# CLOSURE PLAN

*FOR*

# THE OPEN DETONATION (OD) AREA #2 HAZARDOUS WASTE TREATMENT UNIT

*PREPARED FOR*

# U.S. ARMY CORPS OF ENGINEERS NASHVILLE DISTRICT

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SAIC® Science Applications International Corporation
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# Closure Plan
# for the Open Demolition Area #2
# Hazardous Waste Treatment Unit
# Ravenna Army Ammunition Plant
# Ravenna, Ohio

Prepared for:
United States Army Corps of Engineers
Nashville District
Nashville, Tennessee 37202

Prepared by:

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
655 Metro Place South, Suite 745
Dublin, Ohio 43017

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ABS | absorption factor |
| AMSL | above mean sea level |
| ARAR | applicable or relevant and appropriate requirement |
| BGS | below ground surface |
| COC | Chain of Custody |
| COPC | constituent of potential concern |
| DOT | Department of Transportation |
| DNT | Dinitrotoluene |
| ELCR | Excess Lifetime Cancer Risk |
| EPA | Environmental Protection Agency |
| EP Toxicity | Extraction Procedure Toxicity |
| GPD/ft | gallons per day per foot |
| GPM | gallons per minute |
| HASP | Health and Safety Plan |
| HEAST | Health Effects Summary Tables |
| HI | Hazard Index |
| HMX | 1,3,5,7-Hexahydro-1,3,5,7-tetranitrotriazine |
| HSWA | Hazardous and Solid Waste Amendments |
| IRIS | Integrated Risk Information System |
| LPD/m | liters per day per meter |
| MCL | maximum contaminant level |
| MCLG | maximum contaminant level goal |
| mg/L | milligram per liter |
| NPDES | National Pollutant Discharge Elimination System |
| OAC | Ohio Administrative Code |
| OB | Open Burning |
| OD | Open Detonation |
| OEPA | Ohio Environmental Protection Agency |
| PCBs | Polychlorinated Biphenyls |
| PEF | Particulate Emission Factor |
| POTW | Publicly Owned Treatment Works |
| QA/QC | Quality Assurance/Quality Control |
| RCRA | Resource Conservation and Recovery Act |
| RDX | 1,3,5-Hexahydro-1,3,5-trinitrohydrazine |
| RME | Reasonable Maximum Exposure |
| RfC | reference concentration |
| RfD | reference dose |
| RVAAP | Ravenna Army Ammunition Plant |
| SAP | Sampling and Analysis Plan |
| Sf | slope factor |
| SOP | standard operating procedure |

| | |
|---|---|
| TCLP | Toxicity Characteristic Leaching Procedure |
| TNT | 2,4,6-Trinitrotoluene |
| TSDF | Treatment Storage and Disposal Facility |
| UCL | Upper Confidence Limit |
| ug/L | microgram per liter |
| U.S. | United States |
| USAEHA | United States Army Environmental Hygiene Agency |
| USGS | United States Geological Survey |
| UXO | Unexploded Ordnance |
| VF | volatilization factor |

# Closure Plan for the Open Demolition Area #2
# Hazardous Waste Treatment Unit

## 1.0 FACILITY DESCRIPTION

### 1.1 GENERAL DESCRIPTION

The Ravenna Army Ammunition Plant (RVAAP) is located within Portage and Trumbull Counties in the northeastern portion of the State of Ohio, as shown on Figure 1-1. The installation covers approximately 8,668.3 hectares (21,419 acres), and is approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide as shown in Figure 1-2. During operation, the primary purpose of the facility was to load explosives into medium and major caliber artillery ammunition, bombs, mines, fuzes and boosters, primers, and percussion elements. Currently, the munitions facilities are in an inactive status.

The Open Detonation (OD) Area #2 consists of a cleared area approximately 200 feet by 250 feet. The site is located about 150 feet north of Sand Creek on ground that gently slopes toward the creek. The RVAAP detonated large caliber munitions and "off-spec" bulk explosives at the OD unit. The past operating procedures were to place explosives to be detonated in a pit that had been excavated to a minimum depth of 4 feet. The trench was backfilled with 2 feet of soil, and the explosives were detonated. After detonation, the site was carefully policed for shrapnel, scrap metal, or any unexploded ordnance (UXO). The OD unit and surrounding area have been used for the treatment of munitions since 1948. Materials treated in this area have included primer elements, bombs, and various caliber munitions ranging from 40 mm to 8 inches. The OD unit is surrounded by an area of approximately 20 acres that may have formerly been used for burial of munitions. Bombs, white phosphorus, and other UXO may have been buried within the immediate vicinity of the OD unit. The OD unit is shown as reference number 4 on the facility map, Figure 1-2. Wastes treated at the OD unit had the EPA hazardous waste number D003. Treatment by OD removes the reactivity characteristic. Wastes were not chemically characterized by analysis prior to OD since adequate physical and chemical data were obtained through process knowledge.

The open burning and open demolition of munitions has ceased at RVAAP. In accordance with the Interim Measures Plan for the OD Area #2, a thorough unexploded ordnance survey and removal will be conducted at this area, and certain measures will be taken to control erosion before implementation of this closure plan is anticipated.

### 1.2 TOPOGRAPHIC MAP

The U.S. Geologic Survey (USGS) topographic map for the portion of the facility upon which this unit is located is shown on Figure 1-3. Details of the layout of the Open Demolition Area # 2 are shown on Figure 1-4.

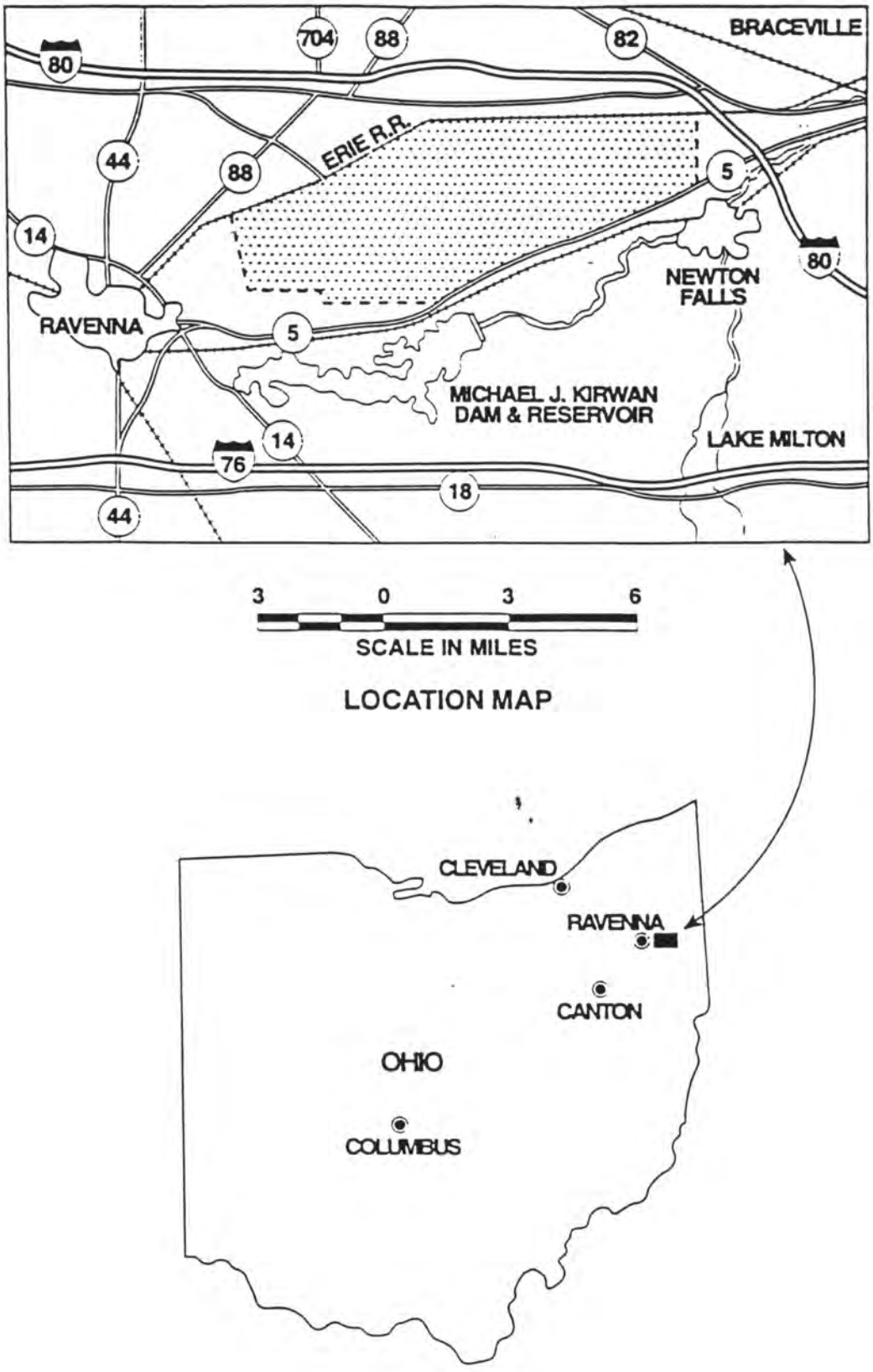
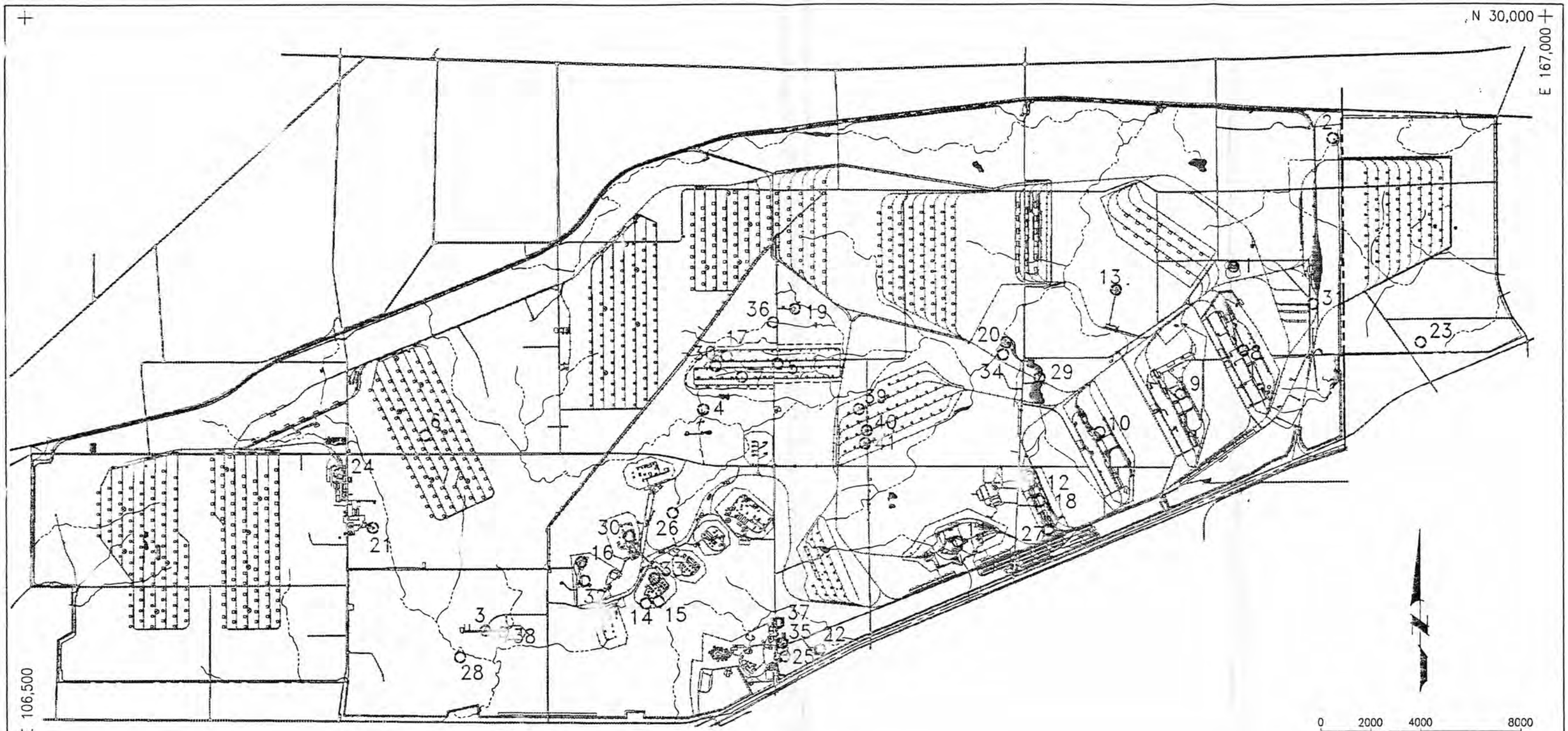



