitary landfill were constructed on the OU-1 site during 1977-1978. The purpose of the pond is to retain storm flows, settle sediment, and support compliance with NPDES discharge standards for suspended solids. The sanitary landfill was constructed to provide containment of solid waste removed from the historic landfill during construction of the pond.

The pond is built with earthen dikes and has a 5,000,000-gallon capacity. The bottom of the overflow pond is lined with a 3 feet-thick layer of natural clay distributed over an area of approximately 90,000 square feet. The entire overflow pond construction project was monitored by Mound Plant health physicists. One bucket (less than five gallons of soil) with an elevated plutonium concentration above 100 pCi/g was removed from the overflow pond construction area. Only material with plutonium levels greater than 100 pCi/g was considered hazardous during pond construction.

Much of the solid waste in the historic landfill where the pond was constructed was excavated and moved to the site sanitary landfill. Generally, historical waste below the site sanitary landfill, debris from the Dayton Unit fire in the first trench and empty, crushed drums that had contained thorium in the second trench, were not excavated and remained under the landfill. The two trench areas are currently scheduled for a removal action in the spring of 2005.

Low-level radioactive (plutonium-238) sediments dredged from the plant drainage ditch were routinely placed in Area B in the early 1970s. This dredged material does not appear to have been distinguished from other contamination and was probably incorporated into the sanitary landfill when it was constructed. It is also reasonable to assume that the landfill liner, berms, and cover also received contaminated soils. No known radioactive materials above action levels at the time were included in construction of either the interior or the cover of the new site sanitary landfill.

The sanitary landfill clay liner was designed to be 4-5 feet thick, but it is reported to be actually closer to 10 feet thick. The clay liner was compacted to ensure a proper seal and integrity over time (90 and 95% dry density). Clay berms were constructed on the landfill to prevent runoff from pooling on the top of the landfill and to direct it to the overflow pond.

A leachate collection system was constructed, using collection drains at the top of the lower clay liner of the landfill. The drain located in the landfill allows for drainage of any landfill liquids into the adjacent overflow pond. According to personal accounts, some of the trash was saturated during excavation and liquid flowed from the drain pipe into the pond for six months afterward. No known samples of this leachate were collected and no known drainage has occurred since the initial six-month period.

In June of 2004, SRNL National Laboratory (SRNL) conducted gas sampling from the leachate collection system drain pipe to identify contamination and/or indication of degradation. A large volume of air was pulled from the pipe (over 300ft^3) and analyzed for VOCs, CO_2 and oxygen. Trace levels of VOCs were identified in several samples; however the oxygen and CO_2 remained near atmospheric levels. Results from the drain pipe sampling are not conclusive due to the unknown integrity of the pipe.

Five French drains were installed 2-25 feet below the landfill liner. The French drains were installed partially in a fine gravel/sand layer and partially in a silty clay layer. The purpose of these French drains is to drain moisture from under the site sanitary landfill to ensure soil slope stability. Based on interviews with current site personnel, drain samples have been collected on several occasions with no results indicating migration of contaminants. These sampling events are not documented.

The sanitary landfill cap, constructed of 3 feet of clay with 2-5 feet of low-permeability topsoil, was designed to minimize infiltration of precipitation and snowmelt into the landfill and subsequent flow through contaminated soils and debris, and thereby to reduce leachate generation. In addition, the cover prevents direct contact with potentially contaminated surface soils and controls contaminant migration by way of air, surface water, and sediment pathways.

From 1982-1985, Mound Plant collected core and surface samples to obtain radiological data on the sanitary landfill cap (a.k.a., Area 18) and in the vicinity of an area used for disposal of crushed empty thorium drums (a.k.a., Area 2, PRS-11) and polonium-210-contaminated sand filters (reference OU-9, Site Scoping Report volume 3, Radiological Site Survey). The Core Team believes residual low-level plutonium-238 still remains in the OU-1 area. However, the available data demonstrate concentrations present at OU-1 are well below Mound risk-based action levels and are consistent with or lower than concentrations found in other areas outside of OU-1. A map depicting surface concentrations relative to Mound risk-based action levels for radionuclides is included as Attachment 4. As a result, the Core Team does not view these levels as an unacceptable risk to human health or the environment. This is consistent historically with decisions across the balance of the Mound Plant.

In September of 2004, SRNL took two soil gas samples penetrating only the top layer of the Site Sanitary Landfill cocoon and then tremie grouted the core with bentonite slurry. These soil gas samples were analyzed for VOC, O_2, CO_2 and Methane. Gas samples were collected at the vertical center of the cocoon (24 foot depth). Concentrations were 16 and 27% methane, 13 and 9% O_2, 13 and 22% CO_2. Trace levels of gaseous PCE and TCE were identified. SRNL concluded the high O_2 may indicate degradation processes inside the cocoon are complete and the cocoon is not likely a continued source of VOC contamination.

1991 Technical Memorandum: Area B, Extent of Contamination

The maximum concentrations for all six VOC constituents detected in OU-1 soils (TCE, 1,2-trans-dichloroethene, chloroethene, benzene, ethylbenzene, and toluene) were in four locations west of the sanitary landfill. Data were not collected east or west of these locations to define the horizontal extent of VOC contamination. All six of these contaminants were also detected at locations north and northeast of OU-1.

In soil samples collected west of the overflow pond, which is north of the Site Sanitary Landfill, aromatics, benzene, toluene, and ethylbenzene, were detected more often and at higher concentrations than chlorinated hydrocarbons. The soil sample collected at the southwest corner of the overflow pond indicated no contamination for three of these constituents, and relatively low concentrations for the other three constituents. This result was surprising because the sample location was close to the four highest concentration locations, it is on top of the location of the old landfill, and it is close to the well with the highest groundwater concentrations.

At the seven soil sampling locations south of OU-1, some contamination was detected. However, the measured concentrations were relatively low. The highest values in this area (0.27 and 0.11ug/L) were both for benzene.

OU-1 Soil sampling data also indicate widespread, low-level plutonium-238 surface soil contamination. However, except for one surface soil sample and the composite overflow pond

sediment sample, all the concentrations within OU-1 are below the ALARA goal of 25 pCi/g versus the current clean-up goal of 55 pCi/g. The data also indicate limited thorium surface contamination, mostly east and uphill of OU-1. All the concentrations were below the past Mound Plant D&D clean-up guideline (5 pCi/g in the first 15 cm of soil and 15 pCi/g for soils below 15 cm).

All tritium concentrations are below the drinking water standard.

The data indicate no surface soil concern within the base map area for cobalt-60, cesium-137, radium-226, and americium-241.

The VOC soil gas and surface soil data indicate relatively high VOC concentrations directly west of the landfill.

Subsurface source term nature and extent (Technical Memorandum: Area B, Extent of Contamination – soils, 1991)

Although all the radiological subsurface data indicate concentrations below the then Mound Plant D&D clean-up guideline, the core holes on the Site Sanitary Landfill and along the southern and western borders of OU-1 show the highest plutonium-238 concentrations. One subsurface sample indicated thorium in the area of the buried crushed drums beneath the Site Sanitary Landfill. However, the concentration was below the D&D clean-up standard.

The VOC subsurface soil data indicate that chlorinated hydrocarbons occur in the vadose zone and saturated zone soils.

Metal Anomalies

In September 1990, and again during 2004, magnetic field strength data were collected in the southwest corner of OU-1 to locate the disposal area of 2,500 crushed steel drums that had contained thorium (PRS-11). These crushed empty drums are under the clay berm to the south of the landfill. In 1997, while installing the current SVE system, six of 38 thorium-232 samples contained concentrations above the current site action level for thorium (2.1 pCi/g). All but one of the six samples that exceeded 2.1 pCi/g were located in the south bench. The highest thorium concentration measured was 561.7 pCi/g. After evaluating the 85 samples in the crushed thorium drum burial area, there are 43 detections and 42 non-detects. The overall average thorium concentration is 23.6 pCi/g with the median value being 0.48 pCi/g. The data indicate that eight elevated samples in five separate locations are driving the risk associated with this area. A removal action in this area is scheduled to begin in April 2005. This removal action will not compromise the adjacent sanitary landfill cocoon. Once this removal action is complete the nature and extent of contamination will be further defined.

As a result of the magnetic reconnaissance data, several additional probable disposal areas have been delineated. Zone B-1 is interpreted to be the location of PRS-11. Zones B-2 and B-3 are locations in which large amounts of ferrous materials have been disposed. These data were interpreted in conjunction with detailed maps of ferrous features and power lines on the surface. In this way, magnetic anomalies related to known ferrous features have been excluded from the interpretation of the data.

Zone B-2 is adjacent to the B-1 location (PRS-11) mentioned above. A portion of the B-2 magnetic anomaly was excavated during the P&T system installation and was found to only contain miscellaneous metal debris (no contamination was observed). However, when location B-1 (PRS-11) is excavated, additional data may be gained with respect to zone B-2.

Zone B-3 was sampled during 2004, as part of a SRNL OU-1 investigation (sample ID: MDOU-1-10). Soil samples were collected at 1-foot intervals from 6-18 feet. The contaminant composition and distribution was similar to sample ID: MD OU-1-5, which showed decreasing VOC concentrations with depth. The 10-14 foot core sample contained a pure phase oily substance and corresponds to high solvent concentrations. The decreasing concentrations with depth indicate that solvents are no longer mobile or are not migrating at a significant rate. High levels of degradation products indicate strong natural anaerobic degradation processes are occurring in this tight fill formation (SRNL screening level results). However, the depth limitations of the Geoprobe prevented complete vertical profiling. Soil gas samples were not collected due to the low permeability of the formation.

2. Nature and Extent of Groundwater Contamination at Operable Unit (OU)-1

DOE Mound initially began monitoring groundwater in the OU-1 area during the mid- 1980s. Solvent contamination detected in the groundwater was one of the primary reasons for the Mound Plant's placement on the USEPA NPL in 1989. The groundwater beneath the OU-1 area is located in a BVA that is designated as a Sole Source Aquifer. The aquifer supplied drinking water for the Mound Plant and continues to provide drinking water for the local community. Mound Plant production wells are located a few hundred feet south (down gradient) of the OU-1 disposal area. These production wells are scheduled to be abandoned. The City of Miamisburg's production wells are currently located northwest of the OU-1 area (up gradient of OU-1). A city production well, which was abandoned in 2002, was located off property directly adjacent to OU-1 but was secured by DOE to address previous tritium groundwater contamination not associated with OU-1.

A CERCLA RI/FS was conducted for the area in the early 1990s. Documents regarding the OU-1 RI/FS can be found in the public reading room.

The purpose of this section is to evaluate the nature and extent of the groundwater contamination and identified uncertainties regarding groundwater contamination. The primary uncertainties include:

- source of low level TCE contamination detected in piezometer P046 located south of OU-1 near the Mound production well #3,
- TCE and PCE contamination in the "eastern edge wells" (MW410, MW419 and P015),
- is groundwater rising up to contact contaminated sediments and possibly waste,
- the potential presence of DNAPL, and
- groundwater flow dynamics without Mound production wells and/or OU-1 groundwater P&T system (groundwater containment system).

Other more recent sources of information used to evaluate the above include routine groundwater monitoring data; Operable Unit 1 Groundwater Rebound Test, Final Report, April 2005, and Groundwater Strategy for the OU-1 Landfill Area: Results and Recommendations, Miamisburg Closure Project, Ohio March 2005 (SRNL).

The VOC source term (TCE ,PCE, DCE) has been reduced since implementing the OU-1 remedy. Over 4,000 lbs. of solvent have been removed to date by the SVE system. The Safe Drinking Water Act (SDWA) MCL for TCE and PCE is 5 ppb and 70 ppb for DCE. The majority of wells in the OU-1 area show concentrations at or below the MCL for TCE & PCE with generally much lower levels of DCE. Approximately six to eight wells consistently show concentrations above or slightly above the MCL. The highest concentrations (TCE) observed are approximately 20 to 30 ppb.

Nature and Extent of Groundwater Contamination

The extent of VOC groundwater contamination is shown in the PRS-414 Addendum Package, Final 2004, as well as the Operable Unit 1 Groundwater Rebound Test, Final Report, April 2005. Contoured TCE, PCE, DCE, and VC concentration maps from January 1997-January 2004 are included in Attachment C of the addendum and are included as Attachment 2 to this Technical Memorandum. In addition to contoured concentration maps, concentration-versus-time plots are included in the PRS-414 Addendum and in this Technical Memorandum. Both the concentration contour maps and concentration-versus-time plots indicate a shrinking plume over the 1997-early 2004 time frame. Although concentrations have decreased to near MCL levels in many monitoring wells, several wells remain above MCLs as noted above. The behavior of VOC concentrations in these wells has been monitored as the system returns to equilibrium after the rebound test.

There is some uncertainty associated with VOC contamination located along the eastern boundary of the BVA beneath and down gradient of OU-1 (in the area once referred to as PRS-414) since VOC contaminant levels tend to "bounce" above and below their MCLs in this area. The area includes monitoring wells MW410, MW419 and P015. Primary contaminants include TCE and PCE and range from non-detect to 50 ppb over the course of monitoring (1998-present). More recent results show concentrations near the MCL of 5 ppb for TCE and PCE. The Core Team concluded that the TCE and PCE groundwater contamination is not from the upland bedrock high to the east where TCE is being monitored, but from the OU-1 disposal area. Further research must be conducted to try to establish whether contamination is somehow getting by the hydraulic barrier only where the BVA pinches off along this eastern edge or whether historic contamination has become "hung up" in this location after migrating away from the landfill area. If the source of the elevated groundwater contamination was some amount of contamination hung up down gradient from OU-1, it would be expected that every time the groundwater elevation drops, higher VOC concentrations should be observed. This, in fact, has been the case to date for the eastern boundary area. In any event, the highest concentrations measured along this eastern boundary are in the range of 10-20 ppb for various VOC contaminants, and these levels do not warrant a more aggressive treatment method than the system already in place.

Radiological monitoring has also occurred at OU-1, but at a lower frequency than VOC monitoring. Attached (Attachment 5) is the available ground water radiological data for the OU1 area.

Tritium monitoring occurred relatively frequently from the early 1990s until the present. Tritium results generally indicate decreasing trends from the early 1990s until present. One well (0305) exceeded the MCL of 20,000 pCi/l with a concentration of 24,000 pCi/l for the January 31, 1991 sample. The latest result (November 2, 2004) for monitoring well 0305 indicates a concentration of 1,120 pCi/l. Several wells (e.g. 0063, 0305, 0313, 0370, 0417, 0418, 0420, 0421, 0422, 0423, and 0424) show a general decrease through the 2000/2001 time frame, but may have a slight increasing trend since then. These increases, if present, are minor and are still well below the MCL. Tritium will continue to be monitored site-wide as the clean up continues at the Mound plant and will be evaluated for inclusion into the long term OU1 ground water monitoring.

Also attached are tables with the maximum results for other radiological parameters and a table listed by well, sample collection date and parameter. Of interest, plutonium 238 was detected at a maximum value of 6.2 pCi/l in well 0063 for the June 22, 1992 sampling event. Previous and subsequent sampling results are at or near detection limits and other guideline/background comparison values. Plutonium 239/240 showed similar results. Radium 226 was detected at a maximum result of 3.1 pCi/g in well 0313 for the March 3, 1992 sampling event. This result is below the MCL of 5 pCi/l. In addition, subsequent sampling results (4) in this well are at or below the background concentrations of 1 pCi/l. Thorium 228 was detected at a maximum of 4.7 pCi/l in well 313 for the February 3, 1991 sampling event. All subsequent samples (5) for thorium 228 in this well were below the background value of 0.78 pCi/l. Thorium 230 was detected at a maximum of 3.8 pCi/l in well 0046 for the July 10, 1987 sampling event. Subsequent sampling events (2) are all less than 0.2 pCi/l and near the limits of detection. Thorium 232 was detected at a maximum value of 0.59 pCi/l in well 0317 for the March 16, 1994 sampling event. This concentration is near the background value of 0.314 pCi/l. Uranium 234 was detected at a maximum result of 13 pCi/l in well 0313 for the February 3, 1991 sampling event. Uranium 235 was detected at a maximum result of 12 pCi/l in well 0046 for the July 1987 sampling event. Uranium 234/235 results are suspect and inconsistent with other wells in the area. In addition, no detection limit was reported for these results. Uranium 238 was detected at a maximum of 4.3 pCi/l in well 0313 for the February 3, 1991 sampling event. The subsequent sample collected August 4, 1991 from well 0313 had a result of 3.57 pCi/l. All subsequent samples (6) are near or below the background value of 0.69 pCi/l or the analytical detection limits.

Overall the ground water in the OU1 areas does not appear to be radiologically impacted, except by tritium. The tritium levels have decreased although there may be some small increase since 2000 in some wells. All tritium levels remain well below the MCL of 20,000 pCi/l. The Core Team recommends the OU1 areas should be periodically sampled for radiological contaminants due the area's disposal history and some the questionable data above.

Piezometer P046

In addition to the eastern edge wells, P046 showed TCE levels just above the MCL. An increasing trend began during late 1998 and continued to increase to about 7.5 ppb in late 2002 when the concentration peaked. Levels have since continued to decrease and are currently below the MCL. The specific source of the TCE in PO46 is unknown but probably represents some plume remnant from OU-1. If so, this

(along with minor detections in production well #3) represents the furthest southern extent of the OU-1 plume. At the current levels detected in P046 (2-3 ppb), additional investigation to address this uncertainty is not warranted. The well should continue to be monitored. It is important to note that production well #3 may have prevented further down gradient migration of VOC contamination at that time.

Groundwater Contacting Waste

A rebound test was conducted from May 2003 through Feb 2004. The groundwater system showed small VOC rebound prior to restarting the P&T system. In response to a large rainfall event, the groundwater level in the BVA did rise approximately 6 feet during the rebound test. The Operable Unit 1 Groundwater Rebound Test, Final Report, April 2005 speculates "that increasing water table levels due to exceptionally high river stage in July 2003 caused the water to rise into contact with contaminated sediments know to exist at location EW-N7 (a SVE remediation well located immediately upgradient of well 0413). As the water table came into contact with these sediments, VOCs partitioned into the water phase. As the water table lowered to more normal conditions the contaminated groundwater migrated southward to intersect the first well 413 and at a somewhat later time well 0417. It therefore appears that the mechanism causing the increasing VOC concentrations observed in these wells is not related to rebound in the classical sense, but is more a function of rare transient significant increases in the water table elevation." An illustration of this concept is included as Attachment 6. It is also expected that a small contribution to contamination levels found in groundwater is caused by surface water migration downward through residual source term within OU-1.

Historical information provided in drawing (#FSD16667) in the Operable Unit 9, Site Scoping Report, Volume 7 – Waste Management, suggest waste is located as deep as 680 above mean sea level. This elevation also corresponds roughly to the average groundwater level. Boring logs from the waste disposal area provide some information regarding the depth of waste, but they are open to technical interpretation and not conclusive.

Therefore, groundwater probably does rise and contact contaminated sediments and possibly comes into direct contact with waste. It is not uncommon for gravel mining operations (the original purpose for the excavations in the OU-1 area) to excavate to and below groundwater levels to extract gravel. Nevertheless, additional information will become available during the PRS-11 excavation beginning this spring.

Dense Non-Aqueous Phase Liquids (DNAPL)

With regards to DNAPLs, the Core Team reviewed the information provided by SNRL Technical Team Report dated May 17, 2004, assessing the stakeholder concern regarding the presence of migrating DNAPL pools. The Core Team concurs with SRNL's assessment that the evidence does not support the presence of DNAPL pools. However, the Core Team also concurs that residual source is present in the vadose zone soil (possibly as free phase product) trapped in the fine grained sediments beneath and to the north of the sanitary landfill. This residual source does not appear to be migrating rapidly, rather it appears to be controlled by slow mass transfer limited release.

Groundwater Flow Dynamics

Groundwater flow dynamics without influence from Mound production wells or OU-1 groundwater P&T system were modeled and reported in the SRNL report titled Groundwater Strategy for the OU-1 Landfill Area: Results and Recommendations, Miamisburg Closure Project, Ohio March 2005. The results of the

evaluation indicated groundwater flow parallels the bedrock BVA valley wall to the east, generally flowing south by southeast (see Attachment 7). The modeled impact of turning the production wells off is an approximate 50% decrease in groundwater flow velocities. Without groundwater extraction via the OU-1 P&T system and the DOE production wells, any contaminants migrating to and in the groundwater will migrate down gradient until attenuated, degraded, diluted, or otherwise intercepted. The groundwater plume maintained stability during the 9 month period of time the pump and treat and SVE systems were shut-off during the rebound test. However, production well #3 remained in operation and would have altered the flow dynamics and possibly plume behavior. All three plant production wells are scheduled to be decommissioned in the summer of 2005.

It has been suggested that monitoring wells may not be screened at the most likely depth to monitor the highest level of VOCs in the groundwater immediately down gradient of OU-1. A detailed analysis of the OU-1 monitoring well network, with respect to well locations and screened depths, will be conducted in negotiating a Core Team approved OU-1 Long-Term Groundwater Monitoring Plan. This issue also becomes extremely important assuming the P&T system is expected to be turned off sometime in the future. The Core Team agrees that the monitoring well system needs to be evaluated and changed if needed prior to that time. An adequate groundwater monitoring system is essential to any long-term monitoring of the site.

Pathway of Concern and Potential Receptor for VOC Contamination:
The pathway of concern for VOCs is consumption of and/or exposure to contaminated groundwater, or subsurface exposure to elevated VOC concentrations in the vadose zone. The Mound site was connected to the City of Miamisburg's potable water distribution system in December of 2004. This action, coupled with the property-wide restriction prohibiting the use of groundwater on site, effectively limits any potential exposure to a receptor within the Mound Plant boundary. The BVA Sole Source Aquifer is an extremely valuable resource for the area and warrants protection. There are no CERCLA restrictions to installing production wells outside the plant boundary.

The groundwater system at OU-1 is monitored with a very dense network of groundwater monitoring wells. The only contaminants detected above regulatory guidelines are VOCs. The OU-1 remedy utilizes a groundwater P&T system to provide hydraulic containment of the groundwater directly below OU-1.

VOCs have diffused over time (i.e. during active disposal) into the low permeability glacial tills in the aquifer and slowly diffused out over time causing a continual flux of low concentration VOCs into the aquifer. Behavior of groundwater VOC groundwater concentrations during active phase of P&T operations supports this scenario. Given the maturity of the disposal site, this implicates VOCs as the only constituent capable of negatively impacting the underlying groundwater. Current maximum VOC concentrations at OU-1 are approximately 30 ppb of tetrachloroethene. Typical arial concentrations are less than 10 ppb for TCE, PCE, DCE. Low-level (e.g., 10 ppb) VOC concentrations will likely be an ongoing condition in the groundwater in the immediate vicinity of OU-1 for the next 10 - 15 years.

Down gradient production wells (approximately 50 yards south of the OU-1 compliance boundary) had consistently supplied drinking water that meets federal safe drinking water act standards. This demonstrates that overall water quality down gradient of the OU-1 area is good and the OU-1 area is currently having a minimal impact on down gradient drinking water.

3. Evaluation of Remedial Performance

The OU-1 remedy currently consists of three components. Two of the components, a P&T system and ICs, were required by the ROD for OU-1 signed in June 1995. Subsequent to the ROD, a SVE system was added as an enhancement to the OU-1 remedy in 1996.

Pump-and-Treat (P&T) System with Air Stripper
In 1995, after conducting a thorough review of alternatives, a P&T system was selected to treat contaminated groundwater in the OU-1 area. The purpose of the P&T system was twofold. The system was designed to contain the groundwater plume in a location beneath the OU-1 area, and the system was designed to use an air stripper to remove VOC contaminants from the extracted groundwater through volatilization.

A system of three extraction wells was installed in 1995. The wells were placed in locations that would allow for containment to be maintained at the point of compliance. At OU-1, the point of compliance is an east-west and north-south line along the roads west and south of the landfill area. Groundwater elevations have been measured regularly in the three wells since they were installed. Based upon monthly triangulation calculations, it has been shown that capture has been maintained. In addition, about 310 million gallons of groundwater have been extracted from these wells for treatment with an air stripper. The water is pumped to the surface so that it can be pumped through the air stripper. The air stripper "cleans" the water by allowing for dissolved VOCs to volatilize out of the groundwater. To date, this air stripper system has removed about 30 pounds of VOC material from the contaminated groundwater. Currently, it is anticipated that groundwater clean-up goals will be achieved in 10 to 15 years.

Institutional Controls (IC)
It was also contemplated in the 1995 ROD that OU-1 property ownership may eventually be transferred to an entity other than DOE. While DOE continues to own the OU-1 property, DOE can control access to the landfill area and provide measures to insure that no person comes into contact with the waste material in the landfill area. However, DOE would not have the same level of oversight or control if the property were transferred to another owner. For this reason, the 1995 ROD stated that, in the event that DOE intends to transfer the OU-1 property, appropriate ICs (including deed restrictions) should be placed on the property to insure that its use remains protective of human health. At the time the 1995 ROD was written, there was not much guidance on what specific restrictions should be required or how deed restrictions should be implemented at Superfund sites. Due to this lack of guidance and experience in using ICs, the 1995 ROD is vague about what ICs should be required for OU-1. In recent years, many Superfund sites have relied on deed restrictions as part of the final remedy. In the RODs for these sites, the specific restrictions are spelled out for inclusion in the deeds for the property to be transferred; similar to what has been done for other parcels of property at Mound which have already been transferred.

The RODs for other parcels of property transferred at Mound contain the following restrictions:

- Maintenance of industrial/commercial use;
- Prohibition against residential use;
- Prohibition against the use of groundwater;

- Site access for federal and state agencies for the purpose of sampling and monitoring; and
- Prohibition against removal of soils from the DOE Mound property (as owned in 1998) boundary without approval from the Ohio Department of Health, the OEPA, and the USEPA.

It is anticipated that the same restrictions would be implemented for the OU-1 area, along with an OU-1 specific restriction prohibiting any excavation in the OU-1 landfill areas (as defined by a property survey), before the OU-1 property could be transferred from DOE ownership.

Soil Vapor Extraction (SVE) System

In 1996, after the P&T system became operational, a technical workgroup called the ITRD project was initiated at Mound to investigate methods for completing the clean-up at OU-1 faster and more cost effectively. The focus of this group was on innovative technologies that may not have been implemented on a large scale nationwide. A determination was made by this group that clean-up could be completed more quickly if some focused treatment of the groundwater contamination source were conducted. To this end, an SVE treatment system was installed in 1996 to treat VOC contamination in the vadose zone (soil). This treatment system could eliminate some of the contamination that could eventually migrate to the groundwater and become dissolved in the groundwater plume. To date, the SVE system has collected about 4,500 pounds of VOC contamination. This is more than 100 times more contamination that has been removed from the OU-1 area through the groundwater P&T system. The amount of VOC mass being collected by the SVE system has leveled off in recent years. Since the SVE system has proven to be such a successful treatment method for contaminated soils in OU-1, an analysis should be conducted to evaluate the potential for updating or augmenting the current system configuration to remove even more source material. It is anticipated that additional wells could be added to the system, and that some wells could be abandoned where contamination is no longer being extracted from the subsurface.

An uncertainty has been raised through the OU-1 Technical Team that there could still be significant VOC mass (thousands of pounds) buried in OU-1 based upon postulated volumes disposed of in the area. It is difficult to say with any degree of certainty how much VOC mass remains in OU-1. First of all, there is very little information with respect to how much was actually disposed there. Secondly, it is impossible to know how much of that material was burned and how much was just poured onto the ground in the historic landfill. Finally, this area sat idle for 15 years between the time that the dumping and burning practices ceased at OU-1 and the time that a remedy was installed for contaminated groundwater. It is known that some VOCs had already migrated through the subsurface to the groundwater before a remedy was implemented, resulting in elevated groundwater VOC concentrations. It is impossible to say how much VOC mass had already migrated away from the landfill area before the OU-1 remedy was installed.

There is no doubt that a certain amount of VOC and radioactive contamination remains buried at OU-1. The CERCLA questions to be answered are whether this buried contamination is presenting a continuing significant source of contamination to the BVA Valley Aquifer and whether or not this material could pose a direct contact risk to a future user of the OU-1 property.

4. Programmatic Uncertainties

The Core Team agrees that, before the OU-1 property can be transferred from DOE to another property

owner, the final OU-1 Remedy as described in the ESD would have to be in place and DOE must get concurrence from US EPA that the OU-1 Remedy is operating properly and successfully (OPS).

The Core Team recognizes that another uncertainty was raised with respect to the ARAR's that would apply to a cap remedy at OU-1. Because a cap is not being recommended for the final remedy at OU-1, cap-related ARARs would not be triggered for consideration.

5) Consideration of Full Excavation

The Core Team was asked by MMCIC to consider the possibility that the historic and "sanitary" landfills be excavated in order to be protective of human health and the environment and to allow for more flexibility in future use of the OU-1 site. The Core Team carefully considered this alternative. The information used by the Core Team in conducting this evaluation included potential reductions in risk to future site users, potential reductions in the required deed restrictions on the OU-1 property, and the cost of excavation of the landfill areas. After considering the fact that the existing remedy (soil cover with deed restrictions) would successfully manage any future risks associated with the OU-1 property, the primary decision criteria comes down to the cost of the existing remedy vs. the cost of full excavation of the OU-1 landfill area.

The Core Team agreed that the only way that it could endorse the excavation alternative was if the cost of excavation was only slightly higher than the life-cycle cost of the existing remedy. In order to examine this possibility, the Core Team selected a cost estimate for excavation that was on the low end of the range of estimated costs [$30 million from a range of $23.4 to $62.2 million, according to the April 14, 2004 Office of Engineering and Construction Management (OECM) independent government cost estimate (IGCE)], and the Core Team selected a cost estimate for the existing remedy that was biased high (assuming maximum costs for maintenance and long-term site monitoring). This was done to minimize the difference in cost between the existing remedy and the proposed excavation. After performing this cost difference minimization, the difference between the two alternatives is about $25 million. The cost calculations used by the Core Team are shown below. The Core Team did not feel that any more detail beyond what is shown here was required to reach a decision regarding the viability of excavation at OU-1.

Existing Remedy:

OU-1 system operational costs

Annual P&T system operation:	$40,000 per year
Annual SVE system operation:	+$25,000 per year
Total annual P&T/SVE operational costs:	$65,000 per year

30 year (US EPA guidance) operational estimate: $65,000 * 30 = $1,950,000 (approximately $2M)

Sampling/analytical costs (assuming 20 wells sampled quarterly required for post closure)

$400 per well per sample event (mobilization, sample collection and input into Mound Environmental Information Management System (MEIMS)
$150 per well per analytical event

$550 sampling per event x 20 wells = $11,000 per quarter

$11,000 x 4 quarters = $44,000 annually or a conservative estimate would be $50,000 per year
$50,000 annually over 30 years = $50,000 * 30 = $1,500,000

Soil cover and maintenance

Installation of soil cover and grading of the site for proper drainage:	$500,000
Approximately 30k annually for mowing and fertilizing and 1% surface repair (4 acres): $30,000 per year * 30 years =	+$900,000
Total cost of soil cover and maintenance:	$1,400,000

Adding together the operational, monitoring, and soil cover costs, the total cost of the existing remedy over a 30 year period is about $5 million. Life-cycle costs for maintenance of the soil cover (conservatively estimated at $30,000 annually) will continue after the 30th year, however, these costs are not significant (relative to the cost of excavation of the entire landfill).

Full Excavation

As mentioned previously, the Core Team assumed the excavation costs would be about$30 million based upon the range of costs calculated in the April 14, 2004 Independent Government Cost Estimate (IGCE) developed for DOE by the Office of Engineering and Construction Management (OECM) for the excavation of OU-1. USEPA also had an independent contractor familiar with excavation projects review the DOE-OECM cost estimate on their behalf, and USEPA found that the cost estimate was reasonable. Finally, the Core Team chose $30 million because it was on the low end of the range of costs ($23.4 to $62.2 million) for the excavation and disposal of OU-1 waste materials. The IGCE is attached to this technical memorandum as Attachment 8.

11.0 Core Team Recommendations

The Mound Core Team
1075 Mound Road
Miamisburg, Ohio 45342-3216

Core Team Summary of Recommendations
Operable Unit 1 - DOE Mound Plant

The Mound Core Team, made up of the United States Department of Energy Miamisburg Closure Project (DOE), the USEPA - Region 5, and the OEPA, has been tasked with examining the existing remedy associated with Operable Unit 1 (OU-1) at the DOE Mound Plant in Miamisburg, Ohio to determine whether the remedy is protective for human health and the environment. This review was brought on by the fact that there have been additions and clarifications made with respect to the remedy since the OU-1 Record of Decision (ROD) was signed in June 1995 and the fact that new data has been collected in the OU-1 area that resulted in the changing of a "binning" decision associated with PRS-11 to require a removal action to remove thorium-contaminated drums. It is also anticipated that ownership of the OU-1 area may be transferred from DOE to another future land owner.

A CERCLA ROD was signed by DOE, US EPA and OEPA in June 1995, pursuant to the existing Federal Facility Agreement (FFA) among the three agencies, selecting a P&T system to collect, treat and dispose of groundwater contaminated with volatile organic compounds (VOCs). The P&T system was installed and began operation in 1996. This system not only treats contaminated groundwater in an attempt to decrease groundwater contaminant concentrations, but it provides a hydraulic barrier preventing a VOC contaminant plume from migrating away from the landfill area. After the P&T system began operation, an innovative technology demonstration project at Mound resulted in the installation of a SVE system at OU-1. The purpose of this system is to treat the VOC source term in the vadose zone before contaminants have an opportunity to migrate to OU-1 groundwater. The SVE system has removed approximately 4,000 pounds of VOCs from the vadose zone at OU-1 and constitutes a successful effort to treat VOC soil contamination at OU-1. Finally, the 1995 ROD contemplated the eventual transfer of the OU-1 property to another land owner in the future, and the ROD stipulated that DOE would be required to place appropriate restrictions on the use of the OU-1

property to prevent unacceptable exposures to residual buried contamination remaining in the landfill areas. At this time, the Core Team anticipates that these restrictions will be (1) prevention of the installation of additional groundwater wells and a prohibition on the extraction of OU-1 groundwater for any purpose (other than wells installed for environmental monitoring and groundwater extracted for sampling purposes), (2) restriction of future use of the OU-1 property (to be defined as part of the post-ROD change documentation process), (3) a prohibition on residential use of the OU-1 property, (4) provisions for access at any time for DOE, US EPA, and OEPA to conduct sampling, perform remedial action and/or inspect the property to insure compliance with CERCLA, (5) a prohibition on removal of soil from any parcel of property that includes OU-1 to a location outside of the Mound Plant boundary without the permission of OEPA, ODH and US EPA, and (6) a prohibition on any excavation and/or re-grading in the legally-defined landfill areas of OU-1, encompassing the historic landfill, "sanitary" landfill and a buffer zone.

In June 2004, a report was issued by the OU-1 Technical Team, a group composed of DOE, US EPA, OEPA, MMCIC, City of Miamisburg, and other stakeholders. This report identified several uncertainties with respect to the OU-1 area and its implemented remedy. The Core Team has considered every one of the uncertainties documented in the OU-1 Technical Team's report and has researched all of the OU-1 historical documentation, sampling data, and remedy performance data in order to arrive at a set of recommendations for the OU-1 remedy. The specific uncertainties identified in the Technical Team's report could generally be grouped into one of five overarching concerns: (1) the nature and extent of the soil contamination in the OU-1 area, (2) the nature and extent of the groundwater contamination in the OU-1 area, (3) the performance of the existing remedy, as required by the 1995 OU-1 ROD, (4) programmatic issues associated with the transfer of the OU-1 property and CERCLA documentation, and (5) risk pathways and exposures associated with the reuse of the OU-1 area after transfer of the property from DOE to MMCIC.

In examining the issue of contaminant nature and extent in soil, the Core Team researched operational information and sampling data contained in many different historical documents associated with the OU-1 area. The purpose of this research was to identify the locations of various disposal areas at OU-1 and also to determine what contaminants may be associated with each of these areas. The main concerns associated with any buried contamination at OU-1 are whether these contaminants are serving as a continuing source for groundwater contamination beneath OU-1 and/or whether these contaminants could pose an unacceptable direct contact risk to a person using the OU-1 property in the future. The Core Team acknowledges the fact that the OU-1 area has not been *completely* characterized to determine what contaminants, along with their concentrations, would remain in every part of the historic and sanitary landfills in the OU-1 area in the future. Even if this information were known, it would not change the ultimate decision of what remedy is appropriate for OU-1. The Core Team believes that it is almost certain that both radioactive and chemical contamination exist in the historic and sanitary landfills at OU-1. The knowledge of the exact concentrations of these contaminants or what

particular chemicals or radioactive isotopes are present would not affect the overall decision of the Core Team that, with sufficient soil cover, the exposure pathway to any buried contamination can be eliminated and that the existing buried soil contamination does not appear to be serving as a significant source term for groundwater contamination at OU-1. With the exposure pathway eliminated for direct contact risks, the issue of a quantitative residual risk calculation becomes moot. In addition, it is documented that (1) the last disposal of waste materials in OU-1 took place in 1974, (2) groundwater VOC concentrations were stable or declining prior to implementation of the OU-1 P&T system, (3) approximately 4,000 pounds of VOC have been removed by the SVE system to date, (4) groundwater VOC concentrations have declined by an order of magnitude in some wells since the early 1990s, and (5) the highest groundwater concentrations are currently at or slightly exceed the MCL drinking water standards in most wells in the BVA beneath and down gradient from OU-1. These facts suggest that, after over 30 years of potential leaching of contaminants to groundwater, it is unlikely that there will be any future migration of contaminants from soil to groundwater which would elevate VOC concentrations significantly above current levels.

The Core Team was asked by MMCIC to consider the possibility that the historic and "sanitary" landfills be excavated in order to be protective of human health and the environment and to allow for more flexibility in future use of the OU-1 site. The Core Team carefully considered this alternative. The information used by the Core Team in conducting this evaluation included potential reductions in risk to future site users, potential reductions in the required deed restrictions on the OU-1 property, and the cost of excavation of the landfill areas. After considering the fact that the existing remedy (soil cover with deed restrictions) would successfully manage any future risks associated with the OU-1 property, the Core Team could not endorse the excavation alternative. It was determined that the only long-term remedy requirement that could be eliminated if excavation were successfully accomplished would be the prohibition on future excavation in the OU-1 landfill areas. Even if this restriction were removed, all other deed restrictions would be implemented as they have been in other Mound property transfers. There would also probably be some shortening of the remediation time for groundwater with most source materials removed, but it is not clear how much faster MCLs would be achieved. The cost of excavation was estimated to be about $30 million, under a "best-case" scenario (assuming some excavated material could be reused as clean backfill or be sent to an instate sanitary landfill for disposal). Actual costs would probably significantly exceed this estimate. Considering the fact that the recommended remedy achieves protectiveness at a cost of about $5 million projected over 30 years (CERCLA standard assumption), which includes $1.5 million ($500,000 + $30,000 annually) for the installation and maintenance of additional soil cover and improved surface drainage controls, $2 million ($65,000 annually) to operate the P&T and SVE systems, and $1.5 million ($50,000 annually) to conduct long-term groundwater sampling and analysis, the Core Team could not find the excavation alternative to be a cost-effective alternative for OU-1. The Core Team understands the issues associated with reuse of the property and has always attempted to facilitate the successful redevelopment of the Mound property when possible. In this case, however, the Core Team could not find sufficient justification to require the excavation of the OU-1 landfills under their CERCLA authorities.

The Core Team understands that there may be some attempt by DOE and MMCIC to reach agreement on ways to facilitate redevelopment of the OU-1 property, but these agreements would be outside the scope of the Core Team's CERCLA-driven review.

With respect to the nature and extent of groundwater contamination at OU-1, the Core Team has not observed any new data or information that is inconsistent with the information available at the time the 1995 ROD was signed. The P&T system has been successful in establishing a reversed groundwater gradient so that contaminants do not migrate past the hydraulic barrier established at the compliance boundary for OU-1. There is some uncertainty associated with VOC contamination located along the eastern boundary of the BVA beneath and down gradient of OU-1 (in the area once referred to as PRS-414) since VOC contaminant levels tend to "bounce" above and below their MCLs in this area. Further research must be conducted to try to establish whether contamination is somehow getting by the hydraulic barrier only where the BVA pinches off along this eastern edge or whether historic contamination has become "hung up" in this location after migrating away from the landfill area. If the source of the elevated groundwater contamination was some amount of contamination hung up down gradient from OU-1, it would be expected that every time the groundwater elevation drops, higher levels of VOC should be observed. This, in fact, has been the case to date for the eastern boundary area. In any event, the highest concentrations measured along this eastern boundary are in the range of 10-20 ppb for various VOC contaminants, and these levels do not warrant a more aggressive treatment method than the system already in place.

The Core Team recommends that further research be conducted with respect to groundwater flow paths along the eastern boundary and in the entire OU-1 area after the Mound plant production wells are turned off. Groundwater flow paths should also be evaluated with the groundwater P&T extraction wells turned off to determine how far and at what concentrations VOC contaminants would travel in the BVA away from OU-1 under ambient conditions (if no hydraulic barrier were in place). In the meantime, the Core Team is in agreement that the P&T system should remain in place to maintain containment of the VOC groundwater plume. The SRNL technical assistance team, a group solicited by DOE to provide recommendations for the OU-1 area, has suggested that MNA could be a viable remedy for groundwater at OU-1. While the Core Team does not dispute the fact that a case could be made for MNA at OU-1, the Core Team believes that this issue requires further study and it does not have sufficient information at this time to approve of such a change.

Finally, the Core Team recommends that DOE prepare an Explanation of Significant Difference (ESD) under the CERCLA post-ROD decision document guidance to clarify the requirements associated with maintaining soil cover at OU-1, access restrictions/ICs and the performance standards necessary for operating the SVE system. The ESD will serve to spell out the deed restrictions necessary to transfer the OU-1 property, along with any legal property descriptions and physical markings necessary for enforcing these restrictions, and to document the SVE system as an enforceable part of the final OU-1 remedy. The Core Team believes that an

assessment of the current SVE system should also be completed and that efforts should be undertaken to optimize the performance of the system in removing vadose zone contaminants. This may include the installation of additional wells in known source areas and the abandonment of wells in areas that have not been successful in removing significant quantities of VOCs from the soil. The ESD would also require the submittal of, among other things, an Operation and Maintenance Plan for assessing and optimizing the performance of the soil cover, deed restrictions, SVE system and P&T system in the future, along with a long-term groundwater monitoring plan for OU-1. Although CERCLA does not require a 30-day public comment period on an ESD, the Core Team has committed to provide for this comment period due to the increased public interest in the OU-1 area. A decision on the final OU-1 remedy will be documented in the final ESD after consideration of all public comments.

Signed:

DOE/MCP:		
	Paul C. Lucas, Remedial Project Manager	3/10/2005
USEPA:		
	Timothy J. Fischer, Remedial Project Manager	3/8/2005
OEPA:		
	Brian K. Nickel, Project Manager	3/10/2005

The Mound Core Team
1075 Mound Road
Miamisburg, Ohio 45342-3216

Core Team Summary of Recommendations
Operable Unit 1 - DOE Mound Plant

The Mound Core Team, made up of the United States Department of Energy Miamisburg Closure Project (DOE), the United States Environmental Protection Agency - Region 5 (US EPA), and the Ohio Environmental Protection Agency (OEPA), has been tasked with examining the existing remedy associated with Operable Unit 1 (OU1) at the DOE Mound Plant in Miamisburg, Ohio to determine whether the remedy is protective for human health and the environment. This review was brought on by the fact that there have been additions and clarifications made with respect to the remedy since the OU1 Record of Decision (ROD) was signed in June 1995 and the fact that new data has been collected in the OU1 area that resulted in the changing of a "binning" decision associated with Potential Release Site (PRS) 11 to require a removal action to remove thorium-contaminated drums. It is also anticipated that ownership of the OU1 area may be transferred from DOE to another future land owner.

A CERCLA ROD was signed by DOE, US EPA and OEPA in June 1995, pursuant to the existing Federal Facility Agreement (FFA) among the three agencies, selecting a pump-and-treat system to collect, treat and dispose of groundwater contaminated with volatile organic compounds (VOCs). The pump-and-treat system was installed and began operation in 1996. This system not only treats contaminated groundwater in an attempt to decrease groundwater contaminant concentrations, but it provides a hydraulic barrier preventing a VOC contaminant plume from migrating away from the landfill area. After the pump-and-treat system began operation, an innovative technology demonstration project at Mound resulted in the installation of a soil vapor extraction (SVE) system at OU1. The purpose of this system is to treat the VOC source term in the vadose zone before contaminants have an opportunity to migrate to OU1 groundwater. The SVE system has removed approximately 4,000 pounds of VOCs from the vadose zone at OU1 and constitutes a successful effort to treat VOC soil contamination at OU1. Finally, the 1995 ROD contemplated the eventual transfer of the OU1 property to another land owner in the future, and the ROD stipulated that DOE would be required to place appropriate restrictions on the use of the OU1 property to prevent unacceptable exposures to residual buried contamination remaining in the landfill areas. At this time, the Core Team anticipates that these restrictions will be (1) prevention of the installation of additional groundwater wells and a prohibition on the extraction of OU1 groundwater for any purpose (other than wells installed for environmental monitoring and groundwater extracted for sampling purposes), (2) restriction of future use of the OU1 property (to be defined as part of the post-ROD change documentation process), (3) a prohibition on residential use of the OU1 property, (4) provisions for access at any time

for DOE, US EPA, and OEPA to conduct sampling, perform remedial action and/or inspect the property to insure compliance with CERCLA, (5) a prohibition on removal of soil from any parcel of property that includes OU1 to a location outside of the Mound Plant boundary without the permission of OEPA, ODH and US EPA, and (6) a prohibition on any excavation and/or regrading in the legally-defined landfill areas of OU1, encompassing the historic landfill, "sanitary" landfill and a buffer zone.

In June 2004, a report was issued by the OU1 Technical Team, a group composed of DOE, US EPA, OEPA, MMCIC, City of Miamisburg, and other stakeholders. This report identified several uncertainties with respect to the OU1 area and its implemented remedy. The Core Team has considered every one of the uncertainties documented in the OU1 Technical Team's report and has researched all of the OU1 historical documentation, sampling data, and remedy performance data in order to arrive at a set of recommendations for the OU1 remedy. The specific uncertainties identified in the Technical Team's report could generally be grouped into one of five overarching concerns: (1) the nature and extent of the soil contamination in the OU1 area, (2) the nature and extent of the groundwater contamination in the OU1 area, (3) the performance of the existing remedy, as required by the 1995 OU1 ROD, (4) programmatic issues associated with the transfer of the OU1 property and CERCLA documentation, and (5) risk pathways and exposures associated with the reuse of the OU1 area after transfer of the property from DOE to MMCIC.

In examining the issue of contaminant nature and extent in soil, the Core Team researched operational information and sampling data contained in many different historical documents associated with the OU1 area. The purpose of this research was to identify the locations of various disposal areas at OU1 and also to determine what contaminants may be associated with each of these areas. The main concerns associated with any buried contamination at OU1 are whether these contaminants are serving as a continuing source for groundwater contamination beneath OU1 and/or whether these contaminants could pose an unacceptable direct contact risk to a person using the OU1 property in the future. The Core Team acknowledges the fact that the OU1 area has not been *completely* characterized to determine what contaminants, along with their concentrations, would remain in every part of the historic and sanitary landfills in the OU1 area in the future. Even if this information were known, it would not change the ultimate decision of what remedy is appropriate for OU1. The Core Team believes that it is almost certain that both radioactive and chemical contamination exist in the historic and sanitary landfills at OU1. The knowledge of the exact concentrations of these contaminants or what particular chemicals or radioactive isotopes are present would not affect the overall decision of the Core Team that, with sufficient soil cover, the exposure pathway to any buried contamination can be eliminated and that the existing buried soil contamination does not appear to be serving as a significant source term for groundwater contamination at OU1. With the exposure pathway eliminated for direct contact risks, the issue of a quantitative residual risk calculation becomes moot. In addition, it is documented that (1) the last disposal of waste materials in OU1 took place in 1974, (2) groundwater VOC concentrations were stable or declining prior to implementation of the OU1 pump-and-treat system, (3) approximately 4,000 pounds of VOC have been

removed by the SVE system to date, (4) groundwater VOC concentrations have declined by an order of magnitude in some wells since the early 1990s, and (5) the highest groundwater concentrations are currently at or slightly exceed the Maximum Contaminant Level (MCL) drinking water standards in most wells in the Buried Valley Aquifer (BVA) beneath and downgradient from OU1. These facts suggest that, after over 30 years of potential leaching of contaminants to groundwater, it is unlikely that there will be any future migration of contaminants from soil to groundwater which would elevate VOC concentrations significantly above current levels.

The Core Team was asked by MMCIC to consider the possibility that the historic and "sanitary" landfills be excavated in order to be protective of human health and the environment and to allow for more flexibility in future use of the OU1 site. The Core Team carefully considered this alternative. The information used by the Core Team in conducting this evaluation included potential reductions in risk to future site users, potential reductions in the required deed restrictions on the OU1 property, and the cost of excavation of the landfill areas. After considering the fact that the existing remedy (soil cover with deed restrictions) would successfully manage any future risks associated with the OU1 property, the Core Team could not endorse the excavation alternative. It was determined that the only long-term remedy requirement that could be eliminated if excavation were successfully accomplished would be the prohibition on future excavation in the OU1 landfill areas. Even if this restriction were removed, all other deed restrictions would be implemented as they have been in other Mound property transfers. There would also probably be some shortening of the remediation time for groundwater with most source materials removed, but it is not clear how much faster MCLs would be achieved. The cost of excavation was estimated to be about $30 million, under a "best-case" scenario (assuming some excavated material could be reused as clean backfill or be sent to an instate sanitary landfill for disposal). Actual costs would probably significantly exceed this estimate. Considering the fact that the recommended remedy achieves protectiveness at a cost of about $5 million projected over 30 years (CERCLA standard assumption), which includes $1.5 million ($500,000 + $30,000 annually) for the installation and maintenance of additional soil cover and improved surface drainage controls, $2 million ($65,000 annually) to operate the pump-and-treat and SVE systems, and $1.5 million ($50,000 annually) to conduct long-term groundwater sampling and analysis, the Core Team could not find the excavation alternative to be a cost-effective alternative for OU1. The Core Team understands the issues associated with reuse of the property and has always attempted to facilitate the successful redevelopment of the Mound property when possible. In this case, however, the Core Team could not find sufficient justification to require the excavation of the OU1 landfills under their CERCLA authorities. The Core Team understands that there may be some attempt by DOE and MMCIC to reach agreement on ways to facilitate redevelopment of the OU1 property, but these agreements would be outside the scope of the Core Team's CERCLA-driven review.

With respect to the nature and extent of groundwater contamination at OU1, the Core Team has not observed any new data or information that is inconsistent with the information available at the time the 1995 ROD was signed. The pump-and-treat system

has been successful in establishing a reversed groundwater gradient so that contaminants do not migrate past the hydraulic barrier established at the compliance boundary for OU1. There is some uncertainty associated with VOC contamination located along the eastern boundary of the BVA beneath and downgradient of OU1 (in the area once referred to as PRS 414) since VOC contaminant levels tend to "bounce" above and below their MCLs in this area. Further research must be conducted to try to establish whether contamination is somehow getting by the hydraulic barrier only where the BVA pinches off along this eastern edge or whether historic contamination has become "hung up" in this location after migrating away from the landfill area. If the source of the elevated groundwater contamination was some amount of contamination hung up downgradient from OU1, it would be expected that every time the groundwater elevation drops, higher levels of VOC should be observed. This, in fact, has been the case to date for the eastern boundary area. In any event, the highest concentrations measured along this eastern boundary are in the range of 10-20 ppb for various VOC contaminants, and these levels do not warrant a more aggressive treatment method than the system already in place.

The Core Team recommends that further research be conducted with respect to groundwater flow paths along the eastern boundary and in the entire OU1 area after the Mound plant production wells are turned off. Groundwater flow paths should also be evaluated with the groundwater pump-and-treat extraction wells turned off to determine how far and at what concentrations VOC contaminants would travel in the BVA away from OU1 under ambient conditions (if no hydraulic barrier were in place). In the meantime, the Core Team is in agreement that the pump-and-treat system should remain in place to maintain containment of the VOC groundwater plume. The Savannah River technical assistance team, a group solicited by DOE to provide recommendations for the OU1 area, has suggested that monitored natural attenuation (MNA) could be a viable remedy for groundwater at OU1. While the Core Team does not dispute the fact that a case could be made for MNA at OU1, the Core Team believes that this issue requires further study and it does not have sufficient information at this time to approve of such a change.

Finally, the Core Team recommends that DOE prepare an Explanation of Significant Difference (ESD) under the CERCLA post-ROD decision document guidance to clarify the requirements associated with maintaining soil cover at OU1, access restrictions/institutional controls and the performance standards necessary for operating the SVE system. The ESD will serve to spell out the deed restrictions necessary to transfer the OU1 property, along with any legal property descriptions and physical markings necessary for enforcing these restrictions, and to document the SVE system as an enforceable part of the final OU1 remedy. The Core Team believes that an assessment of the current SVE system should also be completed and that efforts should be undertaken to optimize the performance of the system in removing vadose zone contaminants. This may include the installation of additional wells in known source areas and the abandonment of wells in areas that have not been successful in removing significant quantities of VOCs from the soil. The ESD would also require the submittal of, among other things, an Operation and Maintenance Plan for assessing and optimizing

the performance of the soil cover, deed restrictions, SVE system and pump-and-treat system in the future, along with a long-term groundwater monitoring plan for OU1. Although CERCLA does not require a 30-day public comment period on an ESD, the Core Team has committed to provide for this comment period due to the increased public interest in the OU1 area. A decision on the final OU1 remedy will be documented in the final ESD after consideration of all public comments.

DOE/MEMP:	Paul C. Lucas 3/10/05
	Paul C. Lucas, Remedial Project Manager
USEPA:	Timothy J. Fischer 3/8/05
	Timothy J. Fischer, Remedial Project Manager
OEPA:	Brian K. Nickel 3/10/05
	Brian K. Nickel, Project Manager

Attachment 3

Summary of COPCs and CSM at Time of ROD

Mound Core Team, Technical Memorandum
Operable Unit 1 (OU-1)

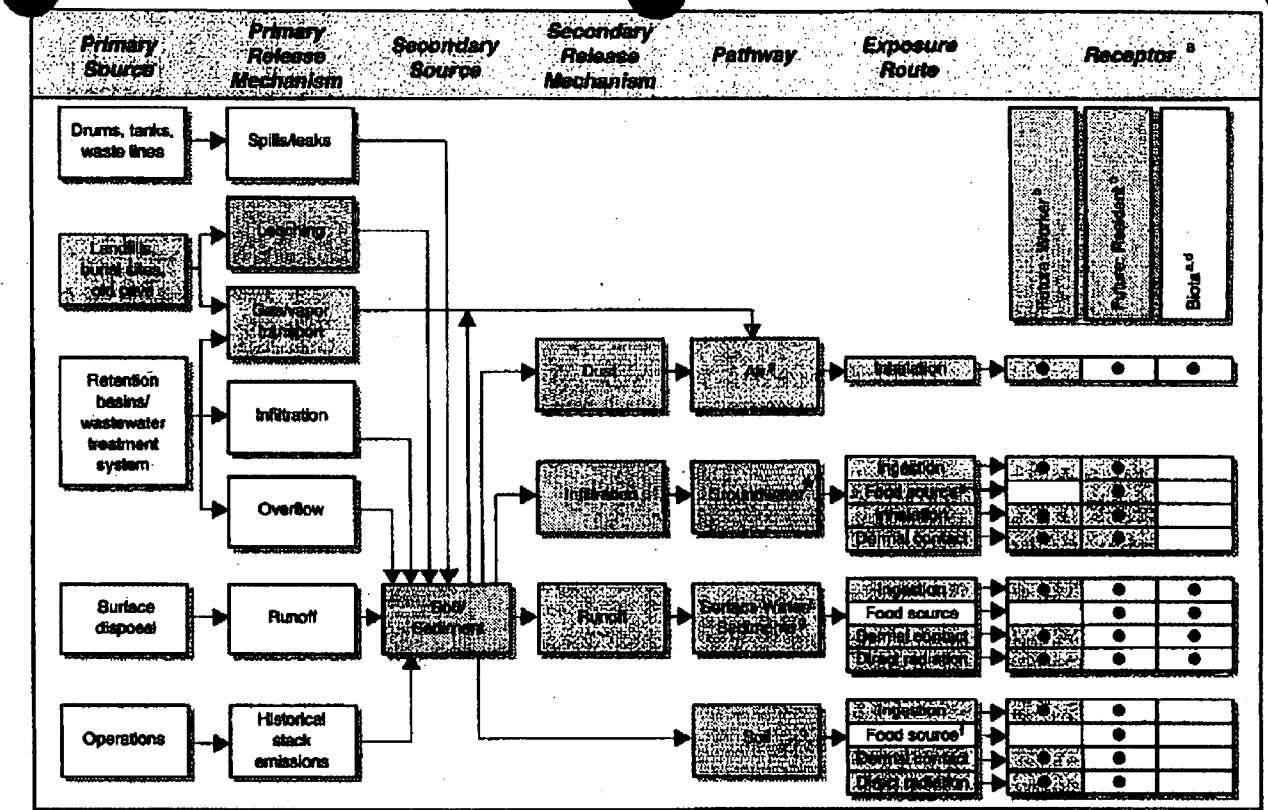
Table 1. Summary of COPCs

Groundwater	
The organic COPCs for groundwater are:	
- 1,1,1-TCA	20 µg/L
- 1,2-cis-DCE	640 (J)
- *bis*-(2-ethylhexyl)phthalate	0.23 (J)
- chlordane (alpha)	0.06
- diethyl phthalate	10 (J)
- pyrene	10 (J)
- PCE	200 (J)
- tetrachloromethane	5
- TCE	160
- dichloromethane	140 (J)
- trichlorofluoromethane	12
- vinyl chloride	17
The radioactive COPCs (that exceeded background levels) are:	
- actinium-227	2.27 pCi/L
- plutonium-238	0.057
- plutonium 239/240	0.263
- strontium-90	0.766
- tritium	13,500
- uranium-235 and -236	0.188
- uranium 238	1.46
The following radionuclides were retained as groundwater COPCs because they are daughter products of the radionuclides that were found to exceed background levels:	
- radium-226	2.61 pCi/L
- thorium-228	0.97 (J)
- thorium-230	3.86
- thorium-232	0.588 (J)
- uranium-234	0.782
Soil	
The organic COPCs for soils are:	
- 1,2,3,4,6,7,8-HpCDF	214 pg/g
- 1,2,3,4,6,7,8-HpCDD	259
- 1,2,3,4,7,8,9-HpCDF	41.4
- 1,2,3,4,7,8-HxCDD	8.5
- 1,2,3,4,7,8-HxCDF	209
- 1,2,3,6,7,8-HxCDF	63.2
- 1,2,3,6,7,8-HxCDD	28.3
- 1,2,3,7,8,9-HxCDD	39.7
- 1,2,3,7,8-PeCDF	43.2
- 2,3,4,6,7,8-HxCDF	64.1
- 2,3,4,7,8-PeCDF	150
- 2,3,7,8-TCDD	22.5
- 2,3,7,8-TCDF	132

Table 1. (page 2 of 2)

Soil (Continued)	
- OCDD	2110
- OCDF	163
- 1,2-DCE	6,700 µg/kg
- 4-methyphenol	290
- aroclor-1248	220,000
- benzo(a)anthracene	3,400
- benzo(a)pyrene	2,600
- benzo(b)fluoranthene	4,060
- benzo(k)fluoranthene	1,500
- benzoic acid	1,700
- *bis*(2-ethylhexyl)phthalate	5,600
- vinyl chloride	190
- chrysene	2,600
- dichloromethane	81
- fluoranthene	8,300
- indeno(1,2,3-cd)pyrene	1,200
- phenol	120 (J)
- pyrene	7,200 (J)
- PCE	24,000
- toluene	7,100
- TCE	970 (J)
Inorganic COPCs consist of:	
- fluoride	12.6 mg/kg
- nitrate	16.87
- silver	6.3
The radioactive COPCs (that exceeded background levels) are:	
- plutonium-238	10.6 pCi/g
- plutonium-239/240	1.2
- uranium-99	9.79
- tritium	40.3
The following radionuclides were retained as soil COPCs because they are daughter products of the radionuclides that were found to exceed background levels:	
- thorium-228	1.3 pCi/G
- thorium-232	1.04
- uranium-235/236	0.091 (J)

COPC - contaminants of potential concern
DCE - dichloroethene
(J) - estimated quantity
mg/kg - milligram per kilogram
µg/kg - microgram per kilogram
PCE - tetrachloroethene
pCi/g - picocuries per gram
pCi/L - picocuries per liter
pg/g - picogram per gram
TCA - trichloroethane
TCE - trichloroethene
[illegible] - contaminant contributing significantly [illegible]



LEGEND

a ECOLOGICAL RISK assessment to be conducted in OU 9.

b FUTURE WORKER – Works outside or within a building on the site as a laborer. Receptor is exposed to contaminants in environmental media; not an evaluation of occupational exposure.

c FUTURE RESIDENT – Uses groundwater onsite.

d TERRESTRIAL BIOTA – Analysis of terrestrial biota will include quantitative analysis to the extent possible, but will not be possible for all exposure routes, such as dermal contact.

e FOOD INGESTION from the groundwater pathway will be based on consumption of vegetables grown in gardens irrigated with contaminated groundwater.

f FOOD INGESTION from the soil pathway will include ingestion of plants that have taken up contaminants from soil.

g INVESTIGATION to be conducted in OU 9

● Possible intersection of pathway and receptor.

★ Because there are two groundwater receptors being used (future worker and future resident), the higher of the two risk calculations will be used in the assessment.

NOTE: Shaded areas indicate aspects relevant to Area B Feasibility Study

MND/OU1/ROD-02/4-10-95

Figure 5. Conceptual pathway model for OU 1.

Attachment 4

Radiological Surface Results

Mound Core Team, Technical Memorandum
Operable Unit 1 (OU-1)

N
W E
S

-6

LEGEND

OPPERABLE UNIT 1 AREA

SURFACE RADIONUCLIDE CONCENTRATION NORMALIZED BY CLEANUP VALUE

- < CLEANUP VALUE
- 1.00 - 1.99
- 2.00 - 3.99
- > 4.00 (MAX 6.52)

NOTE:

-DATA WAS NORMALIZED BY DIVIDING RESULTS BY THE CLEAN UP GOAL

0 150 300 Feet

OPERABLE UNIT NO. 1
MIAMISBURG CLOSURE PROJECT
MIAMISBURG, MONTGOMERY COUNTY, OHIO

FIGURE X-X
OPERABLE UNIT NO. 1
SURFACE RADIONUCLIDE SOIL
CONTAMINATION LOCATIONS ABOVE THE CLEANUP VALUE
RESULTS INCLUDE U QUALIFIERS

Tetra Tech EM Inc.

06.2004 G:/GJ6009/L0307006/odrive/draft/Distribution_hotspots.mxd anna.purses CH-TTEMI

Attachment 5

Radiological Monitoring Results

Mound Core Team, Technical Memorandum
Operable Unit 1 (OU-1)

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA
0313	9/17/92	Actinium	2.27	1		
0305	1/31/91	Actinium	1.4	0		
0410	7/21/94	Americium-241	0.47			J
0400	7/14/94	Americium-241	0.27			
0317	9/10/93	Americium-241	0.131	0.039		
0373	9/25/93	Americium-241	0.128	0.044		R
0046	10/13/93	Americium-241	0.0989	0.045		R
0372	9/24/93	Americium-241	0.0852	0.046		R
0379	9/26/93	Americium-241	0.0783	0.042		R
0370	9/24/93	Americium-241	0.0747	0.068		
0344	3/24/94	Americium-241	0.014	0.010		
0313	5/7/91	Bismuth-210	0.63			
0305	5/5/91	Bismuth-210	0.09			
0063	6/22/92	Plutonium-238	6.2	0.5		
0063	3/23/92	Plutonium-238	0.8	0.5		
0344	1/26/00	Plutonium-238	0.091	0.006		
0344	10/14/93	Plutonium-238	0.0475	0.043		
0372	3/30/93	Plutonium-238	0.0364	0.033		
0344	1/26/00	Plutonium-238	0.034	0.005		
0313	3/17/94	Plutonium-238	0.012	0.003		
0370	3/8/94	Plutonium-238	0.006	0.006		
0063	3/18/94	Plutonium-238	0.005	0.002		
0370	3/8/94	Plutonium-238	0.005	0.003		
0063	3/23/92	Plutonium-238	0	0.5		
0063	6/22/92	Plutonium-238	0	0.5		
0305	3/19/92	Plutonium-238	0	0.5		
0305	6/22/92	Plutonium-238	0	0.5		
0313	3/22/92	Plutonium-238	0	0.5		
0313	6/21/92	Plutonium-238	0	0.4		
0313	6/21/92	Plutonium-239/240	2.8	0.4		
0063	6/22/92	Plutonium-239/240	2.3	0.5		
0305	3/19/92	Plutonium-239/240	1.3	0.5		
0063	9/16/92	Plutonium-239/240	0.679	1		
0063	10/13/93	Plutonium-239/240	0.326	0.097		R
0372	9/24/93	Plutonium-239/240	0.24	0.036		R
0046	10/13/93	Plutonium-239/240	0.227	0.036		R
0397	9/25/93	Plutonium-239/240	0.213	0.041		R
0370	9/24/93	Plutonium-239/240	0.207	0.062		R
0344	10/14/93	Plutonium-239/240	0.206	0.043		R
0374	4/1/93	Plutonium-239/240	0.196	0.028		
0372	3/30/93	Plutonium-239/240	0.182	0.033		
0370	3/31/93	Plutonium-239/240	0.145	0.07		

0373	3/30/93	Plutonium-239/240	0.144	0.028		
0305	9/11/93	Plutonium-239/240	0.136	0.089		R
0379	9/26/93	Plutonium-239/240	0.136	0.037		R
0397	3/31/93	Plutonium-239/240	0.127	0.029		
0373	9/25/93	Plutonium-239/240	0.113	0.094		R
0397	3/31/93	Plutonium-239/240	0.113	0.067		
0317	9/10/93	Plutonium-239/240	0.108	0.036		R
0379	3/29/93	Plutonium-239/240	0.0848	0.029		
0313	9/13/93	Plutonium-239/240	0.069	0.037		
0370	3/8/94	Plutonium-239/240	0.008	0.006		
0313	3/17/94	Plutonium-239/240	0.003	0.003		
0063	3/18/94	Plutonium-239/240	0.002	0.002		
0063	3/23/92	Plutonium-239/240	0	0.5		
0063	3/23/92	Plutonium-239/240	0	0.5		
0063	6/22/92	Plutonium-239/240	0	0.5		
0305	6/22/92	Plutonium-239/240	0	0.5		
0313	3/22/92	Plutonium-239/240	0	0.5		

0374	10/3/94	Potassium-40	341	191.0		J
0313	2/3/91	Potassium-40	170	0		

0313	3/22/92	Radium-226	3.1	0.2		
0305	6/22/92	Radium-226	2.4	0.2		
0372	9/24/93	Radium-226	2.15	0.49		
0372	3/21/94	Radium-226	2.03	0.17		
0313	12/17/91	Radium-226	1.96	1		
0313	8/4/91	Radium-226	1.72	0		
0344	10/14/93	Radium-226	1.67	0.85		
0313	5/7/91	Radium-226	1.27			
0305	1/31/91	Radium-226	1.1	0		
0313	2/3/91	Radium-226	1.1	0		
P027	3/21/94	Radium-226	0.91	0.15		
0410	7/21/94	Radium-226	0.89			J
0305	9/16/92	Radium-226	0.859	1		
0313	9/13/93	Radium-226	0.817	0.21		
P033	4/20/04	Radium-226	0.72	0.17	J	
0063	6/22/92	Radium-226	0.7	0.2		
0313	9/17/92	Radium-226	0.647	1		
0319	9/23/93	Radium-226	0.595	0.47		
P033	7/13/04	Radium-226	0.52	0.17	J	
0400	7/14/94	Radium-226	0.51			J
0317	3/16/94	Radium-226	0.5	0.15		
0397	3/31/93	Radium-226	0.455	0.181		
0344	3/24/94	Radium-226	0.44	0.20		
0305	9/11/93	Radium-226	0.437	0.38		
0373	3/30/93	Radium-226	0.43	0.092		
P033	11/16/04	Radium-226	0.43	0.21	J	
0374	10/3/94	Radium-226	0.399	0.0613		
0370	9/24/93	Radium-226	0.382	0.29		
0400	11/12/02	Radium-226	0.36	0.17	J	
0370	3/31/93	Radium-226	0.344	0.238		
0317	3/16/94	Radium-226	0.34	0.14		

0374	4/1/93	Radium-226	0.334	0.193		
0379	3/15/94	Radium-226	0.31	0.26		
0063	3/23/92	Radium-226	0.3	0.2		
0063	6/22/92	Radium-226	0.3	0.2		
0063	3/18/94	Radium-226	0.3	0.20		
0305	3/19/92	Radium-226	0.3	0.2		
0397	3/31/93	Radium-226	0.293	0.088		
P033	1/21/04	Radium-226	0.29	0.28	J	
0313	3/17/94	Radium-226	0.28	0.17		
0400	1/21/04	Radium-226	0.28	0.20	J	
0319	3/21/94	Radium-226	0.26	0.16		
0373	3/16/94	Radium-226	0.25	0.18		
P033	10/21/03	Radium-226	0.23	0.20	J	
0370	3/8/94	Radium-226	0.21	0.18		
0400	11/16/04	Radium-226	0.21	0.18	J	
P033	11/12/02	Radium-226	0.2	0.19	J	
0046	3/18/94	Radium-226	0.19	0.18		
0400	7/13/04	Radium-226	0.19	0.17	J	
0063	3/23/92	Radium-226	0	0.2		
0313	6/21/92	Radium-226	0	0.3		
P033	11/16/04	Radium-228	1.23	0.70		
P033	4/20/04	Radium-228	1.11	0.59		

0063	2/5/91	Strontium-85	26	0		
0313	2/3/91	Strontium-85	20	0		

0305	3/19/92	Strontium-90	2.9	1		
0372	3/30/93	Strontium-90	1.77	0.563		
0313	6/21/92	Strontium-90	1.1	1		
0063	6/22/92	Strontium-90	0.8	1		
0305	6/22/92	Strontium-90	0.2	1		
0063	3/23/92	Strontium-90	0	1		
0063	3/23/92	Strontium-90	0	1		
0063	6/22/92	Strontium-90	0	1		
0313	3/22/92	Strontium-90	0	1		

0313	2/3/91	Thorium-228	4.7	0		
0305	8/2/91	Thorium-228	2.31	0		
0410	7/21/94	Thorium-228	1.5	1.50		U
0063	12/16/91	Thorium-228	1.46	1		
0063	8/5/91	Thorium-228	1.29	0		
0313	10/31/90	Thorium-228	1.28	0		
0400	7/14/94	Thorium-228	1.13	1.13		U
0305	12/17/91	Thorium-228	1.06	1		
0305	9/11/93	Thorium-228	1.02	0.36		R
0063	2/5/91	Thorium-228	1	0		
0317	3/16/94	Thorium-228	0.97	0.019		J
0046	10/13/93	Thorium-228	0.825	0.58		R
0319	9/23/93	Thorium-228	0.806	0.091		R
0370	9/24/93	Thorium-228	0.765	0.51		R
0397	9/25/93	Thorium-228	0.765	0.067		R
0317	9/10/93	Thorium-228	0.735	0.22		R

0372	9/24/93	Thorium-228	0.707	0.055		R
0379	9/26/93	Thorium-228	0.625	0.26		R
0344	10/14/93	Thorium-228	0.537	0.36		R
0373	9/25/93	Thorium-228	0.518	0.061		R
0313	3/22/92	Thorium-228	0.5	0.2		
0313	9/13/93	Thorium-228	0.441	0.19		R
P027	3/21/94	Thorium-228	0.342	0.031		
0313	9/17/92	Thorium-228	0.293	1		
0313	3/17/94	Thorium-228	0.158	0.042		
0344	1/26/00	Thorium-228	0.147	0.020		
0372	3/30/93	Thorium-228	0.123	0.065		
0397	3/31/93	Thorium-228	0.113	0.051		
0344	3/24/94	Thorium-228	0.095	0.025		J
0397	3/11/94	Thorium-228	0.06	0.048		
0370	3/8/94	Thorium-228	0.056	0.037		J
0317	3/16/94	Thorium-228	0.049	0.021		J
0319	3/21/94	Thorium-228	0.035	0.019		
0344	1/26/00	Thorium-228	0.035	0.006		
0379	3/15/94	Thorium-228	0.026	0.013		
0063	3/23/92	Thorium-228	0	0.2		
0063	3/23/92	Thorium-228	0	0.2		
0063	6/22/92	Thorium-228	0	0.2		
0063	6/22/92	Thorium-228	0	0.2		
0305	3/19/92	Thorium-228	0	0.2		
0305	6/22/92	Thorium-228	0	0.2		
0313	6/21/92	Thorium-228	0	0.4		

0046	7/10/87	Thorium-230	3.8			
0305	9/11/93	Thorium-230	3.22	0.21		J
0063	9/16/92	Thorium-230	3.17	1		
0305	3/10/94	Thorium-230	1.95	0.213		
0370	9/24/93	Thorium-230	1.42	0.37		J
0317	3/16/94	Thorium-230	0.95	0.015		J
0313	3/22/92	Thorium-230	0.9	0.2		
0344	10/14/93	Thorium-230	0.868	0.076		
0313	9/13/93	Thorium-230	0.717	0.046		
0410	7/21/94	Thorium-230	0.59			J
0063	10/13/93	Thorium-230	0.451	0.1		
0370	3/8/94	Thorium-230	0.38	0.131		J
0379	9/26/93	Thorium-230	0.365	0.19		R
0373	9/25/93	Thorium-230	0.27	0.061		R
0397	9/25/93	Thorium-230	0.247	0.067		R
0313	9/17/92	Thorium-230	0.225	1		
P027	3/21/94	Thorium-230	0.212	0.016		J
0319	9/23/93	Thorium-230	0.202	0.091		R
0313	6/21/92	Thorium-230	0.2	0.4		
0046	10/13/93	Thorium-230	0.194	0.13		
0313	3/17/94	Thorium-230	0.192	0.023		
0370	3/31/93	Thorium-230	0.189	0.12		
0400	7/14/94	Thorium-230	0.14			
0046	3/18/94	Thorium-230	0.121	0.047		
0372	9/24/93	Thorium-230	0.101	0.055		R

0063	6/22/92	Thorium-230	0.1	0.2		
0305	6/22/92	Thorium-230	0.1	0.2		
0397	3/11/94	Thorium-230	0.09	0.035		
0344	1/26/00	Thorium-230	0.079	0.020		
0372	3/30/93	Thorium-230	0.0578	0.031		
0319	3/21/94	Thorium-230	0.055	0.019		J
0317	3/16/94	Thorium-230	0.049	0.011		J
0063	3/18/94	Thorium-230	0.039	0.019		J
0344	1/26/00	Thorium-230	0.035	0.006		
0370	3/8/94	Thorium-230	0.032	0.027		J
0344	3/24/94	Thorium-230	0.019	0.018		
0319	1/26/00	Thorium-230	0.012	0.008		
0379	3/15/94	Thorium-230	0.009	0.009		
0063	3/23/92	Thorium-230	0	0.2		
0063	3/23/92	Thorium-230	0	0.2		
0063	6/22/92	Thorium-230	0	0.2		
0305	3/19/92	Thorium-230	0	0.2		

0317	3/16/94	Thorium-232	0.588	0.012		J
0305	9/11/93	Thorium-232	0.463	0.21		
0313	9/17/92	Thorium-232	0.252	1		
0313	3/22/92	Thorium-232	0.2	0.2		
P027	3/21/94	Thorium-232	0.167	0.016		J
0063	10/13/93	Thorium-232	0.15	0.1		
0313	3/17/94	Thorium-232	0.101	0.019		
0397	9/25/93	Thorium-232	0.099	0.067		
0344	1/26/00	Thorium-232	0.049	0.007		
0317	3/16/94	Thorium-232	0.036	0.011		J
0344	1/26/00	Thorium-232	0.024	0.006		
0063	3/23/92	Thorium-232	0	0.2		
0063	3/23/92	Thorium-232	0	0.2		
0063	6/22/92	Thorium-232	0	0.2		
0063	6/22/92	Thorium-232	0	0.2		
0305	3/19/92	Thorium-232	0	0.2		
0305	6/22/92	Thorium-232	0	0.2		
0313	6/21/92	Thorium-232	0	0.4		

0400	1/26/00	Uranium-233/234	1.952	0.005		
0319	1/26/00	Uranium-233/234	0.553	0.023		
P033	1/29/03	Uranium-233/234	0.179	0.011		
0344	1/26/00	Uranium-233/234	0.15	0.006		
0400	1/28/03	Uranium-233/234	0.137	0.051		
0344	1/26/00	Uranium-233/234	0.099	0.005		

0313	2/3/91	Uranium-234	13	0		
0313	8/4/91	Uranium-234	3.24	0		
0305	1/31/91	Uranium-234	2.4	0		
0374	10/3/94	Uranium-234	1.53	0.368		
0313	12/17/91	Uranium-234	1.46	1		
0374	4/1/93	Uranium-234	1.23	0.031		
0063	6/22/92	Uranium-234	1.2	0.4		
0063	12/16/91	Uranium-234	1.15	1		

0319	9/23/93	Uranium-234	1.14	0.14		
0370	3/31/93	Uranium-234	1.07	0.07		
0373	3/30/93	Uranium-234	0.977	0.033		
0063	8/5/91	Uranium-234	0.913	0		
0305	3/19/92	Uranium-234	0.8	0.4		
0313	9/17/92	Uranium-234	0.749	1		
0313	9/13/93	Uranium-234	0.738	0.12		
0313	6/21/92	Uranium-234	0.7	0.4		
0373	3/16/94	Uranium-234	0.7	0.015		
0370	9/24/93	Uranium-234	0.695	0.26		
0046	10/13/93	Uranium-234	0.689	0.13		
0305	9/11/93	Uranium-234	0.653	0.054		
0410	7/21/94	Uranium-234	0.65			J
0305	9/16/92	Uranium-234	0.635	1		
P027	3/21/94	Uranium-234	0.635	0.008		
0319	3/21/94	Uranium-234	0.617	0.010		
0400	7/14/94	Uranium-234	0.61			J
0313	3/17/94	Uranium-234	0.605	0.013		
0370	3/8/94	Uranium-234	0.6	0.015		
0373	9/25/93	Uranium-234	0.59	0.15		
0397	9/25/93	Uranium-234	0.556	0.11		
0397	3/31/93	Uranium-234	0.555	0.054		
0370	3/8/94	Uranium-234	0.54	0.031		
0063	10/13/93	Uranium-234	0.523	0.16		
0379	9/26/93	Uranium-234	0.52	0.11		
0305	3/10/94	Uranium-234	0.515	0.016		
0379	3/29/93	Uranium-234	0.503	0.086		
0317	9/10/93	Uranium-234	0.478	0.054		
0397	3/31/93	Uranium-234	0.461	0.037		
0397	3/11/94	Uranium-234	0.459	0.023		
0063	9/16/92	Uranium-234	0.451	1		
0379	3/15/94	Uranium-234	0.45	0.016		
0046	3/18/94	Uranium-234	0.44	0.024		
0313	3/22/92	Uranium-234	0.4	0.4		
0063	3/18/94	Uranium-234	0.374	0.014		
0372	9/24/93	Uranium-234	0.3	0.28		
0317	3/16/94	Uranium-234	0.262	0.014		
0317	3/16/94	Uranium-234	0.227	0.015		
0372	3/30/93	Uranium-234	0.211	0.072		
0063	3/23/92	Uranium-234	0.2	0.4		
0063	6/22/92	Uranium-234	0.2	0.4		
0372	3/21/94	Uranium-234	0.122	0.010		J
0344	3/24/94	Uranium-234	0.093	0.010		J
0063	3/23/92	Uranium-234	0	0.4		
0305	6/22/92	Uranium-234	0	0.4		

0046	7/10/87	Uranium-235	12			
0313	2/3/91	Uranium-235	4.7	0		
0305	1/31/91	Uranium-235	1.2	0		
0410	7/21/94	Uranium-235	0.17			
0400	7/14/94	Uranium-235	0.14			J
0400	1/26/00	Uranium-235	0.109	0.005		

0373	3/16/94	Uranium-235	0.057	0.015		
0370	3/8/94	Uranium-235	0.049	0.031		
0370	3/8/94	Uranium-235	0.048	0.015		
0313	3/17/94	Uranium-235	0.046	0.011		
P027	3/21/94	Uranium-235	0.038	0.009		
0397	3/11/94	Uranium-235	0.027	0.018		
0305	3/10/94	Uranium-235	0.025	0.013		
0319	3/21/94	Uranium-235	0.025	0.012		
P033	1/29/03	Uranium-235	0.02	0.011		
0319	1/26/00	Uranium-235	0.018	0.007		
0379	3/15/94	Uranium-235	0.015	0.012		
0063	3/23/92	Uranium-235	0	0.4		
0063	3/23/92	Uranium-235	0	0.4		
0063	6/22/92	Uranium-235	0	0.4		
0063	6/22/92	Uranium-235	0	0.4		
0305	3/19/92	Uranium-235	0	0.4		
0305	6/22/92	Uranium-235	0	0.4		
0313	3/22/92	Uranium-235	0	0.4		
0313	6/21/92	Uranium-235	0	0.4		

0305	9/11/93	Uranium-235/236	0.098	0.066		
0373	3/30/93	Uranium-235/236	0.0745	0.04		
0372	3/30/93	Uranium-235/236	0.0471	0.043		

0313	2/3/91	Uranium-238	4.3	0		
0313	8/4/91	Uranium-238	3.57	0		
0370	3/31/93	Uranium-238	2.3	0.03		
0400	1/26/00	Uranium-238	2.023	0.014		
0305	1/31/91	Uranium-238	1.6	0		
0370	9/24/93	Uranium-238	1.46	0.15		
0374	4/1/93	Uranium-238	1.26	0.09		
0313	12/17/91	Uranium-238	1.19	1		
0370	3/8/94	Uranium-238	1.16	0.015		
0374	10/3/94	Uranium-238	1.1	0.297		
0063	12/16/91	Uranium-238	1.03	1		
0063	8/5/91	Uranium-238	0.973	0		
0373	3/30/93	Uranium-238	0.967	0.033		
0319	9/23/93	Uranium-238	0.906	0.14		
0063	3/23/92	Uranium-238	0.9	0.4		
0063	6/22/92	Uranium-238	0.9	0.4		
0370	3/8/94	Uranium-238	0.88	0.031		
0046	10/13/93	Uranium-238	0.808	0.18		
0313	3/22/92	Uranium-238	0.8	0.4		
0313	9/17/92	Uranium-238	0.718	1		
0063	3/23/92	Uranium-238	0.7	0.4		
0373	9/25/93	Uranium-238	0.691	0.052		
0305	9/16/92	Uranium-238	0.663	1		
P027	3/21/94	Uranium-238	0.653	0.010		
0410	7/21/94	Uranium-238	0.65			
0373	3/16/94	Uranium-238	0.6	0.015		
0313	9/13/93	Uranium-238	0.594	0.06		
0313	3/17/94	Uranium-238	0.569	0.013		

0305	9/11/93	Uranium-238	0.567	0.11		
0400	7/14/94	Uranium-238	0.53			J
0305	3/19/92	Uranium-238	0.5	0.4		
0305	3/10/94	Uranium-238	0.478	0.013		
0063	10/13/93	Uranium-238	0.471	0.14		
0063	9/16/92	Uranium-238	0.451	1		
0379	9/26/93	Uranium-238	0.44	0.12		
0397	3/31/93	Uranium-238	0.41	0.093		
0063	6/22/92	Uranium-238	0.4	0.4		
0046	3/18/94	Uranium-238	0.39	0.024		
0397	9/25/93	Uranium-238	0.389	0.13		
0397	3/11/94	Uranium-238	0.374	0.015		
0379	3/29/93	Uranium-238	0.372	0.067		
0319	1/26/00	Uranium-238	0.361	0.023		
0379	3/15/94	Uranium-238	0.358	0.010		
0319	3/21/94	Uranium-238	0.309	0.014		
0305	6/22/92	Uranium-238	0.3	0.4		
0317	3/16/94	Uranium-238	0.293	0.017		
0397	3/31/93	Uranium-238	0.29	0.112		
0063	3/18/94	Uranium-238	0.228	0.014		
0313	6/21/92	Uranium-238	0.2	0.4		
0317	3/16/94	Uranium-238	0.178	0.014		
0372	3/30/93	Uranium-238	0.178	0.035		
0317	9/10/93	Uranium-238	0.172	0.11		
P033	1/29/03	Uranium-238	0.139	0.011		
0344	1/26/00	Uranium-238	0.107	0.006		
0400	1/28/03	Uranium-238	0.082	0.040		
0372	3/21/94	Uranium-238	0.073	0.010		J
0344	1/26/00	Uranium-238	0.069	0.005		
0344	3/24/94	Uranium-238	0.039	0.010		J

DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD
	0.098	1.30	NA	ASTM24
	0.098	1.30	NA	ASTM24
	0.46	2.40	1.39	EPA 907.0
	0.46	2.40	1.39	EPA 907.0
	0.46	2.40	1.39	UNKNOWN
	0.46	2.40	1.39	UNKNOWN
	0.46	2.40	1.39	UNKNOWN
	0.46	2.40	1.39	UNKNOWN
	0.46	2.40	1.39	UNKNOWN
	0.46	2.40	1.39	UNKNOWN
	0.46	2.40	1.39	UNKNOWN
	0.86	110	NA	EPA 903
	0.86	110	NA	EPA 900
	0.36	2.7 (a)	0.087	E84006
	0.36	2.7 (a)	0.087	E84006
	0.36	2.7 (a)	0.087	NAS 1965
	0.36	2.7 (a)	0.087	NAS 1965
	0.36	2.7 (a)	0.087	NAS 1965
	0.36	2.7 (a)	0.087	NAS 1965
	0.36	2.7 (a)	0.087	UNKNOWN
	0.36	2.7 (a)	0.087	UNKNOWN
	0.36	2.7 (a)	0.087	UNKNOWN
	0.36	2.7 (a)	0.087	UNKNOWN
	0.36	2.7 (a)	0.087	E84006
	0.36	2.7 (a)	0.087	E84006
	0.36	2.7 (a)	0.087	E84006
	0.36	2.7 (a)	0.087	E84006
	0.36	2.7 (a)	0.087	E84006
	0.36	2.7 (a)	0.087	E84006
	0.35	2.7 (a)	0.087	E84006
	0.35	2.7 (a)	0.087	E84006
	0.35	2.7 (a)	0.087	E84006
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965

	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	NAS 1965
	0.35	2.7 (a)	0.087	UNKNOWN
	0.35	2.7 (a)	0.087	UNKNOWN
	0.35	2.7 (a)	0.087	UNKNOWN
	0.35	2.7 (a)	0.087	E84006
	0.35	2.7 (a)	0.087	E84006
	0.35	2.7 (a)	0.087	E84006
	0.35	2.7 (a)	0.087	E84006
	0.35	2.7 (a)	0.087	E84006

				UNKNOWN
				ASTM24

5 pCi/L	0.12	2.7	1.0	EPA 901
5 pCi/L	0.12	2.7	1.0	EPA 901
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	EPA 903
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	EPA 903
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	EPA 903
5 pCi/L	0.12	2.7	1.0	EPA 903.1
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	SW846 9315
5 pCi/L	0.12	2.7	1.0	EPA 901
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	SW846 9315
5 pCi/L	0.12	2.7	1.0	EPA 903.1
5 pCi/L	0.12	2.7	1.0	EPA 903
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	EPA 903
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	SW846 9315
5 pCi/L	0.12	2.7	1.0	UNKNOWN
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	SW846 9315
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	EPA 903

5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	EPA 903
5 pCi/L	0.12	2.7	1.0	EPA 901
5 pCi/L	0.12	2.7	1.0	EPA 901
5 pCi/L	0.12	2.7	1.0	EPA 903
5 pCi/L	0.12	2.7	1.0	EPA 901
5 pCi/L	0.12	2.7	1.0	ASTM24
5 pCi/L	0.12	2.7	1.0	SW846 9315
5 pCi/L	0.12	2.7	1.0	EPA 903
5 pCi/L	0.12	2.7	1.0	SW846 9315
5 pCi/L	0.12	2.7	1.0	EPA 903
5 pCi/L	0.12	2.7	1.0	EPA 903
5 pCi/L	0.12	2.7	1.0	SW846 9315
5 pCi/L	0.12	2.7	1.0	EPA 903
5 pCi/L	0.12	2.7	1.0	SW846 9315
5 pCi/L	0.12	2.7	1.0	SW846 9315
5 pCi/L	0.12	2.7	1.0	EPA 903
5 pCi/L	0.12	2.7	1.0	SW846 9315
5 pCi/L	0.12	2.7	1.0	EPA 901
5 pCi/L	0.12	2.7	1.0	EPA 901
5 pCi/L	0.12	2.7	1.0	SW846 9320
5 pCi/L	0.12	2.7	1.0	SW846 9320

				ASTM24
				ASTM24

8 pCi/L	0.64	14	0.975	EPA 905
8 pCi/L	0.64	14	0.975	EPA 905
8 pCi/L	0.64	14	0.975	EPA 905
8 pCi/L	0.64	14	0.975	EPA 905
8 pCi/L	0.64	14	0.975	EPA 905
8 pCi/L	0.64	14	0.975	EPA 905
8 pCi/L	0.64	14	0.975	EPA 905
8 pCi/L	0.64	14	0.975	EPA 905
8 pCi/L	0.64	14	0.975	EPA 905

	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	EPA 907.0
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	EPA 907.0
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	UNKNOWN
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	NAS 1960

	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	AECRMO
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	UNKNOWN
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	UNKNOWN
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	UNKNOWN
	0.16	3.5 (a) *	0.779	UNKNOWN
	0.16	3.5 (a) *	0.779	UNKNOWN
	0.16	3.5 (a) *	0.779	UNKNOWN
	0.16	3.5 (a) *	0.779	UNKNOWN
	0.16	3.5 (a) *	0.779	NAS 1960
	0.16	3.5 (a) *	0.779	UNKNOWN
	0.16	3.5 (a) *	0.779	AECRMO
	0.16	3.5 (a) *	0.779	AECRMO
	0.16	3.5 (a) *	0.779	AECRMO
	0.16	3.5 (a) *	0.779	AECRMO
	0.16	3.5 (a) *	0.779	AECRMO
	0.16	3.5 (a) *	0.779	AECRMO
	0.16	3.5 (a) *	0.779	AECRMO

	0.027	0.6 (a) *	NA	ALPHA
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	UNKNOWN
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	UNKNOWN
	0.027	0.6 (a) *	NA	AECRMO
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	EPA 907.0
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	UNKNOWN
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	UNKNOWN
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	AECRMO
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	UNKNOWN
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	EPA 907.0
	0.027	0.6 (a) *	NA	UNKNOWN
	0.027	0.6 (a) *	NA	NAS 1960

	0.027	0.6 (a) *	NA	AECRMO
	0.027	0.6 (a) *	NA	AECRMO
	0.027	0.6 (a) *	NA	UNKNOWN
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	UNKNOWN
	0.027	0.6 (a) *	NA	UNKNOWN
	0.027	0.6 (a) *	NA	UNKNOWN
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	UNKNOWN
	0.027	0.6 (a) *	NA	UNKNOWN
	0.027	0.6 (a) *	NA	NAS 1960
	0.027	0.6 (a) *	NA	UNKNOWN
	0.027	0.6 (a) *	NA	AECRMO
	0.027	0.6 (a) *	NA	AECRMO
	0.027	0.6 (a) *	NA	AECRMO
	0.027	0.6 (a) *	NA	AECRMO

	0.033	1.6 (a) *	0.314	UNKNOWN
	0.033	1.6 (a) *	0.314	NAS 1960
	0.033	1.6 (a) *	0.314	NAS 1960
	0.033	1.6 (a) *	0.314	AECRMO
	0.033	1.6 (a) *	0.314	UNKNOWN
	0.033	1.6 (a) *	0.314	NAS 1960
	0.033	1.6 (a) *	0.314	UNKNOWN
	0.033	1.6 (a) *	0.314	NAS 1960
	0.033	1.6 (a) *	0.314	NAS 1960
	0.033	1.6 (a) *	0.314	UNKNOWN
	0.033	1.6 (a) *	0.314	NAS 1960
	0.033	1.6 (a) *	0.314	AECRMO
	0.033	1.6 (a) *	0.314	AECRMO
	0.033	1.6 (a) *	0.314	AECRMO
	0.033	1.6 (a) *	0.314	AECRMO
	0.033	1.6 (a) *	0.314	AECRMO
	0.033	1.6 (a) *	0.314	AECRMO
	0.033	1.6 (a) *	0.314	AECRMO

30 µg/L	0.67 (U-234)	18 (a)	NA	NAS 1962
30 µg/L	0.67 (U-234)	18 (a)	NA	NAS 1962
30 µg/L	0.67 (U-234)	18 (a)	NA	NAS 1962
30 µg/L	0.67 (U-234)	18 (a)	NA	NAS 1962
30 µg/L	0.67 (U-234)	18 (a)	NA	NAS 1962
30 µg/L	0.67 (U-234)	18 (a)	NA	NAS 1962

30 µg/L	0.67	18 (U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18 (U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18 (U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18 (U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18 (U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18 (U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18 (U-234/234) (a)	NA	EPA 908
30 µg/L	0.67	18 (U-234/234) (a)	NA	NAS 1962

30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	EPA 908
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	EPA 908
30 µg/L	0.67	18	(U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	EPA 907.0
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18	(U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18	(U-234/234) (a)	NA	EPA 907.0
30 µg/L	0.67	18	(U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18	(U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18	(U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18	(U-234/234) (a)	NA	EPA 908
30 µg/L	0.67	18	(U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18	(U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18	(U-234/234) (a)	NA	NAS 1962
30 µg/L	0.67	18	(U-234/234) (a)	NA	EPA 908
30 µg/L	0.67	18	(U-234/234) (a)	NA	EPA 908
30 µg/L	0.67	18	(U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18	(U-234/234) (a)	NA	UNKNOWN
30 µg/L	0.67	18	(U-234/234) (a)	NA	EPA 908
30 µg/L	0.67	18	(U-234/234) (a)	NA	EPA 908

30 µg/L	0.065	17 (a)	0.814	GAMMA SCAN
30 µg/L	0.065	17 (a)	0.814	NAS 1962
30 µg/L	0.065	17 (a)	0.814	NAS 1962
30 µg/L	0.065	17 (a)	0.814	EPA 907.0
30 µg/L	0.065	17 (a)	0.814	EPA 907.0
30 µg/L	0.065	17 (a)	0.814	NAS 1962

30 µg/L	0.065	17 (a)	0.814	UNKNOWN
30 µg/L	0.065	17 (a)	0.814	UNKNOWN
30 µg/L	0.065	17 (a)	0.814	UNKNOWN
30 µg/L	0.065	17 (a)	0.814	UNKNOWN
30 µg/L	0.065	17 (a)	0.814	UNKNOWN
30 µg/L	0.065	17 (a)	0.814	UNKNOWN
30 µg/L	0.065	17 (a)	0.814	UNKNOWN
30 µg/L	0.065	17 (a)	0.814	UNKNOWN
30 µg/L	0.065	17 (a)	0.814	NAS 1962
30 µg/L	0.065	17 (a)	0.814	NAS 1962
30 µg/L	0.065	17 (a)	0.814	UNKNOWN
30 µg/L	0.065	17 (a)	0.814	EPA 908
30 µg/L	0.065	17 (a)	0.814	EPA 908
30 µg/L	0.065	17 (a)	0.814	EPA 908
30 µg/L	0.065	17 (a)	0.814	EPA 908
30 µg/L	0.065	17 (a)	0.814	EPA 908
30 µg/L	0.065	17 (a)	0.814	EPA 908
30 µg/L	0.065	17 (a)	0.814	EPA 908
30 µg/L	0.065	17 (a)	0.814	EPA 908

30 µg/L				NAS 1962
30 µg/L				NAS 1962
30 µg/L				NAS 1962

30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	EPA 908
30 µg/L	0.025	0.56 (a) *	0.688	EPA 908
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	EPA 908
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	EPA 908
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN
30 µg/L	0.025	0.56 (a) *	0.688	EPA 907.0
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN

30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	EPA 907.0
30 µg/L	0.025	0.56 (a) *	0.688	EPA 908
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	EPA 908
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN
30 µg/L	0.025	0.56 (a) *	0.688	EPA 908
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN
30 µg/L	0.025	0.56 (a) *	0.688	EPA 908
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN
30 µg/L	0.025	0.56 (a) *	0.688	NAS 1962
30 µg/L	0.025	0.56 (a) *	0.688	UNKNOWN

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DOE OU1 RESULTS - MAXIMUM CONCENTRATION PER ANALYTE

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0313	9/17/92	Actinium	2.27	1				0.098	1.30	NA	ASTM24	IT
0410	7/21/94	Americium-241	0.47			J		0.46	2.40	1.39	EPA 907.0	COMPUC
0313	5/7/91	Bismuth-210	0.63					0.86	110	NA	EPA 903	COMPUC
0063	6/22/92	Plutonium-238	6.2	0.5				0.36	2.7 (a)	0.087	E84006	BAR
0313	6/21/92	Plutonium-239/240	2.8	0.4				0.35	2.7 (a)	0.087	E84006	BAR
0374	10/3/94	Potassium-40	341	191.0		J					UNKNOWN	QTESR
0313	3/22/92	Radium-226	3.1	0.2			5 pCi/L	0.12	2.7	1.0	EPA 901	BAR
0063	2/5/91	Strontium-85	26	0							ASTM24	IT
0305	3/19/92	Strontium-90	2.9	1			8 pCi/L	0.64	14	0.975	EPA 905	BAR
0313	2/3/91	Thorium-228	4.7	0				0.16	3.5 (a) *	0.779	NAS 1960	IT
0046	7/10/87	Thorium-230	3.8					0.027	0.6 (a) *	NA	ALPHA	ORNL
0317	3/16/94	Thorium-232	0.588	0.012		J		0.033	1.6 (a) *	0.314	UNKNOWN	ENSECO
0400	1/26/00	Uranium-233/234	1.952	0.005				0.67 (U-234)	18 (a)	NA	NAS 1962	MND
0313	2/3/91	Uranium-234	13	0				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0046	7/10/87	Uranium-235	12					0.065	17 (a)	0.814	GAMMA SCAN	ORNL
0305	9/11/93	Uranium-235/236	0.098	0.066							NAS 1962	IT
0313	2/3/91	Uranium-238	4.3	0				0.025	0.56 (a) *	0.688	NAS 1962	IT

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0046	10/13/93	Americium-241	0.0989	0.045		R		0.46	2.40	1.39	UNKNOWN	IT
0046	10/13/93	Plutonium-239/240	0.227	0.036		R		0.35	2.7 (a)	0.087	NAS 1965	IT
0046	3/18/94	Radium-226	0.19	0.18			5 pCi/L	0.12	2.7	1.0	EPA 903	ENSECO
0046	10/13/93	Thorium-228	0.825	0.58		R		0.16	3.5 (a) *	0.779	NAS 1960	IT
0046	7/10/87	Thorium-230	3.8					0.027	0.6 (a) *	NA	ALPHA	ORNL
0046	10/13/93	Thorium-230	0.194	0.13				0.027	0.6 (a) *	NA	NAS 1960	IT
0046	3/18/94	Thorium-230	0.121	0.047				0.027	0.6 (a) *	NA	UNKNOWN	ENSECO
0046	10/13/93	Uranium-234	0.689	0.13				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0046	3/18/94	Uranium-234	0.44	0.024				0.67	18 (U-234/234) (a)	NA	UNKNOWN	ENSECO
0046	7/10/87	Uranium-235	12					0.065	17 (a)	0.814	GAMMA SCAN	ORNL
0046	10/13/93	Uranium-238	0.808	0.18				0.025	0.56 (a) *	0.688	NAS 1962	IT
0046	3/18/94	Uranium-238	0.39	0.024				0.025	0.56 (a) *	0.688	UNKNOWN	ENSECO

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0063	3/23/92	Plutonium-238	0	0.5				0.36	2.7 (a)	0.087	E84006	BAR
0063	3/23/92	Plutonium-238	0.8	0.5				0.36	2.7 (a)	0.087	E84006	BAR
0063	6/22/92	Plutonium-238	0	0.5				0.36	2.7 (a)	0.087	E84006	BAR
0063	6/22/92	Plutonium-238	6.2	0.5				0.36	2.7 (a)	0.087	E84006	BAR
0063	3/18/94	Plutonium-238	0.005	0.002				0.36	2.7 (a)	0.087	UNKNOWN	ENSECO
0063	3/23/92	Plutonium-239/240	0	0.5				0.35	2.7 (a)	0.087	E84006	BAR
0063	6/22/92	Plutonium-239/240	0	0.5				0.35	2.7 (a)	0.087	E84006	BAR
0063	6/22/92	Plutonium-239/240	2.3	0.5				0.35	2.7 (a)	0.087	E84006	BAR
0063	9/16/92	Plutonium-239/240	0.679	1				0.35	2.7 (a)	0.087	NAS 1965	IT
0063	10/13/93	Plutonium-239/240	0.326	0.097		R		0.35	2.7 (a)	0.087	NAS 1965	IT
0063	3/18/94	Plutonium-239/240	0.002	0.002				0.35	2.7 (a)	0.087	UNKNOWN	ENSECO
0063	3/23/92	Radium-226	0	0.2			5 pCi/L	0.12	2.7	1.0	EPA 901	BAR
0063	3/23/92	Radium-226	0.3	0.2			5 pCi/L	0.12	2.7	1.0	EPA 901	BAR
0063	6/22/92	Radium-226	0.3	0.2			5 pCi/L	0.12	2.7	1.0	EPA 901	BAR
0063	6/22/92	Radium-226	0.7	0.2			5 pCi/L	0.12	2.7	1.0	EPA 901	BAR
0063	3/18/94	Radium-226	0.3	0.20			5 pCi/L	0.12	2.7	1.0	EPA 903	ENSECO
0063	2/5/91	Strontium-85	26	0							ASTM24	IT
0063	3/23/92	Strontium-90	0	1			8 pCi/L	0.64	14	0.975	EPA 905	BAR
0063	6/22/92	Strontium-90	0	1			8 pCi/L	0.64	14	0.975	EPA 905	BAR
0063	6/22/92	Strontium-90	0.8	1			8 pCi/L	0.64	14	0.975	EPA 905	BAR
0063	2/5/91	Thorium-228	1	0				0.16	3.5 (a) *	0.779	NAS 1960	IT
0063	8/5/91	Thorium-228	1.29	0				0.16	3.5 (a) *	0.779	NAS 1960	IT
0063	12/16/91	Thorium-228	1.46	1				0.16	3.5 (a) *	0.779	NAS 1960	IT
0063	3/23/92	Thorium-228	0	0.2				0.16	3.5 (a) *	0.779	AECRMO	BAR
0063	6/22/92	Thorium-228	0	0.2				0.16	3.5 (a) *	0.779	AECRMO	BAR
0063	3/23/92	Thorium-230	0	0.2				0.027	0.6 (a) *	NA	AECRMO	BAR
0063	6/22/92	Thorium-230	0	0.2				0.027	0.6 (a) *	NA	AECRMO	BAR
0063	6/22/92	Thorium-230	0.1	0.2				0.027	0.6 (a) *	NA	AECRMO	BAR
0063	9/16/92	Thorium-230	3.17	1				0.027	0.6 (a) *	NA	NAS 1960	IT
0063	10/13/93	Thorium-230	0.451	0.1				0.027	0.6 (a) *	NA	NAS 1960	IT
0063	3/18/94	Thorium-230	0.039	0.019		J		0.027	0.6 (a) *	NA	UNKNOWN	ENSECO
0063	3/23/92	Thorium-232	0	0.2				0.033	1.6 (a) *	0.314	AECRMO	BAR
0063	6/22/92	Thorium-232	0	0.2				0.033	1.6 (a) *	0.314	AECRMO	BAR
0063	10/13/93	Thorium-232	0.15	0.1				0.033	1.6 (a) *	0.314	NAS 1960	IT
0063	8/5/91	Uranium-234	0.913	0				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0063	12/16/91	Uranium-234	1.15	1				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0063	3/23/92	Uranium-234	0	0.4				0.67	18 (U-234/234) (a)	NA	EPA 908	BAR
0063	3/23/92	Uranium-234	0.2	0.4				0.67	18 (U-234/234) (a)	NA	EPA 908	BAR
0063	6/22/92	Uranium-234	0.2	0.4				0.67	18 (U-234/234) (a)	NA	EPA 908	BAR
0063	6/22/92	Uranium-234	1.2	0.4				0.67	18 (U-234/234) (a)	NA	EPA 908	BAR
0063	9/16/92	Uranium-234	0.451	1				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0063	10/13/93	Uranium-234	0.523	0.16				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0063	3/18/94	Uranium-234	0.374	0.014				0.67	18 (U-234/234) (a)	NA	UNKNOWN	ENSECO
0063	3/23/92	Uranium-235	0	0.4				0.065	17 (a)	0.814	EPA 908	BAR
0063	6/22/92	Uranium-235	0	0.4				0.065	17 (a)	0.814	EPA 908	BAR
0063	8/5/91	Uranium-238	0.973	0				0.025	0.56 (a) *	0.688	NAS 1962	IT
0063	12/16/91	Uranium-238	1.03	1				0.025	0.56 (a) *	0.688	NAS 1962	IT
0063	3/23/92	Uranium-238	0.7	0.4				0.025	0.56 (a) *	0.688	EPA 908	BAR
0063	3/23/92	Uranium-238	0.9	0.4				0.025	0.56 (a) *	0.688	EPA 908	BAR
0063	6/22/92	Uranium-238	0.4	0.4				0.025	0.56 (a) *	0.688	EPA 908	BAR
0063	6/22/92	Uranium-238	0.9	0.4				0.025	0.56 (a) *	0.688	EPA 908	BAR
0063	9/16/92	Uranium-238	0.451	1				0.025	0.56 (a) *	0.688	NAS 1962	IT
0063	10/13/93	Uranium-238	0.471	0.14				0.025	0.56 (a) *	0.688	NAS 1962	IT
0063	3/18/94	Uranium-238	0.228	0.014				0.025	0.56 (a) *	0.688	UNKNOWN	ENSECO

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0305	1/31/91	Actinium	1.4	0				0.098	1.30	NA	ASTM24	IT
0305	5/5/91	Bismuth-210	0.09					0.86	110	NA	EPA 900	COMPUC
0305	3/19/92	Plutonium-238	0	0.5				0.36	2.7 (a)	0.087	E84006	BAR
0305	6/22/92	Plutonium-238	0	0.5				0.36	2.7 (a)	0.087	E84006	BAR
0305	3/19/92	Plutonium-239/240	1.3	0.5				0.35	2.7 (a)	0.087	E84006	BAR
0305	6/22/92	Plutonium-239/240	0	0.5				0.35	2.7 (a)	0.087	E84006	BAR
0305	9/11/93	Plutonium-239/240	0.136	0.089		R		0.35	2.7 (a)	0.087	NAS 1965	IT
0305	1/31/91	Radium-226	1.1	0			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0305	3/19/92	Radium-226	0.3	0.2			5 pCi/L	0.12	2.7	1.0	EPA 901	BAR
0305	6/22/92	Radium-226	2.4	0.2			5 pCi/L	0.12	2.7	1.0	EPA 901	BAR
0305	9/16/92	Radium-226	0.859	1			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0305	9/11/93	Radium-226	0.437	0.38			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0305	3/19/92	Strontium-90	2.9	1			8 pCi/L	0.64	14	0.975	EPA 905	BAR
0305	6/22/92	Strontium-90	0.2	1			8 pCi/L	0.64	14	0.975	EPA 905	BAR
0305	8/2/91	Thorium-228	2.31	0				0.16	3.5 (a) *	0.779	NAS 1960	IT
0305	12/17/91	Thorium-228	1.06	1				0.16	3.5 (a) *	0.779	NAS 1960	IT
0305	3/19/92	Thorium-228	0	0.2				0.16	3.5 (a) *	0.779	AECRMO	BAR
0305	6/22/92	Thorium-228	0	0.2				0.16	3.5 (a) *	0.779	AECRMO	BAR
0305	9/11/93	Thorium-228	1.02	0.36		R		0.16	3.5 (a) *	0.779	NAS 1960	IT
0305	3/19/92	Thorium-230	0	0.2				0.027	0.6 (a) *	NA	AECRMO	BAR
0305	6/22/92	Thorium-230	0.1	0.2				0.027	0.6 (a) *	NA	AECRMO	BAR
0305	9/11/93	Thorium-230	3.22	0.21		J		0.027	0.6 (a) *	NA	NAS 1960	IT
0305	3/10/94	Thorium-230	1.95	0.213				0.027	0.6 (a) *	NA	UNKNOWN	ENSECO
0305	3/19/92	Thorium-232	0	0.2				0.033	1.6 (a) *	0.314	AECRMO	BAR
0305	6/22/92	Thorium-232	0	0.2				0.033	1.6 (a) *	0.314	AECRMO	BAR
0305	9/11/93	Thorium-232	0.463	0.21				0.033	1.6 (a) *	0.314	NAS 1960	IT
0305	1/31/91	Uranium-234	2.4	0				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0305	3/19/92	Uranium-234	0.8	0.4				0.67	18 (U-234/234) (a)	NA	EPA 908	BAR
0305	6/22/92	Uranium-234	0	0.4				0.67	18 (U-234/234) (a)	NA	EPA 908	BAR
0305	9/16/92	Uranium-234	0.635	1				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0305	9/11/93	Uranium-234	0.653	0.054				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0305	3/10/94	Uranium-234	0.515	0.016				0.67	18 (U-234/234) (a)	NA	UNKNOWN	ENSECO
0305	1/31/91	Uranium-235	1.2	0				0.065	17 (a)	0.814	NAS 1962	IT
0305	3/19/92	Uranium-235	0	0.4				0.065	17 (a)	0.814	EPA 908	BAR
0305	6/22/92	Uranium-235	0	0.4				0.065	17 (a)	0.814	EPA 908	BAR
0305	3/10/94	Uranium-235	0.025	0.013				0.065	17 (a)	0.814	UNKNOWN	ENSECO
0305	9/11/93	Uranium-235/236	0.098	0.066							NAS 1962	IT
0305	1/31/91	Uranium-238	1.6	0				0.025	0.56 (a) *	0.688	NAS 1962	IT
0305	3/19/92	Uranium-238	0.5	0.4				0.025	0.56 (a) *	0.688	EPA 908	BAR
0305	6/22/92	Uranium-238	0.3	0.4				0.025	0.56 (a) *	0.688	EPA 908	BAR
0305	9/16/92	Uranium-238	0.663	1				0.025	0.56 (a) *	0.688	NAS 1962	IT
0305	9/11/93	Uranium-238	0.567	0.11				0.025	0.56 (a) *	0.688	NAS 1962	IT
0305	3/10/94	Uranium-238	0.478	0.013				0.025	0.56 (a) *	0.688	UNKNOWN	ENSECO

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0313	9/17/92	Actinium	2.27	1				0.098	1.30	NA	ASTM24	IT
0313	5/7/91	Bismuth-210	0.63					0.86	110	NA	EPA 903	COMPUC
0313	3/22/92	Plutonium-238	0	0.5				0.36	2.7 (a)	0.087	E84006	BAR
0313	6/21/92	Plutonium-238	0	0.4				0.36	2.7 (a)	0.087	E84006	BAR
0313	3/17/94	Plutonium-238	0.012	0.003				0.36	2.7 (a)	0.087	UNKNOWN	ENSECO
0313	3/22/92	Plutonium-239/240	0	0.5				0.35	2.7 (a)	0.087	E84006	BAR
0313	6/21/92	Plutonium-239/240	2.8	0.4				0.35	2.7 (a)	0.087	E84006	BAR
0313	9/13/93	Plutonium-239/240	0.069	0.037				0.35	2.7 (a)	0.087	NAS 1965	IT
0313	3/17/94	Plutonium-239/240	0.003	0.003				0.35	2.7 (a)	0.087	UNKNOWN	ENSECO
0313	2/3/91	Potassium-40	170	0							ASTM24	IT
0313	2/3/91	Radium-226	1.1	0			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0313	5/7/91	Radium-226	1.27				5 pCi/L	0.12	2.7	1.0	EPA 903	COMPUC
0313	8/4/91	Radium-226	1.72	0			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0313	12/17/91	Radium-226	1.96	1			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0313	3/22/92	Radium-226	3.1	0.2			5 pCi/L	0.12	2.7	1.0	EPA 901	BAR
0313	6/21/92	Radium-226	0	0.3			5 pCi/L	0.12	2.7	1.0	EPA 901	BAR
0313	9/17/92	Radium-226	0.647	1			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0313	9/13/93	Radium-226	0.817	0.21			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0313	3/17/94	Radium-226	0.28	0.17			5 pCi/L	0.12	2.7	1.0	EPA 903	ENSECO
0313	2/3/91	Strontium-85	20	0							ASTM24	IT
0313	3/22/92	Strontium-90	0	1			8 pCi/L	0.64	14	0.975	EPA 905	BAR
0313	6/21/92	Strontium-90	1.1	1			8 pCi/L	0.64	14	0.975	EPA 905	BAR
0313	10/31/90	Thorium-228	1.28	0				0.16	3.5 (a) *	0.779	NAS 1960	IT
0313	2/3/91	Thorium-228	4.7	0				0.16	3.5 (a) *	0.779	NAS 1960	IT
0313	3/22/92	Thorium-228	0.5	0.2				0.16	3.5 (a) *	0.779	AECRMO	BAR
0313	6/21/92	Thorium-228	0	0.4				0.16	3.5 (a) *	0.779	AECRMO	BAR
0313	9/17/92	Thorium-228	0.293	1				0.16	3.5 (a) *	0.779	NAS 1960	IT
0313	9/13/93	Thorium-228	0.441	0.19		R		0.16	3.5 (a) *	0.779	NAS 1960	IT
0313	3/17/94	Thorium-228	0.158	0.042				0.16	3.5 (a) *	0.779	UNKNOWN	ENSECO
0313	3/22/92	Thorium-230	0.9	0.2				0.027	0.6 (a) *	NA	AECRMO	BAR
0313	6/21/92	Thorium-230	0.2	0.4				0.027	0.6 (a) *	NA	AECRMO	BAR
0313	9/17/92	Thorium-230	0.225	1				0.027	0.6 (a) *	NA	NAS 1960	IT
0313	9/13/93	Thorium-230	0.717	0.046				0.027	0.6 (a) *	NA	NAS 1960	IT
0313	3/17/94	Thorium-230	0.192	0.023				0.027	0.6 (a) *	NA	UNKNOWN	ENSECO
0313	3/22/92	Thorium-232	0.2	0.2				0.033	1.6 (a) *	0.314	AECRMO	BAR
0313	6/21/92	Thorium-232	0	0.4				0.033	1.6 (a) *	0.314	AECRMO	BAR
0313	9/17/92	Thorium-232	0.252	1				0.033	1.6 (a) *	0.314	NAS 1960	IT
0313	3/17/94	Thorium-232	0.101	0.019				0.033	1.6 (a) *	0.314	UNKNOWN	ENSECO
0313	2/3/91	Uranium-234	13	0				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0313	8/4/91	Uranium-234	3.24	0				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0313	12/17/91	Uranium-234	1.46	1				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0313	3/22/92	Uranium-234	0.4	0.4				0.67	18 (U-234/234) (a)	NA	EPA 908	BAR
0313	6/21/92	Uranium-234	0.7	0.4				0.67	18 (U-234/234) (a)	NA	EPA 908	BAR
0313	9/17/92	Uranium-234	0.749	1				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0313	9/13/93	Uranium-234	0.738	0.12				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0313	3/17/94	Uranium-234	0.605	0.013				0.67	18 (U-234/234) (a)	NA	UNKNOWN	ENSECO
0313	2/3/91	Uranium-235	4.7	0				0.065	17 (a)	0.814	NAS 1962	IT
0313	3/22/92	Uranium-235	0	0.4				0.065	17 (a)	0.814	EPA 908	BAR
0313	6/21/92	Uranium-235	0	0.4				0.065	17 (a)	0.814	EPA 908	BAR
0313	3/17/94	Uranium-235	0.046	0.011				0.065	17 (a)	0.814	UNKNOWN	ENSECO
0313	2/3/91	Uranium-238	4.3	0				0.025	0.56 (a) *	0.688	NAS 1962	IT
0313	8/4/91	Uranium-238	3.57	0				0.025	0.56 (a) *	0.688	NAS 1962	IT
0313	12/17/91	Uranium-238	1.19	1				0.025	0.56 (a) *	0.688	NAS 1962	IT
0313	3/22/92	Uranium-238	0.8	0.4				0.025	0.56 (a) *	0.688	EPA 908	BAR
0313	6/21/92	Uranium-238	0.2	0.4				0.025	0.56 (a) *	0.688	EPA 908	BAR
0313	9/17/92	Uranium-238	0.718	1				0.025	0.56 (a) *	0.688	NAS 1962	IT
0313	9/13/93	Uranium-238	0.594	0.06				0.025	0.56 (a) *	0.688	NAS 1962	IT
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

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STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0317	9/10/93	Americium-241	0.131	0.039				0.46	2.40	1.39	UNKNOWN	IT
0317	9/10/93	Plutonium-239/240	0.108	0.036		R		0.35	2.7 (a)	0.087	NAS 1965	IT
0317	3/16/94	Radium-226	0.34	0.14			5 pCi/L	0.12	2.7	1.0	EPA 903	ENSECO
0317	3/16/94	Radium-226	0.5	0.15			5 pCi/L	0.12	2.7	1.0	EPA 903	ENSECO
0317	9/10/93	Thorium-228	0.735	0.22		R		0.16	3.5 (a) *	0.779	NAS 1960	IT
0317	3/16/94	Thorium-228	0.049	0.021		J		0.16	3.5 (a) *	0.779	UNKNOWN	ENSECO
0317	3/16/94	Thorium-228	0.97	0.019		J		0.16	3.5 (a) *	0.779	UNKNOWN	ENSECO
0317	3/16/94	Thorium-230	0.049	0.011		J		0.027	0.6 (a) *	NA	UNKNOWN	ENSECO
0317	3/16/94	Thorium-230	0.95	0.015		J		0.027	0.6 (a) *	NA	UNKNOWN	ENSECO
0317	3/16/94	Thorium-232	0.036	0.011		J		0.033	1.6 (a) *	0.314	UNKNOWN	ENSECO
0317	3/16/94	Thorium-232	0.588	0.012		J		0.033	1.6 (a) *	0.314	UNKNOWN	ENSECO
0317	9/10/93	Uranium-234	0.478	0.054				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0317	3/16/94	Uranium-234	0.227	0.015				0.67	18 (U-234/234) (a)	NA	UNKNOWN	ENSECO
0317	3/16/94	Uranium-234	0.262	0.014				0.67	18 (U-234/234) (a)	NA	UNKNOWN	ENSECO
0317	9/10/93	Uranium-238	0.172	0.11				0.025	0.56 (a) *	0.688	NAS 1962	IT
0317	3/16/94	Uranium-238	0.178	0.014				0.025	0.56 (a) *	0.688	UNKNOWN	ENSECO
0317	3/16/94	Uranium-238	0.293	0.017				0.025	0.56 (a) *	0.688	UNKNOWN	ENSECO
0319	9/23/93	Radium-226	0.595	0.47			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0319	3/21/94	Radium-226	0.26	0.16			5 pCi/L	0.12	2.7	1.0	EPA 903	ENSECO
0319	9/23/93	Thorium-228	0.806	0.091		R		0.16	3.5 (a) *	0.779	NAS 1960	IT
0319	3/21/94	Thorium-228	0.035	0.019				0.16	3.5 (a) *	0.779	UNKNOWN	ENSECO
0319	9/23/93	Thorium-230	0.202	0.091		R		0.027	0.6 (a) *	NA	NAS 1960	IT
0319	3/21/94	Thorium-230	0.055	0.019		J		0.027	0.6 (a) *	NA	UNKNOWN	ENSECO
0319	1/26/00	Thorium-230	0.012	0.008				0.027	0.6 (a) *	NA	NAS 1960	MND
0319	1/26/00	Uranium-233/234	0.553	0.023				0.67 (U-234)	18 (a)	NA	NAS 1962	MND
0319	9/23/93	Uranium-234	1.14	0.14				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0319	3/21/94	Uranium-234	0.617	0.010				0.67	18 (U-234/234) (a)	NA	UNKNOWN	ENSECO
0319	3/21/94	Uranium-235	0.025	0.012				0.065	17 (a)	0.814	UNKNOWN	ENSECO
0319	1/26/00	Uranium-235	0.018	0.007				0.065	17 (a)	0.814	NAS 1962	MND
0319	9/23/93	Uranium-238	0.906	0.14				0.025	0.56 (a) *	0.688	NAS 1962	IT
0319	3/21/94	Uranium-238	0.309	0.014				0.025	0.56 (a) *	0.688	UNKNOWN	ENSECO
0319	1/26/00	Uranium-238	0.361	0.023				0.025	0.56 (a) *	0.688	NAS 1962	MND
0344	3/24/94	Americium-241	0.014	0.010				0.46	2.40	1.39	UNKNOWN	ENSECO
0344	10/14/93	Plutonium-238	0.0475	0.043				0.36	2.7 (a)	0.087	NAS 1965	IT
0344	1/26/00	Plutonium-238	0.034	0.005				0.36	2.7 (a)	0.087	NAS 1965	MND
0344	1/26/00	Plutonium-238	0.091	0.006				0.36	2.7 (a)	0.087	NAS 1965	MND
0344	10/14/93	Plutonium-239/240	0.206	0.043		R		0.35	2.7 (a)	0.087	NAS 1965	IT
0344	10/14/93	Radium-226	1.67	0.85			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0344	3/24/94	Radium-226	0.44	0.20			5 pCi/L	0.12	2.7	1.0	EPA 903	ENSECO
0344	10/14/93	Thorium-228	0.537	0.36		R		0.16	3.5 (a) *	0.779	NAS 1960	IT
0344	3/24/94	Thorium-228	0.095	0.025		J		0.16	3.5 (a) *	0.779	UNKNOWN	ENSECO
0344	1/26/00	Thorium-228	0.035	0.006				0.16	3.5 (a) *	0.779	NAS 1960	MND
0344	1/26/00	Thorium-228	0.147	0.020				0.16	3.5 (a) *	0.779	NAS 1960	MND
0344	10/14/93	Thorium-230	0.868	0.076				0.027	0.6 (a) *	NA	NAS 1960	IT
0344	3/24/94	Thorium-230	0.019	0.018				0.027	0.6 (a) *	NA	UNKNOWN	ENSECO
0344	1/26/00	Thorium-230	0.035	0.006				0.027	0.6 (a) *	NA	NAS 1960	MND
0344	1/26/00	Thorium-230	0.079	0.020				0.027	0.6 (a) *	NA	NAS 1960	MND
0344	1/26/00	Thorium-232	0.024	0.006				0.033	1.6 (a) *	0.314	NAS 1960	MND
0344	1/26/00	Thorium-232	0.049	0.007				0.033	1.6 (a) *	0.314	NAS 1960	MND
0344	1/26/00	Uranium-233/234	0.099	0.005				0.67 (U-234)	18 (a)	NA	NAS 1962	MND
0344	1/26/00	Uranium-233/234	0.15	0.006				0.67 (U-234)	18 (a)	NA	NAS 1962	MND
0344	3/24/94	Uranium-234	0.093	0.010		J		0.67	18 (U-234/234) (a)	NA	UNKNOWN	ENSECO
0344	3/24/94	Uranium-238	0.039	0.010		J		0.025	0.56 (a) *	0.688	UNKNOWN	ENSECO
0344	1/26/00	Uranium-238	0.069	0.005				0.025	0.56 (a) *	0.688	NAS 1962	MND
0344	1/26/00	Uranium-238	0.107	0.006				0.025	0.56 (a) *	0.688	NAS 1962	MND

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0370	9/24/93	Americium-241	0.0747	0.068				0.46	2.40	1.39	UNKNOWN	IT
0370	3/8/94	Plutonium-238	0.005	0.003				0.36	2.7 (a)	0.087	UNKNOWN	ENSECO
0370	3/8/94	Plutonium-238	0.006	0.006				0.36	2.7 (a)	0.087	UNKNOWN	ENSECO
0370	3/31/93	Plutonium-239/240	0.145	0.07				0.35	2.7 (a)	0.087	NAS 1965	IT
0370	9/24/93	Plutonium-239/240	0.207	0.062		R		0.35	2.7 (a)	0.087	NAS 1965	IT
0370	3/8/94	Plutonium-239/240	0.008	0.006				0.35	2.7 (a)	0.087	UNKNOWN	ENSECO
0370	3/31/93	Radium-226	0.344	0.238			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0370	9/24/93	Radium-226	0.382	0.29			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0370	3/8/94	Radium-226	0.21	0.18			5 pCi/L	0.12	2.7	1.0	EPA 903	ENSECO
0370	9/24/93	Thorium-228	0.765	0.51		R		0.16	3.5 (a) *	0.779	NAS 1960	IT
0370	3/8/94	Thorium-228	0.056	0.037		J		0.16	3.5 (a) *	0.779	UNKNOWN	ENSECO
0370	3/31/93	Thorium-230	0.189	0.12				0.027	0.6 (a) *	NA	NAS 1960	IT
0370	9/24/93	Thorium-230	1.42	0.37		J		0.027	0.6 (a) *	NA	NAS 1960	IT
0370	3/8/94	Thorium-230	0.032	0.027		J		0.027	0.6 (a) *	NA	UNKNOWN	ENSECO
0370	3/8/94	Thorium-230	0.38	0.131		J		0.027	0.6 (a) *	NA	UNKNOWN	ENSECO
0370	3/31/93	Uranium-234	1.07	0.07				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0370	9/24/93	Uranium-234	0.695	0.26				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0370	3/8/94	Uranium-234	0.54	0.031				0.67	18 (U-234/234) (a)	NA	UNKNOWN	ENSECO
0370	3/8/94	Uranium-234	0.6	0.015				0.67	18 (U-234/234) (a)	NA	UNKNOWN	ENSECO
0370	3/8/94	Uranium-235	0.048	0.015				0.065	17 (a)	0.814	UNKNOWN	ENSECO
0370	3/8/94	Uranium-235	0.049	0.031				0.065	17 (a)	0.814	UNKNOWN	ENSECO
0370	3/31/93	Uranium-238	2.3	0.03				0.025	0.56 (a) *	0.688	NAS 1962	IT
0370	9/24/93	Uranium-238	1.46	0.15				0.025	0.56 (a) *	0.688	NAS 1962	IT
0370	3/8/94	Uranium-238	0.88	0.031				0.025	0.56 (a) *	0.688	UNKNOWN	ENSECO
0370	3/8/94	Uranium-238	1.16	0.015				0.025	0.56 (a) *	0.688	UNKNOWN	ENSECO
0372	9/24/93	Americium-241	0.0852	0.046		R		0.46	2.40	1.39	UNKNOWN	IT
0372	3/30/93	Plutonium-238	0.0364	0.033				0.36	2.7 (a)	0.087	NAS 1965	IT
0372	3/30/93	Plutonium-239/240	0.182	0.033				0.35	2.7 (a)	0.087	NAS 1965	IT
0372	9/24/93	Plutonium-239/240	0.24	0.036		R		0.35	2.7 (a)	0.087	NAS 1965	IT
0372	9/24/93	Radium-226	2.15	0.49			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0372	3/21/94	Radium-226	2.03	0.17			5 pCi/L	0.12	2.7	1.0	EPA 903	ENSECO
0372	3/30/93	Strontium-90	1.77	0.563			8 pCi/L	0.64	14	0.975	EPA 905	IT
0372	3/30/93	Thorium-228	0.123	0.065				0.16	3.5 (a) *	0.779	NAS 1960	IT
0372	9/24/93	Thorium-228	0.707	0.055		R		0.16	3.5 (a) *	0.779	NAS 1960	IT
0372	3/30/93	Thorium-230	0.0578	0.031				0.027	0.6 (a) *	NA	NAS 1960	IT
0372	9/24/93	Thorium-230	0.101	0.055		R		0.027	0.6 (a) *	NA	NAS 1960	IT
0372	3/30/93	Uranium-234	0.211	0.072				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0372	9/24/93	Uranium-234	0.3	0.28				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0372	3/21/94	Uranium-234	0.122	0.010		J		0.67	18 (U-234/234) (a)	NA	UNKNOWN	ENSECO
0372	3/30/93	Uranium-235/236	0.0471	0.043							NAS 1962	IT
0372	3/30/93	Uranium-238	0.178	0.035				0.025	0.56 (a) *	0.688	NAS 1962	IT
0372	3/21/94	Uranium-238	0.073	0.010		J		0.025	0.56 (a) *	0.688	UNKNOWN	ENSECO
0373	9/25/93	Americium-241	0.128	0.044		R		0.46	2.40	1.39	UNKNOWN	IT
0373	3/30/93	Plutonium-239/240	0.144	0.028				0.35	2.7 (a)	0.087	NAS 1965	IT
0373	9/25/93	Plutonium-239/240	0.113	0.094		R		0.35	2.7 (a)	0.087	NAS 1965	IT
0373	3/30/93	Radium-226	0.43	0.092			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0373	3/16/94	Radium-226	0.25	0.18			5 pCi/L	0.12	2.7	1.0	EPA 903	ENSECO
0373	9/25/93	Thorium-228	0.518	0.061		R		0.16	3.5 (a) *	0.779	NAS 1960	IT
0373	9/25/93	Thorium-230	0.27	0.061		R		0.027	0.6 (a) *	NA	NAS 1960	IT
0373	3/30/93	Uranium-234	0.977	0.033				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0373	9/25/93	Uranium-234	0.59	0.15				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0373	3/16/94	Uranium-234	0.7	0.015				0.67	18 (U-234/234) (a)	NA	UNKNOWN	ENSECO
0373	3/16/94	Uranium-235	0.057	0.015				0.065	17 (a)	0.814	UNKNOWN	ENSECO
0373	3/30/93	Uranium-235/236	0.0745	0.04							NAS 1962	IT
0373	3/30/93	Uranium-238	0.967	0.033				0.025	0.56 (a) *	0.688	NAS 1962	IT
0373	9/25/93	Uranium-238	0.691	0.052				0.025	0.56 (a) *	0.688	NAS 1962	IT
0373	3/16/94	Uranium-238	0.6	0.015				0.025	0.56 (a) *	0.688	UNKNOWN	ENSECO

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0374	4/1/93	Plutonium-239/240	0.196	0.028				0.35	2.7 (a)	0.087	NAS 1965	IT
0374	10/3/94	Potassium-40	341	191.0		J					UNKNOWN	QTESR
0374	4/1/93	Radium-226	0.334	0.193				0.12	2.7	1.0	ASTM24	IT
0374	10/3/94	Radium-226	0.399	0.0613				0.12	2.7	1.0	UNKNOWN	QTESR
0374	4/1/93	Uranium-234	1.23	0.031				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0374	10/3/94	Uranium-234	1.53	0.368				0.67	18 (U-234/234) (a)	NA	UNKNOWN	QTESR
0374	4/1/93	Uranium-238	1.26	0.09				0.025	0.56 (a) *	0.688	NAS 1962	IT
0374	10/3/94	Uranium-238	1.1	0.297				0.025	0.56 (a) *	0.688	UNKNOWN	QTESR
0379	9/26/93	Americium-241	0.0783	0.042		R		0.46	2.40	1.39	UNKNOWN	IT
0379	3/29/93	Plutonium-239/240	0.0848	0.029				0.35	2.7 (a)	0.087	NAS 1965	IT
0379	9/26/93	Plutonium-239/240	0.136	0.037		R		0.35	2.7 (a)	0.087	NAS 1965	IT
0379	3/15/94	Radium-226	0.31	0.26			5 pCi/L	0.12	2.7	1.0	EPA 903	ENSECO
0379	9/26/93	Thorium-228	0.625	0.26		R		0.16	3.5 (a) *	0.779	NAS 1960	IT
0379	3/15/94	Thorium-228	0.026	0.013				0.16	3.5 (a) *	0.779	UNKNOWN	ENSECO
0379	9/26/93	Thorium-230	0.365	0.19		R		0.027	0.6 (a) *	NA	NAS 1960	IT
0379	3/15/94	Thorium-230	0.009	0.009				0.027	0.6 (a) *	NA	UNKNOWN	ENSECO
0379	3/29/93	Uranium-234	0.503	0.086				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0379	9/26/93	Uranium-234	0.52	0.11				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0379	3/15/94	Uranium-234	0.45	0.016				0.67	18 (U-234/234) (a)	NA	UNKNOWN	ENSECO
0379	3/15/94	Uranium-235	0.015	0.012				0.065	17 (a)	0.814	UNKNOWN	ENSECO
0379	3/29/93	Uranium-238	0.372	0.067				0.025	0.56 (a) *	0.688	NAS 1962	IT
0379	9/26/93	Uranium-238	0.44	0.12				0.025	0.56 (a) *	0.688	NAS 1962	IT
0379	3/15/94	Uranium-238	0.358	0.010				0.025	0.56 (a) *	0.688	UNKNOWN	ENSECO
0397	3/31/93	Plutonium-239/240	0.113	0.067				0.35	2.7 (a)	0.087	NAS 1965	IT
0397	3/31/93	Plutonium-239/240	0.127	0.029				0.35	2.7 (a)	0.087	NAS 1965	IT
0397	9/25/93	Plutonium-239/240	0.213	0.041		R		0.35	2.7 (a)	0.087	NAS 1965	IT
0397	3/31/93	Radium-226	0.293	0.088			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0397	3/31/93	Radium-226	0.455	0.181			5 pCi/L	0.12	2.7	1.0	ASTM24	IT
0397	3/31/93	Thorium-228	0.113	0.051				0.16	3.5 (a) *	0.779	NAS 1960	IT
0397	9/25/93	Thorium-228	0.765	0.067		R		0.16	3.5 (a) *	0.779	NAS 1960	IT
0397	3/11/94	Thorium-228	0.06	0.048				0.16	3.5 (a) *	0.779	UNKNOWN	ENSECO
0397	9/25/93	Thorium-230	0.247	0.067		R		0.027	0.6 (a) *	NA	NAS 1960	IT
0397	3/11/94	Thorium-230	0.09	0.035				0.027	0.6 (a) *	NA	UNKNOWN	ENSECO
0397	9/25/93	Thorium-232	0.099	0.067				0.033	1.6 (a) *	0.314	NAS 1960	IT
0397	3/31/93	Uranium-234	0.461	0.037				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0397	3/31/93	Uranium-234	0.555	0.054				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0397	9/25/93	Uranium-234	0.556	0.11				0.67	18 (U-234/234) (a)	NA	NAS 1962	IT
0397	3/11/94	Uranium-234	0.459	0.023				0.67	18 (U-234/234) (a)	NA	UNKNOWN	ENSECO
0397	3/11/94	Uranium-235	0.027	0.018				0.065	17 (a)	0.814	UNKNOWN	ENSECO
0397	3/31/93	Uranium-238	0.29	0.112				0.025	0.56 (a) *	0.688	NAS 1962	IT
0397	3/31/93	Uranium-238	0.41	0.093				0.025	0.56 (a) *	0.688	NAS 1962	IT
0397	9/25/93	Uranium-238	0.389	0.13				0.025	0.56 (a) *	0.688	NAS 1962	IT
0397	3/11/94	Uranium-238	0.374	0.015				0.025	0.56 (a) *	0.688	UNKNOWN	ENSECO

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STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0400	7/14/94	Americium-241	0.27					0.46	2.40	1.39	EPA 907.0	COMPUC
0400	7/14/94	Radium-226	0.51			J	5 pCi/L	0.12	2.7	1.0	EPA 903.1	COMPUC
0400	11/12/02	Radium-226	0.36	0.17	J		5 pCi/L	0.12	2.7	1.0	SW846 9315	STLSL
0400	1/21/04	Radium-226	0.28	0.20	J		5 pCi/L	0.12	2.7	1.0	SW846 9315	STLSL
0400	7/13/04	Radium-226	0.19	0.17	J		5 pCi/L	0.12	2.7	1.0	SW846 9315	STLSL
0400	11/16/04	Radium-226	0.21	0.18	J		5 pCi/L	0.12	2.7	1.0	SW846 9315	STLSL
0400	7/14/94	Thorium-228	1.13	1.13		U		0.16	3.5 (a) *	0.779	EPA 907.0	COMPUC
0400	7/14/94	Thorium-230	0.14					0.027	0.6 (a) *	NA	EPA 907.0	COMPUC
0400	1/26/00	Uranium-233/234	1.952	0.005				0.67 (U-234)	18 (a)	NA	NAS 1962	MND
0400	1/28/03	Uranium-233/234	0.137	0.051				0.67 (U-234)	18 (a)	NA	NAS 1962	MND
0400	7/14/94	Uranium-234	0.61			J		0.67	18 (U-234/234) (a)	NA	EPA 907.0	COMPUC
0400	7/14/94	Uranium-235	0.14			J		0.065	17 (a)	0.814	EPA 907.0	COMPUC
0400	1/26/00	Uranium-235	0.109	0.005				0.065	17 (a)	0.814	NAS 1962	MND
0400	7/14/94	Uranium-238	0.53			J		0.025	0.56 (a) *	0.688	EPA 907.0	COMPUC
0400	1/26/00	Uranium-238	2.023	0.014				0.025	0.56 (a) *	0.688	NAS 1962	MND
0400	1/28/03	Uranium-238	0.082	0.040				0.025	0.56 (a) *	0.688	NAS 1962	MND
0410	7/21/94	Americium-241	0.47			J		0.46	2.40	1.39	EPA 907.0	COMPUC
0410	7/21/94	Radium-226	0.89			J	5 pCi/L	0.12	2.7	1.0	EPA 903.1	COMPUC
0410	7/21/94	Thorium-228	1.5	1.50		U		0.16	3.5 (a) *	0.779	EPA 907.0	COMPUC
0410	7/21/94	Thorium-230	0.59			J		0.027	0.6 (a) *	NA	EPA 907.0	COMPUC
0410	7/21/94	Uranium-234	0.65			J		0.67	18 (U-234/234) (a)	NA	EPA 907.0	COMPUC
0410	7/21/94	Uranium-235	0.17					0.065	17 (a)	0.814	EPA 907.0	COMPUC
0410	7/21/94	Uranium-238	0.65					0.025	0.56 (a) *	0.688	EPA 907.0	COMPUC
P027	3/21/94	Radium-226	0.91	0.15			5 pCi/L	0.12	2.7	1.0	EPA 903	ENSECO
P027	3/21/94	Thorium-228	0.342	0.031				0.16	3.5 (a) *	0.779	UNKNOWN	ENSECO
P027	3/21/94	Thorium-230	0.212	0.016		J		0.027	0.6 (a) *	NA	UNKNOWN	ENSECO
P027	3/21/94	Thorium-232	0.167	0.016		J		0.033	1.6 (a) *	0.314	UNKNOWN	ENSECO
P027	3/21/94	Uranium-234	0.635	0.008				0.67	18 (U-234/234) (a)	NA	UNKNOWN	ENSECO
P027	3/21/94	Uranium-235	0.038	0.009				0.065	17 (a)	0.814	UNKNOWN	ENSECO
P027	3/21/94	Uranium-238	0.653	0.010				0.025	0.56 (a) *	0.688	UNKNOWN	ENSECO
P033	11/12/02	Radium-226	0.2	0.19	J		5 pCi/L	0.12	2.7	1.0	SW846 9315	STLSL
P033	10/21/03	Radium-226	0.23	0.20	J		5 pCi/L	0.12	2.7	1.0	SW846 9315	STLSL
P033	1/21/04	Radium-226	0.29	0.28	J		5 pCi/L	0.12	2.7	1.0	SW846 9315	STLSL
P033	4/20/04	Radium-226	0.72	0.17	J		5 pCi/L	0.12	2.7	1.0	SW846 9315	STLSL
P033	7/13/04	Radium-226	0.52	0.17	J		5 pCi/L	0.12	2.7	1.0	SW846 9315	STLSL
P033	11/16/04	Radium-226	0.43	0.21	J		5 pCi/L	0.12	2.7	1.0	SW846 9315	STLSL
P033	4/20/04	Radium-228	1.11	0.59			5 pCi/L	0.12	2.7	1.0	SW846 9320	STLSL
P033	11/16/04	Radium-228	1.23	0.70			5 pCi/L	0.12	2.7	1.0	SW846 9320	STLSL
P033	1/29/03	Uranium-233/234	0.179	0.011				0.67 (U-234)	18 (a)	NA	NAS 1962	MND
P033	1/29/03	Uranium-235	0.02	0.011				0.065	17 (a)	0.814	NAS 1962	MND
P033	1/29/03	Uranium-238	0.139	0.011				0.025	0.56 (a) *	0.688	NAS 1962	MND

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STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0046	7/10/87	Tritium	15000				20,000	932	11,000 (b)	1,485	LCS ORNL	ORNL
0046	9/13/88	Tritium	6640	50000			20,000	932	11,000 (b)	1,485	UNKNOWN	MND
0046	9/13/88	Tritium	6590	50000			20,000	932	11,000 (b)	1,485	UNKNOWN	MND
0046	11/6/90	Tritium	8830	0			20,000	932	11,000 (b)	1,485	EPA 906	IT
0046	2/5/91	Tritium	6600	0			20,000	932	11,000 (b)	1,485	EPA 906	IT
0046	5/6/91	Tritium	6170	50			20,000	932	11,000 (b)	1,485	EPA 906	COMPUC
0046	8/5/91	Tritium	6210	0			20,000	932	11,000 (b)	1,485	EPA 906	IT
0046	12/16/91	Tritium	8380	5			20,000	932	11,000 (b)	1,485	EPA 906	IT
0046	3/23/92	Tritium	8700	460			20,000	932	11,000 (b)	1,485	EPA 906	BAR
0046	6/22/92	Tritium	7700	460			20,000	932	11,000 (b)	1,485	EPA 906	BAR
0046	9/16/92	Tritium	6940	500			20,000	932	11,000 (b)	1,485	EPA 906	IT
0046	10/13/93	Tritium	5720	200			20,000	932	11,000 (b)	1,485	EPA 906	IT
0046	3/18/94	Tritium	5630	499			20,000	932	11,000 (b)	1,485	EPA 906	ENSECO
0063	7/9/87	Tritium	12000				20,000	932	11,000 (b)	1,485	LCS ORNL	ORNL
0063	9/13/88	Tritium	10890	500000			20,000	932	11,000 (b)	1,485	UNKNOWN	MND
0063	9/13/88	Tritium	10810	500000			20,000	932	11,000 (b)	1,485	UNKNOWN	MND
0063	1/25/90	Tritium	7640				20,000	932	11,000 (b)	1,485	UNKNOWN	IT
0063	11/1/90	Tritium	7930	0			20,000	932	11,000 (b)	1,485	EPA 906	IT
0063	2/5/91	Tritium	7000	0			20,000	932	11,000 (b)	1,485	EPA 906	IT
0063	5/6/91	Tritium	7859	500			20,000	932	11,000 (b)	1,485	EPA 906	COMPUC
0063	8/5/91	Tritium	6410	0			20,000	932	11,000 (b)	1,485	EPA 906	IT
0063	12/16/91	Tritium	5390	5			20,000	932	11,000 (b)	1,485	EPA 906	IT
0063	3/23/92	Tritium	6900	460			20,000	932	11,000 (b)	1,485	EPA 906	BAR
0063	3/23/92	Tritium	6700	460			20,000	932	11,000 (b)	1,485	EPA 906	BAR
0063	6/22/92	Tritium	6700	460			20,000	932	11,000 (b)	1,485	EPA 906	BAR
0063	6/22/92	Tritium	6500	460			20,000	932	11,000 (b)	1,485	EPA 906	BAR
0063	9/16/92	Tritium	7600	500			20,000	932	11,000 (b)	1,485	EPA 906	IT
0063	12/8/92	Tritium	6170	500			20,000	932	11,000 (b)	1,485	UNKNOWN	ENSECO
0063	3/31/93	Tritium	5990	500			20,000	932	11,000 (b)	1,485	UNKNOWN	ENSECO
0063	10/13/93	Tritium	4540	200			20,000	932	11,000 (b)	1,485	EPA 906	IT
0063	3/18/94	Tritium	5150	485			20,000	932	11,000 (b)	1,485	EPA 906	ENSECO
0063	6/25/98	Tritium	1590				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0063	10/14/98	Tritium	2640				20,000	932	11,000 (b)	1,485	EPA 906	MND
0063	1/7/99	Tritium	2380				20,000	932	11,000 (b)	1,485	EPA 906	MND
0063	4/29/99	Tritium	2200				20,000	932	11,000 (b)	1,485	MD 830	MND
0063	6/18/99	Tritium	1750				20,000	932	11,000 (b)	1,485	MD 830	MND
0063	9/1/99	Tritium	1700				20,000	932	11,000 (b)	1,485	MD 830	MND
0063	1/24/00	Tritium	900				20,000	932	11,000 (b)	1,485	MD 830	MND
0063	4/11/00	Tritium	370				20,000	932	11,000 (b)	1,485	MD 830	MND
0063	6/20/00	Tritium	10				20,000	932	11,000 (b)	1,485	MD 830	MND
0063	9/20/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0063	3/1/01	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0063	5/2/01	Tritium	270				20,000	932	11,000 (b)	1,485	MD 830	MND
0063	7/26/01	Tritium	520				20,000	932	11,000 (b)	1,485	MD 830	MND
0063	10/22/01	Tritium	230				20,000	932	11,000 (b)	1,485	MD 830	MND
0063	1/31/02	Tritium	760				20,000	932	11,000 (b)	1,485	MD 830	MND
0063	4/22/02	Tritium	550				20,000	932	11,000 (b)	1,485	MD 830	MND
0063	7/25/02	Tritium	1200	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0063	11/13/02	Tritium	840	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0063	2/14/03	Tritium	1000	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0063	5/19/03	Tritium	1200	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0063	7/14/03	Tritium	1180	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0063	10/15/03	Tritium	1230	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0063	1/15/04	Tritium	1730	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0063	7/15/04	Tritium	1460	600			20,000	932	11,000 (b)	1,485	MD 830	MND

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STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0305	11/1/90	Tritium	8060	0			20,000	932	11,000 (b)	1,485	EPA 906	IT
0305	1/31/91	Tritium	24000	0			20,000	932	11,000 (b)	1,485	EPA 906	IT
0305	5/5/91	Tritium	7907	500			20,000	932	11,000 (b)	1,485	EPA 906	COMPUC
0305	8/2/91	Tritium	7140	0			20,000	932	11,000 (b)	1,485	EPA 906	IT
0305	12/17/91	Tritium	6300	5			20,000	932	11,000 (b)	1,485	EPA 906	IT
0305	12/17/91	Tritium	6050	5			20,000	932	11,000 (b)	1,485	EPA 906	IT
0305	3/19/92	Tritium	6600	460			20,000	932	11,000 (b)	1,485	EPA 906	BAR
0305	6/22/92	Tritium	7100	460			20,000	932	11,000 (b)	1,485	EPA 906	BAR
0305	6/22/92	Tritium	6700	460			20,000	932	11,000 (b)	1,485	EPA 906	BAR
0305	9/16/92	Tritium	7280	500			20,000	932	11,000 (b)	1,485	EPA 906	IT
0305	12/8/92	Tritium	5910	500			20,000	932	11,000 (b)	1,485	UNKNOWN	ENSECO
0305	3/30/93	Tritium	6650	500			20,000	932	11,000 (b)	1,485	UNKNOWN	ENSECO
0305	3/30/93	Tritium	6650	500			20,000	932	11,000 (b)	1,485	UNKNOWN	ENSECO
0305	3/30/93	Tritium	20	500			20,000	932	11,000 (b)	1,485	UNKNOWN	ENSECO
0305	9/11/93	Tritium	5200	210			20,000	932	11,000 (b)	1,485	EPA 906	IT
0305	3/10/94	Tritium	5070	480			20,000	932	11,000 (b)	1,485	EPA 906	ENSECO
0305	11/1/94	Tritium	4060	500			20,000	932	11,000 (b)	1,485	UNKNOWN	ECOTEK
0305	4/11/95	Tritium	4220	300			20,000	932	11,000 (b)	1,485	UNKNOWN	ENSECO
0305	6/19/97	Tritium	1570				20,000	932	11,000 (b)	1,485	MD 830	MND
0305	9/16/97	Tritium	1570				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0305	3/30/98	Tritium	610				20,000	932	11,000 (b)	1,485	EPA 906	MND
0305	6/18/98	Tritium	1500				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0305	10/12/98	Tritium	1540				20,000	932	11,000 (b)	1,485	EPA 906	MND
0305	1/7/99	Tritium	1170				20,000	932	11,000 (b)	1,485	EPA 906	MND
0305	4/27/99	Tritium	1090				20,000	932	11,000 (b)	1,485	MD 830	MND
0305	6/15/99	Tritium	650				20,000	932	11,000 (b)	1,485	MD 830	MND
0305	8/31/99	Tritium	880				20,000	932	11,000 (b)	1,485	MD 830	MND
0305	1/19/00	Tritium	520				20,000	932	11,000 (b)	1,485	MD 830	MND
0305	4/10/00	Tritium	540				20,000	932	11,000 (b)	1,485	MD 830	MND
0305	6/21/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0305	9/19/00	Tritium	60				20,000	932	11,000 (b)	1,485	MD 830	MND
0305	1/31/01	Tritium	260				20,000	932	11,000 (b)	1,485	MD 830	MND
0305	5/2/01	Tritium	270				20,000	932	11,000 (b)	1,485	MD 830	MND
0305	7/26/01	Tritium	150				20,000	932	11,000 (b)	1,485	MD 830	MND
0305	10/22/01	Tritium	500				20,000	932	11,000 (b)	1,485	MD 830	MND
0305	2/1/02	Tritium	660				20,000	932	11,000 (b)	1,485	MD 830	MND
0305	4/23/02	Tritium	950				20,000	932	11,000 (b)	1,485	MD 830	MND
0305	7/26/02	Tritium	840	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0305	11/4/02	Tritium	880	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0305	2/5/03	Tritium	900	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0305	5/19/03	Tritium	880	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0305	7/14/03	Tritium	1170	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0305	10/14/03	Tritium	1130	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0305	1/14/04	Tritium	1310	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0305	7/16/04	Tritium	700	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0305	11/2/04	Tritium	1120	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0308	6/24/98	Tritium	4310				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0308	4/12/00	Tritium	6620				20,000	932	11,000 (b)	1,485	MD 830	MND

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STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0313	10/31/90	Tritium	8230	0			20,000	932	11,000 (b)	1,485	EPA 906	IT
0313	2/3/91	Tritium	6500	0			20,000	932	11,000 (b)	1,485	EPA 906	IT
0313	5/7/91	Tritium	7568	500			20,000	932	11,000 (b)	1,485	EPA 906	COMPUC
0313	8/4/91	Tritium	6880	0			20,000	932	11,000 (b)	1,485	EPA 906	IT
0313	12/17/91	Tritium	7310	5			20,000	932	11,000 (b)	1,485	EPA 906	IT
0313	3/22/92	Tritium	7300	460			20,000	932	11,000 (b)	1,485	EPA 906	BAR
0313	6/21/92	Tritium	7300	460			20,000	932	11,000 (b)	1,485	EPA 906	BAR
0313	9/17/92	Tritium	7380	500			20,000	932	11,000 (b)	1,485	EPA 906	IT
0313	12/8/92	Tritium	6610	500			20,000	932	11,000 (b)	1,485	UNKNOWN	ENSECO
0313	3/30/93	Tritium	5970	500			20,000	932	11,000 (b)	1,485	UNKNOWN	ENSECO
0313	9/13/93	Tritium	4850	220			20,000	932	11,000 (b)	1,485	EPA 906	IT
0313	3/17/94	Tritium	4980	478			20,000	932	11,000 (b)	1,485	EPA 906	ENSECO
0313	11/2/94	Tritium	4050	500			20,000	932	11,000 (b)	1,485	UNKNOWN	ECOTEK
0313	4/12/95	Tritium	3220	300			20,000	932	11,000 (b)	1,485	UNKNOWN	ENSECO
0313	12/6/95	Tritium	2959				20,000	932	11,000 (b)	1,485	PD80030-2261	MND
0313	6/19/97	Tritium	2740				20,000	932	11,000 (b)	1,485	MD 830	MND
0313	9/17/97	Tritium	3110				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0313	12/10/97	Tritium	6820				20,000	932	11,000 (b)	1,485	EPA 906	MND
0313	3/30/98	Tritium	4010				20,000	932	11,000 (b)	1,485	EPA 906	MND
0313	6/23/98	Tritium	4070				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0313	10/6/98	Tritium	3200				20,000	932	11,000 (b)	1,485	EPA 906	MND
0313	1/7/99	Tritium	3470				20,000	932	11,000 (b)	1,485	EPA 906	MND
0313	4/27/99	Tritium	2620				20,000	932	11,000 (b)	1,485	MD 830	MND
0313	6/18/99	Tritium	3280				20,000	932	11,000 (b)	1,485	MD 830	MND
0313	9/1/99	Tritium	2460				20,000	932	11,000 (b)	1,485	MD 830	MND
0313	1/19/00	Tritium	520				20,000	932	11,000 (b)	1,485	MD 830	MND
0313	4/12/00	Tritium	550				20,000	932	11,000 (b)	1,485	MD 830	MND
0313	6/26/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0313	9/20/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0313	2/1/01	Tritium	460				20,000	932	11,000 (b)	1,485	MD 830	MND
0313	5/3/01	Tritium	680				20,000	932	11,000 (b)	1,485	MD 830	MND
0313	7/20/01	Tritium	1500				20,000	932	11,000 (b)	1,485	MD 830	MND
0313	10/22/01	Tritium	1180				20,000	932	11,000 (b)	1,485	MD 830	MND
0313	1/31/02	Tritium	850				20,000	932	11,000 (b)	1,485	MD 830	MND
0313	4/22/02	Tritium	900				20,000	932	11,000 (b)	1,485	MD 830	MND
0313	7/29/02	Tritium	970	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0313	11/7/02	Tritium	1620	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0313	2/18/03	Tritium	980	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0313	4/25/03	Tritium	1710	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0313	7/17/03	Tritium	1290	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0313	7/19/04	Tritium	1590	600			20,000	932	11,000 (b)	1,485	MD 830	MND

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0317	11/6/90	Tritium	3200	0			20,000	932	11,000 (b)	1,485	EPA 906	IT
0317	5/8/91	Tritium	4856	500			20,000	932	11,000 (b)	1,485	EPA 906	COMPUC
0317	12/16/91	Tritium	3050	5			20,000	932	11,000 (b)	1,485	EPA 906	IT
0317	12/16/91	Tritium	2780	5			20,000	932	11,000 (b)	1,485	EPA 906	IT
0317	6/20/92	Tritium	3000	460			20,000	932	11,000 (b)	1,485	EPA 906	BAR
0317	9/10/93	Tritium	1240	210			20,000	932	11,000 (b)	1,485	EPA 906	IT
0317	3/16/94	Tritium	2230	476			20,000	932	11,000 (b)	1,485	EPA 906	ENSECO
0317	3/16/94	Tritium	2020	476			20,000	932	11,000 (b)	1,485	EPA 906	ENSECO
0317	6/20/97	Tritium	1400				20,000	932	11,000 (b)	1,485	MD 830	MND
0317	9/16/97	Tritium	1510				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0317	12/16/97	Tritium	1420				20,000	932	11,000 (b)	1,485	EPA 906	MND
0317	3/25/98	Tritium	840				20,000	932	11,000 (b)	1,485	EPA 906	MND
0317	6/18/98	Tritium	0				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0317	10/8/98	Tritium	460				20,000	932	11,000 (b)	1,485	EPA 906	MND
0317	5/3/99	Tritium	510				20,000	932	11,000 (b)	1,485	MD 830	MND
0317	6/17/99	Tritium	20				20,000	932	11,000 (b)	1,485	MD 830	MND
0317	9/2/99	Tritium	420				20,000	932	11,000 (b)	1,485	MD 830	MND
0317	1/19/00	Tritium	1100				20,000	932	11,000 (b)	1,485	MD 830	MND
0317	4/13/00	Tritium	710				20,000	932	11,000 (b)	1,485	MD 830	MND
0317	6/26/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0317	9/28/00	Tritium	850				20,000	932	11,000 (b)	1,485	MD 830	MND
0317	1/31/01	Tritium	90				20,000	932	11,000 (b)	1,485	MD 830	MND
0317	5/1/01	Tritium	650				20,000	932	11,000 (b)	1,485	MD 830	MND
0317	7/23/01	Tritium	600				20,000	932	11,000 (b)	1,485	MD 830	MND
0317	10/17/01	Tritium	590				20,000	932	11,000 (b)	1,485	MD 830	MND
0317	1/24/02	Tritium	480				20,000	932	11,000 (b)	1,485	MD 830	MND
0317	4/24/02	Tritium	240				20,000	932	11,000 (b)	1,485	MD 830	MND
0317	7/24/02	Tritium	250	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
0317	11/1/02	Tritium	420	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
0317	2/13/03	Tritium	650	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0317	4/30/03	Tritium	860	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0317	7/16/03	Tritium	890	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0317	1/16/04	Tritium	580	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
0319	11/4/90	Tritium	1080	0			20,000	932	11,000 (b)	1,485	EPA 906	IT
0319	5/7/91	Tritium	1253	500			20,000	932	11,000 (b)	1,485	EPA 906	COMPUC
0319	12/18/91	Tritium	897	5			20,000	932	11,000 (b)	1,485	EPA 906	IT
0319	6/19/92	Tritium	1000	460			20,000	932	11,000 (b)	1,485	EPA 906	BAR
0319	9/23/93	Tritium	654	340			20,000	932	11,000 (b)	1,485	EPA 906	IT
0319	3/21/94	Tritium	1220	474			20,000	932	11,000 (b)	1,485	EPA 906	ENSECO
0319	12/6/96	Tritium	2770				20,000	932	11,000 (b)	1,485	MD 830	MND
0319	1/26/00	Tritium	1210				20,000	932	11,000 (b)	1,485	MD 830	MND
0319	4/17/00	Tritium	720				20,000	932	11,000 (b)	1,485	MD 830	MND
0319	6/22/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0319	9/27/00	Tritium	1160				20,000	932	11,000 (b)	1,485	MD 830	MND
0319	2/9/01	Tritium	760				20,000	932	11,000 (b)	1,485	MD 830	MND
0319	4/26/01	Tritium	1080				20,000	932	11,000 (b)	1,485	MD 830	MND
0319	7/24/01	Tritium	830				20,000	932	11,000 (b)	1,485	MD 830	MND
0319	10/10/01	Tritium	620				20,000	932	11,000 (b)	1,485	MD 830	MND
0319	1/16/02	Tritium	340				20,000	932	11,000 (b)	1,485	MD 830	MND
0319	5/2/02	Tritium	500				20,000	932	11,000 (b)	1,485	MD 830	MND
0319	7/15/02	Tritium	990	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0319	11/12/02	Tritium	740	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0319	11/16/04	Tritium	750	600			20,000	932	11,000 (b)	1,485	MD 830	MND

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0344	10/14/93	Tritium	2150	200			20,000	932	11,000 (b)	1,485	EPA 906	IT
0344	3/24/94	Tritium	2400	476			20,000	932	11,000 (b)	1,485	EPA 906	ENSECO
0344	12/6/96	Tritium	2420				20,000	932	11,000 (b)	1,485	MD 830	MND
0344	1/26/00	Tritium	1020				20,000	932	11,000 (b)	1,485	MD 830	MND
0344	1/26/00	Tritium	790				20,000	932	11,000 (b)	1,485	MD 830	MND
0370	3/31/93	Tritium	7610	6.69			20,000	932	11,000 (b)	1,485	EPA 906	IT
0370	9/24/93	Tritium	4850	210			20,000	932	11,000 (b)	1,485	EPA 906	IT
0370	3/8/94	Tritium	5340	489			20,000	932	11,000 (b)	1,485	EPA 906	ENSECO
0370	3/8/94	Tritium	5270	493			20,000	932	11,000 (b)	1,485	EPA 906	ENSECO
0370	6/26/97	Tritium	3640				20,000	932	11,000 (b)	1,485	MD 830	MND
0370	9/17/97	Tritium	4380				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0370	12/10/97	Tritium	298				20,000	932	11,000 (b)	1,485	EPA 906	MND
0370	3/26/98	Tritium	4060				20,000	932	11,000 (b)	1,485	EPA 906	MND
0370	6/23/98	Tritium	2920				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0370	10/6/98	Tritium	3010				20,000	932	11,000 (b)	1,485	EPA 906	MND
0370	1/8/99	Tritium	3140				20,000	932	11,000 (b)	1,485	EPA 906	MND
0370	4/27/99	Tritium	3220				20,000	932	11,000 (b)	1,485	MD 830	MND
0370	6/18/99	Tritium	2630				20,000	932	11,000 (b)	1,485	MD 830	MND
0370	9/7/99	Tritium	2170				20,000	932	11,000 (b)	1,485	MD 830	MND
0370	1/24/00	Tritium	1280				20,000	932	11,000 (b)	1,485	MD 830	MND
0370	4/12/00	Tritium	1710				20,000	932	11,000 (b)	1,485	MD 830	MND
0370	6/27/00	Tritium	470				20,000	932	11,000 (b)	1,485	MD 830	MND
0370	9/20/00	Tritium	1010				20,000	932	11,000 (b)	1,485	MD 830	MND
0370	2/1/01	Tritium	1390				20,000	932	11,000 (b)	1,485	MD 830	MND
0370	5/3/01	Tritium	1520				20,000	932	11,000 (b)	1,485	MD 830	MND
0370	7/20/01	Tritium	1670				20,000	932	11,000 (b)	1,485	MD 830	MND
0370	10/22/01	Tritium	1750				20,000	932	11,000 (b)	1,485	MD 830	MND
0370	1/31/02	Tritium	2640				20,000	932	11,000 (b)	1,485	MD 830	MND
0370	4/22/02	Tritium	2150				20,000	932	11,000 (b)	1,485	MD 830	MND
0370	7/23/02	Tritium	2460	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0370	11/6/02	Tritium	1950	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0370	2/18/03	Tritium	2100	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0370	5/20/03	Tritium	2090	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0370	7/15/03	Tritium	2060	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0370	10/15/03	Tritium	2230	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0370	1/15/04	Tritium	1760	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0370	7/19/04	Tritium	2300	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0370	11/3/04	Tritium	2530	600			20,000	932	11,000 (b)	1,485	MD 830	MND

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0373	3/30/93	Tritium	6110	6.69			20,000	932	11,000 (b)	1,485	EPA 906	IT
0373	9/25/93	Tritium	4930	210			20,000	932	11,000 (b)	1,485	EPA 906	IT
0373	3/16/94	Tritium	5080	483			20,000	932	11,000 (b)	1,485	EPA 906	ENSECO
0373	6/26/97	Tritium	3690				20,000	932	11,000 (b)	1,485	MD 830	MND
0373	9/17/97	Tritium	1000				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0373	1/8/98	Tritium	4300				20,000	932	11,000 (b)	1,485	EPA 906	MND
0373	3/30/98	Tritium	3630				20,000	932	11,000 (b)	1,485	EPA 906	MND
0373	6/24/98	Tritium	2670				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0373	10/12/98	Tritium	3720				20,000	932	11,000 (b)	1,485	EPA 906	MND
0373	1/18/99	Tritium	2580				20,000	932	11,000 (b)	1,485	EPA 906	MND
0373	4/27/99	Tritium	2410				20,000	932	11,000 (b)	1,485	MD 830	MND
0373	6/24/99	Tritium	2300				20,000	932	11,000 (b)	1,485	MD 830	MND
0373	9/7/99	Tritium	2690				20,000	932	11,000 (b)	1,485	MD 830	MND
0373	1/31/00	Tritium	1090				20,000	932	11,000 (b)	1,485	MD 830	MND
0373	4/12/00	Tritium	1420				20,000	932	11,000 (b)	1,485	MD 830	MND
0373	6/23/00	Tritium	480				20,000	932	11,000 (b)	1,485	MD 830	MND
0373	9/26/00	Tritium	1310				20,000	932	11,000 (b)	1,485	MD 830	MND
0373	2/7/01	Tritium	1660				20,000	932	11,000 (b)	1,485	MD 830	MND
0373	5/3/01	Tritium	1210				20,000	932	11,000 (b)	1,485	MD 830	MND
0373	7/27/01	Tritium	1810				20,000	932	11,000 (b)	1,485	MD 830	MND
0373	10/22/01	Tritium	1540				20,000	932	11,000 (b)	1,485	MD 830	MND
0373	1/30/02	Tritium	1470				20,000	932	11,000 (b)	1,485	MD 830	MND
0373	4/24/02	Tritium	1450				20,000	932	11,000 (b)	1,485	MD 830	MND
0373	7/30/02	Tritium	1990	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0373	11/4/02	Tritium	2260	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0373	2/19/03	Tritium	2110	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0373	5/20/03	Tritium	1470	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0373	7/16/03	Tritium	1570	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0373	10/17/03	Tritium	1570	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0373	1/16/04	Tritium	1840	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0373	7/15/04	Tritium	2150	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0374	4/1/93	Tritium	6540	6.69			20,000	932	11,000 (b)	1,485	EPA 906	IT
0374	10/3/94	Tritium	4340	251.0			20,000	932	11,000 (b)	1,485	EPA 906	QTESR
0374	6/25/98	Tritium	1960				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0374	10/12/98	Tritium	1300				20,000	932	11,000 (b)	1,485	EPA 906	MND
0374	1/7/99	Tritium	2580				20,000	932	11,000 (b)	1,485	EPA 906	MND
0374	4/27/99	Tritium	640				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	6/18/99	Tritium	750				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	8/31/98	Tritium	2400				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	1/19/00	Tritium	2360				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	4/10/00	Tritium	1170				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	6/22/00	Tritium	1210				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	9/22/00	Tritium	1820				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	2/1/01	Tritium	1590				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	5/2/01	Tritium	1260				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	7/26/01	Tritium	2140				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	10/22/01	Tritium	1410				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	1/31/02	Tritium	1050				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	4/22/02	Tritium	1480				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	7/23/02	Tritium	2080	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0374	11/6/02	Tritium	1450	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0374	2/14/03	Tritium	1540	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0374	5/19/03	Tritium	1600	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0374	7/14/03	Tritium	1150	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0374	10/15/03	Tritium	1440	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0374	1/15/04	Tritium	1520	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0374	7/19/04	Tritium	1620	600			20,000	932	11,000 (b)	1,485	MD 830	MND

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0374	4/1/93	Tritium	6540	6.69			20,000	932	11,000 (b)	1,485	EPA 906	IT
0374	10/3/94	Tritium	4340	251.0			20,000	932	11,000 (b)	1,485	EPA 906	QTESR
0374	6/25/98	Tritium	1960				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0374	10/12/98	Tritium	1300				20,000	932	11,000 (b)	1,485	EPA 906	MND
0374	1/7/99	Tritium	2580				20,000	932	11,000 (b)	1,485	EPA 906	MND
0374	4/27/99	Tritium	640				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	6/18/99	Tritium	750				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	8/31/99	Tritium	2400				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	1/19/00	Tritium	2360				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	4/10/00	Tritium	1170				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	6/22/00	Tritium	1210				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	9/22/00	Tritium	1820				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	2/1/01	Tritium	1590				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	5/2/01	Tritium	1260				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	7/26/01	Tritium	2140				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	10/22/01	Tritium	1410				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	1/31/02	Tritium	1050				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	4/22/02	Tritium	1480				20,000	932	11,000 (b)	1,485	MD 830	MND
0374	7/23/02	Tritium	2080	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0374	11/6/02	Tritium	1450	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0374	2/14/03	Tritium	1540	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0374	5/19/03	Tritium	1600	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0374	7/14/03	Tritium	1150	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0374	10/15/03	Tritium	1440	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0374	1/15/04	Tritium	1520	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0374	7/19/04	Tritium	1620	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0379	3/29/93	Tritium	6890	6.69			20,000	932	11,000 (b)	1,485	EPA 906	IT
0379	9/26/93	Tritium	5680	210			20,000	932	11,000 (b)	1,485	EPA 906	IT
0379	3/15/94	Tritium	6070	512			20,000	932	11,000 (b)	1,485	EPA 906	ENSECO
0379	12/6/96	Tritium	4960				20,000	932	11,000 (b)	1,485	MD 830	MND
0379	6/20/97	Tritium	5160				20,000	932	11,000 (b)	1,485	MD 830	MND
0379	6/20/97	Tritium	5120				20,000	932	11,000 (b)	1,485	MD 830	MND
0379	12/16/97	Tritium	3810				20,000	932	11,000 (b)	1,485	EPA 906	MND
0379	6/24/98	Tritium	3830				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0379	1/8/99	Tritium	3730				20,000	932	11,000 (b)	1,485	EPA 906	MND
0379	6/22/99	Tritium	4030				20,000	932	11,000 (b)	1,485	MD 830	MND
0379	1/20/00	Tritium	2330				20,000	932	11,000 (b)	1,485	MD 830	MND
0379	7/6/00	Tritium	1230				20,000	932	11,000 (b)	1,485	MD 830	MND
0379	2/6/01	Tritium	2590				20,000	932	11,000 (b)	1,485	MD 830	MND
0379	7/17/01	Tritium	3760				20,000	932	11,000 (b)	1,485	MD 830	MND
0379	1/21/02	Tritium	2930				20,000	932	11,000 (b)	1,485	MD 830	MND
0379	7/19/02	Tritium	2230	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0379	2/5/03	Tritium	2590	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0379	7/21/03	Tritium	2010	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0379	1/20/04	Tritium	1950	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0379	7/7/04	Tritium	1730	600			20,000	932	11,000 (b)	1,485	MD 830	MND

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0397	3/31/93	Tritium	5930	6.69			20,000	932	11,000 (b)	1,485	EPA 906	IT
0397	3/31/93	Tritium	5630	6.69			20,000	932	11,000 (b)	1,485	EPA 906	IT
0397	9/25/93	Tritium	3480	370			20,000	932	11,000 (b)	1,485	EPA 906	IT
0397	3/11/94	Tritium	5390	490			20,000	932	11,000 (b)	1,485	EPA 906	ENSECO
0397	6/26/97	Tritium	3910				20,000	932	11,000 (b)	1,485	MD 830	MND
0397	9/17/97	Tritium	3690				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0397	12/11/97	Tritium	1100				20,000	932	11,000 (b)	1,485	EPA 906	MND
0397	3/30/98	Tritium	2610				20,000	932	11,000 (b)	1,485	EPA 906	MND
0397	6/23/98	Tritium	1210				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0397	1/12/99	Tritium	1340				20,000	932	11,000 (b)	1,485	EPA 906	MND
0397	5/3/99	Tritium	1540				20,000	932	11,000 (b)	1,485	MD 830	MND
0397	6/22/99	Tritium	1720				20,000	932	11,000 (b)	1,485	MD 830	MND
0397	9/7/99	Tritium	1260				20,000	932	11,000 (b)	1,485	MD 830	MND
0397	1/25/00	Tritium	130				20,000	932	11,000 (b)	1,485	MD 830	MND
0397	4/12/00	Tritium	410				20,000	932	11,000 (b)	1,485	MD 830	MND
0397	6/26/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0397	9/19/00	Tritium	30				20,000	932	11,000 (b)	1,485	MD 830	MND
0397	2/7/01	Tritium	40				20,000	932	11,000 (b)	1,485	MD 830	MND
0397	5/2/01	Tritium	480				20,000	932	11,000 (b)	1,485	MD 830	MND
0397	7/26/01	Tritium	890				20,000	932	11,000 (b)	1,485	MD 830	MND
0397	10/22/01	Tritium	1420				20,000	932	11,000 (b)	1,485	MD 830	MND
0397	1/31/02	Tritium	880				20,000	932	11,000 (b)	1,485	MD 830	MND
0397	4/24/02	Tritium	410				20,000	932	11,000 (b)	1,485	MD 830	MND
0397	11/13/02	Tritium	1040	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0397	2/18/03	Tritium	900	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0397	5/20/03	Tritium	1510	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0397	7/16/03	Tritium	1370	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0397	10/17/03	Tritium	1080	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0397	1/15/04	Tritium	1140	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0397	7/19/04	Tritium	1320	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0400	7/14/94	Tritium	590.2				20,000	932	11,000 (b)	1,485	EPA 906.1	COMPUC
0400	1/26/00	Tritium	1000				20,000	932	11,000 (b)	1,485	MD 830	MND
0400	4/14/00	Tritium	570				20,000	932	11,000 (b)	1,485	MD 830	MND
0400	6/22/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0400	9/29/00	Tritium	90				20,000	932	11,000 (b)	1,485	MD 830	MND
0400	2/8/01	Tritium	390				20,000	932	11,000 (b)	1,485	MD 830	MND
0400	4/26/01	Tritium	350				20,000	932	11,000 (b)	1,485	MD 830	MND
0400	7/24/01	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0400	10/10/01	Tritium	190				20,000	932	11,000 (b)	1,485	MD 830	MND
0400	1/16/02	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0400	5/2/02	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0400	7/15/02	Tritium	470	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
0400	11/12/02	Tritium	720	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0400	1/28/03	Tritium	690	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0400	4/23/03	Tritium	950	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0400	10/21/03	Tritium	510	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
0400	1/21/04	Tritium	410	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
0400	11/16/04	Tritium	1560	600			20,000	932	11,000 (b)	1,485	MD 830	MND

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0410	7/21/94	Tritium	4223.3				20,000	932	11,000 (b)	1,485	EPA 906.1	COMPUC
0410	12/11/95	Tritium	4280				20,000	932	11,000 (b)	1,485	PD80030-2261	MND
0410	12/3/96	Tritium	4800				20,000	932	11,000 (b)	1,485	MD 830	MND
0410	9/18/97	Tritium	0				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0410	12/16/97	Tritium	740				20,000	932	11,000 (b)	1,485	EPA 906	MND
0410	3/26/98	Tritium	770				20,000	932	11,000 (b)	1,485	EPA 906	MND
0410	6/24/98	Tritium	1010				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0410	10/13/98	Tritium	3630				20,000	932	11,000 (b)	1,485	EPA 906	MND
0410	1/8/99	Tritium	1330				20,000	932	11,000 (b)	1,485	EPA 906	MND
0410	4/29/99	Tritium	660				20,000	932	11,000 (b)	1,485	MD 830	MND
0410	6/17/99	Tritium	200				20,000	932	11,000 (b)	1,485	MD 830	MND
0410	9/1/99	Tritium	4110				20,000	932	11,000 (b)	1,485	MD 830	MND
0410	1/19/00	Tritium	2730				20,000	932	11,000 (b)	1,485	MD 830	MND
0410	4/11/00	Tritium	1940				20,000	932	11,000 (b)	1,485	MD 830	MND
0410	6/20/00	Tritium	1970				20,000	932	11,000 (b)	1,485	MD 830	MND
0410	9/27/00	Tritium	4080				20,000	932	11,000 (b)	1,485	MD 830	MND
0410	2/8/01	Tritium	2620				20,000	932	11,000 (b)	1,485	MD 830	MND
0410	4/25/01	Tritium	380				20,000	932	11,000 (b)	1,485	MD 830	MND
0410	7/25/01	Tritium	490				20,000	932	11,000 (b)	1,485	MD 830	MND
0410	10/18/01	Tritium	1580				20,000	932	11,000 (b)	1,485	MD 830	MND
0410	2/1/02	Tritium	820				20,000	932	11,000 (b)	1,485	MD 830	MND
0410	4/22/02	Tritium	740				20,000	932	11,000 (b)	1,485	MD 830	MND
0410	11/8/02	Tritium	2040	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0410	2/5/03	Tritium	860	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0410	5/19/03	Tritium	850	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0410	7/14/03	Tritium	1630	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0410	10/17/03	Tritium	2030	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0410	1/14/04	Tritium	820	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0415	6/19/97	Tritium	1610				20,000	932	11,000 (b)	1,485	MD 830	MND
0415	9/17/97	Tritium	1620				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0415	12/10/97	Tritium	510				20,000	932	11,000 (b)	1,485	EPA 906	MND
0415	3/30/98	Tritium	1410				20,000	932	11,000 (b)	1,485	EPA 906	MND
0415	6/18/98	Tritium	1570				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0415	10/13/98	Tritium	1420				20,000	932	11,000 (b)	1,485	EPA 906	MND
0415	1/7/99	Tritium	1270				20,000	932	11,000 (b)	1,485	EPA 906	MND
0415	4/30/99	Tritium	1110				20,000	932	11,000 (b)	1,485	MD 830	MND
0415	6/15/99	Tritium	580				20,000	932	11,000 (b)	1,485	MD 830	MND
0415	8/31/99	Tritium	710				20,000	932	11,000 (b)	1,485	MD 830	MND
0415	1/24/00	Tritium	1700				20,000	932	11,000 (b)	1,485	MD 830	MND
0415	4/11/00	Tritium	550				20,000	932	11,000 (b)	1,485	MD 830	MND
0415	6/20/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0415	9/20/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0415	2/20/01	Tritium	450				20,000	932	11,000 (b)	1,485	MD 830	MND
0415	5/2/01	Tritium	1040				20,000	932	11,000 (b)	1,485	MD 830	MND
0415	7/26/01	Tritium	450				20,000	932	11,000 (b)	1,485	MD 830	MND
0415	10/22/01	Tritium	760				20,000	932	11,000 (b)	1,485	MD 830	MND
0415	1/31/02	Tritium	510				20,000	932	11,000 (b)	1,485	MD 830	MND
0415	4/23/02	Tritium	720				20,000	932	11,000 (b)	1,485	MD 830	MND
0415	7/30/02	Tritium	770	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0415	11/13/02	Tritium	660	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0415	2/18/03	Tritium	1280	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0415	5/19/03	Tritium	1200	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0415	7/14/03	Tritium	1210	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0415	10/17/03	Tritium	1010	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0415	1/15/04	Tritium	1320	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0415	7/15/04	Tritium	1070	600			20,000	932	11,000 (b)	1,485	MD 830	MND

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STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0416	6/18/97	Tritium	2090				20,000	932	11,000 (b)	1,485	MD 830	MND
0416	9/18/97	Tritium	0				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0416	12/10/97	Tritium	810				20,000	932	11,000 (b)	1,485	EPA 906	MND
0416	3/30/98	Tritium	1940				20,000	932	11,000 (b)	1,485	EPA 906	MND
0416	6/18/98	Tritium	3460				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0416	10/13/98	Tritium	830				20,000	932	11,000 (b)	1,485	EPA 906	MND
0416	1/7/99	Tritium	114				20,000	932	11,000 (b)	1,485	EPA 906	MND
0416	4/29/99	Tritium	540				20,000	932	11,000 (b)	1,485	MD 830	MND
0416	6/15/99	Tritium	550				20,000	932	11,000 (b)	1,485	MD 830	MND
0416	8/31/99	Tritium	770				20,000	932	11,000 (b)	1,485	MD 830	MND
0416	1/24/00	Tritium	820				20,000	932	11,000 (b)	1,485	MD 830	MND
0416	4/11/00	Tritium	600				20,000	932	11,000 (b)	1,485	MD 830	MND
0416	6/20/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0416	9/20/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0416	1/31/01	Tritium	250				20,000	932	11,000 (b)	1,485	MD 830	MND
0416	4/30/01	Tritium	500				20,000	932	11,000 (b)	1,485	MD 830	MND
0416	7/20/01	Tritium	530				20,000	932	11,000 (b)	1,485	MD 830	MND
0416	10/17/01	Tritium	1000				20,000	932	11,000 (b)	1,485	MD 830	MND
0416	1/23/02	Tritium	810				20,000	932	11,000 (b)	1,485	MD 830	MND
0416	4/19/02	Tritium	860				20,000	932	11,000 (b)	1,485	MD 830	MND
0416	7/26/02	Tritium	870	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0416	11/1/02	Tritium	920	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0416	2/13/03	Tritium	860	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0416	4/30/03	Tritium	760	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0416	7/16/03	Tritium	560	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
0416	1/19/04	Tritium	810	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0416	4/15/04	Tritium	1030	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0417	6/18/97	Tritium	1180				20,000	932	11,000 (b)	1,485	MD 830	MND
0417	9/18/97	Tritium	300				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0417	12/10/97	Tritium	810				20,000	932	11,000 (b)	1,485	EPA 906	MND
0417	3/30/98	Tritium	1030				20,000	932	11,000 (b)	1,485	EPA 906	MND
0417	6/18/98	Tritium	280				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0417	10/13/98	Tritium	640				20,000	932	11,000 (b)	1,485	EPA 906	MND
0417	1/7/99	Tritium	660				20,000	932	11,000 (b)	1,485	EPA 906	MND
0417	4/29/99	Tritium	210				20,000	932	11,000 (b)	1,485	MD 830	MND
0417	6/15/99	Tritium	770				20,000	932	11,000 (b)	1,485	MD 830	MND
0417	8/31/99	Tritium	470				20,000	932	11,000 (b)	1,485	MD 830	MND
0417	1/20/00	Tritium	210				20,000	932	11,000 (b)	1,485	MD 830	MND
0417	4/11/00	Tritium	480				20,000	932	11,000 (b)	1,485	MD 830	MND
0417	6/20/00	Tritium	180				20,000	932	11,000 (b)	1,485	MD 830	MND
0417	9/20/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0417	2/1/01	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0417	5/2/01	Tritium	170				20,000	932	11,000 (b)	1,485	MD 830	MND
0417	7/26/01	Tritium	300				20,000	932	11,000 (b)	1,485	MD 830	MND
0417	10/22/01	Tritium	530				20,000	932	11,000 (b)	1,485	MD 830	MND
0417	2/1/02	Tritium	1000				20,000	932	11,000 (b)	1,485	MD 830	MND
0417	4/23/02	Tritium	620				20,000	932	11,000 (b)	1,485	MD 830	MND
0417	7/26/02	Tritium	650	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0417	11/13/02	Tritium	520	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
0417	2/14/03	Tritium	800	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0417	5/19/03	Tritium	620	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0417	7/14/03	Tritium	930	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0417	10/14/03	Tritium	1200	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0417	1/14/04	Tritium	1360	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0417	4/15/04	Tritium	660	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0417	7/16/04	Tritium	870	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0417	11/2/04	Tritium	1020	600			20,000	932	11,000 (b)	1,485	MD 830	MND