FIGURE 1-1 General Location and Orientation of RVAAP




## LEGEND OF SITES:

1. RAMSDELL QUARRY LANDFILL
2. ERIE BURNING GROUNDS
3. DEMOLITIONS AREA #1
4. DEMOLITIONS AREA #2
5. WINKLEPECK BURNING GROUNDS
6. C BLOCK QUARRY
7. BLDG 1601 HAZARDOUS WASTE STORAGE
8. LOAD LINE 1 AND DILUTION/SETTLING POND
9. LOAD LINE 2 AND DILUTION/SETTLING POND
10. LOAD LINE 3 AND DILUTION/SETTLING POND
11. LOAD LINE 4 AND DILUTION/SETTLING POND
12. LOAD LINE 12 AND DILUTION/SETTLING POND
13. BLDG 1200 AND DILUTION/SETTLING POND
14. LOAD LINE 6, EVAPORATION UNIT
15. LOAD LINE 6, TREATMENT PLANT QUARRY LANDFILL/FORMER
16. FUZE & BOOSTER BURNING PITS
17. DEACTIVATION FURNACE
18. LOAD LINE 12 PINK WASTE WATER TREATMENT
19. LANDFILL NORTH OF WINKLEPECK BURNING GROUND
20. SAND CREEK SEWAGE TREATMENT PLANT
21. DEPOT SEWAGE TREATMENT PLANT
22. GEORGE ROAD SEWAGE TREATMENT PLANT
23. UNIT TRAINING SITE WASTE OIL TANK
24. RESERVE UNIT MAINTENANCE AREA WASTE OIL TANK
25. BLDG 1034 MOTOR POOL WASTE OIL TANK
26. FUZE BOOSTER AREA SETTLING TANKS
27. BLDG 854–PCB STORAGE
28. MUSTARD AGENT BURIAL SITE
29. UPPER AND LOWER COBBS POND COMPLEX
30. LOAD LINE 7 PINK WATER TREATMENT PLANT
31. ORE PILE RETENTION POND
32. 40 AND 60 MM FIRING RANGE
33. FIRESTONE TEST FACILITY
34. SAND CREEK DISPOSAL ROAD LANDFILL
35. 1037 BUILDING–LAUNDRY WASTEWATER SUMP
36. PISTOL RANGE
37. PESTICIDE BUILDING S–44S2
38. NACA TEST AREA
39. BUILDING U–202
40. BUILDING W–221
41. BUILDING X–232

US Army Corps of Engineers Nashville District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NASHVILLE, TENNESSEE

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO
FACILITY MAP

| DRAWN BY: | PCP: | CAD FILE: |
|---|---|---|
| R. BEELER | 19111X17 | S:\RAVENNA\19111X17 |

**FIGURE 1-2 Facility Map**


FIGURE 1–3. TOPOGRAPHIC LOCATION MAP

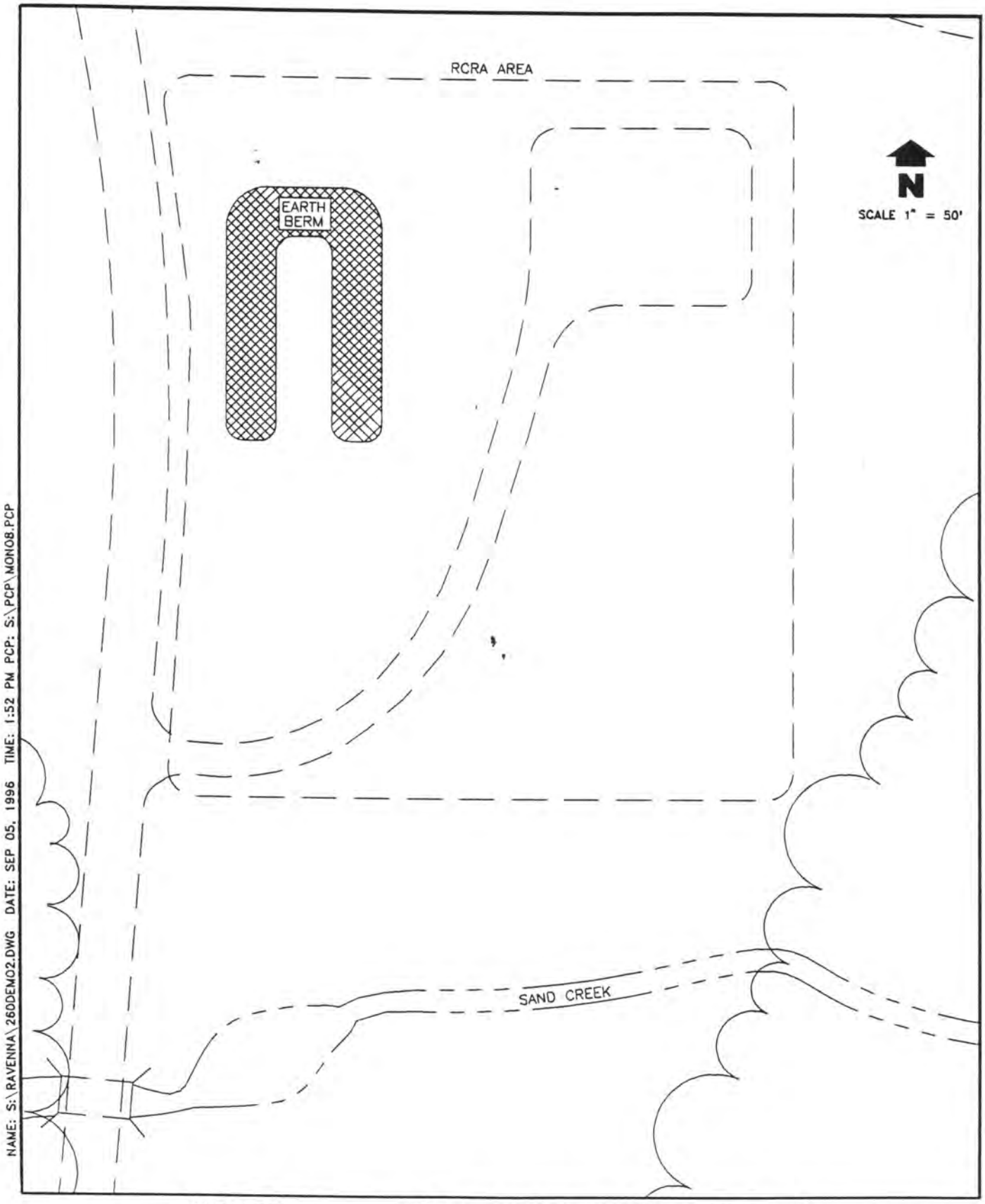



FIGURE 1-4. OPEN DETONATION AREA #2

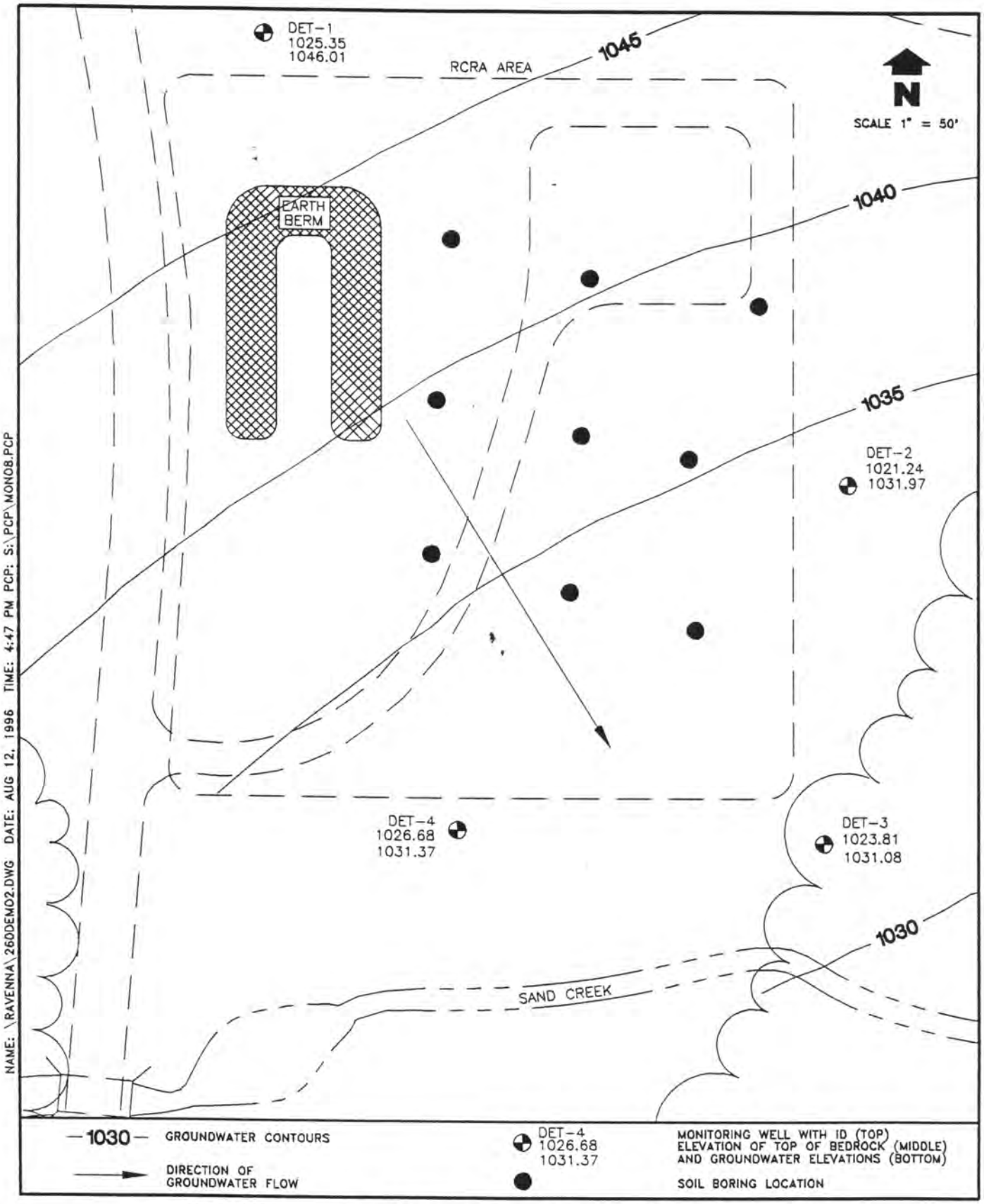



FIGURE 1-5. OPEN DETONATION AREA #2
MONITORING WELLS, GROUNDWATER SURFACE ELEVATION,
AND TOP OF BEDROCK DATA

## 1.3 SOLID WASTE MANAGEMENT UNITS

Other RCRA-regulated units that exist at RVAAP that have not yet been certified as closed include:

1. The Open Burning Grounds, an area approximately 100 feet by 100 feet square identified in Figure 1-2 as the RCRA-regulated portion of the Winklepeck Burning Grounds (map reference #5). This area is to be closed in accordance with a closure plan that is anticipated to be submitted to Ohio Environmental Protection Agency (OEPA) at approximately the same time as this closure plan. As in the case of Building 1601, the Open Burning Grounds was listed in the RVAAP RCRA Part B Permit Application, which was subsequently withdrawn.

2. The Building 1601 Container Storage Unit, a 20 feet by 22 feet reinforced concrete structure that was used to store up to 72 55-gallon drums of ash residue from open burning and spent activated carbon from the pink water treatment plant until this material was disposed of off site. This building is to be closed in accordance with a closure plan that is anticipated to be submitted to Ohio Environmental Protection Agency (OEPA) at the same time as this closure plan. The Building 1601 Container Storage Unit was listed in the RVAAP RCRA Part B Permit Application, which was subsequently withdrawn.

3. The Deactivation Furnace, a thermal treatment device used to remove the characteristic of reactivity from certain off-specification or waste items produced when the facility was in operation. Some closure activity has taken place at this unit, identified in Figure 1-2 as the Deactivation Furnace (map reference #17). However, some soil contamination was discovered that has indicated that this unit can not be closed "clean", and discussions on future activities at this unit continue with Ohio EPA. As with the other units discussed, the Deactivation Furnace was listed in the RVAAP RCRA Part B Permit Application, which was subsequently withdrawn.