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0418	6/19/97	Tritium	1980				20,000	932	11,000 (b)	1,485	MD 830	MND
0418	9/18/97	Tritium	330				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0418	12/10/97	Tritium	340				20,000	932	11,000 (b)	1,485	EPA 906	MND
0418	3/30/98	Tritium	870				20,000	932	11,000 (b)	1,485	EPA 906	MND
0418	6/18/98	Tritium	0				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0418	1/7/99	Tritium	1360				20,000	932	11,000 (b)	1,485	EPA 906	MND
0418	4/29/99	Tritium	580				20,000	932	11,000 (b)	1,485	MD 830	MND
0418	6/15/99	Tritium	680				20,000	932	11,000 (b)	1,485	MD 830	MND
0418	8/31/99	Tritium	820				20,000	932	11,000 (b)	1,485	MD 830	MND
0418	1/24/00	Tritium	810				20,000	932	11,000 (b)	1,485	MD 830	MND
0418	4/10/00	Tritium	680				20,000	932	11,000 (b)	1,485	MD 830	MND
0418	6/20/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0418	9/20/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0418	2/1/01	Tritium	330				20,000	932	11,000 (b)	1,485	MD 830	MND
0418	5/2/01	Tritium	490				20,000	932	11,000 (b)	1,485	MD 830	MND
0418	7/26/01	Tritium	270				20,000	932	11,000 (b)	1,485	MD 830	MND
0418	10/22/01	Tritium	590				20,000	932	11,000 (b)	1,485	MD 830	MND
0418	2/1/02	Tritium	530				20,000	932	11,000 (b)	1,485	MD 830	MND
0418	4/22/02	Tritium	670				20,000	932	11,000 (b)	1,485	MD 830	MND
0418	11/8/02	Tritium	910	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0418	2/14/03	Tritium	800	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0418	6/9/03	Tritium	710	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0418	7/17/03	Tritium	1150	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0418	10/14/03	Tritium	1100	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0418	1/14/04	Tritium	980	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0418	4/15/04	Tritium	780	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0418	7/16/04	Tritium	920	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0418	11/2/04	Tritium	2370	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0419	6/19/97	Tritium	2030				20,000	932	11,000 (b)	1,485	MD 830	MND
0419	9/18/97	Tritium	130				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0419	12/10/97	Tritium	680				20,000	932	11,000 (b)	1,485	EPA 906	MND
0419	3/26/98	Tritium	1650				20,000	932	11,000 (b)	1,485	EPA 906	MND
0419	6/25/98	Tritium	840				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0419	10/13/98	Tritium	1870				20,000	932	11,000 (b)	1,485	EPA 906	MND
0419	1/8/99	Tritium	1710				20,000	932	11,000 (b)	1,485	EPA 906	MND
0419	4/30/99	Tritium	580				20,000	932	11,000 (b)	1,485	MD 830	MND
0419	6/15/99	Tritium	140				20,000	932	11,000 (b)	1,485	MD 830	MND
0419	8/31/99	Tritium	2540				20,000	932	11,000 (b)	1,485	MD 830	MND
0419	1/24/00	Tritium	3110				20,000	932	11,000 (b)	1,485	MD 830	MND
0419	4/10/00	Tritium	2350				20,000	932	11,000 (b)	1,485	MD 830	MND
0419	6/20/00	Tritium	1470				20,000	932	11,000 (b)	1,485	MD 830	MND
0419	9/20/00	Tritium	2210				20,000	932	11,000 (b)	1,485	MD 830	MND
0419	2/20/01	Tritium	2230				20,000	932	11,000 (b)	1,485	MD 830	MND
0419	5/2/01	Tritium	1020				20,000	932	11,000 (b)	1,485	MD 830	MND
0419	7/26/01	Tritium	920				20,000	932	11,000 (b)	1,485	MD 830	MND
0419	10/23/01	Tritium	1990				20,000	932	11,000 (b)	1,485	MD 830	MND
0419	1/31/02	Tritium	120				20,000	932	11,000 (b)	1,485	MD 830	MND
0419	4/23/02	Tritium	730				20,000	932	11,000 (b)	1,485	MD 830	MND
0419	7/29/02	Tritium	520	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
0419	11/13/02	Tritium	1960	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0419	2/19/03	Tritium	770	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0419	5/19/03	Tritium	1760	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0419	7/14/03	Tritium	1540	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0419	10/17/03	Tritium	2920	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0419	1/14/04	Tritium	2280	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0419	4/15/04	Tritium	640	600			20,000	932	11,000 (b)	1,485	MD 830	MND

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STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0420	6/17/97	Tritium	2480				20,000	932	11,000 (b)	1,485	MD 830	MND
0420	9/9/97	Tritium	2990				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0420	12/9/97	Tritium	3560				20,000	932	11,000 (b)	1,485	EPA 906	MND
0420	3/24/98	Tritium	6060				20,000	932	11,000 (b)	1,485	EPA 906	MND
0420	6/22/98	Tritium	2740				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0420	10/5/98	Tritium	2490				20,000	932	11,000 (b)	1,485	EPA 906	MND
0420	1/6/99	Tritium	3570				20,000	932	11,000 (b)	1,485	EPA 906	MND
0420	4/30/99	Tritium	3520				20,000	932	11,000 (b)	1,485	MD 830	MND
0420	6/16/99	Tritium	2690				20,000	932	11,000 (b)	1,485	MD 830	MND
0420	8/31/99	Tritium	2720				20,000	932	11,000 (b)	1,485	MD 830	MND
0420	1/20/00	Tritium	160				20,000	932	11,000 (b)	1,485	MD 830	MND
0420	4/12/00	Tritium	280				20,000	932	11,000 (b)	1,485	MD 830	MND
0420	6/21/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0420	9/18/00	Tritium	60				20,000	932	11,000 (b)	1,485	MD 830	MND
0420	1/30/01	Tritium	180				20,000	932	11,000 (b)	1,485	MD 830	MND
0420	4/30/01	Tritium	1300				20,000	932	11,000 (b)	1,485	MD 830	MND
0420	7/20/01	Tritium	1320				20,000	932	11,000 (b)	1,485	MD 830	MND
0420	10/17/01	Tritium	1140				20,000	932	11,000 (b)	1,485	MD 830	MND
0420	1/23/02	Tritium	650				20,000	932	11,000 (b)	1,485	MD 830	MND
0420	4/18/02	Tritium	1460				20,000	932	11,000 (b)	1,485	MD 830	MND
0420	7/26/02	Tritium	1500	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0420	10/31/02	Tritium	1210	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0420	2/12/03	Tritium	1190	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0420	4/25/03	Tritium	1230	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0420	7/17/03	Tritium	1560	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0420	7/14/04	Tritium	1550	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0421	6/17/97	Tritium	1800				20,000	932	11,000 (b)	1,485	MD 830	MND
0421	12/16/97	Tritium	1880				20,000	932	11,000 (b)	1,485	EPA 906	MND
0421	3/24/98	Tritium	1530				20,000	932	11,000 (b)	1,485	EPA 906	MND
0421	6/22/98	Tritium	1710				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0421	10/5/98	Tritium	1320				20,000	932	11,000 (b)	1,485	EPA 906	MND
0421	4/30/99	Tritium	1190				20,000	932	11,000 (b)	1,485	MD 830	MND
0421	6/16/99	Tritium	1000				20,000	932	11,000 (b)	1,485	MD 830	MND
0421	9/3/99	Tritium	800				20,000	932	11,000 (b)	1,485	MD 830	MND
0421	4/12/00	Tritium	360				20,000	932	11,000 (b)	1,485	MD 830	MND
0421	6/21/00	Tritium	110				20,000	932	11,000 (b)	1,485	MD 830	MND
0421	2/21/01	Tritium	620				20,000	932	11,000 (b)	1,485	MD 830	MND
0421	5/1/01	Tritium	860				20,000	932	11,000 (b)	1,485	MD 830	MND
0421	7/17/01	Tritium	1810				20,000	932	11,000 (b)	1,485	MD 830	MND
0421	10/18/01	Tritium	1030				20,000	932	11,000 (b)	1,485	MD 830	MND
0421	1/23/02	Tritium	360				20,000	932	11,000 (b)	1,485	MD 830	MND
0421	4/19/02	Tritium	1350				20,000	932	11,000 (b)	1,485	MD 830	MND
0421	7/29/02	Tritium	800	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0421	2/12/03	Tritium	1110	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0421	4/25/03	Tritium	1480	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0421	7/17/03	Tritium	1230	600			20,000	932	11,000 (b)	1,485	MD 830	MND

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0422	6/17/97	Tritium	2320				20,000	932	11,000 (b)	1,485	MD 830	MND
0422	9/10/97	Tritium	4700				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0422	12/9/97	Tritium	5520				20,000	932	11,000 (b)	1,485	EPA 906	MND
0422	3/24/98	Tritium	5150				20,000	932	11,000 (b)	1,485	EPA 906	MND
0422	6/22/98	Tritium	2830				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0422	10/6/98	Tritium	4110				20,000	932	11,000 (b)	1,485	EPA 906	MND
0422	1/12/99	Tritium	4030				20,000	932	11,000 (b)	1,485	EPA 906	MND
0422	4/26/99	Tritium	2630				20,000	932	11,000 (b)	1,485	MD 830	MND
0422	6/17/99	Tritium	2680				20,000	932	11,000 (b)	1,485	MD 830	MND
0422	8/31/99	Tritium	2150				20,000	932	11,000 (b)	1,485	MD 830	MND
0422	1/20/00	Tritium	360				20,000	932	11,000 (b)	1,485	MD 830	MND
0422	4/12/00	Tritium	550				20,000	932	11,000 (b)	1,485	MD 830	MND
0422	6/21/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0422	9/18/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0422	1/30/01	Tritium	540				20,000	932	11,000 (b)	1,485	MD 830	MND
0422	4/30/01	Tritium	900				20,000	932	11,000 (b)	1,485	MD 830	MND
0422	7/20/01	Tritium	650				20,000	932	11,000 (b)	1,485	MD 830	MND
0422	10/17/01	Tritium	680				20,000	932	11,000 (b)	1,485	MD 830	MND
0422	1/23/02	Tritium	1150				20,000	932	11,000 (b)	1,485	MD 830	MND
0422	4/18/02	Tritium	1050				20,000	932	11,000 (b)	1,485	MD 830	MND
0422	7/26/02	Tritium	1630	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0422	10/31/02	Tritium	1210	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0422	2/12/03	Tritium	1440	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0422	5/20/03	Tritium	1690	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0422	7/15/03	Tritium	1620	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0422	10/15/03	Tritium	830	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0422	1/16/04	Tritium	1590	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0422	7/14/04	Tritium	1980	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0423	6/18/97	Tritium	2890				20,000	932	11,000 (b)	1,485	MD 830	MND
0423	9/11/97	Tritium	3180				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0423	12/19/97	Tritium	1190				20,000	932	11,000 (b)	1,485	EPA 906	MND
0423	3/23/98	Tritium	4330				20,000	932	11,000 (b)	1,485	EPA 906	MND
0423	6/22/98	Tritium	710				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0423	10/6/98	Tritium	1670				20,000	932	11,000 (b)	1,485	EPA 906	MND
0423	4/26/99	Tritium	1180				20,000	932	11,000 (b)	1,485	MD 830	MND
0423	6/17/99	Tritium	680				20,000	932	11,000 (b)	1,485	MD 830	MND
0423	8/31/99	Tritium	490				20,000	932	11,000 (b)	1,485	MD 830	MND
0423	1/20/00	Tritium	480				20,000	932	11,000 (b)	1,485	MD 830	MND
0423	4/11/00	Tritium	360				20,000	932	11,000 (b)	1,485	MD 830	MND
0423	6/21/00	Tritium	10				20,000	932	11,000 (b)	1,485	MD 830	MND
0423	9/19/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0423	1/30/01	Tritium	360				20,000	932	11,000 (b)	1,485	MD 830	MND
0423	4/30/01	Tritium	840				20,000	932	11,000 (b)	1,485	MD 830	MND
0423	7/20/01	Tritium	1170				20,000	932	11,000 (b)	1,485	MD 830	MND
0423	10/17/01	Tritium	890				20,000	932	11,000 (b)	1,485	MD 830	MND
0423	1/23/02	Tritium	960				20,000	932	11,000 (b)	1,485	MD 830	MND
0423	4/19/02	Tritium	1140				20,000	932	11,000 (b)	1,485	MD 830	MND
0423	7/26/02	Tritium	1230	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0423	10/31/02	Tritium	1210	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0423	2/12/03	Tritium	870	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0423	5/20/03	Tritium	1150	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0423	7/15/03	Tritium	950	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0423	10/15/03	Tritium	1190	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0423	1/16/04	Tritium	1310	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0423	7/14/04	Tritium	1050	600			20,000	932	11,000 (b)	1,485	MD 830	MND

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
0424	6/18/97	Tritium	1680				20,000	932	11,000 (b)	1,485	MD 830	MND
0424	9/10/97	Tritium	3060				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0424	12/8/97	Tritium	850				20,000	932	11,000 (b)	1,485	EPA 906	MND
0424	3/23/98	Tritium	1740				20,000	932	11,000 (b)	1,485	EPA 906	MND
0424	6/18/98	Tritium	1530				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0424	10/7/98	Tritium	1110				20,000	932	11,000 (b)	1,485	EPA 906	MND
0424	1/6/99	Tritium	1190				20,000	932	11,000 (b)	1,485	EPA 906	MND
0424	4/28/99	Tritium	670				20,000	932	11,000 (b)	1,485	MD 830	MND
0424	6/17/99	Tritium	810				20,000	932	11,000 (b)	1,485	MD 830	MND
0424	9/1/99	Tritium	600				20,000	932	11,000 (b)	1,485	MD 830	MND
0424	1/20/00	Tritium	260				20,000	932	11,000 (b)	1,485	MD 830	MND
0424	4/11/00	Tritium	650				20,000	932	11,000 (b)	1,485	MD 830	MND
0424	6/21/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0424	9/19/00	Tritium	80				20,000	932	11,000 (b)	1,485	MD 830	MND
0424	1/31/01	Tritium	180				20,000	932	11,000 (b)	1,485	MD 830	MND
0424	5/1/01	Tritium	740				20,000	932	11,000 (b)	1,485	MD 830	MND
0424	7/23/01	Tritium	650				20,000	932	11,000 (b)	1,485	MD 830	MND
0424	10/17/01	Tritium	320				20,000	932	11,000 (b)	1,485	MD 830	MND
0424	1/23/02	Tritium	410				20,000	932	11,000 (b)	1,485	MD 830	MND
0424	4/19/02	Tritium	320				20,000	932	11,000 (b)	1,485	MD 830	MND
0424	7/29/02	Tritium	280	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
0424	11/1/02	Tritium	730	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0424	2/13/03	Tritium	970	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0424	4/30/03	Tritium	1070	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0424	7/16/03	Tritium	1010	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0424	10/14/03	Tritium	780	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0424	1/16/04	Tritium	520	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
0424	7/16/04	Tritium	800	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0425	6/19/97	Tritium	1200				20,000	932	11,000 (b)	1,485	MD 830	MND
0425	9/10/97	Tritium	1900				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
0425	12/8/97	Tritium	550				20,000	932	11,000 (b)	1,485	EPA 906	MND
0425	3/23/98	Tritium	740				20,000	932	11,000 (b)	1,485	EPA 906	MND
0425	6/18/98	Tritium	0				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
0425	1/6/99	Tritium	7380				20,000	932	11,000 (b)	1,485	EPA 906	MND
0425	4/28/99	Tritium	420				20,000	932	11,000 (b)	1,485	MD 830	MND
0425	6/17/99	Tritium	660				20,000	932	11,000 (b)	1,485	MD 830	MND
0425	9/1/99	Tritium	980				20,000	932	11,000 (b)	1,485	MD 830	MND
0425	1/20/00	Tritium	300				20,000	932	11,000 (b)	1,485	MD 830	MND
0425	4/11/00	Tritium	770				20,000	932	11,000 (b)	1,485	MD 830	MND
0425	6/21/00	Tritium	30				20,000	932	11,000 (b)	1,485	MD 830	MND
0425	9/19/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
0425	1/31/01	Tritium	210				20,000	932	11,000 (b)	1,485	MD 830	MND
0425	5/1/01	Tritium	340				20,000	932	11,000 (b)	1,485	MD 830	MND
0425	7/23/01	Tritium	520				20,000	932	11,000 (b)	1,485	MD 830	MND
0425	10/17/01	Tritium	490				20,000	932	11,000 (b)	1,485	MD 830	MND
0425	1/24/02	Tritium	700				20,000	932	11,000 (b)	1,485	MD 830	MND
0425	4/19/02	Tritium	340				20,000	932	11,000 (b)	1,485	MD 830	MND
0425	7/29/02	Tritium	130	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
0425	11/1/02	Tritium	450	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
0425	2/13/03	Tritium	800	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0425	6/10/03	Tritium	660	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0425	7/15/03	Tritium	620	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0425	10/14/03	Tritium	960	600			20,000	932	11,000 (b)	1,485	MD 830	MND
0425	1/16/04	Tritium	650	600			20,000	932	11,000 (b)	1,485	MD 830	MND

DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
P015	12/7/95	Tritium	4430				20,000	932	11,000 (b)	1,485	PD80030-2261	MND
P015	12/5/96	Tritium	6130				20,000	932	11,000 (b)	1,485	MD 830	MND
P015	9/18/97	Tritium	2470				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
P015	12/15/97	Tritium	2980				20,000	932	11,000 (b)	1,485	EPA 906	MND
P015	4/1/98	Tritium	3400				20,000	932	11,000 (b)	1,485	EPA 906	MND
P015	6/24/98	Tritium	2160				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
P015	10/14/98	Tritium	1220				20,000	932	11,000 (b)	1,485	EPA 906	MND
P015	4/27/99	Tritium	1970				20,000	932	11,000 (b)	1,485	MD 830	MND
P015	6/21/99	Tritium	1520				20,000	932	11,000 (b)	1,485	MD 830	MND
P015	9/2/99	Tritium	960				20,000	932	11,000 (b)	1,485	MD 830	MND
P015	2/1/00	Tritium	2530				20,000	932	11,000 (b)	1,485	MD 830	MND
P015	4/14/00	Tritium	2200				20,000	932	11,000 (b)	1,485	MD 830	MND
P015	6/23/00	Tritium	1360				20,000	932	11,000 (b)	1,485	MD 830	MND
P015	9/29/00	Tritium	1970				20,000	932	11,000 (b)	1,485	MD 830	MND
P015	3/1/01	Tritium	1590				20,000	932	11,000 (b)	1,485	MD 830	MND
P015	5/3/01	Tritium	1740				20,000	932	11,000 (b)	1,485	MD 830	MND
P015	7/27/01	Tritium	1300				20,000	932	11,000 (b)	1,485	MD 830	MND
P015	10/23/01	Tritium	2040				20,000	932	11,000 (b)	1,485	MD 830	MND
P015	1/25/02	Tritium	1240				20,000	932	11,000 (b)	1,485	MD 830	MND
P015	4/24/02	Tritium	950				20,000	932	11,000 (b)	1,485	MD 830	MND
P015	7/25/02	Tritium	770	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P015	11/4/02	Tritium	1630	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P015	2/19/03	Tritium	980	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P015	5/19/03	Tritium	750	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P015	7/14/03	Tritium	1890	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P015	10/15/03	Tritium	1640	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P015	1/14/04	Tritium	1850	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P015	4/15/04	Tritium	880	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P015	11/2/04	Tritium	1090	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P027	3/21/94	Tritium	2860	473			20,000	932	11,000 (b)	1,485	EPA 906	ENSECO
P027	12/8/95	Tritium	1730				20,000	932	11,000 (b)	1,485	PD80030-2261	MND
P027	12/2/96	Tritium	2730				20,000	932	11,000 (b)	1,485	MD 830	MND
P027	9/19/97	Tritium	720				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
P027	12/9/97	Tritium	640				20,000	932	11,000 (b)	1,485	EPA 906	MND
P027	3/25/98	Tritium	890				20,000	932	11,000 (b)	1,485	EPA 906	MND
P027	6/25/98	Tritium	1530				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
P027	10/8/98	Tritium	780				20,000	932	11,000 (b)	1,485	EPA 906	MND
P027	1/6/99	Tritium	1190				20,000	932	11,000 (b)	1,485	EPA 906	MND
P027	5/3/99	Tritium	1110				20,000	932	11,000 (b)	1,485	MD 830	MND
P027	6/17/99	Tritium	450				20,000	932	11,000 (b)	1,485	MD 830	MND
P027	9/1/99	Tritium	600				20,000	932	11,000 (b)	1,485	MD 830	MND
P027	1/19/00	Tritium	1120				20,000	932	11,000 (b)	1,485	MD 830	MND
P027	4/13/00	Tritium	420				20,000	932	11,000 (b)	1,485	MD 830	MND
P027	6/26/00	Tritium	120				20,000	932	11,000 (b)	1,485	MD 830	MND
P027	9/28/00	Tritium	700				20,000	932	11,000 (b)	1,485	MD 830	MND
P027	2/8/01	Tritium	260				20,000	932	11,000 (b)	1,485	MD 830	MND
P027	5/2/01	Tritium	630				20,000	932	11,000 (b)	1,485	MD 830	MND
P027	7/26/01	Tritium	160				20,000	932	11,000 (b)	1,485	MD 830	MND
P027	10/23/01	Tritium	680				20,000	932	11,000 (b)	1,485	MD 830	MND
P027	1/24/02	Tritium	880				20,000	932	11,000 (b)	1,485	MD 830	MND
P027	4/24/02	Tritium	810				20,000	932	11,000 (b)	1,485	MD 830	MND
P027	7/24/02	Tritium	610	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P027	11/6/02	Tritium	760	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P027	2/13/03	Tritium	900	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P027	6/9/03	Tritium	960	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P027	7/15/03	Tritium	610	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P027	10/14/03	Tritium	610	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P027	1/14/04	Tritium	920	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P027	4/16/04	Tritium	680	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P027	7/15/04	Tritium	870	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P027	11/2/04	Tritium	940	600			20,000	932	11,000 (b)	1,485	MD 830	MND

DOE OU1 RESULTS

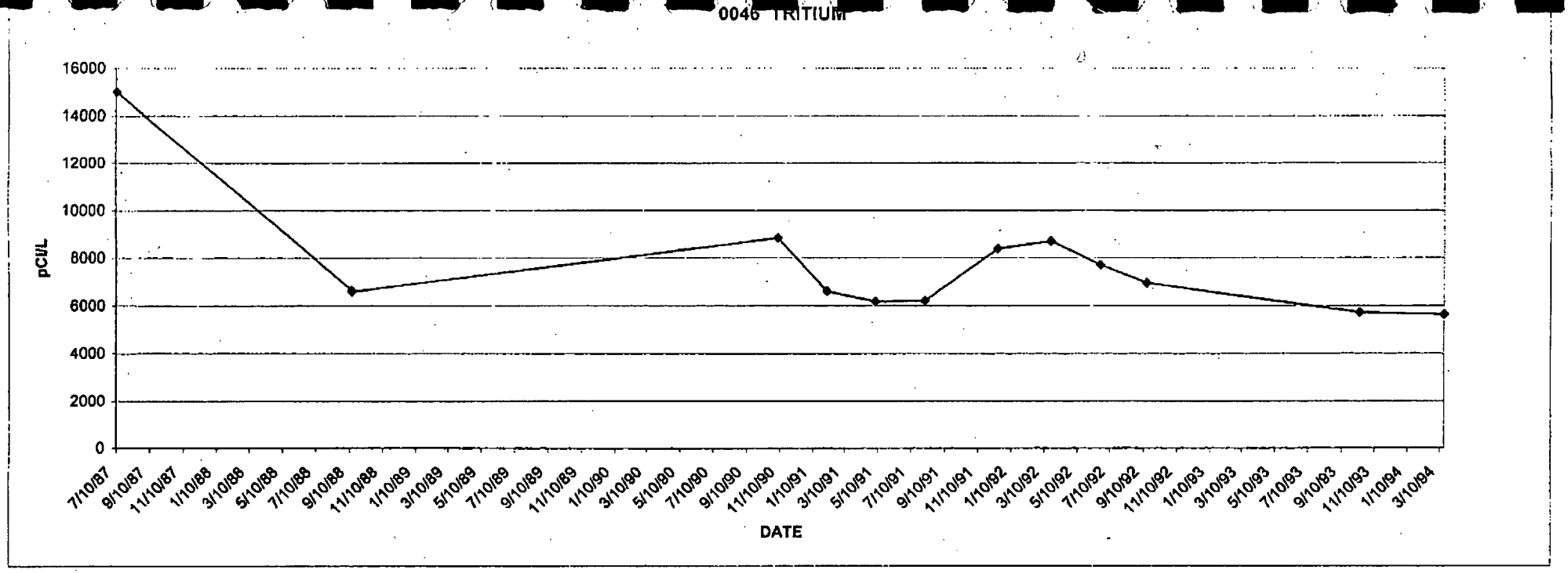
STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
P031	12/11/95	Tritium	860				20,000	932	11,000 (b)	1,485	PD80030-2261	MND
P031	12/2/96	Tritium	1540				20,000	932	11,000 (b)	1,485	MD 830	MND
P031	9/19/97	Tritium	950				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
P031	12/9/97	Tritium	290				20,000	932	11,000 (b)	1,485	EPA 906	MND
P031	12/16/97	Tritium	290				20,000	932	11,000 (b)	1,485	EPA 906	MND
P031	3/25/98	Tritium	880				20,000	932	11,000 (b)	1,485	EPA 906	MND
P031	6/25/98	Tritium	1160				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
P031	1/6/99	Tritium	750				20,000	932	11,000 (b)	1,485	EPA 906	MND
P031	5/3/99	Tritium	640				20,000	932	11,000 (b)	1,485	MD 830	MND
P031	6/17/99	Tritium	710				20,000	932	11,000 (b)	1,485	MD 830	MND
P031	9/1/99	Tritium	390				20,000	932	11,000 (b)	1,485	MD 830	MND
P031	1/19/00	Tritium	730				20,000	932	11,000 (b)	1,485	MD 830	MND
P031	4/14/00	Tritium	760				20,000	932	11,000 (b)	1,485	MD 830	MND
P031	6/22/00	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
P031	9/28/00	Tritium	470				20,000	932	11,000 (b)	1,485	MD 830	MND
P031	2/5/01	Tritium	370				20,000	932	11,000 (b)	1,485	MD 830	MND
P031	5/1/01	Tritium	750				20,000	932	11,000 (b)	1,485	MD 830	MND
P031	7/26/01	Tritium	260				20,000	932	11,000 (b)	1,485	MD 830	MND
P031	10/23/01	Tritium	210				20,000	932	11,000 (b)	1,485	MD 830	MND
P031	1/24/02	Tritium	530				20,000	932	11,000 (b)	1,485	MD 830	MND
P031	4/24/02	Tritium	340				20,000	932	11,000 (b)	1,485	MD 830	MND
P031	7/25/02	Tritium	290	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P031	11/13/02	Tritium	430	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P031	2/13/03	Tritium	800	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P031	6/9/03	Tritium	620	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P031	7/15/03	Tritium	510	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P031	10/14/03	Tritium	790	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P031	1/14/04	Tritium	300	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P031	7/19/04	Tritium	800	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P031	11/2/04	Tritium	760	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P033	2/9/01	Tritium	500				20,000	932	11,000 (b)	1,485	MD 830	MND
P033	4/27/01	Tritium	170				20,000	932	11,000 (b)	1,485	MD 830	MND
P033	7/25/01	Tritium	90				20,000	932	11,000 (b)	1,485	MD 830	MND
P033	10/11/01	Tritium	390				20,000	932	11,000 (b)	1,485	MD 830	MND
P033	1/16/02	Tritium	160				20,000	932	11,000 (b)	1,485	MD 830	MND
P033	5/2/02	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
P033	7/15/02	Tritium	270	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P033	11/12/02	Tritium	500	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P033	1/29/03	Tritium	560	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P033	4/23/03	Tritium	760	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P033	10/21/03	Tritium	290	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P033	1/21/04	Tritium	280	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P033	7/13/04	Tritium	810	600			20,000	932	11,000 (b)	1,485	MD 830	MND

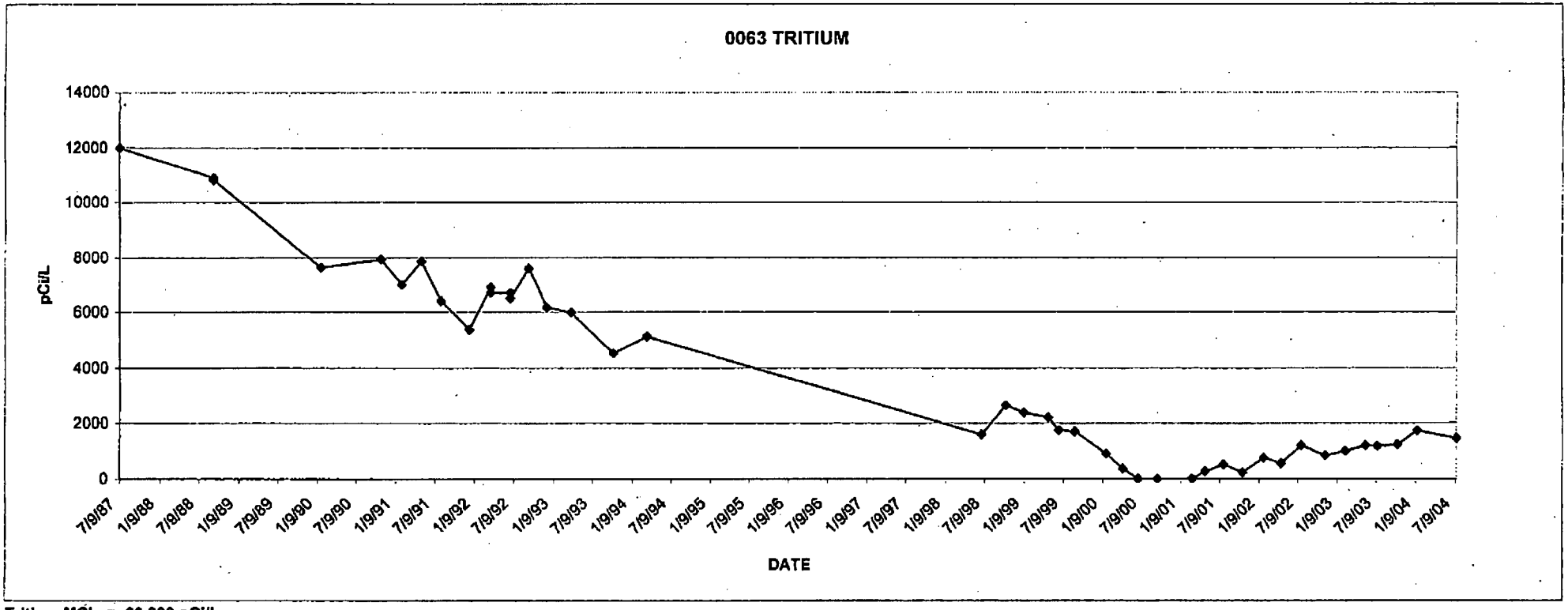
DOE OU1 RESULTS

STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
P043	6/18/97	Tritium	5480				20,000	932	11,000 (b)	1,485	MD 830	MND
P043	9/10/97	Tritium	5050				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
P043	12/16/97	Tritium	4130				20,000	932	11,000 (b)	1,485	EPA 906	MND
P043	3/23/98	Tritium	5110				20,000	932	11,000 (b)	1,485	EPA 906	MND
P043	6/18/98	Tritium	4670				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
P043	10/14/98	Tritium	3580				20,000	932	11,000 (b)	1,485	EPA 906	MND
P043	1/6/99	Tritium	4150				20,000	932	11,000 (b)	1,485	EPA 906	MND
P043	4/28/99	Tritium	2650				20,000	932	11,000 (b)	1,485	MD 830	MND
P043	6/17/99	Tritium	2270				20,000	932	11,000 (b)	1,485	MD 830	MND
P043	9/1/99	Tritium	2710				20,000	932	11,000 (b)	1,485	MD 830	MND
P043	1/20/00	Tritium	1530				20,000	932	11,000 (b)	1,485	MD 830	MND
P043	4/11/00	Tritium	1370				20,000	932	11,000 (b)	1,485	MD 830	MND
P043	6/21/00	Tritium	1050				20,000	932	11,000 (b)	1,485	MD 830	MND
P043	9/19/00	Tritium	1170				20,000	932	11,000 (b)	1,485	MD 830	MND
P043	2/5/01	Tritium	1180				20,000	932	11,000 (b)	1,485	MD 830	MND
P043	5/1/01	Tritium	1830				20,000	932	11,000 (b)	1,485	MD 830	MND
P043	7/23/01	Tritium	1100				20,000	932	11,000 (b)	1,485	MD 830	MND
P043	10/17/01	Tritium	1260				20,000	932	11,000 (b)	1,485	MD 830	MND
P043	1/23/02	Tritium	830				20,000	932	11,000 (b)	1,485	MD 830	MND
P043	4/19/02	Tritium	1180				20,000	932	11,000 (b)	1,485	MD 830	MND
P043	7/29/02	Tritium	1170	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P043	11/1/02	Tritium	960	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P043	2/13/03	Tritium	1200	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P043	4/30/03	Tritium	1390	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P043	7/16/03	Tritium	1000	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P043	1/19/04	Tritium	1370	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P044	6/19/97	Tritium	1690				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	9/15/97	Tritium	860				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
P044	12/15/97	Tritium	820				20,000	932	11,000 (b)	1,485	EPA 906	MND
P044	3/25/98	Tritium	540				20,000	932	11,000 (b)	1,485	EPA 906	MND
P044	6/18/98	Tritium	550				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
P044	10/8/98	Tritium	580				20,000	932	11,000 (b)	1,485	EPA 906	MND
P044	1/6/99	Tritium	470				20,000	932	11,000 (b)	1,485	EPA 906	MND
P044	5/3/99	Tritium	660				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	6/17/99	Tritium	20				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	9/1/99	Tritium	230				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	1/19/00	Tritium	1000				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	4/13/00	Tritium	250				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	6/26/00	Tritium	260				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	9/26/00	Tritium	580				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	2/5/01	Tritium	270				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	5/1/01	Tritium	230				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	7/23/01	Tritium	200				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	10/17/01	Tritium	230				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	1/24/02	Tritium	190				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	4/24/02	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	7/24/02	Tritium	270	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P044	11/1/02	Tritium	350	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P044	2/13/03	Tritium	270	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P044	4/30/03	Tritium	530	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P044	7/16/03	Tritium	480	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P044	1/16/04	Tritium	170	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P044	7/15/04	Tritium	610	600			20,000	932	11,000 (b)	1,485	MD 830	MND

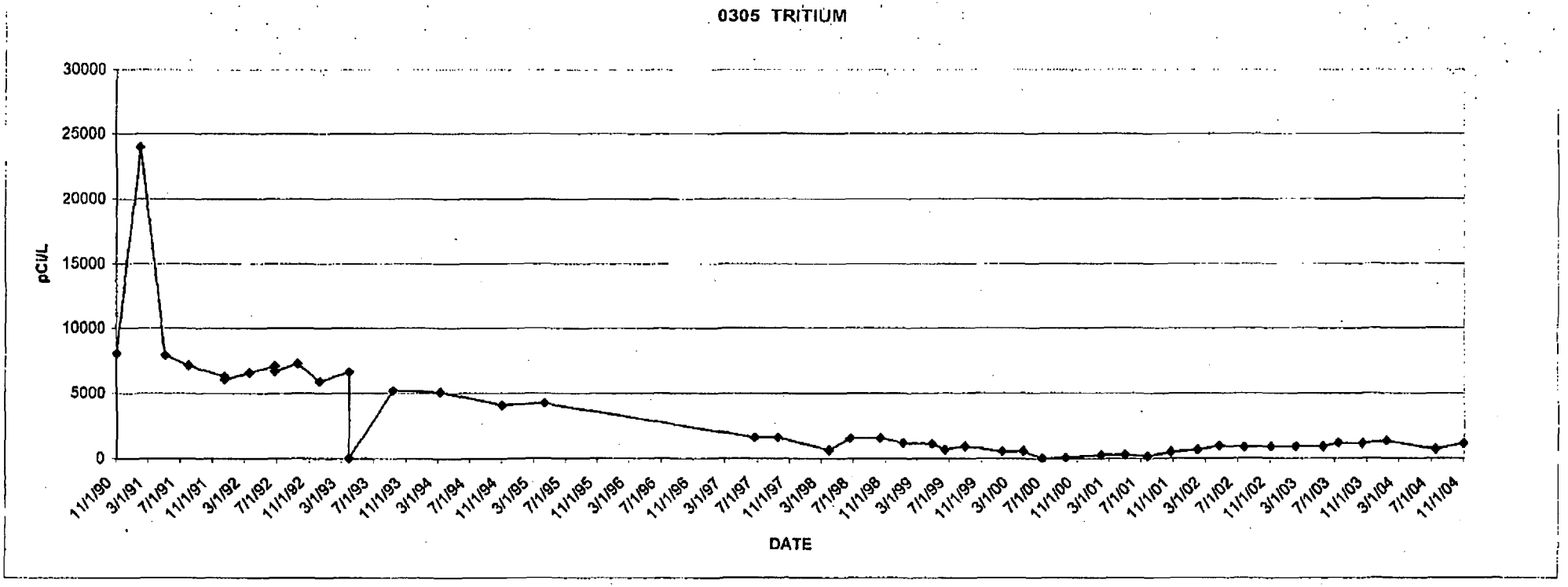
DOE OU1 RESULTS

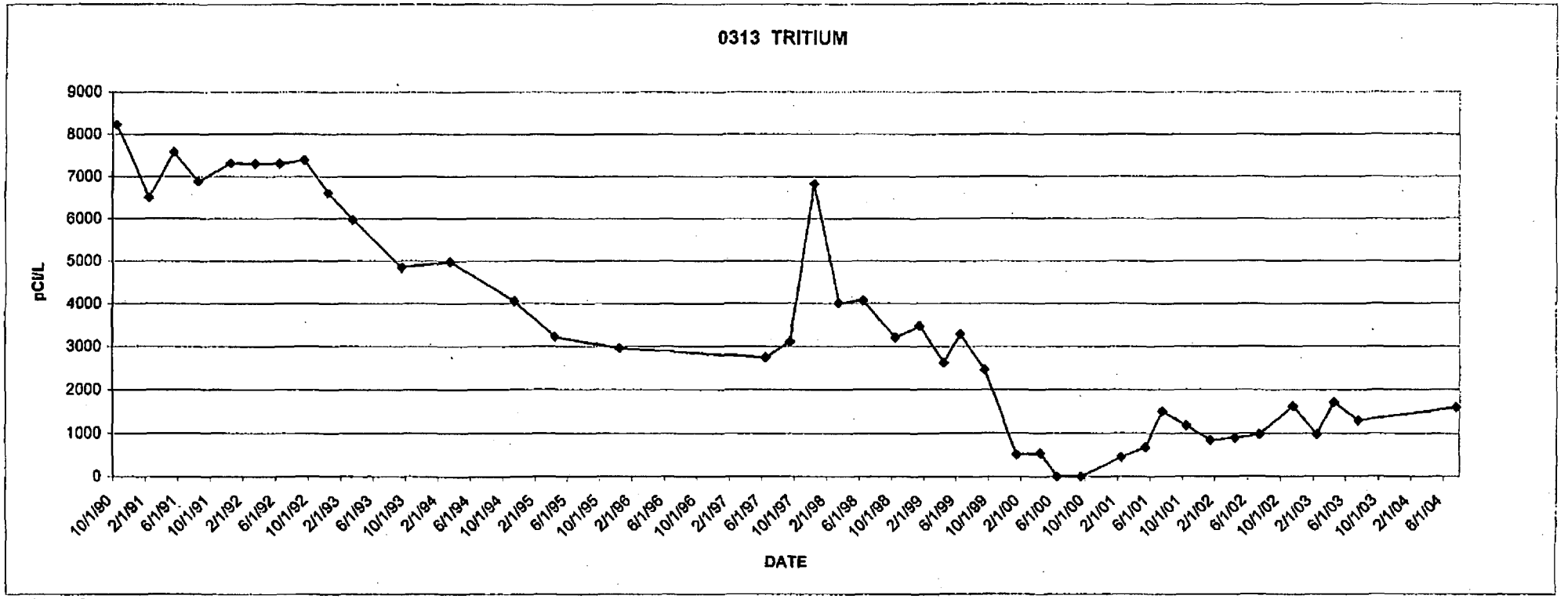
STATION	COLLECT DATE	ANALYTE	RESULTS pCi/L	MDA pCi/L	LAB QA	DATA QA	DRINKING WATER MCL pCi/L	GUIDELINE VALUE RESIDENTIAL pCi/L (Oct. 2002)	GUIDELINE VALUE CONSTRUCTION SITE EMPLOYEE	BACKGROUND pCi/L	METHOD	LAB
P044	6/19/97	Tritium	1690				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	9/15/97	Tritium	860				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
P044	12/15/97	Tritium	820				20,000	932	11,000 (b)	1,485	EPA 906	MND
P044	3/25/98	Tritium	540				20,000	932	11,000 (b)	1,485	EPA 906	MND
P044	6/18/98	Tritium	550				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
P044	10/8/98	Tritium	580				20,000	932	11,000 (b)	1,485	EPA 906	MND
P044	1/6/99	Tritium	470				20,000	932	11,000 (b)	1,485	EPA 906	MND
P044	5/3/99	Tritium	660				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	6/17/99	Tritium	20				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	9/1/99	Tritium	230				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	1/19/00	Tritium	1000				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	4/13/00	Tritium	250				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	6/26/00	Tritium	260				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	9/26/00	Tritium	580				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	2/5/01	Tritium	270				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	5/1/01	Tritium	230				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	7/23/01	Tritium	200				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	10/17/01	Tritium	230				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	1/24/02	Tritium	190				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	4/24/02	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
P044	7/24/02	Tritium	270	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P044	11/1/02	Tritium	350	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P044	2/13/03	Tritium	270	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P044	4/30/03	Tritium	530	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P044	7/16/03	Tritium	480	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P044	1/16/04	Tritium	170	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P044	7/15/04	Tritium	610	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P045	6/19/97	Tritium	710				20,000	932	11,000 (b)	1,485	MD 830	MND
P045	9/15/97	Tritium	650				20,000	932	11,000 (b)	1,485	EPA 901.1	MND
P045	12/16/97	Tritium	660				20,000	932	11,000 (b)	1,485	EPA 906	MND
P045	3/26/98	Tritium	880				20,000	932	11,000 (b)	1,485	EPA 906	MND
P045	6/22/98	Tritium	180				20,000	932	11,000 (b)	1,485	EPA 906.1	MND
P045	1/8/99	Tritium	700				20,000	932	11,000 (b)	1,485	EPA 906	MND
P045	5/3/99	Tritium	870				20,000	932	11,000 (b)	1,485	MD 830	MND
P045	6/18/99	Tritium	320				20,000	932	11,000 (b)	1,485	MD 830	MND
P045	9/2/99	Tritium	530				20,000	932	11,000 (b)	1,485	MD 830	MND
P045	1/19/00	Tritium	550				20,000	932	11,000 (b)	1,485	MD 830	MND
P045	4/13/00	Tritium	690				20,000	932	11,000 (b)	1,485	MD 830	MND
P045	6/26/00	Tritium	120				20,000	932	11,000 (b)	1,485	MD 830	MND
P045	9/28/00	Tritium	580				20,000	932	11,000 (b)	1,485	MD 830	MND
P045	2/5/01	Tritium	100				20,000	932	11,000 (b)	1,485	MD 830	MND
P045	5/1/01	Tritium	1070				20,000	932	11,000 (b)	1,485	MD 830	MND
P045	7/23/01	Tritium	860				20,000	932	11,000 (b)	1,485	MD 830	MND
P045	10/17/01	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
P045	1/24/02	Tritium	200				20,000	932	11,000 (b)	1,485	MD 830	MND
P045	4/24/02	Tritium	0				20,000	932	11,000 (b)	1,485	MD 830	MND
P045	7/24/02	Tritium	410	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P045	11/1/02	Tritium	360	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P045	2/13/03	Tritium	350	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P045	6/10/03	Tritium	280	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P045	7/15/03	Tritium	670	600			20,000	932	11,000 (b)	1,485	MD 830	MND
P045	10/14/03	Tritium	80	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND
P045	1/16/04	Tritium	240	600	J		20,000	932	11,000 (b)	1,485	MD 830	MND



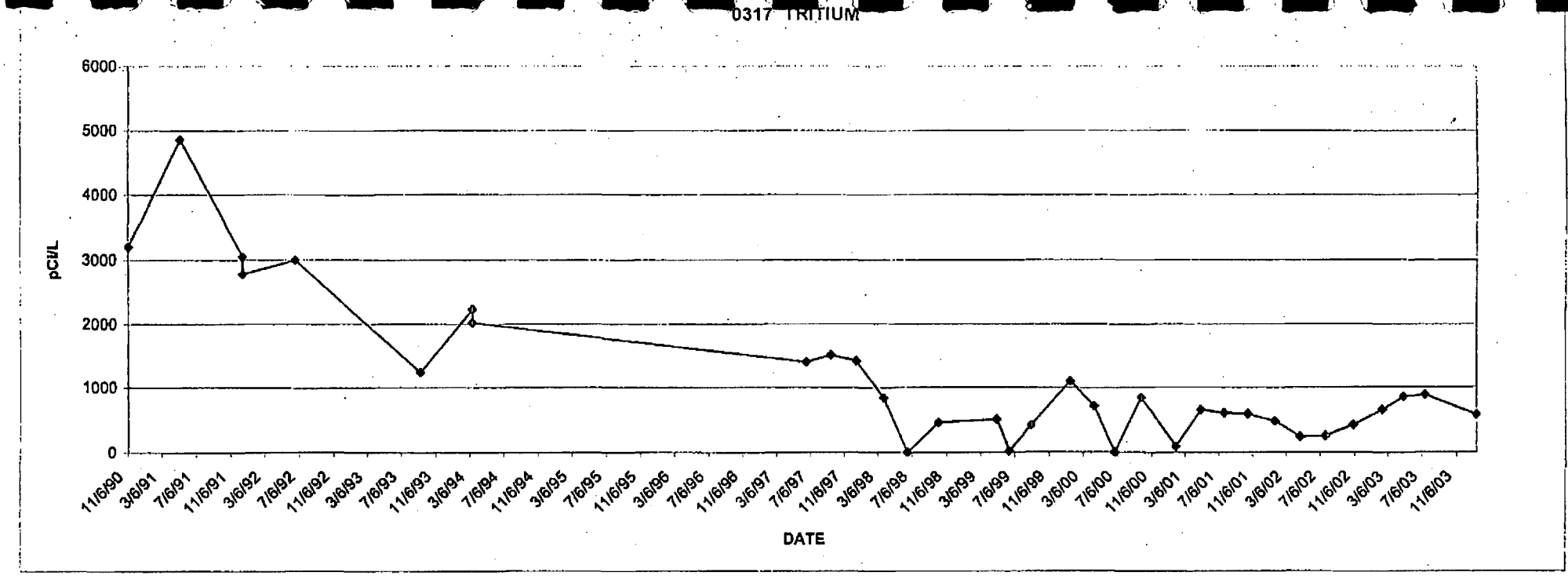


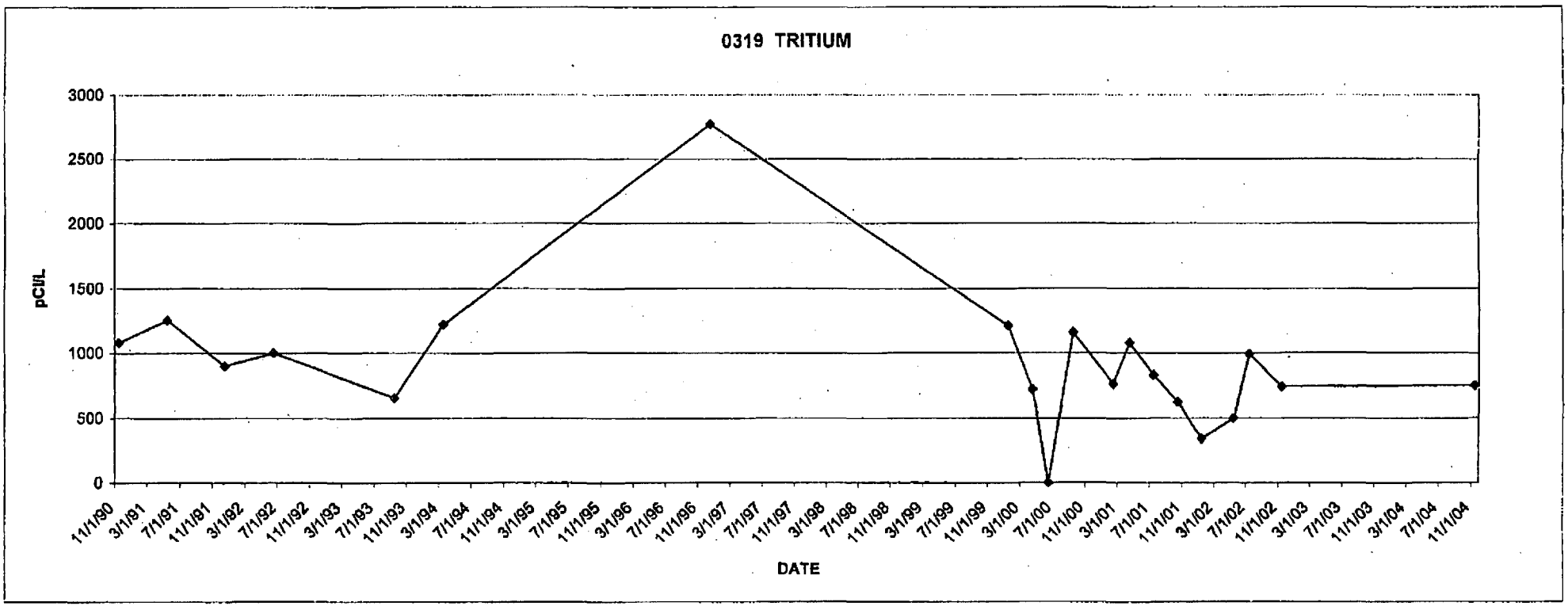
Tritium MCL = 20,000 pCi/L



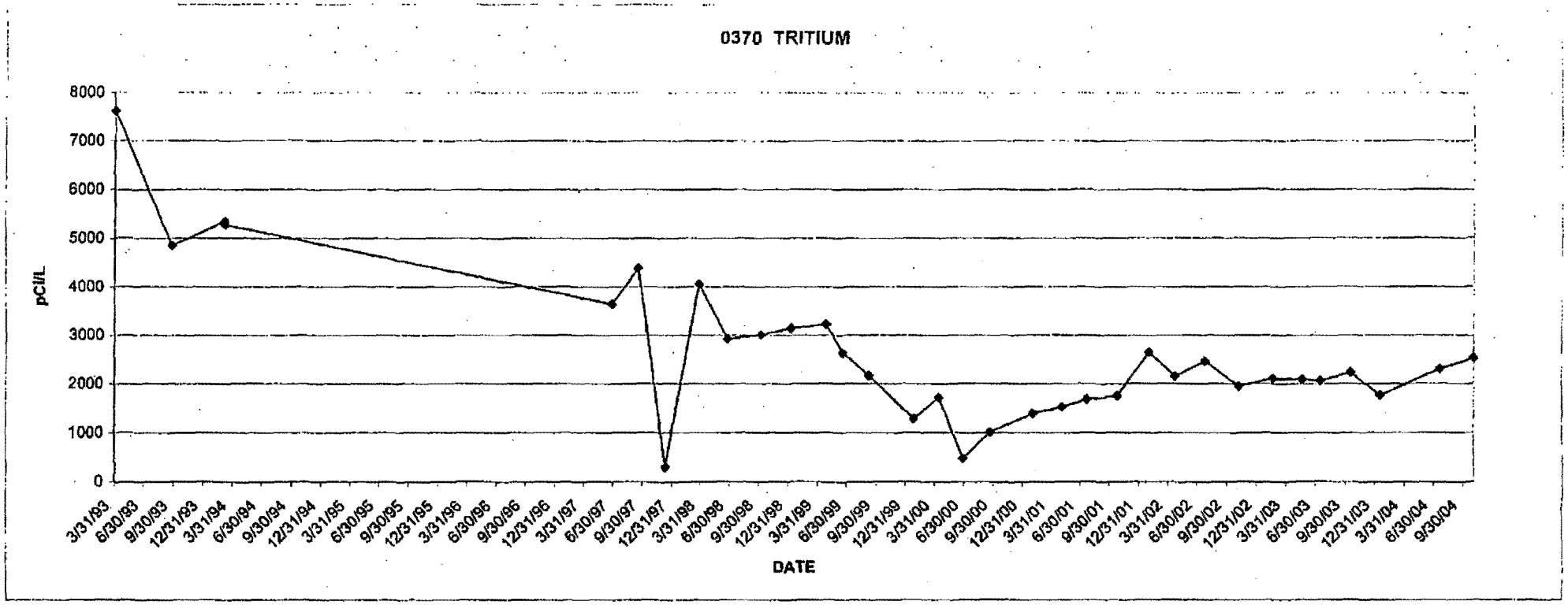


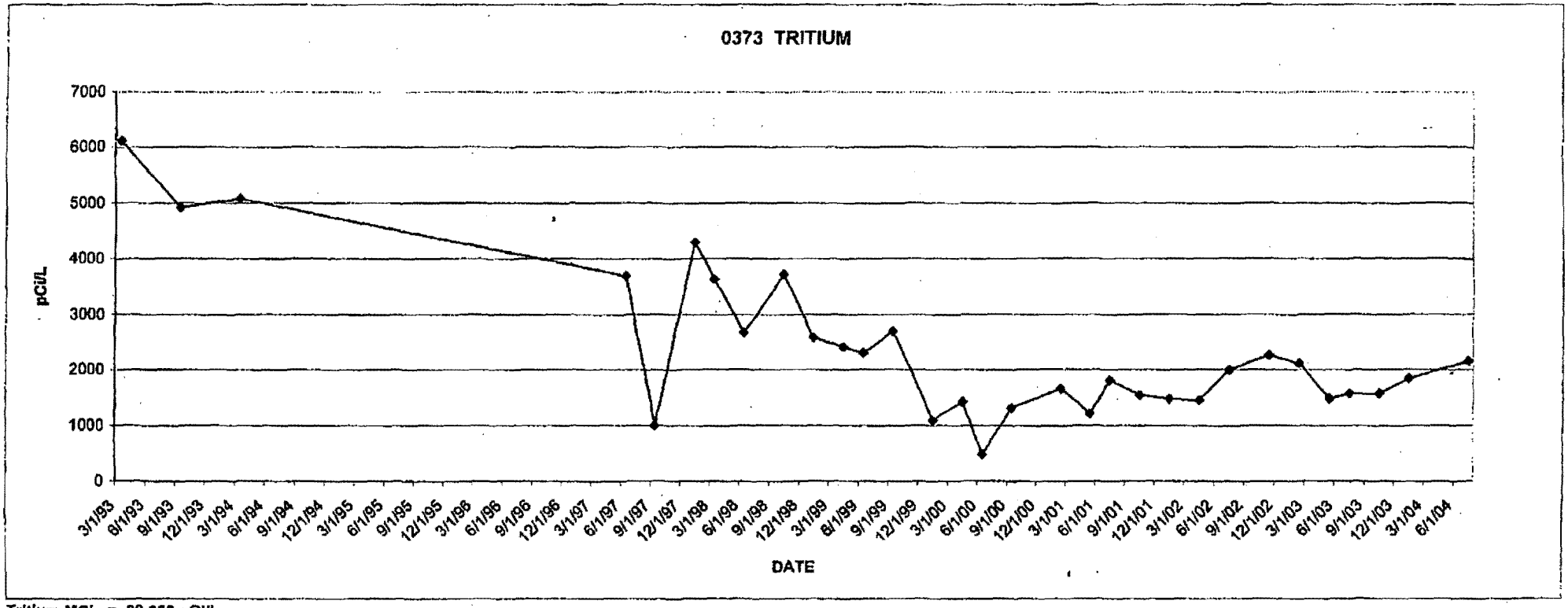
Tritium MCL = 20,000 pCi/L



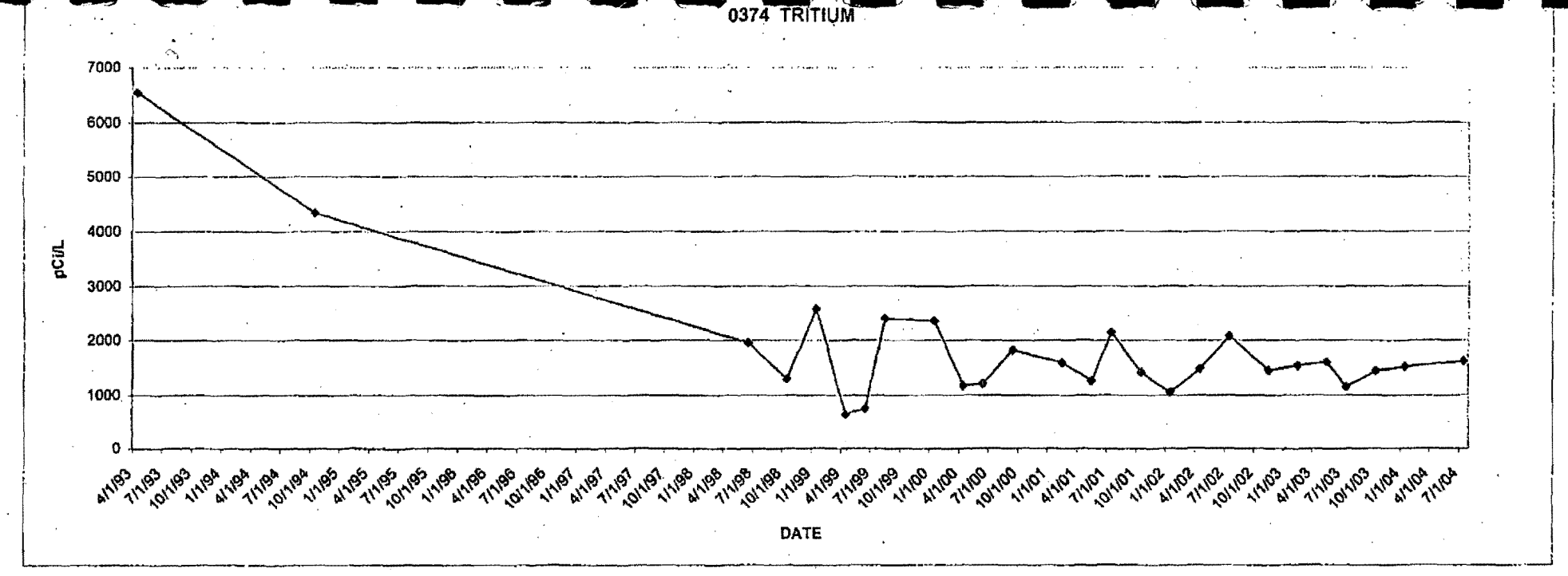


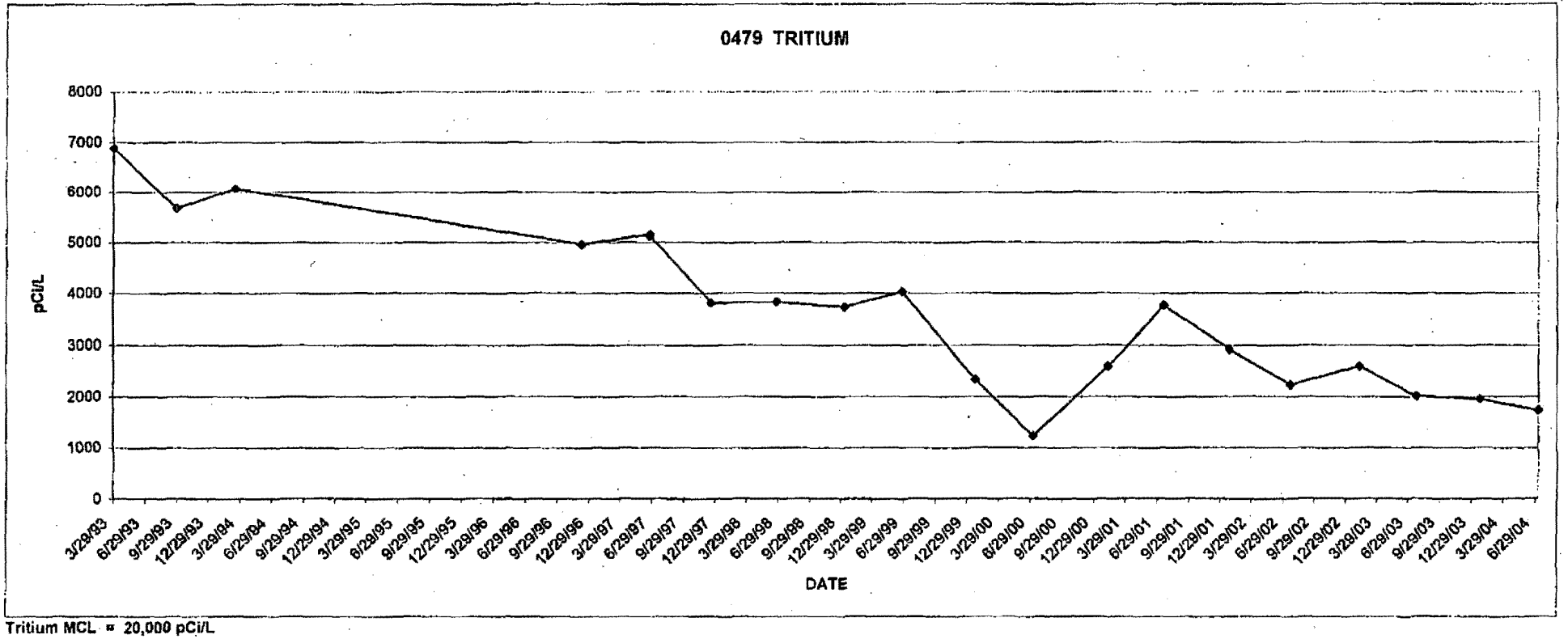
Tritium MCL = 20,000 pCi/L



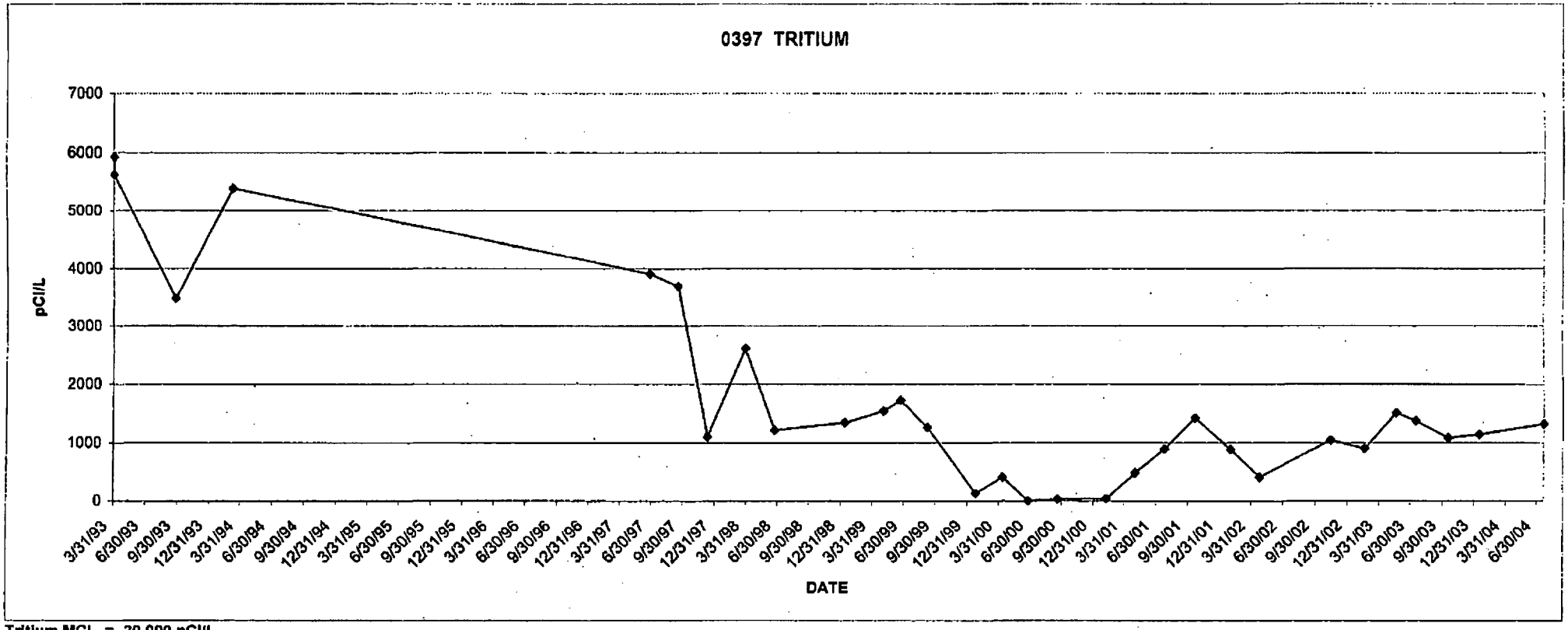


Tritium MCL = 20,000 pCi/L





Tritium MCL = 20,000 pCi/L



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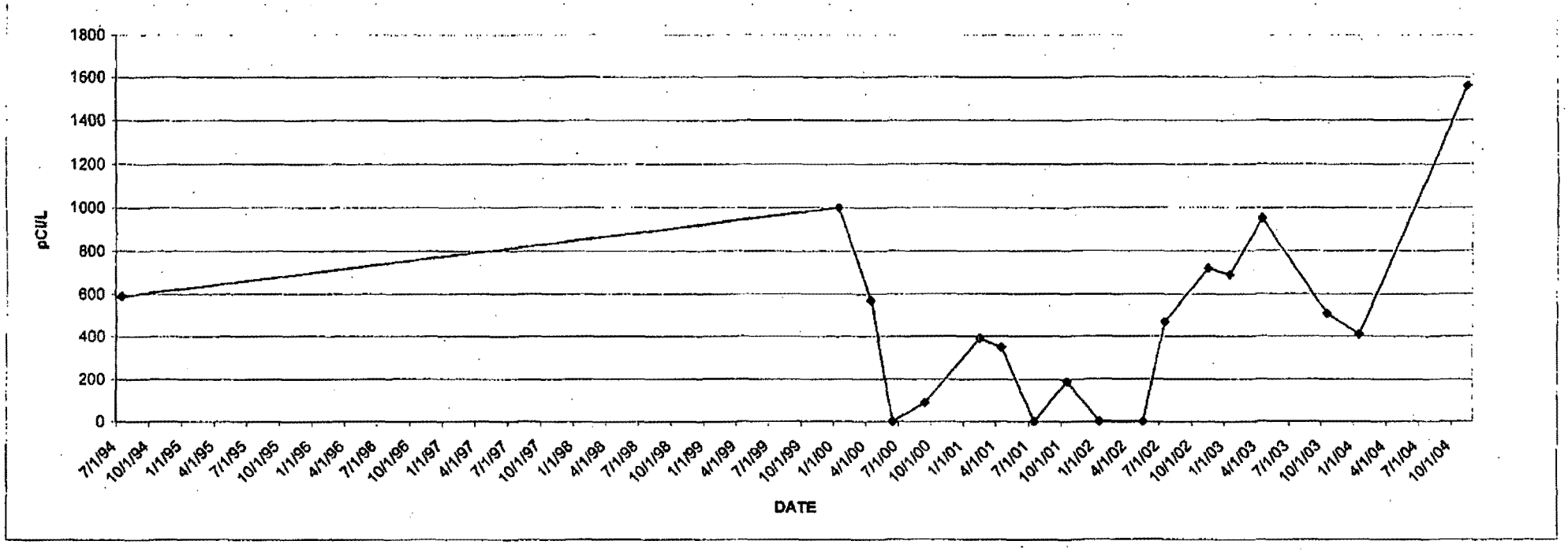

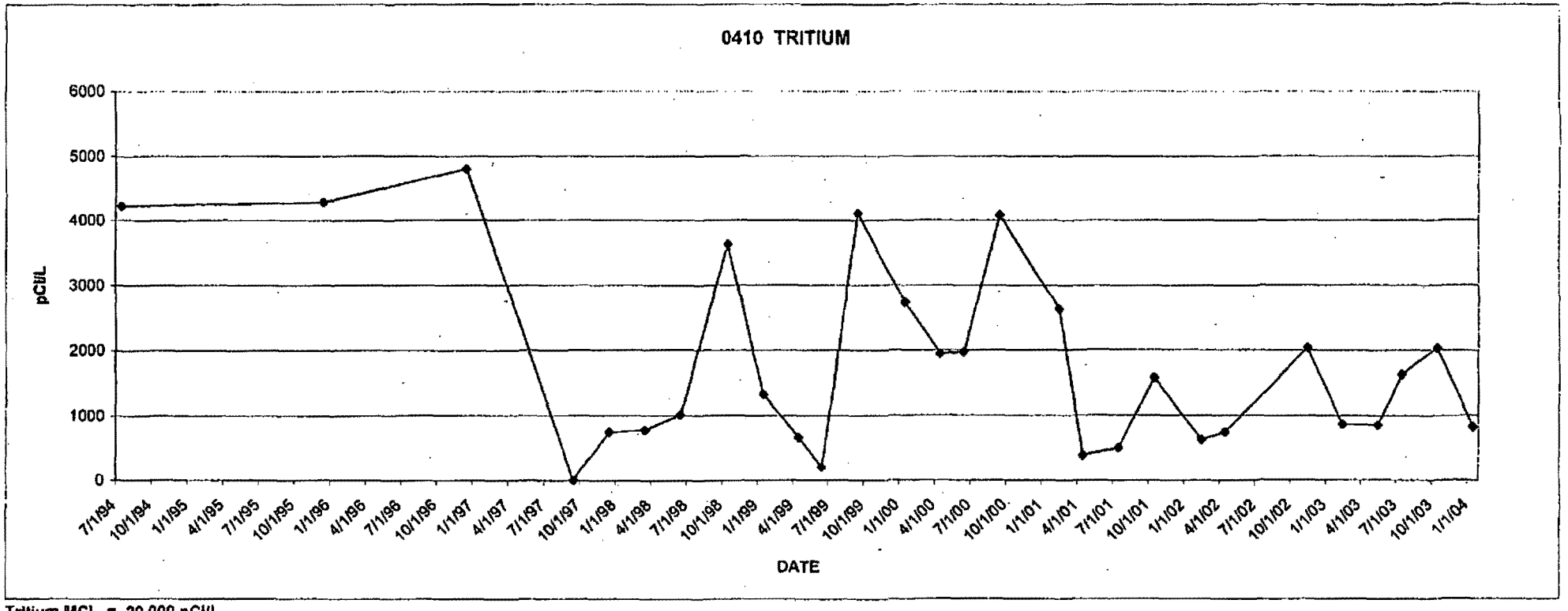

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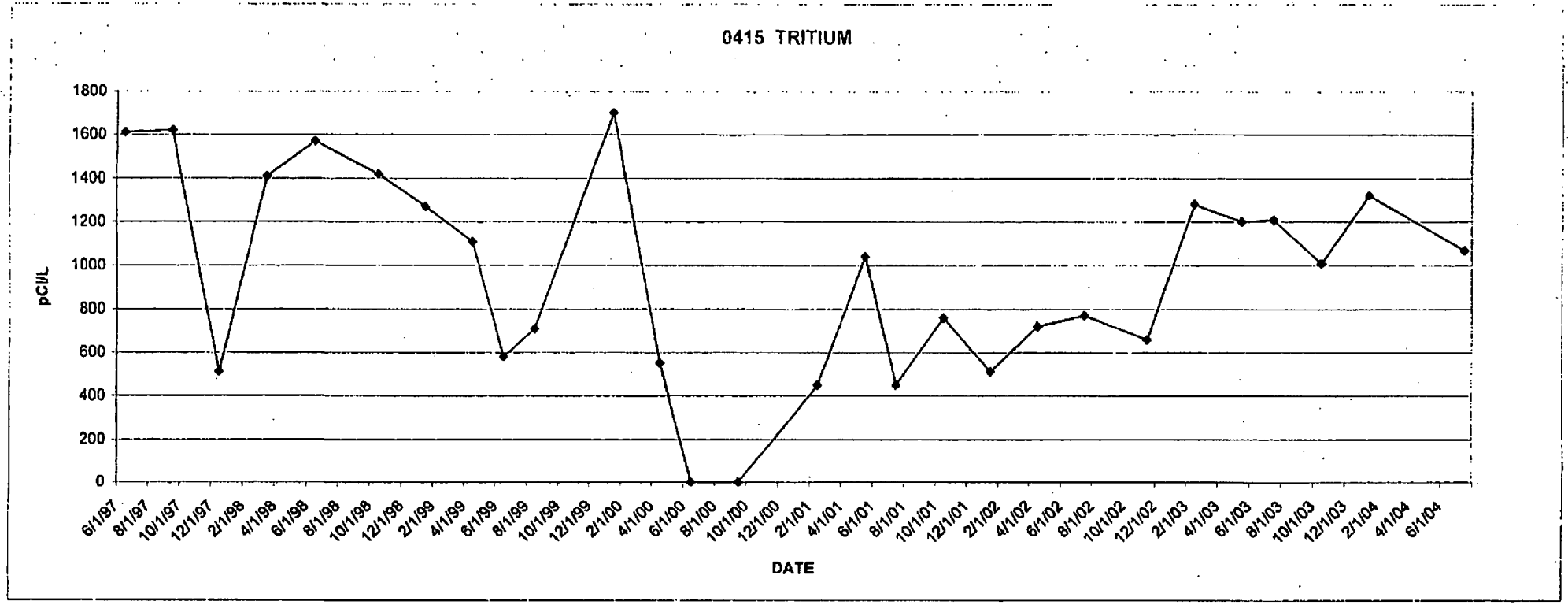
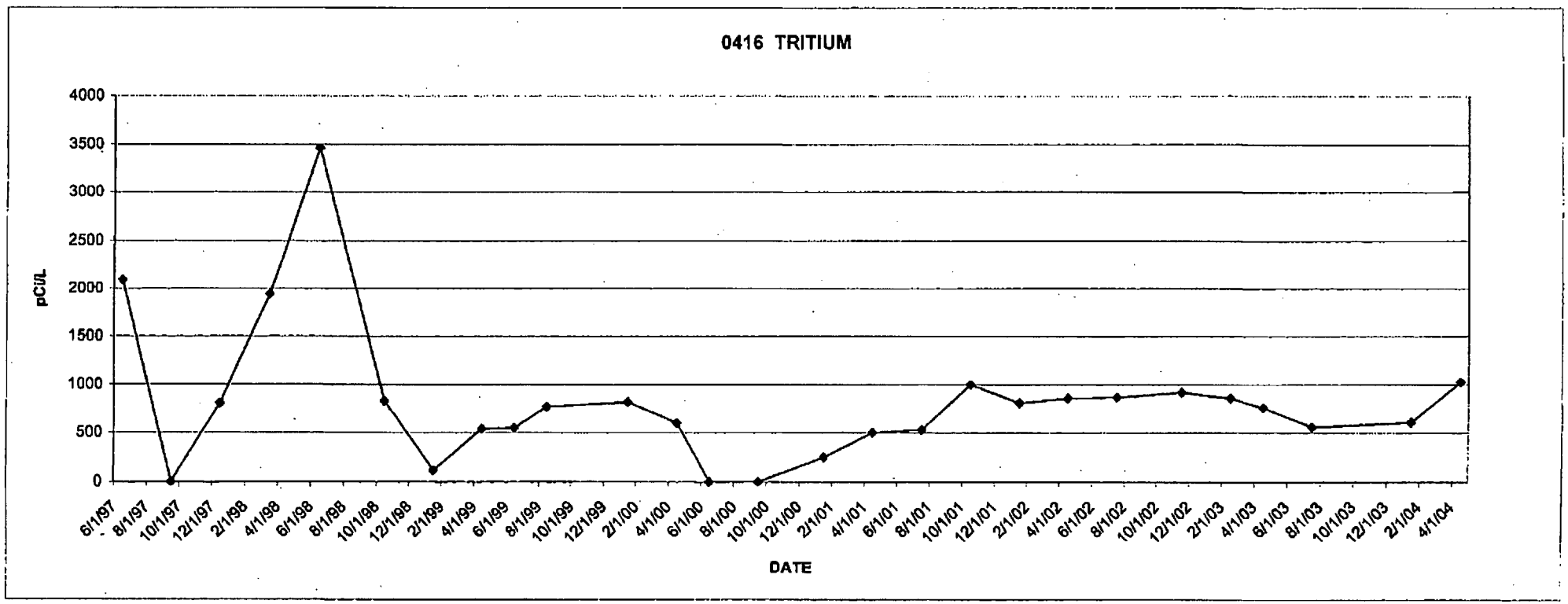
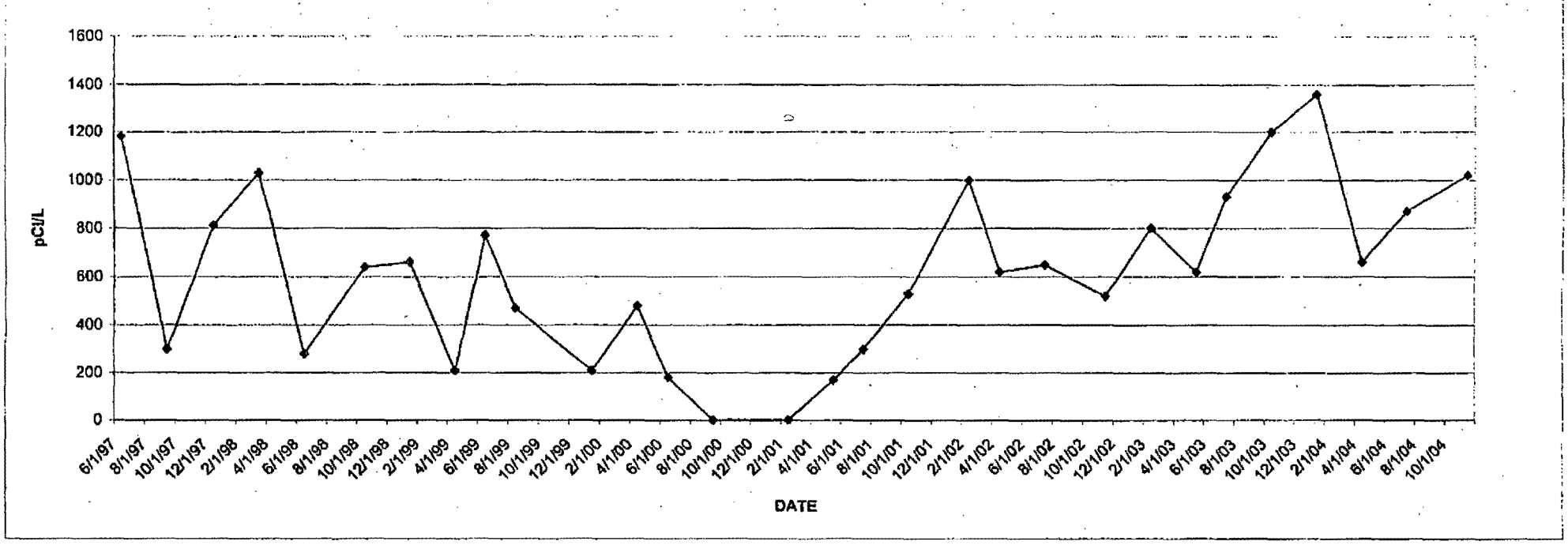
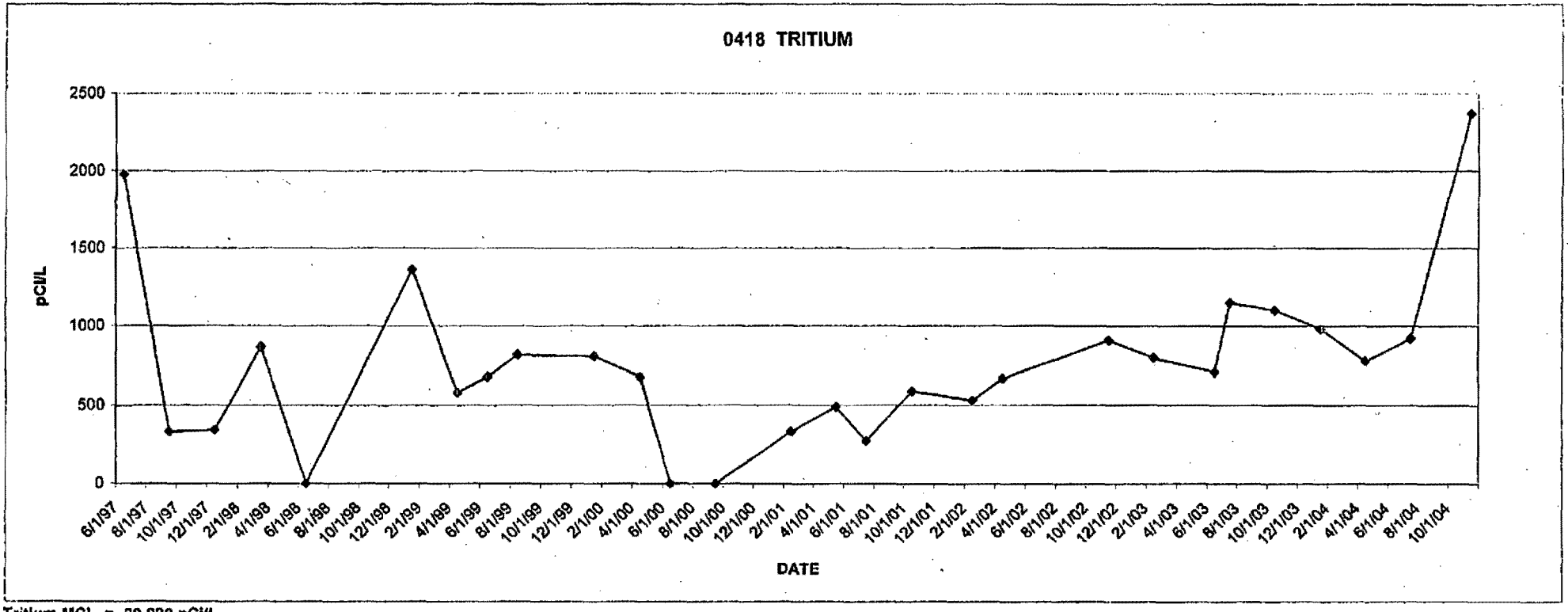