Other units of concern (not RCRA regulated) that exist at RVAAP include:

1. The Load Line 12 Pink Waste Water Treatment Plant, identified in Figure 1-2, is an active facility with an active NPDES Permit No. 3I000000BD. The unit consists of dual mode activated carbon filters used in the treatment of pink water. Twin 2000-pound carbon units are enclosed in a steel girder metal sided building set on a concrete floor.

2. Building U-202 is an earth covered concrete building within Group 5, identified in Figure 1-2. The building was never used for storage of potentially hazardous waste.

3. Building W-221 is an earth covered concrete building within Group 5, identified in Figure 1-2. The building was used as a 90 day storage area for potentially reactive waste.

4. Building X-232 is an earth covered concrete building within Group 5, identified in Figure 1-2. The building was used as a 90 day storage area for potentially reactive waste.

## 1.4 HYDROGEOLOGY INFORMATION

### 1.4.1 Geologic and Hydrogeologic Settings

#### 1.4.1.1 Geologic Setting

Two glacial advances during the Wisconsin Age of the Pleistocene Epoch resulted in the deposition of a veneer of glacial till over the entire RVAAP installation. The first glacial advance deposited the Kent Till over the facility. The Kent Till consists mostly of sand and silt with a few cobbles and sporadic boulders, and ranges in depth from 6.1 to 12.2 meters (20 to 40 feet) below ground surface (BGS). The second glacial advance deposited the Hiram Till over the eastern two-thirds of the facility only, which includes the Building 1601 area. The Hiram Till consists of approximately 12 percent sand, 41 percent silt, and 47 percent illite and chlorite clay minerals, and ranges in depth from 1.5 to 4.6 meters (5 to 15 feet) BGS. The Hiram Till overlies thin beds of sandy outwash material in the far northeastern corner of the facility. Field observations indicate that overall till thickness is less than 0.6 meters (2 feet) in some areas of RVAAP. The reduced thickness may be due to natural erosion or construction grading operations and is not necessarily the result of deposition.

A buried glacial valley, oriented in a southwest-northeast direction, is located in the central portion of the facility. This valley is filled with glacial outwash consisting of poorly sorted clay, till, gravel, and silty sand. Depths of unconsolidated sediments in the valley range from 30.5 to 60.7 meters (100 to 200 feet) BGS.

The bedrock geology of RVAAP consists of Carboniferous Age sedimentary rocks that lie stratigraphically beneath the glacial deposits of the Kent and Hiram Tills. The oldest bedrock that outcrops within the facility is the Cuyahoga Formation of the Mississippian Age. Three members comprise this formation: (1) the Orangeville Shale, (2) the Sharpsville Sandstone, and (3) the Meadville Shale. The Cuyahoga outcrops in the far northeastern corner of the facility, and generally consists of a blue-gray silty shale with interbedded sandstone. The regional dip of the Cuyahoga strata is between 1.5 to 3 meters (5 to 10 feet) per mile to the south.

The remainder of the facility is underlain by bedrock associated with the Pottsville Formation of the Pennsylvanian Age. The Pottsville Formation, which lies unconformably on an erosional surface of the Cuyahoga Formation, is divided into four members: (1) the Sharon, (2) the Connoquenessing Sandstone, (3) the Mercer, and (4) the Homewood Sandstone. The Sharon Member consists of two individual units: the Sharon Conglomerate and the Sharon Shale. The Sharon Conglomerate is a porous, coarse-grained, gray-white sandstone that often exhibits thin layers of milky white quartz pebbles. The Sharon Conglomerate also has locally occurring thin shale lenses in the upper portion of the unit. Due to the differences in lithology between the Sharon Conglomerate and the underlying shales of the Cuyahoga Formation, the contact between the Pottsville and Cuyahoga Formations usually is quite distinct. The Sharon Shale overlies the

Sharon Conglomerate and consists of sandy, gray-black, fissile shale with some plant fragments and thin flagstone beds.

The Connoquenessing Sandstone member of the Pottsville Formation unconformably overlies the Sharon Member and is a medium-to-coarse grained, gray-white sandstone with more feldspar and clay than the Sharon Conglomerate. Thin interbeds and partings of sandy shale also are common in the Connoquenessing. The Mercer member of the Pottsville Formation overlies the Connoquenessing and consists of silty to carbonaceous shale with abundant thin, discontinuous sandstone lenses in the upper portion. Regionally, the Mercer also has been noted to contain interbeds of coal. The Homewood Member of the Pottsville Formation unconformably overlies the Mercer member and consists of coarse-grained crossbedded sandstones that contain discontinuous shale lenses.

The Connoquenessing, Mercer, and Homewood members are present only in the western half of the RVAAP facility. The Sharon Conglomerate unit is the upper bedrock surface in most of the eastern half of the RVAAP facility. The regional dip of the Pottsville Formation strata is between 1.5 and 3 meters (5 and 10 feet) per mile to the south.

#### 1.4.1.2 Hydrologic Setting

The largest ground water supplies within Portage County come from two buried valleys that underlie Franklin, Brimfield, and Suffield Townships; and Streetsboro, Shaersville, and Mantua Townships, respectively. The sand and gravel within these buried valleys are favorably situated to receive discharge from surface streams and surface infiltration. The water bearing characteristics for the sand and gravel aquifers in the vicinity of the RVAAP facility are poorly documented. Wells that penetrate these aquifers can yield up to 6080 liters per minute (1600 gallons per minute (GPM)). However, yields from wells penetrating silty or clay till materials are significantly lower in yield. In general, the Kent and Hiram Tills are too thin and impermeable to produce useful quantities of water.

The most important bedrock sources of ground water in the vicinity of the RVAAP facility are the sandstone/conglomerate members of the Pottsville Formation. These aquifers, together with two other deeper Mississippian/Devonian sandstone aquifers, represent the most important bedrock sources of ground water in Northeastern Ohio.

The Sharon Conglomerate is the primary source of ground water at RVAAP and maintains the most significant well yields of the Pottsville Formation members with hydraulic conductivity values of 62.1 to 24,839.0 LPD/m (5 to 2000 gallons per day per foot (GPD/ft)). Past studies of the Sharon Conglomerate indicate that the highest yields are associated with the true conglomerate phase (coarse-grained sandstone with abundant quartz pebbles) and with joints and fractures in the bedrock; however, there is no facility-specific information available regarding variations in aquifer properties due to these factors. Where present, the overlying Sharon Shale

acts as a relatively impermeable confining layer for the Sharon Conglomerate. Several flowing artesian wells have been noted at the facility.

The Connoquenessing Sandstone and the Homewood Sandstone are the remaining aquifers of the Pottsville Formation and exhibit hydraulic conductivities of 62.1 to 3,725.8 LPD/m (5 to 300 GPD/ft), and 62.1 to 2,483.9 LPD/m (5 to 200 GPD/ft), respectively. Well yields in the Connoquenessing and Homewood Sandstones, although lower than the Sharon Conglomerate, are high enough to provide significant quantities of water. Several wells at the RVAAP facility have penetrated both the Sharon Conglomerate and the Connoquenessing Sandstone and reportedly produced water from both units.

In general, hydraulic conductivities for the shales of the Sharon and Mercer Members of the Pottsville Formation are low and result in insignificant ground water yields. The primary porosity of the shales is likely secondary, owing to joints and fractures in the bedrock; however, there is no facility-specific information available regarding the occurrence of joints and fractures in these units.

### 1.4.2 Ground Water Monitoring System

Four ground water monitoring wells were installed at this unit in 1992. These wells, identified as DET-1 through DET-4, are indicated on Figure 1-5. DET-1 is installed as the upgradient well (ground water level measured at approximately 1045 feet AMSL) and DET-2 through DET-4 are located down gradient of the unit, with the ground water surface measured between approximately 1030 feet AMSL and 1032 feet AMSL, with some seasonal variation. The well locations, depths, and construction details were approved by Ohio EPA as part of the U.S. Army Environmental Hygiene Agency's *Geohydrologic Study No. 38-26-KF95-92; Soils, Ground Water, and Surface Water Characterization for the Open Burning and Open Detonation Areas, Ravenna Army Ammunition Plant, Ravenna, Ohio.*

All four wells were completed at the soil-bedrock interface. The wells were completed with a single 5-foot section well screen set at the bottom of the well. Generally, sand was placed around the well screen to a level of several feet above the top of the well screen. A native pack was used for well DET-2, because the borehole walls sloughed around the well screen before the sand pack could be placed. Sand was added at this well above the borehole sloughing. The well annulus from the sand pack to the surface was sealed with bentonite pellets.

Two of the wells, DET-1 and DET-2, used a series of two, 6- to 12- inch sand intervals within the bentonite interval, as requested by Ohio EPA. An initial two feet of bentonite was placed and wetted over the sand pack, followed by 6-12 inches of sand, a second two feet of bentonite, and another 6- to 12-inch sand layer. The remainder of the well annulus was filled with bentonite. Wells DET-3 and DET-4 were too shallow to use a sand layer within the bentonite. Copies of the drilling logs from the above-referenced study are included as Appendix B, and the

copies of details of individual well construction and a diagram of generalized monitoring well construction are provided in Appendix C.

### 1.4.2.1 Site Hydrogeology

All four monitoring wells encountered mixtures of clay and silt with occasional sand layers. The depth to ground water varied from approximately 28 feet below the surface in DET-2 to about 5 feet below the surface in DET-3 and DET-4. The uppermost aquifer is contained within the clayey silts above the bedrock. The confining layer under the uppermost aquifer is the top of the bedrock, the depth of which being determined by auger or spoon refusal. The top of bedrock elevations are shown in Figure 1-5, reproduced from the above-referenced study, as is ground water flow direction.

### 1.4.2.2 Ground Water Monitoring Results

Ground water monitoring results are available from 15 rounds of well sampling from the four wells at the OD Grounds. Two sampling events were conducted in 1992, and four sampling events were conducted each year thereafter. The most recent available analytical results are from the March, 1996 sampling event. The analytical data from these sampling events are presented in Appendix D. Table 1-1, below, summarizes certain of the data for constituents found in the ground water that underlies the OD Grounds.

**Table 1-1. Maximum Concentrations of Selected Analytes Detected in Ground Water Samples**

**(micrograms/liter)**

| | DET-1 | DET-2 | DET-3 | DET-4 |
|---|---|---|---|---|
| Arsenic | 19 | 28 | 290 | 250 |
| Antimony | 4 | ND | 15 | 20 |
| Cadmium | ND | 1 | 3 | 8 |
| Chromium | 20 | 26 | 66 | 160 |
| Lead | 8 | 20 | 38 | 190 |
| Nickel | 24 | 32 | 35 | 150 |
| RDX | 1.4 | 3.3 | 4.1 | ND |
| HMX | ND | ND | 1.1 | ND |
| 1,2-DCE | 0.6 | 0.9 | ND | 0.7 |
| 1,3,5-TNB | 2.4 | ND | ND | ND |

These data appear to indicate that an impact to ground water quality by activities at the OD Grounds has been noted, especially at DET-3 and DET-4. However, analytical results from the most recent several sampling rounds indicate concentrations of the above analytes at stable and much lower concentrations than those indicated above for DET-3 and DET-4. In general, the higher concentrations of metals noted in DET-3 and DET-4 could be attributable to higher ground water surface elevations found in those wells.

### 1.4.3 Corrective Actions

There are suspected releases of hazardous wastes or constituents from this unit. However, this closure plan details the actions to be taken to eliminate unacceptable risk that may be posed to human health or the environment from those releases. Therefore, no corrective action (under HSWA) is anticipated.

## 1.5 OPEN DEMOLITION AREA #2 UNIT DESCRIPTION

### 1.5.1 Waste Managed

The RVAAP detonated large caliber munitions and "off-spec" bulk explosives at the OD unit. The past operating procedures were to place explosives to be detonated in a pit that had been excavated to a minimum depth of 4 feet. The trench was backfilled with 2 feet of soil, and the explosives were detonated. After detonation, the site was carefully policed for shrapnel, scrap metal, or any unexploded ordnance (UXO). The OD unit and surrounding area have been used for the treatment of munitions since 1948. Materials treated in this area have included primer elements, bombs, and various caliber munitions ranging from 40 mm to 8 inches. The OD unit is surrounded by an area of approximately 20 acres that may have formerly been used for burial of munitions. Bombs, white phosphorus, and other UXO may have been buried within the immediate vicinity of the OD unit. The OD unit is shown in Figure 1-4. Wastes treated at the OD unit had the EPA hazardous waste number D003. Treatment by OD removes the reactivity characteristic. Wastes were not chemically characterized by analysis prior to OD since adequate physical and chemical data were obtained through process knowledge.

The open burning and open demolition of munitions has ceased at RVAAP. In accordance with the Interim Measures Plan for the OD Area #2, a thorough unexploded ordnance survey and removal will be conducted at this area, and certain measures will be taken to control erosion before implementation of this closure plan is anticipated

Although the only RCRA wastes treated at this unit were characteristic for reactivity and the process of demolition removed that characteristic, it is possible that incomplete detonation occurred. Any waste that still exhibits the characterisitic of reactivity will be removed during the UXO removal effort to be conducted as part of the Interim Measures Plan discussed in the

preceeding paragraph. However, other constituents have been found in ash left from the open burning of explosives, and these constituents are included in the constituent of concern list for the Open Demolition Area #2. Any contaminated media found through sampling to be conducted at the OD area may prove to be characteristic hazardous wastes for several of the constituents, to be determined by TCLP analyses. The other constituents listed, although not TCLP analytes, may be present above risk-based cleanup standards and may therefore require removal. The constituents are listed in Table 1-2.

**Table 1-2. Constituents of Concern for the Open Demolition Area #2**

| Medium | Potential Waste Code | Constituents |
|---|---|---|
| Waste Explosives | D003 | Reactivity characteristic |
| Soil | D004 | Arsenic |
| Soil | D005 | Barium |
| Soil | D006 | Cadmium |
| Soil | D007 | Chromium |
| Soil | D008 | Lead |
| Soil | D009 | Mercury |
| Soil | D030 | 2,4-dinitrotoluene |
| Soil | None, potential risk-based removal required | 2,4,5-trinitrotoluene (TNT)<br>1,3,5-hexahydro-1,3,5-trinitrohydazine (RDX)<br>1,3,5,7-hexahydro-1,3,5,7-tetranitrohydrazine (HMX) |

### 1.5.2 Capacity

The maximum possible capacity for managing hazardous wastes at the OD area before detonation was limited to the daily treatment capacity of 1000 pounds.

## 1.6 REFERENCES TO OTHER ENVIRONMENTAL PERMITS

The RVAAP facility has ceased all operations. The only permit currently held is the pink water discharge permit, NPDES # 3I000000BD. The RCRA Part B Permit application has been withdrawn, which has required the closure of all formerly-operated RCRA-regulated units.

## 1.7 ANTICIPATED WAIVERS OR EXEMPTIONS

No waivers or exemptions are anticipated to be requested or required for the closure of this unit, unless UXO removal (which must be conducted before extensive sampling or contaminated media removal can take place) is delayed. In such an event, an extension will be requested for the closure schedule. The RVAAP facility, including the Open Demolition Area #2, is owned by the U.S. Department of Defense, a Federal Agency.

## 1.8 CLOSURE AND POST-CLOSURE COST ESTIMATES

In accordance with Ohio Administrative Code (OAC) 3745-55-40(C), closure and post-closure cost estimates are not required for this Federal Facility.

## 1.9 FINANCIAL ASSURANCE

In accordance with OAC 3745-55-40(C), financial assurance is not required for this Federal Facility.

Production based support funds have been identified as the type of funds which will fund the closure. However, the funds have not been identified at this time.

## 1.10 LIABILITY COVERAGE

In accordance with OAC 3745-55-40(C), liability coverage is not required for this Federal Facility.

# 2.0 CLOSURE PROCEDURES

## 2.1 RISK-BASED CLOSURE

The proposed procedures for closure of the OD Area are to evaluate existing information concerning the presence of hazardous waste, collect necessary additional data from environmental media potentially contaminated by hazardous wastes or hazardous waste constituents, and develop a risk-based closure report.

This plan presents the proposed methodology to be used to perform a risk-based closure for the Open Demolition Area at RVAAP. The methodology presented in this work plan is based primarily on Ohio EPA's *Guidance for Reviewing Risk-based Closure Plans for RCRA Units* (Ohio EPA 1993). The proposed risk-based closure report will consist of a human health risk assessment which will evaluate risks to potential receptors under a future recreational land use scenario. Risks from exposures to both soil and ground water contaminants will be estimated in an additive assessment which considers multiple constituents and multiple pathways. The risk-based closure report will demonstrate that the residual material meets health-based standards, or if the material does not meet health-based standards, it will specify the chemical and media-specific standards that must be achieved in order to complete risk-based closure of the unit.

The preparation of a risk-based closure report indicates RVAAP's desire to pursue closure option #2 as described in the risk-based closure guidance (Ohio EPA 1993). This option requires, "Complete removal of waste materials and decontamination of environmental media (soil, water, air) to health-based standards," in order to close the RCRA unit. Waste material (shrapnel, unexploded ordnance exhibiting the characteristic of reactivity) was removed during operation of the unit or will be removed during implementation of an Interim Measures Plan currently being reviewed by Ohio EPA. The risk-based closure report will demonstrate that soil and ground water containing residual contamination meet health-based standards, or if this material does not meet health-based standards, it will specify the chemical and media-specific standards that must be achieved in order to complete risk-based closure of the RCRA unit.

The risk-based closure report will present human health risk estimates based on exposure to residual contamination at the unit. The risk estimates will be used to determine whether or not constituents remaining in soils and ground water at the unit are present at levels in compliance with RCRA health-based closure standards. Based on these estimates, it will be determined if the OD Area can be considered risk-based closed or whether further remediation and/or monitoring are required before certifying risk-based closure. Upon approval of risk-based closure, the unit will be considered decontaminated and will require no subsequent post-closure monitoring other than confirmatory ground water monitoring (Ohio EPA 1993). In addition, the RCRA unit will not be subject to RCRA-imposed land use restrictions (Ohio EPA 1993).

### 2.1.1 Risk Assessment Methodology

As stated above, the human health risk assessment will be performed according to Ohio EPA's risk-based closure guidance (Ohio EPA 1993). This guidance document specifies four steps to be followed when preparing the risk assessment. These four steps are as follows:

(1) Data Evaluation/Collection;
(2) Exposure Assessment;
(3) Toxicity Assessment; and
(4) Risk Characterization.

In addition to these four steps, an uncertainty assessment and risk summary will be included at the end of the risk assessment.

### 2.1.2 Data Evaluation/Collection

Analytical data that will be used in the risk assessment consist of historical data from past sampling events and data obtained from additional sampling to be completed prior to performing the risk assessment. Historical data are available from several sampling events including the following: ground water monitoring activities, soil samples from horseshoe-shaped area (USAEHA, 1984), and soil samples collected from the cleared area of the unit east of the horseshoe-shaped area (USAEHA, 1992) (see Figure 2-1-2). These results are explained briefly in the following bullets.

- Analytical results for ground water samples collected from the four monitoring wells installed in 1992. Analytical results are available from 15 rounds of ground water sampling from May, 1992 through March, 1996. Results are available for inorganic and organic compounds.

- Analytical results from soil samples collected from nine soil borings advanced in May, 1992 from the cleared area (USAEHA, 1992). Samples were analyzed for total metals, explosive compounds, explosive byproducts, phosphorus, nitrates and total Kjeldahl nitrogen. The total metals parameters include arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver. The explosives parameters include 2,4,6-TNT; 2,4-DNT; 2,6-DNT; RDX; HMX; and TNB.

- Analytical results from 6 soil samples collected from the horseshoe-shaped area and 4 samples collected of blast residue and the drainageway out of the bermed area. These samples were analyzed for explosives and EP Toxicity metals.

- Analytical results for 12 background soil samples as presented in the 1992 USAEHA report.

A review of these data indicate that several data gaps must be addressed in order to obtain a complete evaluation of the nature and extent of residual contamination at the OD Area. These gaps must be filled prior to beginning the risk assessment. These data gaps include additional soil samples located in a manner to better define the distribution and concentration of hazardous constituents at the unit, and Toxicity Characteristic Leaching Procedure (TCLP) analytical results from samples of soil taken in the bermed area.

A sampling plan to address these data gaps will be submitted to Ohio EPA for approval prior to initiating further sampling. In addition, Ohio EPA will be consulted regarding the use of the historical data set prior to inclusion in the risk assessment. It is RVAAP's intention that approval be received from Ohio EPA regarding the complete definition of the nature and extent of contamination at the RCRA unit prior to preparing the risk-based closure report.

### 2.1.3 Background Concentrations of Naturally-Occurring Constituents

The background values for eight naturally-occurring constituents in soil were presented in the 1992 Geohydrologic Study (USAEHA 1992). These values are average concentrations based on the results of the 12 background samples collected near the RCRA unit (see Table 2-1). In the risk assessment, it is proposed that the upper confidence limit, or UCL (i.e., mean plus two standard deviations) be used rather than the average concentrations. The calculation and use of the UCL will follow Ohio EPA guidance (Ohio EPA 1993). Background concentrations for naturally-occurring constituents in ground water will be determined using results from the upgradient monitoring well (DET-1).

**Table 2-1**
**Average UCL Background Concentrations for Soil Constituents**

| Soil Constituent | Average UCL Background Concentration (mg/kg) |
|---|---|
| Arsenic | 40.3 |
| Barium | 83.2 |
| Cadmium | * |
| Chromium | 25.3 |
| Mercury | * |
| Lead | 28.8 |
| Selenium | 1.2 |
| Silver | * |

* All background sample results were non-detect for this element

### 2.1.4 Selection of Contaminants of Potential Concern

Contaminants of potential concern (COPCs) are constituents determined to be potential site-related contaminants. It will be assumed that all explosive constituents detected in the OD Area are site-related contaminants and all will be included as COPCs. Inorganic COPCs will be limited to the inorganic constituents listed as possible site contaminants in Table 1-2. These inorganic constituents include arsenic, barium, cadmium, chromium, lead, and mercury. Inorganic constituents that were detected in samples at concentrations greater than background are assumed to be related to the unit and will be included as COPCs. The background values used in this comparison will be UCLs. All constituents determined to be COPCs will be included in the human health risk assessment.

## 2.2 EXPOSURE ASSESSMENT

The current land use at RVAAP is discontinued commercial/industrial and recreational. The planned land use for the foreseeable future is recreational and/or as a military training ground. As a result of these land use considerations, it is proposed that this risk assessment will estimate risks to receptors under a recreational land use. Receptors for the recreational land use include on-site receptors who may come in contact with residual contamination at the unit on an infrequent basis. There are no plans to release this property from control of the U.S. Army.

### 2.2.1 Point of Exposure

Ohio EPA (1993) and U.S.EPA (1987) specify that the potential point of exposure to hazardous waste constituents is assumed to be directly within the unit boundary. Therefore, analytical results from samples taken directly in the OD Area will be used to determine exposure intakes.

### 2.2.2 Exposure Pathways

Table 2-2 summarizes the exposure pathways evaluated for the future recreational land use scenario. These pathways represent all feasible pathways based on recreational land use. Exposure to soil, surface water, and ground water contaminants will be evaluated. In accordance with Ohio EPA 1993 guidance, the potential migration of soil contaminants to ground water will be evaluated using TCLP analysis rather than fate and transport modeling.

### 2.2.3 Exposure Parameters

Default exposure equations and parameters for industrial land use scenarios for soils and parameters are listed in Appendix E, Tables 6 through 10 of the Ohio EPA 1993 guidance. These default parameters will be used unless defensible site-specific information can be obtained. For the recreational land use scenario, the concentration term will be calculated for each constituent by determining the 95 percent UCL of the arithmetic mean. The concentration term is the average constituent concentration a receptor can be expected to contact at a site over time. The 95 percent UCL is the reasonable maximum exposure estimate (RME) that provides reasonable confidence that the true site average, contacted over time, will not be underestimated. The 95 percent UCL will be determined statistically in accordance with U.S. EPA guidance (1992a).

**Table 2-2**
**Exposure Pathways Evaluated for Recreational Land Use Scenario**

| Media | Exposure Pathways |
|---|---|
| Soil | ingestion, dermal contact, inhalation of particulates, and inhalation of volatiles |
| Surface Water | ingestion, dermal contact |
| Ground Water | ingestion, dermal contact |

### 2.2.4 Intake Equations

Intakes will be estimated using the standard intake equations provided in Ohio EPA guidance (1993) (Appendix E, Tables 6 through 10). Chemical specific intakes will be estimated and will be expressed as the amount of chemical at the exposure boundary (e.g., skin, lungs, gut) that is available for absorption. Intakes from dermal contact with soils will be expressed as an absorbed dose. Dermal intake equations presented in U.S. EPA's (1992b) *Dermal Exposure Assessment: Principles and Applications* have replaced those presented in Ohio EPA (1993); therefore, the U.S. EPA, 1992b equations will be used to estimate absorbed doses. Chemical specific absorption factors (ABS) will be used to reflect the desorption of the chemical from soil and the absorption of the chemical across the skin and into the blood stream. In accordance with current Ohio EPA policy, the following ABS values will be used: 0.01 for inorganics, 0.06 for polychlorinated biphenyls (PCBs), 0.10 for semi-volatile organic compounds, and 0.25 for volatile organic compounds.