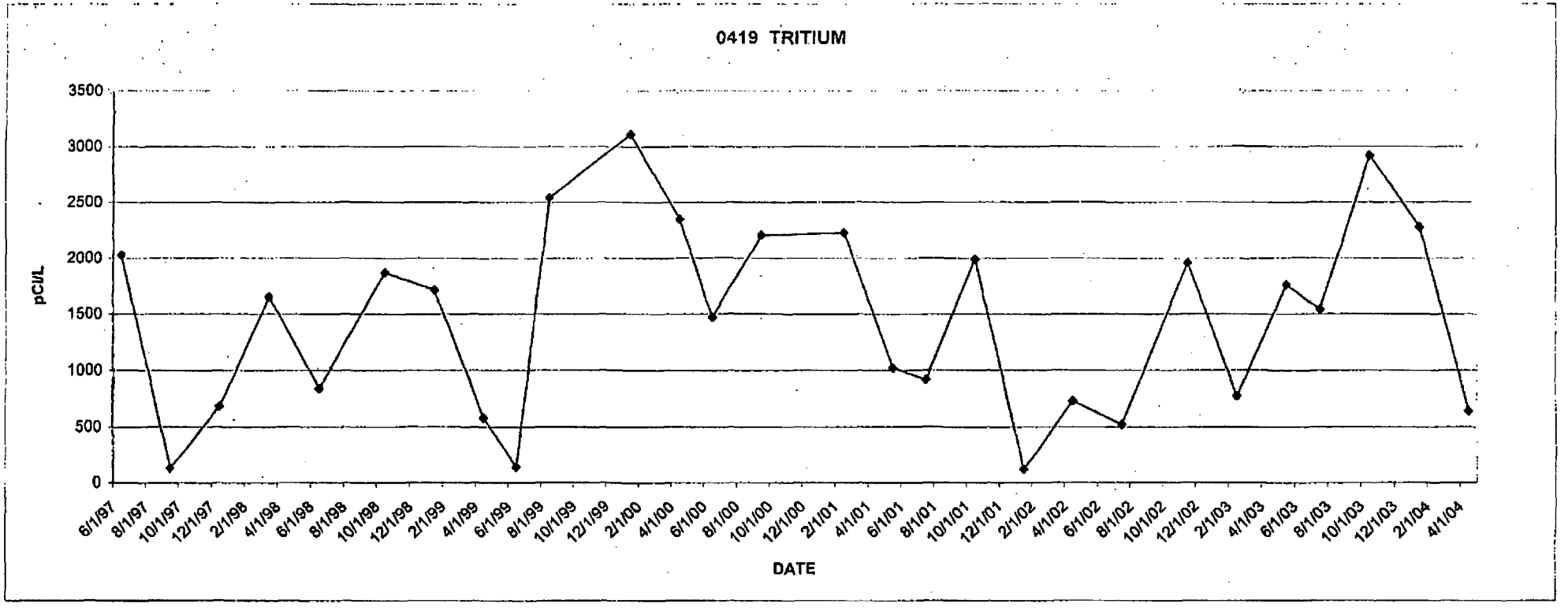


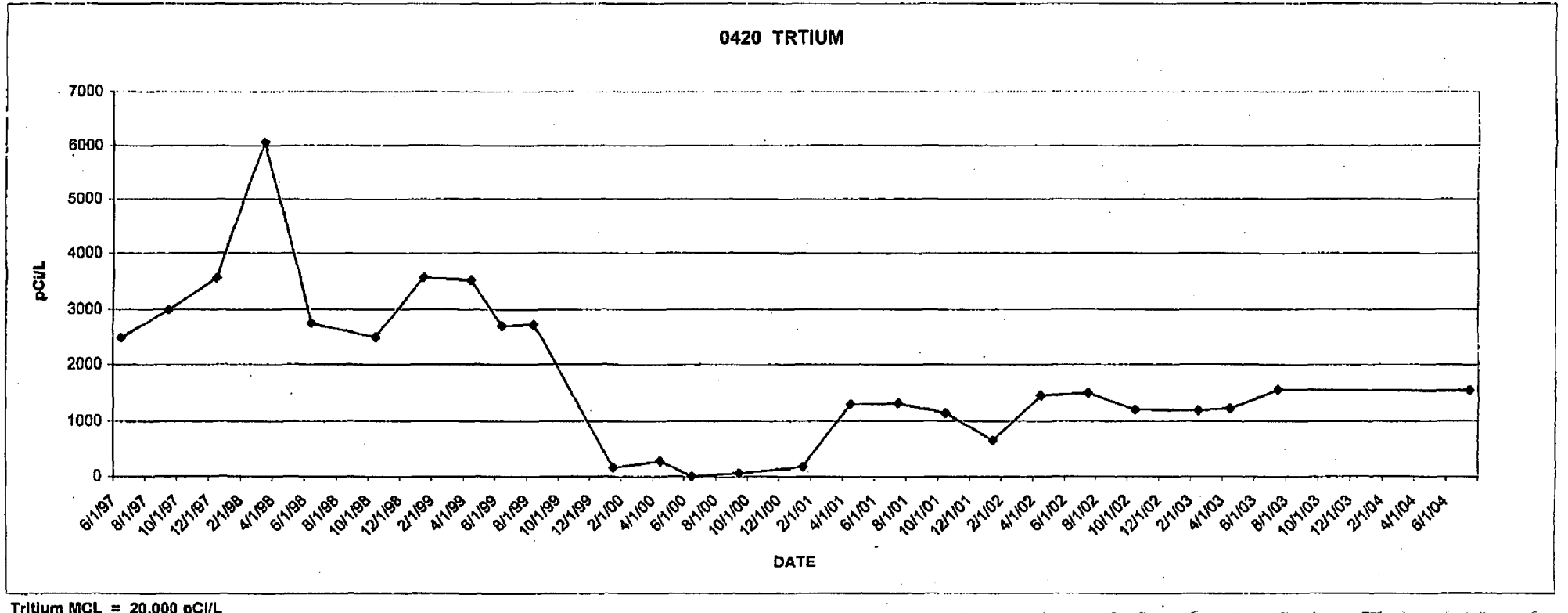
Tritium MCL = 20,000 pCi/L



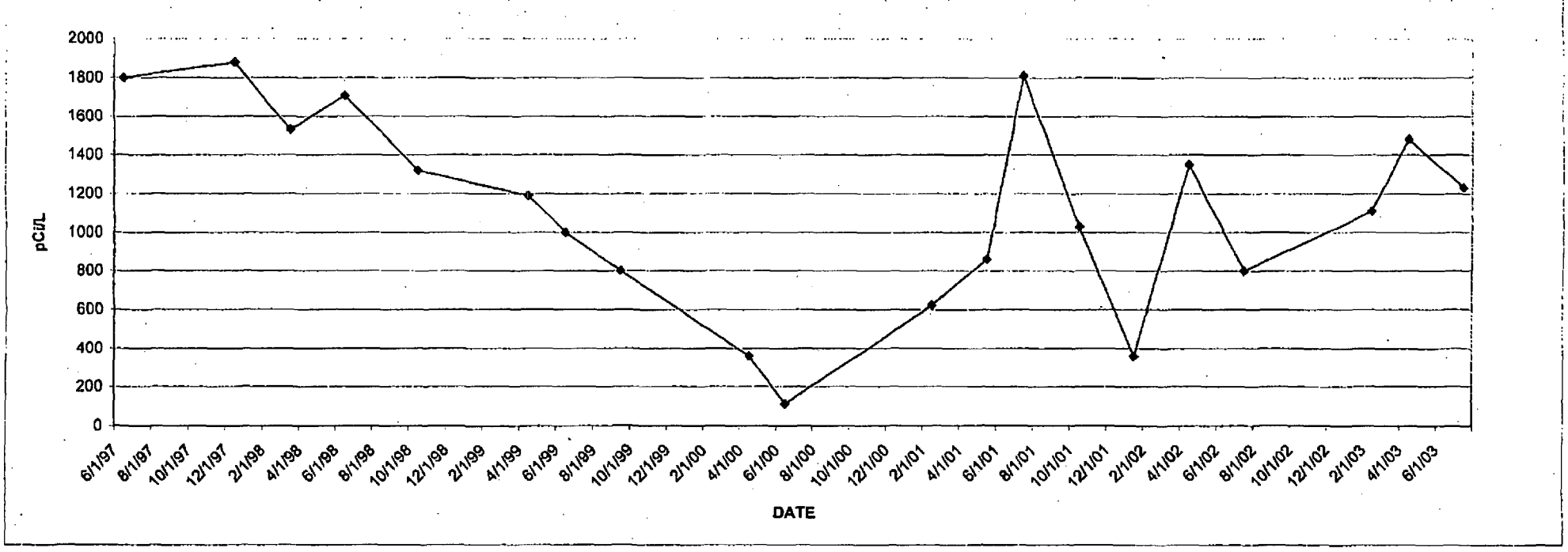


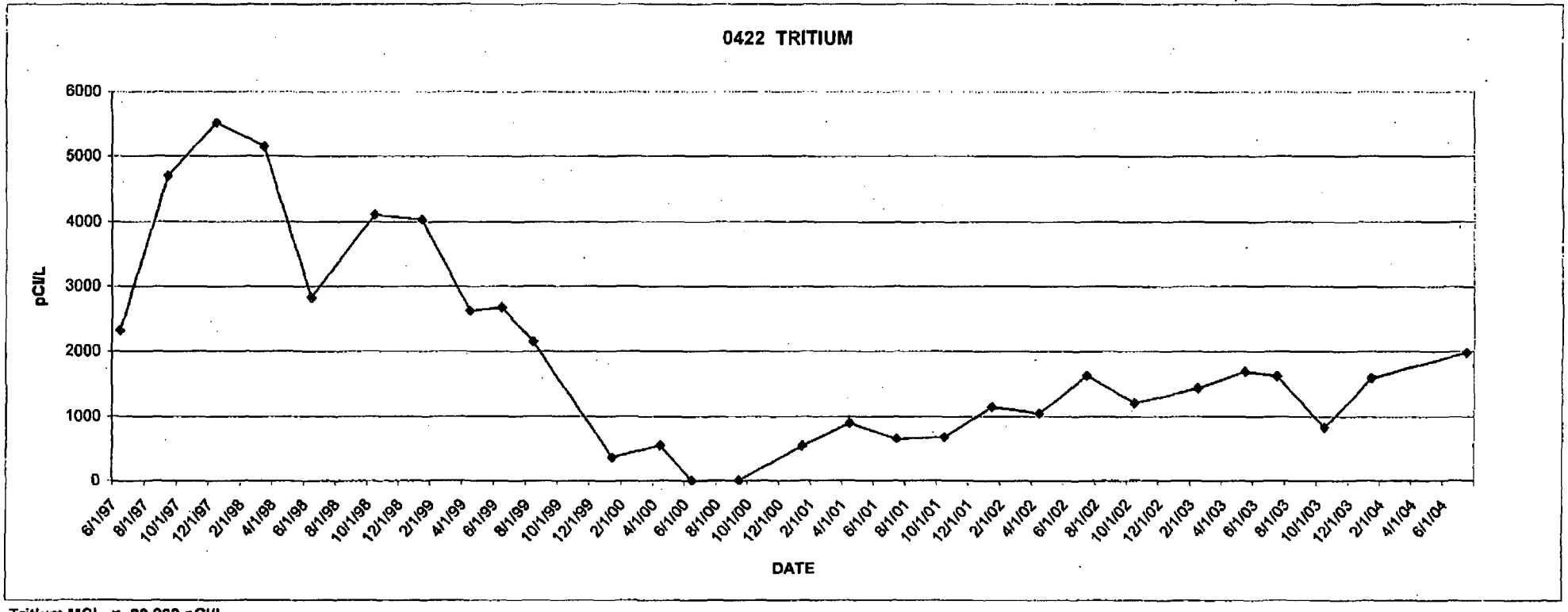
Tritium MCL = 20,000 pCi/L



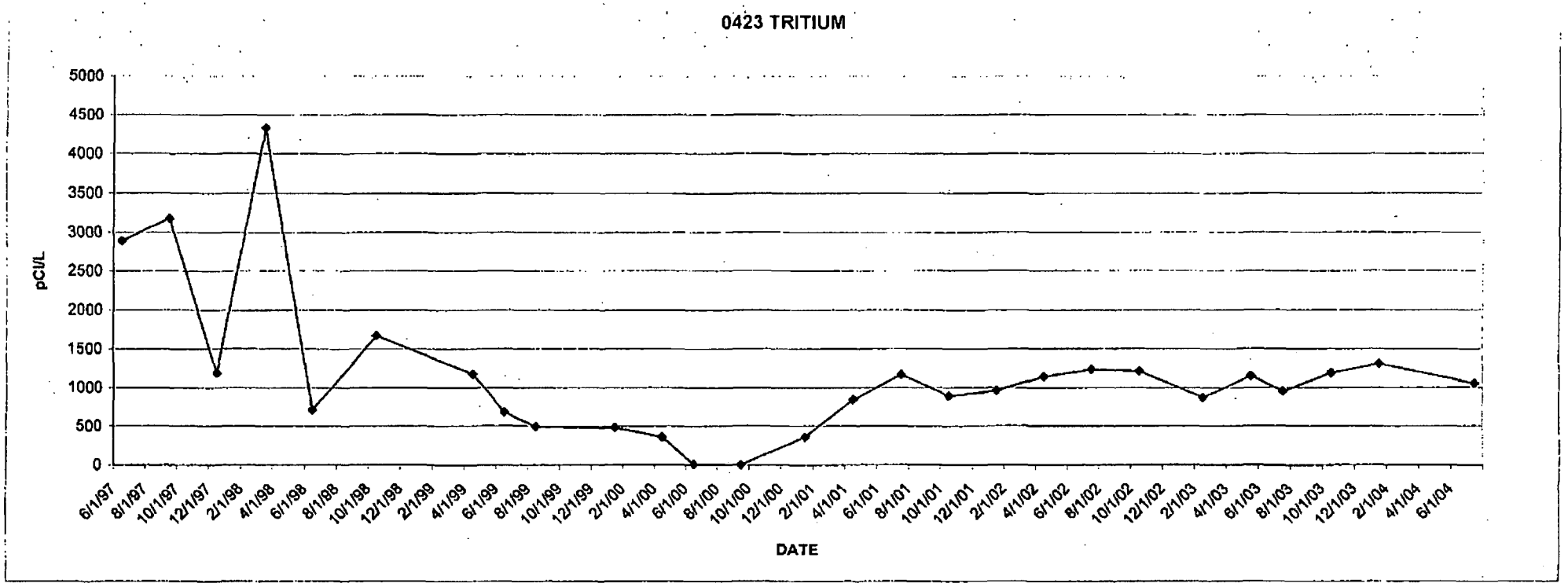


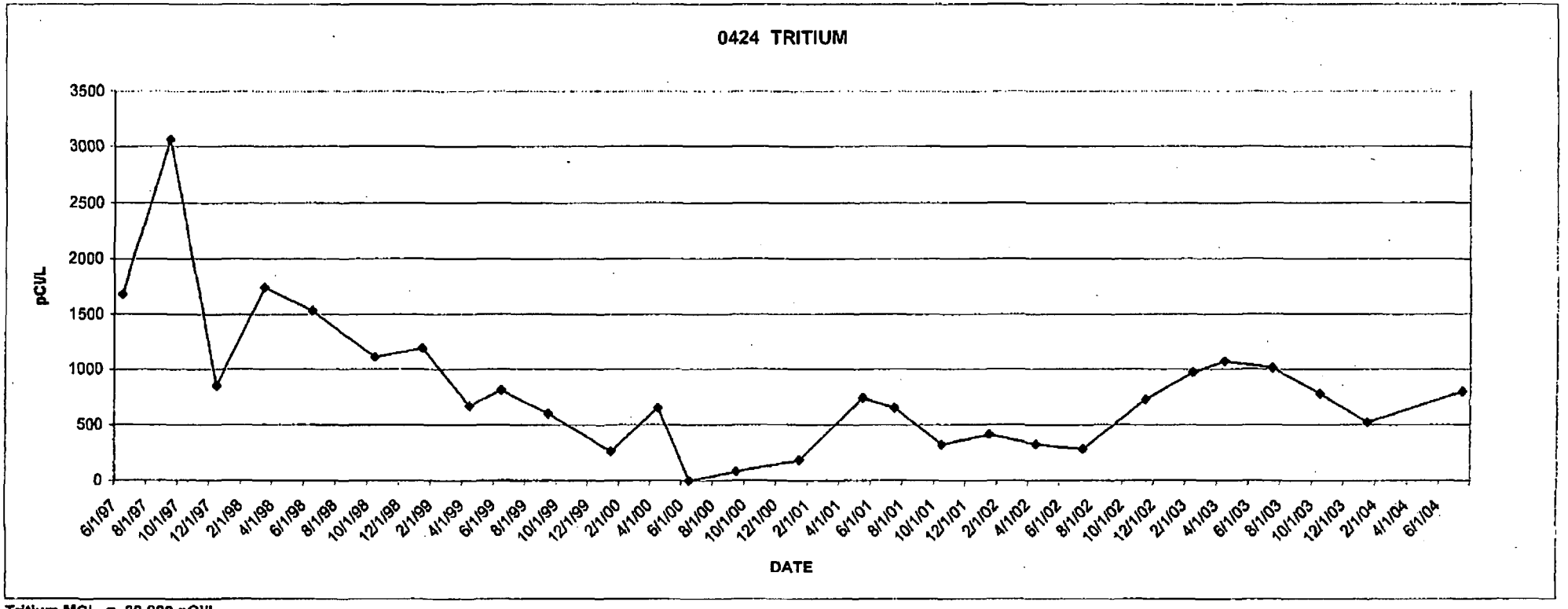
Tritium MCL = 20,000 pCi/L



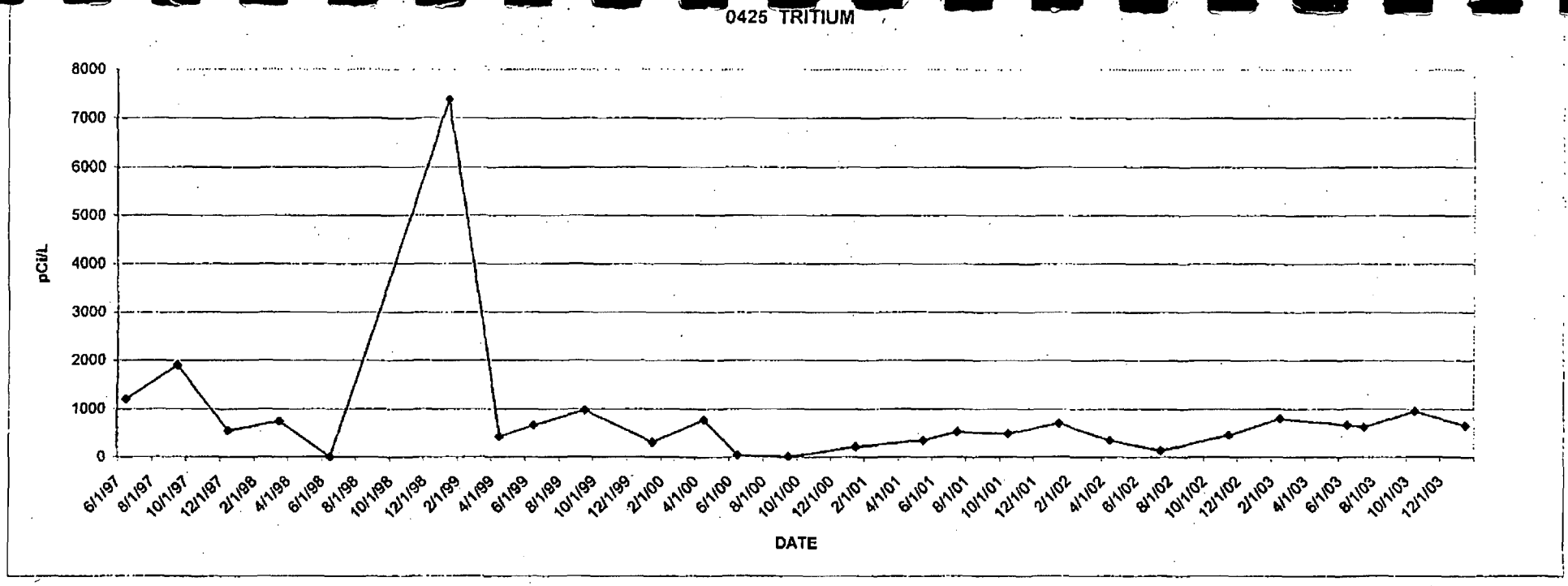


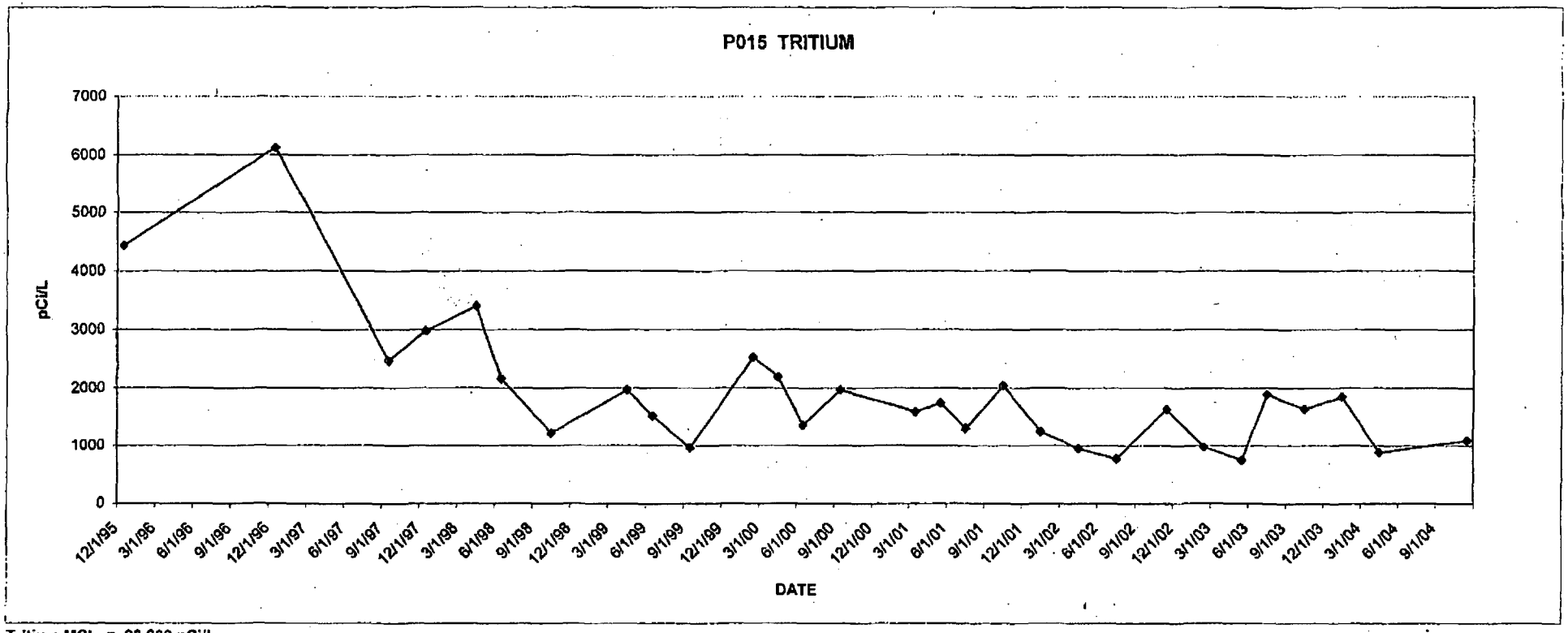
Tritium MCL = 20,000 pCi/L



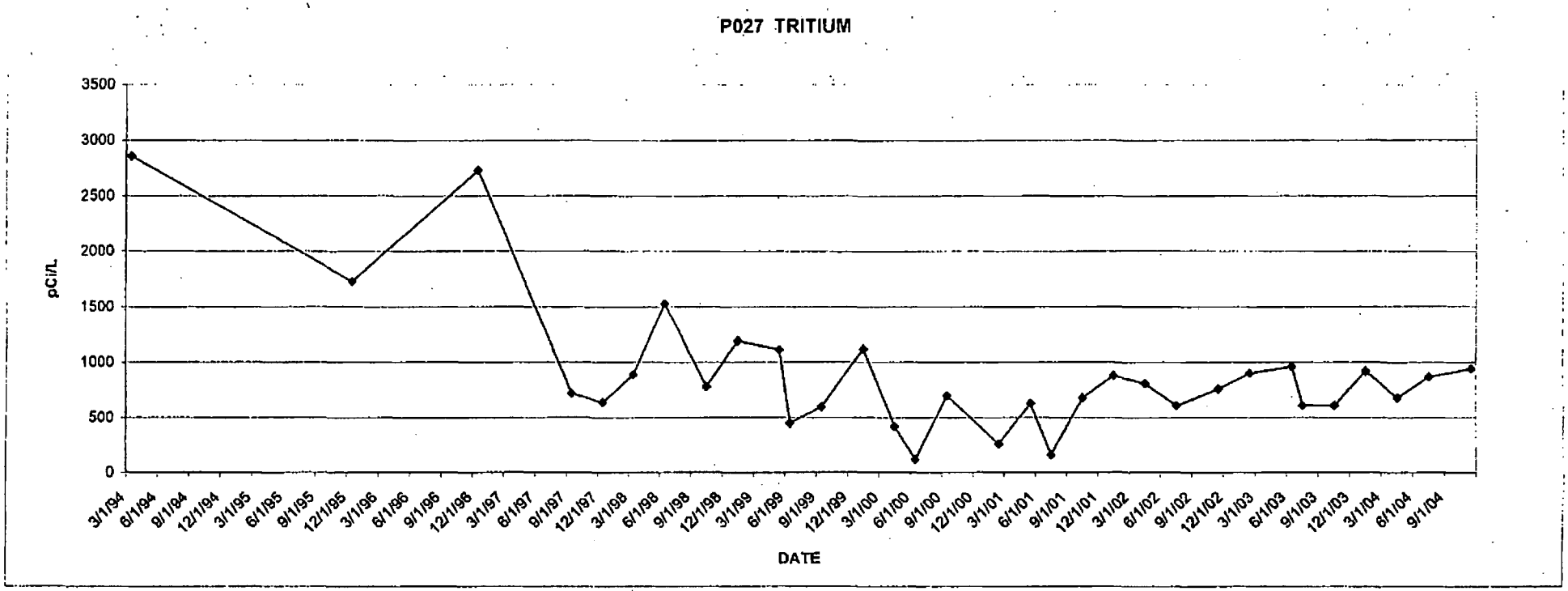


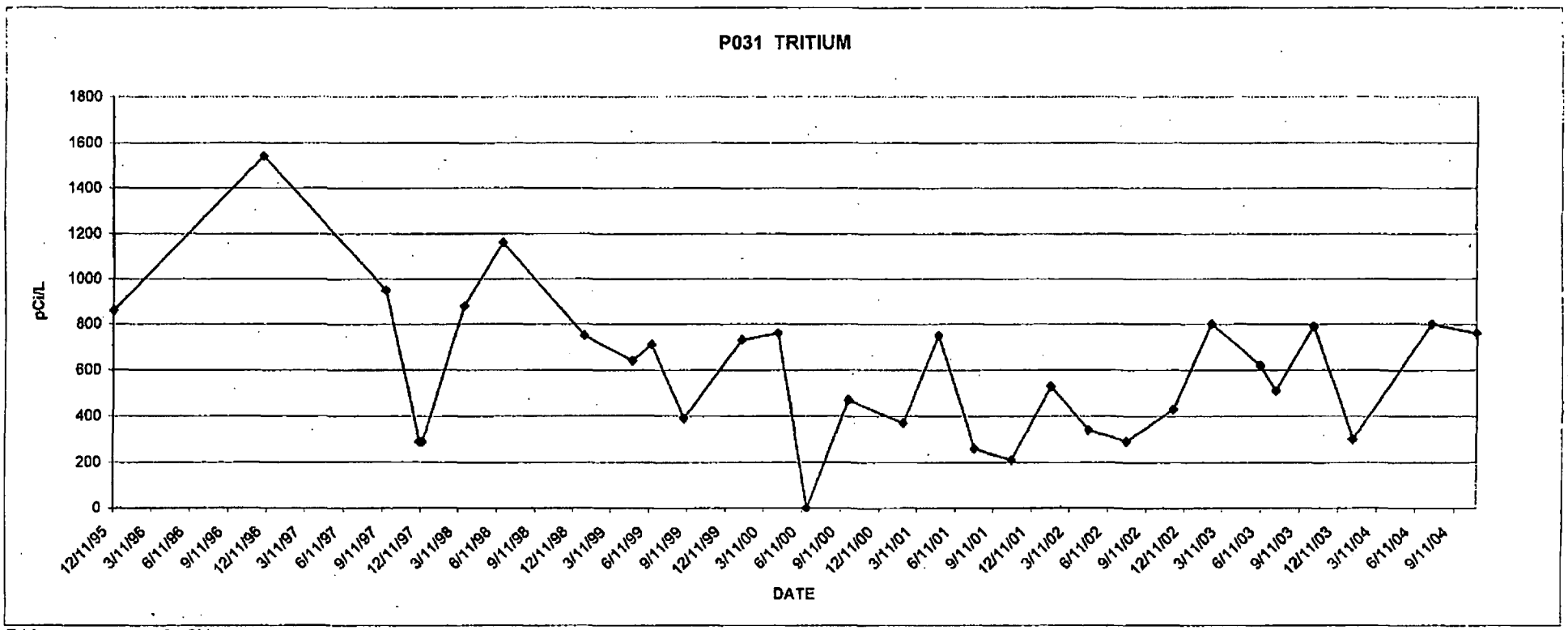
Tritium MCL = 20,000 pCi/L



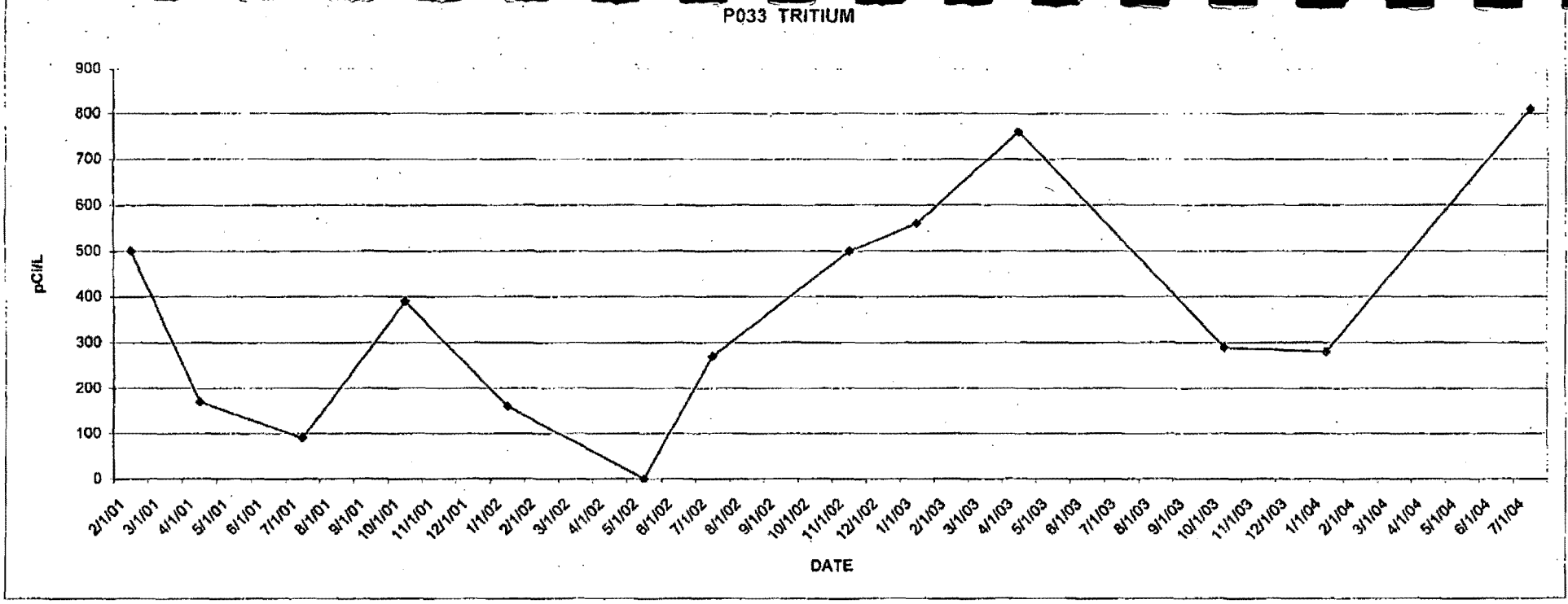


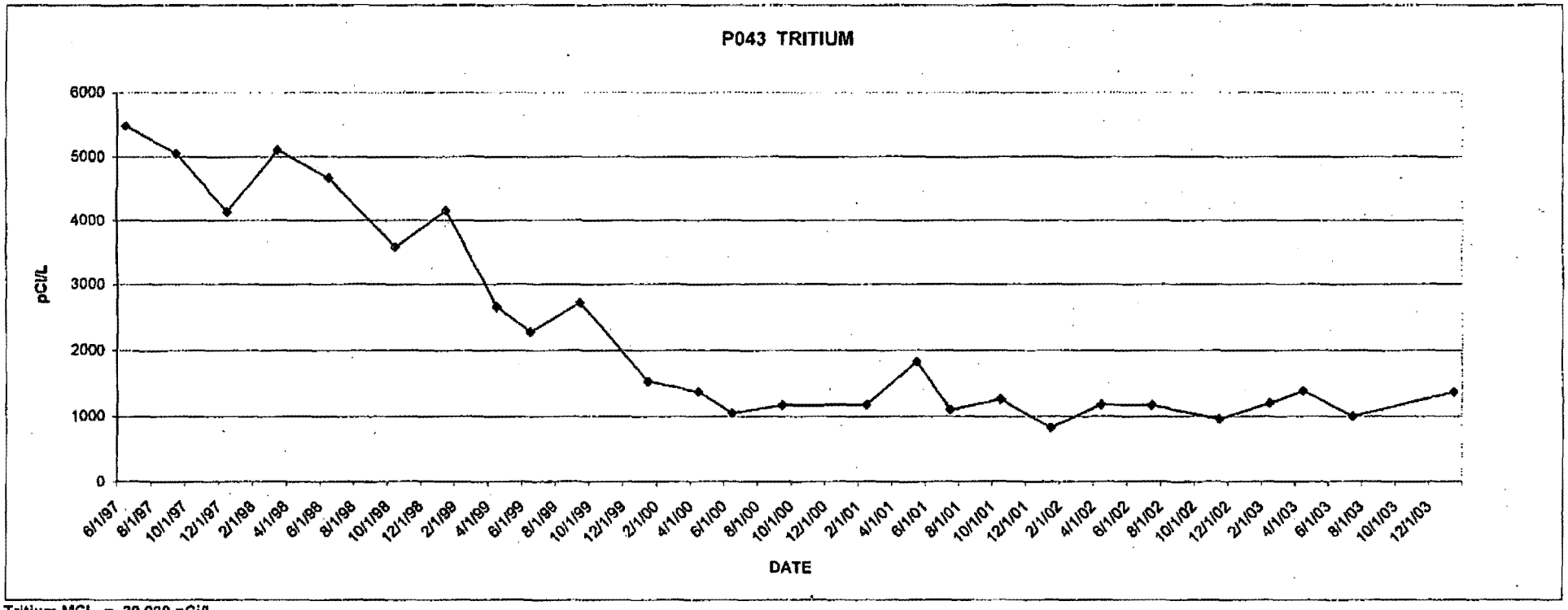
Tritium MCL = 20,000 pCi/L



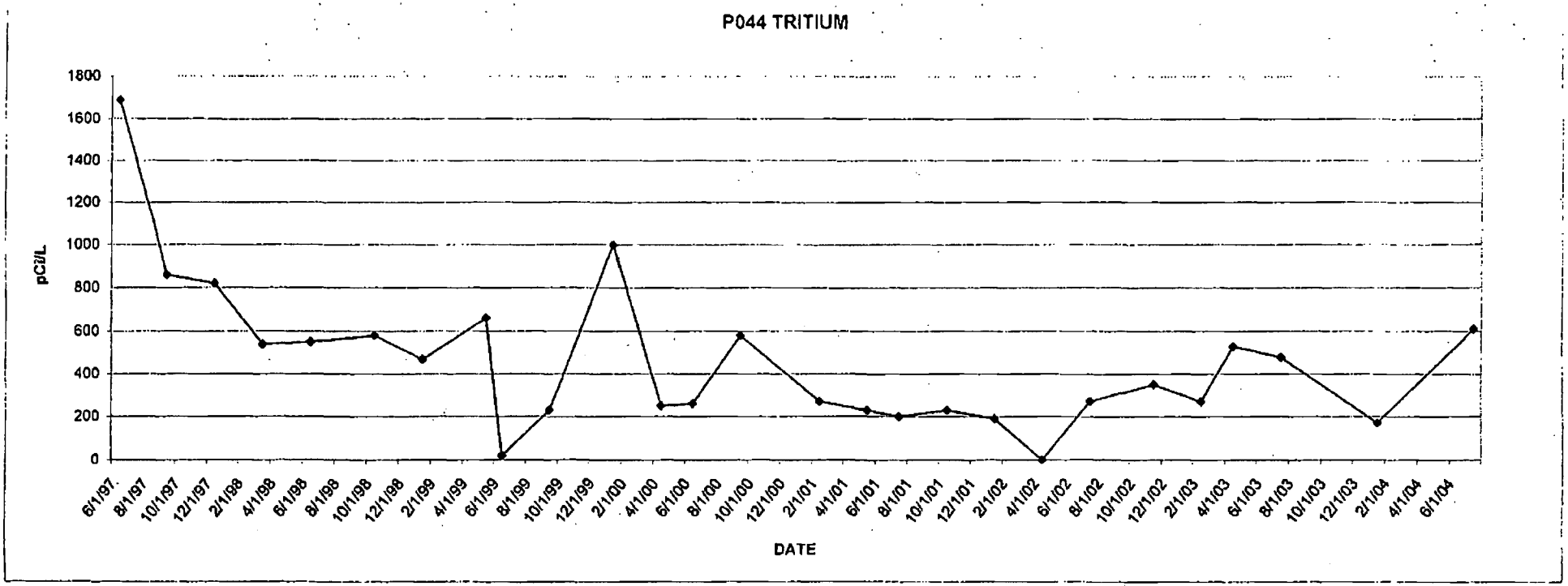


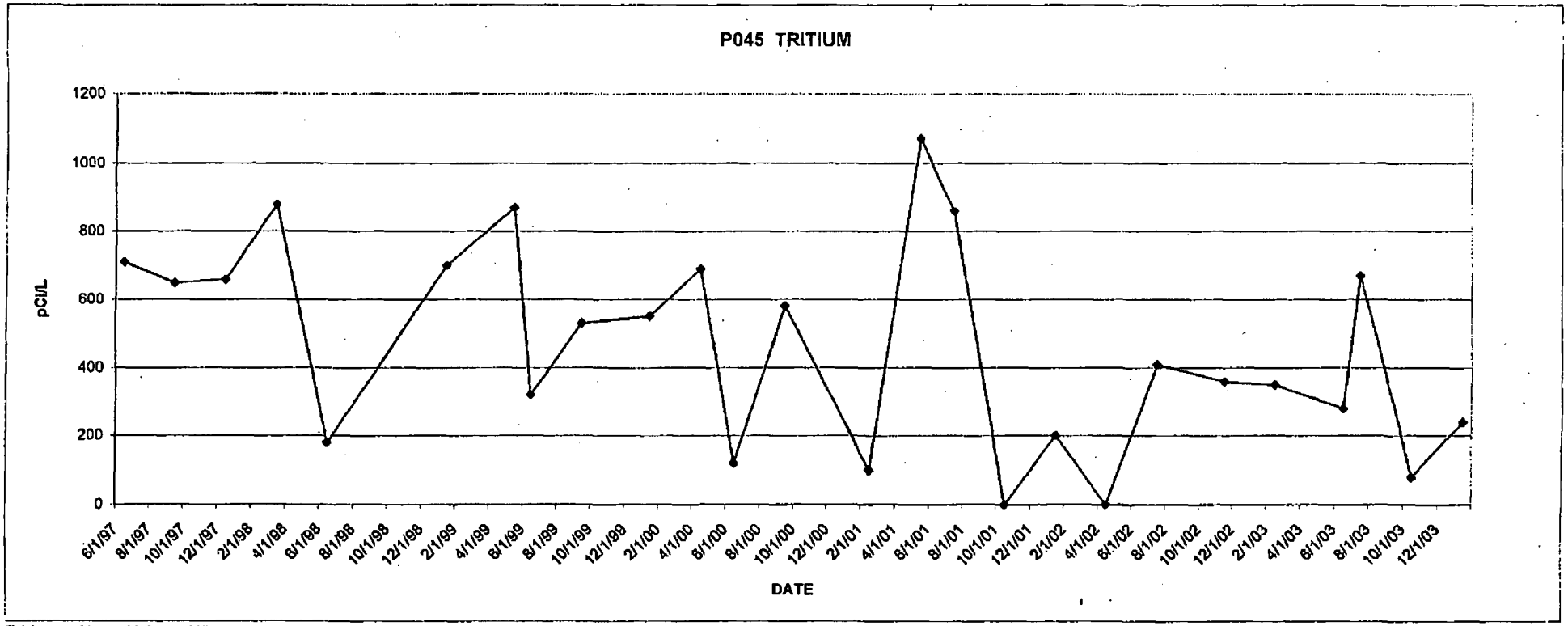
Tritium MCL = 20,000 pCi/L





Tritium MCL = 20,000 pCi/L





Tritium MCL = 20,000 pCi/L

GROUND WATER RADIOLOGICAL ANALYTES	RESIDENTIAL GUIDELINE VALUE pCi/L	CONSTRUCTION GUIDELINE VALUE pCi/L	BACK-GROUND VALUE
Actinium-227+D	0.098	1.30	NA
Americium-241	0.46	2.40	1.39
Bismuth-207		160	
Bismuth-210	0.86	110	NA
Cesium-137+D	1.57	25	
Cobalt-60	3.03	42	
Lead 210+D	0.038		
Plutonium-238	0.36	2.7 (a)	0.087
Plutonium-239	0.35		
Plutonium-240	0.35		
Plutonium-239/240		2.5 (a)	0.125
Protactinium 231+D	0.072		
Radium-226+D	0.12	2.7	1.0
Strontium-85		570	NA
Strontium-90+D	0.64	14	0.975
Tech 99	17.3		
Thorium-227		19.8 (a)	NA
Thorium-228+D	0.16	3.5 (a) *	0.779
Thorium-230+D	0.027	0.6 (a) *	NA
Thorium-232+D	0.033	1.6 (a) *	0.314
Tritium	932	11,000 (b)	
Uranium-233/234		18 (a)	NA
Uranium-234	0.67	18 (a)	0.792
Uranium-235	0.065		
Uranium-235+D		17 (a)	0.814
Uranium-238+D	0.025	0.56 (a) *	0.688
Potassium-40		NA	NA

Notes:
DOE tritium result for well 0158 from 1/26/00 was 950 pCi/L
pCi/L = picoCuries per liter
< = less than the minimum detectable activity (MDA)
+/- error = the uncertainty of a measurement
a = 10^{-6} cancer risk for ingestion
b = 10^{-6} cancer risk for ingestion, inhalation and dermal
* = Guideline values include daughter products
The guideline value of 10^{-6} cancer risk represents an incremental cancer increase of one human in one million humans risk level for the construction worker/Mound employee scenario.
Guideline values are from Risk-based Guideline Values, Mound Plant, March 1997 or Residuel Risk Evaluation, Mound Plant Parcel 4, Feb. 2001.

CONSTRUCTION = CONSTRUCTION WORKER / MOUND EMPLOYEE

Up-dated 4/12/00

OHIO MAXIMUM CONTAMINANT LEVELS FOR DRINKING WATER	
RADIOLOGICAL ANALYTES	MCL
Combined Ra226 & Ra228	5 pCi/L
Gross alpha particle activity	*15 pCi/L
Beta particle and photon radioactivity	**4 mrem/yr
Iodine-131	3 pCi/L
Cesium-134	80 pCi/L
Tritium - total body	20,000 pCi/L
Uranium	30 µg/L
Strontium-89 - bone marrow	20 pCi/L
Strontium-90 - bone marrow	8 pCi/L

USEPA MAXIMUM CONTAMINANT LEVELS (MCL's) FOR DRINKING WATER	
Uranium	30 µg/L
Radium 226 & 228 combined	5 pCi/L
Radon	300 pCi/L
Beta particle & photon activity	4 mrem/yr
Gross alpha particle activity	15 pCi/L

Notes:
µg/L = micrograms per liter
mrem = millirems
pCi/L = picoCuries per liter

* Gross alpha particle activity (including radium-226 but excluding radon and uranium)-fifteen pCi/L.

** The average annual concentration of beta particle and photon radioactivity from man-made radionuclides in drinking water shall not produce an annual dose equivalent to the total body or any internal organ greater than four millirem/year.

MCL's up-dated 4/21/05

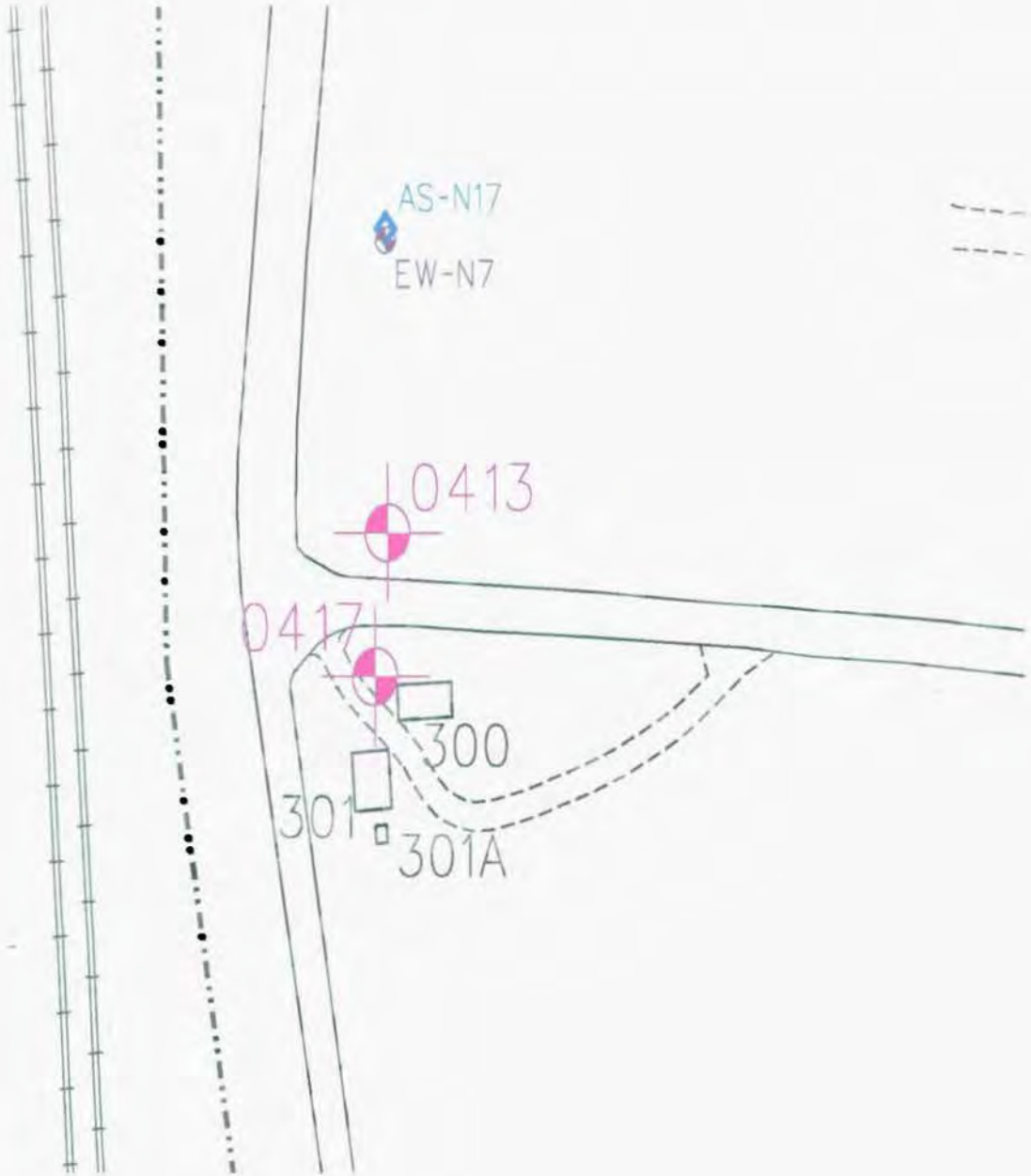
Attachment 6

Fluctuations in Groundwater Table

Mound Core Team, Technical Memorandum
Operable Unit 1 (OU-1)

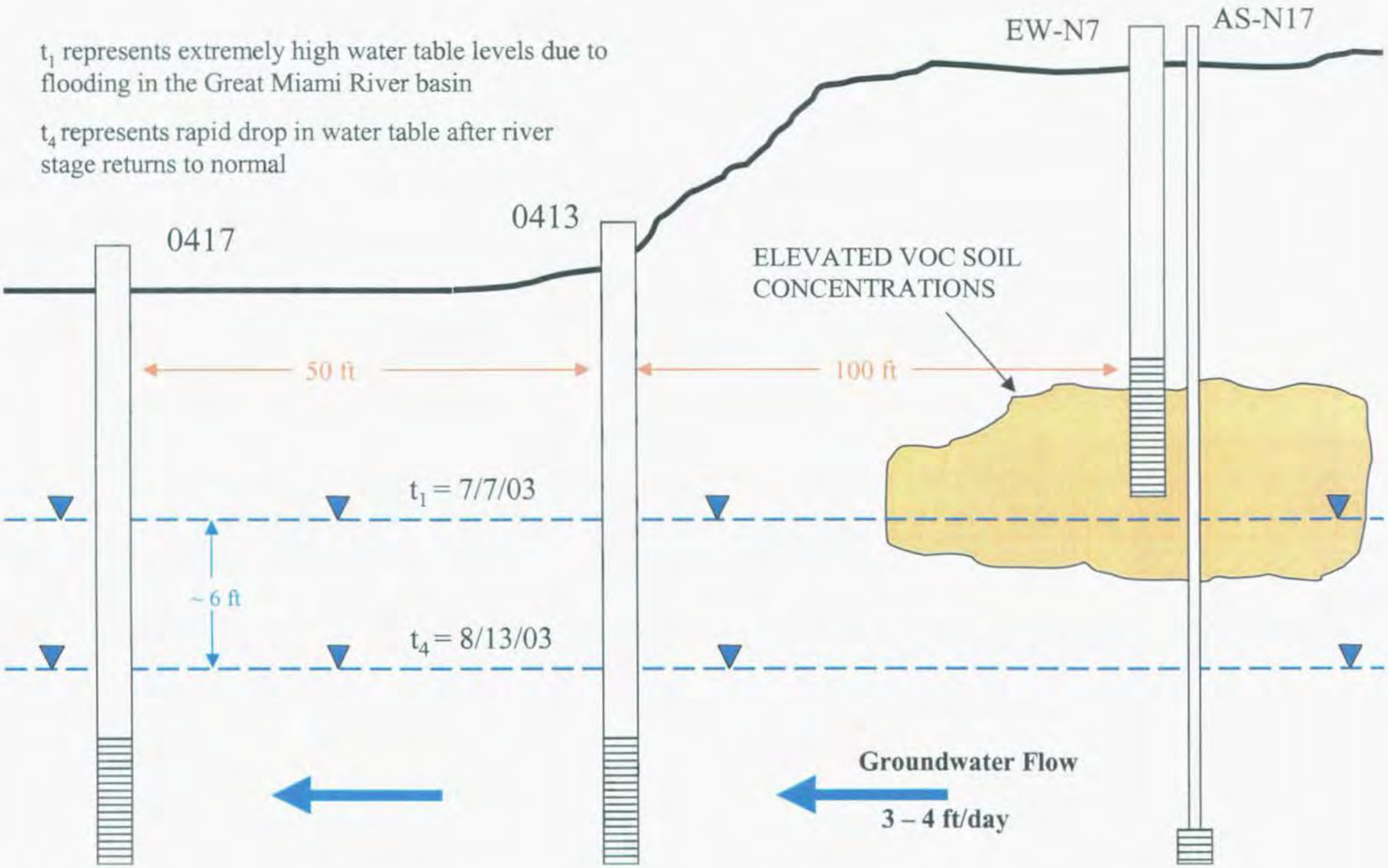
Events Leading to Increasing Concentrations of VOCs in Monitoring Wells 0413 and 0417 During August 2003

- Water table elevation near OU-1 normally at approximately 680 ft MSL
- Water table elevation near Mound is extremely sensitive to river stage in The Great Miami
- Flooding in Great Miami River basin in early July 2003 leads to significant rise in river stage
- Water table near Mound responds rapidly to increased river stage
- Water levels recorded during July 13 rebound test sampling event show water table elevation in OU-1 area at approximately 686 ft MSL (highest levels since remediation efforts were initiated)
- Groundwater rises into contact with VOC contaminated soils know to exist at air-sparge well AS-N17 and soil vapor extraction well EW-N7 (concentrations in 1997 as high as 300 mg/kg TCE)
- VOCs begin to partition (leach) from the soil into the groundwater
- As river stage decreases steadily over the next month the water table drops back towards the 680 ft MSL position
- As the water table drops, natural groundwater flow to the south begins to distribute the leached VOCs downgradient of the contaminated soil zone
- The "slug" of groundwater containing leached VOCs continues to migrate downgradient with VOC concentrations continually declining due to hydrodynamic dispersion
- The "slug" migrating at approximately the advective groundwater rate of 3-4 ft/day is intercepted first by well 0413 and then by 0417
- Groundwater samples collected at 0413 and 0417 during the 8/13/03 sampling event show the effects of this unusual flood event (the groundwater flow rate of 3-4 ft/day is sufficient to transport the "slug" from the contaminated soil zone to the two downgradient wells in the time frame between the flood event and the sampling event)


AS-N17
EW-N7
0413
0417
300
301
301A

S N

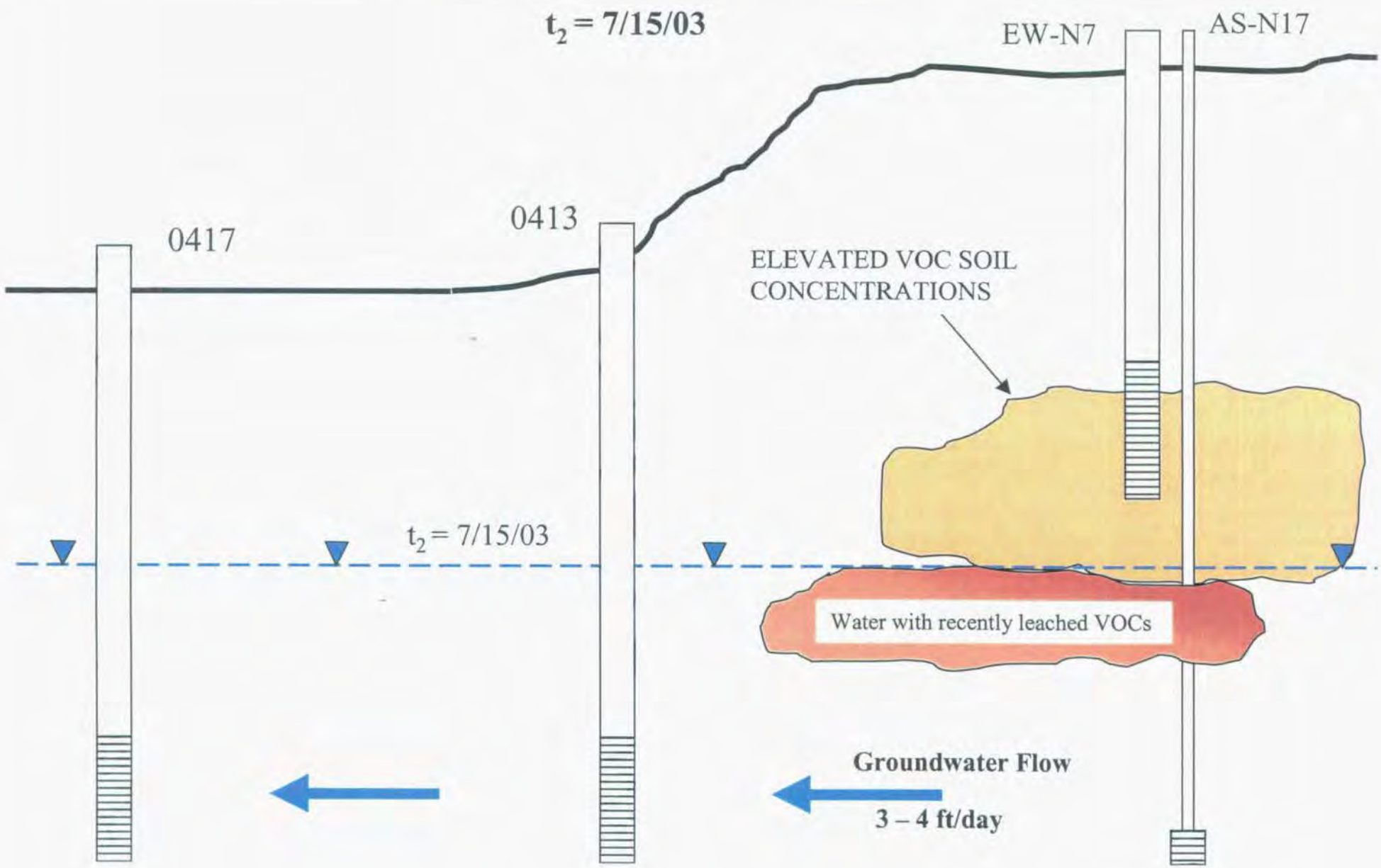
Water Table Elevations at OU-1 During Recent Great Miami River Flooding



S

Progression of Water Table Drop From 7/7/03 Through 8/13/03

N



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Progression of Water Table Drop From 7/7/03 Through 8/13/03

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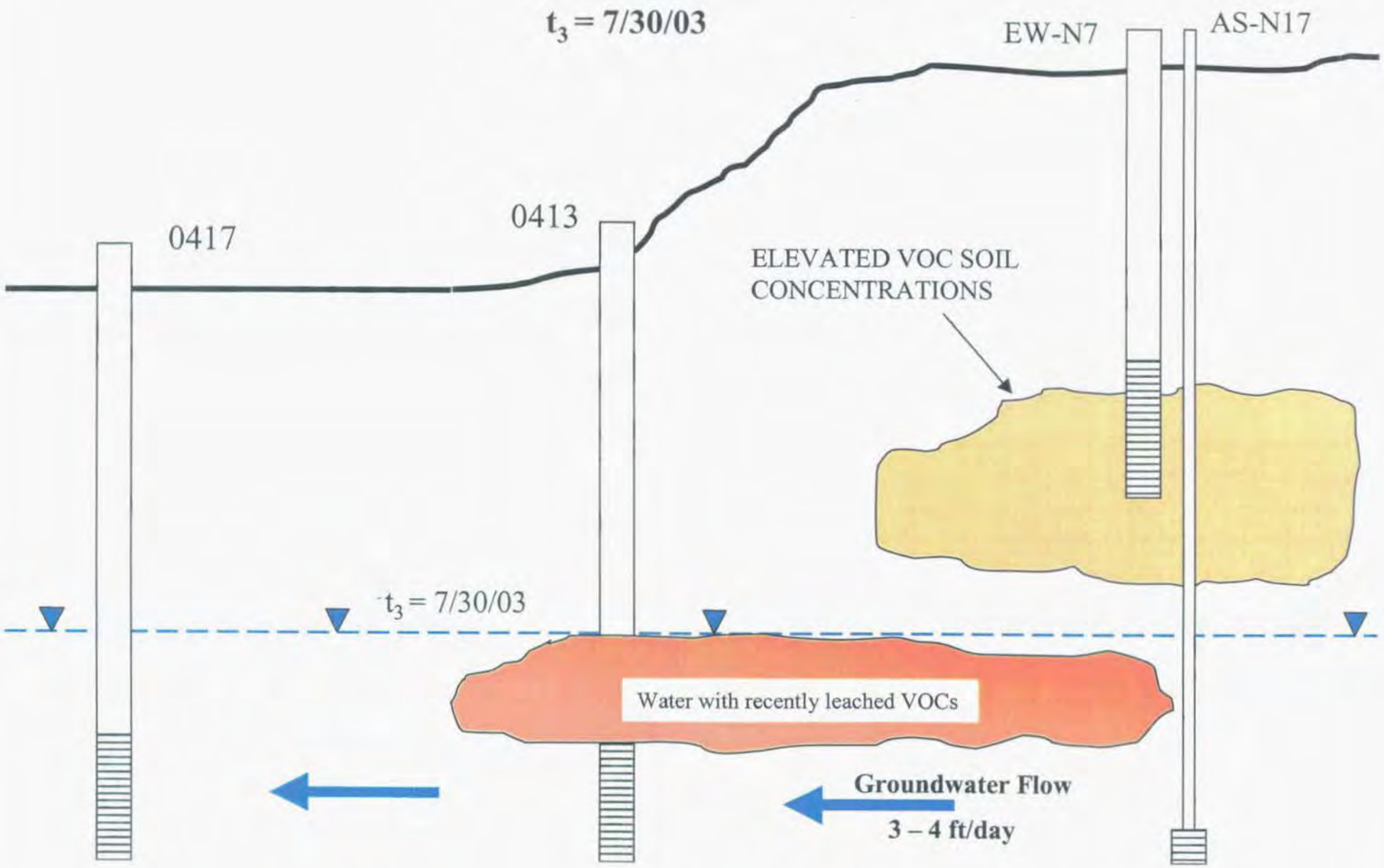
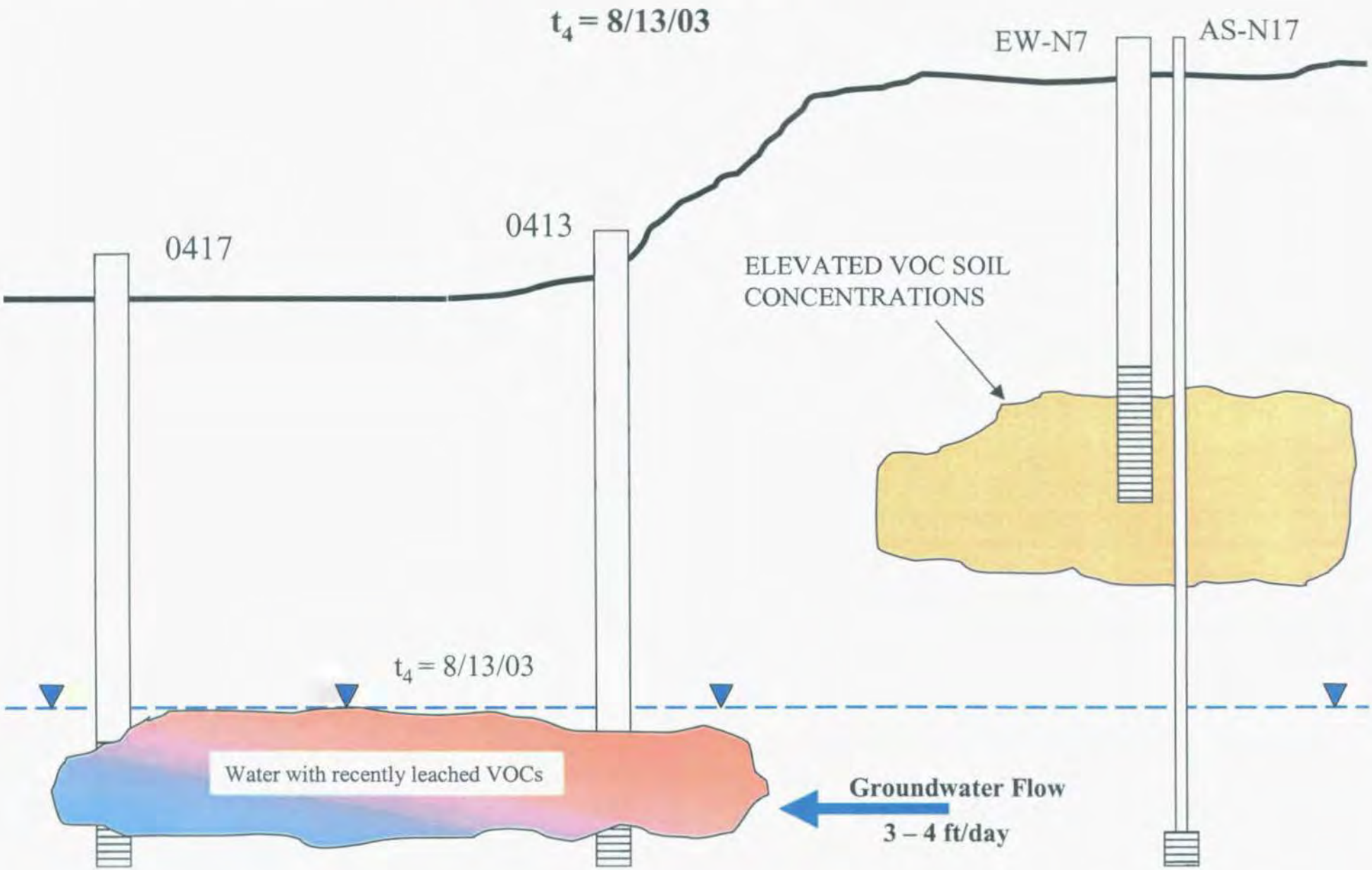


S

Progression of Water Table Drop From 7/7/03 Through 8/13/03

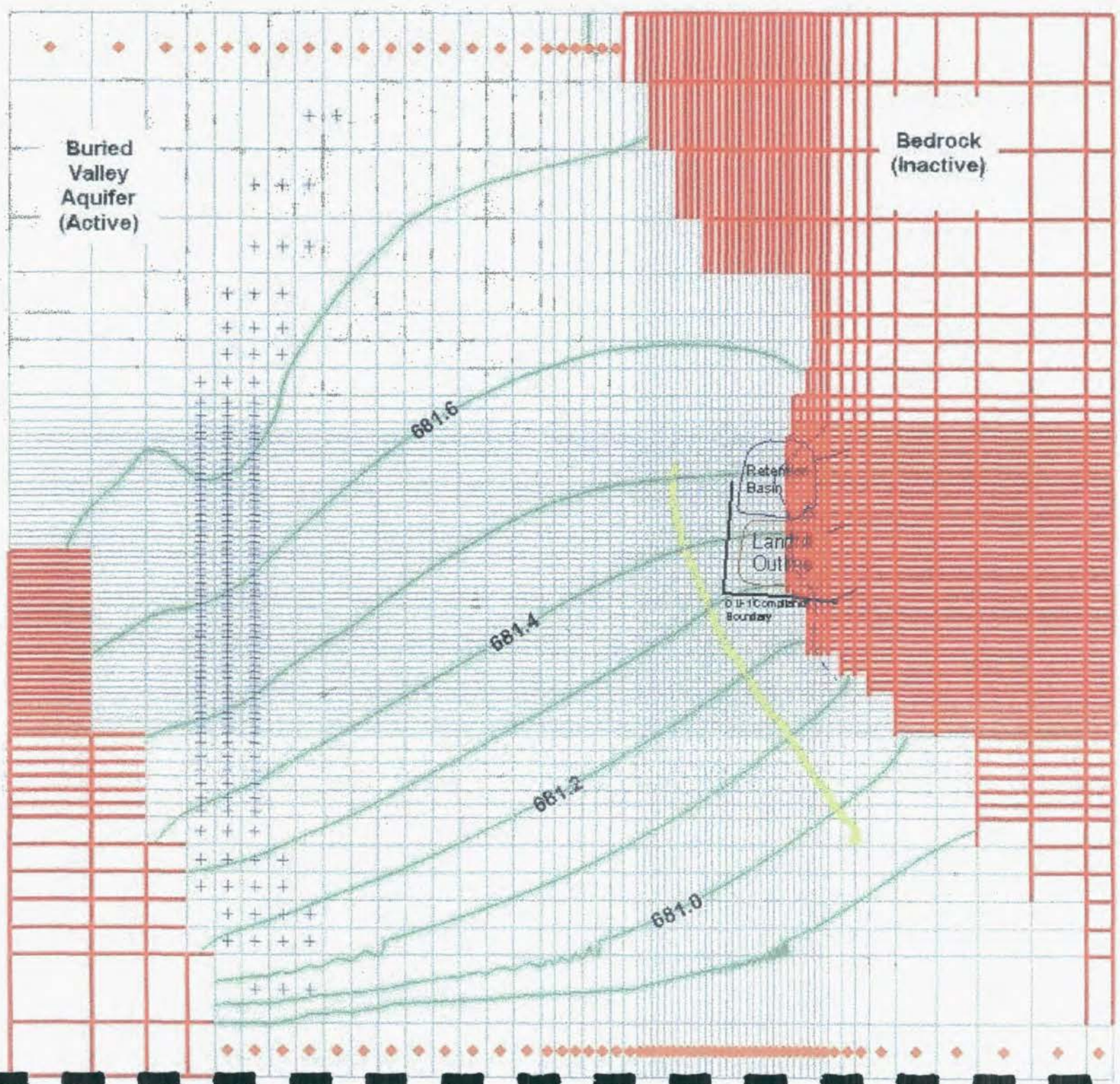
N



Attachment 7

Groundwater Flow Dynamics

Mound Core Team, Technical Memorandum
Operable Unit 1 (OU-1)


Buried
Valley
Aquifer
(Active)
Bedrock
(Inactive)
681.6
681.4
681.2
681.0
Retention
Basin
Landfill
Outline
OU-1 Complete
Boundary

Attachment 8

Cost Estimates

Mound Core Team, Technical Memorandum
Operable Unit 1 (OU-1)

DRAFT

Independent Government Cost Estimate for Remediation of Operable Unit 1 At the Mound Plant in Miamisburg Ohio

April 14, 2004

DRAFT

Executive Summary

Operable Unit (OU)-1 is in the southwestern portion of the Mound Plant, located in Miamisburg, Ohio. It includes a sanitary landfill, an overflow pond, and several additional Potential Release Sites (PRS). The Ohio Field Office requested that a cost estimate be developed for remediation of OU-1.

The cost estimating team developed the estimate using Remedial Action Cost Engineering and Requirements System (RACER) parametric cost estimating software along with parametric analysis of historic cost information for similar work at other sites. Best engineering judgment was used to ensure that the scope included in the RACER estimates and historic costs accurately reflected the work to be completed at OU-1.

The cost estimate for each scenario is presented in Table ES-1. Costs for OU-1 range from just over $1 million for installation of a beautification cap over the area to more than $60 million for excavation and disposal of material as mixed waste.

Table ES-1. OU-1 Cost Summary (thousands of dollars, unescalated)

Remediation Scenario	Cost Estimate
Excavation of the Sanitary Landfill with Disposal as Sanitary Waste	7,014
Excavation of the Sanitary Landfill with Disposal as Low-Level Waste	33,561
Excavation of the Sanitary Landfill with Disposal as Mixed Waste	35,246
Excavation of OU-1 with Disposal as Sanitary Waste	23,417
Excavation of OU-1 with Disposal as Low-Level Waste	59,611
Excavation of OU-1 with Disposal as Mixed Waste	62,239
PRS 414 Monitoring Wells	24
Beautification Cap	1,132
Single Barrier Cap	3,951
Multilayer Cap	5,687

Because these costs are largely based on RACER-derived estimates, they have no contingency and have a 50% confidence level. However, it should be noted that when comparing the RACER cost estimates to actual cost information from the Fernald Closure Project, there was generally good agreement. In the one case where there was not close agreement between the RACER estimate and actual costs from analogous work at other sites (i.e., the multilayer cap estimate), the estimate was adjusted to more closely reflect the actual cost information.

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Appendix B RACER Data
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1. Introduction/Approach

Operable Unit (OU)-1 is in the southwestern portion of the Mound Plant, located in Miamisburg, Ohio. It includes a sanitary landfill, an overflow pond, and several additional Potential Release Sites (PRS). The Ohio Field Office has requested that a cost estimate be developed for remediation of OU-1. This report describes the specific scenarios considered in the estimate, the estimating approach, and the cost estimating results.

1.1.Operable Unit 1

OU-1 was used from 1948 to 1974 for burning and/or disposing of plant waste materials, including general trash, liquid waste, and residual steel and metal debris. Originally, open burning of trash and garbage was done at OU-1. However, that practice was replaced with trench burials of solid waste when the state of Ohio banned open burning in 1969. Much of this material has since been removed. In 1955 and possibly 1956, approximately 2,500 empty 55-gallon drums that had contained thorium were buried in the southwest corner of OU-1 at a depth of about 1 to 2 feet. The empty drums remain in this area, which is known as PRS 11.

In 1977 and 1978, the overflow pond and site sanitary landfill were constructed. The overflow pond (PRS 69) was built with a natural clay-bearing compacted glacial till liner and earthen dikes and has a 5,000,000-gallon capacity. Effluent from the pond is discharged to the Miami-Erie Canal and to the Great Miami River through National Pollutant Discharge Elimination System (NPDES) Outfall 002. The site sanitary landfill was constructed with a 4- to 5-foot thick clay liner and a cap of 3 feet of clay covered with 2 to 5 feet of low-permeability topsoil. A leachate collection system was constructed using collection drains, which allow landfill liquids to move into the overflow pond.

There are two additional PRSs located within OU-1, PRS 409 and 410. Both are areas of petroleum product soil contamination. Some material was removed from both of these areas but an estimated 120,000 cubic feet of contaminated material remains. This estimate also includes some work in the area adjacent to OU-1, which is PRS 414.

1.2.Estimating Approach

The estimating team consisted of Environmental Management staff at Headquarters and the field who have expertise in cost estimating and environmental remediation. Team members were also familiar with the Mound site, and no site visit was necessary. Team members were Stephanie Short, Ethan Merrill, Bob Ratzer, and Bryan Skokan.

The team developed the estimate using Remedial Action Cost Engineering and Requirements System (RACER) parametric cost estimating software along with parametric analysis of historic cost information for similar work at other sites. Best engineering judgment was used to ensure

that the scope included in the RACER estimates and historic costs accurately reflected the work to be completed at OU-1.

Because the costs presented in this report are largely based on RACER-derived estimates, they have no contingency and have a 50% confidence level. However, it should be noted that when comparing the RACER cost estimates to actual cost information from the Fernald Closure Project, there was generally good agreement. In the one case where there was not close agreement between the RACER estimate and actual costs from analogous work at other sites (i.e., the multilayer cap estimate), the estimate was adjusted to more closely reflect the actual cost information.

In order to better understand the history of OU-1 and scope to be included in the estimate, the following documents were used as primary references while developing the cost estimate.

- Operable Unit 1 Feasibility Study Report, Mound Plant, Miamisburg, Ohio, October 1994
- Operable Unit 1 Record of Decision, Mound Plant, Miamisburg, Ohio, June 1995
- Letter Report: Preliminary Results of Reconnaissance Magnetic Survey, Mound Plant, Areas 2,6,7 and C, November 1990

1.3.Major Assumptions

To develop the cost estimate, assumptions were used to bound the work scope and define requirements. The following major assumptions were used in the development of this estimate.

- Other than the thorium drum waste, no waste sorting or segregation will be required.
- Sampling to meet disposal facility waste acceptance criteria will be conducted.
- Waste disposal activities will utilize existing on site waste handling and transportation facilities and contracts.
- Clean material that is excavated, including the existing sanitary landfill cover and fill material, will be used on site as backfill.
- The PRS 414 area adjacent to OU-1 will be used as a staging area. A gravel pad will be installed for this purpose and removed upon completion of work.
- All regulatory documentation, with the exception of the final closure report (e.g., Remedial Action Report), will be completed by the Ohio Office and costs for that work are not included here.
- The existing NPDES outfall to which PRS 69 is draining will be used to discharge the remaining water in the overflow pond, and the water will require no pretreatment prior to discharge.

1.4.Work Breakdown Structure

The cost estimate results are presented in this report according to the following work breakdown structure, which includes all remediation options estimated.

Table 1. Work Breakdown Structure

1 Excavation of the Sanitary Landfill
- 1.1 Project Management
- 1.2 Excavation and Regrading
- 1.3 Waste Disposal

2 Excavation of Operable Unit 1
- 2.1 Project Management
- 2.2 Excavation and Regrading
- 2.3 Waste Disposal

3 Potential Release Site 414 Monitoring Wells

4 Capping
- 4.1 Project Management
- 4.2 Capping

2. Cost Estimate Results

Results of the cost estimate are presented here, first in summary and then by remediation scenario. Costs are presented in constant dollars and include appropriate indirect charges for contractor programmatic activities (e.g., baseline management, program planning, Integrated Safety Management System programs) based on RACER default values.

2.1. Summary of Results

Table 2. Cost Summary (thousands of dollars, unescalated)

Remediation Scenario	Cost Estimate
Excavation of the Sanitary Landfill with Disposal as Sanitary Waste	7,014
Excavation of the Sanitary Landfill with Disposal as Low-Level Waste	33,561
Excavation of the Sanitary Landfill with Disposal as Mixed Waste	35,246
Excavation of OU-1 with Disposal as Sanitary Waste	23,417
Excavation of OU-1 with Disposal as Low-Level Waste	59,611
Excavation of OU-1 with Disposal as Mixed Waste	62,239
PRS 414 Monitoring Wells	24
Beautification Cap	1,132
Single Barrier Cap	3,951
Multilayer Cap	5,687

The cost estimate for each scenario is presented above in Table 2. Costs for the OU-1 remediation scenarios range from just over $1 million for installation of a beautification cap over the area to more than $60 million for excavation and disposal of 3,000,000 cubic feet of material as mixed waste. A more detailed summary of each cost estimate is presented in subsequent sections of this report and in Appendix A. The RACER data used to build the estimates are included in Appendix B.

2.2. Excavation of the Sanitary Landfill

The scope of work included in this portion of the estimate is removal of the sanitary landfill, including the existing cover, contents, and liner, using conventional excavating equipment. The total waste volume to be excavated is 1.6 million cubic feet (58,000 cubic yards), as estimated by the OU-1 Feasibility Study. The primary contaminant of concern is assumed to be volatile organic compounds.

This estimate assumes that the existing cover material (~300,000 cubic feet) is clean and will be used as backfill once excavation is complete. The existing fill and till material will not be excavated but will be used to regrade the site once excavation is complete, making borrow fill unnecessary. The landfill contents and liner (totaling 1.3 million cubic feet) will be disposed. This estimate presents the cost for three waste disposal options: 1) disposal at a local sanitary landfill, 2) disposal as low-level waste at Envirocare, and 3) disposal as mixed low-level waste at Envirocare. A gravel pad will be installed over a 2.5-acre area of PRS 414 located just south of OU-1 for staging of excavated waste before it is transported to the rail yard for disposal using the existing waste transportation and disposal contracts. Rates for disposal were provided by the site and are $0.50 per cubic foot for disposal at the local sanitary landfill and $10.00 per cubic foot for disposal at Envirocare. These rates include transportation from the rail yard to the disposal location. Upon completion of excavation and waste disposal, a completion report will be prepared and submitted to the regulators.

The total cost estimate for this scenario was developed using RACER data and is presented in Table 3. Costs range from $7 million (for sanitary waste disposal) to approximately $35 million (for mixed waste disposal).

Table 3. Excavation of the Sanitary Landfill (thousands of dollars, unescalated)

WBS/Activity	Sanitary	Low-Level	Mixed
1.1 Project Management	1,170	7,635	7,946
1.2 Excavation and Regrading	4,440	4,853	4,853
1.3 Waste Disposal	1,404	21,073	22,447
TOTAL	7,014	33,561	35,246

Excavation and regrading of the site totals approximately $5 million regardless of the disposal option and includes excavation of the sanitary landfill, preparation and cleanup of PRS 414 for bulk waste staging, on site analytical costs, plugging and abandonment of the well within the

footprint of the sanitary landfill, and regrading/landscaping the site using the existing till and fill material. Waste disposal costs range from $1.4 million for disposal at the local sanitary landfill to $22 million for disposal at Envirocare as mixed waste.

In order to check the RACER estimates presented above against actual cost information for analogous work at other sites, a comparison was made between the RACER estimate and actual costs from the Fernald Closure Project for key work activities. That comparison is presented in Table 4.

Table 4. Fernald Closure Project Work Activity Comparison (thousands of dollars, unescalated)

Work Activity	RACER	Actual
Sanitary Waste Excavation	667	480
Mixed Waste Excavation	917	2,038
Load and Haul	262	294
Sanitary Disposal	2,064	1,393
Low-Level Waste Disposal (at Envirocare)	27,511	20,800
Mixed Waste Disposal (at Envirocare)	28,885	20,800

The column labeled "Actual" was derived using the same volumetric assumptions as those in the RACER estimate. Unit rates for each work activity shown were derived from Fernald Closure Project actual cost data for excavation and hauling activities. The Mound unit rates for waste disposal were used as actual costs for those activities (these same rates are used throughout this estimate).

The largest variability between the two estimates is seen for mixed waste excavation. However, the unit rate actual cost information from Fernald in this case is based on "dentil" excavation ($41.75 per cubic yard), which is more precise and therefore more costly than the excavation expected for OU-1. Otherwise, there is general agreement between the actual cost and RACER estimate.

2.3. Excavation of Operable Unit 1

This remediation scenario includes excavation of the entire OU-1 area, including the sanitary landfill, overflow pond (PRS 69), thorium drum area (PRS 11), and contaminated soil at PRS 409 and 410. As with the prior estimate, excavation is assumed to be completed with conventional excavating equipment. Per the Feasibility Study and conversations with the site, a total of 3 million cubic feet of material is assumed to be removed in this scenario. The landfill cover as well as the 3.7 million cubic feet of existing fill and till material associated with the landfill are assumed to be clean and used as backfill. Paved roads and existing monitoring wells (8) within the footprint of the excavation are removed. The site is backfilled and regraded. Six monitoring wells to be installed in or near the area of excavation for future groundwater monitoring are included in the estimate, and regulatory completion documentation is also included.

As with the prior scenario, three different waste disposal options are shown for the estimate: 1) sanitary waste disposal, 2) low-level waste disposal, and 3) mixed waste disposal. The thorium drum area is assumed to be disposed as low-level waste in all three scenarios. Other than that material, no other waste sorting or segregation is planned. As before, excavated waste is assumed to be staged on PRS 414 and disposed using the existing contracts for waste transportation and disposal. Those rates are $0.50 per cubic foot for disposal at the local sanitary landfill and $10.00 per cubic foot for disposal at Envirocare. These rates include transportation from the rail yard to the disposal location.

Table 5. Excavation of Operable Unit 1 (thousands of dollars, unescalated)

WBS/Activity	Sanitary	Low-Level	Mixed
2.1 Project Management	5,541	11,014	11,405
2.2 Excavation and Regrading			
Total for OU-1	7,267	7,490	7,490
Excavation of Landfill	714	819	819
Excavation of PRS 69	313	333	333
Excavation of PRS 11	344	344	344
Excavation of PRS 409/410	56	56	56
2.3 Waste Disposal	10,600	41,107	43,344
TOTAL	23,417	59,611	62,239

The results of the cost estimate, which is based on RACER data and Mound disposal rates, are presented in Table 6 and range from $23 million for sanitary waste disposal to more than $62 million assuming mixed waste disposal. As requested by the site, the excavation cost for each PRS is listed separately in Table 6. The costs presented for each PRS are for excavation of that volume and do not include the additional work (e.g., analytical services, regrading of the site, excavation of other areas, etc.) that is included in the total excavation and regrading cost figure. As a result, the individual PRS excavation costs do not sum to the total excavation and regrading costs for each scenario.

Because the excavation, hauling, and waste disposal activities are the same here as in the Sanitary Landfill Excavation scenario, the same general comparison to Fernald Closure Project actual costs apply here as well.

2.4.Potential Release Site 414

The estimate for remediation of PRS 414 includes the installation of two groundwater monitoring wells. The total cost based on RACER data is estimated at $24,000, which includes well installation to a depth of 40 feet.

2.5. Capping

For this scenario, OU-1 will be capped rather than excavated, with the boundaries of the cap covering the "Old OU-1 Boundary" depicted in the map shown in Appendix C, excluding the long, narrow area west of PRS 414. The cap is assumed to cover 7 acres in order to ensure continuity and total coverage of the OU. Prior to capping, PRS 69 will be drained using the existing NPDES outfall, and fill material will be added to lessen the grade around the sanitary landfill. The site itself will not be disturbed in this scenario; all borrow material will come from off site. Once the cap is in place, the site will be revegetated.

Three options are included in this scenario for cap construction. The first is a beautification cap, which consists of a layer of native soil placed over the entire OU-1 area after regrading is complete. The second, a single barrier cap, includes an 18 inch bedding layer, 24 inch clay layer, 12 inch drainage layer, and 24 inch native soil cover. Finally, the cost estimate for a multilayer engineered cap is presented, consisting of a 7-acre composite barrier cap which includes a geosynthetic clay liner.

The costs for capping OU-1 are presented in Table 7. The estimate ranges from just over $1 million for a beautification cap to $5.5 for a multilayer cap. The beautification cap, which is the simplest capping option, is also the least expensive. The multilayer cap, which includes placement of multiple layers is estimated to be nearly five times more costly than the beautification cap.

Table 6. Capping of OU-1 (thousands of dollars, unescalated)

WBS/Activity	Beautification Cap	Single Barrier Cap	Multilayer Cap
4.1 Project Management	415	1,067	1,248
4.2 Capping	717	2,884	4,439
TOTAL	1,132	3,951	5,687

The costs presented in Table 7 are based on RACER data for the beautification cap and single barrier cap. However, a comparison between the RACER estimate for the multilayer cap and actual cost information for similar caps at Fernald and Oak Ridge led the cost estimating team to use the actual cost information to derive the multilayer cap estimate. At Fernald, the cost for placement of a multilayer cap over the On-Site Disposal Facility was approximately $18.00 per square foot of cap. Using this rate, a 7-acre multilayer cap over OU-1 is estimated to cost $5.5 million. Twenty percent of that total is assumed to be project management costs with the remainder covering capping activities. Regulatory documentation and costs for draining PRS 69 were added for a final cost of $5,687.

Appendix A

Cost Estimate Summary

Cost Summary Report

Assembly	Direct Cost	Marked Up Cost

Folder: **Mound**

Project Name: Capping 4 acres
Project Number: 3.4, 3.5, and 3.6
Cost Database Date: 2004
Cost Type: User-Defined
Description: Estimate for 4 acre cap.

Site Name: Native Soil Cap
Site Number: 3.4
Description: 4 acre Native Soil Cap estimate includes an allowance for a leveling layer over the site along with 18 inches of local soil and a 6 inch layer of topsoil. The cap is vegitated to minimize erosion.
Program: N/A

Estimator Information:

Name: Steve Trischman
Title: Acquisition Specialist
Agency/Org./Office: DOE EM-42 (Acquisition Management)
Business Address: EM-42 Cloverleaf 1100
19901 Germantown Rd
Germantown, MD 20874
Phone: 301-903-7478
Email: steve.trischman@em.doe.gov

Prepared Date: 03/02/2005

Reviewer Information:

Name: Steve Trischman
Title: Acquisition Specialist
Agency/Org./Office: DOE EM-42 (Acquisition Management)
Business Address: EM-42 Cloverleaf 1100
19901 Germantown Rd
Germantown, MD 20874
Phone: 301-903-7478
Email: steve.trischman@em.doe.gov

Date Reviewed: 03/02/2005

Phase Name: Native Soil Cap
Phase: Remedial Action
Description: 4 acre Native Soil Cap estimate includes an allowance for a leveling layer over the site along with 18 inches of local soil and a 6 inch layer of topsoil. The cap is vegitated to minimize erosion.

Technology: **Professional Labor Management** # 1

Professional Labor Percentage

33220138	Project Management Labor Cost	14,568	43,980
33220139	Planning Documents Labor Cost	13,597	41,048
33220140	Construction Oversight Labor Cost	11,654	35,184

Note: This report shows first year costs.

Cost Summary Report

Assembly		Direct Cost	Marked Up Cost
33220141	Reporting Labor Cost	1,942	5,864
33220142	As-Built Drawings Labor Cost	1,942	5,864
33220143	Public Notice Labor Cost	583	1,759
33220144	Site Closure Activities Labor Cost	0	0
33220145	Permitting Labor Cost	19,424	58,640
33220146	Responsible Party Labor Cost	0	0
33220147	Reimbursement Claims Preparation Labor Cost	0	0
33220148	Other Labor Cost	0	0
Total Professional Labor Management Technology		**63,710**	**192,341**

Technology: **DRAIN OVERFLOW POND** **# 1**

Comment:

5 million gallon overflow pond. Pump content to NPDES Outfall 002. Move pump into pond area with crane as water level drops.

33021618	Testing, purgeable organics (624, 8260)	2,380	3,064
33021670	Metals Screen, 25 Metals Listed In Method EPA 200.	18,607	23,953
33022251	Testing, rad analytical liquid, alpha spectroscopy	1,525	1,964
33022255	Testing, rad analytical liquid, beta/gamma coincid	1,536	1,978
33040165	22 Ton 4WD Rough Terrain Hydraulic Crane, No Opera	3,233	4,273
33221001	Equip. Operators, Crane/Shovel	3,395	5,416
33260704	Contaminated groundwater recovery, dual pump syste	1,103	1,420
33290111	Pump, general utility, centrifugal, end suction, h	4,663	6,276
Total DRAIN OVERFLOW POND Technology		**36,442**	**48,342**

Technology: **Capping** **# 2**

Comment:

Since the site will not be disturbed under this scenario all soil is assumed imported from off site.

17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes De	167,094	226,098
18050301	Loam or topsoil, imported topsoil, 6" deep, furnis	107,664	145,064
18050402	Seeding, Vegetative Cover	73,521	95,108
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	3,753	5,843
Total Capping Technology		**352,032**	**472,113**
Total Phase Native Soil Cap		**452,184**	**712,795**
Total Site Native Soil Cap		**452,184**	**712,795**
Total Project Capping 4 acres		**452,184**	**712,795**

Note: This report shows first year costs.

CONFIRMED UNCLASSIFIED/NON-SENSITIVE
REVIEWED BY: JANET NESHEIM/EMCBC
DATE: 06-09-10

Cost Summary Report

Assembly		Direct Cost	Marked Up Cost

Project Name: Cap Operations
Project Number: OU1
Cost Database Date: 2005
Cost Type: User-Defined
Description: Operations estimate for maintaining a native soil cap 4 acres in size. Maintenance includes mowing 6 times per year, fertilizing 2 times per year, and reparing erosion of 1% of the cap (0.04 acres x 18" deep = 97 cubic yds). Monitoring includes 1 technician traveling 10 miles to site 4 times per year for 8 hours per visit. A 5-year review and report was included.

Site Name: OU-1 Operations Cost
Site Number: OU-1 Ops
Description: Estimate for operating and maintenance costs for 4 acre cap at OU-1
Program: Environmental Restoration

Estimator Information:
Name: Steve Trischman
Title: Acquisition Specialist
Agency/Org./Office: DOE EM-42 (Acquisition Management)
Business Address: EM-42 Cloverleaf 1100
19901 Germantown Rd
Germantown, MD 20874
Phone: 301-903-7478
Email: steve.trischman@em.doe.gov
Prepared Date: 03/02/2005

Reviewer Information:
Name:
Title:
Agency/Org./Office:
Business Address:
Phone:
Email:
Date Reviewed:

Phase Name: RA-O
Phase: Operations & Maintenance
Description:

Technology: **Operations and Maintenance** # 0
Comment:

Operations and Maintenance			
99020110	Annual Maintenance Materials and Labor	257	386
Capping			
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes De	858	1,217
18050206	Erosion control, silt fence, polypropylene, 3' hig	186	293
18050301	Loam or topsoil, imported topsoil, 6" deep, furnis	2,381	3,334

Note: This report shows first year costs.

Cost Summary Report

Assembly		Direct Cost	Marked Up Cost
18050402	Seeding, Vegetative Cover	18,286	24,686
18050409	Fertilize, 800 Lbs/Acre, Push Rotary	736	1,096
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	6	9
18050415	Mowing	4,319	7,257
33220106	Staff Engineer	71	218
33220112	Field Technician	181	558
Total Operations and Maintenance Technology		**27,281**	**39,053**
Total Phase RA-O		**27,281**	**39,053**

Phase Name: LTM

Phase: Long Term Monitoring

Description:

Technology: **Monitoring** # 1

General Monitoring

33010104	Sample collection, vehicle mileage charge, car or	12	12
33220112	Field Technician	1,010	3,281
Total Monitoring Technology		**1,023**	**3,293**

Technology: **Five-Year Review** # 1

Document Review

33220102	Project Manager	408	1,323
33220105	Project Engineer	543	1,764
33220108	Project Scientist	457	1,485
33220109	Staff Scientist	678	2,202

Interviews

33220102	Project Manager	611	1,985

Site Inspection

33220102	Project Manager	459	1,489
33220105	Project Engineer	790	2,567
33220108	Project Scientist	686	2,228
33220109	Staff Scientist	551	1,789

Report

33220102	Project Manager	306	993
33220105	Project Engineer	790	2,567
33220108	Project Scientist	743	2,414
33220109	Staff Scientist	1,102	3,578

Travel

33010108	Sedan, Automobile, Rental	47	67
33010202	Sample collection, sampling personnel travel, per	86	86
Total Five-Year Review Technology		**8,259**	**26,536**
Total Phase LTM		**9,282**	**29,829**
Total Site OU-1 Operations Cost		**36,563**	**68,882**

Note: This report shows first year costs.

~~This report for official U.S. Government use only.~~
Reviewed for Classified Derivatives
BY: J.H. Neshem
DOE, EMCBC
Date: 06-05-10
Confirmed Unclassified, Not UCNI/Not OUO

Cost Summary Report

Assembly	Direct Cost	Marked Up Cost
Total Project Cap Operations	36,563	68,882

Note: This report shows first year costs.

Print Date: 03-02-2005

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Reviewed for Classification/UCNI/OUO
BY: [illegible] Derivative Classifier
DOE, EMCBC
Date: 06-09-10
Confirmed Unclassified, Not UCNI/Not OUO

Cost Summary Report

Assembly	Direct Cost	Marked Up Cost
Total Folder Mound	488,747	781,678

Note: This report shows first year costs.

Reviewed for Classification/UCNI/OUO
BY: [illegible], Derivative Classifier
DOE, EMCBC
Date: 06-09-10
Confirmed Unclassified, Not UCNI/Not OUO

Cost Estimate Summary

WBS	WBS Title	Brief Activity Description	Unescalated Cost with Markup (thousands)
Sanitary Landfill Excavation with Disposal as Sanitary Waste			
1.1	Project Management	Project Management - includes permitting, design, project oversight	$1,020
1.1	Project Management	Remedial Action Report	$150
	Project Management Total		**$1,170**
1.2	Excavation/Regrading	Bulk Material Storage - preparation of PRS 414 for waste staging	$500
1.2	Excavation/Regrading	Cleanup/Landscaping - general cleanup of OU-1 and PRS 414 at completion	$45
1.2	Excavation/Regrading	Decontamination Facilities - equipment decontamination and cleaning	$131
1.2	Excavation/Regrading	Fencing - boundary fence and signing	$43
1.2	Excavation/Regrading	Demolition, Fencing	$15
1.2	Excavation/Regrading	Excavation of sanitary landfill cover, trash, and liner (1.6 million cubic feet)	$667
1.2	Excavation/Regrading	Excavation - earthwork required to regrade the site using fill and till material	$1,888
1.2	Excavation/Regrading	Parking Lots	$15
1.2	Excavation/Regrading	On-Site Laboratory - characterization and Waste Acceptance Criteria sampling	$1,097
1.2	Excavation/Regrading	Well Abandonment - plugging/abandonment of wells (1) within landfill footprint	$39
	Excavation and Regrading Total		**$4,440**
1.3	Waste Disposal	Load and Haul - disposal at sanitary facility near Hamilton, Ohio	$1,393
1.3	Waste Disposal	Residual Waste Management - disposal of remediation generated waste	$11
	Waste Disposal Total		**$1,404**
		Sanitary Landfill Excavation with Disposal as Sanitary Waste - Total Cost	**$7,014**

Notes: Remedial Action Report estimate based on professional experience.

Load and haul cost from the RACER estimate was adjusted to reflect the disposal cost provided by the site ($0.50 per cubic foot).
Total disposal volume is 1,600,000 cubic feet (Feasibility Study estimate) plus a swell factor of 1.3.