Air intakes will be assessed because individuals may be exposed to the chemical in the vapor phase (volatiles) or adsorbed to particulates (dusts) generated from contaminated soils. Airborne emissions may result from the volatilization of organic constituents from soils and/or ground water. Risk from inhalation of volatiles is assumed to be relevant only for chemicals that easily volatilize. Therefore, intakes from volatile emissions will only be calculated for those constituents with a Henry's Law Constant of greater than $1 \times 10^{-5}$ atm-$m^3$/mole and a molecular weight of less than 200 g/mole.

A volatilization factor (VF) will be used to define the relationship between the concentration of contaminants in soil and the volatilized contaminants in air. The VF is calculated according to default EPA guidance (EPA 1991). Intakes from inhalation of particulate phase chemicals will be derived using a particulate emission factor (PEF). The PEF is used to relate the contaminant concentration in soil with the concentration of respirable particles in the air due to fugitive dust emissions from surface soils. This relationship is derived by Cowherd (1985) and provides as assessment procedure for hazardous waste sites where the surface contamination is assumed to provide a continuous and constant potential for emission over an extended period of time. The PEF will be determined consistent with guidance presented in U.S. EPA (1991).

## 2.3 TOXICITY ASSESSMENT

Toxicological data, used to evaluate risk, will be obtained from the U.S. EPA's Integrated Risk Information System (IRIS). IRIS is an electronic database containing the most current descriptive, quantitative and U.S. EPA regulatory information on chemical and radiological constituents. Chemical files maintained in IRIS contain information relating to noncarcinogenic and carcinogenic health effects. Noncarcinogenic toxicity values are referred to as reference doses (RfDs) or concentrations (RfCs) while carcinogenic toxicity values are referred to as slope factors (SFs). Information also will be obtained from current U.S. EPA Health Effects Summary Tables (HEAST). HEAST is a published reference, updated quarterly by U.S. EPA, and contains

toxicity information and values for chemicals from health and environmental effects documents and profiles.

Currently, dermal toxicity data are not available. As a result, a procedure for the adjustment of administered to absorbed doses will be used to convert oral RfDs and SFs to dermal values. The procedure that will be followed for this conversion is outlined in Appendix A of U.S. EPA (1989). In addition, inhalation RfCs must be converted to RfDs. The procedures outlined in Ohio EPA guidance (1993) will be followed for this conversion.

## 2.4 RISK CHARACTERIZATION

Risks will be characterized by integrating the toxicity and exposure assessments into quantitative and qualitative expressions of risk. To characterize carcinogenic risks, probabilities that an individual will develop cancer over a lifetime of exposure are estimated from projected intakes and chemical-specific dose-response information. To characterize potential noncarcinogenic effects, comparisons are made between projected intakes of substances and toxicity values. Risks will be quantified for each chemical in each exposure pathway for the COPCs.

### 2.4.1 Carcinogenic Risks

For carcinogens, risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the potential carcinogen (i.e., incremental or excess individual lifetime cancer risk [ELCR]). Carcinogenic risks are calculated using the chronic daily intake determined through the exposure assessment and chemical specific toxicity criteria. The toxicity criteria used in the risk calculation is the slope factor (SF). The cancer risk equation is defined below:

$$\text{Cancer Risk} = \text{CDI} \times \text{SF}$$

Where:

Risk = a unitless probability of an individual developing cancer;

CDI = Chronic Daily Intake averaged over 70 years (mg/kg-day); and,

SF = chemical specific slope factor $(\text{mg/kg-day})^{-1}$

Ohio EPA and U.S. EPA guidance require that risks associated with simultaneous exposures to several substances be estimated. In order to assess the risks posed by multiple chemicals, individual cancer risks are summed for each exposure pathway using the following equation:

$$Risk_t = Risk_1 + Risk_2 + ....Risk_i$$

Where:

$Risk_t$ = the total cancer risk, expressed as a unitless probability; and

$Risk_i$ = the risk estimate for the $i^{th}$ substance.

The risk summation methodology assumes that there are no synergistic or antagonistic chemical interactions and that all chemical produce the same effect: cancer.

### 2.4.2 Noncarcinogenic Risks

For noncarcinogens, the potential for toxic effects is measured by comparing an exposure level over a specific time period with a chemical-specific reference dose derived for a similar exposure period. This ratio of exposure is called a hazard quotient. The noncancer hazard quotient assumes that there is a level of exposure below which it is unlikely that adverse health effects will occur, even to sensitive sub-populations. The threshold level is determined through animal and human epidemiological studies and is called the reference dose (RfD). The equation for determining the hazard quotient is described below:

$$\text{Noncancer Hazard Quotient} = E/RfD$$

Where:

E = exposure level (or intake);

RfD = chemical-specific reference dose

If the exposure level exceeds unity (1), there may be a potential noncancer effect. The ratio of E/RfD does not represent a statistical probability; therefore, the level of concern does not increase linearly as the RfD is approached or exceeded. RfD's do not have equal accuracy or precision and are not based on the same severity of toxic effects.

To assess the overall potential for noncarcinogenic effects posed by more than one chemical, a hazard index (HI) approach will be used. This approach assumes that simultaneous subthreshold exposures to several chemicals could result in an adverse health effect.

The HI is equal to the sum of the hazard quotients, as described below;

$$\text{Noncancer Hazard Index} = E_1/RfD_1 + E_2/RfD_2 + ...E_i/RfD_i$$

Where:

$E_i$ = exposure level (or intake) for the $i^{th}$ toxicant;
$RfD_i$ = chemical-specific reference dose for the $i^{th}$ toxicant

The HI assumes that the magnitude of the effect will be proportional to the sum of the ratios of the subthreshold exposures to acceptable exposures.

## 2.5 UNCERTAINTY ASSESSMENT

The sources of uncertainty in the human health risk assessment and the relative influence of these sources on the results of the risk assessment will be discussed in this section. Uncertainty is inherent in every step of the risk assessment process; therefore, the report will discuss the uncertainties associated with the following phases of the risk assessment: data analysis, the exposure assessment, the toxicity assessment, and the risk characterization. The effect of each uncertainty and potential magnitude of each effect on the risk estimates will be discussed.

## 2.6 RISK SUMMARY

The risk summary will briefly summarize the major findings of the risk assessment. This will include the identification of chemicals with risks exceeding the EPA target risk values for noncarcinogenic (HI of 1) and carcinogenic risk (ELCR = $1 \times 10^{-6}$).

## 2.7 CONCLUSIONS AND RECOMMENDATIONS

This section will present conclusions and recommendations based on the results of the risk assessment. If the results indicate that RCRA health-based standards are not exceeded at the unit, then the report will recommend that the unit be considered risk-based closed. Limited confirmatory ground water monitoring also would be recommended, if warranted, to confirm the achievement of standards for a minimum of four consecutive quarters.

However, if the results indicate that RCRA health-based standards are exceeded at the unit, then the report will specify required actions and standards to be achieved before risk-based closure certification. Standards will be identified for all constituents present at concentrations which pose risks that exceed acceptable levels. These standards will consist of risk-based levels derived from the risk assessment, UCL background concentrations, or Applicable or Relevant and Appropriate Requirements (ARARs) such as Maximum Contaminant Levels (MCLs) from the National Primary Drinking Water Standards. The extent of contamination exceeding acceptable levels also would be identified.

RVAAP would then submit a revised closure plan to detail the actions necessary to remove or otherwise eliminate the identified threat to receptors by decontamination of the affected media to the appropriate risk-based concetrations. Upon approval of the revised closure plan, closure actions would be implemented.

## 2.8 ESTIMATES OF THE QUANTITY OF INVENTORY TO BE REMOVED

There is currently no known waste inventory at the OD Area. As indicated earlier, an UXO survey and removal activity will be required before implementation of a Interim Measures Plan can be implemented. This activity should identify and remove any buried materials at this unit that still exhibits the characteristic of reactivity.

During closure activities, decontamination materials (e.g., protective clothing, disposable sampling equipment, and other "disposables") will be generated. These items will be containerized and managed off site as solid waste or hazardous waste, as required.

## 2.9 DESCRIPTION OF SECURITY SYSTEM

RVAAP is a controlled access facility with fencing, gates, and numerous other features that contribute to the safety and security of the facility. Security is maintained by a staff of trained security guards 24-hours a day. Routine patrols of areas outside the main complex are conducted. All security guards are equipped with two-way radios and have direct communication with other RVAAP protection personnel. Employees are required to show identification badges when entering all main complex gates. Visitors and contractors entering the main complex must sign a log sheet and obtain proper passes.

## 2.10 CLOSURE CERTIFICATION

Within sixty (60) days of final closure, the owner/operator and an Independent Registered Professional Engineer will submit a certification of closure to the Ohio EPA Director by registered mail, assuring that the closure has been performed and is in accordance with the approved closure plan.

### 2.10.1 Activities to be Conducted

The activities to be conducted to affect risk-based closure (i.e., sampling protocols and locations) will be presented in a Sampling and Analysis Plan (SAP) to be prepared upon approval of this closure plan. Upon approval of the SAP, sampling, analysis and the preparation of the risk-based closure report will be conducted.

### 2.10.2 Testing and Analysis to be Performed

The sampling and analysis protocol for activities proposed in the SAP will follow the requirements of SW-846. Any departure from acctepted methods will be noted and the rationale expressed. In no case will activity proceed without Ohio EPA approval of the SAP. All laboratory sample analytical methods will follow a specific quality assurance and quality control plan that will be submitted with the SAP.

### 2.10.3 Criteria for Evaluating Adequacy

The information generated in accordance with the approved SAP will be evaluated by an Independent Registered Professional Engineer. The Independent Registered Professional Engineer will be required to submit a report findings and recommendations.

### 2.10.4 Schedule of Inspections

The areas where the activities proposed in the SAP are to be conducted will be inspected by the independent engineer routinely. Upon the beginning of closure operations, the independent engineer will notify the Ohio EPA (District and Central Offices) five (5) days prior to any critical activity and will inspect all closure activities on a daily basis. All observation and inspection activities will be recorded in the engineer's log book. This schedule will continue until the activity has been completed, any hazardous waste generated has been transferred from the facility and the sampling protocol has been completed.

### 2.10.5 Types of Documentation

Documentation that will be included in the closure certification will include sample analysis information, volume of waste generated during closure, waste shipping records, spill/leak reports, all sample and decontamination procedures documentation [Chain-of-Custody (COC), sampling logs, etc.], routine and special inspection records, photographs, the approved closure plan, the risk-based closure report and other related documents. In addition, the closure certification will contain any correspondence with outside agencies and independent evaluations which relate to the closure activity.

### 2.10.6 Future Use

Upon certification of closure, there are no specific plans to use the OD Area.

# 3.0 CLOSURE SCHEDULE

## 3.1 EXPECTED YEAR OF CLOSURE

The Open Demolition Area #2 is expected to undergo closure beginning in 1997.

## 3.2 FREQUENCY OF PARTIAL CLOSURE

There will be no partial closure for the OD Area #2.

## 3.3 WASTE REMOVAL

All known waste has been removed from the OD Area #2. Waste generated during the closure will be managed according to applicable RCRA requirements.

## 3.4 CLOSURE COMPLETION

Closure is expected to be completed within days of beginning closure under an Ohio EPA approved plan. Although no time extension requests are anticipated, if one should become necessary, it will be requested in accordance with the demonstration requirements specified in OAC 3745-66-13.

## 3.5 CERTIFICATION OF CLOSURE

Within 60 days of successful completion of the prescribed closure, RVAAP will submit to the Director of the Ohio EPA by registered mail a certification that the OD Area #2 has been closed in accordance with the specifications in the approved closure plan. In addition, the Regional Administrator, U.S. EPA Region V will be sent a copy. The certification statement will include the exact wording found in OAC 3745-50-42(D). The certification will be signed by the owner and by the Independent Registered Professional Engineer responsible for closure oversight, registered in the State of Ohio.

## 3.6 SURVEY PLAT

Since the closure of the OD Area #2 is expected to satisfy the requirements of a risk-based closure, filing a survey plat is not expected to be required. Should it be determined that a risk-based closure cannot be accomplished, RVAPP will immediately contact the Ohio EPA to discuss amending the closure plan. If it becomes necessary, a survey plat will be submitted to the Portage County Recorder's Office and the Director of the Ohio EPA, which indicates the location and dimensions of

the unit with respect to permanent survey benchmarks. The plat would be prepared and certified by a professional land surveyor. The plat would contain a note, prominently displayed, which states the owners' obligation to restrict disturbance of the hazardous waste unit.

## 3.7 REQUEST FOR EXTENSION TO DEADLINES FOR HANDLING INVENTORY OR COMPLETING CLOSURE

No requests for an extension of time to complete closure are anticipated, unless the risk-based closure report indicates that one or more of the risk-based standards developed in the report are exceeded. In that instance, a revised closure plan will be submitted that will detail the activities necessary to remove or decontaminate media that pose a threat.

## 3.8 MILESTONES

The schedule below exhibits the time required for each phase of the OD Area #2 closure:

Closure will begin within 30 days of Ohio EPA approval of this closure plan. The proposed schedule of projected activities is provided below:

| Task | Cumulative Time (days) |
|---|---|
| Receipt of Ohio EPA approval of closure plan. | 0 |
| Notify Ohio EPA of intent to close OD Area #2 | 30 |
| Submit draft SAP and QAPP for Ohio EPA approval | 120 |
| Receive approval of SAP and QAPP | 150 |
| Implement field sampling effort (The OEPA District Inspector will be notified five days before sampling activities.) | 180 |
| Submit draft risk-based closure report. | 250 |
| Submit closure certification to Ohio EPA, OR, submit revised closure plan to Ohio EPA | 310 |

The RVAAP will contact the facility inspector from the District Office at least 5 business days in advance of certain critical activities (e.g., sampling) so that the inspector may be present to observe the activity, obtain split samples, or inspect other items.

# 4.0 HEALTH AND SAFETY PLAN

The Health and Safety Plan for this project is presented in Appendix A. This is for ease of removal for use by personnel during closure implementation.

# 5.0 CLOSURE PLAN CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, and of those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ _____

(Signature) (Owner/Operator) (Date)

_____ _____

(Signature) (Registered Professional Engineer) (Date)

# 6.0 REFERENCES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# APPENDIX A

## OPEN DETONATION AREA #2 CLOSURE HEALTH AND SAFETY PLAN
## FOR
## THE RAVENNA ARMY AMMUNITION PLANT
## RAVENNA, OHIO

# OPEN DETONATION AREA #2 CLOSURE HEALTH AND SAFETY PLAN
# FOR
# THE RAVENNA ARMY AMMUNITION PLANT
# RAVENNA, OHIO

**September 1996**

# APPROVALS

## OPEN DETONATION UNIT CLOSURE SAFETY AND HEALTH PLAN FOR THE RAVENNA ARMY AMMUNITION PLANT, RAVENNA, OHIO

To Be Determined, Project Manager Date

To Be Determined, Health and Safety Manager Date

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## 2. HAZARD/RISK ANALYSIS

The purpose of the task hazard analysis is to identify and assess potential hazards that may be encountered by personnel and to prescribe required controls. Table 2-1 is a checklist of common hazards that may be posed during the Closure of the OD unit and indicates if a particular major type of hazard is present. The tasks are expected to consist of ash and soil removal, equipment decontamination, and soil and groundwater sampling. In general, given these tasks, the potential for unacceptable exposure to contaminants appears to be low. Expected tasks present a variety of physical hazards including unexploded ordnance, contact with equipment, noise, and heat/cold stress.

**TABLE 2-1. HAZARDS INVENTORY**

| Yes | No | Hazard |
|---|---|---|
| | X | Confined space entry |
| | X | Excavation entry |
| X | | Heavy equipment |
| X | | Fire and explosion |
| X | | Electrical shock |
| X | | Exposure to chemicals |
| X | | Temperature extremes |
| X | | Biological hazards |
| | X | Radiation or radioactive contamination |
| X | | Noise |

Specific tasks are as follows:

- Soil sampling.
- Soil boring and sampling with a drill rig.
- Equipment decontamination and rinsate water sampling.
- Installation of monitoring wells and groundwater sampling.
- Soil excavation and sampling.

# 1. FACILITY DESCRIPTION AND CONTAMINATION CHARACTERIZATION

## 1.1 SITE DESCRIPTION

The Open Detonation (OD) unit consists of a cleared area approximately 200 feet by 250 feet. The OD unit is located about 150 feet north of Sand Creek on ground that gently slopes toward the creek. The RVAAP detonates large caliber munitions and "off-spec" bulk explosives at the OD unit. The present operating procedures are as follows. Explosives to be detonated are placed in a 4-foot deep pit. The trench is backfilled with 2 feet of soil, and the explosives are detonated. After detonation, the site is carefully policed for shrapnel, scrap metal, or any unexploded ordnance (UXO). The OD unit and surrounding area have been used for the treatment of munitions since 1948. Materials treated in this area have included primer elements, bombs, and various caliber munitions ranging from 40 mm to 8 inches. The active OD unit is surrounded by an area of approximately 20 acres that may have formerly been used for burial of munitions. Bombs, white phosphorus, and other UXO may have been buried within the immediate vicinity of the OD unit. Waste treateed at the OD unit must have the EPA hazardous waste number D003. Treatment by open detonation removes the reactivity characteristic. Wastes are not chemically-characterized prior to treatment since adequate physical and chemical data are known from process knodwledge.

## 1.2 CONTAMINANTS

The following is a list of the hazardous waste previously treated at the OD unit, the EPA hazardous waste codes, and the constituents associated with those wastes. Minute quantities of these contaminants may be encountered in the during ash and soil removal, equipment decontamination, and sampling of soil, groundwater, or rinsates.

**TABLE 1-1 POTENTIAL HAZARDOUS CONSTITUENTS AT OD AREA #2**

| MEDIA | POTENTIAL HAZARDOUS WASTE CODE | HAZARDOUS CONSTITUENT |
|---|---|---|
| Soil | D003 | Reactivity Characteristic |
| Soil | D004 | Arsenic |
| Soil | D005 | Barium |
| Soil | D006 | Cadmium |
| Soil | D007 | Chromium |
| Soil | D008 | Lead |
| Soil | D009 | Mercury |
| Soil | D030 | 2,4-Dinitrotoluene |
| Soil | K044 | Reactivity, based on process knowledge of presence of 2,4,5-trinitrotoluene (TNT), 1,3,5-hexahydro-1,3,5-trinitrohydazine (RDX), and 1,3,5,7-hexahydro-1,3,5,7-tetranitrohydrazine (HMX) |

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## 2.1 TASK-SPECIFIC HAZARD ANALYSIS

Table 2-2 presents task-specific hazards, task-specific hazard analyses [Risk Assessment Code (RAC)], relevant hazard controls, and required monitoring, if appropriate, for all of the planned tasks. The RAC in Table 2-2 is derived through a qualitative risk assessment process using probability codes and severity codes. The severity codes are I = injuries/illnesses involving permanent total disability or death; II = injuries/illnesses with permanent partial disability or temporary total disability; III = injuries/illnesses resulting in temporary, reversible conditions with period of disability of less than 3 months; and IV = injuries/illnesses with reversible adverse effects requiring only minor treatment. The probability codes are A = likely to occur immediately, B = probably will occur in time, C = possible to occur in time, and D = unlikely to occur.

## 2.2 POTENTIAL EXPOSURES

Information on the significant suspected contaminants that may be encountered during the OD unit is provided in Table 2-3. Note that this list includes contaminants known or suspected to occur at concentrations sufficient to pose a risk of overexposure. Contaminants that are not expected to occur at significant concentrations are not listed.

**TABLE 2-2. HAZARDS ANALYSIS**

| Safety and Health Hazards | RAC | Controls | Monitoring |
|---|---|---|---|
| **Equipment decontamination (high pressure, hot water washing)** | | | |
| General equipment decontamination hazards (hot water, slips, falls, equipment handling) | C, III | Level D PPE (see Section 5) plus:<br>Nitrile or PVC gloves.<br>Face shield and Saranax or rain suit (when operating steam washer). | None. |
| Noise (spray washer) | B, III | Hearing protection when washer is operating. | None. |
| Electric shock | D, II | Lockout tagout of all electrical sources in area where power wash is in use. | None. |
| Fire (gasoline) | D, III | Control of ignition sources.<br>Control of flammable materials (quantities in decontamination area limited to single day use, proper storage).<br>Fire extinguisher (see Section 9). | Combustible gas meter (as appropriate). |
| Contact with unexploded ordnance | D, IV | On-site training in ordnance recognition for all field personnel. Clearance of sites for intrusive work. Withdrawal of all non-EOD personnel if ordnance or suspected ordnance is discovered. | Visual surveys for ordnance (recognized as large artillery rounds or bombs). Instrument surveys by EOD technicians in munitions disposal areas. |
| Exposure to chemicals (see Table 2.3) | D, III | PPE (Level D) plus nitrile gloves for contact with contaminated material. Washing face and hands prior to taking anything by mouth. Minimal contact. | None. |

**Table 2-2 (continued)**

| Safety and Health Hazards | RAC | Controls | Monitoring |
|---|---|---|---|
| Temperature extremes | C, II | Administrative controls (see Section 8). | Temperature measurements as appropriate; heart rate monitoring as appropriate. |

**Table 2-2 (continued)**

| Safety and Health Hazards | RAC | Controls | Monitoring |
|---|---|---|---|
| **Soil removal using excavation equipment** | | | |
| Safety hazards associated with excavation equipment | D, II | Level D PPE (see Section 5).<br>Personnel will stay well clear of operating equipment. | Daily safety inspections of operations. |
| Potential excavation cave-in | C, II | Personnel will keep at least 0.9 meters (3 feet) distance from excavation edges during excavation. | Daily safety inspections of operations. Examine excavation edge for signs of spalling or collapse. |
| Contact with unexploded ordnance | D, II | On-site training in ordnance recognition for all field personnel. Clearance of sites by EOD personnel for intrusive work. Withdrawal of all non-EOD personnel if ordnance or suspected ordnance is discovered. | Visual surveys for ordnance (recognized as large artillery rounds or bombs). Instrument surveys by EOD technicians in munitions disposal areas. |
| Exposure to chemicals (see Table 2.3) | C, III | PPE (Level D) plus nitrile gloves for contact with contaminated material. Washing face and hands prior to taking anything by mouth. Staying upwind of any dust-generating activities. Minimal contact. | Photoionization detector and other sampling as appropriate. |
| Gunfire (deer hunting with shotguns loaded with slugs allowed on Friday and Saturday during season) | D, I | No field work at dawn or dusk in areas open to hunting. High visibility vests. When possible, work in areas open to hunting will be scheduled for Sunday through Thursday. | None. |
| Fire (vehicle fuels) | D, III | Control of ignition sources.<br>Control of flammable material (quantities limited to single day use, proper storage).<br>Fire extinguisher (see Section 9). | Combustible gas indicator. |

**Table 2-2 (continued)**

| Safety and Health Hazards | RAC | Controls | Monitoring |
|---|---|---|---|
| Noise | B, II | Hearing protection within 7.6 meters (25 feet) of backhoe. | Daily safety inspections. |
| Animal hazards (bees, ticks, wasps, snakes) | C, III | PPE (boots, work clothes).<br>Insect repellant, as necessary. | Visual survey. |
| Electric shock | D, II | Identification and clearance of overhead and underground utilities. | Visual of all work areas. |
| Temperature extremes | C, II | Administrative controls (see Section 8). | Heart rate monitoring as appropriate; temperature measurements as appropriate. |

**Table 2-2 (continued)**

| Safety and Health Hazards | RAC | Controls | Monitoring |
|---|---|---|---|
| **Soil boring, soil sampling, and monitoring well installation using a drill rig** | | | |
| General safety hazards (rotating machinery, suspended loads, moving equipment, slips, falls) | C, II | Level D PPE (see Section 5) plus hard hat. No employees under lifted loads. | Daily site safety inspections. Weekly drill rig inspections. |
| Noise | B, II | Hearing protection within 7.6 meters (25 feet) of rig. | Daily safety inspections. |
| Fire (vehicle fuels) | D, III | Control of ignition sources. Control of flammable material (quantities limited to single day use, proper storage). Fire extinguisher (see Section 9). | Combustible gas indicator. |
| Contact with unexploded ordnance | D, II | On-site training in ordnance recognition for all field personnel. Clearance of sites by EOD personnel for intrusive work. Withdrawal of all non-EOD personnel if ordnance or suspected ordnance is discovered. | Visual surveys for ordnance (recognized as large artillery rounds or bombs). Instrument surveys by EOD technicians in munitions disposal areas. |
| Exposure to chemicals (see Table 2.3) | D, III | PPE (Level D) plus nitrile gloves for contact with contaminated material. Washing face and hands prior to taking anything by mouth. Staying upwind of any dust-generating activities. Minimal contact. | Photoionization detector and other sampling as appropriate. |
| Gunfire (deer hunting with shotguns loaded with slugs allowed on Friday and Saturday during season) | D, I | No field work at dawn or dusk in areas open to hunting. High visibility vests. When possible, work in areas open to hunting will be scheduled for Sunday through Thursday. | None. |