Cost Estimate Summary

WBS	WBS Title	Brief Activity Description	Unescalated Cost with Markup
Sanitary Landfill Excavation with Disposal as Low-Level Waste			
1.1	Project Management	Project Management - includes permitting, design, project oversight	$7,485
1.1	Project Management	Remedial Action Report	$150
	Project Management Total		**$7,635**
1.2	Excavation/Regrading	Bulk Material Storage - preparation of PRS 414 for waste staging	$500
1.2	Excavation/Regrading	Cleanup/Landscaping - general cleanup of OU-1 and PRS 414 at completion	$45
1.2	Excavation/Regrading	Decontamination Facilities - equipment decontamination and cleaning	$294
1.2	Excavation/Regrading	Fencing - boundary fence and signing	$43
1.2	Excavation/Regrading	Demolition, Fencing	$15
1.2	Excavation/Regrading	Excavation of sanitary landfill cover, trash, and liner (1.6 million cubic feet)	$917
1.2	Excavation/Regrading	Excavation - earthwork required to regrade the site using fill and till material	$1,888
1.2	Excavation/Regrading	Parking Lots	$15
1.2	Excavation/Regrading	On-Site Laboratory - characterization and Waste Acceptance Criteria sampling	$1,097
1.2	Excavation/Regrading	Well Abandonment - plugging/abandonment of wells (1) within landfill footprint	$39
	Excavation and Regrading Total		**$4,853**
1.3	Waste Disposal	Load and Haul - from excavation site to staging area and then to rail yard	$262
1.3	Waste Disposal	Off-Site Transportation and Waste Disposal - disposal at Envirocare	$20,800
1.3	Waste Disposal	Residual Waste Management - disposal of remediation generated waste	$11
	Waste Disposal Total		**$21,073**
		Sanitary Landfill Excavation with Disposal as Low-Level Waste - Total Cost	**$33,561**

Notes: Remedial Action Report estimate based on professional experience.

Load and haul cost is based on the RACER estimate. Total waste volume is 1,600,000 cubic feet (Feasibility Study estimate) plus a swell factor of 1.3.

Off-Site Transportation and Disposal costs derived by adjusting RACER estimates to reflect the $10/cubic foot disposal cost of the existing site contract. This cost includes shipment of the waste from the rail yard to Envirocare via gonodola cars.

Cost Estimate Summary

WBS	WBS Title	Brief Activity Description	Unescalated Cost with Markup
Sanitary Landfill Excavation with Disposal as Mixed Waste			
1.1	Project Management	Project Management - includes permitting, design, project oversight	$7,796
1.1	Project Management	Remedial Action Report	$150
	Project Management Total		**$7,946**
1.2	Excavation/Regrading	Bulk Material Storage - preparation of PRS 414 for waste staging	$500
1.2	Excavation/Regrading	Cleanup/Landscaping - general cleanup of OU-1 and PRS 414 at completion	$45
1.2	Excavation/Regrading	Decontamination Facilities - equipment decontamination and cleaning	$294
1.2	Excavation/Regrading	Fencing - boundary fence and signing	$43
1.2	Excavation/Regrading	Demolition, Fencing	$15
1.2	Excavation/Regrading	Excavation of sanitary landfill cover, trash, and liner (1.6 million cubic feet)	$917
1.2	Excavation/Regrading	Excavation - earthwork required to regrade the site using fill and till material	$1,888
1.2	Excavation/Regrading	Parking Lots	$15
1.2	Excavation/Regrading	On-Site Laboratory - characterization and Waste Acceptance Criteria sampling	$1,097
1.2	Excavation/Regrading	Well Abandonment - plugging/abandonment of wells (1) within landfill footprint	$39
	Excavation and Regrading Total		**$4,853**
1.3	Waste Disposal	Load and Haul - from excavation site to staging area and then to rail yard	$262
1.3	Waste Disposal	Off-Site Transportation and Waste Disposal - disposal at Envirocare	$22,174
1.3	Waste Disposal	Residual Waste Management - disposal of remediation generated waste	$11
	Waste Disposal Total		**$22,447**
		Sanitary Landfill Excavation with Disposal as Mixed Waste - Total Cost	**$35,246**

Notes: Remedial Action Report estimate based on professional experience.

Load and haul cost is based on the RACER estimate. Total waste volume is 1,600,000 cubic feet (Feasibility Study estimate) plus a swell factor of 1.3.

Off-Site Transportation and Disposal costs derived by adjusting RACER estimates to reflect the $10/cubic foot disposal cost of the existing site contract. This cost includes shipment of the waste from the rail yard to Envirocare via gonodola cars. RACER analytical costs for mixed waste were added to the site disposal rate.

Cost Estimate Summary

WBS	WBS Title	Brief Activity Description	Unescalated Cost with Markup
Excavation of OU-1 with Disposal as Sanitary Waste			
2.1	Project Management	Project Management - includes permitting, design, project oversight	$5,391
2.1	Project Management	Remedial Action Report	$150
	Project Management Total		**$5,541**
2.2	Excavation/Regrading	Decontamination Facilities - Equipment decontamination and cleaning	$374
2.2	Excavation/Regrading	Excavation of sanitary landfill cover, trash, and liner (1.6 million cubic feet)	$714
2.2	Excavation/Regrading	Excavation of PRS 11 - 350,000 cubic feet of low-level waste	$344
2.2	Excavation/Regrading	Dewatering and excavation of PRS 69	$313
2.2	Excavation/Regrading	Excavation of PRS 409 and 410	$56
2.2	Excavation/Regrading	On-Site Laboratory - characterization and Waste Acceptance Criteria sampling	$1,098
2.2	Excavation/Regrading	Demolition, Catch Basins/Manholes - identified on magnetometer survey maps	$3
2.2	Excavation/Regrading	Fencing - boundary fence and signing	$46
2.2	Excavation/Regrading	Demolition, Fencing	$30
2.2	Excavation/Regrading	Bulk Material Storage - preparation of PRS 414 for waste staging	$1,586
2.2	Excavation/Regrading	Demolition, Pavements used for temporary storage area	$110
2.2	Excavation/Regrading	Demolition, Pavements existing within OU-1 boundary (185,000 square feet)	$250
2.2	Excavation/Regrading	Demolition, Underground pipes within OU-1 boundary	$19
2.2	Excavation/Regrading	Parking Lots	$14
2.2	Excavation/Regrading	Groundwater Monitoring Well Installation - Six wells at a depth of 40 feet	$72
2.2	Excavation/Regrading	Well Abandonment - Grouting of 8 wells to be removed during excavation	$39
2.2	Excavation/Regrading	Cleanup and Landscaping - General cleanup of OU-1 and PRS 414	$25
2.2	Excavation/Regrading	Dewatering Excavated PRS 69 Sludge	$181
2.2	Excavation/Regrading	Storm Water Control Berm - construction and removal	$50
2.2	Excavation/Regrading	Excavation - Regrading of site using existing fill and till material	$1,952
	Excavation and Regrading Total		**$7,276**
2.3	Waste Disposal	Sanitary Landfill Load and Haul	$131
2.3	Waste Disposal	PRS 69 Load and Haul	$328
2.3	Waste Disposal	PRS 11 Load and Haul	$478
2.3	Waste Disposal	Off-Site Transportation and Waste Disposal	$4,328
2.3	Waste Disposal	Off-Site Transportation and Waste Disposal - PRS 11	$5,250
2.3	Waste Disposal	Residual Waste Management - Disposal of remediation generated waste	$45

Cost Estimate Summary

WBS	WBS Title	Brief Activity Description	Unescalated Cost with Markup
2.3	Waste Disposal	PRS 11 Load and Haul	$40
	Waste Disposal Total		**$10,600**
		Excavation of OU-1 with Disposal as Sanitary Waste - Total Cost	**$23,417**

Notes: Remedial Action Report estimate based on professional experience.

Dewatering and excavation of PRS 69 includes 92,520 cubic feet of clay pond liner to a depth of 3 feet.

Load and haul costs include movement of the waste from the site of excavation to the bulk storage location. Total waste volume is 3,000,000 cubic feet (Feasibility Study estimate). A swell factor of 1.3 is assumed for 2,650,000 cubic feet and 1.5 for the 350,000 cubic feet resulting from the thorium drum area. Since the thorium drum waste is disposed as low-level waste, the second load and haul cost for this waste includes transportation from bulk storage to the rail yard for shipment and disposal.

Off-Site Transportation and Waste Disposal includes disposal of 2,650,000 cubic feet (with 1.3 swell factor added) at a local sanitary landfill. The RACER estimate was adjusted to reflect the disposal costs provided by the site - $0.50 per cubic foot.

Off-Site Transportation and Waste Disposal of PRS 11 waste includes disposal as low-level waste at Envirocare via gondola cars. The RACER estimate was adjusted to reflect the disposal costs provided by the site - $10 per cubic foot.

Cost Estimate Summary

WBS	WBS Title	Brief Activity Description	Unescalated Cost with Markup
Excavation of OU-1 with Disposal as Low-Level Waste			
2.1	Project Management	Project Management - includes permitting, design, project oversight	$10,864
2.1	Project Management	Remedial Action Report	$150
	Project Management Total		**$11,014**
2.2	Excavation/Regrading	Decontamination Facilities - Equipment decontamination and cleaning	$464
2.2	Excavation/Regrading	Excavation of sanitary landfill cover, trash, and liner (1.6 million cubic feet)	$819
2.2	Excavation/Regrading	Excavation of PRS 11 - 350,000 cubic feet of low-level waste	$344
2.2	Excavation/Regrading	Dewatering and excavation of PRS 69	$333
2.2	Excavation/Regrading	Excavation of PRS 409 and 410 - 120,000 cubic feet total volume (from site)	$56
2.2	Excavation/Regrading	On-Site Laboratory - characterization and Waste Acceptance Criteria sampling	$1,097
2.2	Excavation/Regrading	Demolition, Catch Basins/Manholes - identified on magnetometer survey maps	$3
2.2	Excavation/Regrading	Fencing - Boundary fence and signing	$46
2.2	Excavation/Regrading	Demolition, Fencing	$30
2.2	Excavation/Regrading	Bulk Material Storage - preparation of PRS 414 for waste staging	$1,586
2.2	Excavation/Regrading	Demolition, Pavements used for temporary storage area	$110
2.2	Excavation/Regrading	Demolition, Pavements existing within OU-1 boundary (185,000 square feet)	$250
2.2	Excavation/Regrading	Demolition, Underground pipes within OU-1 boundary	$19
2.2	Excavation/Regrading	Parking Lots	$14
2.2	Excavation/Regrading	Groundwater Monitoring Well Installation - Six wells at a depth of 40 feet	$72
2.2	Excavation/Regrading	Well Abandonment - Grouting of 8 wells to be removed during excavation	$39
2.2	Excavation/Regrading	Cleanup and Landscaping - General cleanup of OU-1 and PRS 414	$25
2.2	Excavation/Regrading	Dewatering Excavated PRS 69 Sludge	$181
2.2	Excavation/Regrading	Storm Water Control Berm - construction and removal	$50
2.2	Excavation/Regrading	Excavation - Regrading of site using existing fill and till material	$1,952
	Excavation and Regrading Total		**$7,490**
2.3	Waste Disposal	Sanitary Landfill Load and Haul	$240
2.3	Waste Disposal	PRS 69 Load and Haul	$394
2.3	Waste Disposal	PRS 11 Load and Haul	$478
2.3	Waste Disposal	Off-Site Transportation and Waste Disposal	$39,700
2.3	Waste Disposal	Residual Waste Management - Disposal of remediation generated waste	$45
2.3	Waste Disposal	Load and Haul - bulk storage to rail yard	$250

Cost Estimate Summary

WBS	WBS Title	Brief Activity Description	Unescalated Cost with Markup
	Waste Disposal Total		**$41,107**
		Excavation of OU-1 with Disposal as Low-Level Waste - Total Cost	**$59,611**

Notes: Remedial Action Report estimate based on professional experience.

Dewatering and excavation of PRS 69 includes 92,520 cubic feet of clay pond liner to a depth of 3 feet.

Load and haul costs include movement of the waste from the site of excavation to the bulk storage location and then on to the rail yard for disposal. Total waste volume is 3,000,000 cubic feet (Feasibility Study estimate). A swell factor of 1.3 is assumed for 2,650,000 cubic feet and 1.5 for the 350,000 cubic feet resulting from the thorium drum area.

Off-Site Transportation and Waste Disposal includes disposal of 3,000,000 cubic feet (with 1.3/1.5 swell factor added) at Envirocare via gondola cars. The RACER estimate was adjusted to reflect the disposal costs provided by the site - $10.00 per cubic foot.

Cost Estimate Summary

WBS	WBS Title	Brief Activity Description	Unescalated Cost with Markup
Excavation of OU-1 with Disposal as Mixed Waste			
2.1	Project Management	Project/Labor Management - includes permitting, design, project oversight	$11,255
2.1	Project Management	Remedial Action Report	$150
	Project Management Total		**$11,405**
2.2	Excavation/Regrading	Decontamination Facilities - equipment decontamination and cleaning	$464
2.2	Excavation/Regrading	Excavation of sanitary landfill cover, trash, and liner (1.6 million cubic feet)	$819
2.2	Excavation/Regrading	Excavation of PRS 11 - 350,000 cubic feet of low-level waste	$344
2.2	Excavation/Regrading	Dewatering and excavation of PRS 69	$333
2.2	Excavation/Regrading	Excavation of PRS 409 and 410 - 120,000 cubic feet total volume (from site)	$56
2.2	Excavation/Regrading	On-Site Laboratory - characterization and Waste Acceptance Criteria sampling	$1,097
2.2	Excavation/Regrading	Demolition, Catch Basins/Manholes - identified on magnetometer survey maps	$3
2.2	Excavation/Regrading	Fencing - boundary fence and signing	$46
2.2	Excavation/Regrading	Demolition, Fencing	$30
2.2	Excavation/Regrading	Bulk Material Storage - preparation of PRS 414 for waste staging	$1,586
2.2	Excavation/Regrading	Demolition, Pavements used for temporary storage area (185,000 square feet)	$110
2.2	Excavation/Regrading	Demolition, Pavements existing within OU-1 boundary	$250
2.2	Excavation/Regrading	Demolition, Underground pipes within OU-1 boundary	$19
2.2	Excavation/Regrading	Parking Lots	$14
2.2	Excavation/Regrading	Groundwater Monitoring Well Installation - six wells at a depth of 40 feet	$72
2.2	Excavation/Regrading	Well Abandonment - grouting of 8 wells to be removed during excavation	$39
2.2	Excavation/Regrading	Cleanup and Landscaping - general cleanup of OU-1 and PRS 414	$25
2.2	Excavation/Regrading	Dewatering Excavated PRS 69 Sludge	$181
2.2	Excavation/Regrading	Storm Water Control Berm - construction and removal	$50
2.2	Excavation/Regrading	Excavation - regrading of site using existing fill and till material	$1,952
	Excavation and Regrading Total		**$7,490**
2.3	Waste Disposal	Sanitary Landfill Load and Haul	$240
2.3	Waste Disposal	PRS 69 Load and Haul	$394
2.3	Waste Disposal	PRS 11 Load and Haul	$574
2.3	Waste Disposal	Off-Site Transportation and Waste Disposal	$36,591
2.3	Waste Disposal	Off-Site Transportation and Waste Disposal - PRS 11	$5,250
2.3	Waste Disposal	Residual Waste Management - Disposal of remediation generated waste	$45

Cost Estimate Summary

WBS	WBS Title	Brief Activity Description	Unescalated Cost with Markup
2.3	Waste Disposal	Load and Haul - to the rail yard for disposal	$250
	Waste Disposal Total		**$43,344**
		Excavation of OU-1 with Disposal as Mixed Waste - Total Cost	**$62,239**

Notes:

Remedial Action Report estimate based on professional experience.

Dewatering and excavation of PRS 69 includes 92,520 cubic feet of clay pond liner to a depth of 3 feet.

Load and haul costs include movement of the waste from the site of excavation to the bulk storage location and on to the rail yard for disposal at Envirocare. Total waste volume is 3,000,000 cubic feet (Feasibility Study estimate). A swell factor of 1.3 is assumed for 2,650,000 cubic feet and 1.5 for the 350,000 cubic feet resulting from the thorium drum area.

Off-Site Transportation and Waste Disposal includes disposal of 2,650,000 cubic feet (with 1.3 swell factor added) at Envirocare as mixed waste. The RACER estimate was adjusted to reflect the disposal costs provided by the site - $10.00 per cubic foot - plus RACER generated analytical costs associated with mixed waste disposal.

Off-Site Transportation and Waste Disposal of PRS 11 waste includes disposal as low-level waste at Envirocare via gondola cars. The RACER estimate was adjusted to reflect the disposal costs provided by the site - $10 per cubic foot.

Cost Estimate Summary

WBS	WBS Title	Brief Activity Description	Unescalated Cost with Markup
Beautification Cap			
4.1	Project Management	Project Management - includes permitting, design, project oversight	$265
4.1	Project Management	Remedial Action Report	$150
Project Management Total			**$415**
4.2	Capping	Capping (7 acre total cap area)	$669
4.2	Capping	Drain PRS 69	$48
Capping Total			**$717**
		Beautification Cap - Total Cost	**$1,132**

Notes: This scenario includes a 7-acre native soil cap using 18 inches of local soil and a 6 inch layer of topsoil The cap is vegetated to minimize erosion.

Estimate includes the purchase and placement of 31,000 cubic yards of fill material and 7,000 cubic yards of top soil.

Cost Estimate Summary

WBS	WBS Title	Brief Activity Description	Unescalated Cost with Markup
Single Barrier Cap			
4.1	Project Management	Project Management - includes permitting, design, project oversight	$917
4.1	Project Management	Remedial Action Report	$150
Project Management Total			**$1,067**
4.2	Capping	Capping	$2,836
4.2	Capping	Drain PRS 69	$48
Capping Total			**$2,884**
		Single Barrier Cap - Total Cost	**$3,951**

Notes: This scenario includes a 7-acre single barrier cap using an 18 inch bedding layer, 24 inch clay layer, 12 inch drainage layer, and 24 inch native soil cover.

Estimate includes the purchase and placement of 53,000 cubic yards of fill material, 13,000 cubic yards sand, 32,000 cubic yards of clay and 7,000 cubic yards of top soil.

Cost Estimate Summary

WBS	WBS Title	Brief Activity Description	Unescalated Cost with Markup
Multilayer Cap			
4.1	Project Management	Project Management - includes permitting, design, project oversight	$1,098
4.1	Project Management	Remedial Action Report	$150
Project Management Total			**$1,248**
4.2	Capping	Capping	$4,391
4.2	Capping	Drain PRS 69	$48
Capping Total			**$4,439**
		Multilayer Cap - Total Cost	**5,687**

Notes: At Fernald, the cost for placement of a multilayer cap over the On-Site Disposal Facility was approximately $18.00 per square foot of cap. Using this rate, a 7-acre multilayer cap over OU-1 is estimated to cost $5.5 million. Twenty percent of that total is assumed to be project management costs with the remainder covering capping activities. Regulatory documentation and costs for draining PRS 69 were added for a final cost of $5,687.

Appendix B

RACER Data

Removal of Operable Unit 1 at the Mound Plant in Miamisburg, Ohio

Independent Government Cost Estimate

April 19th 2004

Scenarios 3.4, 3.5 and 3.6 Capping Of OU-1

Assumptions:

3.4 Beautification Cap

- PRS 69, the Overflow Pond, will be drained.
- A soil cover encompassing the same boundaries described in Section 3.2 will be placed over OU-1.
- Contouring fill will be added and the site will be graded and vegetated to meet aesthetic requirements.
- Groundwater monitoring wells will be maintained.

3.5 Single Barrier Cap

- PRS 69, the Overflow Pond, will be drained.
- A single barrier multiple layer cap encompassing the same boundaries described in Section 3.2 will be placed.
- The cap will consist of an infiltration barrier layer placed over the existing fill, a drainage layer, a frost protection layer, topsoil, and shallow-rooted vegetation.
- Groundwater monitoring wells will be maintained.

3.6 Composite Barrier

- Cap PRS 69, the Overflow Pond, will be drained.
- A single barrier multiple layer cap encompassing the same boundaries described in Section 3.2 will be placed.
- The cap will consist of an infiltration barrier layer placed over the existing fill, a drainage layer, a frost protection layer, topsoil, and shallow-rooted vegetation.
- Groundwater monitoring wells will be maintained.

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Mound OU 1 Parametric Estimate

Folder: **Mound**

Project Name: Capping
Project Number: 3.4, 3.5, and 3.6
Cost Database Date: 2004
Cost Type: User-Defined
Description: Estimate for 7 acre caps over 4.8 acre area impacted by excavation activities. This includes the Sanitary Landfill, overflow pond, PRS 409, PRS 410, and PRS 11 (thorium drum burial site). The estimates represent three caps, Native Soil, Single Barrier, and Composite Barrier.

Native Soil Cap		
Total Capping Technology	498,471	668,786
Total Professional Labor Management Technology	87,726	264,845
Total DRAIN OVERFLOW POND Technology	36,442	48,171
Total Phase Native Soil Cap	622,640	981,803
Single Barrier Cap		
Total Capping Technology	2,086,889	2,835,687
Total Professional Labor Management Technology	303,689	916,842
Total DRAIN OVERFLOW POND Technology	36,442	48,171
Total Phase Single Barrier Cap	2,427,020	3,800,700
Composite Cap		
Total Capping Technology	2,146,716	2,909,237
Total Professional Labor Management Technology	312,246	942,675
Total DRAIN OVERFLOW POND Technology	36,442	48,171
Total Site Composite Barrier Cap	2,495,405	3,900,083

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Site Name: Native Soil Cap

Site Number: 3.4

Description: 7 acre Native Soil Cap estimate includes an allowance for a leveling layer over the site along with 18 inches of local soil and a 6 inch layer of topsoil. The cap is vegitated to minimize erosion.

Phase Name: Native Soil Cap

Phase: Remedial Action

Description: 7 acre Native Soil Cap estimate includes an allowance for a leveling layer over the site along with 18 inches of local soil and a 6 inch layer of topsoil. The cap is vegitated to minimize erosion.

Technology: **Capping** # 1

Comment:

Since the site will not be disturbed under this scenario all soil is assumed imported from off site.

17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes De	273,627	365,883
18050301	Topsoil, 6" Lifts, Off-Site	206,419	278,420
18050402	Seeding, Vegetative Cover	16,041	20,881
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	2,385	3,602
Total Capping Technology		**498,471**	**668,786**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	30,840.91	CY	5.56	1.48	1.83	$273,626.72
18050301	Topsoil, 6" Lifts, Off-Site	7,296.55	CY	18.77	5.96	3.56	$206,418.66
18050402	Seeding, Vegetative Cover	7.00	ACRE	2,122.60	113.58	55.37	$16,040.84
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	2,422.77	LF	0.05	0.76	0.17	$2,385.22
				Total Element Cost			**$498,471.45**
				Total Un Escalated Technology Cost			**$498,471.45**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Professional Labor Management** **#** 1

Professional Labor Percentage

33220138	Project Management Labor Cost	20,059	60,559
33220139	Planning Documents Labor Cost	18,722	56,522
33220140	Construction Oversight Labor Cost	16,047	48,447
33220141	Reporting Labor Cost	2,675	8,075
33220142	As-Built Drawings Labor Cost	2,675	8,075
33220143	Public Notice Labor Cost	802	2,422
33220144	Site Closure Activities Labor Cost	0	0
33220145	Permitting Labor Cost	26,746	80,746
33220146	Responsible Party Labor Cost	0	0
33220147	Reimbursement Claims Preparation Labor Cost	0	0
33220148	Other Labor Cost	0	0
Total Professional Labor Management Technology		**87,726**	**264,845**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33220138	Project Management Labor Cost	1.00	LS	0.00	20,059.26	0.00	$20,059.26
33220139	Planning Documents Labor Cost	1.00	LS	0.00	18,721.98	0.00	$18,721.98
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	16,047.41	0.00	$16,047.41
33220141	Reporting Labor Cost	1.00	LS	0.00	2,674.57	0.00	$2,674.57
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	2,674.57	0.00	$2,674.57
33220143	Public Notice Labor Cost	1.00	LS	0.00	802.37	0.00	$802.37
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220145	Permitting Labor Cost	1.00	LS	0.00	26,745.68	0.00	$26,745.68
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
			Total Element Cost				**$87,725.84**
			Total Un Escalated Technology Cost				**$87,725.84**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **DRAIN OVERFLOW POND**

Comment:

5 million gallon overflow pond. S&A water and pump content to NPDES Outfall 002. Move pump into pond area with crane as water level drops.

33021618	Volatile Organic Analysis (EPA 624), Water Analysi	2,380	3,064

Assembly		Direct Cost	Marked Up Cost
33021670	Metals Screen, 25 Metals Listed In Method EPA 200.	18,607	23,953
33022251	Liquid, Radium - 226, 228, Alpha Spectroscopy	1,525	1,964
33022255	Liquid, Radium - 226, 228, Beta/Gamma Coincidence	1,536	1,978
33040165	22 Ton 4WD Rough Terrain Hydraulic Crane, No Opera	3,233	4,199
33221001	Equip. Operators, Crane/Shovel	3,395	5,338
33260704	50' Flexible, Product Discharge Hose	1,103	1,420
33290111	20 HP, 500 GPM, Centrifugal Pump	4,663	6,256
Total DRAIN OVERFLOW POND Technology		**36,442**	**48,171**
Total Phase Native Soil Cap		**622,640**	**981,803**
Total Site Native Soil Cap		**622,640**	**981,803**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33021618	Volatile Organic Analysis (EPA 624), Water Analysis	12.00	EA	198.33	0.00	0.00	$2,379.91
33021670	Metals Screen, 25 Metals Listed In Method EPA 200.7, Water Analysis	12.00	EA	1,550.55	0.00	0.00	$18,606.58
33022251	Liquid, Radium - 226, 228, Alpha Spectroscopy	12.00	EA	127.11	0.00	0.00	$1,525.31
33022255	Liquid, Radium - 226, 228, Beta/Gamma Coincidence	12.00	EA	128.01	0.00	0.00	$1,536.12
33040165	22 Ton 4WD Rough Terrain Hydraulic Crane, No Operator	40.00	HR	0.00	0.00	80.83	$3,233.23
33221001	Equip. Operators, Crane/Shovel	60.00	HR	0.00	56.59	0.00	$3,395.44

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

33260704	50' Flexible, Product Discharge Hose	6.00	EA	183.80	0.00	0.00	$1,102.78
33290111	20 HP, 500 GPM, Centrifugal Pump	1.00	EA	3,774.87	888.01	0.00	$4,662.87

Total Element Cost **$36,442.26**

Total Un Escalated Technology Cost **$36,442.26**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Site Name: Single Barrier Cap

Site Number: 3.5

Description: 7 acre Single Barrier Cap estimate.

Phase Name: Single Barrier Cap

Phase: Remedial Action

Description: Cap based on landfill cover selection guide. Single barrier cap modeled is as follows: of a 24 inch Vegitative layer of native soil, 12 inch drainage layer, 24 inch clay layer, and 18 inch bedding layer. Assumption is that cap is placed over existing landfill areas so a passive gas vent system is included.

Technology: **Capping**

Assembly		Direct Cost	Marked Up Cost
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes De	472,730	632,116
17030426	Sand, 6" Lifts, Off-Site	147,347	195,374
18050301	Topsoil, 6" Lifts, Off-Site	206,419	278,420
18050402	Seeding, Vegetative Cover	16,041	20,881
33070201	6" Inside Diameter (Vertical Pipe Spaced @ 200 LF)	32,739	44,993
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	2,385	3,602
33080507	Clay 10E-7, 6" Lifts, Off-Site	732,194	1,016,803
33080513	Drainage Netting, Geotextile Fabric Heat-bonded 2	325,443	431,896
33080571	40 Mil Polymeric Liner, High-density Polyethylene	151,591	211,603
Total Capping Technology		**2,086,889**	**2,835,687**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	53,282.13	CY	5.56	1.48	1.83	$472,729.70
17030426	Sand, 6" Lifts, Off-Site	12,841.93	CY	8.28	1.49	1.70	$147,347.02
18050301	Topsoil, 6" Lifts, Off-Site	7,296.55	CY	18.77	5.96	3.56	$206,418.66
18050402	Seeding, Vegetative Cover	7.00	ACRE	2,122.60	113.58	55.37	$16,040.84
33070201	6" Inside Diameter (Vertical Pipe Spaced @ 200 LF), Gas Vent Piping System	1,400.00	LF	12.39	6.98	4.02	$32,739.00

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33080503	Polymeric Liner Anchor Trench, 3'	2,422.77	LF	0.05	0.76	0.17	$2,385.22
33080507	Clay 10E-7, 6" Lifts, Off-Site	32,688.55	CY	6.69	7.65	8.07	$732,194.12
33080513	Drainage Netting, Geotextile Fabric Heat-bonded 2 Sides	693,464.30	SF	0.40	0.07	0.00	$325,442.80
33080571	40 Mil Polymeric Liner, High-density Polyethylene	346,732.20	SF	0.26	0.17	0.01	$151,591.31
			Total Element Cost				**$2,086,888.68**
			Total Un Escalated Technology Cost				**$2,086,888.68**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Professional Labor Management**

Comment:

Moderatly low level of complexity was used due to the straightforward nature of the construction and good accesability to the site.

Assembly		Direct Cost	Marked Up Cost
Professional Labor Percentage			
33220138	Project Management Labor Cost	63,700	192,311
33220139	Planning Documents Labor Cost	63,700	192,311
33220140	Construction Oversight Labor Cost	79,625	240,389
33220141	Reporting Labor Cost	7,962	24,039
33220142	As-Built Drawings Labor Cost	7,962	24,039
33220143	Public Notice Labor Cost	1,115	3,365
33220144	Site Closure Activities Labor Cost	0	0
33220145	Permitting Labor Cost	79,625	240,389
33220146	Responsible Party Labor Cost	0	0
33220147	Reimbursement Claims Preparation Labor Cost	0	0
33220148	Other Labor Cost	0	0
Total Professional Labor Management Technology		**303,689**	**916,842**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33220138	Project Management Labor Cost	1.00	LS	0.00	63,699.93	0.00	$63,699.93
33220139	Planning Documents Labor Cost	1.00	LS	0.00	63,699.93	0.00	$63,699.93
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	79,624.91	0.00	$79,624.91
33220141	Reporting Labor Cost	1.00	LS	0.00	7,962.49	0.00	$7,962.49
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	7,962.49	0.00	$7,962.49
33220143	Public Notice Labor Cost	1.00	LS	0.00	1,114.75	0.00	$1,114.75
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220145	Permitting Labor Cost	1.00	LS	0.00	79,624.91	0.00	$79,624.91
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
				Total Element Cost			**$303,689.42**
				Total Un Escalated Technology Cost			**$303,689.42**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **DRAIN OVERFLOW POND**

Comment:

5 million gallon overflow pond. S&A water and pump content to NPDES Outfall 002. Move pump into pond area with crane as water level drops.

Assembly		Direct Cost	Marked Up Cost
33021618	Volatile Organic Analysis (EPA 624), Water Analysi	2,380	3,064
33021670	Metals Screen, 25 Metals Listed In Method EPA 200.	18,607	23,953
33022251	Liquid, Radium - 226, 228, Alpha Spectroscopy	1,525	1,964
33022255	Liquid, Radium - 226, 228, Beta/Gamma Coincidence	1,536	1,978
33040165	22 Ton 4WD Rough Terrain Hydraulic Crane, No Opera	3,233	4,199
33221001	Equip. Operators, Crane/Shovel	3,395	5,338
33260704	50' Flexible, Product Discharge Hose	1,103	1,420
33290111	20 HP, 500 GPM, Centrifugal Pump	4,663	6,256
Total DRAIN OVERFLOW POND Technology		**36,442**	**48,171**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33021618	Volatile Organic Analysis (EPA 624), Water Analysis	12.00	EA	198.33	0.00	0.00	$2,379.91
33021670	Metals Screen, 25 Metals Listed In Method EPA 200.7, Water analysis	12.00	EA	1,550.55	0.00	0.00	$18,606.58
33022251	Liquid, Radium - 226, 228, Alpha Spec.	12.00	EA	127.11	0.00	0.00	$1,525.31
33022255	Liquid, Radium - 226, 228, Beta/Gamma Coincidence	12.00	EA	128.01	0.00	0.00	$1,536.12
33040165	22 Ton 4WD Rough Terrain Hydraulic Crane, No Operator	40.00	HR	0.00	0.00	80.83	$3,233.23
33221001	Equip. Operators, Crane/Shovel	60.00	HR	0.00	56.59	0.00	$3,395.44
33260704	50' Flexible, Product Discharge Hose	6.00	EA	183.80	0.00	0.00	$1,102.78
33290111	20 HP, 500 GPM, Centrifugal Pump	1.00	EA	3,774.87	888.01	0.00	$4,662.87
			Total Element Cost				**$36,442.26**
			Total Un Escalated Technology Cost				**$36,442.26**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Site Name: Composite Barrier Cap

Technology: Capping # 1

Assembly		Direct Cost	Marked Up Cost
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes De	403,100	539,010
17030426	Sand, 6" Lifts, Off-Site	147,347	195,374
18050301	Topsoil, 6" Lifts, Off-Site	206,419	278,420
18050402	Seeding, Vegetative Cover	16,041	20,881
33070201	6" Inside Diameter (Vertical Pipe Spaced @ 200 LF)	32,739	44,993
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	2,385	3,602
33080507	Clay 10E-7, 6" Lifts, Off-Site	732,182	1,016,786
33080513	Drainage Netting, Geotextile Fabric Heat-bonded 2	325,443	431,896
33080520	Geosynthetic Clay Liner	129,470	166,673
33080571	40 Mil Polymeric Liner, High-density Polyethylene	151,591	211,603
Total Capping Technology		**2,146,716**	**2,909,237**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compact	45,434.02	CY	5.56	1.48	1.83	$403,099.71
17030426	Sand, 6" Lifts, Off-Site	12,841.93	CY	8.28	1.49	1.70	$147,347.02
18050301	Topsoil, 6" Lifts, Off-Site	7,296.55	CY	18.77	5.96	3.56	$206,418.66
18050402	Seeding, Vegetative Cover	7.00	ACRE	2,122.60	113.58	55.37	$16,040.84
33070201	6" Inside Diameter (Vertical Pipe Spaced @ 200 LF), Gas Vent Piping System	1,400.00	LF	12.39	6.98	4.02	$32,739.00
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	2,422.77	LF	0.05	0.76	0.17	$2,385.22
33080507	Clay 10E-7, 6" Lifts, Off-Site	32,688.00	CY	6.69	7.65	8.07	$732,181.78
33080513	Drainage Netting, Geotextile Fabric Heat-bonded 2 Sides	693,464.30	SF	0.40	0.07	0.00	$325,442.80
33080520	Geosynthetic Clay Liner	346,732.20	SF	0.37	0.00	0.00	$129,469.80
33080571	40 Mil Polymeric Liner,	346,732.20	SF	0.26	0.17	0.01	$151,591.31
				Total Element Cost			**$2,146,716.14**
				Total Un Escalated Technology Cost			**$2,146,716.14**

Technology: **Professional Labor Management**

Comment:

Moderatly low level of complexity was used due to the straightforward nature of the construction and good accesability to the site.

Assembly		Direct Cost	Marked Up Cost
Professional Labor Percentage			
33220138	Project Management Labor Cost	65,495	197,730
33220139	Planning Documents Labor Cost	65,495	197,730
33220140	Construction Oversight Labor Cost	81,868	247,162
33220141	Reporting Labor Cost	8,187	24,716
33220142	As-Built Drawings Labor Cost	8,187	24,716
33220143	Public Notice Labor Cost	1,146	3,460
33220144	Site Closure Activities Labor Cost	0	0
33220145	Permitting Labor Cost	81,868	247,162
33220146	Responsible Party Labor Cost	0	0
33220147	Reimbursement Claims Preparation Labor Cost	0	0
33220148	Other Labor Cost	0	0
Total Professional Labor Management Technology		**312,246**	**942,675**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33220138	Project Management Labor Cost	1.00	LS	0.00	65,494.75	0.00	$65,494.75
33220139	Planning Documents Labor Cost	1.00	LS	0.00	65,494.75	0.00	$65,494.75
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	81,868.45	0.00	$81,868.45
33220141	Reporting Labor Cost	1.00	LS	0.00	8,186.84	0.00	$8,186.84
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	8,186.84	0.00	$8,186.84
33220143	Public Notice Labor Cost	1.00	LS	0.00	1,146.16	0.00	$1,146.16
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220145	Permitting Labor Cost	1.00	LS	0.00	81,868.45	0.00	$81,868.45
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00

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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00	
				Total Element Cost			**$312,246.25**	
				Total Un Escalated Technology Cost			**$312,246.25**	

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Albuquerque, New Mexico

Technology: **DRAIN OVERFLOW POND**

Comment:

5 million gallon overflow pond. Pump content to NPDES Outfall 002. Move pump into pond area with crane as water level drops.

33021618	Volatile Organic Analysis (EPA 624), Water Analysi	2,380	3,064
33021670	Metals Screen, 25 Metals Listed In Method EPA 200.	18,607	23,953
33022251	Liquid, Radium - 226, 228, Alpha Spectroscopy	1,525	1,964
33022255	Liquid, Radium - 226, 228, Beta/Gamma Coincidence	1,536	1,978
33040165	22 Ton 4WD Rough Terrain Hydraulic Crane, No Opera	3,233	4,199
33221001	Equip. Operators, Crane/Shovel	3,395	5,338
33260704	50' Flexible, Product Discharge Hose	1,103	1,420
33290111	20 HP, 500 GPM, Centrifugal Pump	4,663	6,256
Total DRAIN OVERFLOW POND Technology		**36,442**	**48,171**
Total Phase Composite Barrier Cap		**2,495,405**	**3,900,083**
Total Site Composite Barrier Cap		**2,495,405**	**3,900,083**
Total Project Capping		**2,495,405**	**3,900,083**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33021618	Volatile Organic Analysis (EPA 624), Water Analysis	12.00	EA	198.33	0.00	0.00	$2,379.91	
33021670	Metals Screen, 25 Metals Listed In Method EPA 200.7, Water Analyses	12.00	EA	1,550.55	0.00	0.00	$18,606.58	
33022251	Liquid, Radium - 226, 228, Alpha Spec.	12.00	EA	127.11	0.00	0.00	$1,525.31	
33022255	Liquid, Radium - 226, 228, Beta/Gamma Coincidence	12.00	EA	128.01	0.00	0.00	$1,536.12	
33040165	22 Ton 4WD Rough Terrain Hydraulic Crane, No Operator	40.00	HR	0.00	0.00	80.83	$3,233.23	
33221001	Equip. Operators, Crane/Shovel	60.00	HR	0.00	56.59	0.00	$3,395.44	
33260704	50' Flexible, Product Discharge Hose	6.00	EA	183.80	0.00	0.00	$1,102.78	
33290111	20 HP, 500 GPM, Centrifugal Pump	1.00	EA	3,774.87	888.01	0.00	$4,662.87	
			Total Element Cost				**$36,442.26**	
			Total 1st Year Technology Cost				**$36,442.26**	

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Removal of Operable Unit 1 at the Mound Plant in Miamisburg, Ohio

Independent Government Cost Estimate

April 19th 2004

Scenario 3.1 "L" Excavation of the Sanitary Landfill With Disposal of All Content as Low Level Waste

Assumptions:

- The sanitary landfill including the existing cover, contents, and liner will be removed using conventional excavating equipment.
- The total waste volume to be disposed is 1.6 million cubic feet (58,000 cubic yards), as estimated by the OU-1 Feasibility Study[1]. Waste is assumed Low Level for disposal purposes.
- The site will be backfilled and regraded.
- Required regulatory documentation will be completed.

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Mound OU 1 Parametric Estimate

Folder: Mound

Project

Name: Excavation of the Sanitary Landfill w/ Disposal as LLW
ID: 3.1
Location: OHIO STATE AVERAGE, OHIO
Modifiers: **Material** 0.9671
Labor 1.2393
Equipment 0.9891
Category: None

Report Option: Fiscal Year
Description: Remove Existing Cover (11,890 bcy), Content (31790 bcy), and clay liner material (14,690 bcy). Total contaminated media is approximately 1.6 million cubic feet. Collapse and regrade (136,925 bcy) till and fill material used to construct the landfill cell. Borrow fill is being assumed to be un necessary.

Site

Name: Low Level Waste Disposal Scenario
ID: 3.1 L
Type: None
Description: Excavation of Sanitary Landfill with disposal as Low Level Waste at Envirocare in Clive Utah 1775 miles away.

Phase

Name: Mound OU 1 Sanitary Landfill Excavation
Type: Remedial Action
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate
Approach: Ex Situ
Start Date: 4/1/2004

Media/Waste Type: Soil
Secondary Media/Waste Type: Solids
Contaminant: Volatile Organic Compounds (VOCs)
Secondary Contaminant: Low Level Radioactive
Markup Template: System Defaults
O&M Markup Template: N/A

Description: Mixed waste disposal scenario

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Phase Cost Over Time Report (with Markups)

Technology	2004	Total
Bulk Material Storage	$500,222	$500,222
Capping	$412,850	$412,850
Cleanup and Landscaping	$44,721	$44,721
Decontamination Facilities	$294,380	$294,380
Fencing	$43,094	$43,094
Demolition, Fencing	$15,483	$15,483
Excavation	$917,483	$917,483
Excavation	$1,887,844	$1,887,844
Load and Haul	$262,385	$262,385
Off-site Transportation and Waste Disposal	$27,511,269	$27,511,269
Parking Lots	$15,129	$15,129
Residual Waste Management	$11,202	$11,202
Professional Labor Management	$7,485,466	$7,485,466
FIELD GUIDANCE; ONSITE LABORATORY	$1,097,077	$1,097,077
WELL ABANDONMENT	$38,599	$38,599
Total Phase Cost	$40,537,204	$40,537,204

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NNSA Service Center
Albuquerque, New Mexico

Cost Report by Activity

Technology: **Bulk Material Storage** # 1

Comment:

Assumes use of adjacent area to the south which is outside the OU 1 boundry.

Assembly		Direct Cost	Marked Up Cost
17030102	Rough Grading, 12G, 1 Pass	12,649	17,770
17030105	Fine Grading, Hand	8,888	13,974
17030106	Fine Grading, 12G, 2 Passes	6,402	9,183
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes De	7,738	10,458
17030430	Gravel, 6" Lifts	54,477	76,875
33080504	Herbicide Application	895	1,317
33080563	40 Mil Polymeric Liner, PVC	244,084	370,643
Total Bulk Material Storage Technology		**335,133**	**500,222**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030102	Rough Grading, 12G, 1 Pass	12,395.00	SY	0.00	0.40	0.62	$12,649.10
17030105	Fine Grading, Hand	2,083.00	SY	0.00	4.27	0.00	$8,888.37
17030106	Fine Grading, 12G, 2 Passes	12,395.00	SY	0.00	0.26	0.26	$6,402.02
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	758.00	CY	5.56	2.20	2.44	$7,737.74
17030430	Gravel, 6" Lifts	3,767.83	CY	5.92	6.19	2.35	$54,477.17
33080504	Herbicide Application	2.56	ACRE	57.95	224.70	66.80	$894.59
33080563	40 Mil Polymeric Liner, PVC	101,731.40	SF	0.33	1.94	0.13	$244,084.14
				Total Element Cost			**$335,133.13**
				Total Un Escalated Technology Cost			**$335,133.13**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Cleanup and Landscaping** **#** **1**

Comment:

Area is based on OU 1 and adjacent area to the south. All will likely sustain some impact from the operation.

Assembly		Direct Cost	Marked Up Cost
17040101	General Area Cleanup	5,610	8,579
18050101	Area Preparation, 67% Level & 33% Slope	1,423	2,035
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	8,985	12,139
18050408	Fertilizer, Hydro Spread	6,147	8,372
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	7,788	11,591
18050415	Mowing	1,319	2,004
Total Cleanup and Landscaping Technology		**31,272**	**44,721**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17040101	General Area Cleanup	18.00	ACRE	0.00	262.61	49.07	$5,610.21
18050101	Area Preparation, 67% Level & 33% Slope	18.00	ACRE	0.00	38.07	40.96	$1,422.55
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	18.00	ACRE	352.34	110.19	36.63	$8,984.89
18050408	Fertilizer, Hydro Spread	36.00	ACRE	94.24	43.39	33.13	$6,147.30
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	144.00	ACRE	3.88	37.68	12.52	$7,787.76
18050415	Mowing	36.00	ACRE	0.00	29.52	7.13	$1,319.49
			Total Element Cost				**$31,272.20**
			Total Un Escalated Technology Cost				**$31,272.20**

Bob Ratzer, Cost Engineer
NNSA Service Center
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Technology: **Decontamination Facilities** # 1

Decontamination Operation limited to equipment. Decontamination of debris resulting from the excavation is not included in the estimate of this activity. Personal Protection Level C.

Assembly		Direct Cost	Marked Up Cost
19040602	550 Gallon Steel Sump, Aboveground with Supports	1,792	2,566
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	126	191
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80	66	95
33080571	40 Mil Polymeric Liner, High-density Polyethylene	188	267
33170818	1,800 PSI Pressure Washer Rental	1,103	1,420
33170821	8' x 24' Decontamination Trailer with 4 Showers, H	37,022	47,660
33170823	Operation of Pressure Washer, Including Water, Soa	2,330	3,608
33170825	8' - 6" Railroad Wood Crossties	509	700
33199921	DOT Steel Drum, 55 Gallon	41,234	53,083
33220112	Field Technician	60,358	182,222
33230512	1" Submersible Pump Rental, Month	103	132
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	1,637	2,437
Total Decontamination Facilities Technology		**146,468**	**294,380**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
19040602	550 Gallon Steel Sump, Aboveground with Supports & Fittings	1.00	EA	884.19	907.99	0.00	$1,792.18
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	88.80	LF	0.05	1.14	0.23	$125.78
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80 Mil)	40.00	SY	0.69	0.92	0.03	$65.64
33080571	40 Mil Polymeric Liner, High-density Polyethylene	360.00	SF	0.26	0.25	0.01	$187.99
33170818	1,800 PSI Pressure Washer Rental	1.00	MO	1,102.78	0.00	0.00	$1,102.78
33170821	8' x 24' Decontamination Trailer with 4 Showers, HVAC, 2 Sinks	15.00	MO	2,468.14	0.00	0.00	$37,022.04
33170823	Operation of Pressure Washer, Including Water, Soap, Electricity,	30.00	HR	6.56	71.12	0.00	$2,330.45

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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33170825	8' - 6" Railroad Wood Crossties	9.00	EA	30.56	16.86	9.17	$509.37
33199921	DOT Steel Drum, 55 Gallon	541.00	EA	76.22	0.00	0.00	$41,233.99
33220112	Field Technician	1,440.00	HR	0.00	41.92	0.00	$60,358.03
33230512	1" Submersible Pump Rental, Month	1.00	MO	102.60	0.00	0.00	$102.60
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	30.00	LF	15.97	38.59	0.00	$1,636.66
			Total Element Cost				**$146,467.50**

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Technology: **Fencing** # 1

Assembly	Direct Cost	Marked Up Cost
18040105 Boundary Fence, 5' Galvanized	28,766	41,168
18040501 Hazardous Waste Signing	1,285	1,926
Total Fencing Technology	**30,051**	**43,094**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
18040105	Boundary Fence, 5' Galvanized	4,000.00	LF	1.49	3.54	2.16	$28,766.40
18040501	Hazardous Waste Signing	20.00	EA	16.55	47.70	0.00	$1,285.04
			Total Element Cost				**$30,051.44**
			Total Un Escalated Technology Cost				**$30,051.44**

Technology: **Demolition, Fencing** # 1

Assembly	Direct Cost	Marked Up Cost
17020225 Remove Chain-link Fence	9,848	15,483
Total Demolition, Fencing Technology	**9,848**	**15,483**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020225	Remove Chain-link Fence	4,000.00	LF	0.00	2.46	0.00	$9,848.00
			Total Element Cost				**$9,848.00**
			Total Un Escalated Technology Cost				**$9,848.00**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation** **#** 1

Comment:

Excavation volumes represent cap, trash, and liner material from the sanitary Landfill. No fill is budgeted since surrounding area was built up and can be collapsed and graded.

Assembly		Direct Cost	Marked Up Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	301,034	418,933
17030418	Delivered & Dumped, Backfill with Stone	72,195	94,152
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	737	1,011
33020401	Disposable Materials per Sample	811	1,044
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	64,077	82,490
33021707	Target Analyte List (TAL) Metals, Soil Analysis	33,819	43,537
33021712	Mercury (SW 7471), with prep, Soil Analysis	3,210	4,132
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	16,632	21,412
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	19,833	25,532
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	29,208	37,601
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectr	12,440	16,015
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	15,415	19,845
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	19,833	25,532
33080584	Plastic Laminate Waste Pile Cover	90,759	124,853
33170803	Decontaminate Heavy Equipment	790	1,242
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	119	153
Total Excavation Technology		**680,911**	**917,483**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	58,195.55	CY	0.00	1.76	3.42	$301,033.95	
17030418	Delivered & Dumped, Backfill with Stone	2,683.82	BCY	23.92	1.53	1.45	$72,194.76	
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	12.00	DAY	43.14	18.25	0.00	$736.78	

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NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020401	Disposable Materials per Sample	100.00	EA	8.11	0.00	0.00	$811.16
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	100.00	EA	640.77	0.00	0.00	$64,077.36
33021707	Target Analyte List (TAL) Metals, Soil Analysis	100.00	EA	338.19	0.00	0.00	$33,819.11
33021712	Mercury (SW 7471), with prep, Soil Analysis	100.00	EA	32.10	0.00	0.00	$3,209.64
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	100.00	EA	166.32	0.00	0.00	$16,632.35
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	100.00	EA	198.33	0.00	0.00	$19,832.61
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	100.00	EA	292.08	0.00	0.00	$29,208.03
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	100.00	EA	124.40	0.00	0.00	$12,440.46
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	100.00	EA	154.15	0.00	0.00	$15,415.35
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	100.00	EA	198.33	0.00	0.00	$19,832.61
33080584	Plastic Laminate Waste Pile Cover	542,166.10	SF	0.12	0.05	0.00	$90,758.61
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	790.07	0.00	$790.07
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	100.00	LF	1.19	0.00	0.00	$118.64

Total Element Cost **$680,911.48**

Total Un Escalated Technology Cost **$680,911.4**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation** # 2

Comment:

Excavation represents earthwork required to regrade site using fill and till material used to construct the cell.

Assembly		Direct Cost	Marked Up Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	412,902	570,713
17030415	Backfill with Excavated Material	745,521	1,123,093
17030418	Delivered & Dumped, Backfill with Stone	149,178	193,402
33170803	Decontaminate Heavy Equipment	405	636
Total Excavation Technology		**1,308,005**	**1,887,844**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	140,000.00	CY	0.00	0.90	2.05	$412,902.00
17030415	Backfill with Excavated Material	161,009.20	CY	0.31	3.53	0.79	$745,520.91
17030418	Delivered & Dumped, Backfill with Stone	5,833.33	BCY	23.92	0.78	0.87	$149,177.50
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	404.67	0.00	$404.67
			Total Element Cost				**$1,308,005.08**
			Total Un Escalated Technology Cost				**$1,308,005.08**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Load and Haul** **#** 1

Comment:

Load and Haul costs provide an allowance for moving the waste from the landfill to the bulk storage facility and then on to the rail loading area. Double handling is allowed for by doubling the volume. A 1.3 swell factor is assumed.

Assembly	Direct Cost	Marked Up Cost
17030226 988, 7.0 CY, Wheel Loader	115,448	157,633
17030289 32 CY, Semi Dump	66,630	104,753
Total Load and Haul Technology	**182,077**	**262,385**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030226	988, 7.0 CY, Wheel Loader	565.00	HR	0.00	49.81	154.52	$115,447.75
17030289	32 CY, Semi Dump	1,695.00	HR	0.00	39.31	0.00	$66,629.60
			Total Element Cost				**$182,077.35**

Total Un Escalated Technology Cost **$182,077.3**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Off-site Transportation and Waste Disposal** **#** 1

Comment:

Bulk rail shipment to Envirocare in Clive, UT. Soil weight estimated at 85 lbs/bcf and a 1.3 swell factor is used for volume calculations.

Assembly		Direct Cost	Marked Up Cost
33171005	LLW Disposal Charge, Envirocare, UT	13,926,240	17,927,980
33190289	Rail Gondola Transport	7,356,104	9,469,898
33190812	50 to 54 Ft Rail Gondola, 10 Mil Liner, disposable	88,081	113,391
Total Off-site Transportation and Waste Disposal Technology		**21,370,425**	**27,511,269**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33171005	LLW Disposal Charge, Envirocare, UT	1,600,000.00	CF	8.70	0.00	0.00	$13,926,240.00
33190289	Rail Gondola Transport	1,360,000.00	CWT	5.41	0.00	0.00	$7,356,104.00
33190812	50 to 54 Ft Rail Gondola, 10 Mil Liner, disposable	602.00	EA	146.31	0.00	0.00	$88,080.55
			Total Element Cost				**$21,370,424.55**

Total Un Escalated Technology Cost **$21,370,424.55**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Parking Lots** **#** **1**

Assembly		Direct Cost	Marked Up Cost
17030102	Rough Grading, 12G, 1 Pass	969	1,354
17030107	Fine Grading, 120G, 2 Passes	316	450
17030203	Roadway Soil Excavation, with Scraper, Load & Haul	1,291	1,901
17030501	Compact Subgrade, 2 Lifts	167	238
17030510	Dry Roll Gravel, Steel Roller	1,055	1,572
18010102	Gravel, Delivered & Dumped	6,521	8,601
18020501	Precast Parking Stops	724	1,012
Total Parking Lots Technology		**11,044**	**15,129**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030102	Rough Grading, 12G, 1 Pass	1,320.00	SY	0.00	0.27	0.47	$968.88
17030107	Fine Grading, 120G, 2 Passes	1,320.00	SY	0.00	0.11	0.13	$316.01
17030203	Roadway Soil Excavation, with Scraper, Load & Haul Spoil	270.37	CY	0.00	3.03	1.74	$1,290.96
17030501	Compact Subgrade, 2 Lifts	337.96	CY	0.00	0.23	0.27	$167.39
17030510	Dry Roll Gravel, Steel Roller	1,216.67	SY	0.00	0.61	0.26	$1,054.61
18010102	Gravel, Delivered & Dumped	270.37	CY	19.93	2.61	1.58	$6,521.41
18020501	Precast Parking Stops	24.00	EA	16.12	11.58	2.47	$724.27
			Total Element Cost				**$11,043.53**
			Total Un Escalated Technology Cost				**$11,043.53**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Residual Waste Management** # 1

Assembly		Direct Cost	Marked Up Cost
33190101	Liquid Loading Into 5,000 Gallon Bulk Tank Truck	453	682
33190103	Load Drums on Disposal Vehicle	535	788
33190204	Transport 55 Gallon Drums of Hazardous Waste, Max	178	230
33190207	Transport Bulk Liquid/Sludge Hazardous Waste, Maxi	89	115
33190317	Waste Stream Evaluation Fee, Not Including 50% Reb	834	1,074
33197205	Landfill Nonhazardous Solid Waste, 55 Gallon Drum	1,917	2,468
33197278	Landfill Nonhazardous Nonfuel Liquid/Sludge	4,541	5,846
Total Residual Waste Management Technology		**8,548**	**11,202**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33190101	Liquid Loading Into 5,000 Gallon Bulk Tank Truck	1.00	EA	0.00	343.30	109.59	$452.89
33190103	Load Drums on Disposal Vehicle	142.00	EA	0.00	2.39	1.38	$535.10
33190204	Transport 55 Gallon Drums of Hazardous Waste, Max 80 drums (per Mile)	100.00	MI	1.78	0.00	0.00	$178.49
33190207	Transport Bulk Liquid/Sludge Hazardous Waste, Maximum 5,000 Gallon (per Mile)	50.00	MI	1.78	0.00	0.00	$89.25
33190317	Waste Stream Evaluation Fee, Not Including 50% Rebate on 1st Shipment	2.00	EA	417.03	0.00	0.00	$834.05
33197205	Landfill Nonhazardous Solid Waste, 55 Gallon Drum	142.00	EA	13.50	0.00	0.00	$1,917.00
33197278	Landfill Nonhazardous Nonfuel Liquid/Sludge	1,900.00	GAL	2.39	0.00	0.00	$4,541.00

Total Element Cost **$8,547.78**

Total Un Escalated Technology Cost **$8,547.78**

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Technology: **Professional Labor Management** **#** **1**

Professional Labor Percentage

33220138	Project Management Labor Cost	499,888	1,509,167
33220139	Planning Documents Labor Cost	474,893	1,433,708
33220140	Construction Oversight Labor Cost	999,775	3,018,333
33220141	Reporting Labor Cost	124,972	377,292
33220142	As-Built Drawings Labor Cost	124,972	377,292
33220143	Public Notice Labor Cost	4,999	15,092
33220144	Site Closure Activities Labor Cost	0	0
33220145	Permitting Labor Cost	249,944	754,583
33220146	Responsible Party Labor Cost	0	0
33220147	Reimbursement Claims Preparation Labor Cost	0	0
33220148	Other Labor Cost	0	0
Total Professional Labor Management Technology		**2,479,442**	**7,485,466**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220138	Project Management Labor Cost	1.00	LS	0.00	499,887.47	0.00	$499,887.47	
33220139	Planning Documents Labor Cost	1.00	LS	0.00	474,893.09	0.00	$474,893.09	
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	999,774.94	0.00	$999,774.94	
33220141	Reporting Labor Cost	1.00	LS	0.00	124,971.87	0.00	$124,971.87	
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	124,971.87	0.00	$124,971.87	
33220143	Public Notice Labor Cost	1.00	LS	0.00	4,998.88	0.00	$4,998.88	
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00	
33220145	Permitting Labor Cost	1.00	LS	0.00	249,943.73	0.00	$249,943.73	
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00	
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00	
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00	
			Total Element Cost				**$2,479,441.84**	

Total Un Escalated Technology Cost **$2,479,441.84**

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Technology: **FIELD GUIDANCE; ONSITE LABORATORY** **#** 1

Assembly		Direct Cost	Marked Up Cost
33020341	Alpha, Beta, Gamma Detector Equipment	896	1,154
33021206	Geiger Counter, Gamma Survey, 2 internal energy co	1,389	1,788
33021232	Survey Meter, General Pupose, G-M detector, Beta/	2,358	3,035
33021419	Alpha, Beta, Gamma, Pancake G-M Detector	383	493
33029913	Mobile Laboratory Trailer, 8' W x 30' L, Rental	88,223	113,574
33029914	Gas Chromatograph, HP5890A, Rental	39,196	50,459
33029915	Mass Spectrometer, HP5970B MD, Rental	74,076	95,361
33029922	Mobilize/Demobilize Laboratory Trailer	16,067	20,684
33029923	Radiological Scintillation Counter	39,249	50,527
33029929	Laboratory Utilities Allowance	5,509	7,092
33029930	Laboratory Expendables Allowance	57,382	73,870
33029931	Electric Laboratory Scales, Purchase	448	576
33220107	Senior Scientist	101,728	307,119
33220109	Staff Scientist	123,002	371,345
Total FIELD GUIDANCE; ONSITE LABORATORY		**549,904**	**1,097,077**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020341	Alpha, Beta, Gamma Detector Equipment	4.00	EA	224.05	0.00	0.00	$896.22
33021206	Geiger Counter, Gamma Survey, 2 internal energy compensated G-M tubes	24.00	MO	57.86	0.00	0.00	$1,388.72
33021232	Survey Meter, General Pupose, G-M detector, Beta/Gamma	24.00	MO	98.23	0.00	0.00	$2,357.59
33021419	Alpha, Beta, Gamma, Pancake G-M Detector	24.00	MO	15.97	0.00	0.00	$383.24
33029913	Mobile Laboratory Trailer, 8' W x 30' L Rent	24.00	MO	3,675.95	0.00	0.00	$88,222.73
33029914	Gas Chromatograph, HP5890A, rental	12.00	MO	3,266.34	0.00	0.00	$39,196.10
33029915	Mass Spectrometer, HP5970B MD, rental	12.00	MO	6,172.97	0.00	0.00	$74,075.59
33029922	Mobilize/Demobilize Laboratory Trailer	4.00	EA	4,016.71	0.00	0.00	$16,066.85
33029923	Radiological Scintillation Counter	12.00	MO	3,270.75	0.00	0.00	$39,249.01
33029929	Laboratory Utilities Allowance	24.00	MO	229.53	0.00	0.00	$5,508.64
33029930	Laboratory Expendables Allowance	5,000.00	EA	11.48	0.00	0.00	$57,381.50

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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33029931	Electric Laboratory Scales, Purchase	2.00	EA	223.79	0.00	0.00	$447.58	
33220107	Senior Scientist	1,760.00	HR	0.00	57.80	0.00	$101,728.18	
33220109	Staff Scientist	3,520.00	HR	0.00	34.94	0.00	$123,002.18	
				Total Element Cost			**$549,904.12**	
				Total Un Escalated Technology Cost			**$549,904.12**	

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Technology: WELL ABANDONMENT # 2

Assembly	Direct Cost	Marked Up Cost
33231823 Well Abandonment, 4" Well	27,810	38,599
Total WELL ABANDONMENT Technology	**27,810**	**38,599**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33231823	Well Abandonment, 4" Well	800.00	LF	1.05	11.39	22.32	$27,809.76
			Total Element Cost				**$27,809.76**
			Total Un Escalated Technology Cost				**$27,809.76**

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Technology: **Capping** **#** **1**

Comment: Beautification Cap. 3 acre over the 2.7 acre area shown on map provided by site.

Assembly		Direct Cost	Marked Up Cost
17030422	Unclassified Fill, 6" Lifts, On-Site, Includes Spr	136,213	189,630
18050301	Topsoil, 6" Lifts, Off-Site	88,465	119,323
18050402	Seeding, Vegetative Cover	6,875	8,949
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	1,589	2,399
33080513	Drainage Netting, Geotextile Fabric Heat-bonded	269,738	92,549
Total Capping Technology		**302,879**	**412,850**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030422	Unclassified Fill, 6" Lifts, On-Site, Includes Spreading and Compaction	17,092.60	CY	0.31	2.74	4.92	$136,212.64
18050301	Topsoil, 6" Lifts, Off-Site	3,127.09	CY	18.77	5.96	3.56	$88,465.07
18050402	Seeding, Vegetative Cover	3.00	ACRE	2,122.60	113.58	55.37	$6,874.65
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	1,613.70	LF	0.05	0.76	0.17	$1,588.69
33080513	Drainage Netting, Geotextile Fabric Heat-bonded 2 Sides	148,599.50	SF	0.40	0.07	0.00	$69,737.75
			Total Element Cost				**$302,878.78**
			Total Un Escalated Technology Cost				**$302,878.78**

Total Phase Mound OU 1 Sanitary Landfill Excavation

Assembly	Direct Cost	Marked Up Cost
Total Site Sanitary Waste Disposal Scenario	**27,473,817**	**40,537,204**

Removal of Operable Unit 1 at the Mound Plant in Miamisburg, Ohio

Independent Government Cost Estimate

April 19th 2004

Scenario 3.1 "M" Excavation of the Sanitary Landfill With Disposal of All Content as Mixed Waste

Assumptions:

- The sanitary landfill including the existing cover, contents, and liner will be removed using conventional excavating equipment.
- The total waste volume to be disposed is 1.6 million cubic feet (58,000 cubic yards), as estimated by the OU-1 Feasibility Study[1]. Waste is assumed Mixed Low Level for disposal purposes.
- The site will be backfilled and regraded.
- Required regulatory documentation will be completed.

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Mound OU 1 Parametric Estimate

Folder: Mound

Project

Name: Excavation of the Sanitary Landfill w/ Disposal as Mixed Waste
ID: 3.1
Location: OHIO STATE AVERAGE, OHIO
Modifiers:
Material 0.9671
Labor 1.2393
Equipment 0.9891
Category: None

Report Option: Fiscal Year
Description: Remove Existing Cover (11,890 bcy), Content (31790 bcy), and clay liner material (14,690 bcy). Total contaminated media is approximately 1.6 million cubic feet. Collapse and regrade (136,925 bcy) till and fill material used to construct the landfill cell. Borrow fill is being assumed to be un necessary.

Site

Name: **Mixed** Waste Disposal Scenario
ID: 3.1 M
Type: None
Description: Excavation of Sanitary Landfill with disposal as Mixed Waste at Envirocare in Clive Utah 1775 miles away.

Phase

Name: Mound OU 1 Sanitary Landfill Excavation
Type: Remedial Action
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate
Approach: Ex Situ
Start Date: 4/1/2004

Media/Waste Type: Soil
Secondary Media/Waste Type: Solids
Contaminant: Volatile Organic Compounds (VOCs)
Secondary Contaminant: Low Level Radioactive
Markup Template: System Defaults
O&M Markup Template: N/A

Description: **Mixed** waste disposal scenario

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Phase Cost Over Time Report (with Markups)

Technology	2004	Total
Bulk Material Storage	$500,222	$500,222
Capping	$412,850	$412,850
Cleanup and Landscaping	$44,721	$44,721
Decontamination Facilities	$294,380	$294,380
Fencing	$43,094	$43,094
Demolition, Fencing	$15,483	$15,483
Excavation	$917,483	$917,483
Excavation	$1,887,844	$1,887,844
Load and Haul	$262,385	$262,385
Off-site Transportation and Waste Disposal	$28,884,824	$28,884,824
Parking Lots	$15,129	$15,129
Residual Waste Management	$11,202	$11,202
Professional Labor Management	$7,795,800	$7,795,800
FIELD GUIDANCE; ONSITE LABORATORY	$1,097,077	$1,097,077
WELL ABANDONMENT	$38,599	$38,599
Total Phase Cost	$42,221,093	$42,221,093

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NNSA Service Center
Albuquerque, New Mexico

Cost Report by Activity

Technology: **Bulk Material Storage** # 1

Comment:

Assumes use of adjacent area to the south which is outside the OU 1 boundry.

Assembly		Direct Cost	Marked Up Cost
17030102	Rough Grading, 12G, 1 Pass	12,649	17,770
17030105	Fine Grading, Hand	8,888	13,974
17030106	Fine Grading, 12G, 2 Passes	6,402	9,183
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes De	7,738	10,458
17030430	Gravel, 6" Lifts	54,477	76,875
33080504	Herbicide Application	895	1,317
33080563	40 Mil Polymeric Liner, PVC	244,084	370,643
Total Bulk Material Storage Technology		**335,133**	**500,222**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030102	Rough Grading, 12G, 1 Pass	12,395.00	SY	0.00	0.40	0.62	$12,649.10
17030105	Fine Grading, Hand	2,083.00	SY	0.00	4.27	0.00	$8,888.37
17030106	Fine Grading, 12G, 2 Passes	12,395.00	SY	0.00	0.26	0.26	$6,402.02
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	758.00	CY	5.56	2.20	2.44	$7,737.74
17030430	Gravel, 6" Lifts	3,767.83	CY	5.92	6.19	2.35	$54,477.17
33080504	Herbicide Application	2.56	ACRE	57.95	224.70	66.80	$894.59
33080563	40 Mil Polymeric Liner, PVC	101,731.40	SF	0.33	1.94	0.13	$244,084.14
			Total Element Cost				**$335,133.13**
			Total Un Escalated Technology Cost				**$335,133.13**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Cleanup and Landscaping** **#** 1

Comment:

Area is based on OU 1 and adjacent area to the south. All will likely sustain some impact from the operation.

Assembly		Direct Cost	Marked Up Cost
17040101	General Area Cleanup	5,610	8,579
18050101	Area Preparation, 67% Level & 33% Slope	1,423	2,035
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	8,985	12,139
18050408	Fertilizer, Hydro Spread	6,147	8,372
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	7,788	11,591
18050415	Mowing	1,319	2,004
Total Cleanup and Landscaping Technology		**31,272**	**44,721**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17040101	General Area Cleanup	18.00	ACRE	0.00	262.61	49.07	$5,610.21
18050101	Area Preparation, 67% Level & 33% Slope	18.00	ACRE	0.00	38.07	40.96	$1,422.55
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	18.00	ACRE	352.34	110.19	36.63	$8,984.89
18050408	Fertilizer, Hydro Spread	36.00	ACRE	94.24	43.39	33.13	$6,147.30
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	144.00	ACRE	3.88	37.68	12.52	$7,787.76
18050415	Mowing	36.00	ACRE	0.00	29.52	7.13	$1,319.49
			Total Element Cost				**$31,272.20**
			Total Un Escalated Technology Cost				**$31,272.20**

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NNSA Service Center
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Technology: **Decontamination Facilities** # 1

Decontamination Operation limited to equipment. Decontamination of debris resulting from the excavation is not included in the estimate of this activity. Personal Protection Level C.

Assembly		Direct Cost	Marked Up Cost
19040602	550 Gallon Steel Sump, Aboveground with Supports	1,792	2,566
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	126	191
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80	66	95
33080571	40 Mil Polymeric Liner, High-density Polyethylene	188	267
33170818	1,800 PSI Pressure Washer Rental	1,103	1,420
33170821	8' x 24' Decontamination Trailer with 4 Showers, H	37,022	47,660
33170823	Operation of Pressure Washer, Including Water, Soa	2,330	3,608
33170825	8' - 6" Railroad Wood Crossties	509	700
33199921	DOT Steel Drum, 55 Gallon	41,234	53,083
33220112	Field Technician	60,358	182,222
33230512	1" Submersible Pump Rental, Month	103	132
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	1,637	2,437
Total Decontamination Facilities Technology		**146,468**	**294,380**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
19040602	550 Gallon Steel Sump, Aboveground with Supports & Fittings	1.00	EA	884.19	907.99	0.00	$1,792.18
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	88.80	LF	0.05	1.14	0.23	$125.78
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80 Mil)	40.00	SY	0.69	0.92	0.03	$65.64
33080571	40 Mil Polymeric Liner, High-density Polyethylene	360.00	SF	0.26	0.25	0.01	$187.99
33170818	1,800 PSI Pressure Washer Rental	1.00	MO	1,102.78	0.00	0.00	$1,102.78
33170821	8' x 24' Decontamination Trailer with 4 Showers, HVAC, 2 Sinks	15.00	MO	2,468.14	0.00	0.00	$37,022.04
33170823	Operation of Pressure Washer, Including Water, Soap, Electricity,	30.00	HR	6.56	71.12	0.00	$2,330.45

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NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33170825	8' - 6" Railroad Wood Crossties	9.00	EA	30.56	16.86	9.17	$509.37
33199921	DOT Steel Drum, 55 Gallon	541.00	EA	76.22	0.00	0.00	$41,233.99
33220112	Field Technician	1,440.00	HR	0.00	41.92	0.00	$60,358.03
33230512	1" Submersible Pump Rental, Month	1.00	MO	102.60	0.00	0.00	$102.60
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	30.00	LF	15.97	38.59	0.00	$1,636.66
			Total Element Cost				**$146,467.50**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Fencing** # 1

Assembly	Direct Cost	Marked Up Cost
18040105 Boundary Fence, 5' Galvanized	28,766	41,168
18040501 Hazardous Waste Signing	1,285	1,926
Total Fencing Technology	**30,051**	**43,094**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
18040105	Boundary Fence, 5' Galvanized	4,000.00	LF	1.49	3.54	2.16	$28,766.40
18040501	Hazardous Waste Signing	20.00	EA	16.55	47.70	0.00	$1,285.04
			Total Element Cost				**$30,051.44**
			Total Un Escalated Technology Cost				**$30,051.44**

Technology: **Demolition, Fencing** # 1

Assembly	Direct Cost	Marked Up Cost
17020225 Remove Chain-link Fence	9,848	15,483
Total Demolition, Fencing Technology	**9,848**	**15,483**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020225	Remove Chain-link Fence	4,000.00	LF	0.00	2.46	0.00	$9,848.00
			Total Element Cost				**$9,848.00**
			Total Un Escalated Technology Cost				**$9,848.00**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation** **#** 1

Comment:

Excavation volumes represent cap, trash, and liner material from the sanitary Landfill. No fill is budgeted since surrounding area was built up and can be collapsed and graded.

Assembly		Direct Cost	Marked Up Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	301,034	418,933
17030418	Delivered & Dumped, Backfill with Stone	72,195	94,152
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	737	1,011
33020401	Disposable Materials per Sample	811	1,044
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	64,077	82,490
33021707	Target Analyte List (TAL) Metals, Soil Analysis	33,819	43,537
33021712	Mercury (SW 7471), with prep, Soil Analysis	3,210	4,132
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	16,632	21,412
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	19,833	25,532
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	29,208	37,601
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectr	12,440	16,015
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	15,415	19,845
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	19,833	25,532
33080584	Plastic Laminate Waste Pile Cover	90,759	124,853
33170803	Decontaminate Heavy Equipment	790	1,242
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	119	153
Total Excavation Technology		**680,911**	**917,483**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	58,195.55	CY	0.00	1.76	3.42	$301,033.95	
17030418	Delivered & Dumped, Backfill with Stone	2,683.82	BCY	23.92	1.53	1.45	$72,194.76	
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	12.00	DAY	43.14	18.25	0.00	$736.78	

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NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020401	Disposable Materials per Sample	100.00	EA	8.11	0.00	0.00	$811.16
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	100.00	EA	640.77	0.00	0.00	$64,077.36
33021707	Target Analyte List (TAL) Metals, Soil Analysis	100.00	EA	338.19	0.00	0.00	$33,819.11
33021712	Mercury (SW 7471), with prep, Soil Analysis	100.00	EA	32.10	0.00	0.00	$3,209.64
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	100.00	EA	166.32	0.00	0.00	$16,632.35
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	100.00	EA	198.33	0.00	0.00	$19,832.61
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	100.00	EA	292.08	0.00	0.00	$29,208.03
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	100.00	EA	124.40	0.00	0.00	$12,440.46
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	100.00	EA	154.15	0.00	0.00	$15,415.35
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	100.00	EA	198.33	0.00	0.00	$19,832.61
33080584	Plastic Laminate Waste Pile Cover	542,166.10	SF	0.12	0.05	0.00	$90,758.61
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	790.07	0.00	$790.07
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	100.00	LF	1.19	0.00	0.00	$118.64

Total Element Cost **$680,911.48**

Total Un Escalated Technology Cost **$680,911.4**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation** **#** 2

Comment:

Excavation represents earthwork required to regrade site using fill and till material used to construct the cell.

Assembly		Direct Cost	Marked Up Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	412,902	570,713
17030415	Backfill with Excavated Material	745,521	1,123,093
17030418	Delivered & Dumped, Backfill with Stone	149,178	193,402
33170803	Decontaminate Heavy Equipment	405	636
Total Excavation Technology		**1,308,005**	**1,887,844**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	140,000.00	CY	0.00	0.90	2.05	$412,902.00
17030415	Backfill with Excavated Material	161,009.20	CY	0.31	3.53	0.79	$745,520.91
17030418	Delivered & Dumped, Backfill with Stone	5,833.33	BCY	23.92	0.78	0.87	$149,177.50
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	404.67	0.00	$404.67
			Total Element Cost				**$1,308,005.08**
			Total Un Escalated Technology Cost				**$1,308,005.08**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Load and Haul** **#** 1

Comment:

Load and Haul costs provide an allowance for moving the waste from the landfill to the bulk storage facility and then on to the rail loading area. Double handling is allowed for by doubling the volume. A 1.3 swell factor is assumed.

Assembly	Direct Cost	Marked Up Cost
17030226 988, 7.0 CY, Wheel Loader	115,448	157,633
17030289 32 CY, Semi Dump	66,630	104,753
Total Load and Haul Technology	**182,077**	**262,385**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030226	988, 7.0 CY, Wheel Loader	565.00	HR	0.00	49.81	154.52	$115,447.75
17030289	32 CY, Semi Dump	1,695.00	HR	0.00	39.31	0.00	$66,629.60
			Total Element Cost				**$182,077.35**

Total Un Escalated Technology Cost **$182,077.3**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Off-site Transportation and Waste Disposal** # 1

Comment:

Bulk rail shipment to Envirocare in Clive, UT. Soil weight estimated at 85 lbs/bcf and a 1.3 swell factor is used for volume calculations. Disposal uses low level waste unit disposal costs and adds allowances for documentation and treatment.

Assembly		Direct Cost	Marked Up Cost
33171005	LLW Disposal Charge, Envirocare, UT	13,926,240	17,927,980
33190289	Rail Gondola Transport	7,356,104	9,469,898
33190812	50 to 54 Ft Rail Gondola, 10 Mil Liner, disposable	88,081	113,391
95010101	Mixed Waste; EC-200 5 sample pre shipment profilin	2,501	3,779
95010102	Mixed Waste; EC-0175 Profile Record	45,073	70,862
95010103	Mixed Waste; EC-0650 Radiological Evaluation	45,073	70,862
95010104	Mixed Waste; EC-0500 Physical Properties Evaluatio	22,537	35,431
95010105	Mixed Waste; E-100 Rad Shipment and Disposal Recor	22,537	35,431
95010106	Mixed Waste; EPA 8700-22 Uniform Haz Waste Manefes	1,756	2,761
95010107	Mixed Waste; Waste Certification Form	0	0
95010108	Mixed Waste; DOE/NRC Form 741	0	0
95010109	Mixed Waste Treatment, Cat Ox and Vapor Extraction	896,746	1,154,428
Total Off-site Transportation and Waste Disposal Technology		**22,406,647**	**28,884,823**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33171005	LLW Disposal Charge, Envirocare, UT	1,600,000.00	CF	8.70	0.00	0.00	$13,926,240.00
33190289	Rail Gondola Transport	1,360,000.00	CWT	5.41	0.00	0.00	$7,356,104.00
33190812	50 to 54 Ft Rail Gondola, 10 Mil Liner, disposable	602.00	EA	146.31	0.00	0.00	$88,080.55
95010101	Mixed Waste; EC-200 5 sample pre shipment profiling requirement	5.00	SHIPM	60.00	390.24	50.00	$2,501.22
95010102	Mixed Waste; EC-0175 Profile Record	77.00	MCY	0.00	585.37	0.00	$45,073.17
95010103	Mixed Waste; EC-0650 Radiological Evaluation	77.00	MCY	0.00	585.37	0.00	$45,073.17

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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
95010104	Mixed Waste; EC-0500 Physical Properties Evaluation	77.00	MCY	0.00	292.68	0.00	$22,536.58
95010105	Mixed Waste; E-100 Rad Shipment and Disposal Record	77.00	MCY	0.00	292.68	0.00	$22,536.58
95010106	Mixed Waste; EPA 8700-22 Uniform Haz Waste Manefest	12.00	TRUCK	0.00	146.34	0.00	$1,756.10
95010107	Mixed Waste; Waste Certification Form	602.00	MCY	0.00	0.00	0.00	$0.00
95010108	Mixed Waste; DOE/NRC Form 741	1.00	EA	0.00	0.00	0.00	$0.00
95010109	Mixed Waste Treatment, Cat Ox and Vapor Extraction	77,040.00	LCY	11.64	0.00	0.00	$896,745.60
				Total Element Cost			**$22,406,646.98**

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Technology: **Parking Lots** # 1

Assembly		Direct Cost	Marked Up Cost
17030102	Rough Grading, 12G, 1 Pass	969	1,354
17030107	Fine Grading, 120G, 2 Passes	316	450
17030203	Roadway Soil Excavation, with Scraper, Load & Haul	1,291	1,901
17030501	Compact Subgrade, 2 Lifts	167	238
17030510	Dry Roll Gravel, Steel Roller	1,055	1,572
18010102	Gravel, Delivered & Dumped	6,521	8,601
18020501	Precast Parking Stops	724	1,012
Total Parking Lots Technology		**11,044**	**15,129**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030102	Rough Grading, 12G, 1 Pass	1,320.00	SY	0.00	0.27	0.47	$968.88
17030107	Fine Grading, 120G, 2 Passes	1,320.00	SY	0.00	0.11	0.13	$316.01
17030203	Roadway Soil Excavation, with Scraper, Load & Haul Spoil	270.37	CY	0.00	3.03	1.74	$1,290.96
17030501	Compact Subgrade, 2 Lifts	337.96	CY	0.00	0.23	0.27	$167.39
17030510	Dry Roll Gravel, Steel Roller	1,216.67	SY	0.00	0.61	0.26	$1,054.61
18010102	Gravel, Delivered & Dumped	270.37	CY	19.93	2.61	1.58	$6,521.41
18020501	Precast Parking Stops	24.00	EA	16.12	11.58	2.47	$724.27
			Total Element Cost				**$11,043.53**
			Total Un Escalated Technology Cost				**$11,043.53**

Bob Ratzer, Cost Engineer
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Albuquerque, New Mexico

Technology: **Residual Waste Management** **#** 1

Assembly		Direct Cost	Marked Up Cost
33190101	Liquid Loading Into 5,000 Gallon Bulk Tank Truck	453	682
33190103	Load Drums on Disposal Vehicle	535	788
33190204	Transport 55 Gallon Drums of Hazardous Waste, Max	178	230
33190207	Transport Bulk Liquid/Sludge Hazardous Waste, Maxi	89	115
33190317	Waste Stream Evaluation Fee, Not Including 50% Reb	834	1,074
33197205	Landfill Nonhazardous Solid Waste, 55 Gallon Drum	1,917	2,468
33197278	Landfill Nonhazardous Nonfuel Liquid/Sludge	4,541	5,846
Total Residual Waste Management Technology		**8,548**	**11,202**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33190101	Liquid Loading Into 5,000 Gallon Bulk Tank Truck	1.00	EA	0.00	343.30	109.59	$452.89
33190103	Load Drums on Disposal Vehicle	142.00	EA	0.00	2.39	1.38	$535.10
33190204	Transport 55 Gallon Drums of Hazardous Waste, Max 80 drums (per Mile)	100.00	MI	1.78	0.00	0.00	$178.49
33190207	Transport Bulk Liquid/Sludge Hazardous Waste, Maximum 5,000 Gallon (per Mile)	50.00	MI	1.78	0.00	0.00	$89.25
33190317	Waste Stream Evaluation Fee, Not Including 50% Rebate on 1st Shipment	2.00	EA	417.03	0.00	0.00	$834.05
33197205	Landfill Nonhazardous Solid Waste, 55 Gallon Drum	142.00	EA	13.50	0.00	0.00	$1,917.00
33197278	Landfill Nonhazardous Nonfuel Liquid/Sludge	1,900.00	GAL	2.39	0.00	0.00	$4,541.00

Total Element Cost **$8,547.78**

Total Un Escalated Technology Cost **$8,547.78**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Professional Labor Management** **#** 1

Professional Labor Percentage

33220138	Project Management Labor Cost	520,612	1,571,734
33220139	Planning Documents Labor Cost	494,581	1,493,147
33220140	Construction Oversight Labor Cost	1,041,224	3,143,468
33220141	Reporting Labor Cost	130,153	392,934
33220142	As-Built Drawings Labor Cost	130,153	392,934
33220143	Public Notice Labor Cost	5,206	15,717
33220144	Site Closure Activities Labor Cost	0	0
33220145	Permitting Labor Cost	260,306	785,867
33220146	Responsible Party Labor Cost	0	0
33220147	Reimbursement Claims Preparation Labor Cost	0	0
33220148	Other Labor Cost	0	0
Total Professional Labor Management Technology		**2,582,235**	**7,795,801**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33220138	Project Management Labor Cost	1.00	LS	0.00	520,611.97	0.00	$520,611.97
33220139	Planning Documents Labor Cost	1.00	LS	0.00	494,581.38	0.00	$494,581.38
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	1,041,223.94	0.00	$1,041,223.94
33220141	Reporting Labor Cost	1.00	LS	0.00	130,152.99	0.00	$130,152.99
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	130,152.99	0.00	$130,152.99
33220143	Public Notice Labor Cost	1.00	LS	0.00	5,206.12	0.00	$5,206.12
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220145	Permitting Labor Cost	1.00	LS	0.00	260,305.98	0.00	$260,305.98
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00

Total Element Cost **$2,582,235.37**

Total Un Escalated Technology Cost **$2,582,235.37**

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Technology: **FIELD GUIDANCE; ONSITE LABORATORY** **#** **1**

Assembly		Direct Cost	Marked Up Cost
33020341	Alpha, Beta, Gamma Detector Equipment	896	1,154
33021206	Geiger Counter, Gamma Survey, 2 internal energy co	1,389	1,788
33021232	Survey Meter, General Pupose, G-M detector, Beta/	2,358	3,035
33021419	Alpha, Beta, Gamma, Pancake G-M Detector	383	493
33029913	Mobile Laboratory Trailer, 8' W x 30' L, Rental	88,223	113,574
33029914	Gas Chromatograph, HP5890A, Rental	39,196	50,459
33029915	Mass Spectrometer, HP5970B MD, Rental	74,076	95,361
33029922	Mobilize/Demobilize Laboratory Trailer	16,067	20,684
33029923	Radiological Scintillation Counter	39,249	50,527
33029929	Laboratory Utilities Allowance	5,509	7,092
33029930	Laboratory Expendables Allowance	57,382	73,870
33029931	Electric Laboratory Scales, Purchase	448	576
33220107	Senior Scientist	101,728	307,119
33220109	Staff Scientist	123,002	371,345
Total FIELD GUIDANCE; ONSITE LABORATORY		**549,904**	**1,097,077**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020341	Alpha, Beta, Gamma Detector Equipment	4.00	EA	224.05	0.00	0.00	$896.22
33021206	Geiger Counter, Gamma Survey, 2 internal energy compensated G-M tubes	24.00	MO	57.86	0.00	0.00	$1,388.72
33021232	Survey Meter, General Pupose, G-M detector, Beta/Gamma	24.00	MO	98.23	0.00	0.00	$2,357.59
33021419	Alpha, Beta, Gamma, Pancake G-M Detector	24.00	MO	15.97	0.00	0.00	$383.24
33029913	Mobile Laboratory Trailer, 8' W x 30' L Rent	24.00	MO	3,675.95	0.00	0.00	$88,222.73
33029914	Gas Chromatograph, HP5890A, rental	12.00	MO	3,266.34	0.00	0.00	$39,196.10
33029915	Mass Spectrometer, HP5970B MD, rental	12.00	MO	6,172.97	0.00	0.00	$74,075.59
33029922	Mobilize/Demobilize Laboratory Trailer	4.00	EA	4,016.71	0.00	0.00	$16,066.85
33029923	Radiological Scintillation Counter	12.00	MO	3,270.75	0.00	0.00	$39,249.01
33029929	Laboratory Utilities Allowance	24.00	MO	229.53	0.00	0.00	$5,508.64
33029930	Laboratory Expendables Allowance	5,000.00	EA	11.48	0.00	0.00	$57,381.50

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33029931	Electric Laboratory Scales, Purchase	2.00	EA	223.79	0.00	0.00	$447.58	
33220107	Senior Scientist	1,760.00	HR	0.00	57.80	0.00	$101,728.18	
33220109	Staff Scientist	3,520.00	HR	0.00	34.94	0.00	$123,002.18	
				Total Element Cost			**$549,904.12**	
				Total Un Escalated Technology Cost			**$549,904.12**	

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NNSA Service Center
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Technology: WELL ABANDONMENT # 2

Assembly	Direct Cost	Marked Up Cost
33231823 Well Abandonment, 4" Well	27,810	38,599
Total WELL ABANDONMENT Technology	**27,810**	**38,599**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33231823	Well Abandonment, 4" Well	800.00	LF	1.05	11.39	22.32	$27,809.76
			Total Element Cost				**$27,809.76**
			Total Un Escalated Technology Cost				**$27,809.76**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Capping** **#** 1

Comment: Beautification Cap. 3 acre over the 2.7 acre area shown on map provided by site.

Assembly		Direct Cost	Marked Up Cost
17030422	Unclassified Fill, 6" Lifts, On-Site, Includes Spr	136,213	189,630
18050301	Topsoil, 6" Lifts, Off-Site	88,465	119,323
18050402	Seeding, Vegetative Cover	6,875	8,949
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	1,589	2,399
33080513	Drainage Netting, Geotextile Fabric Heat-bonded	269,738	92,549
Total Capping Technology		**302,879**	**412,850**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030422	Unclassified Fill, 6" Lifts, On-Site, Includes Spreading and Compaction	17,092.60	CY	0.31	2.74	4.92	$136,212.64
18050301	Topsoil, 6" Lifts, Off-Site	3,127.09	CY	18.77	5.96	3.56	$88,465.07
18050402	Seeding, Vegetative Cover	3.00	ACRE	2,122.60	113.58	55.37	$6,874.65
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	1,613.70	LF	0.05	0.76	0.17	$1,588.69
33080513	Drainage Netting, Geotextile Fabric Heat-bonded 2 Sides	148,599.50	SF	0.40	0.07	0.00	$69,737.75

Total Element Cost **$302,878.78**

Total Un Escalated Technology Cost **$302,878.78**

Total Phase Mound OU 1 Sanitary Landfill Excavation

Assembly	Direct Cost	Marked Up Cost
Total Site Sanitary Waste Disposal Scenario	**28,612,833**	**42,221,093**

Removal of Operable Unit 1 at the Mound Plant in Miamisburg, Ohio

Independent Government Cost Estimate

April 19th 2004

Scenario 3.1 "S" Excavation of the Sanitary Landfill With Disposal of All Content as Sanitary Waste

Assumptions:

- The sanitary landfill including the existing cover, contents, and liner will be removed using conventional excavating equipment.
- The total waste volume to be disposed is 1.6 million cubic feet (58,000 cubic yards), as estimated by the OU-1 Feasibility Study[1]. Waste is considered sanitary for disposal purposes.
- The site will be backfilled and regraded.
- Required regulatory documentation will be completed.

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Mound OU 1 Parametric Estimate

Folder: Mound

Project

Name: Excavation of the Sanitary Landfill
ID: 3.1
Location: OHIO STATE AVERAGE, OHIO
Modifiers:
Material 0.9671
Labor 1.2393
Equipment 0.9891
Category: None

Report Option: Fiscal Year
Description: Remove Existing Cover (11,890 bcy), Content (31790 bcy), and clay liner material (14,690 bcy). Total contaminated media is approximately 1.6 million cubic feet. Collapse and regrade (136,925 bcy) till and fill material used to construct the landfill cell. Borrow fill is being assumed to be un necessary.

Site

Name: Sanitary Waste Disposal Scenario
ID: 3.1 S
Type: None
Description: Excavation of Sanitary Landfill with disposal as sanitary waste in the Hamilton, OH vacinity 50 miles away.

Phase

Name: Mound OU 1 Sanitary Landfill Excavation
Type: Remedial Action
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate
Approach: Ex Situ
Start Date: 4/1/2004

Media/Waste Type: Soil
Secondary Media/Waste Type: Solids
Contaminant: Volatile Organic Compounds (VOCs)
Secondary Contaminant: none
Markup Template: System Defaults
O&M Markup Template: N/A

Description: Sanitary waste disposal scenario

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NNSA Service Center
Albuquerque, New Mexico

Phase Cost Over Time Report (with Markups)

Technology	2004	Total
Bulk Material Storage	$500,222	$500,222
Cleanup and Landscaping	$44,721	$44,721
Decontamination Facilities	$131,126	$131,126
Fencing	$43,094	$43,094
Demolition, Fencing	$15,483	$15,483
Excavation	$666,951	$666,951
Excavation	$1,887,844	$1,887,844
Load and Haul	$2,064,364	$2,064,364
Parking Lots	$15,129	$15,129
Residual Waste Management	$11,202	$11,202
Professional Labor Management	$1,020,518	$1,020,518
FIELD GUIDANCE; ONSITE LABORATORY	$1,097,077	$1,097,077
WELL ABANDONMENT	$38,599	$38,599
Capping	$412,850	$412,850
Total Phase Cost	$7,949,180	$7,949,180

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Cost Report by Activity

Technology: **Bulk Material Storage** # 1

Comment:

Assumes use of adjacent area to the south which is outside the OU 1 boundry.

Assembly		Direct Cost	Marked Up Cost
17030102	Rough Grading, 12G, 1 Pass	12,649	17,770
17030105	Fine Grading, Hand	8,888	13,974
17030106	Fine Grading, 12G, 2 Passes	6,402	9,183
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes De	7,738	10,458
17030430	Gravel, 6" Lifts	54,477	76,875
33080504	Herbicide Application	895	1,317
33080563	40 Mil Polymeric Liner, PVC	244,084	370,643
Total Bulk Material Storage Technology		**335,133**	**500,222**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030102	Rough Grading, 12G, 1 Pass	12,395.00	SY	0.00	0.40	0.62	$12,649.10
17030105	Fine Grading, Hand	2,083.00	SY	0.00	4.27	0.00	$8,888.37
17030106	Fine Grading, 12G, 2 Passes	12,395.00	SY	0.00	0.26	0.26	$6,402.02
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	758.00	CY	5.56	2.20	2.44	$7,737.74
17030430	Gravel, 6" Lifts	3,767.83	CY	5.92	6.19	2.35	$54,477.17
33080504	Herbicide Application	2.56	ACRE	57.95	224.70	66.80	$894.59
33080563	40 Mil Polymeric Liner, PVC	101,731.40	SF	0.33	1.94	0.13	$244,084.14
			Total Element Cost				**$335,133.13**
			Total Un Escalated Technology Cost				**$335,133.13**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Cleanup and Landscaping** **#** 1

Comment:

Area is based on OU 1 and adjacent area to the south. All will likely sustain some impact from the operation.

Assembly		Direct Cost	Marked Up Cost
17040101	General Area Cleanup	5,610	8,579
18050101	Area Preparation, 67% Level & 33% Slope	1,423	2,035
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	8,985	12,139
18050408	Fertilizer, Hydro Spread	6,147	8,372
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	7,788	11,591
18050415	Mowing	1,319	2,004
Total Cleanup and Landscaping Technology		**31,272**	**44,721**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17040101	General Area Cleanup	18.00	ACRE	0.00	262.61	49.07	$5,610.21
18050101	Area Preparation, 67% Level & 33% Slope	18.00	ACRE	0.00	38.07	40.96	$1,422.55
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	18.00	ACRE	352.34	110.19	36.63	$8,984.89
18050408	Fertilizer, Hydro Spread	36.00	ACRE	94.24	43.39	33.13	$6,147.30
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	144.00	ACRE	3.88	37.68	12.52	$7,787.76
18050415	Mowing	36.00	ACRE	0.00	29.52	7.13	$1,319.49
				Total Element Cost			**$31,272.20**
				Total Un Escalated Technology Cost			**$31,272.20**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Decontamination Facilities** # 1

Assembly		Direct Cost	Marked Up Cost
19040602	550 Gallon Steel Sump, Aboveground with Supports &	1,493	2,096
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	87	132
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80	53	76
33080571	40 Mil Polymeric Liner, High-density Polyethylene	157	220
33170818	1,800 PSI Pressure Washer Rental	1,103	1,420
33170821	8' x 24' Decontamination Trailer with 4 Showers, H	37,022	47,660
33170823	Operation of Pressure Washer, Including Water, Soa	1,628	2,503
33170825	8' - 6" Railroad Wood Crossties	439	595
33199921	DOT Steel Drum, 55 Gallon	10,366	13,344
33220112	Field Technician	20,242	61,111
33230512	1" Submersible Pump Rental, Month	103	132
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	1,255	1,837
Total Decontamination Facilities Technology		**73,949**	**131,126**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
19040602	550 Gallon Steel Sump, Aboveground with Supports & Fittings	1.00	EA	884.19	609.01	0.00	$1,493.21
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	88.80	LF	0.05	0.76	0.17	$87.42
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80 Mil)	40.00	SY	0.69	0.62	0.02	$53.20
33080571	40 Mil Polymeric Liner, High-density Polyethylene	360.00	SF	0.26	0.17	0.01	$157.39
33170818	1,800 PSI Pressure Washer Rental	1.00	MO	1,102.78	0.00	0.00	$1,102.78
33170821	8' x 24' Decontamination Trailer with 4 Showers, HVAC, 2 Sinks	15.00	MO	2,468.14	0.00	0.00	$37,022.04
33170823	Operation of Pressure Washer, Including Water, Soap, Electricity, Labor	30.00	HR	6.56	47.70	0.00	$1,627.95
33170825	8' - 6" Railroad Wood Crossties	9.00	EA	30.56	11.31	6.88	$438.75

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Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33199921	DOT Steel Drum, 55 Gallon	136.00	EA	76.22	0.00	0.00	$10,365.66
33220112	Field Technician	720.00	HR	0.00	28.11	0.00	$20,242.08
33230512	1" Submersible Pump Rental, Month	1.00	MO	102.60	0.00	0.00	$102.60
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	30.00	LF	15.97	25.88	0.00	$1,255.49
			Total Element Cost				**$73,948.58**
			Total Un Escalated Technology Cost				**$73,948.58**

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Technology: **Fencing** # 1

Assembly	Direct Cost	Marked Up Cost
18040105 Boundary Fence, 5' Galvanized	28,766	41,168
18040501 Hazardous Waste Signing	1,285	1,926
Total Fencing Technology	**30,051**	**43,094**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
18040105	Boundary Fence, 5' Galvanized	4,000.00	LF	1.49	3.54	2.16	$28,766.40
18040501	Hazardous Waste Signing	20.00	EA	16.55	47.70	0.00	$1,285.04
				Total Element Cost			**$30,051.44**
				Total Un Escalated Technology Cost			**$30,051.44**

Technology: **Demolition, Fencing** # 1

Assembly	Direct Cost	Marked Up Cost
17020225 Remove Chain-link Fence	9,848	15,483
Total Demolition, Fencing Technology	**9,848**	**15,483**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020225	Remove Chain-link Fence	4,000.00	LF	0.00	2.46	0.00	$9,848.00
				Total Element Cost			**$9,848.00**
				Total Un Escalated Technology Cost			**$9,848.00**

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Technology: **Excavation** **#** 1

Comment:

Excavation volumes represent cap, trash, and liner material from the sanitary Landfill. No fill is budgeted since surrounding area was built up and can be collapsed and graded.

Assembly		Direct Cost	Marked Up Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	237,106	329,296
17030418	Delivered & Dumped, Backfill with Stone	70,445	91,615
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	685	929
33020401	Disposable Materials per Sample	811	1,044
33021781	Army Suites - Soil/Sediment - 3 Suites	99,893	128,597
33080584	Plastic Laminate Waste Pile Cover	84,090	114,368
33170803	Decontaminate Heavy Equipment	603	949
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	119	153
Total Excavation Technology		**493,752**	**666,951**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	58,195.55	CY	0.00	1.34	2.73	$237,106.13
17030418	Delivered & Dumped, Backfill with Stone	2,683.82	BCY	23.92	1.17	1.16	$70,445.45
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	12.00	DAY	43.14	13.94	0.00	$685.00
33020401	Disposable Materials per Sample	100.00	EA	8.11	0.00	0.00	$811.16
33021781	Army Suites - Soil/Sediment - 3 Suites	100.00	EA	998.93	0.00	0.00	$99,892.52
33080584	Plastic Laminate Waste Pile Cover	542,166.10	SF	0.12	0.04	0.00	$84,089.97
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	603.33	0.00	$603.33
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	100.00	LF	1.19	0.00	0.00	$118.64

Total Element Cost **$493,752.19**

Total Un Escalated Technology Cost **$493,752.19**

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Albuquerque, New Mexico

Technology: **Excavation** **#** 2

Comment:

Excavation represents earthwork required to regrade site using fill and till material used to construct the cell.

Assembly		Direct Cost	Marked Up Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	412,902	570,713
17030415	Backfill with Excavated Material	745,521	1,123,093
17030418	Delivered & Dumped, Backfill with Stone	149,178	193,402
33170803	Decontaminate Heavy Equipment	405	636
Total Excavation Technology		**1,308,005**	**1,887,844**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	140,000.00	CY	0.00	0.90	2.05	$412,902.00
17030415	Backfill with Excavated Material	161,009.20	CY	0.31	3.53	0.79	$745,520.91
17030418	Delivered & Dumped, Backfill with Stone	5,833.33	BCY	23.92	0.78	0.87	$149,177.50
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	404.67	0.00	$404.67
			Total Element Cost				**$1,308,005.08**
			Total Un Escalated Technology Cost				**$1,308,005.08**

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Technology: **Load and Haul** **#** 1

Comment:

Disposal at sanitary/industrial permitted facility around Hamilton, OH. 1.3 swell factor used to determine loose cubic yardage for hauling.

Assembly		Direct Cost	Marked Up Cost
17020401	Dump Charges	1,155,600	1,487,665
17030226	988, 7.0 CY, Wheel Loader	50,266	68,633
17030289	32 CY, Semi Dump	323,163	508,066
Total Load and Haul Technology		**1,529,029**	**2,064,364**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020401	Dump Charges	77,040.00	CY	15.00	0.00	0.00	$1,155,600.00
17030226	988, 7.0 CY, Wheel Loader	246.00	HR	0.00	49.81	154.52	$50,265.75
17030289	32 CY, Semi Dump	8,221.00	HR	0.00	39.31	0.00	$323,163.40
			Total Element Cost				**$1,529,029.15**
			Total Un Escalated Technology Cost				**$1,529,029.15**

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Technology: **Parking Lots** **#** 1

Assembly		Direct Cost	Marked Up Cost
17030102	Rough Grading, 12G, 1 Pass	969	1,354
17030107	Fine Grading, 120G, 2 Passes	316	450
17030203	Roadway Soil Excavation, with Scraper, Load & Haul	1,291	1,901
17030501	Compact Subgrade, 2 Lifts	167	238
17030510	Dry Roll Gravel, Steel Roller	1,055	1,572
18010102	Gravel, Delivered & Dumped	6,521	8,601
18020501	Precast Parking Stops	724	1,012
Total Parking Lots Technology		**11,044**	**15,129**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030102	Rough Grading, 12G, 1 Pass	1,320.00	SY	0.00	0.27	0.47	$968.88
17030107	Fine Grading, 120G, 2 Passes	1,320.00	SY	0.00	0.11	0.13	$316.01
17030203	Roadway Soil Excavation, with Scraper, Load & Haul Spoil	270.37	CY	0.00	3.03	1.74	$1,290.96
17030501	Compact Subgrade, 2 Lifts	337.96	CY	0.00	0.23	0.27	$167.39
17030510	Dry Roll Gravel, Steel Roller	1,216.67	SY	0.00	0.61	0.26	$1,054.61
18010102	Gravel, Delivered & Dumped	270.37	CY	19.93	2.61	1.58	$6,521.41
18020501	Precast Parking Stops	24.00	EA	16.12	11.58	2.47	$724.27
			Total Element Cost				**$11,043.53**
			Total Un Escalated Technology Cost				**$11,043.53**

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Technology: **Residual Waste Management** **#** 1

Assembly		Direct Cost	Marked Up Cost
33190101	Liquid Loading Into 5,000 Gallon Bulk Tank Truck	453	682
33190103	Load Drums on Disposal Vehicle	535	788
33190204	Transport 55 Gallon Drums of Hazardous Waste, Max	178	230
33190207	Transport Bulk Liquid/Sludge Hazardous Waste, Maxi	89	115
33190317	Waste Stream Evaluation Fee, Not Including 50% Reb	834	1,074
33197205	Landfill Nonhazardous Solid Waste, 55 Gallon Drum	1,917	2,468
33197278	Landfill Nonhazardous Nonfuel Liquid/Sludge	4,541	5,846
Total Residual Waste Management Technology		**8,548**	**11,202**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33190101	Liquid Loading Into 5,000 Gallon Bulk Tank Truck	1.00	EA	0.00	343.30	109.59	$452.89
33190103	Load Drums on Disposal Vehicle	142.00	EA	0.00	2.39	1.38	$535.10
33190204	Transport 55 Gallon Drums of Hazardous Waste, Max 80 drums (per Mile)	100.00	MI	1.78	0.00	0.00	$178.49
33190207	Transport Bulk Liquid/Sludge Hazardous Waste, Maximum 5,000 Gallon (per Mile)	50.00	MI	1.78	0.00	0.00	$89.25
33190317	Waste Stream Evaluation Fee, Not Including 50% Rebate on 1st Shipment	2.00	EA	417.03	0.00	0.00	$834.05
33197205	Landfill Nonhazardous Solid Waste, 55 Gallon Drum	142.00	EA	13.50	0.00	0.00	$1,917.00
33197278	Landfill Nonhazardous Nonfuel Liquid/Sludge	1,900.00	GAL	2.39	0.00	0.00	$4,541.00
			Total Element Cost				**$8,547.78**
			Total Un Escalated Technology Cost				**$8,547.78**

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NNSA Service Center
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Technology: **Professional Labor Management** **#** 1

Professional Labor Percentage

Assembly		Direct Cost	Marked Up Cost
33220138	Project Management Labor Cost	70,668	213,349
33220139	Planning Documents Labor Cost	77,735	234,684
33220140	Construction Oversight Labor Cost	106,003	320,023
33220141	Reporting Labor Cost	11,778	35,558
33220142	As-Built Drawings Labor Cost	11,778	35,558
33220143	Public Notice Labor Cost	1,178	3,556
33220144	Site Closure Activities Labor Cost	0	0
33220145	Permitting Labor Cost	58,890	177,791
33220146	Responsible Party Labor Cost	0	0
33220147	Reimbursement Claims Preparation Labor Cost	0	0
33220148	Other Labor Cost	0	0
Total Professional Labor Management Technology		**338,030**	**1,020,518**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33220138	Project Management Labor Cost	1.00	LS	0.00	70,668.35	0.00	$70,668.35
33220139	Planning Documents Labor Cost	1.00	LS	0.00	77,735.19	0.00	$77,735.19
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	106,002.53	0.00	$106,002.53
33220141	Reporting Labor Cost	1.00	LS	0.00	11,778.06	0.00	$11,778.06
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	11,778.06	0.00	$11,778.06
33220143	Public Notice Labor Cost	1.00	LS	0.00	1,177.81	0.00	$1,177.81
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220145	Permitting Labor Cost	1.00	LS	0.00	58,890.29	0.00	$58,890.29
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
			Total Element Cost				**$338,030.29**
			Total Un Escalated Technology Cost				**$338,030.29**

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Technology: **FIELD GUIDANCE; ONSITE LABORATORY** **#** **1**

Assembly		Direct Cost	Marked Up Cost
33020341	Alpha, Beta, Gamma Detector Equipment	896	1,154
33021206	Geiger Counter, Gamma Survey, 2 internal energy co	1,389	1,788
33021232	Survey Meter, General Pupose, G-M detector, Beta/	2,358	3,035
33021419	Alpha, Beta, Gamma, Pancake G-M Detector	383	493
33029913	Mobile Laboratory Trailer, 8' W x 30' L, Rental	88,223	113,574
33029914	Gas Chromatograph, HP5890A, Rental	39,196	50,459
33029915	Mass Spectrometer, HP5970B MD, Rental	74,076	95,361
33029922	Mobilize/Demobilize Laboratory Trailer	16,067	20,684
33029923	Radiological Scintillation Counter	39,249	50,527
33029929	Laboratory Utilities Allowance	5,509	7,092
33029930	Laboratory Expendables Allowance	57,382	73,870
33029931	Electric Laboratory Scales, Purchase	448	576
33220107	Senior Scientist	101,728	307,119
33220109	Staff Scientist	123,002	371,345
Total FIELD GUIDANCE; ONSITE LABORATORY		**549,904**	**1,097,077**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020341	Alpha, Beta, Gamma Detector Equipment	4.00	EA	224.05	0.00	0.00	$896.22
33021206	Geiger Counter, Gamma Survey, 2 internal energy compensated G-M tubes	24.00	MO	57.86	0.00	0.00	$1,388.72
33021232	Survey Meter, General Pupose, G-M detector, Beta/Gamma	24.00	MO	98.23	0.00	0.00	$2,357.59
33021419	Alpha, Beta, Gamma, Pancake G-M Detector	24.00	MO	15.97	0.00	0.00	$383.24
33029913	Mobile Laboratory Trailer, 8' W x 30' L Rent	24.00	MO	3,675.95	0.00	0.00	$88,222.73
33029914	Gas Chromatograph, HP5890A, rental	12.00	MO	3,266.34	0.00	0.00	$39,196.10
33029915	Mass Spectrometer, HP5970B MD, rental	12.00	MO	6,172.97	0.00	0.00	$74,075.59
33029922	Mobilize/Demobilize Laboratory Trailer	4.00	EA	4,016.71	0.00	0.00	$16,066.85
33029923	Radiological Scintillation Counter	12.00	MO	3,270.75	0.00	0.00	$39,249.01
33029929	Laboratory Utilities Allowance	24.00	MO	229.53	0.00	0.00	$5,508.64
33029930	Laboratory Expendables Allowance	5,000.00	EA	11.48	0.00	0.00	$57,381.50

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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33029931	Electric Laboratory Scales, Purchase	2.00	EA	223.79	0.00	0.00	$447.58	
33220107	Senior Scientist	1,760.00	HR	0.00	57.80	0.00	$101,728.18	
33220109	Staff Scientist	3,520.00	HR	0.00	34.94	0.00	$123,002.18	
				Total Element Cost			**$549,904.12**	
				Total Un Escalated Technology Cost			**$549,904.12**	

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Technology: WELL ABANDONMENT **# 2**

Assembly	Direct Cost	Marked Up Cost
33231823 Well Abandonment, 4" Well	27,810	38,599
Total WELL ABANDONMENT Technology	**27,810**	**38,599**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33231823	Well Abandonment, 4" Well	800.00	LF	1.05	11.39	22.32	$27,809.76
			Total Element Cost				**$27,809.76**
			Total Un Escalated Technology Cost				**$27,809.76**

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Albuquerque, New Mexico

Technology: **Capping** **#** **1**

Comment: Beautification Cap. 3 acre over the 2.7 acre area shown on map provided by site.

Assembly		Direct Cost	Marked Up Cost
17030422	Unclassified Fill, 6" Lifts, On-Site, Includes Spr	136,213	189,630
18050301	Topsoil, 6" Lifts, Off-Site	88,465	119,323
18050402	Seeding, Vegetative Cover	6,875	8,949
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	1,589	2,399
33080513	Drainage Netting, Geotextile Fabric Heat-bonded	269,738	92,549
Total Capping Technology		**302,879**	**412,850**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030422	Unclassified Fill, 6" Lifts, On-Site, Includes Spreading and Compaction	17,092.60	CY	0.31	2.74	4.92	$136,212.64
18050301	Topsoil, 6" Lifts, Off-Site	3,127.09	CY	18.77	5.96	3.56	$88,465.07
18050402	Seeding, Vegetative Cover	3.00	ACRE	2,122.60	113.58	55.37	$6,874.65
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	1,613.70	LF	0.05	0.76	0.17	$1,588.69
33080513	Drainage Netting, Geotextile Fabric Heat-bonded 2 Sides	148,599.50	SF	0.40	0.07	0.00	$69,737.75

Total Element Cost **$302,878.78**

Total Un Escalated Technology Cost **$302,878.78**

Total Phase Mound OU 1 Sanitary Landfill Excavation

Assembly	Direct Cost	Marked Up Cost
Total Site Sanitary Waste Disposal Scenario	**5,049,254**	**7,949,179**

Attachment 1

Figures

Mound Core Team, Technical Memorandum
Operable Unit 1 (OU-1)

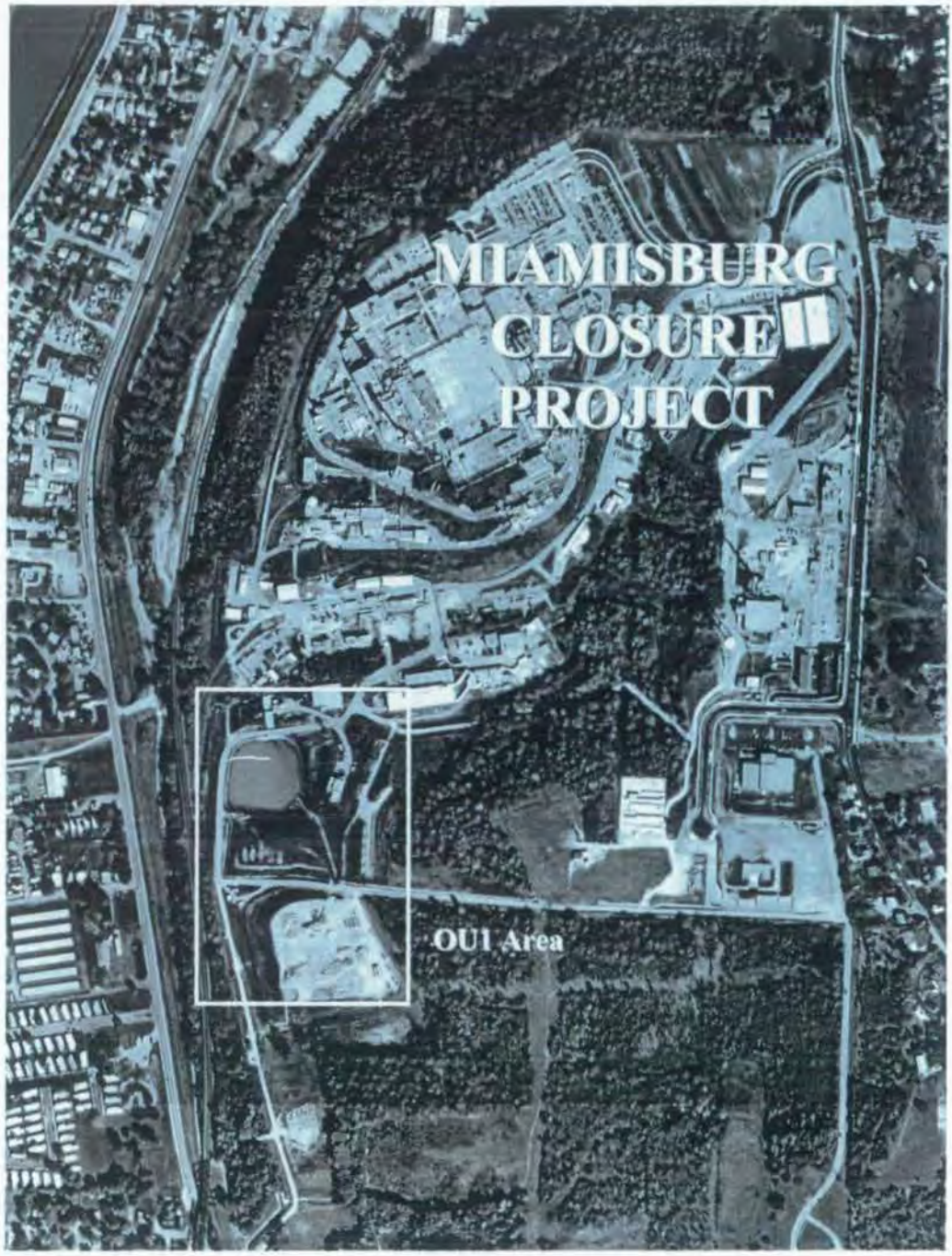
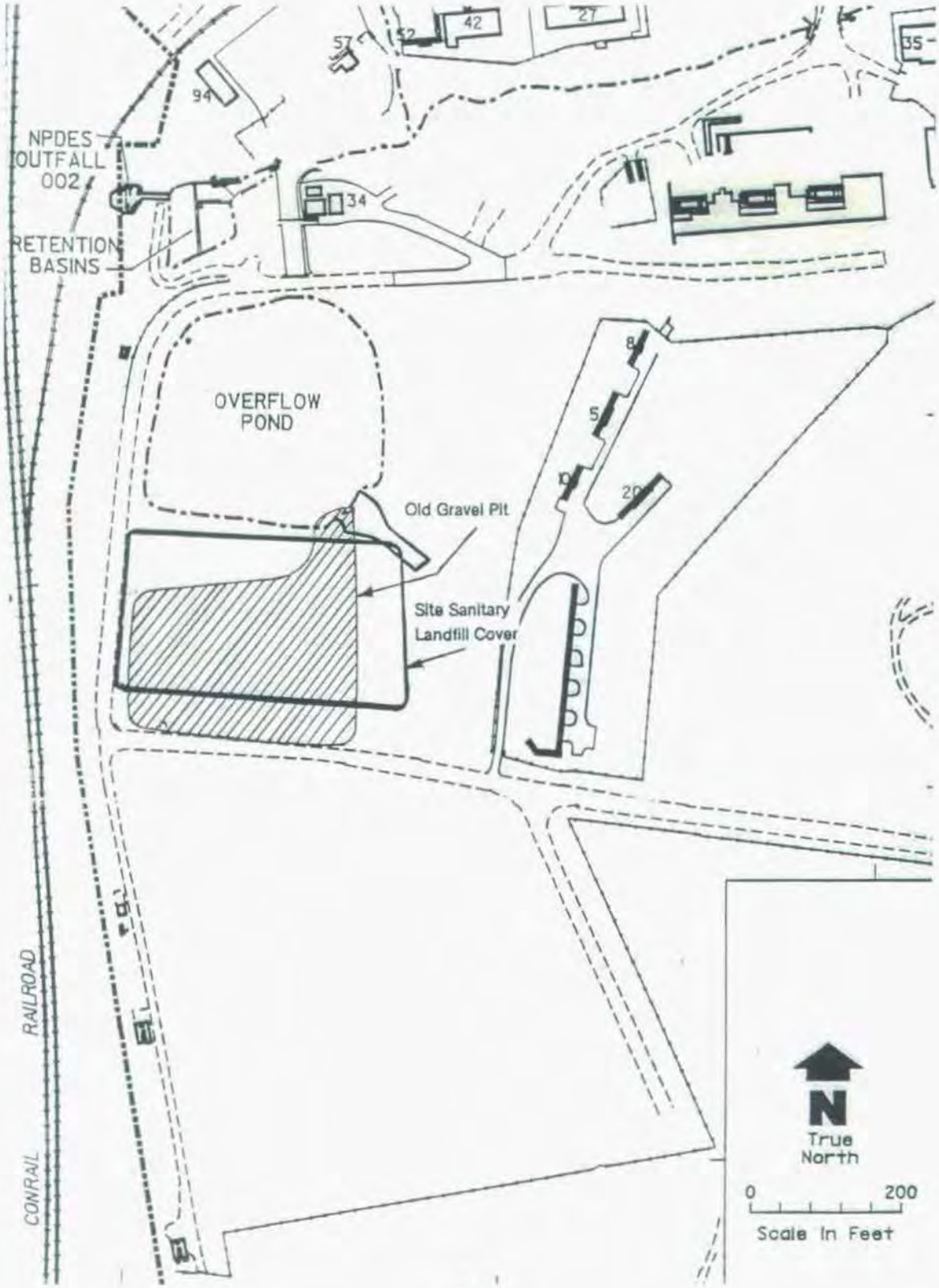
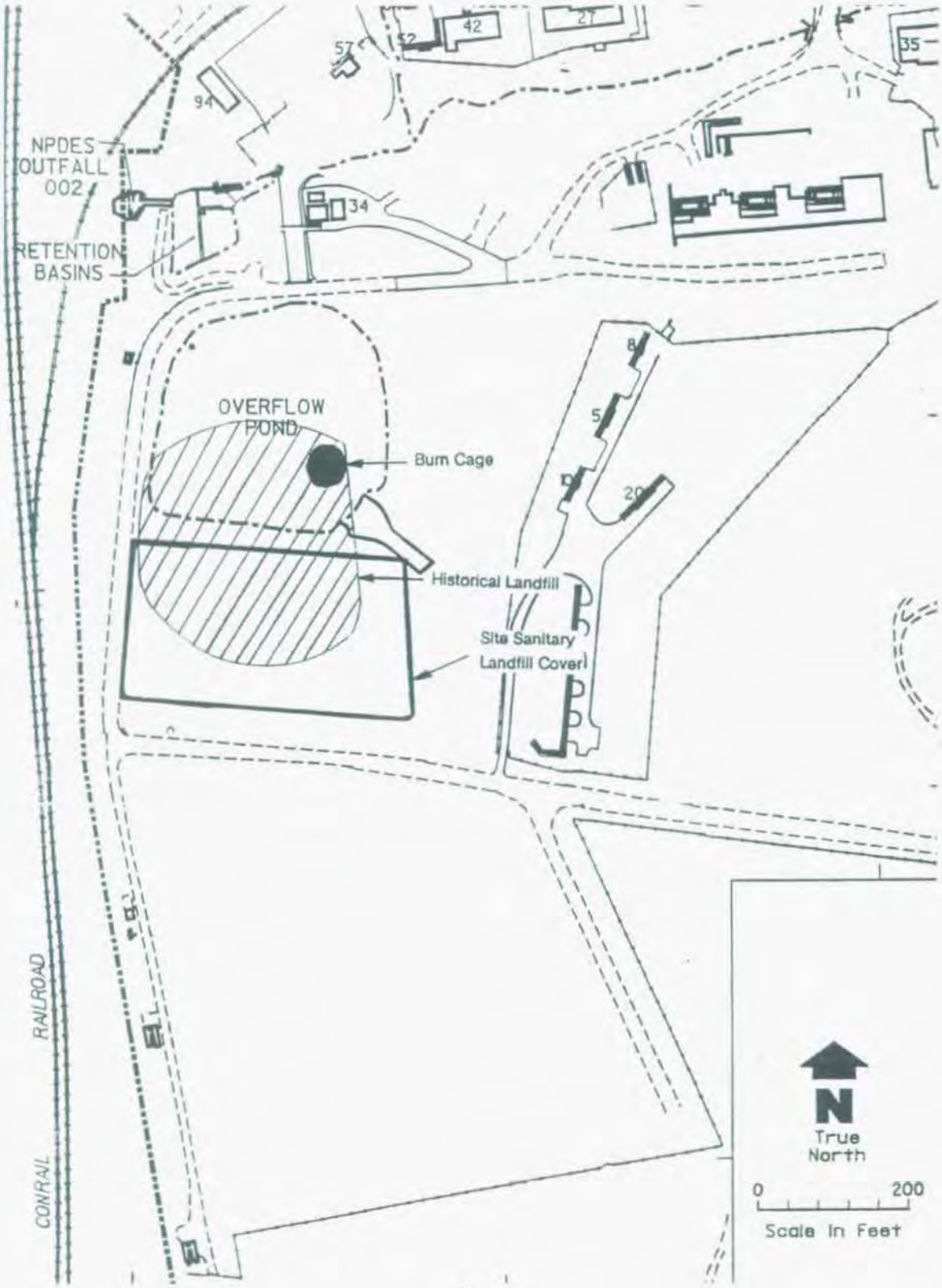
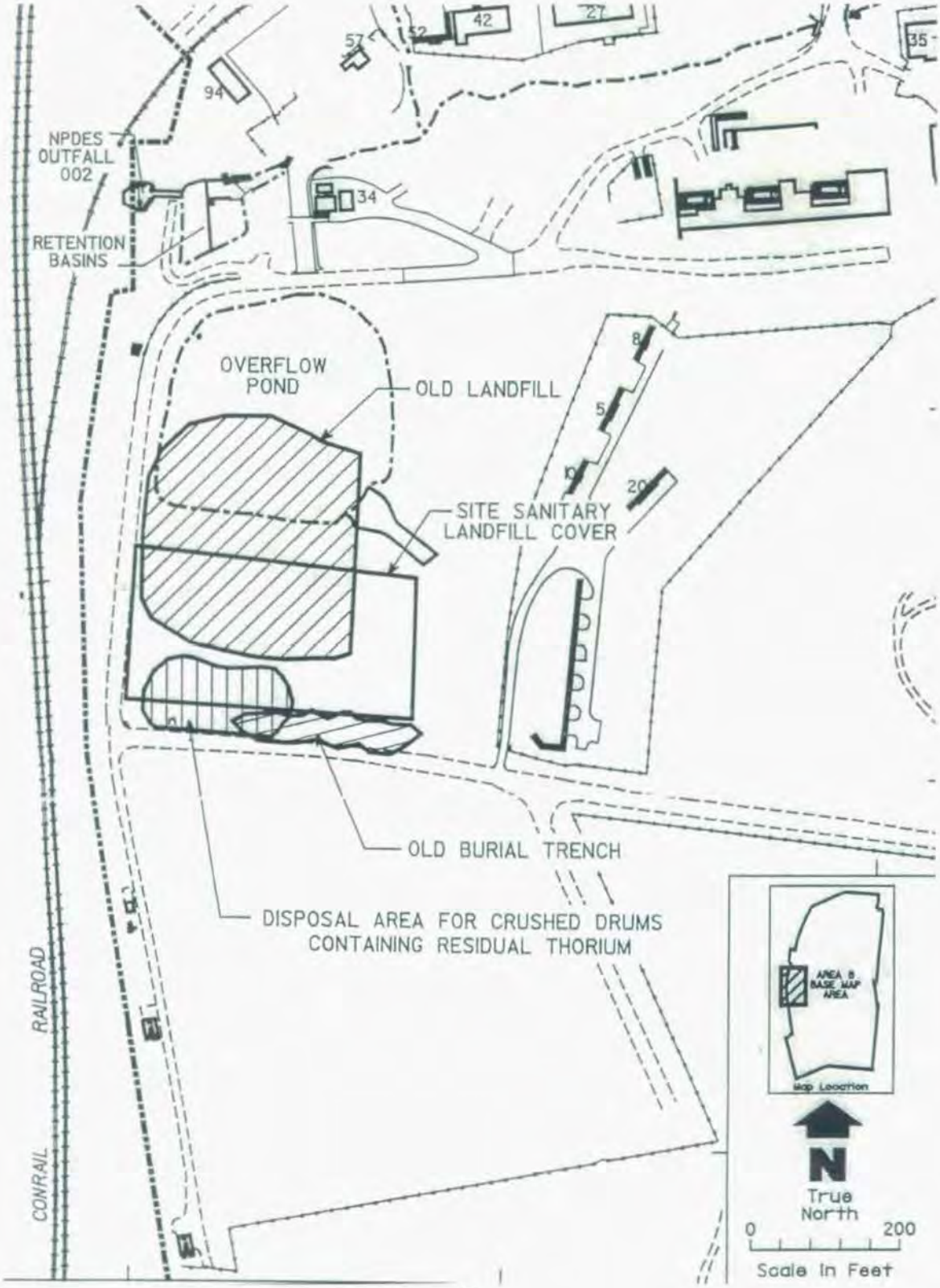


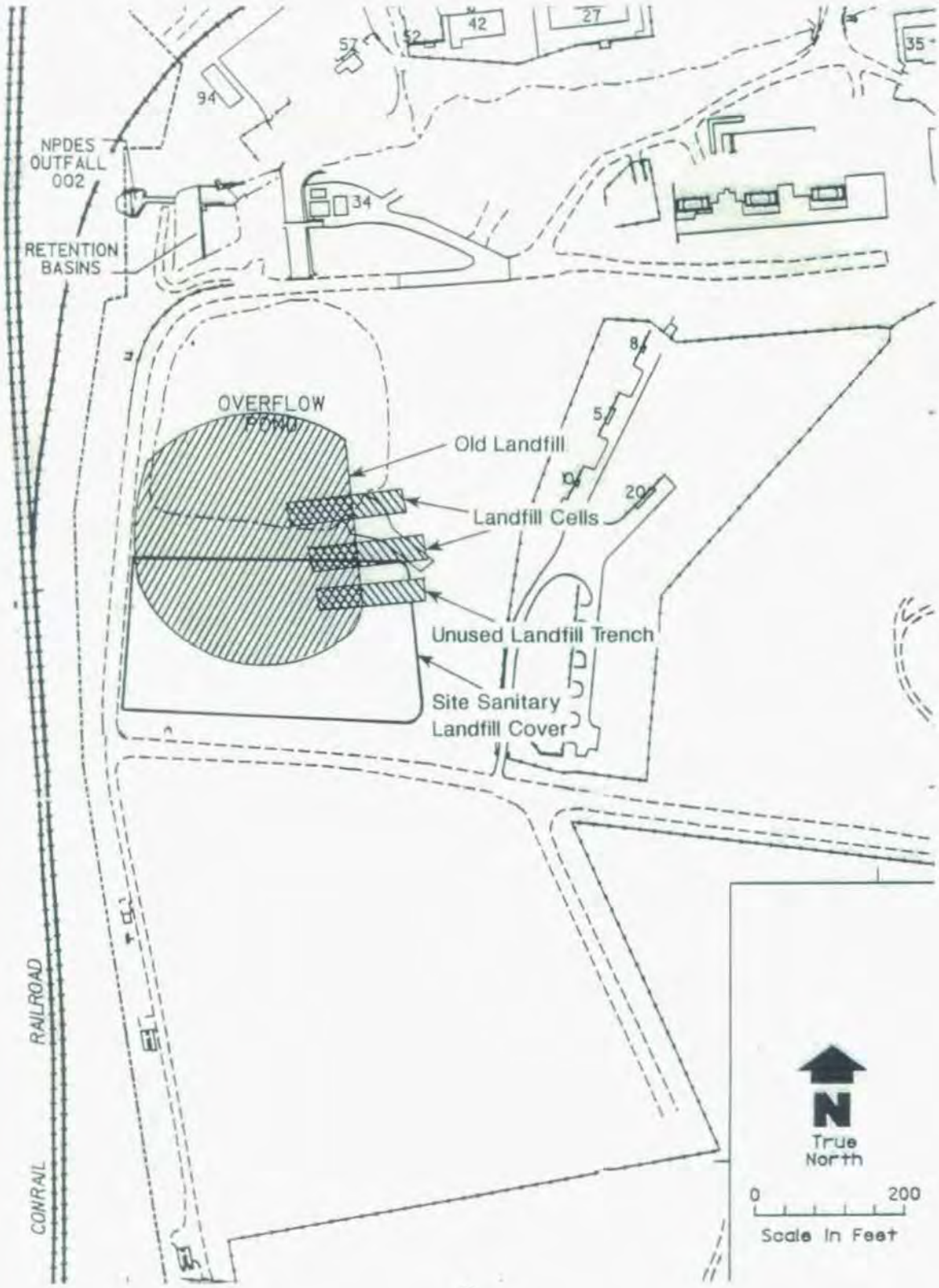
Figure 1 – View of the MCP Site Showing the OU1 Area

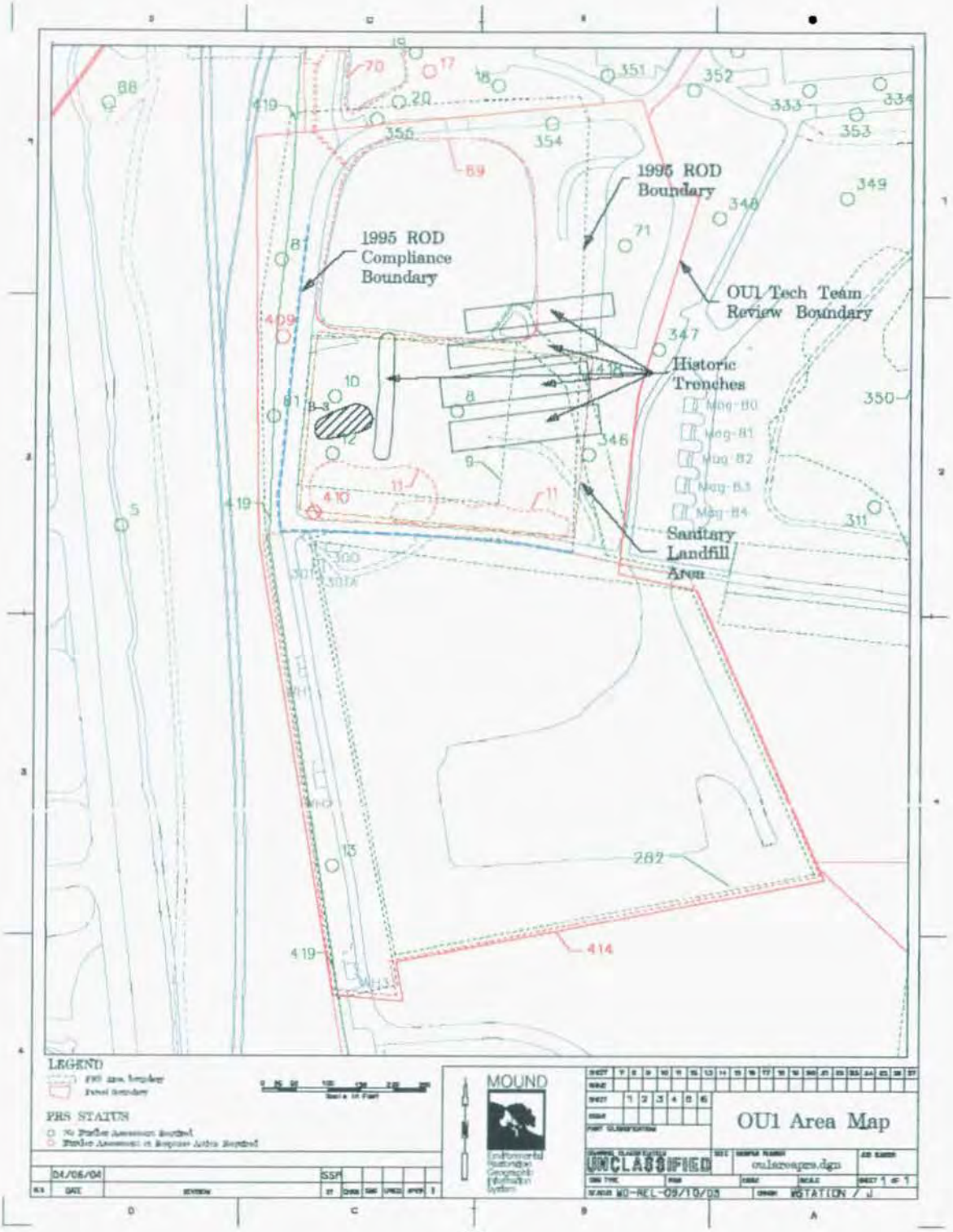
NPDES
OUTFALL
002
RETENTION
BASINS
OVERFLOW
POND
AREA B
RAILROAD
CONRAIL
42
27
57
52
35
94
34
8
5
10
20
AREA B
BASE MAP
AREA
Map Location
N
True
North
0
200
Scale In Feet


NPDES
OUTFALL
002
RETENTION
BASINS
OVERFLOW
POND
Old Gravel Pit
Site Sanitary
Landfill Cover
RAILROAD
CONRAIL
N
True
North
0
200
Scale In Feet


NPDES
OUTFALL
002
RETENTION
BASINS
OVERFLOW
POND
Burn Cage
Historical Landfill
Site Sanitary
Landfill Cover
RAILROAD
CONRAIL
42
27
57
52
35
94
34
8
5
20
N
True
North
0
200
Scale In Feet


NPDES
OUTFALL
002
RETENTION
BASINS
OVERFLOW
POND
OLD LANDFILL
SITE SANITARY
LANDFILL COVER
OLD BURIAL TRENCH
DISPOSAL AREA FOR CRUSHED DRUMS
CONTAINING RESIDUAL THORIUM
RAILROAD
CONRAIL
42
27
57
52
94
35
34
8
5
20
AREA 8
BASE MAP
AREA
Map Location
N
True
North
0
200
Scale In Feet


NPDES
OUTFALL
002
RETENTION
BASINS
OVERFLOW
POND
Old Landfill
Landfill Cells
Unused Landfill Trench
Site Sanitary
Landfill Cover
RAILROAD
CONRAIL
N
True
North
0
200
Scale In Feet

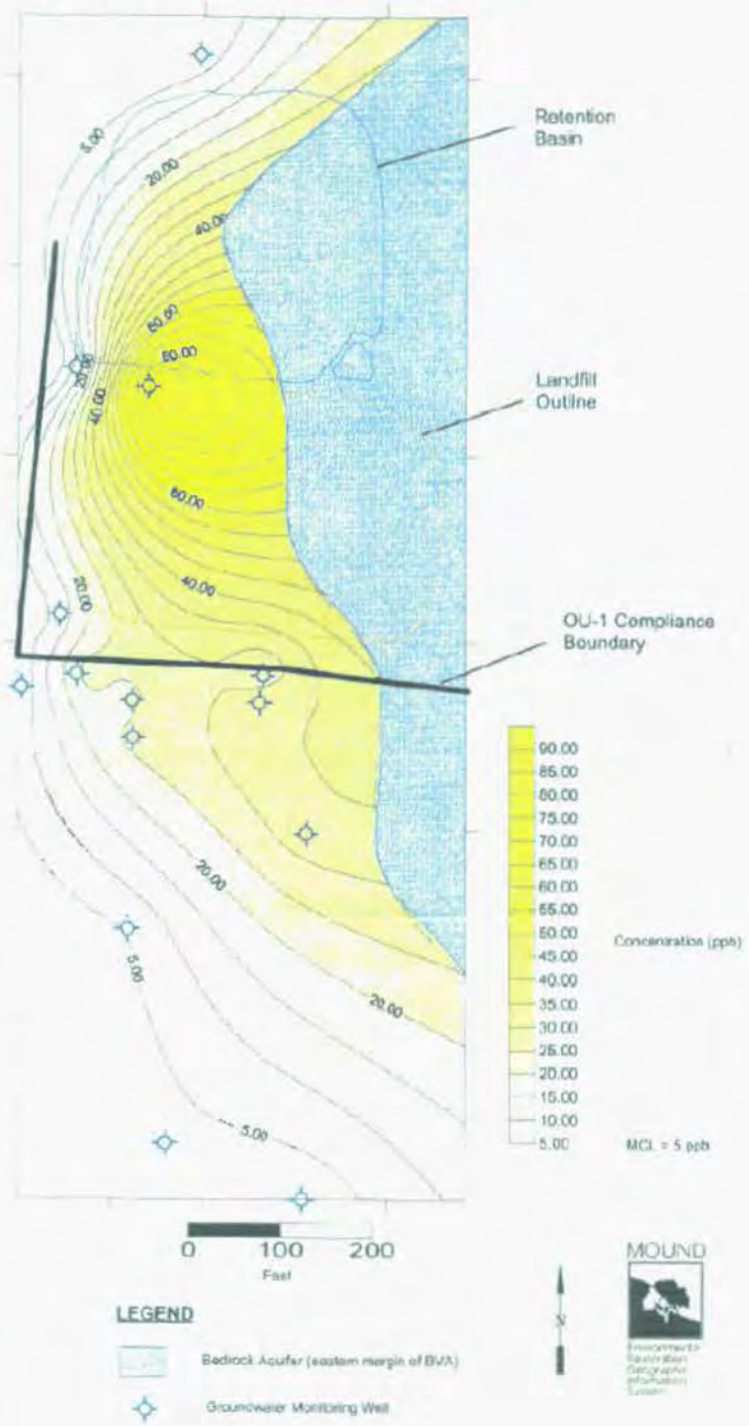

1995 ROD Boundary
1995 ROD Compliance Boundary
OU1 Tech Team Review Boundary
Historic Trenches
Sanitary Landfill Area
LEGEND
PRS STATUS
MOUND
OU1 Area Map
UNCLASSIFIED
ou1areapes.dgn
04/06/04
SSP
WO-REL-09/19/03
ROTATION / J

Attachment 2

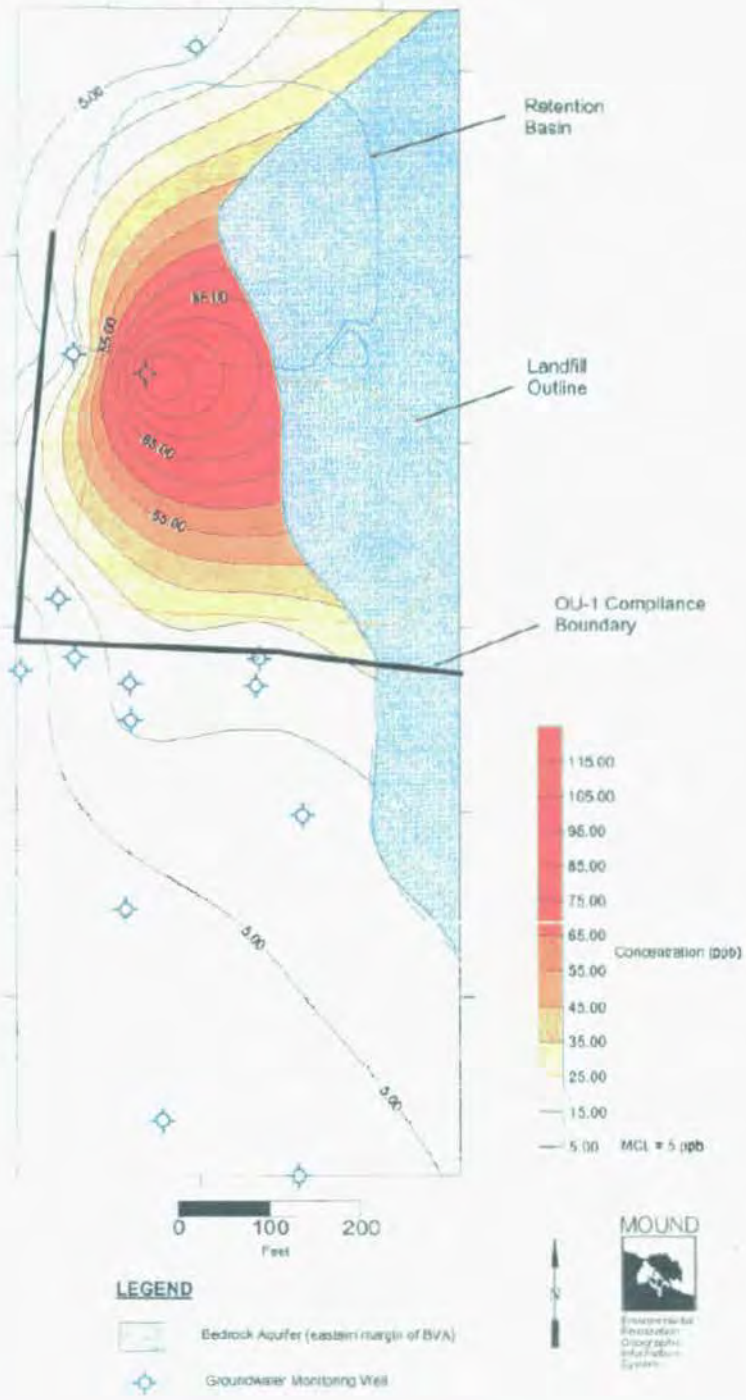
Plume Maps

Mound Core Team, Technical Memorandum
Operable Unit 1 (OU-1)

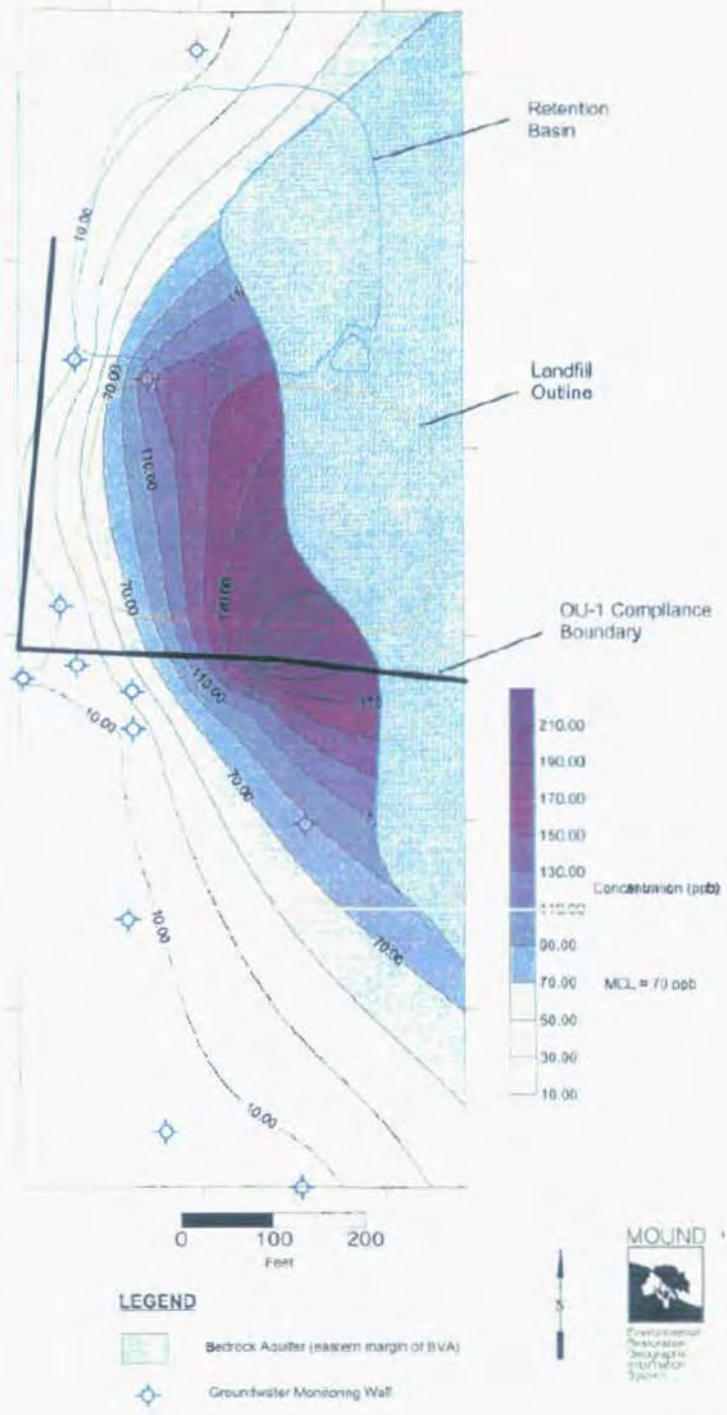
Jan 1997 TCE Concentrations at OU-1



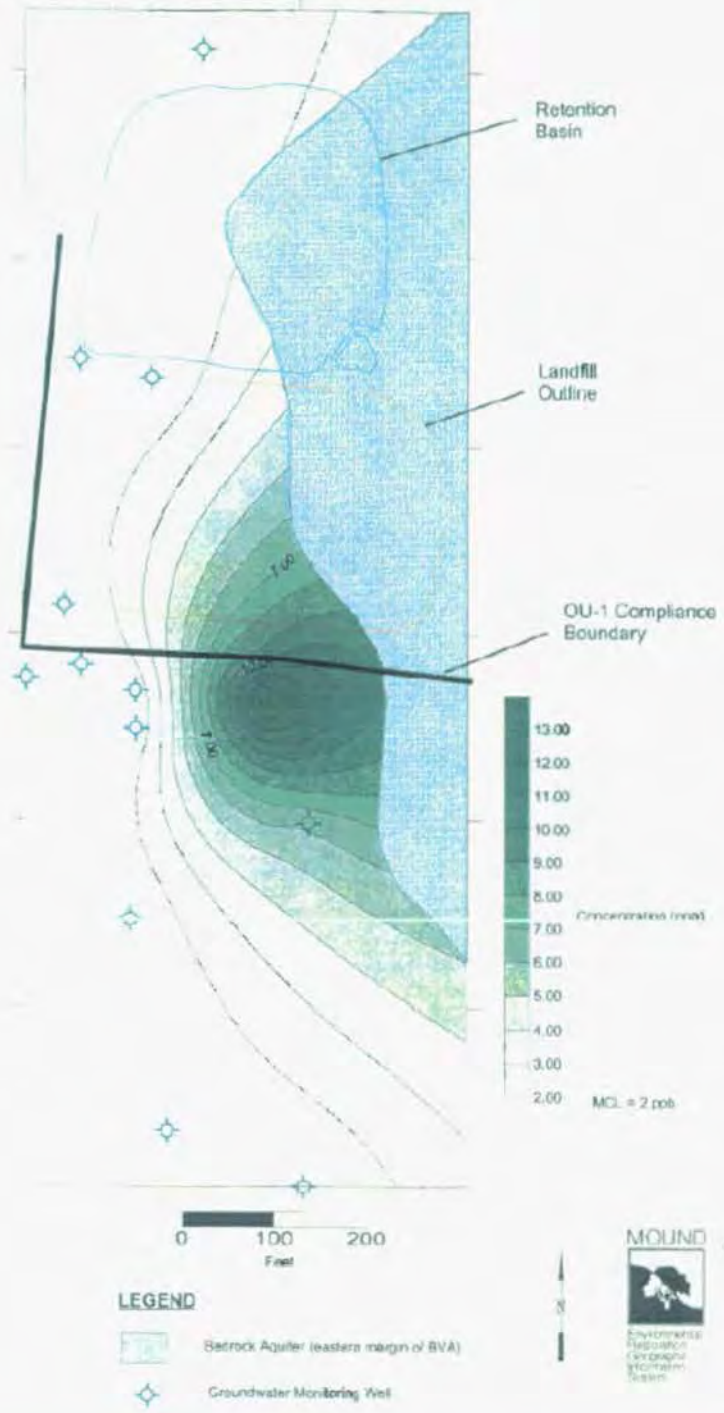
Jan 1997 PCE Concentrations at OU-1



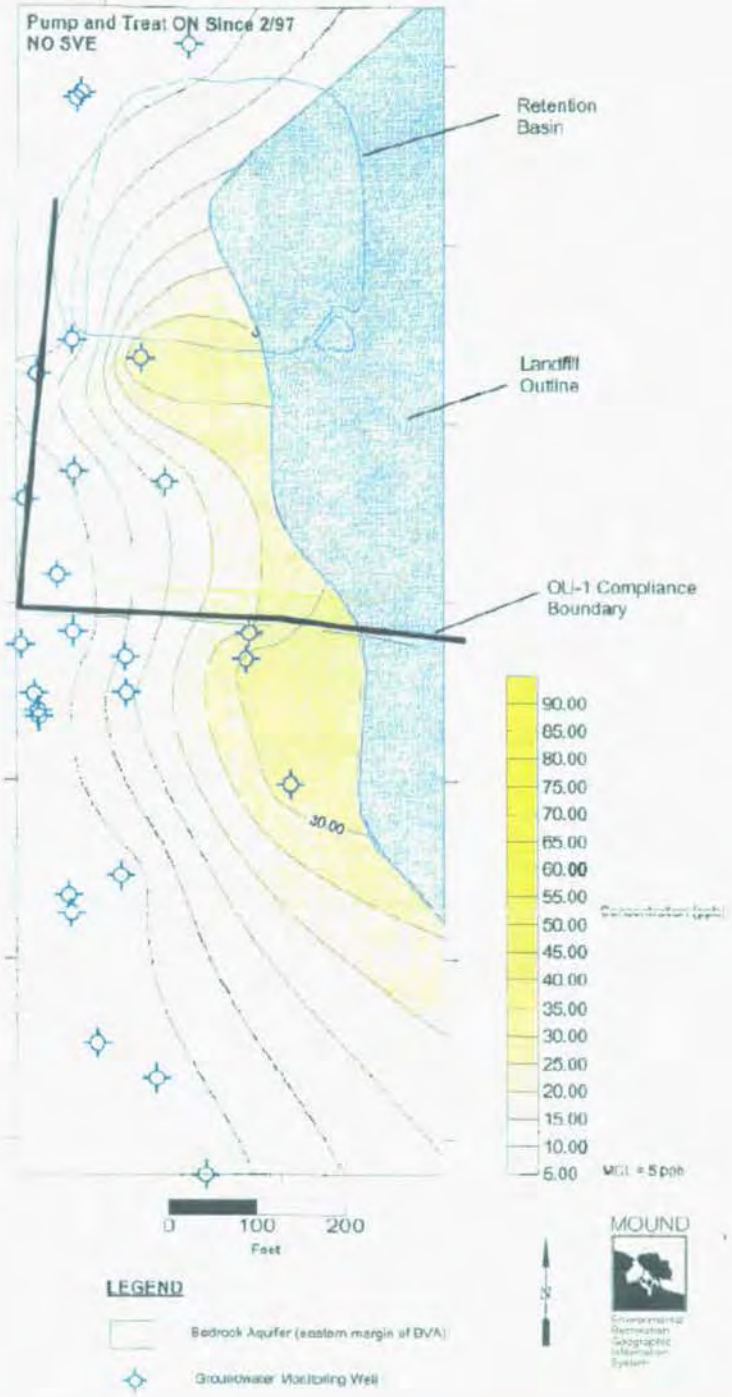
Jan 1997 DCE Concentrations at OU-1



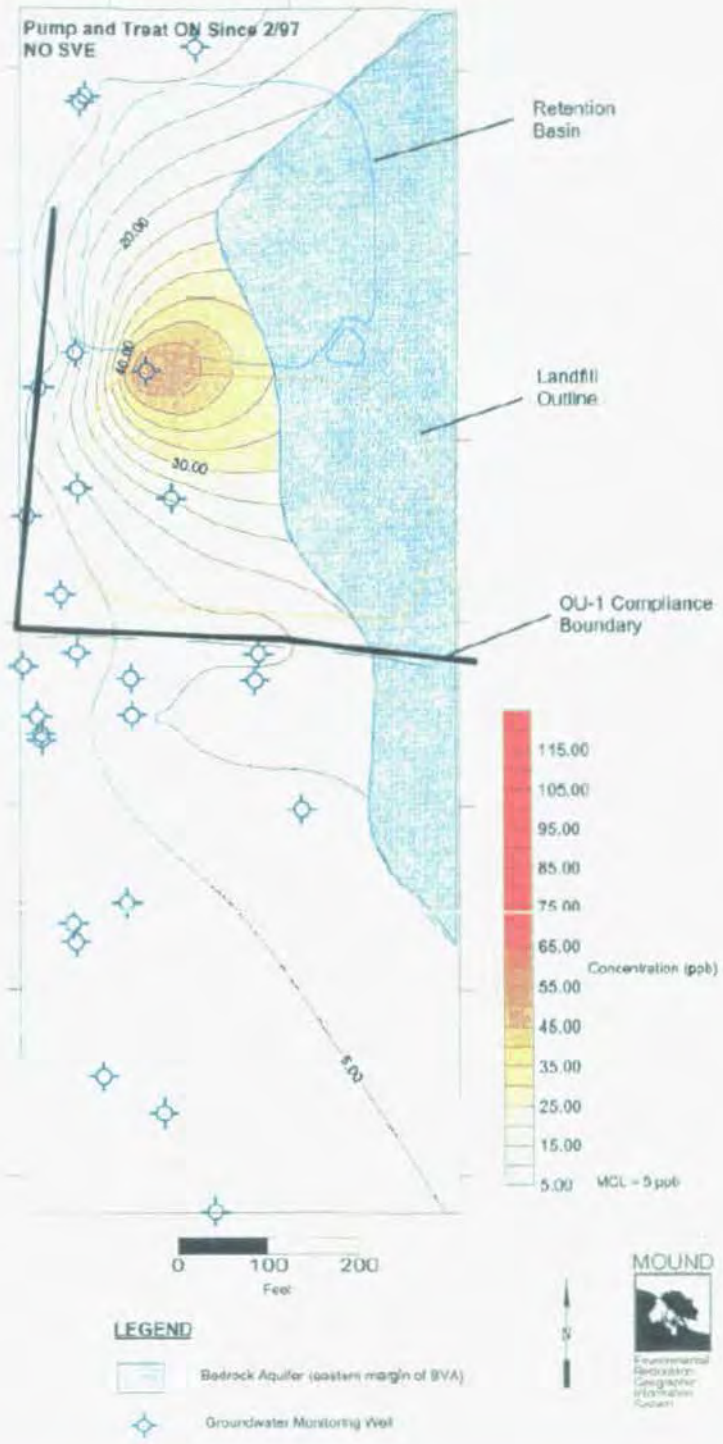
Jan 1997 VC Concentrations at OU-1



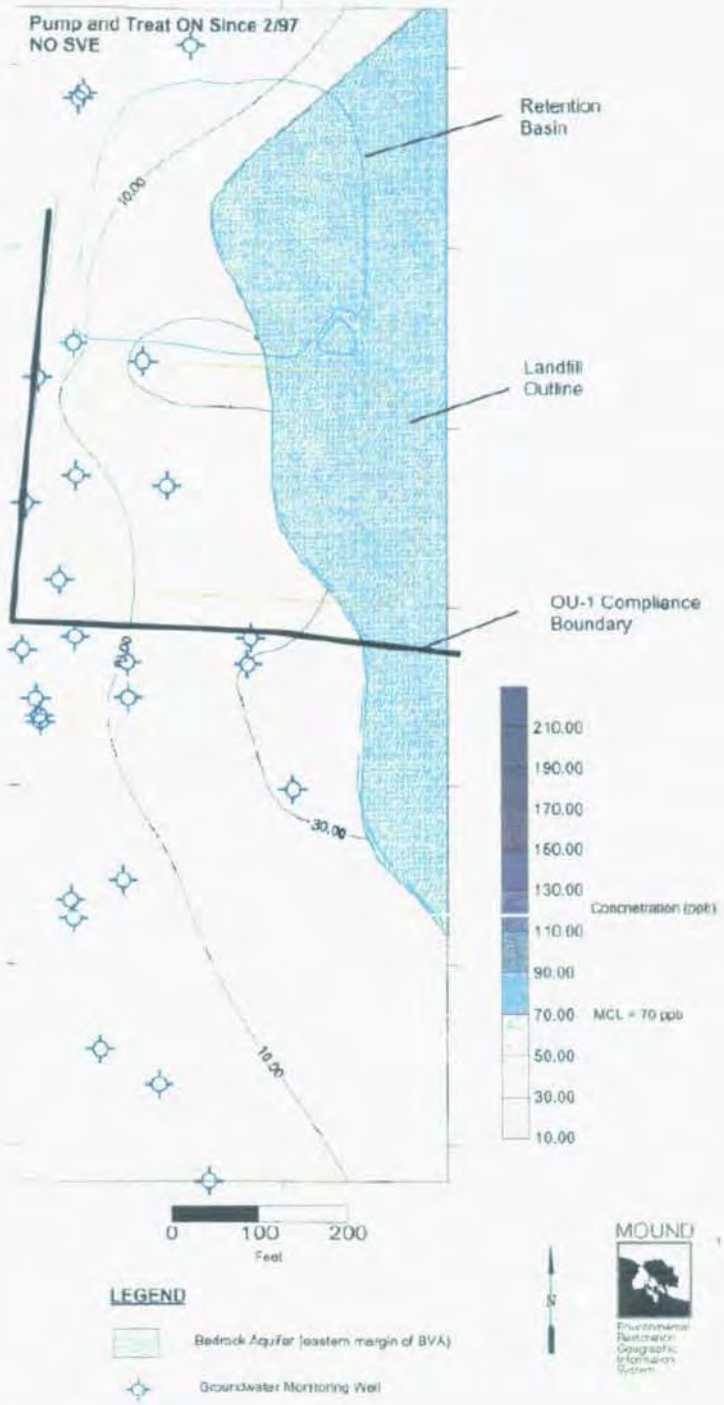
Dec 1997 TCE Concentrations at OU-1



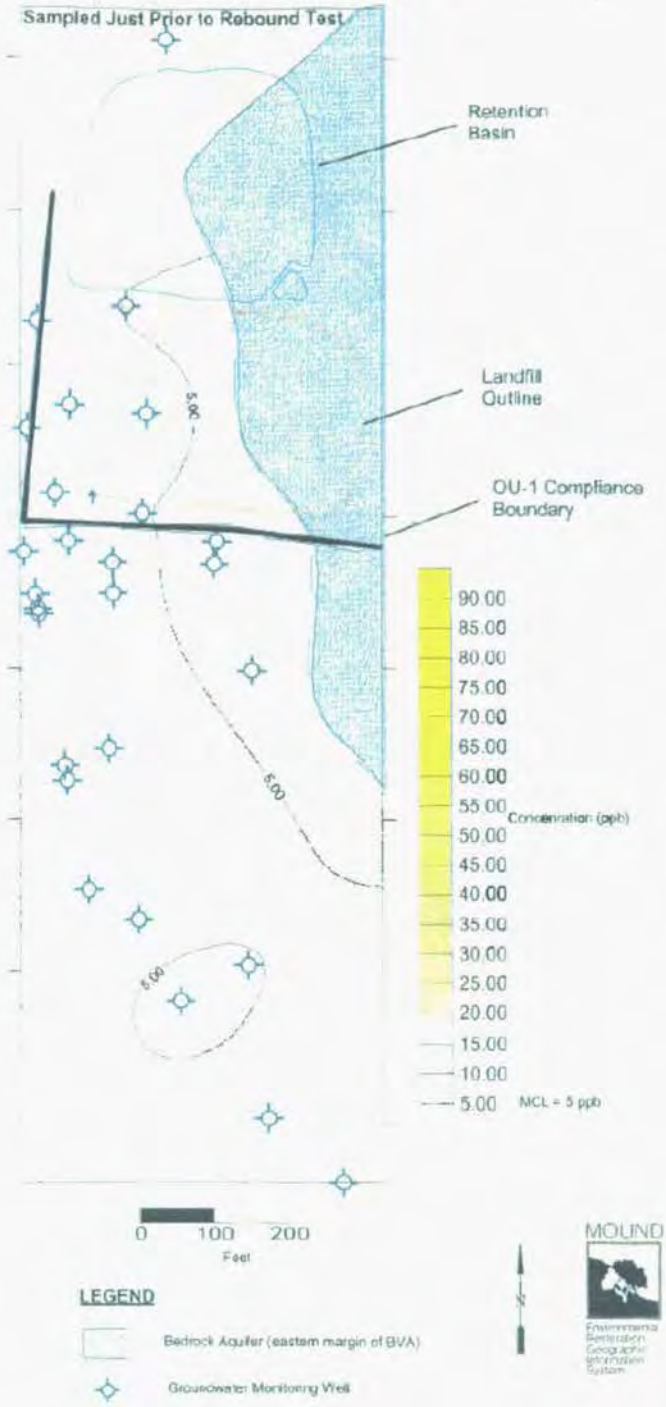
Dec 1997 PCE Concentrations at OU-1



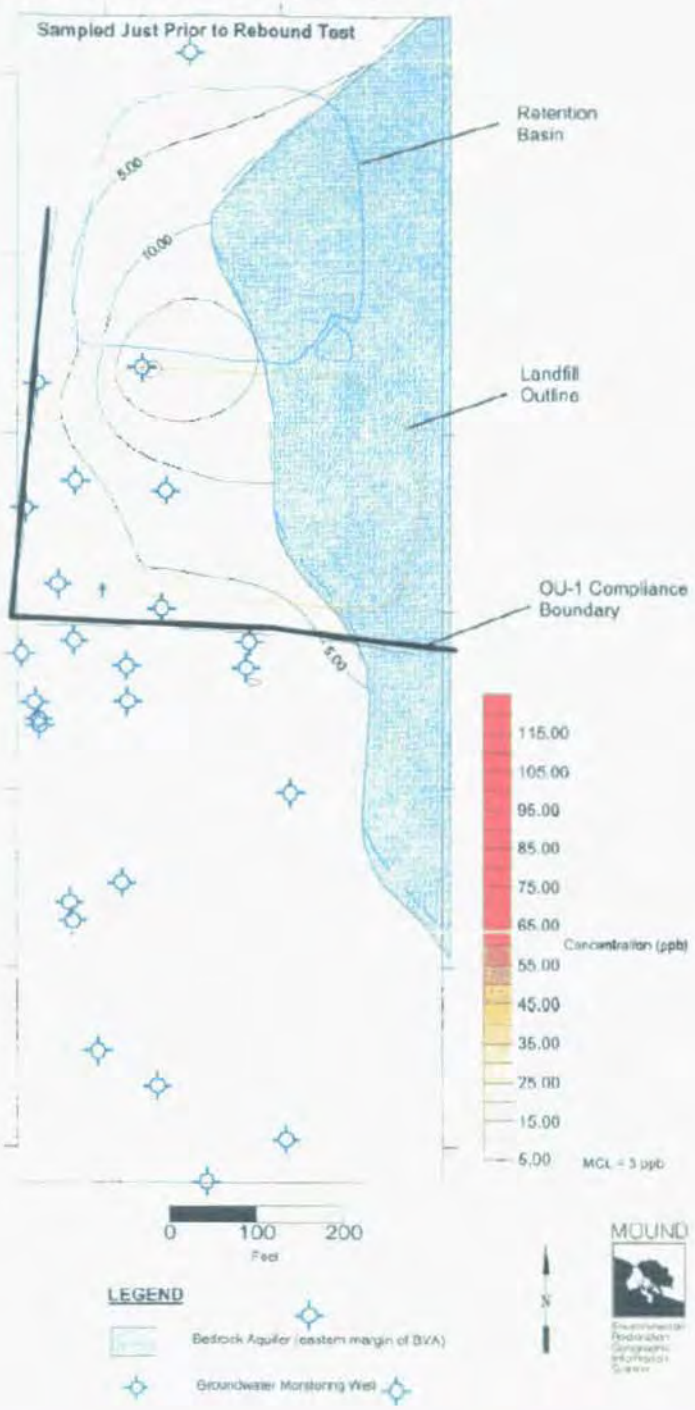
Dec 1997 DCE Concentrations at OU-1



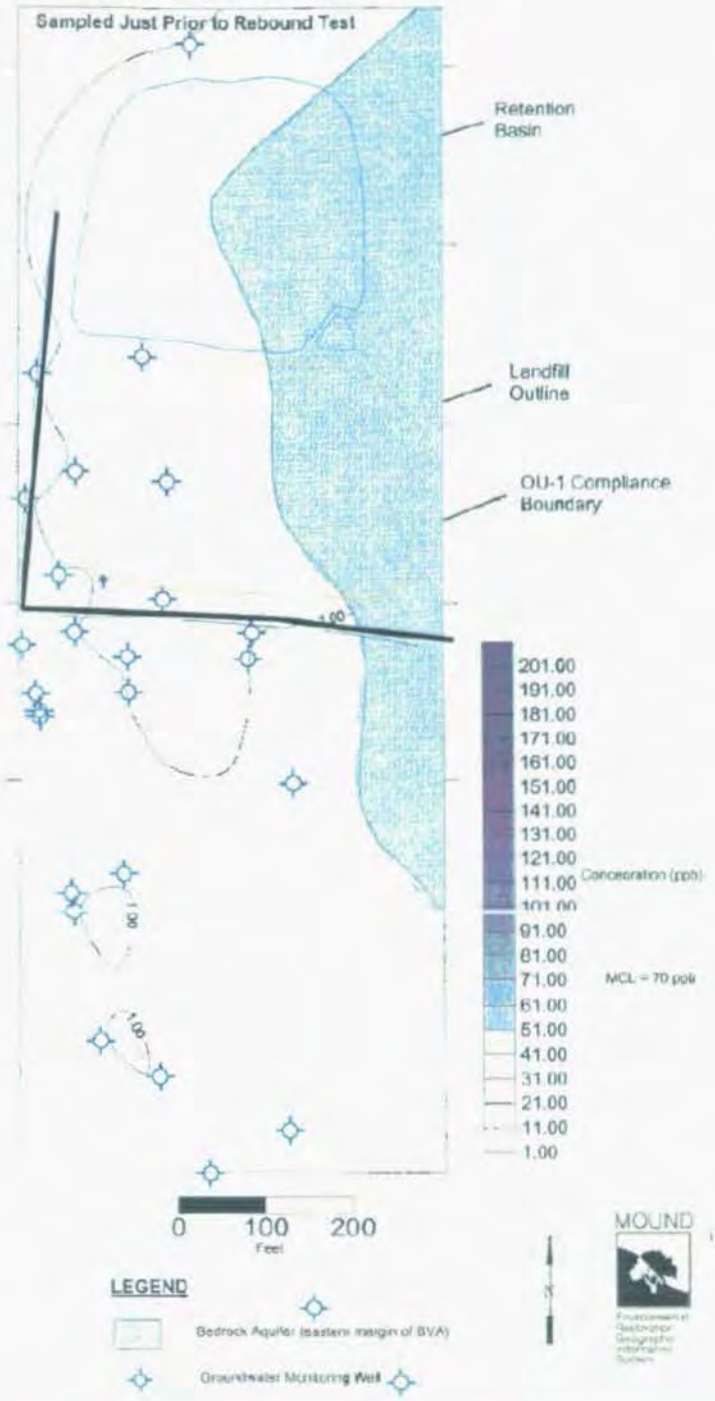
Feb 2003 TCE Concentrations at OU-1



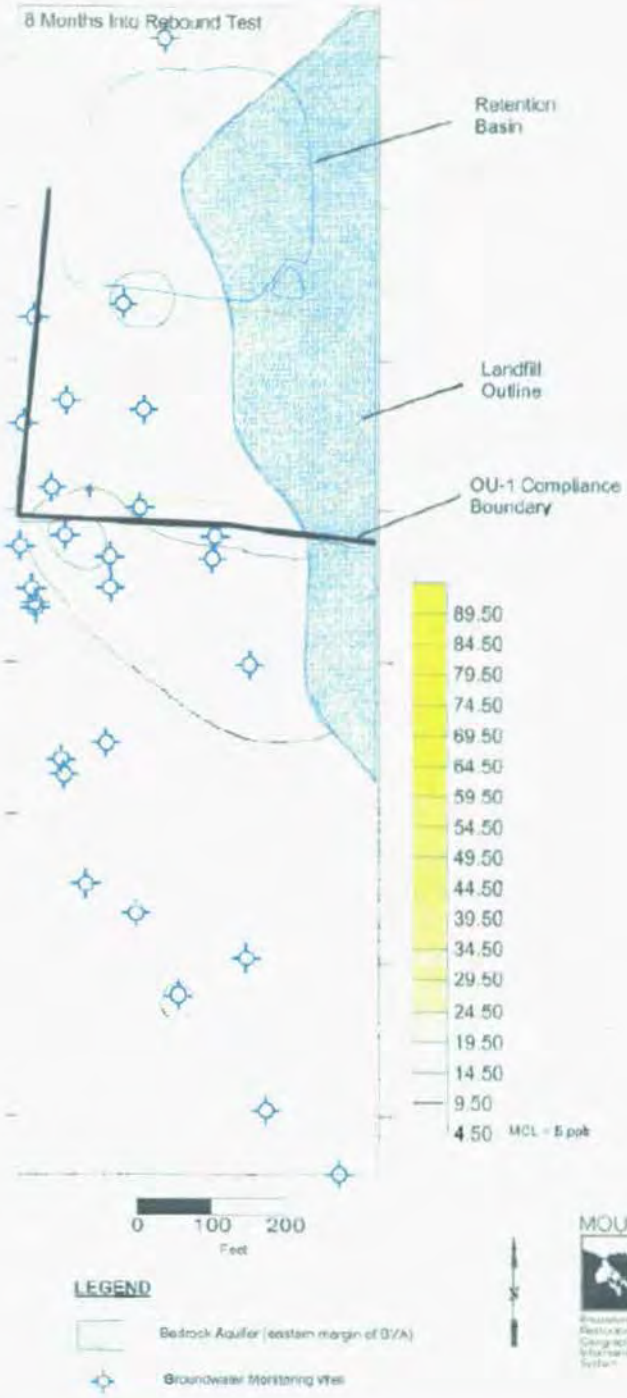
Feb 2003 PCE Concentrations at OU-1



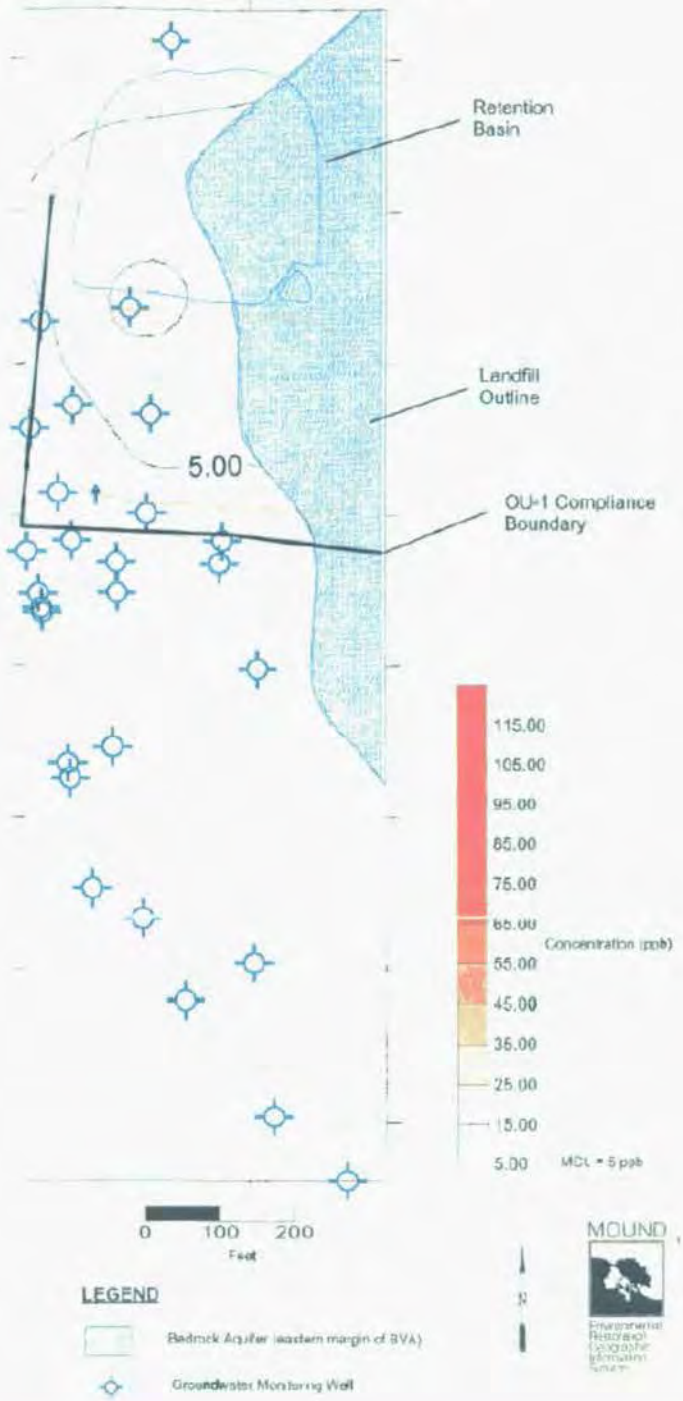
Feb 2003 DCE Concentrations at OU-1



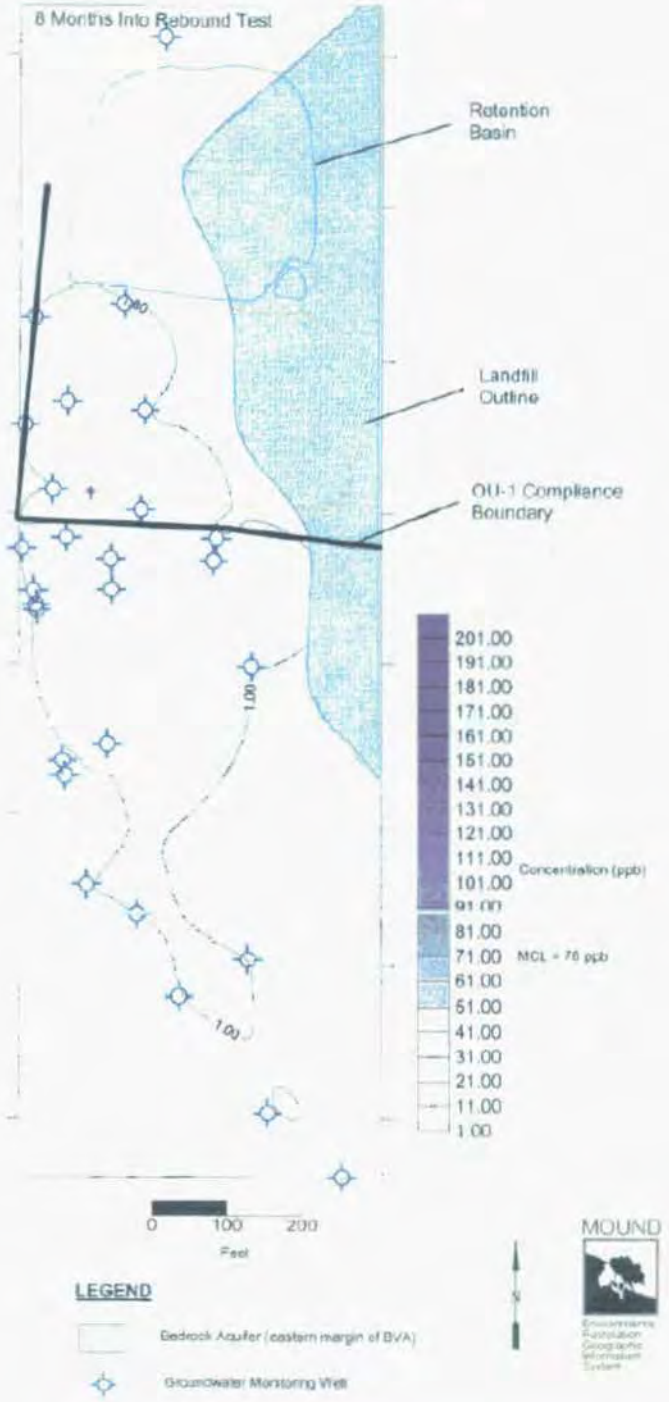
Jan 2004 TCE Concentrations at OU-1



Jan 2004 PCE Concentrations at OU-1



Jan 2004 DCE Concentrations at OU-1



Technology Detail Report
(without Markups)

Folder: Mound

Project

Name: Cap Operations
ID: OU1
Location: OHIO STATE AVERAGE, OHIO
Modifiers:
Material 0.967
Labor 1.116
Equipment 0.989
Category: None

Report Option: Fiscal Year
Description: Operations estimate for maintaining a native soil cap 4 acres in size. Maintenance includes mowing 6 times per year, fertilizing 2 times per year, and reparing erosion of 1% of the cap (0.04 acres x 18" deep = 97 cubic yds). Monitoring includes 1 technician traveling 10 miles to site 4 times per year for 8 hours per visit. A 5-year review and report was included.

Site

Name: OU-1 Operations Cost
ID: OU-1 Ops
Type: None
Description: Estimate for operating and maintenance costs for 4 acre cap at OU-1
Program: Environmental Restoration

Estimator Information:

Name: Steve Trischman
Title: Acquisition Specialist
Agency/Org./Office: DOE EM-42 (Acquisition Management)
Business Address: EM-42 Cloverleaf 1100
19901 Germantown Rd
Germantown, MD 20874
Phone: 301-903-7478
Email: steve.trischman@em.doe.gov
Prepared Date: 03/02/2005

Reviewer Information:

Cost Database Date: 2005
Cost Type: User-Defined
Print Date: 3/2/2005 5:14:04 PM

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CONFIRMED UNCLASSIFIED/NON-SENSITIVE
REVIEWED BY: JANET NESHEIM/EMCBC
DATE: 06-09-10

Technology Detail Report
(without Markups)

Name:
Title:
Agency/Org./Office:
Business Address:
Phone:
Email:
Date Reviewed:

Phase

Name: RA-O
Type: Operations & Maintenance
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate
Approach: Ex Situ

Media/Waste Type: N/A
Secondary Media/Waste Type: N/A
Contaminant: None
Secondary Contaminant: None
Markup Template: System Defaults

Technology

Name: Operations and Maintenance
Prime Markup: 100 %
Sub Markup: 0 %
Comments: Operations and Maintenance

Element: Treatment Train Miscellaneous

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
99020110	Annual Maintenance Materials and Labor	1.00	LS	102.77	102.77	51.38	$256.92	
						Total Element Cost	**$256.92**	

CONFIRMED UNCLASSIFIED/NON-SENSITIVE
REVIEWED BY: JANET NESHEIM/EMCBC
DATE: 06-09-10

Cost Database Date: 2005
Cost Type: User-Defined
Print Date: 3/2/2005 5:14:04 PM

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Technology Detail Report
(without Markups)

Element: Capping

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	97.00	CY	5.73	1.32	1.80	$858.25	
18050206	Erosion control, silt fence, polypropylene, 3' high, includes 7.5' posts	84.00	LF	0.68	1.53	0.00	$185.75	
18050301	Loam or topsoil, imported topsoil, 6" deep, furnish and place	97.00	LCY	19.53	3.61	1.41	$2,380.93	
18050402	Seeding, Vegetative Cover	1.00	ACR	17,895.89	266.00	124.26	$18,286.16	
18050409	Fertilize, 800 Lbs/Acre, Push Rotary	8.00	ACR	38.30	32.03	21.72	$736.36	
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	0.10	ACR	0.84	24.24	32.21	$5.73	
18050415	Mowing	24.00	ACR	0.00	179.95	0.00	$4,318.81	
33220106	Staff Engineer	2.00	HR	0.00	35.45	0.00	$70.90	
33220112	Field Technician	7.00	HR	0.00	25.89	0.00	$181.25	
						Total Element Cost	**$27,024.14**	

Total Technology Cost **$27,281.07**

CONFIRMED UNCLASSIFIED/NON-SENSITIVE
REVIEWED BY: JANET NESHEIM/EMCBC
DATE: 06-09-10

Cost Database Date: 2005

Cost Type: User-Defined

Print Date: 3/2/2005 5:14:04 PM

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Technology Detail Report
(without Markups)

Folder: Mound

Project

Name: Cap Operations
ID: OU1
Location: OHIO STATE AVERAGE, OHIO
Modifiers:
Material 0.967
Labor 1.116
Equipment 0.989
Category: None

Report Option: Fiscal Year
Description: Operations estimate for maintaining a native soil cap 4 acres in size. Maintenance includes mowing 6 times per year, fertilizing 2 times per year, and reparing erosion of 1% of the cap (0.04 acres x 18" deep = 97 cubic yds). Monitoring includes 1 technician traveling 10 miles to site 4 times per year for 8 hours per visit. A 5-year review and report was included.