**Table 2-2 (continued)**

| Safety and Health Hazards | RAC | Controls | Monitoring |
|---|---|---|---|
| Temperature extremes | C, II | Administrative controls (see Section 8). | Heart rate monitoring as appropriate; temperature measurements as appropriate. |
| Animal hazards (bees, ticks, wasps, snakes) | C, III | PPE (boots, work clothes). Insect repellant, as necessary. | Visual survey. |
| Electric shock | D, II | Identification and clearance of overhead and underground utilities. | Visual of all work areas. |
| **Soil sampling using hand augers or scoops** | | | |
| General safety hazards (manual lifting, slips, falls) | D, IV | Level D PPE (see Section 5). Buddy system. | Daily site safety inspections. |
| Contact with unexploded ordnance | D, II | On-site training in ordnance recognition for all field personnel. Clearance of sites by EOD personnel for intrusive work. Withdrawal of all non-EOD personnel if ordnance or suspected ordnance is discovered. | Visual surveys for ordnance (recognized as large artillery rounds or bombs). Instrument surveys by EOD technicians in munitions disposal areas. |
| Exposure to chemicals (see Table 2.3) | D, III | PPE (Level D) plus nitrile gloves for contact with contaminated material. Washing face and hands prior to taking anything by mouth. Staying upwind of any dust-generating activities. Minimal contact. | Photoionization detector and other sampling as appropriate. |
| Gunfire (deer hunting with shotguns loaded with slugs allowed on Friday and Saturday during season) | D, I | No field work at dawn or dusk in areas open to hunting. High visibility vests. When possible, work in areas open to hunting will be scheduled for Sunday through Thursday. | None. |

**Table 2-2 (continued)**

| Safety and Health Hazards | RAC | Controls | Monitoring |
|---|---|---|---|
| Temperature extremes | C, II | Administrative controls (see Section 8). | Heart rate monitoring as appropriate; temperature measurements as appropriate. |
| Animal hazards (bees, ticks, wasps, snakes) | C, III | PPE (boots, work clothes). Insect repellant, as necessary. Snake chaps for work in heavy underbrush during warm weather. | Visual survey. |

EOD = explosive ordnance
GFCI = ground fault circuit interrupter
PPE = personal protective equipment
PVC = polyvinyl chloride

## TABLE 2-3. POTENTIAL EXPOSURES

| Chemical[a] | TLV/PEL/Activity or DAC/STEL/IDLH[b] | Health Effects/ Potential Hazards[c] | Chemical and Physical Properties[c] | Exposure Route(s)[c] |
|---|---|---|---|---|
| Arsenic | TLV/TWA: 0.01, A1 mg/m³ IDLH: 100 mg/m³ | Potential human carcinogen per NIOSH, ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy, respiratory irritation, and hyperpigmentation of skin. | Metal; silver-gray or tin white, brittle, odorless solid; MP: sublimes; IP: NA; VP: 0 mm (approximate). | Inhalation Absorption Contact Ingestion |
| Barium | TLV/TWA: 0.5, mg/m³ IDLH: 1100 mg/m³ | Upper respiratory irritation, gastroenteritis, muscle spasm,slow pulse, extrasystoles, hypokalemia, irritation eye and skin, skin burns. | Barium nitrate & barium chloride are white odorless solids. VP: Low. | Inhalation Ingestion Contact |
| Cadmium | TLV/TWA: 0.01, A2 mg/m³ IDLH: 100 mg/m³ | Suspected human carcinogen, pulmonary edema, dyspnea, cough, chest tight, substernal pain, head, chills, muscle aches, nausea, vomit, diarrhea, anosmia, emphysema, proteinuria, mild anemia. | Metal; silver-white, blue tinged lustrous, odorless solid. VP: 0 mm, IP: NA, Non-combustible solid in bulk form, but will burn in powder form. | Inhalation Ingestion |
| Chromium | TLV/TWA: 0.5 mg/m³ IDLH: 25 mg/m³ | Eye irritation, sensitization | Solid; properties vary depending upon specific compound. VP: 0 mm, IP: NA. Non-combustible solid in bulk form, but finely divided dust burns rapidly in a flame. | Inhalation Ingestion Contact |

**Table 2-3 (continued)**

| Chemical[a] | TLV/PEL/Activity or DAC/STEL/IDLH[b] | Health Effects/ Potential Hazards[c] | Chemical and Physical Properties[c] | Exposure Route(s)[c] |
|---|---|---|---|---|
| DNT (dinitrotoluene) | TLV/TWA: 0.15,A2 mg/m³<br>IDLH: Ca [50 mg/m³] | Suspected human carcinogen, anorexia, cyanosis, reproductive effects | Orange-yellow solid, VP: 1 mm; FP: 404°F | Inhalation<br>Absorption<br>Ingestion<br>Contact |
| Gasoline (used for fuel) | TLV/TWA: 300 ppm<br>IDLH: Ca | Potential carcinogen per NIOSH, dizziness, eye irritation, dermatitis | Liquid with aromatic odor; FP: -45°F; VP: 38-300 mm | Inhalation<br>Ingestion<br>Absorption<br>Contact |
| Lead | TLV/TWA: 0.15 mg/m³<br>PEL/TWA: 0.05 mg/m³<br>IDLH: 100 mg/m³ | Weakness, anorexia, abdominal pain, anemia | Solid metal; VP: 0 mm; FP: NA; IP: NA | Inhalation<br>Ingestion<br>Contact |
| Mercury | TLV/TWA: 0.025 mg/m³<br>IDLH: 28 mg/m³ | Cough, chest pain, dyspnea, bronchitis pneumonitis,tremor,insomnia, irritability, indecision, headache, fatigue, weak, stomatitis, salivation, GI disturbance, anorexia; weight lose, proteinuria, eye irritation, skin irritation. | Silver-white, heavy, odorless, liquid. VP: 0.0012 mm, IP: NA. | Inhalation<br>Absorption<br>Contact |

**Table 2-3 (continued)**

| Chemical[a] | TLV/PEL/Activity or DAC/STEL/IDLH[b] | Health Effects/ Potential Hazards[c] | Chemical and Physical Properties[c] | Exposure Route(s)[c] |
|---|---|---|---|---|
| RDX (cyclonite) | TLV/TWA: 1.5 mg/m³<br>Skin notation<br>IDLH: none established | Explosive; irritation of eyes and skin, dizziness, weakness | White powder; FP: explodes;<br>VP: 0.0004 mm at 230°F | Inhalation<br>Absorption<br>Ingestion<br>Contact |
| TNT | TLV/TWA: 0.5 mg/m³<br>Skin notation<br>IDLH: 500 mg/m³ | Irritation of skin and mucus membranes, liver damage, kidney damage | Pale solid; FP: explodes;<br>VP: 0.0002 mm | Inhalation<br>Absorption<br>Ingestion<br>Contact |

[a] The potential chemicals were obtained from the Draft Action Plan for the Ravenna Army Ammunition Plant, May 5, 1995.
[b] From 1994-1995 Threshold Limit Values, 1994 & NIOSH Pocket Guide to Chemical Hazards, 1994.
[c] From 1994 NIOSH Pocket Guide to Chemical Hazards & the Condensed Chemical Dictionary, Tenth Edition.

A1 = confirmed human carcinogen
A2 = suspected human carcinogen
NA = not applicable
IP = ionization potential
TWA = time-weighted average
VP = vapor pressure
DAC = derived air concentration
PEL = permissible exposure limit
GI = gastrointestinal
FP = flash point
STEL = short-term exposure limit
NIOSH = National Institute for Occupational Safety and Health
IDLH = immediately dangerous to life and health
TLV = threshold limit value

## 3. STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

This section presents the personnel (and their associated telephone numbers) responsible for site safety and health and emergency response. Table 3-1 identifies individuals who will fill key roles.

**TABLE 3-1. STAFF ORGANIZATION**

| Position | Name | Phone |
|---|---|---|
| Program Manager | | |
| Health and Safety Manager | | |
| Project Manager | | |
| Subcontractor Field Team Leader | | |
| Field Task Leader | | |
| Site Safety and Health Officer | | |

### 3.1 PROGRAM MANAGER

The Program Manager is responsible for ensuring conformance with United States Army Corps of Engineers (USACE) policies and procedures. Specific responsibilities of the Program Manager include:

- coordinating with USACE personnel;
- ensuring that project managers satisfy USACE health and safety requirements;
- ensuring that project staff implement the Site Safety and Health Plan (SSHP);
- ensuring that projects have the necessary resources to operate safely; and
- ensuring that project personnel have the appropriate regard for safe job performance.

### 3.2 HEALTH AND SAFETY MANAGER

The health and safety manager establishes health and safety policies and procedures, supports project and office activities, and verifies that safe work practices and conditions are being met. The specific responsibilities of the Health and Safety Manager include:

- coordinating with USACE health and safety personnel;
- reviewing and approving SSHPs;

- approving downgrades in personal protective equipment (PPE) or protective procedures; and
- interfacing with project personnel through routine communications and audits of selected projects.

### 3.3 PROJECT MANAGER

The Project Manager is responsible for overall project execution. The responsibilities of the Project Manager include:

- coordinating with USACE personnel, including reporting accidents and incidents to the USACE Project Manager immediately and submitting written reports within 2 working days;
- ensuring implementation of the FSHP and addenda;
- maintaining auditable project documentation of all required records;
- ensuring that a qualified Site Safety and Health Officer (SSHO) is designated; and
- maintaining a current copy of the FSHP and addenda.

### 3.4 FIELD OPERATIONS MANAGER OR TASK LEADER

The Field Operations Manager or Task Leader will oversee the field activities associated with a project and will be responsible for site accessibility, safety, and quality assurance. He/she is responsible for enforcing the field requirements of this FSHP and its addendum. Specific responsibilities of the Field Operations Manager or Task Leader are:

- enforcing compliance with the FSHP and its addendum;
- coordinating on-site operations, including subcontractor activities;
- ensuring that subcontractors follow the requirements of this FSHP and its addendum;
- coordinating and controlling any emergency response actions;
- ensuring that at least two persons currently certified in first aid/cardiopulmonary resuscitation (CPR) are on site during site operations; and
- maintaining current copies of the FSHP and its addendum and the EM 385-1-1 USACE Safety and Health Requirements Manual on site.

### 3.5 SITE SAFETY AND HEALTH OFFICER

The SSHO is responsible for making health and safety decisions, for specific health and safety activities, and for

verifying the effectiveness of the health and safety program. The SSHO's qualifications include, at a minimum, experience with similar projects, knowledge of and understanding of the FSHP and its addendum, and the ability to use the required monitoring equipment. The SSHO has primary responsibility for the following:

- implementing and verifying compliance with this FSHP and its addendum and reporting to the Field Operations Manager or Task Leader, Project Manager, and Health and Safety Manager any deviations from anticipated conditions;

- conducting daily safety inspections;

- documenting deficiencies identified in the daily inspections and responsible parties, procedures, and timetables for correction;

- stopping work or upgrading protective measures (including protective clothing) if uncontrolled health and safety hazards are encountered. Indications of uncontrolled health and safety hazards include monitoring instrument readings in excess of the established action limits, encountering liquids other than water, soil staining suggestive of unexpectedly high concentrations of nonvolatile contaminants, etc. The SSHO must also authorize resumption of work following correction of the adverse condition(s);

- ensuring that site personnel have access to this plan and are aware of its provisions;

- conducting a site-specific pre-entry health and safety briefing covering potential chemical and physical hazards, safe work practices, and emergency procedures;

- maintaining on-site auditable documentation of
  - Material Safety Data Sheets (MSDSs) for applicable materials utilized at the site;
  - training for site workers and visitors;
  - calibration/maintenance of field instruments such as photoionization detectors, combustible gas indicators, etc.;
  - environmental and personal exposure monitoring results;
  - notification of accidents/incidents;
  - reports of any overexposure or excessive levels;
  - notification of employees of exposure data; and
  - medical surveillance.