Site

Name: OU-1 Operations Cost
ID: OU-1 Ops
Type: None
Description: Estimate for operating and maintenance costs for 4 acre cap at OU-1
Program: Environmental Restoration

Estimator Information:

Name: Steve Trischman
Title: Acquisition Specialist
Agency/Org./Office: DOE EM-42 (Acquisition Management)
Business Address: EM-42 Cloverleaf 1100
19901 Germantown Rd
Germantown, MD 20874
Phone: 301-903-7478
Email: steve.trischman@em.doe.gov
Prepared Date: 03/02/2005

Reviewer Information:

Cost Database Date: 2005
Cost Type: User-Defined
Print Date: 3/2/2005 5:11:02 PM

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CONFIRMED UNCLASSIFIED/NON-SENSITIVE
REVIEWED BY: JANET NESHEIM/EMCBC
DATE: 06-09-10

Technology Detail Report
(without Markups)

Name:
Title:
Agency/Org./Office:
Business Address:
Phone:
Email:
Date Reviewed:

Phase

Name: LTM
Type: Long Term Monitoring
Labor Rate Group:
Analysis Rate Group:
Approach:

Media/Waste Type:
Secondary Media/Waste Type:
Contaminant:
Secondary Contaminant:
Markup Template:

Technology

Name: Monitoring
Prime Markup: 100 %
Sub Markup: 0 %

Element: General Monitoring

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010104	Sample collection, vehicle mileage charge, car or van	80.00	MI	0.15	0.00	0.00	$12.38	
33220112	Field Technician	32.00	HR	0.00	31.58	0.00	$1,010.44	
						Total Element Cost	**$1,022.82**	

Cost Database Date: 2005
Cost Type: User-Defined
Print Date: 3/2/2005 5:11:02 PM

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REVIEWED BY: JANET NESHEIM/EMCBC
DATE: 06-09-10

Technology Detail Report
(without Markups)

Total Technology Cost **$1,022.82**

Cost Database Date: 2005

Cost Type: User-Defined

Print Date: 3/2/2005 5:11:02 PM

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REVIEWED BY: JANET NESHEIM/EMCBC
DATE: 06-09-10

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-All costs are direct costs-

OU1 system operational costs

Annual Pump and Treat system operation $35 - $40k
Annual Soil Vapor Extraction system operation $20 - $25k

Total annual P&T/SVE operational costs $65k

30 year operational estimate $1,950,000 (approximately $2M)

Sampling / analytical costs (conservatively assuming 20 wells required for post closure monitoring sampled quarterly, also assumes no reduction in sampling frequency will occur over a 30 year period.)

$400 per well per sample event [mobilization, sample and input into Mound Environmental Information Management System (MEIMS)]

$150 per well analytical per event
$550 sampling per event x 20 wells = $11,000 per quarter

$11,000 x 4 quarters = $44,000 annually
$44,000 annually over 30 years = 1,320,000 (approximately $1.3M)

Surface controls maintenance

Approximately 30k annually for mowing, fertilizing and assuming 1% surface repair (4 acres).
$30k over 30 years = 900k

Landfill Excavation cost

WBS/Activity	Sanitary	Low-Level	Mixed
2.1 Project Management	5,541	11,014	11,405
2.2 Excavation and Regrading			
Total for OU-1	7,267	7,490	7,490
Excavation of Landfill	714	819	819
Excavation of PRS 69	313	333	333
Excavation of PRS 11	344	344	344
Excavation of PRS 409/410	56	56	56
2.3 Waste Disposal	10,600	41,107	43,344
TOTAL	23,417	59,611	62,239

Removal of Operable Unit 1 at the Mound Plant in Miamisburg, Ohio

Independent Government Cost Estimate

April 19th 2004

Scenario 3.2 "L"

Excavation of Operable Unit 1 Area With Disposal of Entire Waste Volume as Low Level

Assumptions:

- The entire area of OU-1, including the historic landfill site, the sanitary landfill, and the overflow pond, will be excavated using conventional excavating equipment.
- The excavation boundaries and waste volume will match the four-acre area discussed in the Feasibility Study. A total of 3,000,000 cubic feet (111,000 cubic yards) of soil and debris will be excavated and disposed.
- PRS 11 (buried thorium drums), 69 (overflow pond), 409 (contaminated soil area), and 410 (contaminated soil area) will be included in the excavation, and these costs will be shown as separate items within the total estimate for this scenario.
- Paved roads and existing wells within the footprint of excavation will be removed.
- Costs for disposal of soil and debris will be estimated as Low Level waste in all cases, including the Thorium drum area.
- The site will be backfilled and re-graded.
- Six monitoring wells will be placed in or near the area of excavation for future groundwater monitoring.
- Required regulatory documentation will be completed.

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Mound OU 1 Parametric Estimate

Folder: Mound

Project

Name: OU 1 Excavation Of OU-1 Area
ID: OU 1
Location: OHIO STATE AVERAGE, OHIO
Modifiers:
Material 0.9671
Labor 1.2393
Equipment 0.9891
Category: None
Label45
Report Option: Fiscal Year
Description: Excavation of OU 1 contaminated media given the following volumes obtained from discussions. Excavations are separated into 5 areas as requested, the sanitary landfill, PRS 11 (buried thorium drums), PRS 69 (overflow pond), PRS 409 and PRS 410 (both fuel releases). 3 million bank cubic feet will be excavated and disposed of under three scenarios; sanitary, low level and mixed waste. 3.7 million bank cubic feet of fill and till material) used to construct the cell will require regarding.

Site

Name: OU 1 Excavation, Low Level Waste Disposal
ID: 3.2 L
Type: None
Description: Excavation of OU 1 contaminated media given the following volumes obtained from discussions. Excavations are separated into 5 areas as requested, the sanitary landfill, PRS 11 (buried thorium drums), PRS 69 (overflow pond), PRS 409 and PRS 410 (both fuel releases). 3 million bank cubic feet will be excavated and disposed of under this scenario that assumes all 3,000,000 bcf as Low Level waste. An allowance for berm construction and removal to protect the open excavations from storm water runoff is included. 3.7 million bank cubic feet of fill and till material) used to construct the cell will require regrading. The site will receive a vegitated native soil cap.

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Name: 3.2 OU 1 Excavation; Low Level Waste Scenario
Type: Remedial Action
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate
Approach: Ex Situ
Start Date: 3/1/2004
Description: Estimate represents the expected value.

Media/Waste Type: Soil
Secondary Media/Waste Type: Solids
Contaminant: Volatile Organic Compounds (VOCs)
Secondary Contaminant: Low Level Radioactive
Markup Template: System Defaults
O&M Markup Template: N/A

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Phase Cost Over Time Report (with Markups)

Technology	2004	Total
Decontamination Facilities	$463,733	$463,733
Excavation	$818,959	$818,959
Excavation	$344,164	$344,164
Excavation	$332,739	$332,739
Excavation	$36,833	$36,833
Excavation	$36,525	$36,525
Load and Haul	$240,244	$240,244
Load and Haul	$394,239	$394,239
Load and Haul	$573,558	$573,558
Off-site Transportation and Waste Disposal	$55,877,465	$55,877,465
FIELD GUIDANCE; ONSITE LAB	$1,097,077	$1,097,077
Demolition, Catch Basins/Manholes	$2,918	$2,918
Fencing	$46,375	$46,375
Demolition, Fencing	$29,514	$29,514
Bulk Material Storage	$1,586,101	$1,586,101
Demolition, Pavements	$110,257	$110,257
Demolition, Pavements	$92,329	$92,329
Demolition, Underground Pipes	$19,468	$19,468
Parking Lots	$14,117	$14,117
Groundwater Monitoring Well	$71,972	$71,972
WELL ABANDONMENT	$38,599	$38,599
Capping	$785,695	$785,695
Cleanup and Landscaping	$24,845	$24,845
Dewatering (Sludge)	$181,143	$181,143
Residual Waste Management	$45,269	$45,269
Professional Labor Management	$10,864,178	$10,864,178
STORM WATER CONTROL BERM CONST. $ DEMO	$49,718	$49,718
Excavation	$1,951,845	$1,951,845
Load and Haul	$250,373	$250,373
Total Phase Cost	$76,380,252	$76,380,252

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Folder: **Mound**

Project Name: OU 1 Excavation Of OU-1 Area

Project Number: OU 1

Cost Database Date: 2004

Cost Type: User-Defined

Description: Excavation of OU 1 contaminated media given the following volumes obtained from discussions. Excavations are separated into 5 areas as requested, the sanitary landfill, PRS 11 (buried thorium drums), PRS 69 (overflow pond), PRS 409 and PRS 410 (both fuel releases). 3 million bank cubic feet will be excavated and disposed of under three scenarios; sanitary, low level and mixed waste. 3.7 million bank cubic feet of fill and till material) used to construct the cell will require regarding.

Site Name: OU 1 Excavation, Low Level Waste Disposal

Site Number: 3.2 L

Description: Excavation of OU 1 contaminated media given the following volumes obtained from discussions. Excavations are separated into 5 areas as requested, the sanitary landfill, PRS 11 (buried thorium drums), PRS 69 (overflow pond), PRS 409 and PRS 410 (both fuel releases). 3 million bank cubic feet will be excavated and disposed of under this scenario which assumes disposal of all 3,000,000 bcf as Low Level waste. An allowance for berm construction and removal to protect the open excavations from storm water runoff is included. 3.7 million bank cubic feet of fill and till material) used to construct the cell will require regarding. The site will receive a vegitated native soil cap.

Phase Name: 3.2 OU 1 Excavation; Low Level Waste Scenario

Phase: Remedial Action

Description: Estimate represents the expected value.

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Decontamination Facilities** **#** **1**

Comment: Daily crew hygiene and an allowance to clean heavy equipment several times during excavation to support equipment maintenance and final cleaning of equipment prior to transporting it off site. Decontamination pad will not be used as a full time debris cleaning facility so labor hours were cut to reflect equipment decontaminations for maintenance. Safety Level/Personal Protection Level C.

Assembly		Direct Cost	Marked Up Cost
17030109	Pad Subgrade Preparation	237	340
17030257	Cat 215, 1.0 CY, Soil, Shallow, Trenching	3	5
17030501	Compact Subgrade, 2 Lifts	25	35
17030510	Dry Roll Gravel, Steel Roller	134	200
18010102	Gravel, Delivered & Dumped	384	511
18010103	Gravel (90%) & Sand Base (10%), with Calcium Chlor	392	523
18010203	Asphalt Curb 8" W x 6" H	1,256	1,776
18010310	Prime Coat	35	46
18010312	Asphalt Wearing Course, 1 Pass (Line Item Includes	1,514	2,126
18020203	26" x 26", 5' Deep Area Drain with Grate	3,579	5,179
19020313	5' x 5' x 5' Reinforced Concrete Sump	4,442	6,532
19020604	12" x 12" CIP Concrete In-Ground Trench Drain with	2,635	3,914
19040604	1,500 Gallon Steel Sump, Aboveground with Supports	3,136	4,463
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	204	310
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80	175	253
33080571	40 Mil Polymeric Liner, High-density Polyethylene	501	713
33170818	1,800 PSI Pressure Washer Rental	1,103	1,420
33170821	8' x 24' Decontamination Trailer with 4 Showers,	22,213	28,596
33170823	Operation of Pressure Washer, Including Water,	3,107	4,810
33199921	DOT Steel Drum, 55 Gallon	23,780	30,613
33220112	Field Technician	120,716	364,443
33231306	High Sump Level Switch for Avoiding Overflow	505	735
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	1,637	2,437
33290401	25 GPM, 1 1/2" Discharge, Cast-iron Sump Pump	2,762	3,753
Total Decontamination Facilities Technology		194,475	463,733

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030109	Pad Subgrade Preparation	35.56	CY	0.00	3.34	3.32	$236.67
17030257	Cat 215, 1.0 CY, Soil, Shallow, Trenching	1.78	CY	0.00	1.03	0.83	$3.31
17030501	Compact Subgrade, 2 Lifts	35.56	CY	0.00	0.34	0.36	$24.76
17030510	Dry Roll Gravel, Steel Roller	106.67	SY	0.00	0.91	0.34	$133.53
18010102	Gravel, Delivered & Dumped	14.81	CY	19.93	3.89	2.10	$383.99
18010103	Gravel (90%) & Sand Base (10%), with Calcium Chloride 3/4 - 1 Lb/CY	14.81	CY	19.89	4.33	2.22	$391.54
18010203	Asphalt Curb 8" W x 6" H	120.00	LF	1.41	4.47	4.59	$1,256.12
18010310	Prime Coat	88.89	SY	0.32	0.06	0.02	$34.76
18010312	Asphalt Wearing Course, 1 Pass (Line Item Includes 5% Waste)	19.33	TON	30.86	31.58	15.88	$1,514.00
18020203	26" x 26", 5' Deep Area Drain with Grate	1.00	EA	1,544.31	2,002.38	32.71	$3,579.40
19020313	5' x 5' x 5' Reinforced Concrete Sump	1.00	EA	1,483.86	2,851.07	107.22	$4,442.15
19020604	12" x 12" CIP Concrete In-Ground Trench Drain with Metal Grate	20.00	LF	39.41	91.58	0.74	$2,634.62
19040604	1,500 Gallon Steel Sump, Aboveground with Supports & Fittings	1.00	EA	1,637.54	1,497.96	0.00	$3,135.51
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	144.00	LF	0.05	1.14	0.23	$203.96
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80 Mil)	106.67	SY	0.69	0.92	0.03	$175.05
33080571	40 Mil Polymeric Liner, High-density Polyethylene	960.00	SF	0.26	0.25	0.01	$501.31
33170818	1,800 PSI Pressure Washer Rental	1.00	MO	1,102.78	0.00	0.00	$1,102.78
33170821	8' x 24' Decontamination Trailer with 4 Showers, HVAC, 2 Sinks	9.00	MO	2,468.14	0.00	0.00	$22,213.22
33170823	Operation of Pressure Washer, Including Water, Soap, Electricity, Labor	40.00	HR	6.56	71.12	0.00	$3,107.27

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33199921	DOT Steel Drum, 55 Gallon	312.00	EA	76.22	0.00	0.00	$23,780.05	
33220112	Field Technician	2,880.00	HR	0.00	41.92	0.00	$120,716.06	
33231306	High Sump Level Switch for Avoiding Overflow	1.00	EA	210.05	295.32	0.00	$505.37	
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	30.00	LF	15.97	38.59	0.00	$1,636.66	
33290401	25 GPM, 1 1/2" Discharge, Cast-iron Sump Pump	1.00	EA	2,071.71	690.75	0.00	$2,762.46	
				Total Element Cost			**$194,474.57**	
				Total Un Escalated Technology Cost			**$194,474.57**	

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation** **# 1**

Comment:

Excavation 1, Sanitary Landfill, remove existing cover, content and liner. Safety Level/Personal Protection Level C. The three components sum to the 1.6 million banked cubic feet as verified using the OU-1 feasibility study report and are to be considered the waste volume per discussions (59,259 bcy). Safety Level/Personal Protection Level B.

Assembly		Direct Cost	Marked Up Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	306,184	426,100
17030418	Delivered & Dumped, Backfill with Stone	73,355	95,666
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	1,842	2,527
33020401	Disposable Materials per Sample	487	627
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	38,446	49,494
33021707	Target Analyte List (TAL) Metals, Soil Analysis	20,291	26,122
33021712	Mercury (SW 7471), with prep, Soil Analysis	1,926	2,479
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	9,979	12,847
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	11,900	15,319
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	17,525	22,561
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectr	7,464	9,609
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	9,249	11,907
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	11,900	15,319
33080584	Plastic Laminate Waste Pile Cover	92,311	126,988
33170803	Decontaminate Heavy Equipment	790	1,242
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	119	153
Total Excavation Technology		**603,768**	**818,959**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030279	4 CY, Crawler-mounted, Hydraulic Excav	59,191.11	CY	0.00	1.76	3.42	$306,183.77	

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030418	Delivered & Dumped, Backfill with Stone	2,726.96	BCY	23.92	1.53	1.45	$73,355.22
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	30.00	DAY	43.14	18.25	0.00	$1,841.94
33020401	Disposable Materials per Sample	60.00	EA	8.11	0.00	0.00	$486.70
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	60.00	EA	640.77	0.00	0.00	$38,446.42
33021707	Target Analyte List (TAL) Metals, Soil Analysis	60.00	EA	338.19	0.00	0.00	$20,291.47
33021712	Mercury (SW 7471), with prep, Soil Analysis	60.00	EA	32.10	0.00	0.00	$1,925.78
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	60.00	EA	166.32	0.00	0.00	$9,979.41
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	60.00	EA	198.33	0.00	0.00	$11,899.57
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	60.00	EA	292.08	0.00	0.00	$17,524.82
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	60.00	EA	124.40	0.00	0.00	$7,464.28
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	60.00	EA	154.15	0.00	0.00	$9,249.21
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	60.00	EA	198.33	0.00	0.00	$11,899.57
33080584	Plastic Laminate Waste Pile Cover	551,439.70	SF	0.12	0.05	0.00	$92,311.00
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	790.07	0.00	$790.07
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	100.00	LF	1.19	0.00	0.00	$118.64
			Total Element Cost				**$603,767.85**
			Total Un Escalated Technology Cost				**$603,767.85**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation # 2**

Comment:

Excavation 2, OU 11 Buried Thorium Drums. 350,000 bank cubic feet (12,963 bcy) of low-level waste. Safety Level/Personal Protection Level B.

Assembly		Direct Cost	Marked Up Cost
17030212	Hand Excavation, Sand/Gravel	101,397	159,413
17030278	3 CY, Crawler-mounted, Hydraulic Excavator	54,154	78,056
17030418	Delivered & Dumped, Backfill with Stone	14,687	19,154
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	1,842	2,527
33020401	Disposable Materials per Sample	162	209
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	12,815	16,498
33021707	Target Analyte List (TAL) Metals, Soil Analysis	6,764	8,707
33021712	Mercury (SW 7471), with prep, Soil Analysis	642	826
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	3,326	4,282
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	3,967	5,106
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	5,842	7,520
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectr	2,488	3,203
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	3,083	3,969
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	3,967	5,106
33080584	Plastic Laminate Waste Pile Cover	20,493	28,191
33170803	Decontaminate Heavy Equipment	790	1,242
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	119	153
Total Excavation Technology		**236,538**	**344,164**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030212	Hand Excavation, Sand/Gravel	1,088.77	CY	0.00	93.13	0.00	$101,397.26
17030278	3 CY, Crawler-mounted, Hydraulic Excavator	12,053.33	CY	0.00	2.34	2.15	$54,154.41
17030418	Delivered & Dumped, Backfill with Stone	546.00	BCY	23.92	1.53	1.45	$14,687.40
17031002	2" Diameter 75 GPM Pump	30.00	DAY	43.14	18.25	0.00	$1,841.94

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020401	Disposable Materials per Sample	20.00	EA	8.11	0.00	0.00	$162.23
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	20.00	EA	640.77	0.00	0.00	$12,815.47
33021707	Target Analyte List (TAL) Metals, Soil Analysis	20.00	EA	338.19	0.00	0.00	$6,763.82
33021712	Mercury (SW 7471), with prep, Soil Analysis	20.00	EA	32.10	0.00	0.00	$641.93
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	20.00	EA	166.32	0.00	0.00	$3,326.47
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	20.00	EA	198.33	0.00	0.00	$3,966.52
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	20.00	EA	292.08	0.00	0.00	$5,841.61
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	20.00	EA	124.40	0.00	0.00	$2,488.09
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	20.00	EA	154.15	0.00	0.00	$3,083.07
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	20.00	EA	198.33	0.00	0.00	$3,966.52
33080584	Plastic Laminate Waste Pile Cover	122,418.70	SF	0.12	0.05	0.00	$20,492.89
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	790.07	0.00	$790.07
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	100.00	LF	1.19	0.00	0.00	$118.64
				Total Element Cost			**$236,538.34**
				Total Un Escalated Technology Cost			**$236,538.34**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation** **# 3**

Comment:

Excavation 3, OU 69 Overflow Pond. Dewater and excavate 92,520 square feet of clay pond liner 3 feet thick (10,280 bcy). Dewatering requires pumping 5 million gallons through the outfall. Drying of sludge is estimated in the dewatering model. Safety Level/Personal Protection Level B.

Assembly		Direct Cost	Marked Up Cost
17030278	3 CY, Crawler-mounted, Hydraulic Excavator	47,200	68,033
17030418	Delivered & Dumped, Backfill with Stone	47,100	61,425
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	7,368	10,109
33020401	Disposable Materials per Sample	487	627
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	38,446	49,494
33021707	Target Analyte List (TAL) Metals, Soil Analysis	20,291	26,122
33021712	Mercury (SW 7471), with prep, Soil Analysis	1,926	2,479
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	9,979	12,847
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	11,900	15,319
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	17,525	22,561
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectr	7,464	9,609
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	9,249	11,907
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	11,900	15,319
33080584	Plastic Laminate Waste Pile Cover	18,532	25,494
33170803	Decontaminate Heavy Equipment	790	1,242
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	119	153
Total Excavation Technology		**250,277**	**332,739**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030278	3 CY, Crawler-mounted, Hydraulic Excavator	10,505.56	CY	0.00	2.34	2.15	$47,200.43	
17030418	Delivered & Dumped, Backfill with Stone	1,750.93	BCY	23.92	1.53	1.45	$47,100.02	
17031002	2" Diameter 75 GPM Pump	120.00	DAY	43.14	18.25	0.00	$7,367.76	

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020401	Disposable Materials per Sample	60.00	EA	8.11	0.00	0.00	$486.70
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	60.00	EA	640.77	0.00	0.00	$38,446.42
33021707	Target Analyte List (TAL) Metals, Soil Analysis	60.00	EA	338.19	0.00	0.00	$20,291.47
33021712	Mercury (SW 7471), with prep, Soil Analysis	60.00	EA	32.10	0.00	0.00	$1,925.78
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	60.00	EA	166.32	0.00	0.00	$9,979.41
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	60.00	EA	198.33	0.00	0.00	$11,899.57
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	60.00	EA	292.08	0.00	0.00	$17,524.82
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	60.00	EA	124.40	0.00	0.00	$7,464.28
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	60.00	EA	154.15	0.00	0.00	$9,249.21
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	60.00	EA	198.33	0.00	0.00	$11,899.57
33080584	Plastic Laminate Waste Pile Cover	110,707.70	SF	0.12	0.05	0.00	$18,532.47
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	790.07	0.00	$790.07
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	100.00	LF	1.19	0.00	0.00	$118.64
				Total Element Cost			**$250,276.59**
				Total Un Escalated Technology Cost			**$250,276.59**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation** # 4

Comment:

Excavation 4, OU 409 Petroleum Spill. Safety Level/Personal Protection Level C.

Assembly		Direct Cost	Marked Up Cost
17030276	1 CY, Crawler-mounted, Hydraulic Excavator	834	1,210
17030418	Delivered & Dumped, Backfill with Stone	630	819
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	114	155
33020401	Disposable Materials per Sample	97	125
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	7,689	9,899
33021707	Target Analyte List (TAL) Metals, Soil Analysis	4,058	5,224
33021712	Mercury (SW 7471), with prep, Soil Analysis	385	496
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	1,996	2,569
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	2,380	3,064
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	3,505	4,512
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spec	1,493	1,922
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	1,850	2,381
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	2,380	3,064
33080584	Plastic Laminate Waste Pile Cover	214	291
33170803	Decontaminate Heavy Equipment	603	949
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	119	153
Total Excavation Technology		**28,348**	**36,833**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030276	1 CY, Crawler-mounted, Hydraulic Excavator	140.00	CY	0.00	3.30	2.66	$834.19
17030418	Delivered & Dumped, Backfill with Stone	24.00	BCY	23.92	1.17	1.16	$629.96

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	2.00	DAY	43.14	13.94	0.00	$114.17
33020401	Disposable Materials per Sample	12.00	EA	8.11	0.00	0.00	$97.34
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	12.00	EA	640.77	0.00	0.00	$7,689.28
33021707	Target Analyte List (TAL) Metals, Soil Analysis	12.00	EA	338.19	0.00	0.00	$4,058.29
33021712	Mercury (SW 7471), with prep, Soil Analysis	12.00	EA	32.10	0.00	0.00	$385.16
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	12.00	EA	166.32	0.00	0.00	$1,995.88
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	12.00	EA	198.33	0.00	0.00	$2,379.91
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	12.00	EA	292.08	0.00	0.00	$3,504.96
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	12.00	EA	124.40	0.00	0.00	$1,492.86
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	12.00	EA	154.15	0.00	0.00	$1,849.84
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	12.00	EA	198.33	0.00	0.00	$2,379.91
33080584	Plastic Laminate Waste Pile Cover	1,378.62	SF	0.12	0.04	0.00	$213.82
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	603.33	0.00	$603.33
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	100.00	LF	1.19	0.00	0.00	$118.64
			Total Element Cost				**$28,347.54**
			Total Un Escalated Technology Cost				**$28,347.54**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation** # 5

Comment: Excavation 4, OU 410 Petroleum Spill. Safety Level/Personal Protection Level C.

Assembly		Direct Cost	Marked Up Cost
17030276	1 CY, Crawler-mounted, Hydraulic Excavator	834	1,210
17030418	Delivered & Dumped, Backfill with Stone	630	819
33020401	Disposable Materials per Sample	97	125
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	7,689	9,899
33021707	Target Analyte List (TAL) Metals, Soil Analysis	4,058	5,224
33021712	Mercury (SW 7471), with prep, Soil Analysis	385	496
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	1,996	2,569
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	2,380	3,064
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	3,505	4,512
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spec	1,493	1,922
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	1,850	2,381
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	2,380	3,064
33080584	Plastic Laminate Waste Pile Cover	214	291
33170803	Decontaminate Heavy Equipment	603	949
Total Excavation Technology		**28,115**	**36,525**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030276	1 CY, Crawler-mounted, Hydraulic Excavator	140.00	CY	0.00	3.30	2.66	$834.19
17030418	Delivered & Dumped, Backfill with Stone	24.00	BCY	23.92	1.17	1.16	$629.96
33020401	Disposable Materials per Sample	12.00	EA	8.11	0.00	0.00	$97.34
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	12.00	EA	640.77	0.00	0.00	$7,689.28

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33021707	Target Analyte List (TAL) Metals, Soil Analysis	12.00	EA	338.19	0.00	0.00	$4,058.29
33021712	Mercury (SW 7471), with prep, Soil Analysis	12.00	EA	32.10	0.00	0.00	$385.16
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	12.00	EA	166.32	0.00	0.00	$1,995.88
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	12.00	EA	198.33	0.00	0.00	$2,379.91
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	12.00	EA	292.08	0.00	0.00	$3,504.96
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	12.00	EA	124.40	0.00	0.00	$1,492.86
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	12.00	EA	154.15	0.00	0.00	$1,849.84
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	12.00	EA	198.33	0.00	0.00	$2,379.91
33080584	Plastic Laminate Waste Pile Cover	1,378.62	SF	0.12	0.04	0.00	$213.82
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	603.33	0.00	$603.33
			Total Element Cost				**$28,114.74**
			Total Un Escalated Technology Cost				**$28,114.74**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Load and Haul** **#** 1

Comment:

Onsite waste handling. Movement of Sanitary Landfill content to bulk waste storage and characterization area. 1.3 soil swell factor is used. Safety Level/Personal Protection Level B.

17030226	988, 7.0 CY, Wheel Loader	100,405	137,925
17030289	32 CY, Semi Dump	65,082	102,319
Total Load and Haul Technology		**165,486**	**240,244**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030226	988, 7.0 CY, Wheel Loader	283.00	HR	0.00	97.26	257.53	$100,404.52
17030289	32 CY, Semi Dump	848.00	HR	0.00	76.75	0.00	$65,081.63
			Total Element Cost				**$165,486.15**
			Total Un Escalated Technology Cost				**$165,486.15**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Load and Haul** # 2

Comment:

Movement of soils from overflow pond liner excavation to bulk material storage and characterization area. 1.3 swell factor is used. Safety Level/Personal Protection Level B.

Assembly	Direct Cost	Marked Up Cost
17020401 Dump Charges	200,460	258,063
17030224 966, 4.0 CY, Wheel Loader	14,159	20,102
17030288 26 CY, Semi Dump	73,831	116,074
Total Load and Haul Technology	**288,450**	**394,239**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020401	Dump Charges	13,364.00	CY	15.00	0.00	0.00	$200,460.00
17030224	966, 4.0 CY, Wheel Loader	68.00	HR	0.00	92.13	116.10	$14,159.49
17030288	26 CY, Semi Dump	962.00	HR	0.00	76.75	0.00	$73,830.81
				Total Element Cost			**$288,450.30**
				Total Un Escalated Technology Cost			**$288,450.30**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Load and Haul** **#** 3

Comment:

Movement of crushed thorium drums and soils to bulk waste staging and characterization area. 1.5 bulking factor is used due to perceived high debris content.

Assembly		Direct Cost	Marked Up Cost
17020401	Dump Charges	291,675	375,489
17030224	966, 4.0 CY, Wheel Loader	11,568	16,301
17030288	26 CY, Semi Dump	54,994	86,460
Total Load and Haul Technology		**358,237**	**478,249**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020401	Dump Charges	19,445.00	CY	15.00	0.00	0.00	$291,675.00
17030224	966, 4.0 CY, Wheel Loader	99.00	HR	0.00	47.19	69.66	$11,567.88
17030288	26 CY, Semi Dump	1,399.00	HR	0.00	39.31	0.00	$54,993.99
			Total Element Cost				**$358,236.87**
			Total Un Escalated Technology Cost				**$358,236.87**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Off-site Transportation and Waste Disposal** # 1

Technology: **Off-site Transportation and Waste Disposal** # 1

Comment:

Low Level Landfill disposal allowance. Volume based on 3,000,000 bcf that includes the 350,000 cf of thorium drum waste. All waste will be shipped by rail as bulk using 128 cy 54 foot gondola capacity with a 1.3 swell factor for landfill content and 1.5 swell factor for thorium drum waste. Soil density used is 2800 lb/cy to estimate cost. Settlement during shipment may or may not reduce swelled volume, bulk disposal fee calculations by volume require an agreement with disposal company and may be based on compacted volume in their disposal cell sometimes.

Assembly		Direct Cost	Marked Up Cost
33171005	LLW Disposal Charge, Envirocare, UT	26,111,700	33,614,960
33190102	Bulk Solid Hazardous Waste Loading Into Truck	272,711	382,912
33190289	Rail Gondola Transport	16,827,690	21,663,170
33190812	50 to 54 Ft Rail Gondola, 10 Mil Liner, disposable	168,114	216,422
Total Off-site Transportation and Waste Disposal Technology		**43,380,213**	**55,877,464**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33171005	LLW Disposal Charge, Envirocare, UT	3,000,000.00	CF	8.70	0.00	0.00	$26,111,700.00
33190102	Bulk Solid Hazardous Waste Loading Into Truck	111,111.00	CY	0.00	0.95	1.51	$272,710.84
33190289	Rail Gondola Transport	3,111,111.00	CWT	5.41	0.00	0.00	$16,827,688.29
33190812	50 to 54 Ft Rail Gondola, 10 Mil Liner, disposable	1,149.00	EA	146.31	0.00	0.00	$168,113.87
			Total Element Cost				**$43,380,212.99**
			Total Un Escalated Technology Cost				**$43,380,212.99**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: FIELD GUIDANCE; ONSITE LABORATORY # 1

Assembly		Direct Cost	Marked Up Cost
33020341	Alpha, Beta, Gamma Detector Equipment	896	1,154
33021206	Geiger Counter, Gamma Survey, 2 internal energy counter	1,389	1,788
33021232	Survey Meter, General Purpose, G-M detector, Beta/	2,358	3,035
33021419	Alpha, Beta, Gamma, Pancake G-M Detector	383	493
33029913	Mobile Laboratory Trailer, 8' W x 30' L, Rental	88,223	113,574
33029914	Gas Chromatograph, HP5890A, Rental	39,196	50,459
33029915	Mass Spectrometer, HP5970B MD, Rental	74,076	95,361
33029922	Mobilize/Demobilize Laboratory Trailer	16,067	20,684
33029923	Radiological Scintillation Counter	39,249	50,527
33029929	Laboratory Utilities Allowance	5,509	7,092
33029930	Laboratory Expendables Allowance	57,382	73,870
33029931	Electric Laboratory Scales, Purchase	448	576
33220107	Senior Scientist	101,728	307,119
33220109	Staff Scientist	123,002	371,345
Total FIELD GUIDANCE;		549,904	1,097,077

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020341	Alpha, Beta, Gamma Detector Equipment	4.00	EA	224.05	0.00	0.00	$896.22
33021206	Geiger Counter, Gamma Survey, 2 internal energy compensated G-M tubes	24.00	MO	57.86	0.00	0.00	$1,388.72
33021232	Survey Meter, General Purpose, G-M detector, Beta/Gamma	24.00	MO	98.23	0.00	0.00	$2,357.59
33021419	Alpha, Beta, Gamma, Pancake G-M Detector	24.00	MO	15.97	0.00	0.00	$383.24
33029913	Mobile Laboratory Trailer, 8' W x	24.00	MO	3,675.95	0.00	0.00	$88,222.73

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

30' L, Rental

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33029914	Gas Chromatograph, HP5890A, Rental	12.00	MO	3,266.34	0.00	0.00	$39,196.10
33029915	Mass Spectrometer, HP5970B MD, Rental	12.00	MO	6,172.97	0.00	0.00	$74,075.59
33029922	Mobilize/Demobilize Laboratory Trailer	4.00	EA	4,016.71	0.00	0.00	$16,066.85
33029923	Radiological Scintillation Counter	12.00	MO	3,270.75	0.00	0.00	$39,249.01
33029929	Laboratory Utilities Allowance	24.00	MO	229.53	0.00	0.00	$5,508.64
33029930	Laboratory Expendables Allowance	5,000.00	EA	11.48	0.00	0.00	$57,381.50
33029931	Electric Laboratory Scales, Purchase	2.00	EA	223.79	0.00	0.00	$447.58
33220107	Senior Scientist	1,760.00	HR	0.00	57.80	0.00	$101,728.18
33220109	Staff Scientist	3,520.00	HR	0.00	34.94	0.00	$123,002.18
			Total Element Cost				**$549,904.12**
			Total Un Escalated Technology Cost				**$549,904.12**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Demolition, Catch Basins/Manholes** **#** **1**

Comment:

Allowance for electrical manholes identified on Magnetometer survey maps.

Assembly		Direct Cost	Marked Up Cost
17020306	Remove Catch Basin/Manhole	1,325	2,017
17020401	Dump Charges	348	448
17030220	910, 1.25 CY, Wheel Loader	78	114
17030284	8 CY, Dump Truck	79	124
17030420	Backfill Trench, Borrow Material, Delivered & Dump	159	215
Total Demolition, Catch Basins/Manholes Technology		**1,989**	**2,918**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020306	Remove Catch Basin/Manhole	23.20	CY	0.00	46.56	10.57	$1,325.46
17020401	Dump Charges	23.20	CY	15.00	0.00	0.00	$348.00
17030220	910, 1.25 CY, Wheel Loader	1.00	HR	0.00	47.19	30.56	$77.75
17030284	8 CY, Dump Truck	2.00	HR	0.00	39.31	0.00	$78.62
17030420	Backfill Trench, Borrow Material, Delivered & Dumped Only	23.20	CY	5.25	1.60	0.00	$159.06
			Total Element Cost				**$1,988.88**
			Total Un Escalated Technology Cost				**$1,988.88**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Fencing#** 1

Comment: Installation of construction area exclusion fencing.

Assembly	Direct Cost	Marked Up Cost
18040105 Boundary Fence, 5' Galvanized	30,924	44,256
18040501 Hazardous Waste Signing	1,414	2,119
Total Fencing Technology	**32,337**	**46,375**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
18040105	Boundary Fence, 5' Galvanized	4,300.00	LF	1.49	3.54	2.16	$30,923.88
18040501	Hazardous Waste Signing	22.00	EA	16.55	47.70	0.00	$1,413.54
			Total Element Cost				**$32,337.42**
			Total Un Escalated Technology Cost				**$32,337.42**

Technology: **Demolition, Fencing** # 1

Comment: Removal of construction area exclusion fencing.

Assembly	Direct Cost	Marked Up Cost
17020225 Remove Chain-link Fence	10,587	16,644
17020401 Dump Charges	7,740	9,964
17030221 916, 1.5 CY, Wheel Loader	768	1,114
17030285 12 CY, Dump Truck	1,140	1,792
Total Demolition, Fencing Technology	**20,235**	**29,514**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020225	Remove Chain-link Fence	4,300.00	LF	0.00	2.46	0.00	$10,586.60
17020401	Dump Charges	516.00	CY	15.00	0.00	0.00	$7,740.00
17030221	916, 1.5 CY, Wheel Loader	9.00	HR	0.00	47.19	38.19	$768.37
17030285	12 CY, Dump Truck	29.00	HR	0.00	39.31	0.00	$1,139.98
			Total Element Cost				**$20,234.95**
			Total Un Escalated Technology Cost				**$20,234.95**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Bulk Material Storage** **#** 1

Comment: Waste handling and characterization area. Asphalt pavement to provide a semi impervious surface. Area will also be available for storage of existing clean cover material and 500,000 cf of clean excavated material. 8,210,000 cf / 27 = 30,410 cy.

Assembly		Direct Cost	Marked Up Cost
17030102	Rough Grading, 12G, 1 Pass	55,966	78,625
17030105	Fine Grading, Hand	19,138	30,088
17030106	Fine Grading, 12G, 2 Passes	28,326	40,631
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes De	16,670	22,531
18020301	Asphalt Pavement - 10" Subgrade, 9" Base, 1 1/2" T	493,932	699,739
33080504	Herbicide Application	3,959	5,831
33080507	Clay 10E-7, 6" Lifts, Off-Site	504,668	708,656
Total Bulk Material Storage Technology		**1,122,659**	**1,586,101**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030102	Rough Grading, 12G, 1 Pass	54,842.00	SY	0.00	0.40	0.62	$55,966.26
17030105	Fine Grading, Hand	4,485.00	SY	0.00	4.27	0.00	$19,137.94
17030106	Fine Grading, 12G, 2 Passes	54,842.00	SY	0.00	0.26	0.26	$28,325.89
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	1,633.00	CY	5.56	2.20	2.44	$16,669.83
18020301	Asphalt Pavement - 10" Subgrade, 9" Base, 1 1/2" Topping	14,500.00	SY	6.62	14.97	12.48	$493,932.35
33080504	Herbicide Application	11.33	ACRE	57.95	224.70	66.80	$3,959.26
33080507	Clay 10E-7, 6" Lifts, Off-Site	17,497.42	CY	6.69	11.40	10.75	$504,667.58
				Total Element Cost			**$1,122,659.12**
				Total Un Escalated Technology Cost			**$1,122,659.12**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Demolition, Pavements** # 1

Comment: Demolition of pavement temporarily used to construct material storage area. Assume haul to South Dayton area for recycling. 12.5 miles

Assembly		Direct Cost	Marked Up Cost
17020201	Demolish Bituminous Road with Power Equipment	64,982	97,735
17030224	966, 4.0 CY, Wheel Loader	2,220	3,128
17030288	26 CY, Semi Dump	5,975	9,394
Total Demolition, Pavements Technology		**73,177**	**110,257**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020201	Demolish Bituminous Road with Power Equipment	2,419.75	CY	0.00	20.16	6.69	$64,981.66
17030224	966, 4.0 CY, Wheel Loader	19.00	HR	0.00	47.19	69.66	$2,220.10
17030288	26 CY, Semi Dump	152.00	HR	0.00	39.31	0.00	$5,975.04
			Total Element Cost				**$73,176.80**
			Total Un Escalated Technology Cost				**$73,176.80**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Demolition, Pavements** **# 2**

Comment:

Demolition of existing pavement within OU 1 boundary, 65,000 sf. Assume haul to South Dayton area for recycling. 12.5 miles

17020201	Demolish Bituminous Road with Power Equipment	32,325	48,618
17020401	Dump Charges	27,083	34,866
17030222	926, 2.0 CY, Wheel Loader	3,084	4,457
17030287	20 CY, Semi Dump	2,791	4,388
Total Demolition, Pavements Technology		**65,283**	**92,329**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020201	Demolish Bituminous Road with Power Equipment	1,203.70	CY	0.00	20.16	6.69	$32,325.00
17020401	Dump Charges	1,805.56	CY	15.00	0.00	0.00	$27,083.40
17030222	926, 2.0 CY, Wheel Loader	35.00	HR	0.00	47.19	40.93	$3,083.97
17030287	20 CY, Semi Dump	71.00	HR	0.00	39.31	0.00	$2,790.97
			Total Element Cost				**$65,283.35**
			Total Un Escalated Technology Cost				**$65,283.35**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: Demolition, Underground Pipes # 1

Assembly		Direct Cost	Marked Up Cost
17020401	Dump Charges	99	127
17020601	Remove 4" Diameter Steel-welded Connections, Not	10,142	15,265
17030220	910, 1.25 CY, Wheel Loader	78	114
17030259	Cat 225, 1.5 CY, Soil/Sand, Trenching	346	499
17030284	8 CY, Dump Truck	39	62
17030401	950, 3.00 CY, Backfill with Excavated Material	487	695
17030420	Backfill Trench, Borrow Material, Delivered & Dump	40	54
17030511	Compact Soil with Vibrating Plate	1,698	2,652
Total Demolition, Underground Pipes Technology		**12,928**	**19,468**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020401	Dump Charges	6.57	CY	15.00	0.00	0.00	$98.55
17020601	Remove 4" Diameter Steel-welded Connections, Not Including Excavation	1,000.00	LF	0.00	7.65	2.49	$10,141.90
17030220	910, 1.25 CY, Wheel Loader	1.00	HR	0.00	47.19	30.56	$77.75
17030259	Cat 225, 1.5 CY, Soil/Sand, Trenching	345.68	CY	0.00	0.53	0.47	$345.99
17030284	8 CY, Dump Truck	1.00	HR	0.00	39.31	0.00	$39.31
17030401	950, 3.00 CY, Backfill with Excavated Material	345.68	CY	0.00	0.67	0.74	$486.75
17030420	Backfill Trench, Borrow Material, Delivered & Dumped Only	5.81	CY	5.25	1.60	0.00	$39.83
17030511	Compact Soil with Vibrating Plate	345.68	CY	0.00	4.73	0.19	$1,698.19
			Total Element Cost				**$12,928.27**
			Total Un Escalated Technology Cost				**$12,928.27**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Parking Lots** # 1

Comment: Temporary parking area to be removed during job site demobilization.

Assembly		Direct Cost	Marked Up Cost
17030102	Rough Grading, 12G, 1 Pass	969	1,354
17030107	Fine Grading, 120G, 2 Passes	316	450
17030203	Roadway Soil Excavation, with Scraper, Load & Haul	1,291	1,901
17030501	Compact Subgrade, 2 Lifts	167	238
17030510	Dry Roll Gravel, Steel Roller	1,055	1,572
18010102	Gravel, Delivered & Dumped	6,521	8,601
Total Parking Lots Technology		**10,319**	**14,117**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030102	Rough Grading, 12G, 1 Pass	1,320.00	SY	0.00	0.27	0.47	$968.88
17030107	Fine Grading, 120G, 2 Passes	1,320.00	SY	0.00	0.11	0.13	$316.01
17030203	Roadway Soil Excavation, with Scraper, Load & Haul Spoil	270.37	CY	0.00	3.03	1.74	$1,290.96
17030501	Compact Subgrade, 2 Lifts	337.96	CY	0.00	0.23	0.27	$167.39
17030510	Dry Roll Gravel, Steel Roller	1,216.67	SY	0.00	0.61	0.26	$1,054.61
18010102	Gravel, Delivered & Dumped	270.37	CY	19.93	2.61	1.58	$6,521.41
			Total Element Cost				**$10,319.26**
			Total Un Escalated Technology Cost				**$10,319.26**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Groundwater Monitoring Well** **#** 1

Comment: Allowance for 6 groundwater monitoring wells. Water table is at or around 40 feet plus a 10 foot screened interval. 4" PVC wells are budgeted for.

Assembly		Direct Cost	Marked Up Cost
33020303	Organic Vapor Analyzer Rental, per Day	444	571
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	7,689	9,899
33021707	Target Analyte List (TAL) Metals, Soil Analysis	4,058	5,224
33021712	Mercury (SW 7471), with prep, Soil Analysis	385	496
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	1,996	2,569
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	2,380	3,064
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	3,505	4,512
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spec	1,493	1,922
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	1,850	2,381
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	2,380	3,064
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment	437	562
33220112	Field Technician	1,799	5,432
33230101	2" PVC, Schedule 40, Well Casing	2,689	3,713
33230201	2" PVC, Schedule 40, Well Screen	934	1,283
33230301	2" PVC, Well Plug	123	168

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Cost Summary Report

Assembly		Direct Cost	Marked Up Cost
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 f	8,486	11,805
33231173	Split Spoon Sampling	2,860	3,979
33231182	Furnish 55 Gallon Drum for Drill Cuttings & Develo	1,219	1,570
33231401	2" Screen, Filter Pack	823	1,123
33231811	2" Well, Portland Cement Grout	234	301
33232101	2" Well, Bentonite Seal	255	350
General Aquifers			
33010101	Mobilize/DeMobilize Drilling Rig & Crew	3,034	4,220
33231504	Surface Pad, Concrete, 2' x 2' x 4"	894	1,333
33232301	5' Guard Posts, Cast Iron, Concrete Fill	1,648	2,430
Total Groundwater Monitoring Well Technology		**51,614**	**71,972**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020303	Organic Vapor Analyzer Rental, per Day	4.00	DAY	110.88	0.00	0.00	$443.53
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	12.00	EA	640.77	0.00	0.00	$7,689.28
33021707	Target Analyte List (TAL) Metals, Soil Analysis	12.00	EA	338.19	0.00	0.00	$4,058.29
33021712	Mercury (SW 7471), with prep, Soil Analysis	12.00	EA	32.10	0.00	0.00	$385.16
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	12.00	EA	166.32	0.00	0.00	$1,995.88
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	12.00	EA	198.33	0.00	0.00	$2,379.91
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	12.00	EA	292.08	0.00	0.00	$3,504.96
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	12.00	EA	124.40	0.00	0.00	$1,492.86
33022350	Vegetation/Soil/Sediment, Nickel -63, Liq. Scin.	12.00	EA	154.15	0.00	0.00	$1,849.84

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	12.00	EA	198.33	0.00	0.00	$2,379.91
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	4.00	DAY	109.13	0.00	0.00	$436.53
33220112	Field Technician	64.00	HR	0.00	28.11	0.00	$1,799.30
33230101	2" PVC, Schedule 40, Well Casing	240.00	LF	1.09	3.42	6.70	$2,688.67
33230201	2" PVC, Schedule 40, Well Screen	60.00	LF	2.52	4.41	8.64	$933.72
33230301	2" PVC, Well Plug	6.00	EA	5.30	5.12	10.04	$122.83
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	306.00	LF	0.00	9.37	18.36	$8,485.72
33231173	Split Spoon Sampling	66.00	LF	0.00	14.64	28.70	$2,860.42
33231182	Furnish 55 Gallon Drum for Drill Cuttings & Development Water	16.00	EA	76.22	0.00	0.00	$1,219.49
33231401	2" Screen, Filter Pack	72.00	LF	2.83	2.90	5.69	$822.57
33231811	2" Well, Portland Cement Grout	222.00	LF	1.05	0.00	0.00	$233.88
33232101	2" Well, Bentonite Seal	6.00	EA	8.41	11.53	22.60	$255.23
						Total Element Cost	**$46,037.98**

General Aquifers

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	0.00	1,024.84	2,008.94	$3,033.78
33231504	Surface Pad, Concrete, 2' x 2' x 4"	6.00	EA	36.84	106.51	5.66	$894.01
33232301	5' Guard Posts, Cast Iron, Concrete Fill	24.00	EA	23.42	45.18	0.06	$1,647.79
						Total Element Cost	**$5,575.58**
						Total Un Escalated Technology Cost	**$51,613.56**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **WELL ABANDONMENT** # 2

Comment: Grout closed 8 wells up to 100 feet each.

Assembly	Direct Cost	Marked Up Cost
33231823 Well Abandonment, 4" Well	27,810	38,599
Total WELL ABANDONMENT Technology	**27,810**	**38,599**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33231823	Well Abandonment, 4" Well	800.00	LF	1.05	11.39	22.32	$27,809.76
			Total Element Cost				**$27,809.76**
			Total Un Escalated Technology Cost				**$27,809.76**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Capping** **# 1**

Comment:

Beautification Cover, 7 acre cap over entire affected area.. Soil cover compacted and graded to promote site runoff and minimize water infiltration.

Assembly		Direct Cost	Marked Up Cost
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes De	343,257	458,990
18050302	Topsoil, 6" Lifts, On-Site	62,461	86,274
18050402	Seeding, Vegetative Cover	16,041	20,881
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	2,385	3,602
33080513	Drainage Netting, Geotextile Fabric Heat-bonded	2162,721	215,948
Total Capping Technology		**586,865**	**785,695**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	38,689.03	CY	5.56	1.48	1.83	$343,256.82
18050302	Topsoil, 6" Lifts, On-Site	7,296.55	CY	0.01	2.58	5.96	$62,460.66
18050402	Seeding, Vegetative Cover	7.00	ACRE	2,122.60	113.58	55.37	$16,040.84
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	2,422.77	LF	0.05	0.76	0.17	$2,385.22
33080513	Drainage Netting, Geotextile Fabric Heat-bonded 2 Sides	346,732.20	SF	0.40	0.07	0.00	$162,721.42
			Total Element Cost				**$586,864.95**
			Total Un Escalated Technology Cost				**$586,864.95**

Bob Ratzer, Cost Engineer
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Albuquerque, New Mexico

Technology: **Cleanup and Landscaping** **# 1**

Assembly		Direct Cost	Marked Up Cost
17040101	General Area Cleanup	3,117	4,766
18050101	Area Preparation, 67% Level & 33% Slope	790	1,130
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	4,992	6,744
18050408	Fertilizer, Hydro Spread	3,415	4,651
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	4,327	6,440
18050415	Mowing	733	1,113
Total Cleanup and Landscaping Technology		**17,373**	**24,845**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17040101	General Area Cleanup	10.00	ACRE	0.00	262.61	49.07	$3,116.78
18050101	Area Preparation, 67% Level & 33% Slope	10.00	ACRE	0.00	38.07	40.96	$790.31
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	10.00	ACRE	352.34	110.19	36.63	$4,991.61
18050408	Fertilizer, Hydro Spread	20.00	ACRE	94.24	43.39	33.13	$3,415.17
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	80.00	ACRE	3.88	37.68	12.52	$4,326.54
18050415	Mowing	20.00	ACRE	0.00	29.52	7.13	$733.05
			Total Element Cost				**$17,373.45**
			Total Un Escalated Technology Cost				**$17,373.45**

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Technology: **Dewatering (Sludge)** # 1

Comment:

Drying of pond liner clay and sediments, 10,280 bcy.

Assembly		Direct Cost	Marked Up Cost
18020322	8" Structural Slab on Grade	843	1,198
33260101	1" Carbon Steel Piping	273	414
33260702	50' x 6" Brown Gum Rubber, Chemical-resistant, Fle	1,563	2,084
33333014	25 CF Filter Press system w/sludge tanks,pumps,mix	137,838	177,446
Total Dewatering (Sludge) Technology		**140,518**	**181,143**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
18020322	8" Structural Slab on Grade	110.00	SF	3.72	3.59	0.35	$843.12
33260101	1" Carbon Steel Piping	50.00	LF	0.89	4.35	0.23	$273.45
33260702	50' x 6" Brown Gum Rubber, Chemical-resistant, Flexible Hose	1.00	EA	1,311.93	251.56	0.00	$1,563.48
33333014	25 CF Filter Press system w/sludge tanks,pumps,mixers,sludge cart	1.00	EA	137,837.81	0.00	0.00	$137,837.81

Total Element Cost **$140,517.86**

Total Un Escalated Technology Cost **$140,517.86**

Bob Ratzer, Cost Engineer
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Technology: **Residual Waste Management # 1**

Assembly		Direct Cost	Marked Up Cost
33190101	Liquid Loading Into 5,000 Gallon Bulk Tank Truck	1,974	2,983
33190103	Load Drums on Disposal Vehicle	551	815
33190204	Transport 55 Gallon Drums of Hazardous Waste, Max	178	230
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 C	89	115
33190207	Transport Bulk Liquid/Sludge Hazardous Waste, Maxi	268	345
33190317	Waste Stream Evaluation Fee, Not Including 50% Reb	1,251	1,611
33197205	Landfill Nonhazardous Solid Waste, 55 Gallon Drum	1,377	1,773
33197270	Landfill Nonhazardous Solid Bulk Waste by CY	131	169
33197278	Landfill Nonhazardous Nonfuel Liquid/Sludge	28,919	37,229
Total Residual Waste Management Technology		**34,739**	**45,269**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33190101	Liquid Loading Into 5,000 Gallon Bulk Tank Truck	3.00	EA	0.00	511.82	146.12	$1,973.85
33190103	Load Drums on Disposal Vehicle	102.00	EA	0.00	3.56	1.84	$550.90
33190204	Transport 55 Gallon Drums of Hazardous Waste, Max 80 drums (per Mile)	100.00	MI	1.78	0.00	0.00	$178.49
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 CY (per Mile)	50.00	MI	1.78	0.00	0.00	$89.25
33190207	Transport Bulk Liquid/Sludge Hazardous Waste, Maximum 5,000 Gallon (per Mile)	150.00	MI	1.78	0.00	0.00	$267.74
33190317	Waste Stream Evaluation Fee, Not Including 50% Rebate on 1st Shipment	3.00	EA	417.03	0.00	0.00	$1,251.08
33197205	Landfill Nonhazardous Solid Waste, 55 Gallon Drum	102.00	EA	13.50	0.00	0.00	$1,377.00

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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33197270	Landfill Nonhazardous Solid Bulk Waste by CY	1.00	CY	131.30	0.00	0.00	$131.30
33197278	Landfill Nonhazardous Nonfuel Liquid/Sludge	12,100.00	GAL	2.39	0.00	0.00	$28,919.00
			Total Element Cost				**$34,738.59**
			Total Un Escalated Technology Cost				**$34,738.59**

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Technology: **Professional Labor Management # 1**

Professional Labor Percentage

33220138	Project Management Labor Cost	499,111	1,506,821
33220139	Planning Documents Labor Cost	598,933	1,808,185
33220140	Construction Oversight Labor Cost	1,497,332	4,520,463
33220141	Reporting Labor Cost	249,555	753,411
33220142	As-Built Drawings Labor Cost	249,555	753,411
33220143	Public Notice Labor Cost	4,991	15,068
33220144	Site Closure Activities Labor Cost	0	0
33220145	Permitting Labor Cost	499,111	1,506,821
33220146	Responsible Party Labor Cost	0	0
33220147	Reimbursement Claims Preparation Labor Cost	0	0
33220148	Other Labor Cost	0	0
Total Professional Labor Management Technology		**3,598,587**	**10,864,179**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33220138	Project Management Labor Cost	1.00	LS	0.00	499,110.53	0.00	$499,110.53
33220139	Planning Documents Labor Cost	1.00	LS	0.00	598,932.63	0.00	$598,932.63
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	1,497,331.50	0.00	$1,497,331.50
33220141	Reporting Labor Cost	1.00	LS	0.00	249,555.27	0.00	$249,555.27
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	249,555.27	0.00	$249,555.27
33220143	Public Notice Labor Cost	1.00	LS	0.00	4,991.11	0.00	$4,991.11
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220145	Permitting Labor Cost	1.00	LS	0.00	499,110.53	0.00	$499,110.53
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
			Total Element Cost				**$3,598,586.82**
			Total Un Escalated Technology Cost				**$3,598,586.82**

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Technology: STORM WATER CONTROL BERM CONSTRUCTION AND REMOVAL # 3

Assembly		Direct Cost	Marked Up Cost
16019913	950, 3.0 CY Wheel Loader	8,483	12,114
17010706	5 Miles, Semi Dump, Load & Haul Debris	2,575	3,517
17020203	Demolish Bituminous Pavement with Air Equipment	12,410	18,903
17030513	Spread Dumped Borrow & Compact with Roller	2,431	3,461
18010105	Asphalt, Stabilized Base Course	9,048	11,723
Total STORM WATER CONTROL BERM CONSTRUCTION AND REMOVAL		**34,947**	**49,718**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
16019913	950, 3.0 CY Wheel Loader	85.00	HR	0.00	47.19	52.61	$8,483.03
17010706	5 Miles, Semi Dump, Load & Haul Debris	550.00	CY	0.00	1.15	3.53	$2,574.88
17020203	Demolish Bituminous Pavement with Air Equipment	275.00	CY	0.00	37.06	8.07	$12,409.79
17030513	Spread Dumped Borrow & Compact with Roller	4,908.00	CY	0.00	0.23	0.27	$2,430.93
18010105	Asphalt, Stabilized Base Course	275.00	CY	30.57	0.89	1.44	$9,048.11
			Total Element Cost				**$34,946.74**
			Total Un Escalated Technology Cost				**$34,946.74**

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Technology: **Excavation # 6**

Comment:

Excavation 6, Collapse, re grade, and compact 3.7 million bank cubic feet of fill and till material remaining on site. 1.3 swell factor implies handling 4.8 million cubic feet or 178,150 lcy. Personal Protection Level D.

Assembly		Direct Cost	Marked Up Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	407,550	563,315
17030415	Backfill with Excavated Material	735,858	1,108,535
17030418	Delivered & Dumped, Backfill with Stone	215,479	279,359
33170803	Decontaminate Heavy Equipment	405	636
Total Excavation Technology		**1,359,291**	**1,951,845**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	138,185.20	CY	0.00	0.90	2.05	$407,549.62
17030415	Backfill with Excavated Material	158,922.20	CY	0.31	3.53	0.79	$735,857.48
17030418	Delivered & Dumped, Backfill with Stone	8,425.93	BCY	23.92	0.78	0.87	$215,478.83
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	404.67	0.00	$404.67
			Total Element Cost				**$1,359,290.59**
			Total Un Escalated Technology Cost				**$1,359,290.59**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Load and Haul** # 4

Comment:

Allowance to transfer 3,000,000 cf of waste from bulk material storage area to rail loading area. 2,650,000 cf was given a bulking factor of 1.3 and 350,000 cf was giving a bulking factor of 1.5 to be consistent with earlier practice. Safety Level/Personal Protection Level D is lower than that estimated for drivers in the excavation during an uncertain discovery operation.

Assembly	Direct Cost	Marked Up Cost
17030226 988, 7.0 CY, Wheel Loader	110,135	150,379
17030289 32 CY, Semi Dump	63,603	99,994
Total Load and Haul Technology	**173,738**	**250,373**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030226	988, 7.0 CY, Wheel Loader	539.00	HR	0.00	49.81	154.52	$110,135.11	
17030289	32 CY, Semi Dump	1,618.00	HR	0.00	39.31	0.00	$63,602.77	
				Total Element Cost			**$173,737.88**	
				Total Un Escalated Technology Cost			**$173,737.88**	

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Total Phase 3.2 OU 1 Excavation; Low Level Waste Scenario

Assembly	Direct Cost	Marked Up Cost
Total Site OU 1 Excavation, Low Level Waste Disposal	53,509,640	76,380,250

Removal of Operable Unit 1 at the Mound Plant in Miamisburg, Ohio

Independent Government Cost Estimate

April 19th 2004

Scenario 3.2 "M"

Excavation of Operable Unit 1 Area With Disposal of Thorium Drum Waste as Low Level and Remaining Content as Mixed Waste

Assumptions:

- The entire area of OU-1, including the historic landfill site, the sanitary landfill, and the overflow pond, will be excavated using conventional excavating equipment.
- The excavation boundaries and waste volume will match the four-acre area discussed in the Feasibility Study. A total of 3,000,000 cubic feet (111,000 cubic yards) of soil and debris will be excavated and disposed.
- PRS 11 (buried thorium drums), 69 (overflow pond), 409 (contaminated soil area), and 410 (contaminated soil area) will be included in the excavation, and these costs will be shown as separate items within the total estimate for this scenario.
- Paved roads and existing wells within the footprint of excavation will be removed.
- Costs for disposal of soil and debris will be estimated as Low Level waste for the Thorium drum area and the remainder as all mixed waste. Exceptions necessary for specific waste will be documented in the estimate (e.g., the 350,000 cubic feet of material associated with the thorium drums in PRS 11 will not be able to be disposed as sanitary waste and will instead be disposed as low-level waste in all scenarios).
- The site will be backfilled and re-graded.
- Six monitoring wells will be placed in or near the area of excavation for future groundwater monitoring.
- Required regulatory documentation will be completed.

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Mound OU 1 Parametric Estimate

Folder: Mound

Project

Name: OU 1 Excavation Of OU-1 Area
ID: OU 1
Location: OHIO STATE AVERAGE, OHIO
Modifiers: **Material** 0.9671
Labor 1.2393
Equipment 0.9891
Category: None
Label45
Report Option: Fiscal Year
Description: Excavation of OU 1 contaminated media given the following volumes obtained from discussions. Excavations are separated into 5 areas as requested, the sanitary landfill, PRS 11 (buried thorium drums), PRS 69 (overflow pond), PRS 409 and PRS 410 (both fuel releases). 3 million bank cubic feet will be excavated and disposed of under three scenarios; sanitary, low level and mixed waste. 3.7 million bank cubic feet of fill and till material) used to construct the cell will require regarding.

Site

Name: OU 1 Excavation, Mixed Waste Disposal
ID: 3.2 M
Type: None
Description: Excavation of OU 1 contaminated media given the following volumes obtained from discussions. Excavations are separated into 5 areas as requested, the sanitary landfill, PRS 11 (buried thorium drums), PRS 69 (overflow pond), PRS 409 and PRS 410 (both fuel releases). 3 million bank cubic feet will be excavated and disposed of under this scenario assumes disposal of 2,650,000 bcf as Mixed waste

disposed of under this scenario assumes disposal of 2,650,000 bcf as Mixed waste and 350,000 bcf of thorium waste as low level. An allowance for berm construction and removal to protect the open excavations from storm water runoff is included. 3.7 million bank cubic feet of fill and till material) used to construct the cell will require regarding. The site will receive a vegitated native soil cap.

Phase

Name:	3.2 OU 1 Excavation; Mixed Waste Scenario	**Media/Waste Type:**	Soil
Type:	Remedial Action	**Secondary Media/Waste Type:**	Solids
Labor Rate Group:	System Labor Rate	**Contaminant:**	Volatile Organic Compounds (VOCs)
Analysis Rate Group:	System Analysis Rate	**Secondary Contaminant:**	Low Level Radioactive
Approach:	Ex Situ	**Markup Template:**	System Defaults
Start Date:	3/1/2004	**O&M Markup Template:**	N/A
Description:	Estimate represents the expected value.		

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NNSA Service Center
Albuquerque, New Mexico

Phase Cost Over Time Report (with Markups)

Technology	2004	Total
Decontamination Facilities	$463,733	$463,733
Excavation	$818,959	$818,959
Excavation	$344,164	$344,164
Excavation	$332,739	$332,739
Excavation	$36,833	$36,833
Excavation	$36,525	$36,525
Load and Haul	$240,244	$240,244
Load and Haul	$394,239	$394,239
Load and Haul	$573,558	$573,558
Off-site Transportation and Waste Disposal	$51,541,973	$51,541,973
Off-site Transportation and Waste Disposal	$6,548,895	$6,548,895
FIELD GUIDANCE; ONSITE LAB	$1,097,077	$1,097,077
Demolition, Catch Basins/Manholes	$2,918	$2,918
Fencing	$46,375	$46,375
Demolition, Fencing	$29,514	$29,514
Bulk Material Storage	$1,586,101	$1,586,101
Demolition, Pavements	$110,257	$110,257
Demolition, Pavements	$250,314	$250,314
Demolition, Underground Pipes	$19,468	$19,468
Parking Lots	$14,117	$14,117
Groundwater Monitoring Well	$71,972	$71,972
WELL ABANDONMENT	$38,599	$38,599
Capping	$785,695	$785,695
Cleanup and Landscaping	$24,845	$24,845
Dewatering (Sludge)	$181,143	$181,143
Residual Waste Management	$45,269	$45,269
Professional Labor Management	$11,255,104	$11,255,104
STORM WATER CONTROL BERM CONST & DEMO	$49,718	$49,718
Excavation	$1,951,845	$1,951,845
Load and Haul	$250,373	$250,373
Total Phase Cost	$79,142,566	$79,142,566

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Folder: **Mound**

Project Name: OU 1 Excavation Of OU-1 Area

Project Number: OU 1

Cost Database Date: 2004

Cost Type: User-Defined

Description: Excavation of OU 1 contaminated media given the following volumes obtained from discussions. Excavations are separated into 5 areas as requested, the sanitary landfill, PRS 11 (buried thorium drums), PRS 69 (overflow pond), PRS 409 and PRS 410 (both fuel releases). 3 million bank cubic feet will be excavated and disposed of under three scenarios; sanitary, low level and mixed waste. 3.7 million bank cubic feet of fill and till material) used to construct the cell will require regarding.

Site Name: OU 1 Excavation, Mixed Waste Disposal

Site Number: 3.2 M

Description: Excavation of OU 1 contaminated media given the following volumes obtained from discussions. Excavations are separated into 5 areas as requested, the sanitary landfill, PRS 11 (buried thorium drums), PRS 69 (overflow pond), PRS 409 and PRS 410 (both fuel releases). 3 million bank cubic feet will be excavated and disposed of under this scenario assumes disposal of 2,650,000 bcf as Mixed waste and 350,000 bcf of thorium waste as low level. An allowance for berm construction and removal to protect the open excavations from storm water runoff is included. 3.7 million bank cubic feet of fill and till material) used to construct the cell will require regarding. The site will receive a vegitated native soil cap.

Phase Name: 3.2 OU 1 Excavation; Mixed Waste Scenario

Phase: Remedial Action

Description: Estimate represents the expected value.

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Decontamination Facilities** **#** 1

Comment: Daily crew hygiene and an allowance to clean heavy equipment several times during excavation to support equipment maintenance and final cleaning of equipment prior to transporting it off site. Decontamination pad will not be used as a full time debris cleaning facility so labor hours were cut to reflect equipment decontaminations for maintenance. Safety Level/Personal Protection Level C.

	Assembly	Direct Cost	Marked Up Cost
17030109	Pad Subgrade Preparation	237	340
17030257	Cat 215, 1.0 CY, Soil, Shallow, Trenching	3	5
17030501	Compact Subgrade, 2 Lifts	25	35
17030510	Dry Roll Gravel, Steel Roller	134	200
18010102	Gravel, Delivered & Dumped	384	511
18010103	Gravel (90%) & Sand Base (10%), with Calcium Chlor	392	523
18010203	Asphalt Curb 8" W x 6" H	1,256	1,776
18010310	Prime Coat	35	46
18010312	Asphalt Wearing Course, 1 Pass (Line Item Includes	1,514	2,126
18020203	26" x 26", 5' Deep Area Drain with Grate	3,579	5,179
19020313	5' x 5' x 5' Reinforced Concrete Sump	4,442	6,532
19020604	12" x 12" CIP Concrete In-Ground Trench Drain with	2,635	3,914
19040604	1,500 Gallon Steel Sump, Aboveground with Supports	3,136	4,463
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	204	310
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80	175	253
33080571	40 Mil Polymeric Liner, High-density Polyethylene	501	713
33170818	1,800 PSI Pressure Washer Rental	1,103	1,420
33170821	8' x 24' Decontamination Trailer with 4 Showers,	22,213	28,596
33170823	Operation of Pressure Washer, Including Water,	3,107	4,810
33199921	DOT Steel Drum, 55 Gallon	23,780	30,613
33220112	Field Technician	120,716	364,443
33231306	High Sump Level Switch for Avoiding Overflow	505	735
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	1,637	2,437
33290401	25 GPM, 1 1/2" Discharge, Cast-iron Sump Pump	2,762	3,753
Total Decontamination Facilities Technology		194,475	463,733

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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030109	Pad Subgrade Preparation	35.56	CY	0.00	3.34	3.32	$236.67
17030257	Cat 215, 1.0 CY, Soil, Shallow, Trenching	1.78	CY	0.00	1.03	0.83	$3.31
17030501	Compact Subgrade, 2 Lifts	35.56	CY	0.00	0.34	0.36	$24.76
17030510	Dry Roll Gravel, Steel Roller	106.67	SY	0.00	0.91	0.34	$133.53
18010102	Gravel, Delivered & Dumped	14.81	CY	19.93	3.89	2.10	$383.99
18010103	Gravel (90%) & Sand Base (10%), with Calcium Chloride 3/4 - 1 Lb/CY	14.81	CY	19.89	4.33	2.22	$391.54
18010203	Asphalt Curb 8" W x 6" H	120.00	LF	1.41	4.47	4.59	$1,256.12
18010310	Prime Coat	88.89	SY	0.32	0.06	0.02	$34.76
18010312	Asphalt Wearing Course, 1 Pass (Line Item Includes 5% Waste)	19.33	TON	30.86	31.58	15.88	$1,514.00
18020203	26" x 26", 5' Deep Area Drain with Grate	1.00	EA	1,544.31	2,002.38	32.71	$3,579.40
19020313	5' x 5' x 5' Reinforced Concrete Sump	1.00	EA	1,483.86	2,851.07	107.22	$4,442.15
19020604	12" x 12" CIP Concrete In-Ground Trench Drain with Metal Grate	20.00	LF	39.41	91.58	0.74	$2,634.62
19040604	1,500 Gallon Steel Sump, Aboveground with Supports & Fittings	1.00	EA	1,637.54	1,497.96	0.00	$3,135.51
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	144.00	LF	0.05	1.14	0.23	$203.96
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80 Mil)	106.67	SY	0.69	0.92	0.03	$175.05
33080571	40 Mil Polymeric Liner, High-density Polyethylene	960.00	SF	0.26	0.25	0.01	$501.31
33170818	1,800 PSI Pressure Washer Rental	1.00	MO	1,102.78	0.00	0.00	$1,102.78
33170821	8' x 24' Decontamination Trailer with 4 Showers, HVAC, 2 Sinks	9.00	MO	2,468.14	0.00	0.00	$22,213.22
33170823	Operation of Pressure Washer, Including Water, Soap, Electricity, Labor	40.00	HR	6.56	71.12	0.00	$3,107.27

Bob Ratzer, Cost Engineer
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Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33199921	DOT Steel Drum, 55 Gallon	312.00	EA	76.22	0.00	0.00	$23,780.05
33220112	Field Technician	2,880.00	HR	0.00	41.92	0.00	$120,716.06
33231306	High Sump Level Switch for Avoiding Overflow	1.00	EA	210.05	295.32	0.00	$505.37
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	30.00	LF	15.97	38.59	0.00	$1,636.66
33290401	25 GPM, 1 1/2" Discharge, Cast-iron Sump Pump	1.00	EA	2,071.71	690.75	0.00	$2,762.46
			Total Element Cost				**$194,474.57**
			Total Un Escalated Technology Cost				**$194,474.57**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation** **# 1**

Comment:

Excavation 1, Sanitary Landfill, remove existing cover, content and liner. Safety Level/Personal Protection Level C. The three components sum to the 1.6 million banked cubic feet as verified using the OU-1 feasibility study report and are to be considered the waste volume per discussions (59,259 bcy). Safety Level/Personal Protection Level B.

17030279	4 CY, Crawler-mounted, Hydraulic Excavator	306,184	426,100
17030418	Delivered & Dumped, Backfill with Stone	73,355	95,666
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	1,842	2,527
33020401	Disposable Materials per Sample	487	627
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	38,446	49,494
33021707	Target Analyte List (TAL) Metals, Soil Analysis	20,291	26,122
33021712	Mercury (SW 7471), with prep, Soil Analysis	1,926	2,479
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	9,979	12,847
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	11,900	15,319
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	17,525	22,561
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectr	7,464	9,609
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	9,249	11,907
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	11,900	15,319
33080584	Plastic Laminate Waste Pile Cover	92,311	126,988
33170803	Decontaminate Heavy Equipment	790	1,242
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	119	153
Total Excavation Technology		**603,768**	**818,959**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	59,191.11	CY	0.00	1.76	3.42	$306,183.77

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030418	Delivered & Dumped, Backfill with Stone	2,726.96	BCY	23.92	1.53	1.45	$73,355.22
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	30.00	DAY	43.14	18.25	0.00	$1,841.94
33020401	Disposable Materials per Sample	60.00	EA	8.11	0.00	0.00	$486.70
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	60.00	EA	640.77	0.00	0.00	$38,446.42
33021707	Target Analyte List (TAL) Metals, Soil Analysis	60.00	EA	338.19	0.00	0.00	$20,291.47
33021712	Mercury (SW 7471), with prep, Soil Analysis	60.00	EA	32.10	0.00	0.00	$1,925.78
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	60.00	EA	166.32	0.00	0.00	$9,979.41
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	60.00	EA	198.33	0.00	0.00	$11,899.57
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	60.00	EA	292.08	0.00	0.00	$17,524.82
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	60.00	EA	124.40	0.00	0.00	$7,464.28
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	60.00	EA	154.15	0.00	0.00	$9,249.21
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	60.00	EA	198.33	0.00	0.00	$11,899.57
33080584	Plastic Laminate Waste Pile Cover	551,439.70	SF	0.12	0.05	0.00	$92,311.00
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	790.07	0.00	$790.07
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	100.00	LF	1.19	0.00	0.00	$118.64
			Total Element Cost				**$603,767.85**
			Total Un Escalated Technology Cost				**$603,767.85**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation # 2**

Comment:

Excavation 2, OU 11 Buried Thorium Drums. 350,000 bank cubic feet (12,963 bcy) of low-level waste. Safety Level/Personal Protection Level B.

Assembly		Direct Cost	Marked Up Cost
17030212	Hand Excavation, Sand/Gravel	101,397	159,413
17030278	3 CY, Crawler-mounted, Hydraulic Excavator	54,154	78,056
17030418	Delivered & Dumped, Backfill with Stone	14,687	19,154
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	1,842	2,527
33020401	Disposable Materials per Sample	162	209
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	12,815	16,498
33021707	Target Analyte List (TAL) Metals, Soil Analysis	6,764	8,707
33021712	Mercury (SW 7471), with prep, Soil Analysis	642	826
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	3,326	4,282
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	3,967	5,106
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	5,842	7,520
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectr	2,488	3,203
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	3,083	3,969
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	3,967	5,106
33080584	Plastic Laminate Waste Pile Cover	20,493	28,191
33170803	Decontaminate Heavy Equipment	790	1,242
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	119	153
Total Excavation Technology		**236,538**	**344,164**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030212	Hand Excavation, Sand/Gravel	1,088.77	CY	0.00	93.13	0.00	$101,397.26
17030278	3 CY, Crawler-mounted, Hydraulic Excavator	12,053.33	CY	0.00	2.34	2.15	$54,154.41
17030418	Delivered & Dumped, Backfill with Stone	546.00	BCY	23.92	1.53	1.45	$14,687.40
17031002	2" Diameter 75 GPM Pump	30.00	DAY	43.14	18.25	0.00	$1,841.94

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020401	Disposable Materials per Sample	20.00	EA	8.11	0.00	0.00	$162.23
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	20.00	EA	640.77	0.00	0.00	$12,815.47
33021707	Target Analyte List (TAL) Metals, Soil Analysis	20.00	EA	338.19	0.00	0.00	$6,763.82
33021712	Mercury (SW 7471), with prep, Soil Analysis	20.00	EA	32.10	0.00	0.00	$641.93
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	20.00	EA	166.32	0.00	0.00	$3,326.47
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	20.00	EA	198.33	0.00	0.00	$3,966.52
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	20.00	EA	292.08	0.00	0.00	$5,841.61
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	20.00	EA	124.40	0.00	0.00	$2,488.09
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	20.00	EA	154.15	0.00	0.00	$3,083.07
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	20.00	EA	198.33	0.00	0.00	$3,966.52
33080584	Plastic Laminate Waste Pile Cover	122,418.70	SF	0.12	0.05	0.00	$20,492.89
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	790.07	0.00	$790.07
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	100.00	LF	1.19	0.00	0.00	$118.64
			Total Element Cost				**$236,538.34**
			Total Un Escalated Technology Cost				**$236,538.34**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation** **# 3**

Comment:

Excavation 3, OU 69 Overflow Pond. Dewater and excavate 92,520 square feet of clay pond liner 3 feet thick (10,280 bcy). Dewatering requires pumping 5 million gallons through the outfall. Drying of sludge is estimated in the dewatering model. Safety Level/Personal Protection Level B.

17030278	3 CY, Crawler-mounted, Hydraulic Excavator	47,200	68,033
17030418	Delivered & Dumped, Backfill with Stone	47,100	61,425
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	7,368	10,109
33020401	Disposable Materials per Sample	487	627
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	38,446	49,494
33021707	Target Analyte List (TAL) Metals, Soil Analysis	20,291	26,122
33021712	Mercury (SW 7471), with prep, Soil Analysis	1,926	2,479
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	9,979	12,847
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	11,900	15,319
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	17,525	22,561
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectr	7,464	9,609
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	9,249	11,907
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	11,900	15,319
33080584	Plastic Laminate Waste Pile Cover	18,532	25,494
33170803	Decontaminate Heavy Equipment	790	1,242
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	119	153
Total Excavation Technology		**250,277**	**332,739**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030278	3 CY, Crawler-mounted, Hydraulic Excavator	10,505.56	CY	0.00	2.34	2.15	$47,200.43
17030418	Delivered & Dumped, Backfill with Stone	1,750.93	BCY	23.92	1.53	1.45	$47,100.02
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	120.00	DAY	43.14	18.25	0.00	$7,367.76

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020401	Disposable Materials per Sample	60.00	EA	8.11	0.00	0.00	$486.70
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	60.00	EA	640.77	0.00	0.00	$38,446.42
33021707	Target Analyte List (TAL) Metals, Soil Analysis	60.00	EA	338.19	0.00	0.00	$20,291.47
33021712	Mercury (SW 7471), with prep, Soil Analysis	60.00	EA	32.10	0.00	0.00	$1,925.78
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	60.00	EA	166.32	0.00	0.00	$9,979.41
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	60.00	EA	198.33	0.00	0.00	$11,899.57
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	60.00	EA	292.08	0.00	0.00	$17,524.82
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	60.00	EA	124.40	0.00	0.00	$7,464.28
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	60.00	EA	154.15	0.00	0.00	$9,249.21
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	60.00	EA	198.33	0.00	0.00	$11,899.57
33080584	Plastic Laminate Waste Pile Cover	110,707.70	SF	0.12	0.05	0.00	$18,532.47
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	790.07	0.00	$790.07
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	100.00	LF	1.19	0.00	0.00	$118.64
			Total Element Cost				**$250,276.59**
			Total Un Escalated Technology Cost				**$250,276.59**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation** **# 4**

Comment:

Excavation 4, OU 409 Petroleum Spill. Safety Level/Personal Protection Level C.

Assembly		Direct Cost	Marked Up Cost
17030276	1 CY, Crawler-mounted, Hydraulic Excavator	834	1,210
17030418	Delivered & Dumped, Backfill with Stone	630	819
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	114	155
33020401	Disposable Materials per Sample	97	125
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	7,689	9,899
33021707	Target Analyte List (TAL) Metals, Soil Analysis	4,058	5,224
33021712	Mercury (SW 7471), with prep, Soil Analysis	385	496
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	1,996	2,569
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	2,380	3,064
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	3,505	4,512
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spec	1,493	1,922
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	1,850	2,381
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	2,380	3,064
33080584	Plastic Laminate Waste Pile Cover	214	291
33170803	Decontaminate Heavy Equipment	603	949
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	119	153
Total Excavation Technology		**28,348**	**36,833**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030276	1 CY, Crawler-mounted, Hydraulic Excavator	140.00	CY	0.00	3.30	2.66	$834.19
17030418	Delivered & Dumped, Backfill with Stone	24.00	BCY	23.92	1.17	1.16	$629.96

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	2.00	DAY	43.14	13.94	0.00	$114.17
33020401	Disposable Materials per Sample	12.00	EA	8.11	0.00	0.00	$97.34
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	12.00	EA	640.77	0.00	0.00	$7,689.28
33021707	Target Analyte List (TAL) Metals, Soil Analysis	12.00	EA	338.19	0.00	0.00	$4,058.29
33021712	Mercury (SW 7471), with prep, Soil Analysis	12.00	EA	32.10	0.00	0.00	$385.16
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	12.00	EA	166.32	0.00	0.00	$1,995.88
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	12.00	EA	198.33	0.00	0.00	$2,379.91
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	12.00	EA	292.08	0.00	0.00	$3,504.96
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	12.00	EA	124.40	0.00	0.00	$1,492.86
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	12.00	EA	154.15	0.00	0.00	$1,849.84
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	12.00	EA	198.33	0.00	0.00	$2,379.91
33080584	Plastic Laminate Waste Pile Cover	1,378.62	SF	0.12	0.04	0.00	$213.82
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	603.33	0.00	$603.33
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	100.00	LF	1.19	0.00	0.00	$118.64
			Total Element Cost				**$28,347.54**
			Total Un Escalated Technology Cost				**$28,347.54**

Technology: **Excavation** # 5

Comment: Excavation 4, OU 410 Petroleum Spill. Safety Level/Personal Protection Level C.

Assembly		Direct Cost	Marked Up Cost
17030276	1 CY, Crawler-mounted, Hydraulic Excavator	834	1,210
17030418	Delivered & Dumped, Backfill with Stone	630	819
33020401	Disposable Materials per Sample	97	125
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	7,689	9,899
33021707	Target Analyte List (TAL) Metals, Soil Analysis	4,058	5,224
33021712	Mercury (SW 7471), with prep, Soil Analysis	385	496
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	1,996	2,569
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	2,380	3,064
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	3,505	4,512
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spec	1,493	1,922
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	1,850	2,381
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	2,380	3,064
33080584	Plastic Laminate Waste Pile Cover	214	291
33170803	Decontaminate Heavy Equipment	603	949
Total Excavation Technology		**28,115**	**36,525**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030276	1 CY, Crawler-mounted, Hydraulic Excavator	140.00	CY	0.00	3.30	2.66	$834.19
17030418	Delivered & Dumped, Backfill with Stone	24.00	BCY	23.92	1.17	1.16	$629.96
33020401	Disposable Materials per Sample	12.00	EA	8.11	0.00	0.00	$97.34
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	12.00	EA	640.77	0.00	0.00	$7,689.28

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33021707	Target Analyte List (TAL) Metals, Soil Analysis	12.00	EA	338.19	0.00	0.00	$4,058.29
33021712	Mercury (SW 7471), with prep, Soil Analysis	12.00	EA	32.10	0.00	0.00	$385.16
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	12.00	EA	166.32	0.00	0.00	$1,995.88
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	12.00	EA	198.33	0.00	0.00	$2,379.91
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	12.00	EA	292.08	0.00	0.00	$3,504.96
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	12.00	EA	124.40	0.00	0.00	$1,492.86
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	12.00	EA	154.15	0.00	0.00	$1,849.84
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	12.00	EA	198.33	0.00	0.00	$2,379.91
33080584	Plastic Laminate Waste Pile Cover	1,378.62	SF	0.12	0.04	0.00	$213.82
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	603.33	0.00	$603.33
			Total Element Cost				**$28,114.74**
			Total Un Escalated Technology Cost				**$28,114.74**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Load and Haul** **#** 1

Comment:

Onsite waste handling. Movement of Sanitary Landfill content to bulk waste storage and characterization area. 1.3 soil swell factor is used. Safety Level/Personal Protection Level B.

17030226	988, 7.0 CY, Wheel Loader	100,405	137,925
17030289	32 CY, Semi Dump	65,082	102,319
Total Load and Haul Technology		**165,486**	**240,244**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030226	988, 7.0 CY, Wheel Loader	283.00	HR	0.00	97.26	257.53	$100,404.52
17030289	32 CY, Semi Dump	848.00	HR	0.00	76.75	0.00	$65,081.63
			Total Element Cost				**$165,486.15**
			Total Un Escalated Technology Cost				**$165,486.15**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Load and Haul** # 2

Comment:

Movement of soils from overflow pond liner excavation to bulk material storage and characterization area. 1.3 swell factor is used. Safety Level/Personal Protection Level B.

17020401	Dump Charges	200,460	258,063
17030224	966, 4.0 CY, Wheel Loader	14,159	20,102
17030288	26 CY, Semi Dump	73,831	116,074
Total Load and Haul Technology		**288,450**	**394,239**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020401	Dump Charges	13,364.00	CY	15.00	0.00	0.00	$200,460.00
17030224	966, 4.0 CY, Wheel Loader	68.00	HR	0.00	92.13	116.10	$14,159.49
17030288	26 CY, Semi Dump	962.00	HR	0.00	76.75	0.00	$73,830.81
			Total Element Cost				**$288,450.30**
			Total Un Escalated Technology Cost				**$288,450.30**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Load and Haul** **#** 3

Comment:

Movement of crushed thorium drums and soils to bulk waste staging and characterization area. 1.5 bulking factor is used due to perceived high debris content.

Assembly		Direct Cost	Marked Up Cost
17020401	Dump Charges	291,675	375,489
17030224	966, 4.0 CY, Wheel Loader	11,568	16,301
17030288	26 CY, Semi Dump	54,994	86,460
Total Load and Haul Technology		**358,237**	**478,249**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020401	Dump Charges	19,445.00	CY	15.00	0.00	0.00	$291,675.00
17030224	966, 4.0 CY, Wheel Loader	99.00	HR	0.00	47.19	69.66	$11,567.88
17030288	26 CY, Semi Dump	1,399.00	HR	0.00	39.31	0.00	$54,993.99
				Total Element Cost			**$358,236.87**
				Total Un Escalated Technology Cost			**$358,236.87**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Off-site Transportation and Waste Disposal** **#** 1

Comment:

Mixed Waste Landfill disposal allowance. Volume based on 3,000,000 bcf less 350,000 cf of thorium drum waste. All waste will be shipped by rail as bulk using 128 cy 54 foot gondola capacity 1.3 swell factor and 2800 lb/cy to estimate cost. Mixed waste is being given an allowance for Vapor extraction and catalytic oxidation with off gas carbon filtration determined using a 100,000 lcy treatment estimate done separately to determine the $11.64 /lcy value. treatment. Settlement during shipment may or may not reduce swelled volume, bulk disposal fee calculations by volume require an agreement with disposal company and may be based on compacted volume in their disposal cell sometimes.

Assembly		Direct Cost	Marked Up Cost
33171005	LLW Disposal Charge, Envirocare, UT	23,065,340	29,693,220
33190102	Bulk Solid Hazardous Waste Loading Into Truck	240,899	338,246
33190289	Rail Gondola Transport	14,864,740	19,136,160
33190812	50 to 54 Ft Rail Gondola, 10 Mil Liner, disposable	145,874	187,792
95010101	Mixed Waste; EC-200 5 sample pre shipment profilin	2,501	3,779
95010102	Mixed Waste; EC-0175 Profile Record	57,366	90,189
95010103	Mixed Waste; EC-0650 Radiological Evaluation	57,366	90,189
95010104	Mixed Waste; EC-0500 Physical Properties Evaluation	28,683	45,094
95010105	Mixed Waste; E-100 Rad Shipment and Disposal Recor	28,683	45,094
95010106	Mixed Waste; EPA 8700-22 Uniform Haz Waste Manifest	146	230
95010107	Mixed Waste; Waste Certification Form	0	0
95010108	Mixed Waste; DOE/NRC Form 741	0	0
95010109	Mixed Waste Treatment, Cat Ox and Vapor Extraction	1,485,206	1,911,984
Total Off-site Transportation and Waste Disposal Technology		39,976,800	51,541,971

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33171005	LLW Disposal Charge, Envirocare, UT	2,650,000.00	CF	8.70	0.00	0.00	$23,065,335.00
33190102	Bulk Solid Hazardous Waste loading	98,150.00	CY	0.00	0.95	1.51	$240,899.36

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33190289	Rail Gondola Transport	2,748,200.00	CWT	5.41	0.00	0.00	$14,864,738.98
33190812	50 to 54 Ft Rail Gondola, 10 Mil Liner, disposable	997.00	EA	146.31	0.00	0.00	$145,874.26
95010101	Mixed Waste; EC-200 5 sample pre shipment profiling requirement	5.00	SHIPM	60.00	390.24	50.00	$2,501.22
95010102	Mixed Waste; EC-0175 Profile Record	98.00	MCY	0.00	585.37	0.00	$57,365.86
95010103	Mixed Waste; EC-0650 Radiological Evaluation	98.00	MCY	0.00	585.37	0.00	$57,365.86
95010104	Mixed Waste; EC-0500 Physical Properties Evaluation	98.00	MCY	0.00	292.68	0.00	$28,682.92
95010105	Mixed Waste; E-100 Rad Shipment and Disposal Record	98.00	MCY	0.00	292.68	0.00	$28,682.92
95010106	Mixed Waste; EPA 8700-22 Uniform Haz Waste Manifest	1.00	TRUCK	0.00	146.34	0.00	$146.34
95010107	Mixed Waste; Waste Certification Form	98.00	MCY	0.00	0.00	0.00	$0.00
95010108	Mixed Waste; DOE/NRC Form 741	1.00	EA	0.00	0.00	0.00	$0.00
95010109	Mixed Waste Treatment, Cat Ox and Vapor Extraction	127,595.00	LCY	11.64	0.00	0.00	$1,485,205.80
			Total Element Cost				**$39,976,798.53**
			Total Un Escalated Technology Cost				**$39,976,798.53**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Off-site Transportation and Waste Disposal** # 2

Comment:

Transportation and disposal of the 350,000 bank cf of soil and debris associated with the thorium drums. 1.3 bulking factor assumed for loading of rail gondolas and computation of liner requirements. 54 foot by 8 foot by 8 foot gondola holds 128 lcy. 350,000 bank cf equates to 16,852 loose cy. 132 rail cars.

Assembly		Direct Cost	Marked Up Cost
33171005	LLW Disposal Charge, Envirocare, UT	3,046,365	3,921,746
33190289	Rail Gondola Transport	2,021,425	2,602,286
33190812	50 to 54 Ft Rail Gondola, 10 Mil Liner, disposable	19,313	24,863
Total Off-site Transportation and Waste Disposal Technology		**5,087,103**	**6,548,895**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33171005	LLW Disposal Charge, Envirocare, UT	350,000.00	CF	8.70	0.00	0.00	$3,046,365.00
33190289	Rail Gondola Transport	373,722.00	CWT	5.41	0.00	0.00	$2,021,424.93
33190812	50 to 54 Ft Rail Gondola, 10 Mil Liner, disposable	132.00	EA	146.31	0.00	0.00	$19,313.34
			Total Element Cost				**$5,087,103.27**
			Total Un Escalated Technology Cost				**$5,087,103.27**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **FIELD GUIDANCE; ONSITE LABORATORY** **# 1**

Assembly		Direct Cost	Marked Up Cost
33020341	Alpha, Beta, Gamma Detector Equipment	896	1,154
33021206	Geiger Counter, Gamma Survey, 2 internal energy counter	1,389	1,788
33021232	Survey Meter, General Purpose, G-M detector, Beta/	2,358	3,035
33021419	Alpha, Beta, Gamma, Pancake G-M Detector	383	493
33029913	Mobile Laboratory Trailer, 8' W x 30' L, Rental	88,223	113,574
33029914	Gas Chromatograph, HP5890A, Rental	39,196	50,459
33029915	Mass Spectrometer, HP5970B MD, Rental	74,076	95,361
33029922	Mobilize/Demobilize Laboratory Trailer	16,067	20,684
33029923	Radiological Scintillation Counter	39,249	50,527
33029929	Laboratory Utilities Allowance	5,509	7,092
33029930	Laboratory Expendables Allowance	57,382	73,870
33029931	Electric Laboratory Scales, Purchase	448	576
33220107	Senior Scientist	101,728	307,119
33220109	Staff Scientist	123,002	371,345
Total FIELD GUIDANCE; ONSITE LABORATORY Technology		**549,904**	**1,097,077**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020341	Alpha, Beta, Gamma Detector Equipment	4.00	EA	224.05	0.00	0.00	$896.22
33021206	Geiger Counter, Gamma Survey, 2 internal energy compensated G-M tubes	24.00	MO	57.86	0.00	0.00	$1,388.72
33021232	Survey Meter, General Purpose, G-M detector, Beta/Gamma	24.00	MO	98.23	0.00	0.00	$2,357.59
33021419	Alpha, Beta, Gamma, Pancake G-M Detector	24.00	MO	15.97	0.00	0.00	$383.24
33029913	Mobile Laboratory Trailer, 8' W x 30' L, Rental	24.00	MO	3,675.95	0.00	0.00	$88,222.73

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NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33029914	Gas Chromatograph, HP5890A, Rental	12.00	MO	3,266.34	0.00	0.00	$39,196.10
33029915	Mass Spectrometer, HP5970B MD, Rental	12.00	MO	6,172.97	0.00	0.00	$74,075.59
33029922	Mobilize/Demobilize Laboratory Trailer	4.00	EA	4,016.71	0.00	0.00	$16,066.85
33029923	Radiological Scintillation Counter	12.00	MO	3,270.75	0.00	0.00	$39,249.01
33029929	Laboratory Utilities Allowance	24.00	MO	229.53	0.00	0.00	$5,508.64
33029930	Laboratory Expendables Allowance	5,000.00	EA	11.48	0.00	0.00	$57,381.50
33029931	Electric Laboratory Scales, Purchase	2.00	EA	223.79	0.00	0.00	$447.58
33220107	Senior Scientist	1,760.00	HR	0.00	57.80	0.00	$101,728.18
33220109	Staff Scientist	3,520.00	HR	0.00	34.94	0.00	$123,002.18
			Total Element Cost				**$549,904.12**
			Total Un Escalated Technology Cost				**$549,904.12**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Demolition, Catch Basins/Manholes** **#** 1

Comment:

Allowance for electrical manholes identified on Magnetometer survey maps.

Assembly		Direct Cost	Marked Up Cost
17020306	Remove Catch Basin/Manhole	1,325	2,017
17020401	Dump Charges	348	448
17030220	910, 1.25 CY, Wheel Loader	78	114
17030284	8 CY, Dump Truck	79	124
17030420	Backfill Trench, Borrow Material, Delivered & Dump	159	215
Total Demolition, Catch Basins/Manholes Technology		**1,989**	**2,918**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020306	Remove Catch Basin/Manhole	23.20	CY	0.00	46.56	10.57	$1,325.46
17020401	Dump Charges	23.20	CY	15.00	0.00	0.00	$348.00
17030220	910, 1.25 CY, Wheel Loader	1.00	HR	0.00	47.19	30.56	$77.75
17030284	8 CY, Dump Truck	2.00	HR	0.00	39.31	0.00	$78.62
17030420	Backfill Trench, Borrow Material, Delivered & Dumped Only	23.20	CY	5.25	1.60	0.00	$159.06
				Total Element Cost			**$1,988.88**
				Total Un Escalated Technology Cost			**$1,988.88**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Fencing#** 1

Comment: Installation of construction area exclusion fencing.

Assembly		Direct Cost	Marked Up Cost
18040105	Boundary Fence, 5' Galvanized	30,924	44,256
18040501	Hazardous Waste Signing	1,414	2,119
Total Fencing Technology		**32,337**	**46,375**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
18040105	Boundary Fence, 5' Galvanized	4,300.00	LF	1.49	3.54	2.16	$30,923.88
18040501	Hazardous Waste Signing	22.00	EA	16.55	47.70	0.00	$1,413.54
			Total Element Cost				**$32,337.42**
			Total Un Escalated Technology Cost				**$32,337.42**

Technology: **Demolition, Fencing** **#** 1

Comment: Removal of construction area exclusion fencing.

Assembly		Direct Cost	Marked Up Cost
17020225	Remove Chain-link Fence	10,587	16,644
17020401	Dump Charges	7,740	9,964
17030221	916, 1.5 CY, Wheel Loader	768	1,114
17030285	12 CY, Dump Truck	1,140	1,792
Total Demolition, Fencing Technology		**20,235**	**29,514**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020225	Remove Chain-link Fence	4,300.00	LF	0.00	2.46	0.00	$10,586.60
17020401	Dump Charges	516.00	CY	15.00	0.00	0.00	$7,740.00
17030221	916, 1.5 CY, Wheel Loader	9.00	HR	0.00	47.19	38.19	$768.37
17030285	12 CY, Dump Truck	29.00	HR	0.00	39.31	0.00	$1,139.98
			Total Element Cost				**$20,234.95**
			Total Un Escalated Technology Cost				**$20,234.95**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Bulk Material Storage** **#** 1

Comment: Waste handling and characterization area. Asphalt pavement to provide a semi impervious surface. Area will also be available for storage of existing clean cover material and 500,000 cf of clean excavated material. 8,210,000 cf / 27 = 30,410 cy.

Assembly		Direct Cost	Marked Up Cost
17030102	Rough Grading, 12G, 1 Pass	55,966	78,625
17030105	Fine Grading, Hand	19,138	30,088
17030106	Fine Grading, 12G, 2 Passes	28,326	40,631
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes De	16,670	22,531
18020301	Asphalt Pavement - 10" Subgrade, 9" Base, 1 1/2" T	493,932	699,739
33080504	Herbicide Application	3,959	5,831
33080507	Clay 10E-7, 6" Lifts, Off-Site	504,668	708,656
Total Bulk Material Storage Technology		**1,122,659**	**1,586,101**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030102	Rough Grading, 12G, 1 Pass	54,842.00	SY	0.00	0.40	0.62	$55,966.26
17030105	Fine Grading, Hand	4,485.00	SY	0.00	4.27	0.00	$19,137.94
17030106	Fine Grading, 12G, 2 Passes	54,842.00	SY	0.00	0.26	0.26	$28,325.89
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	1,633.00	CY	5.56	2.20	2.44	$16,669.83
18020301	Asphalt Pavement - 10" Subgrade, 9" Base, 1 1/2" Topping	14,500.00	SY	6.62	14.97	12.48	$493,932.35
33080504	Herbicide Application	11.33	ACRE	57.95	224.70	66.80	$3,959.26
33080507	Clay 10E-7, 6" Lifts, Off-Site	17,497.42	CY	6.69	11.40	10.75	$504,667.58
			Total Element Cost				**$1,122,659.12**
			Total Un Escalated Technology Cost				**$1,122,659.12**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Demolition, Pavements** # 1

Comment: Demolition of pavement temporarily used to construct material storage area. Assume haul to South Dayton area for recycling. 12.5 miles

Assembly		Direct Cost	Marked Up Cost
17020201	Demolish Bituminous Road with Power Equipment	64,982	97,735
17030224	966, 4.0 CY, Wheel Loader	2,220	3,128
17030288	26 CY, Semi Dump	5,975	9,394
Total Demolition, Pavements Technology		**73,177**	**110,257**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020201	Demolish Bituminous Road with Power Equipment	2,419.75	CY	0.00	20.16	6.69	$64,981.66
17030224	966, 4.0 CY, Wheel Loader	19.00	HR	0.00	47.19	69.66	$2,220.10
17030288	26 CY, Semi Dump	152.00	HR	0.00	39.31	0.00	$5,975.04
			Total Element Cost				**$73,176.80**
			Total Un Escalated Technology Cost				**$73,176.80**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Demolition, Pavements** # 2

Comment:

Demolition of existing pavement within OU 1 boundary, 185,000 sf. Assume haul to South Dayton area for recycling. 12.5 miles

Assembly		Direct Cost	Marked Up Cost
17020201	Demolish Bituminous Road with Power Equipment	92,002	138,375
17020401	Dump Charges	77,083	99,233
17030224	966, 4.0 CY, Wheel Loader	3,622	5,104
17030288	26 CY, Semi Dump	4,835	7,602
Total Demolition, Pavements Technology		**177,543**	**250,314**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020201	Demolish Bituminous Road with Power Equipment	3,425.93	CY	0.00	20.16	6.69	$92,002.32
17020401	Dump Charges	5,138.89	CY	15.00	0.00	0.00	$77,083.35
17030224	966, 4.0 CY, Wheel Loader	31.00	HR	0.00	47.19	69.66	$3,622.27
17030288	26 CY, Semi Dump	123.00	HR	0.00	39.31	0.00	$4,835.07
			Total Element Cost				**$177,543.01**
			Total Un Escalated Technology Cost				**$177,543.01**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Demolition, Underground Pipes** **#** 1

Assembly		Direct Cost	Marked Up Cost
17020401	Dump Charges	99	127
17020601	Remove 4" Diameter Steel-welded Connections, Not I	10,142	15,265
17030220	910, 1.25 CY, Wheel Loader	78	114
17030259	Cat 225, 1.5 CY, Soil/Sand, Trenching	346	499
17030284	8 CY, Dump Truck	39	62
17030401	950, 3.00 CY, Backfill with Excavated Material	487	695
17030420	Backfill Trench, Borrow Material, Delivered & Dump	40	54
17030511	Compact Soil with Vibrating Plate	1,698	2,652
Total Demolition, Underground Pipes Technology		**12,928**	**19,468**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020401	Dump Charges	6.57	CY	15.00	0.00	0.00	$98.55
17020601	Remove 4" Diameter Steel-welded Connections, Not Including Excavation	1,000.00	LF	0.00	7.65	2.49	$10,141.90
17030220	910, 1.25 CY, Wheel Loader	1.00	HR	0.00	47.19	30.56	$77.75
17030259	Cat 225, 1.5 CY, Soil/Sand, Trenching	345.68	CY	0.00	0.53	0.47	$345.99
17030284	8 CY, Dump Truck	1.00	HR	0.00	39.31	0.00	$39.31
17030401	950, 3.00 CY, Backfill with Excavated Material	345.68	CY	0.00	0.67	0.74	$486.75
17030420	Backfill Trench, Borrow Material, Delivered & Dumped Only	5.81	CY	5.25	1.60	0.00	$39.83
17030511	Compact Soil with Vibrating Plate	345.68	CY	0.00	4.73	0.19	$1,698.19
			Total Element Cost				**$12,928.27**
			Total Un Escalated Technology Cost				**$12,928.27**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Parking Lots** **# 1**

Comment: Temporary parking area to be removed during job site demobilization.

Assembly		Direct Cost	Marked Up Cost
17030102	Rough Grading, 12G, 1 Pass	969	1,354
17030107	Fine Grading, 120G, 2 Passes	316	450
17030203	Roadway Soil Excavation, with Scraper, Load & Haul	1,291	1,901
17030501	Compact Subgrade, 2 Lifts	167	238
17030510	Dry Roll Gravel, Steel Roller	1,055	1,572
18010102	Gravel, Delivered & Dumped	6,521	8,601
Total Parking Lots Technology		**10,319**	**14,117**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030102	Rough Grading, 12G, 1 Pass	1,320.00	SY	0.00	0.27	0.47	$968.88
17030107	Fine Grading, 120G, 2 Passes	1,320.00	SY	0.00	0.11	0.13	$316.01
17030203	Roadway Soil Excavation, with Scraper, Load & Haul Spoil	270.37	CY	0.00	3.03	1.74	$1,290.96
17030501	Compact Subgrade, 2 Lifts	337.96	CY	0.00	0.23	0.27	$167.39
17030510	Dry Roll Gravel, Steel Roller	1,216.67	SY	0.00	0.61	0.26	$1,054.61
18010102	Gravel, Delivered & Dumped	270.37	CY	19.93	2.61	1.58	$6,521.41
			Total Element Cost				**$10,319.26**
			Total Un Escalated Technology Cost				**$10,319.26**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Groundwater Monitoring Well** # 1

Comment: Allowance for 6 groundwater monitoring wells. Water table is at or around 40 feet plus a 10 foot screened interval. 4" PVC wells are budgeted for.

Assembly		Direct Cost	Marked Up Cost
33020303	Organic Vapor Analyzer Rental, per Day	444	571
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	7,689	9,899
33021707	Target Analyte List (TAL) Metals, Soil Analysis	4,058	5,224
33021712	Mercury (SW 7471), with prep, Soil Analysis	385	496
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	1,996	2,569
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	2,380	3,064
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	3,505	4,512
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spec	1,493	1,922
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	1,850	2,381
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	2,380	3,064
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment	437	562
33220112	Field Technician	1,799	5,432
33230101	2" PVC, Schedule 40, Well Casing	2,689	3,713
33230201	2" PVC, Schedule 40, Well Screen	934	1,283
33230301	2" PVC, Well Plug	123	168

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Cost Summary Report

Assembly		Direct Cost	Marked Up Cost
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 f	8,486	11,805
33231173	Split Spoon Sampling	2,860	3,979
33231182	Furnish 55 Gallon Drum for Drill Cuttings & Develo	1,219	1,570
33231401	2" Screen, Filter Pack	823	1,123
33231811	2" Well, Portland Cement Grout	234	301
33232101	2" Well, Bentonite Seal	255	350
General Aquifers			
33010101	Mobilize/DeMobilize Drilling Rig & Crew	3,034	4,220
33231504	Surface Pad, Concrete, 2' x 2' x 4"	894	1,333
33232301	5' Guard Posts, Cast Iron, Concrete Fill	1,648	2,430
Total Groundwater Monitoring Well Technology		**51,614**	**71,972**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020303	Organic Vapor Analyzer Rental, per Day	4.00	DAY	110.88	0.00	0.00	$443.53
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	12.00	EA	640.77	0.00	0.00	$7,689.28
33021707	Target Analyte List (TAL) Metals, Soil Analysis	12.00	EA	338.19	0.00	0.00	$4,058.29
33021712	Mercury (SW 7471), with prep, Soil Analysis	12.00	EA	32.10	0.00	0.00	$385.16
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	12.00	EA	166.32	0.00	0.00	$1,995.88
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	12.00	EA	198.33	0.00	0.00	$2,379.91
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	12.00	EA	292.08	0.00	0.00	$3,504.96
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	12.00	EA	124.40	0.00	0.00	$1,492.86
33022350	Vegetation/Soil/Sediment, Nickel -63, Liq. Scin.	12.00	EA	154.15	0.00	0.00	$1,849.84

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	12.00	EA	198.33	0.00	0.00	$2,379.91
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	4.00	DAY	109.13	0.00	0.00	$436.53
33220112	Field Technician	64.00	HR	0.00	28.11	0.00	$1,799.30
33230101	2" PVC, Schedule 40, Well Casing	240.00	LF	1.09	3.42	6.70	$2,688.67
33230201	2" PVC, Schedule 40, Well Screen	60.00	LF	2.52	4.41	8.64	$933.72
33230301	2" PVC, Well Plug	6.00	EA	5.30	5.12	10.04	$122.83
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	306.00	LF	0.00	9.37	18.36	$8,485.72
33231173	Split Spoon Sampling	66.00	LF	0.00	14.64	28.70	$2,860.42
33231182	Furnish 55 Gallon Drum for Drill Cuttings & Development Water	16.00	EA	76.22	0.00	0.00	$1,219.49
33231401	2" Screen, Filter Pack	72.00	LF	2.83	2.90	5.69	$822.57
33231811	2" Well, Portland Cement Grout	222.00	LF	1.05	0.00	0.00	$233.88
33232101	2" Well, Bentonite Seal	6.00	EA	8.41	11.53	22.60	$255.23
						Total Element Cost	**$46,037.98**

General Aquifers

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	0.00	1,024.84	2,008.94	$3,033.78
33231504	Surface Pad, Concrete, 2' x 2' x 4"	6.00	EA	36.84	106.51	5.66	$894.01
33232301	5' Guard Posts, Cast Iron, Concrete Fill	24.00	EA	23.42	45.18	0.06	$1,647.79
				Total Element Cost			**$5,575.58**
				Total Un Escalated Technology Cost			**$51,613.56**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **WELL ABANDONMENT** # 2

Comment: Grout closed 8 wells up to 100 feet each.

Assembly	Direct Cost	Marked Up Cost
33231823 Well Abandonment, 4" Well	27,810	38,599
Total WELL ABANDONMENT Technology	**27,810**	**38,599**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33231823	Well Abandonment, 4" Well	800.00	LF	1.05	11.39	22.32	$27,809.76
				Total Element Cost			**$27,809.76**
				Total Un Escalated Technology Cost			**$27,809.76**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Capping** **# 1**

Comment:

Beautification Cover, 7 acre cap over entire affected area.. Soil cover compacted and graded to promote site runoff and minimize water infiltration.

Assembly		Direct Cost	Marked Up Cost
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes De	343,257	458,990
18050302	Topsoil, 6" Lifts, On-Site	62,461	86,274
18050402	Seeding, Vegetative Cover	16,041	20,881
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	2,385	3,602
33080513	Drainage Netting, Geotextile Fabric Heat-bonded	2162,721	215,948
Total Capping Technology		**586,865**	**785,695**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	38,689.03	CY	5.56	1.48	1.83	$343,256.82
18050302	Topsoil, 6" Lifts, On-Site	7,296.55	CY	0.01	2.58	5.96	$62,460.66
18050402	Seeding, Vegetative Cover	7.00	ACRE	2,122.60	113.58	55.37	$16,040.84
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	2,422.77	LF	0.05	0.76	0.17	$2,385.22
33080513	Drainage Netting, Geotextile Fabric Heat-bonded 2 Sides	346,732.20	SF	0.40	0.07	0.00	$162,721.42
				Total Element Cost			**$586,864.95**
				Total Un Escalated Technology Cost			**$586,864.95**

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Technology: **Cleanup and Landscaping** **# 1**

Assembly		Direct Cost	Marked Up Cost
17040101	General Area Cleanup	3,117	4,766
18050101	Area Preparation, 67% Level & 33% Slope	790	1,130
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	4,992	6,744
18050408	Fertilizer, Hydro Spread	3,415	4,651
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	4,327	6,440
18050415	Mowing	733	1,113
Total Cleanup and Landscaping Technology		**17,373**	**24,845**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17040101	General Area Cleanup	10.00	ACRE	0.00	262.61	49.07	$3,116.78
18050101	Area Preparation, 67% Level & 33% Slope	10.00	ACRE	0.00	38.07	40.96	$790.31
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	10.00	ACRE	352.34	110.19	36.63	$4,991.61
18050408	Fertilizer, Hydro Spread	20.00	ACRE	94.24	43.39	33.13	$3,415.17
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	80.00	ACRE	3.88	37.68	12.52	$4,326.54
18050415	Mowing	20.00	ACRE	0.00	29.52	7.13	$733.05
			Total Element Cost				**$17,373.45**
			Total Un Escalated Technology Cost				**$17,373.45**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Dewatering (Sludge)** # 1

Comment:

Drying of pond liner clay and sediments, 10,280 bcy.

Assembly		Direct Cost	Marked Up Cost
18020322	8" Structural Slab on Grade	843	1,198
33260101	1" Carbon Steel Piping	273	414
33260702	50' x 6" Brown Gum Rubber, Chemical-resistant, Fle	1,563	2,084
33333014	25 CF Filter Press system w/sludge tanks,pumps,mix	137,838	177,446
Total Dewatering (Sludge) Technology		**140,518**	**181,143**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
18020322	8" Structural Slab on Grade	110.00	SF	3.72	3.59	0.35	$843.12
33260101	1" Carbon Steel Piping	50.00	LF	0.89	4.35	0.23	$273.45
33260702	50' x 6" Brown Gum Rubber, Chemical-resistant, Flexible Hose	1.00	EA	1,311.93	251.56	0.00	$1,563.48
33333014	25 CF Filter Press system w/sludge tanks,pumps,mixers,sludge cart	1.00	EA	137,837.81	0.00	0.00	$137,837.81

Total Element Cost **$140,517.86**

Total Un Escalated Technology Cost **$140,517.86**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Residual Waste Management # 1**

Assembly		Direct Cost	Marked Up Cost
33190101	Liquid Loading Into 5,000 Gallon Bulk Tank Truck	1,974	2,983
33190103	Load Drums on Disposal Vehicle	551	815
33190204	Transport 55 Gallon Drums of Hazardous Waste, Max	178	230
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 C	89	115
33190207	Transport Bulk Liquid/Sludge Hazardous Waste, Maxi	268	345
33190317	Waste Stream Evaluation Fee, Not Including 50% Reb	1,251	1,611
33197205	Landfill Nonhazardous Solid Waste, 55 Gallon Drum	1,377	1,773
33197270	Landfill Nonhazardous Solid Bulk Waste by CY	131	169
33197278	Landfill Nonhazardous Nonfuel Liquid/Sludge	28,919	37,229
Total Residual Waste Management Technology		**34,739**	**45,269**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33190101	Liquid Loading Into 5,000 Gallon Bulk Tank Truck	3.00	EA	0.00	511.82	146.12	$1,973.85
33190103	Load Drums on Disposal Vehicle	102.00	EA	0.00	3.56	1.84	$550.90
33190204	Transport 55 Gallon Drums of Hazardous Waste, Max 80 drums (per Mile)	100.00	MI	1.78	0.00	0.00	$178.49
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 CY (per Mile)	50.00	MI	1.78	0.00	0.00	$89.25
33190207	Transport Bulk Liquid/Sludge Hazardous Waste, Maximum 5,000 Gallon (per Mile)	150.00	MI	1.78	0.00	0.00	$267.74
33190317	Waste Stream Evaluation Fee, Not Including 50% Rebate on 1st Shipment	3.00	EA	417.03	0.00	0.00	$1,251.08
33197205	Landfill Nonhazardous Solid Waste, 55 Gallon Drum	102.00	EA	13.50	0.00	0.00	$1,377.00

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33197270	Landfill Nonhazardous Solid Bulk Waste by CY	1.00	CY	131.30	0.00	0.00	$131.30
33197278	Landfill Nonhazardous Nonfuel Liquid/Sludge	12,100.00	GAL	2.39	0.00	0.00	$28,919.00
				Total Element Cost			**$34,738.59**
				Total Un Escalated Technology Cost			**$34,738.59**

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Technology: **Professional Labor Management # 1**

Professional Labor Percentage

33220138	Project Management Labor Cost	517,070	1,561,041
33220139	Planning Documents Labor Cost	620,484	1,873,249
33220140	Construction Oversight Labor Cost	1,551,210	4,683,123
33220141	Reporting Labor Cost	258,535	780,520
33220142	As-Built Drawings Labor Cost	258,535	780,520
33220143	Public Notice Labor Cost	5,171	15,610
33220144	Site Closure Activities Labor Cost	0	0
33220145	Permitting Labor Cost	517,070	1,561,041
33220146	Responsible Party Labor Cost	0	0
33220147	Reimbursement Claims Preparation Labor Cost	0	0
33220148	Other Labor Cost	0	0
Total Professional Labor Management Technology		**3,728,075**	**11,255,104**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33220138	Project Management Labor Cost	1.00	LS	0.00	517,070.00	0.00	$517,070.00
33220139	Planning Documents Labor Cost	1.00	LS	0.00	620,484.00	0.00	$620,484.00
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	1,551,210.00	0.00	$1,551,210.00
33220141	Reporting Labor Cost	1.00	LS	0.00	258,535.00	0.00	$258,535.00
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	258,535.00	0.00	$258,535.00
33220143	Public Notice Labor Cost	1.00	LS	0.00	5,170.70	0.00	$5,170.70
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220145	Permitting Labor Cost	1.00	LS	0.00	517,070.00	0.00	$517,070.00
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
			Total Element Cost				**$3,728,074.70**
			Total Un Escalated Technology Cost				**$3,728,074.70**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **STORM WATER CONTROL BERM CONSTRUCTION AND REMOVAL # 3**

Assembly		Direct Cost	Marked Up Cost
16019913	950, 3.0 CY Wheel Loader	8,483	12,114
17010706	5 Miles, Semi Dump, Load & Haul Debris	2,575	3,517
17020203	Demolish Bituminous Pavement with Air Equipment	12,410	18,903
17030513	Spread Dumped Borrow & Compact with Roller	2,431	3,461
18010105	Asphalt, Stabilized Base Course	9,048	11,723
Total STORM WATER CONTROL BERM CONSTRUCTION AND REMOVAL		**34,947**	**49,718**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
16019913	950, 3.0 CY Wheel Loader	85.00	HR	0.00	47.19	52.61	$8,483.03
17010706	5 Miles, Semi Dump, Load & Haul Debris	550.00	CY	0.00	1.15	3.53	$2,574.88
17020203	Demolish Bituminous Pavement with Air Equipment	275.00	CY	0.00	37.06	8.07	$12,409.79
17030513	Spread Dumped Borrow & Compact with Roller	4,908.00	CY	0.00	0.23	0.27	$2,430.93
18010105	Asphalt, Stabilized Base Course	275.00	CY	30.57	0.89	1.44	$9,048.11
			Total Element Cost				**$34,946.74**
			Total Un Escalated Technology Cost				**$34,946.74**

Bob Ratzer, Cost Engineer
NNSA Service Center
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Technology: **Excavation # 6**

Comment:

Excavation 6, Collapse, re grade, and compact 3.7 million bank cubic feet of fill and till material remaining on site.
1.3 swell factor implies handling 4.8 million cubic feet or 178,150 lcy. Personal Protection Level D.

Assembly		Direct Cost	Marked Up Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	407,550	563,315
17030415	Backfill with Excavated Material	735,858	1,108,535
17030418	Delivered & Dumped, Backfill with Stone	215,479	279,359
33170803	Decontaminate Heavy Equipment	405	636
Total Excavation Technology		**1,359,291**	**1,951,845**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	138,185.20	CY	0.00	0.90	2.05	$407,549.62
17030415	Backfill with Excavated Material	158,922.20	CY	0.31	3.53	0.79	$735,857.48
17030418	Delivered & Dumped, Backfill with Stone	8,425.93	BCY	23.92	0.78	0.87	$215,478.83
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	404.67	0.00	$404.67
			Total Element Cost				**$1,359,290.59**
			Total Un Escalated Technology Cost				**$1,359,290.59**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Load and Haul** **# 4**

Comment:

Allowance to transfer 3,000,000 cf of waste from bulk material storage area to rail loading area. 2,650,000 cf was given a bulking factor of 1.3 and 350,000 cf was giving a bulking factor of 1.5 to be consistent with earlier practice. Safety Level/Personal Protection Level D is lower than that estimated for drivers in the excavation during an uncertain discovery operation.

Assembly	Direct Cost	Marked Up Cost
17030226 988, 7.0 CY, Wheel Loader	110,135	150,379
17030289 32 CY, Semi Dump	63,603	99,994
Total Load and Haul Technology	**173,738**	**250,373**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030226	988, 7.0 CY, Wheel Loader	539.00	HR	0.00	49.81	154.52	$110,135.11
17030289	32 CY, Semi Dump	1,618.00	HR	0.00	39.31	0.00	$63,602.77
			Total Element Cost				**$173,737.88**
			Total Un Escalated Technology Cost				**$173,737.88**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Total Phase 3.2 OU 1 Excavation; Mixed Waste Scenario

Assembly	Direct Cost	Marked Up Cost
Total Site OU 1 Excavation, Mixed Waste Disposal	55,435,078	79,142,564

Removal of Operable Unit 1 at the Mound Plant in Miamisburg, Ohio

Independent Government Cost Estimate

April 19th 2004

Scenario 3.2 "S"

Excavation of Operable Unit 1 Area With Disposal of Thorium Drum Waste as Low Level and Remaining Content as Sanitary Waste

Assumptions:

- The entire area of OU-1, including the historic landfill site, the sanitary landfill, and the overflow pond, will be excavated using conventional excavating equipment.
- The excavation boundaries and waste volume will match the four-acre area discussed in the Feasibility Study. A total of 3,000,000 cubic feet (111,000 cubic yards) of soil and debris will be excavated and disposed.
- PRS 11 (buried thorium drums), 69 (overflow pond), 409 (contaminated soil area), and 410 (contaminated soil area) will be included in the excavation, and these costs will be shown as separate items within the total estimate for this scenario.
- Paved roads and existing wells within the footprint of excavation will be removed.
- Costs for disposal of soil and debris will generally be estimated in three ways: 1) all sanitary waste, 2) all mixed waste, and 3) all low-level waste. Exceptions necessary for specific waste will be documented in the estimate (e.g., the 350,000 cubic feet of material associated with the thorium drums in PRS 11 will not be able to be disposed as sanitary waste and will instead be disposed as low-level waste in all scenarios).
- The site will be backfilled and re-graded.
- Six monitoring wells will be placed in or near the area of excavation for future groundwater monitoring.
- Required regulatory documentation will be completed.

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Mound OU 1 Parametric Estimate

Folder: Mound

Project

Name: OU 1 Excavation Of OU-1 Area
ID: OU 1
Location: OHIO STATE AVERAGE, OHIO
Modifiers: **Material** 0.9671
Labor 1.2393
Equipment 0.9891
Category: None
Label45
Report Option: Fiscal Year
Description: Excavation of OU 1 contaminated media given the following volumes obtained from discussions. Excavations are separated into 5 areas as requested, the sanitary landfill, PRS 11 (buried thorium drums), PRS 69 (overflow pond), PRS 409 and PRS 410 (both fuel releases). 3 million bank cubic feet will be excavated and disposed of under three scenarios; sanitary, low level and mixed waste. 3.7 million bank cubic feet of fill and till material) used to construct the cell will require re-grading.

Site

Name: OU 1 Excavation, Sanitary Disposal
ID: 3.2 S
Type: None
Description: Excavation of OU 1 contaminated media given the following volumes obtained from discussions. Excavations are separated into 5 areas as requested, the sanitary landfill, PRS 11 (buried thorium drums), PRS 69 (overflow pond), PRS 409 and PRS 410 (both fuel releases). 3 million bank cubic feet will be excavated, 2,650,000 bcf will be disposed of as sanitary waste and 350,000 bcf as low level. An allowance for berm construction and removal to protect the open excavations from storm water runoff is included. 3.7 million bank cubic feet of fill and till material) used to construct the cell will require re-grading and the site will receive a native soil vegetated cap.

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Phase

Name: 3.2 OU 1 Excavation; Sanitary Waste Scenario
Type: Remedial Action
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate
Approach: Ex Situ
Start Date: 3/1/2004
Description: Estimate represents the expected value.

Media/Waste Type: Soil
Secondary Media/Waste Type: Solids
Contaminant: Volatile Organic Compounds (VOCs)
Secondary Contaminant: Metals
Markup Template: System Defaults
O&M Markup Template: N/A

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Phase Cost Over Time Report
(with Markups)

Technology	2004	Total
Decontamination Facilities	$373,609	$373,609
Excavation	$714,050	$714,050
Excavation	$344,164	$344,164
Excavation	$312,822	$312,822
Excavation	$36,833	$36,833
Excavation	$36,525	$36,525
Load and Haul	$131,363	$131,363
Load and Haul	$328,712	$328,712
Load and Haul	$478,249	$478,249
Off-site Transportation and Waste Disposal	$15,241,190	$15,241,190
Off-site Transportation and Waste Disposal	$6,548,895	$6,548,895
FIELD GUIDANCE; ONSITE Laboratory	$1,097,077	$1,097,077
Demolition, Catch Basins/Manholes	$2,918	$2,918
Fencing	$46,375	$46,375
Demolition, Fencing	$29,514	$29,514
Bulk Material Storage	$1,586,101	$1,586,101
Demolition, Pavements	$110,257	$110,257
Demolition, Pavements	$250,314	$250,314
Demolition, Underground Pipes	$19,468	$19,468
Parking Lots	$14,117	$14,117
Groundwater Monitoring Well	$71,972	$71,972
WELL ABANDONMENT	$38,599	$38,599
Capping	$977,841	$977,841
Cleanup and Landscaping	$24,845	$24,845
Dewatering (Sludge)	$181,143	$181,143
Residual Waste Management	$45,269	$45,269
Professional Labor Management	$5,390,905	$5,390,905
STORM WATER CONTROL BERM CONSTRUCTION AND REMOVAL	$49,718	$49,718
Excavation	$1,951,845	$1,951,845
Load and Haul	$39,842	$39,842
Total Phase Cost	$36,117,300	$36,117,300

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Cost Report by Activity

Folder: Mound

Project Name: OU 1 Excavation Of OU-1 Area

Project Number: OU 1

Cost Database Date: 2004

Cost Type: User-Defined

Description: Excavation of OU 1 contaminated media given the following volumes obtained from discussions. Excavations are separated into 5 areas as requested, the sanitary landfill, PRS 11 (buried thorium drums), PRS 69 (overflow pond), PRS 409 and PRS 410 (both fuel releases). 3 million bank cubic feet will be excavated and disposed of under three scenarios; sanitary, low level and mixed waste. 3.7 million bank cubic feet of fill and till material) used to construct the cell will require regarding.

Site Name: OU 1 Excavation, Sanitary Disposal

Site Number: 3.2 S

Description: Excavation of OU 1 contaminated media given the following volumes obtained from discussions. Excavations are separated into 5 areas as requested, the sanitary landfill, PRS 11 (buried thorium drums), PRS 69 (overflow pond), PRS 409 and PRS 410 (both fuel releases). 3 million bank cubic feet will be excavated, 2,650,000 bcf will be disposed of as sanitary waste and 350,000 bcf as low level. An allowance for berm construction and removal to protect the open excavations from storm water runoff is included. 3.7 million bank cubic feet of fill and till material) used to construct the cell will require re-grading and the site will receive a native soil vegetated cap.

Phase Name: 3.2 OU 1 Excavation; Sanitary Waste Scenario

Phase: Remedial Action

Description: Estimate represents the expected value.

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Decontamination Facilities** # 1

Comment:

Daily crew hygiene and an allowance to clean heavy equipment several times during excavation to support equipment maintenance and final cleaning of equipment prior to transporting it off site.

Assembly		Direct Cost	Marked Up Cost
17030109	Pad Subgrade Preparation	168	240
17030257	Cat 215, 1.0 CY, Soil, Shallow, Trenching	2	3
17030501	Compact Subgrade, 2 Lifts	18	25
17030510	Dry Roll Gravel, Steel Roller	92	138
18010102	Gravel, Delivered & Dumped	357	471
18010103	Gravel (90%) & Sand Base (10%), with Calcium Chloride	362	479
18010203	Asphalt Curb 8" W x 6" H	942	1,320
18010310	Prime Coat	33	43
18010312	Asphalt Wearing Course, 1 Pass (Line Item Includes	1,236	1,711
18020203	26" x 26", 5' Deep Area Drain with Grate	2,912	4,131
19020313	5' x 5' x 5' Reinforced Concrete Sump	3,477	5,021
19020604	12" x 12" CIP Concrete In-Ground Trench Drain	2,028	2,961
19040604	1,500 Gallon Steel Sump, Aboveground with Supports	2,642	3,688
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	142	214
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80	142	201
33080571	40 Mil Polymeric Liner, High-density Polyethylene	420	586
33170818	1,800 PSI Pressure Washer Rental	1,103	1,420
33170821	8' x 24' Decontamination Trailer with 4 Showers	22,213	28,596
33170823	Operation of Pressure Washer, Including Water	2,171	3,338
33199921	DOT Steel Drum, 55 Gallon	5,945	7,653
33220112	Field Technician	101,210	305,556
33231306	High Sump Level Switch for Avoiding Overflow	408	582
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	1,255	1,837
33290401	25 GPM, 1 1/2" Discharge, Cast-iron Sump Pump	2,535	3,395
	Total Decontamination Facilities Technology	**151,813**	**373,609**

Bob Ratzer, Cost Engineer
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Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030109	Pad Subgrade Preparation	35.56	CY	0.00	2.24	2.49	$168.10
17030257	Cat 215, 1.0 CY, Soil, Shallow, Trenching	1.78	CY	0.00	0.69	0.62	$2.34
17030501	Compact Subgrade, 2 Lifts	35.56	CY	0.00	0.23	0.27	$17.61
17030510	Dry Roll Gravel, Steel Roller	106.67	SY	0.00	0.61	0.26	$92.46
18010102	Gravel, Delivered & Dumped	14.81	CY	19.93	2.61	1.58	$357.22
18010103	Gravel (90%) & Sand Base (10%), with Calcium Chloride 3/4 - 1 Lb/CY	14.81	CY	19.89	2.90	1.67	$362.20
18010203	Asphalt Curb 8" W x 6" H	120.00	LF	1.41	3.00	3.44	$941.80
18010310	Prime Coat	88.89	SY	0.32	0.04	0.01	$32.68
18010312	Asphalt Wearing Course, 1 Pass (Line Item Includes 5% Waste)	19.33	TON	30.86	21.18	11.91	$1,236.24
18020203	26" x 26", 5' Deep Area Drain with Grate	1.00	EA	1,544.31	1,343.06	24.53	$2,911.90
19020313	5' x 5' x 5' Reinforced Concrete Sump	1.00	EA	1,483.86	1,912.30	80.42	$3,476.58
19020604	12" x 12" CIP Concrete In-Ground Trench Drain with Metal Grate	20.00	LF	39.41	61.43	0.56	$2,027.80
19040604	1,500 Gallon Steel Sump, Aboveground with Supports & Fittings	1.00	EA	1,637.54	1,004.73	0.00	$2,642.27
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	144.00	LF	0.05	0.76	0.17	$141.77
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80 Mil)	106.67	SY	0.69	0.62	0.02	$141.87
33080571	40 Mil Polymeric Liner, High-density Polyethylene	960.00	SF	0.26	0.17	0.01	$419.71
33170818	1,800 PSI Pressure Washer Rental	1.00	MO	1,102.78	0.00	0.00	$1,102.78
33170821	8' x 24' Decontamination Trailer with 4 Showers, HVAC, 2 Sinks	9.00	MO	2,468.14	0.00	0.00	$22,213.22
33170823	Operation of Pressure Washer, Including Water, Soap, Electricity, Labor	40.00	HR	6.56	47.70	0.00	$2,170.60

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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33199921	DOT Steel Drum, 55 Gallon	78.00	EA	76.22	0.00	0.00	$5,945.01
33220112	Field Technician	3,600.00	HR	0.00	28.11	0.00	$101,210.40
33231306	High Sump Level Switch for Avoiding Overflow	1.00	EA	210.05	198.08	0.00	$408.13
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	30.00	LF	15.97	25.88	0.00	$1,255.49
33290401	25 GPM, 1 1/2" Discharge, Cast-iron Sump Pump	1.00	EA	2,071.71	463.31	0.00	$2,535.02
			Total Element Cost				**$151,813.24**
			Total Un Escalated Technology Cost				**$151,813.24**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation** **#** 1

Comment:

Excavation 1, Sanitary Landfill, remove existing cover, content and liner. The three components sum to the 1.6 million banked cubic feet as verified using the OU-1 feasibility study report and are to be considered the waste volume per discussions (59,259 bcy). Safety Level/Personal Protection Level C.

Assembly		Direct Cost	Marked Up Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	241,162	334,929
17030418	Delivered & Dumped, Backfill with Stone	71,578	93,088
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	1,713	2,324
33020401	Disposable Materials per Sample	487	627
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	38,446	49,494
33021707	Target Analyte List (TAL) Metals, Soil Analysis	20,291	26,122
33021712	Mercury (SW 7471), with prep, Soil Analysis	1,926	2,479
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	9,979	12,847
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	11,900	15,319
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	17,525	22,561
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spec	7,464	9,609
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	9,249	11,907
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	11,900	15,319
33080584	Plastic Laminate Waste Pile Cover	85,528	116,325
33170803	Decontaminate Heavy Equipment	603	949
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	119	153
Total Excavation Technology		**529,870**	**714,050**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	59,191.11	CY	0.00	1.34	2.73	$241,162.34
17030418	Delivered & Dumped, Backfill with Stone	2,726.96	BCY	23.92	1.17	1.16	$71,577.79
17031002	2" Diameter Contractor's Trash Pump 75gpm	30.00	DAY	43.14	13.94	0.00	$1,712.51

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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020401	Disposable Materials per Sample	60.00	EA	8.11	0.00	0.00	$486.70
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	60.00	EA	640.77	0.00	0.00	$38,446.42
33021707	Target Analyte List (TAL) Metals, Soil Analysis	60.00	EA	338.19	0.00	0.00	$20,291.47
33021712	Mercury (SW 7471), with prep, Soil Analysis	60.00	EA	32.10	0.00	0.00	$1,925.78
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	60.00	EA	166.32	0.00	0.00	$9,979.41
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	60.00	EA	198.33	0.00	0.00	$11,899.57
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	60.00	EA	292.08	0.00	0.00	$17,524.82
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	60.00	EA	124.40	0.00	0.00	$7,464.28
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	60.00	EA	154.15	0.00	0.00	$9,249.21
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	60.00	EA	198.33	0.00	0.00	$11,899.57
33080584	Plastic Laminate Waste Pile Cover	551,439.70	SF	0.12	0.04	0.00	$85,528.30
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	603.33	0.00	$603.33
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	100.00	LF	1.19	0.00	0.00	$118.64
			Total Element Cost				**$529,870.10**
			Total Un Escalated Technology Cost				**$529,870.10**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation # 2**

Comment:

Excavation 2, OU 11 Buried Thorium Drums. 350,000 bank cubic feet (12,963 bcy) of low-level waste. Safety Level/Personal Protection Level B.

Assembly		Direct Cost	Marked Up Cost
17030212	Hand Excavation, Sand/Gravel	101,397	159,413
17030278	3 CY, Crawler-mounted, Hydraulic Excavator	54,154	78,056
17030418	Delivered & Dumped, Backfill with Stone	14,687	19,154
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	1,842	2,527
33020401	Disposable Materials per Sample	162	209
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	12,815	16,498
33021707	Target Analyte List (TAL) Metals, Soil Analysis	6,764	8,707
33021712	Mercury (SW 7471), with prep, Soil Analysis	642	826
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	3,326	4,282
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	3,967	5,106
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	5,842	7,520
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectr	2,488	3,203
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	3,083	3,969
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	3,967	5,106
33080584	Plastic Laminate Waste Pile Cover	20,493	28,191
33170803	Decontaminate Heavy Equipment	790	1,242
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	119	153
Total Excavation Technology		**236,538**	**344,164**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030212	Hand Excavation, Sand/Gravel	1,088.77	CY	0.00	93.13	0.00	$101,397.26
17030278	3 CY, Crawler-mounted, Hydraulic Excavator	12,053.33	CY	0.00	2.34	2.15	$54,154.41
17030418	Delivered & Dumped, Backfill with Stone	546.00	BCY	23.92	1.53	1.45	$14,687.40
17031002	2" Diameter 75 GPM Pump	30.00	DAY	43.14	18.25	0.00	$1,841.94

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NNSA Service Center
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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020401	Disposable Materials per Sample	20.00	EA	8.11	0.00	0.00	$162.23
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	20.00	EA	640.77	0.00	0.00	$12,815.47
33021707	Target Analyte List (TAL) Metals, Soil Analysis	20.00	EA	338.19	0.00	0.00	$6,763.82
33021712	Mercury (SW 7471), with prep, Soil Analysis	20.00	EA	32.10	0.00	0.00	$641.93
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	20.00	EA	166.32	0.00	0.00	$3,326.47
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	20.00	EA	198.33	0.00	0.00	$3,966.52
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	20.00	EA	292.08	0.00	0.00	$5,841.61
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	20.00	EA	124.40	0.00	0.00	$2,488.09
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	20.00	EA	154.15	0.00	0.00	$3,083.07
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	20.00	EA	198.33	0.00	0.00	$3,966.52
33080584	Plastic Laminate Waste Pile Cover	122,418.70	SF	0.12	0.05	0.00	$20,492.89
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	790.07	0.00	$790.07
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	100.00	LF	1.19	0.00	0.00	$118.64
				Total Element Cost			**$236,538.34**
				Total Un Escalated Technology Cost			**$236,538.34**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation** # 3

Comment:

Excavation 3, OU 69 Overflow Pond. Dewater and excavate 92,520 square feet of clay pond liner 3 feet thick (10,280 bcy). Dewatering requires pumping 5 million gallons through the outfall. Drying of sludge is estimated in the dewatering model. Safety Level/Personal Protection Level C.

Assembly		Direct Cost	Marked Up Cost
17030278	3 CY, Crawler-mounted, Hydraulic Excavator	36,865	53,019
17030418	Delivered & Dumped, Backfill with Stone	45,959	59,770
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	6,850	9,295
33020401	Disposable Materials per Sample	487	627
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	38,446	49,494
33021707	Target Analyte List (TAL) Metals, Soil Analysis	20,291	26,122
33021712	Mercury (SW 7471), with prep, Soil Analysis	1,926	2,479
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	9,979	12,847
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	11,900	15,319
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	17,525	22,561
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spec	7,464	9,609
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	9,249	11,907
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	11,900	15,319
33080584	Plastic Laminate Waste Pile Cover	17,171	23,353
33170803	Decontaminate Heavy Equipment	603	949
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	119	153
Total Excavation Technology		**236,734**	**312,822**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030278	3 CY, Crawler-mounted, Hydraulic Excavator	10,505.56	CY	0.00	1.79	1.72	$36,865.06
17030418	Delivered & Dumped, Backfill with Stone	1,750.93	BCY	23.92	1.17	1.16	$45,958.76
17031002	2" Diameter 75 GPM Pump	120.00	DAY	43.14	13.94	0.00	$6,850.03

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NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020401	Disposable Materials per Sample	60.00	EA	8.11	0.00	0.00	$486.70
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	60.00	EA	640.77	0.00	0.00	$38,446.42
33021707	Target Analyte List (TAL) Metals, Soil Analysis	60.00	EA	338.19	0.00	0.00	$20,291.47
33021712	Mercury (SW 7471), with prep, Soil Analysis	60.00	EA	32.10	0.00	0.00	$1,925.78
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	60.00	EA	166.32	0.00	0.00	$9,979.41
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	60.00	EA	198.33	0.00	0.00	$11,899.57
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	60.00	EA	292.08	0.00	0.00	$17,524.82
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	60.00	EA	124.40	0.00	0.00	$7,464.28
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	60.00	EA	154.15	0.00	0.00	$9,249.21
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	60.00	EA	198.33	0.00	0.00	$11,899.57
33080584	Plastic Laminate Waste Pile Cover	110,707.70	SF	0.12	0.04	0.00	$17,170.76
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	603.33	0.00	$603.33
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	100.00	LF	1.19	0.00	0.00	$118.64
			Total Element Cost				**$236,733.79**
			Total Un Escalated Technology Cost				**$236,733.79**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation** # 4

Comment:

Excavation 4, OU 409 Petroleum Spill. Safety Level/Personal Protection Level C.

Assembly		Direct Cost	Marked Up Cost
17030276	1 CY, Crawler-mounted, Hydraulic Excavator	834	1,210
17030418	Delivered & Dumped, Backfill with Stone	630	819
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	114	155
33020401	Disposable Materials per Sample	97	125
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	7,689	9,899
33021707	Target Analyte List (TAL) Metals, Soil Analysis	4,058	5,224
33021712	Mercury (SW 7471), with prep, Soil Analysis	385	496
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	1,996	2,569
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	2,380	3,064
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	3,505	4,512
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spec	1,493	1,922
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	1,850	2,381
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	2,380	3,064
33080584	Plastic Laminate Waste Pile Cover	214	291
33170803	Decontaminate Heavy Equipment	603	949
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	119	153
Total Excavation Technology		**28,348**	**36,833**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030276	1 CY, Crawler-mounted, Hydraulic Excavator	140.00	CY	0.00	3.30	2.66	$834.19
17030418	Delivered & Dumped, Backfill with Stone	24.00	BCY	23.92	1.17	1.16	$629.96

Bob Ratzer, Cost Engineer
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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17031002	2" Diameter Contractor's Trash Pump, 75 GPM	2.00	DAY	43.14	13.94	0.00	$114.17
33020401	Disposable Materials per Sample	12.00	EA	8.11	0.00	0.00	$97.34
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	12.00	EA	640.77	0.00	0.00	$7,689.28
33021707	Target Analyte List (TAL) Metals, Soil Analysis	12.00	EA	338.19	0.00	0.00	$4,058.29
33021712	Mercury (SW 7471), with prep, Soil Analysis	12.00	EA	32.10	0.00	0.00	$385.16
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	12.00	EA	166.32	0.00	0.00	$1,995.88
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	12.00	EA	198.33	0.00	0.00	$2,379.91
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	12.00	EA	292.08	0.00	0.00	$3,504.96
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	12.00	EA	124.40	0.00	0.00	$1,492.86
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	12.00	EA	154.15	0.00	0.00	$1,849.84
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	12.00	EA	198.33	0.00	0.00	$2,379.91
33080584	Plastic Laminate Waste Pile Cover	1,378.62	SF	0.12	0.04	0.00	$213.82
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	603.33	0.00	$603.33
33260550	2" Polyethylene, flexible piping, SDR15, 125 psi	100.00	LF	1.19	0.00	0.00	$118.64
				Total Element Cost			**$28,347.54**
				Total Un Escalated Technology Cost			**$28,347.54**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Excavation** # 5

Comment: Excavation 4, OU 410 Petroleum Spill. Safety Level/Personal Protection Level C.

Assembly		Direct Cost	Marked Up Cost
17030276	1 CY, Crawler-mounted, Hydraulic Excavator	834	1,210
17030418	Delivered & Dumped, Backfill with Stone	630	819
33020401	Disposable Materials per Sample	97	125
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	7,689	9,899
33021707	Target Analyte List (TAL) Metals, Soil Analysis	4,058	5,224
33021712	Mercury (SW 7471), with prep, Soil Analysis	385	496
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	1,996	2,569
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	2,380	3,064
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	3,505	4,512
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spec	1,493	1,922
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	1,850	2,381
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	2,380	3,064
33080584	Plastic Laminate Waste Pile Cover	214	291
33170803	Decontaminate Heavy Equipment	603	949
Total Excavation Technology		**28,115**	**36,525**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030276	1 CY, Crawler-mounted, Hydraulic Excavator	140.00	CY	0.00	3.30	2.66	$834.19
17030418	Delivered & Dumped, Backfill with Stone	24.00	BCY	23.92	1.17	1.16	$629.96
33020401	Disposable Materials per Sample	12.00	EA	8.11	0.00	0.00	$97.34
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	12.00	EA	640.77	0.00	0.00	$7,689.28

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33021707	Target Analyte List (TAL) Metals, Soil Analysis	12.00	EA	338.19	0.00	0.00	$4,058.29
33021712	Mercury (SW 7471), with prep, Soil Analysis	12.00	EA	32.10	0.00	0.00	$385.16
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	12.00	EA	166.32	0.00	0.00	$1,995.88
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	12.00	EA	198.33	0.00	0.00	$2,379.91
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	12.00	EA	292.08	0.00	0.00	$3,504.96
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	12.00	EA	124.40	0.00	0.00	$1,492.86
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scintillation	12.00	EA	154.15	0.00	0.00	$1,849.84
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	12.00	EA	198.33	0.00	0.00	$2,379.91
33080584	Plastic Laminate Waste Pile Cover	1,378.62	SF	0.12	0.04	0.00	$213.82
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	603.33	0.00	$603.33
			Total Element Cost				**$28,114.74**
			Total Un Escalated Technology Cost				**$28,114.74**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Load and Haul** **#** 1

Comment:

Onsite waste handling. Movement of Sanitary Landfill content to bulk waste storage and characterization area. 1.3 soil swell factor is used.

Assembly	Direct Cost	Marked Up Cost
17030226 988, 7.0 CY, Wheel Loader	57,826	78,956
17030289 32 CY, Semi Dump	33,334	52,407
Total Load and Haul Technology	**91,160**	**131,363**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030226	988, 7.0 CY, Wheel Loader	283.00	HR	0.00	49.81	154.52	$57,826.04
17030289	32 CY, Semi Dump	848.00	HR	0.00	39.31	0.00	$33,334.46
			Total Element Cost				**$91,160.50**
			Total Un Escalated Technology Cost				**$91,160.50**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Load and Haul** # 2

Comment:

Movement of soils from overflow pond liner excavation to bulk material storage and characterization area. 1.3 swell factor is used.

Assembly		Direct Cost	Marked Up Cost
17020401	Dump Charges	200,460	258,063
17030224	966, 4.0 CY, Wheel Loader	7,946	11,197
17030288	26 CY, Semi Dump	37,816	59,453
Total Load and Haul Technology		**246,221**	**328,712**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020401	Dump Charges	13,364.00	CY	15.00	0.00	0.00	$200,460.00
17030224	966, 4.0 CY, Wheel Loader	68.00	HR	0.00	47.19	69.66	$7,945.62
17030288	26 CY, Semi Dump	962.00	HR	0.00	39.31	0.00	$37,815.74
			Total Element Cost				**$246,221.36**
			Total Un Escalated Technology Cost				**$246,221.36**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Load and Haul** # 3

Comment:

Movement of crushed thorium drums and soils to bulk waste staging and characterization area. 1.5 bulking factor is used due to perceived high debris content.

Assembly	Direct Cost	Marked Up Cost
17020401 Dump Charges	291,675	375,489
17030224 966, 4.0 CY, Wheel Loader	11,568	16,301
17030288 26 CY, Semi Dump	54,994	86,460
Total Load and Haul Technology	**358,237**	**478,249**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020401	Dump Charges	19,445.00	CY	15.00	0.00	0.00	$291,675.00
17030224	966, 4.0 CY, Wheel Loader	99.00	HR	0.00	47.19	69.66	$11,567.88
17030288	26 CY, Semi Dump	1,399.00	HR	0.00	39.31	0.00	$54,993.99
			Total Element Cost				**$358,236.87**
			Total Un Escalated Technology Cost				**$358,236.87**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Off-site Transportation and Waste Disposal** **#** 1

Comment:

Sanitary Landfill disposal allowance. Volume based on 3,000,000 bcf less 350,000 cf of thorium drum waste. Settlement during shipment may or may not reduce swelled volume, bulk disposal fee calculations by volume require an agreement with disposal company and may be based on compacted volume in their disposal cell sometimes.

Assembly		Direct Cost	Marked Up Cost
33190102	Bulk Solid Hazardous Waste Loading Into Truck	240,899	338,246
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 C	963,632	1,240,534
33190311	Truck Washout/Decontamination	790,799	1,027,046
33197264	Landfill Hazardous Solid Bulk Waste by CY	9,815,000	12,635,370
Total Off-site Transportation and Waste Disposal Technology		**11,810,330**	**15,241,190**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33190102	Bulk Solid Hazardous Waste Loading Into Truck	98,150.00	CY	0.00	0.95	1.51	$240,899.36
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 CY (per Mile)	539,880.00	MI	1.78	0.00	0.00	$963,631.81
33190311	Truck Washout/Decontamination	4,908.00	EA	0.00	0.00	161.12	$790,798.56
33197264	Landfill Hazardous Solid Bulk Waste by CY	98,150.00	CY	100.00	0.00	0.00	$9,815,000.00
				Total Element Cost			**$11,810,329.73**
				Total Un Escalated Technology Cost			**$11,810,329.73**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Off-site Transportation and Waste Disposal** # 2

Comment:

Transportation and disposal of the 350,000 bank cf of soil and debris associated with the thorium drums. 1.3 bulking factor assumed for loading of rail gondolas and computation of liner requirements. 54 foot by 8 foot by 8 foot gondola holds 128 lcy. 350,000 bank cf equates to 16,852 loose cy. 132 rail cars.

Assembly		Direct Cost	Marked Up Cost
33171005	LLW Disposal Charge, Envirocare, UT	3,046,365	3,921,746
33190289	Rail Gondola Transport	2,021,425	2,602,286
33190812	50 to 54 Ft Rail Gondola, 10 Mil Liner, disposable	19,313	24,863
Total Off-site Transportation and Waste Disposal Technology		**5,087,103**	**6,548,895**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33171005	LLW Disposal Charge, Envirocare, UT	350,000.00	CF	8.70	0.00	0.00	$3,046,365.00
33190289	Rail Gondola Transport	373,722.00	CWT	5.41	0.00	0.00	$2,021,424.93
33190812	50 to 54 Ft Rail Gondola, 10 Mil Liner, disposable	132.00	EA	146.31	0.00	0.00	$19,313.34
			Total Element Cost				**$5,087,103.27**
			Total Un Escalated Technology Cost				**$5,087,103.27**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **FIELD GUIDANCE; ONSITE LABORATORY** **# 1**

Assembly		Direct Cost	Marked Up Cost
33020341	Alpha, Beta, Gamma Detector Equipment	896	1,154
33021206	Geiger Counter, Gamma Survey, 2 internal energy counter	1,389	1,788
33021232	Survey Meter, General Purpose, G-M detector, Beta/	2,358	3,035
33021419	Alpha, Beta, Gamma, Pancake G-M Detector	383	493
33029913	Mobile Laboratory Trailer, 8' W x 30' L, Rental	88,223	113,574
33029914	Gas Chromatograph, HP5890A, Rental	39,196	50,459
33029915	Mass Spectrometer, HP5970B MD, Rental	74,076	95,361
33029922	Mobilize/Demobilize Laboratory Trailer	16,067	20,684
33029923	Radiological Scintillation Counter	39,249	50,527
33029929	Laboratory Utilities Allowance	5,509	7,092
33029930	Laboratory Expendables Allowance	57,382	73,870
33029931	Electric Laboratory Scales, Purchase	448	576
33220107	Senior Scientist	101,728	307,119
33220109	Staff Scientist	123,002	371,345
Total FIELD GUIDANCE; ONSITE LABORATORY Technology		**549,904**	**1,097,077**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020341	Alpha, Beta, Gamma Detector Equipment	4.00	EA	224.05	0.00	0.00	$896.22
33021206	Geiger Counter, Gamma Survey, 2 internal energy compensated G-M tubes	24.00	MO	57.86	0.00	0.00	$1,388.72
33021232	Survey Meter, General Purpose, G-M detector, Beta/Gamma	24.00	MO	98.23	0.00	0.00	$2,357.59
33021419	Alpha, Beta, Gamma, Pancake G-M Detector	24.00	MO	15.97	0.00	0.00	$383.24
33029913	Mobile Laboratory Trailer, 8' W x 30' L, Rental	24.00	MO	3,675.95	0.00	0.00	$88,222.73

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33029914	Gas Chromatograph, HP5890A, Rental	12.00	MO	3,266.34	0.00	0.00	$39,196.10
33029915	Mass Spectrometer, HP5970B MD, Rental	12.00	MO	6,172.97	0.00	0.00	$74,075.59
33029922	Mobilize/Demobilize Laboratory Trailer	4.00	EA	4,016.71	0.00	0.00	$16,066.85
33029923	Radiological Scintillation Counter	12.00	MO	3,270.75	0.00	0.00	$39,249.01
33029929	Laboratory Utilities Allowance	24.00	MO	229.53	0.00	0.00	$5,508.64
33029930	Laboratory Expendables Allowance	5,000.00	EA	11.48	0.00	0.00	$57,381.50
33029931	Electric Laboratory Scales, Purchase	2.00	EA	223.79	0.00	0.00	$447.58
33220107	Senior Scientist	1,760.00	HR	0.00	57.80	0.00	$101,728.18
33220109	Staff Scientist	3,520.00	HR	0.00	34.94	0.00	$123,002.18
			Total Element Cost				**$549,904.12**
			Total Un Escalated Technology Cost				**$549,904.12**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Demolition, Catch Basins/Manholes** # 1

Comment:

Allowance for electrical manholes identified on Magnetometer survey maps.

Assembly		Direct Cost	Marked Up Cost
17020306	Remove Catch Basin/Manhole	1,325	2,017
17020401	Dump Charges	348	448
17030220	910, 1.25 CY, Wheel Loader	78	114
17030284	8 CY, Dump Truck	79	124
17030420	Backfill Trench, Borrow Material, Delivered & Dump	159	215
Total Demolition, Catch Basins/Manholes Technology		**1,989**	**2,918**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020306	Remove Catch Basin/Manhole	23.20	CY	0.00	46.56	10.57	$1,325.46
17020401	Dump Charges	23.20	CY	15.00	0.00	0.00	$348.00
17030220	910, 1.25 CY, Wheel Loader	1.00	HR	0.00	47.19	30.56	$77.75
17030284	8 CY, Dump Truck	2.00	HR	0.00	39.31	0.00	$78.62
17030420	Backfill Trench, Borrow Material, Delivered & Dumped Only	23.20	CY	5.25	1.60	0.00	$159.06
			Total Element Cost				**$1,988.88**
			Total Un Escalated Technology Cost				**$1,988.88**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Fencing#** 1

Comment: Installation of construction area exclusion fencing.

Assembly		Direct Cost	Marked Up Cost
18040105	Boundary Fence, 5' Galvanized	30,924	44,256
18040501	Hazardous Waste Signing	1,414	2,119
Total Fencing Technology		**32,337**	**46,375**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
18040105	Boundary Fence, 5' Galvanized	4,300.00	LF	1.49	3.54	2.16	$30,923.88
18040501	Hazardous Waste Signing	22.00	EA	16.55	47.70	0.00	$1,413.54
			Total Element Cost				**$32,337.42**
			Total Un Escalated Technology Cost				**$32,337.42**

Technology: **Demolition, Fencing** **#** 1

Comment: Removal of construction area exclusion fencing.

Assembly		Direct Cost	Marked Up Cost
17020225	Remove Chain-link Fence	10,587	16,644
17020401	Dump Charges	7,740	9,964
17030221	916, 1.5 CY, Wheel Loader	768	1,114
17030285	12 CY, Dump Truck	1,140	1,792
Total Demolition, Fencing Technology		**20,235**	**29,514**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020225	Remove Chain-link Fence	4,300.00	LF	0.00	2.46	0.00	$10,586.60
17020401	Dump Charges	516.00	CY	15.00	0.00	0.00	$7,740.00
17030221	916, 1.5 CY, Wheel Loader	9.00	HR	0.00	47.19	38.19	$768.37
17030285	12 CY, Dump Truck	29.00	HR	0.00	39.31	0.00	$1,139.98
			Total Element Cost				**$20,234.95**
			Total Un Escalated Technology Cost				**$20,234.95**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Bulk Material Storage** **#** 1

Comment: Waste handling and characterization area. Asphalt pavement to provide a semi impervious surface. Area will also be available for storage of existing clean cover material and 500,000 cf of clean excavated material. 8,210,000 cf / 27 = 30,410 cy.

Assembly		Direct Cost	Marked Up Cost
17030102	Rough Grading, 12G, 1 Pass	55,966	78,625
17030105	Fine Grading, Hand	19,138	30,088
17030106	Fine Grading, 12G, 2 Passes	28,326	40,631
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes De	16,670	22,531
18020301	Asphalt Pavement - 10" Subgrade, 9" Base, 1 1/2" T	493,932	699,739
33080504	Herbicide Application	3,959	5,831
33080507	Clay 10E-7, 6" Lifts, Off-Site	504,668	708,656
Total Bulk Material Storage Technology		**1,122,659**	**1,586,101**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030102	Rough Grading, 12G, 1 Pass	54,842.00	SY	0.00	0.40	0.62	$55,966.26
17030105	Fine Grading, Hand	4,485.00	SY	0.00	4.27	0.00	$19,137.94
17030106	Fine Grading, 12G, 2 Passes	54,842.00	SY	0.00	0.26	0.26	$28,325.89
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	1,633.00	CY	5.56	2.20	2.44	$16,669.83
18020301	Asphalt Pavement - 10" Subgrade, 9" Base, 1 1/2" Topping	14,500.00	SY	6.62	14.97	12.48	$493,932.35
33080504	Herbicide Application	11.33	ACRE	57.95	224.70	66.80	$3,959.26
33080507	Clay 10E-7, 6" Lifts, Off-Site	17,497.42	CY	6.69	11.40	10.75	$504,667.58
				Total Element Cost			**$1,122,659.12**
				Total Un Escalated Technology Cost			**$1,122,659.12**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Demolition, Pavements** # 1

Comment: Demolition of pavement temporarily used to construct material storage area. Assume haul to South Dayton area for recycling. 12.5 miles

Assembly		Direct Cost	Marked Up Cost
17020201	Demolish Bituminous Road with Power Equipment	64,982	97,735
17030224	966, 4.0 CY, Wheel Loader	2,220	3,128
17030288	26 CY, Semi Dump	5,975	9,394
Total Demolition, Pavements Technology		**73,177**	**110,257**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020201	Demolish Bituminous Road with Power Equipment	2,419.75	CY	0.00	20.16	6.69	$64,981.66
17030224	966, 4.0 CY, Wheel Loader	19.00	HR	0.00	47.19	69.66	$2,220.10
17030288	26 CY, Semi Dump	152.00	HR	0.00	39.31	0.00	$5,975.04
			Total Element Cost				**$73,176.80**
			Total Un Escalated Technology Cost				**$73,176.80**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Demolition, Pavements** # 2

Comment:

Demolition of existing pavement within OU 1 boundary, 185,000 sf. Assume haul to South Dayton area for recycling. 12.5 miles

Assembly		Direct Cost	Marked Up Cost
17020201	Demolish Bituminous Road with Power Equipment	92,002	138,375
17020401	Dump Charges	77,083	99,233
17030224	966, 4.0 CY, Wheel Loader	3,622	5,104
17030288	26 CY, Semi Dump	4,835	7,602
Total Demolition, Pavements Technology		**177,543**	**250,314**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020201	Demolish Bituminous Road with Power Equipment	3,425.93	CY	0.00	20.16	6.69	$92,002.32
17020401	Dump Charges	5,138.89	CY	15.00	0.00	0.00	$77,083.35
17030224	966, 4.0 CY, Wheel Loader	31.00	HR	0.00	47.19	69.66	$3,622.27
17030288	26 CY, Semi Dump	123.00	HR	0.00	39.31	0.00	$4,835.07
			Total Element Cost				**$177,543.01**
			Total Un Escalated Technology Cost				**$177,543.01**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Demolition, Underground Pipes** # 1

Assembly		Direct Cost	Marked Up Cost
17020401	Dump Charges	99	127
17020601	Remove 4" Diameter Steel-welded Connections, Not I	10,142	15,265
17030220	910, 1.25 CY, Wheel Loader	78	114
17030259	Cat 225, 1.5 CY, Soil/Sand, Trenching	346	499
17030284	8 CY, Dump Truck	39	62
17030401	950, 3.00 CY, Backfill with Excavated Material	487	695
17030420	Backfill Trench, Borrow Material, Delivered & Dump	40	54
17030511	Compact Soil with Vibrating Plate	1,698	2,652
Total Demolition, Underground Pipes Technology		**12,928**	**19,468**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17020401	Dump Charges	6.57	CY	15.00	0.00	0.00	$98.55
17020601	Remove 4" Diameter Steel-welded Connections, Not Including Excavation	1,000.00	LF	0.00	7.65	2.49	$10,141.90
17030220	910, 1.25 CY, Wheel Loader	1.00	HR	0.00	47.19	30.56	$77.75
17030259	Cat 225, 1.5 CY, Soil/Sand, Trenching	345.68	CY	0.00	0.53	0.47	$345.99
17030284	8 CY, Dump Truck	1.00	HR	0.00	39.31	0.00	$39.31
17030401	950, 3.00 CY, Backfill with Excavated Material	345.68	CY	0.00	0.67	0.74	$486.75
17030420	Backfill Trench, Borrow Material, Delivered & Dumped Only	5.81	CY	5.25	1.60	0.00	$39.83
17030511	Compact Soil with Vibrating Plate	345.68	CY	0.00	4.73	0.19	$1,698.19
			Total Element Cost				**$12,928.27**
			Total Un Escalated Technology Cost				**$12,928.27**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Parking Lots** # 1

Comment: Temporary parking area to be removed during job site demobilization.

Assembly		Direct Cost	Marked Up Cost
17030102	Rough Grading, 12G, 1 Pass	969	1,354
17030107	Fine Grading, 120G, 2 Passes	316	450
17030203	Roadway Soil Excavation, with Scraper, Load & Haul	1,291	1,901
17030501	Compact Subgrade, 2 Lifts	167	238
17030510	Dry Roll Gravel, Steel Roller	1,055	1,572
18010102	Gravel, Delivered & Dumped	6,521	8,601
Total Parking Lots Technology		**10,319**	**14,117**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030102	Rough Grading, 12G, 1 Pass	1,320.00	SY	0.00	0.27	0.47	$968.88
17030107	Fine Grading, 120G, 2 Passes	1,320.00	SY	0.00	0.11	0.13	$316.01
17030203	Roadway Soil Excavation, with Scraper, Load & Haul Spoil	270.37	CY	0.00	3.03	1.74	$1,290.96
17030501	Compact Subgrade, 2 Lifts	337.96	CY	0.00	0.23	0.27	$167.39
17030510	Dry Roll Gravel, Steel Roller	1,216.67	SY	0.00	0.61	0.26	$1,054.61
18010102	Gravel, Delivered & Dumped	270.37	CY	19.93	2.61	1.58	$6,521.41
			Total Element Cost				**$10,319.26**
			Total Un Escalated Technology Cost				**$10,319.26**

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Technology: **Groundwater Monitoring Well** # 1

Comment: Allowance for 6 groundwater monitoring wells. Water table is at or around 40 feet plus a 10 foot screened interval. 4" PVC wells are budgeted for.

Assembly		Direct Cost	Marked Up Cost
33020303	Organic Vapor Analyzer Rental, per Day	444	571
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles o	7,689	9,899
33021707	Target Analyte List (TAL) Metals, Soil Analysis	4,058	5,224
33021712	Mercury (SW 7471), with prep, Soil Analysis	385	496
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Anal	1,996	2,569
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil	2,380	3,064
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with pre	3,505	4,512
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spec	1,493	1,922
33022350	Vegetation/Soil/Sediment, Nickel - 63, Liquid Scin	1,850	2,381
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Pluto	2,380	3,064
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment	437	562
33220112	Field Technician	1,799	5,432
33230101	2" PVC, Schedule 40, Well Casing	2,689	3,713
33230201	2" PVC, Schedule 40, Well Screen	934	1,283
33230301	2" PVC, Well Plug	123	168

Bob Ratzer, Cost Engineer
NNSA Service Center
Albuquerque, New Mexico

Cost Summary Report

Assembly		Direct Cost	Marked Up Cost
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 f	8,486	11,805
33231173	Split Spoon Sampling	2,860	3,979
33231182	Furnish 55 Gallon Drum for Drill Cuttings & Develo	1,219	1,570
33231401	2" Screen, Filter Pack	823	1,123
33231811	2" Well, Portland Cement Grout	234	301
33232101	2" Well, Bentonite Seal	255	350
General Aquifers			
33010101	Mobilize/DeMobilize Drilling Rig & Crew	3,034	4,220
33231504	Surface Pad, Concrete, 2' x 2' x 4"	894	1,333
33232301	5' Guard Posts, Cast Iron, Concrete Fill	1,648	2,430
Total Groundwater Monitoring Well Technology		**51,614**	**71,972**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33020303	Organic Vapor Analyzer Rental, per Day	4.00	DAY	110.88	0.00	0.00	$443.53
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	12.00	EA	640.77	0.00	0.00	$7,689.28
33021707	Target Analyte List (TAL) Metals, Soil Analysis	12.00	EA	338.19	0.00	0.00	$4,058.29
33021712	Mercury (SW 7471), with prep, Soil Analysis	12.00	EA	32.10	0.00	0.00	$385.16
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	12.00	EA	166.32	0.00	0.00	$1,995.88
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	12.00	EA	198.33	0.00	0.00	$2,379.91
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	12.00	EA	292.08	0.00	0.00	$3,504.96
33022344	Vegetation/Soil/Sediment, Lead - 210, Gamma Spectroscopy	12.00	EA	124.40	0.00	0.00	$1,492.86
33022350	Vegetation/Soil/Sediment, Nickel -63, Liq. Scin.	12.00	EA	154.15	0.00	0.00	$1,849.84

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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33022354	Vegetation/Soil/Sediment, Plutonium Isotopic/Plutonium 241, Alpha Spectroscopy	12.00	EA	198.33	0.00	0.00	$2,379.91
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	4.00	DAY	109.13	0.00	0.00	$436.53
33220112	Field Technician	64.00	HR	0.00	28.11	0.00	$1,799.30
33230101	2" PVC, Schedule 40, Well Casing	240.00	LF	1.09	3.42	6.70	$2,688.67
33230201	2" PVC, Schedule 40, Well Screen	60.00	LF	2.52	4.41	8.64	$933.72
33230301	2" PVC, Well Plug	6.00	EA	5.30	5.12	10.04	$122.83
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	306.00	LF	0.00	9.37	18.36	$8,485.72
33231173	Split Spoon Sampling	66.00	LF	0.00	14.64	28.70	$2,860.42
33231182	Furnish 55 Gallon Drum for Drill Cuttings & Development Water	16.00	EA	76.22	0.00	0.00	$1,219.49
33231401	2" Screen, Filter Pack	72.00	LF	2.83	2.90	5.69	$822.57
33231811	2" Well, Portland Cement Grout	222.00	LF	1.05	0.00	0.00	$233.88
33232101	2" Well, Bentonite Seal	6.00	EA	8.41	11.53	22.60	$255.23
						Total Element Cost	**$46,037.98**

General Aquifers

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	0.00	1,024.84	2,008.94	$3,033.78
33231504	Surface Pad, Concrete, 2' x 2' x 4"	6.00	EA	36.84	106.51	5.66	$894.01
33232301	5' Guard Posts, Cast Iron, Concrete Fill	24.00	EA	23.42	45.18	0.06	$1,647.79
				Total Element Cost			**$5,575.58**
				Total Un Escalated Technology Cost			**$51,613.56**

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Technology: **WELL ABANDONMENT** **# 2**

Comment: Grout closed 8 wells up to 100 feet each.

33231823	Well Abandonment, 4" Well	27,810	38,599
Total WELL ABANDONMENT Technology		**27,810**	**38,599**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33231823	Well Abandonment, 4" Well	800.00	LF	1.05	11.39	22.32	$27,809.76
			Total Element Cost				**$27,809.76**
			Total Un Escalated Technology Cost				**$27,809.76**

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Technology: **Capping** **# 1**

Comment:

Beautification Cover, 7 acre cap over entire affected area.. Soil cover compacted and graded to promote site runoff and minimize water infiltration.

17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes De	343,257	458,990
18050301	Topsoil, 6" Lifts, Off-Site	206,419	278,420
18050402	Seeding, Vegetative Cover	16,041	20,881
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	2,385	3,602
33080513	Drainage Netting, Geotextile Fabric Heat-bonded	2162,721	215,948
Total Capping Technology		**730,823**	**977,841**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	38,689.03	CY	5.56	1.48	1.83	$343,256.82
18050301	Topsoil, 6" Lifts, Off-Site	7,296.55	CY	18.77	5.96	3.56	$206,418.66
18050402	Seeding, Vegetative Cover	7.00	ACRE	2,122.60	113.58	55.37	$16,040.84
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	2,422.77	LF	0.05	0.76	0.17	$2,385.22
33080513	Drainage Netting, Geotextile Fabric Heat-bonded 2 Sides	346,732.20	SF	0.40	0.07	0.00	$162,721.42
				Total Element Cost			**$730,822.96**
				Total Un Escalated Technology Cost			**$730,822.96**

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Technology: **Cleanup and Landscaping** # 1

Assembly		Direct Cost	Marked Up Cost
17040101	General Area Cleanup	3,117	4,766
18050101	Area Preparation, 67% Level & 33% Slope	790	1,130
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	4,992	6,744
18050408	Fertilizer, Hydro Spread	3,415	4,651
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	4,327	6,440
18050415	Mowing	733	1,113
Total Cleanup and Landscaping Technology		**17,373**	**24,845**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17040101	General Area Cleanup	10.00	ACRE	0.00	262.61	49.07	$3,116.78
18050101	Area Preparation, 67% Level & 33% Slope	10.00	ACRE	0.00	38.07	40.96	$790.31
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	10.00	ACRE	352.34	110.19	36.63	$4,991.61
18050408	Fertilizer, Hydro Spread	20.00	ACRE	94.24	43.39	33.13	$3,415.17
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	80.00	ACRE	3.88	37.68	12.52	$4,326.54
18050415	Mowing	20.00	ACRE	0.00	29.52	7.13	$733.05
			Total Element Cost				**$17,373.45**
			Total Un Escalated Technology Cost				**$17,373.45**

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NNSA Service Center
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Technology: **Dewatering (Sludge)** # 1

Comment:

Drying of pond liner clay and sediments, 10,280 bcy.

Assembly		Direct Cost	Marked Up Cost
18020322	8" Structural Slab on Grade	843	1,198
33260101	1" Carbon Steel Piping	273	414
33260702	50' x 6" Brown Gum Rubber, Chemical-resistant, Fle	1,563	2,084
33333014	25 CF Filter Press system w/sludge tanks,pumps,mix	137,838	177,446
Total Dewatering (Sludge) Technology		**140,518**	**181,143**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
18020322	8" Structural Slab on Grade	110.00	SF	3.72	3.59	0.35	$843.12
33260101	1" Carbon Steel Piping	50.00	LF	0.89	4.35	0.23	$273.45
33260702	50' x 6" Brown Gum Rubber, Chemical-resistant, Flexible Hose	1.00	EA	1,311.93	251.56	0.00	$1,563.48
33333014	25 CF Filter Press system w/sludge tanks,pumps,mixers,sludge cart	1.00	EA	137,837.81	0.00	0.00	$137,837.81

Total Element Cost **$140,517.86**

Total Un Escalated Technology Cost **$140,517.86**

Bob Ratzer, Cost Engineer
NNSA Service Center
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Technology: **Residual Waste Management # 1**

Assembly		Direct Cost	Marked Up Cost
33190101	Liquid Loading Into 5,000 Gallon Bulk Tank Truck	1,974	2,983
33190103	Load Drums on Disposal Vehicle	551	815
33190204	Transport 55 Gallon Drums of Hazardous Waste, Max	178	230
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 C	89	115
33190207	Transport Bulk Liquid/Sludge Hazardous Waste, Maxi	268	345
33190317	Waste Stream Evaluation Fee, Not Including 50% Reb	1,251	1,611
33197205	Landfill Nonhazardous Solid Waste, 55 Gallon Drum	1,377	1,773
33197270	Landfill Nonhazardous Solid Bulk Waste by CY	131	169
33197278	Landfill Nonhazardous Nonfuel Liquid/Sludge	28,919	37,229
Total Residual Waste Management Technology		**34,739**	**45,269**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33190101	Liquid Loading Into 5,000 Gallon Bulk Tank Truck	3.00	EA	0.00	511.82	146.12	$1,973.85
33190103	Load Drums on Disposal Vehicle	102.00	EA	0.00	3.56	1.84	$550.90
33190204	Transport 55 Gallon Drums of Hazardous Waste, Max 80 drums (per Mile)	100.00	MI	1.78	0.00	0.00	$178.49
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 CY (per Mile)	50.00	MI	1.78	0.00	0.00	$89.25
33190207	Transport Bulk Liquid/Sludge Hazardous Waste, Maximum 5,000 Gallon (per Mile)	150.00	MI	1.78	0.00	0.00	$267.74
33190317	Waste Stream Evaluation Fee, Not Including 50% Rebate on 1st Shipment	3.00	EA	417.03	0.00	0.00	$1,251.08
33197205	Landfill Nonhazardous Solid Waste, 55 Gallon Drum	102.00	EA	13.50	0.00	0.00	$1,377.00

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Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33197270	Landfill Nonhazardous Solid Bulk Waste by CY	1.00	CY	131.30	0.00	0.00	$131.30
33197278	Landfill Nonhazardous Nonfuel Liquid/Sludge	12,100.00	GAL	2.39	0.00	0.00	$28,919.00
				Total Element Cost			**$34,738.59**
				Total Un Escalated Technology Cost			**$34,738.59**

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Technology: **Professional Labor Management # 1**

Technology: **Professional Labor Management** **# 1**

Professional Labor Percentage

33220138	Project Management Labor Cost	346,754	1,046,854
33220139	Planning Documents Labor Cost	329,416	994,511
33220140	Construction Oversight Labor Cost	693,507	2,093,707
33220141	Reporting Labor Cost	86,688	261,713
33220142	As-Built Drawings Labor Cost	86,688	261,713
33220143	Public Notice Labor Cost	3,468	10,469
33220144	Site Closure Activities Labor Cost	0	0
33220145	Permitting Labor Cost	173,377	523,427
33220146	Responsible Party Labor Cost	0	0
33220147	Reimbursement Claims Preparation Labor Cost	0	0
33220148	Other Labor Cost	0	0
Total Professional Labor Management Technology		**1,719,898**	**5,192,394**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
33220138	Project Management Labor Cost	1.00	LS	0.00	346,753.66	0.00	$346,753.66
33220139	Planning Documents Labor Cost	1.00	LS	0.00	329,415.97	0.00	$329,415.97
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	693,507.31	0.00	$693,507.31
33220141	Reporting Labor Cost	1.00	LS	0.00	86,688.41	0.00	$86,688.41
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	86,688.41	0.00	$86,688.41
33220143	Public Notice Labor Cost	1.00	LS	0.00	3,467.54	0.00	$3,467.54
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220145	Permitting Labor Cost	1.00	LS	0.00	173,376.83	0.00	$173,376.83
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	$0.00
			Total Element Cost				**$1,719,898.13**
			Total Un Escalated Technology Cost				**$1,719,898.13**

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Technology: STORM WATER CONTROL BERM CONSTRUCTION AND REMOVAL # 3

Assembly		Direct Cost	Marked Up Cost
16019913	950, 3.0 CY Wheel Loader	8,483	12,114
17010706	5 Miles, Semi Dump, Load & Haul Debris	2,575	3,517
17020203	Demolish Bituminous Pavement with Air Equipment	12,410	18,903
17030513	Spread Dumped Borrow & Compact with Roller	2,431	3,461
18010105	Asphalt, Stabilized Base Course	9,048	11,723
Total STORM WATER CONTROL BERM CONSTRUCTION AND REMOVAL		**34,947**	**49,718**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
16019913	950, 3.0 CY Wheel Loader	85.00	HR	0.00	47.19	52.61	$8,483.03
17010706	5 Miles, Semi Dump, Load & Haul Debris	550.00	CY	0.00	1.15	3.53	$2,574.88
17020203	Demolish Bituminous Pavement with Air Equipment	275.00	CY	0.00	37.06	8.07	$12,409.79
17030513	Spread Dumped Borrow & Compact with Roller	4,908.00	CY	0.00	0.23	0.27	$2,430.93
18010105	Asphalt, Stabilized Base Course	275.00	CY	30.57	0.89	1.44	$9,048.11
			Total Element Cost				**$34,946.74**
			Total Un Escalated Technology Cost				**$34,946.74**

Bob Ratzer, Cost Engineer
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Technology: **Excavation # 6**

Comment:

Excavation 6, Collapse, re grade, and compact 3.7 million bank cubic feet of fill and till material remaining on site. 1.3 swell factor implies handling 4.8 million cubic feet or 178,150 lcy.. Personal Protection Level D.

Assembly		Direct Cost	Marked Up Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	407,550	563,315
17030415	Backfill with Excavated Material	735,858	1,108,535
17030418	Delivered & Dumped, Backfill with Stone	215,479	279,359
33170803	Decontaminate Heavy Equipment	405	636
Total Excavation Technology		**1,359,291**	**1,951,845**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	138,185.20	CY	0.00	0.90	2.05	$407,549.62
17030415	Backfill with Excavated Material	158,922.20	CY	0.31	3.53	0.79	$735,857.48
17030418	Delivered & Dumped, Backfill with Stone	8,425.93	BCY	23.92	0.78	0.87	$215,478.83
33170803	Decontaminate Heavy Equipment	1.00	EA	0.00	404.67	0.00	$404.67
			Total Element Cost				**$1,359,290.59**
			Total Un Escalated Technology Cost				**$1,359,290.59**

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Technology: **Load and Haul** # 4

Comment:

Load and haul 350,000 cf of thorium drum waste to rail loading point. 1.5 bulking factor used.

Assembly	Direct Cost	Marked Up Cost
17030224 966, 4.0 CY, Wheel Loader	16,125	22,723
17030288 26 CY, Semi Dump	10,889	17,119
Total Load and Haul Technology	**27,014**	**39,842**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
17030224	966, 4.0 CY, Wheel Loader	138.00	HR	0.00	47.19	69.66	$16,124.93
17030288	26 CY, Semi Dump	277.00	HR	0.00	39.31	0.00	$10,888.73
			Total Element Cost				**$27,013.66**
			Total Un Escalated Technology Cost				**$27,013.66**

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NNSA Service Center
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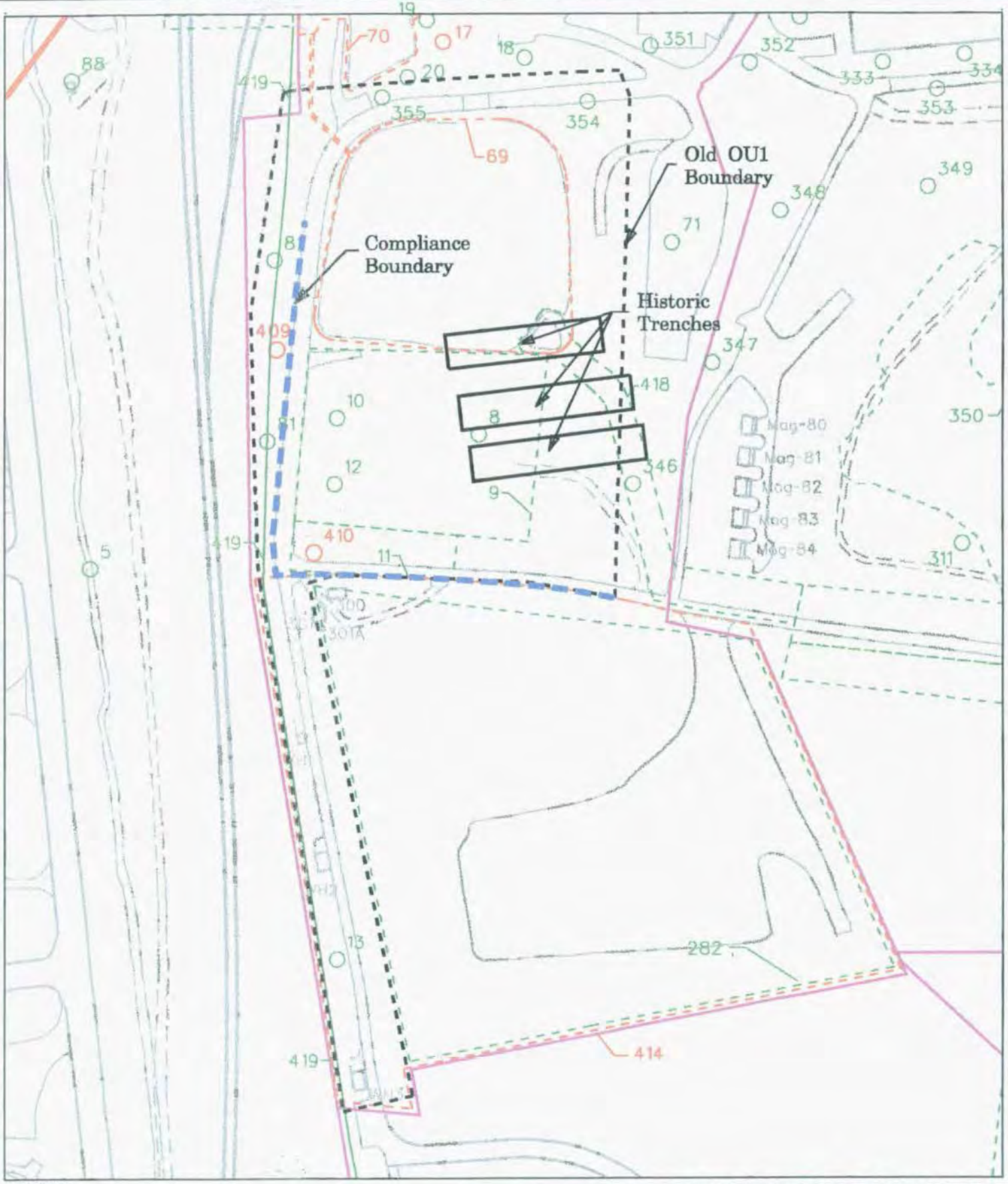
Total Phase 3.2 OU 1 Excavation; Sanitary Waste Scenario

Assembly	Direct Cost	Marked Up Cost
Total Project OU 1 Excavation Of OU-1 Area	24,836,808	36,117,298

Appendix C

Operable Unit 1 Map



LEGEND

PRS Area boundary

Parcel Boundary

PRS STATUS

No Further Assessment Required

Further Assessment or Response Action Required

0 25 50 100 150 200 250

Scale In Feet

MOUND

Environmental Restoration Geographic Information

SHEET	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
ISSUE																					
SHEET	1	2	3	4	5	6															
ISSUE																					

PART CLASSIFICATION

DRAWING CLASSIFICATION: UNCLASSIFIED

SIZE

DRAWING NUMBER: oulareaprs.dgn

JOB NUMBER

DWG TYPE | PRNG | CHECK | SCALE | SHEET 1 OF 1

OU1 Area Map

09/10/03 | SSF