- confirming that all on-site personnel have received the training listed in the Training Requirements section (Section 4) of this FSHP;

- issuing respirators, as necessary, and ensuring that all respirator users have received medical clearance within the last year, have been properly trained, and have been successfully fitted for respiratory protection;

- verifying that the FSHP's emergency points of contact are correct;

- ensuring that all monitoring equipment is operating according to the manufacturer's specifications and performing field checks of instrument calibration;

- ensuring monitoring for potential on-site exposures is conducted in accordance with this FSHP and its

addendum;

- updating the FSHP addenda (field changes) to ensure that all tasks and significant hazards are identified and notifying project personnel and the Health and Safety Manager of changes;
- investigating accidents and near accidents and reporting (in concert with Field Operations Manager or Task Leader) same to Project Manager and Health and Safety Manager;
- conducting daily "tailgate" safety briefings; and
- controlling visitor access to the exclusion zone.

### 3.6 SUBCONTRACTOR FIELD MANAGER

The Field Manager will oversee the field activities of his/her employees. He/she is responsible for enforcing the field requirements of this FSHP and its addendum. Specific responsibilities are:

- ensuring that his/her on-site personnel follow the requirements of the FSHP and its addendum and any other applicable health and safety requirements [Occupational Safety and Health Administration (OSHA), equipment-specific controls, state requirements];
- verifying that this FSHP adequately addresses the hazards and controls of the subcontracted work, and supplementing the information in the FSHP if necessary;
- ensuring the safe operation of any subcontractor equipment;
- coordinating on-site operations of his/her personnel; and
- maintaining any required documentation (drill rig manual) specific to his/her operations.

# 4. TRAINING

Personnel who participate in the closure of OB unit are subject to the following training requirements. Table 4-1 presents the requirements—in condensed format—and a brief discussion of each training course.

**TABLE 4-1. TRAINING REQUIREMENTS**

| Training | Worker | Supervisor | Site Visitor |
|---|---|---|---|
| HAZWOPER (40-hour, 3-day OJT) | √ | √ | √ |
| HAZWOPER Annual Refresher (8 hour) | √ | √ | √ |
| HAZWOPER Supervisors Training (8 hour) | × | √ | × |
| General Hazard Communication Training (Contained in 40-hour and 8-hour courses) | √ | √ | √ |
| Respiratory Protection Training (required only if respirators are worn; contained in 40-hour course) | √ | √ | √ |
| Hearing Conservation Training (for workers in hearing conservation program; contained in 40-hour and 8-hour courses) | √ | √ | √ |
| Pre-entry Briefing | √ | √ | √ |
| Site Specific Hazard Communication (contained in pre-entry briefing) | √ | √ | √ |
| Safety Briefing (daily and whenever conditions or tasks change) | √ | √ | × |

√ = Required
× = Not required
HAZWOPER = Hazardous Waste Site Operations
OJT = on-the-job training

The following paragraphs present brief summaries of the training requirements. These summaries include a course description and guidance on who must take each course.

## 4.1 OFF-SITE TRAINING

The 40-hour Hazardous Waste Site Worker course is required for hazardous, toxic, and radioactive waste (HTRW) activities in the exclusion (contamination) zone, contamination reduction (buffer) zone, or other

hazardous areas on site. Three days of relevant field experience is required in conjunction with this training.

The 8-hour Hazardous Waste Refresher course is required annually to maintain currency in the 40-hour course.

The Hazardous Waste Supervisors Training is required for personnel who directly supervise hazardous waste site workers. This is an 8-hour course that must be taken once. Note that the 40-hour course is a prerequisite.

General Hazard Communication Training is required for all site workers. This training must communicate the risks and protective measures for chemicals that employees may encounter. This requirement is met by taking the 40-hour Hazardous Waste Site Worker course, annual refreshers, and site-specific training.

Respiratory Protection Training is required for all individuals who wear respirators. This requirement is met by taking the 40-hour Hazardous Waste Site Worker course, annual refreshers, and site-specific training.

Hearing Conservation Training is required on an annual basis by 29 *CFR* 1910.95 for all employees enrolled in a hearing conservation program. This will include all employees exposed to occupational noise in excess of 85 dBA on a time weighted average. This refresher training is provided as part of the Hazardous Waste Refresher course.

## 4.2 SITE-SPECIFIC TRAINING

Personnel on site must have received the investigation-specific safety training. Two versions of this training will be used. The site worker version will contain full information regarding site hazards, hazard controls, and emergency procedures. A shortened version will be used for visitors who will be on site for short times and who will not do hands-on work. This shortened version will contain the hazard information that is directly relevant to the purpose of the visit. Signatures of those attending and the type of briefing must be entered in the field logbook before site access will be granted. Note that casual visitors (package deliverers, observers, etc.) to the support zone will not be required to have the site-specific training. The site-specific training will include the following site-specific information:

- names of site health and safety personnel and alternates;
- contents of the FSHP and appropriate addendum;
- hazards and symptoms of contaminant exposure;
- hazards and symptoms of chemicals present in the workplace;
- physical hazards in the workplace;
- recognition and avoidance of live ordnance;
- location and availability of written hazard communication program;
- site and task PPE (including purpose, donning, doffing, proper use);

- safe work practices to minimize risks;
- safe use of engineering controls and equipment;
- medical surveillance requirements;
- site control measures;
- reporting requirements for spills and emergencies;
- personnel decontamination procedures;
- contingency plans (communications, phone numbers, emergency exits, assembly point, etc.);
- spill containment procedures (reporting, clean-up methods, etc.); and
- emergency equipment locations and use (fire extinguishers, spill kits, etc.).

Safety Briefings will be held at least daily and also when conditions or tasks change. These briefings will be conducted by the SSHO and/or operations manager and will be attended by all site workers and supervisors. These briefings will address site-specific safety issues and will be used as an opportunity to refresh workers on specific procedures and to address new hazards and controls.

## 4.3 DOCUMENTATION

Documentation of the required training will be maintained in the on-site project files. This documentation will include copies of 40-hour, 8-hour refresher, and supervisor training certificates, copies of medical clearance reports, and entries in project logs showing the topics covered, trainer, and signatures of those attending on-site training.

# 5. PERSONAL PROTECTIVE EQUIPMENT

PPE for site tasks is based on potential site-specific hazards. In cases where multiple hazards are present, a combination of protective equipment will be selected so that adequate protection is provided for each hazard. When a conflict exists with the PPE requirements, the more restrictive shall apply. This section emphasizes the programmatic requirements for PPE. For task-specific equipment see the Hazard/Risk Analysis section.

## 5.1 PPE PROGRAM

This PPE program is designed to comply with 29 *CFR* 1910 Subpart I and EM 385-1-1 Section 5. The level of protection and types of materials selected for a particular task are based on the following:

- potential for exposure because of work being done;
- route of exposure;
- measured or anticipated concentration in the medium of concern;
- toxicity, reactivity, or other measure of adverse effect; and
- physical hazards such as falling objects, flying projectiles, etc.

In situations where the type of contamination, concentration, and probability of contact are not known, the appropriate protection is selected based on the professional judgment of the Health and Safety Manager until the hazards are further evaluated.

The SSHO may raise or lower the level of PPE worn by the teams, depending upon the site-specific hazards encountered in the field. Prior to lowering the level of PPE, the Field Task Leader and the Health and Safety Manager will be contacted/consulted and the results documented. If site conditions are such that the level of PPE is insufficient or work must be stopped, the SSHO will take appropriate action immediately and the appropriate personnel (see above) will be contacted afterwards. Criteria indicating a possible need for reassessment of the PPE selection include the following:

- commencement of an unplanned (hazard not previously assessed) work phase;
- working in unplanned temperature extremes;
- evidence of contamination such as discolored soil or elevated instrument readings near the soil;
- exceeding the action limits; or
- changing the work scope so that the degree of contact with contaminants changes.

## 5.2 TYPES OF EQUIPMENT

This section presents the types of protective clothing that may be used for the project. Requirements for task-specific levels of protective clothing are presented in the Hazards Analysis table (Table 2-2). Levels of protection that will be used to protect against chemical and physical hazards at this site include:

- Level C Protective Equipment
  - full-face respirator and air purifying cartridges capable of filtering out organic vapors, acid gasses, and radionuclides
  - hooded chemical-resistant clothing (Polyethylene-coated Tyvek® or equivalent) with all openings taped
  - two pair chemical-resistant gloves (nitrile and exam gloves)
  - safety boots
  - shoe covers
  - hard hat (if overhead hazards are present)

- Level D+ Protective Equipment
  - Tyvek® or equivalent coveralls
  - nitrile or polyvinyl chloride (PVC) gloves
  - safety boots
  - boot covers
  - hard hat (if overhead hazards are present)
  - safety glasses with side shields

- Level D Protective Equipment
  - coveralls/field clothes
  - safety boots
  - safety glasses with side shields
  - hard hat (if overhead hazards are present)
  - nitrile or equivalent gloves if contaminated materials are handled

## 5.3 CLEANING, STORAGE, AND PROGRAM VERIFICATION

If site tasks require the use of chemical protective clothing, disposable clothing will be used and will be disposed as part of project generated waste. Unused chemical protective clothing will be stored in clean staging areas until needed. The SSHO will verify that the PPE in use is appropriate and is being used properly.

## 6. MEDICAL SURVEILLANCE

All employees performing on-site hazardous waste-related work will be enrolled in a medical surveillance program to meet the requirements of [29 *CFR* 1910.120(f), 1910.134, 1910.20] to assess and monitor workers' health and fitness for employment in this field. Employees are provided with summaries of medical examination results following each examination and are provided more detailed information upon written request.

### 6.1 FREQUENCY OF EXAM

The frequency of employee medical exams shall be as follows:

- prior to assignment;
- once every 12 months for each employee covered unless the attending physician believes a shorter or longer interval (not to exceed 2 years) is appropriate;
- at termination of employment or reassignment to an area where the employee would not be covered, if the employee has performed field work since his/her last examination and has not had an examination within the last 6 months;
- as soon as possible upon notification by an employee that he/she has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that the employee has been injured or exposed above the permissible exposure limit (PEL) or published exposure levels in an emergency situation.

### 6.2 MEDICAL EXAM CONTENT

Medical examinations shall include a medical and work history (or updated history if one is available in the employee's file) with special emphasis on symptoms related to the handling of hazardous substances. The examination will determine potential health impairments and fitness for duty, including the ability to wear any required PPE. As a minimum, the exam will include:

- collection of information on the employee's medical and work history;
- hands on examination;
- audiometry;
- blood screen such as Sequential Multiple Analyzer with Computer 24;
- chest P/A X-ray at intervals specified by attending physician;
- complete blood count;

- electrocardiogram for persons older than 45, or where medically indicated;
- physical examination;
- spirometry (forced expiratory volume/forced vital capacity); and
- urinalysis (dipstick and microscopic).

## 7. EXPOSURE MONITORING/AIR SAMPLING PROGRAM

Assessment of airborne chemical concentrations will be performed, as appropriate, to ensure that exposures do not exceed acceptable levels. Action levels, with appropriate actions, will be established for this monitoring. In addition to the specified monitoring, the SSHO may perform, or require, additional monitorting, such as, personnel exposure monitoring for specific chemicals. The deployment of monitoring equipment will depend on the activities being conducted and the potential exposures. All personal exposure monitoring records will be maintained in accordance with 29 *CFR* 1910.20. The minimum monitoring requirements and action levels for OD unit closure work are presented in Table 7.1.

## TABLE 7.1. MONITORING REQUIREMENTS AND ACTION LIMITS

| Hazard or measured parameter | Area | Internal | Limit | Action | Tasks |
|---|---|---|---|---|---|
| Oxygen content with meter | Any area where low oxygen is suspected | First entry into enclosed areas | < 19.5% > 23% | Withdraw and allow area to ventilate; notify the Project Manager and the H&S Manager | Initial entry into igloo after it has been closed |
| Noise | Area near an opertating drill rig | When work is initiated and when there is a change in work | 85 dBA and any area perceived as noisy | Require the use of hearing protection | Hearing protection will be worn within the exclusion zone around drill rigs,excavation equipment, and generators |
| Visible contamination | All | Continuously | Visible contaminati on of skin or personal clothing | Upgrade PPE to preclude contact. May include disposable coveralls, boot covers, etc. | All |
| Dust | All | Continuously | Visible dust generation | Use of plastic sheeting to minimize and contain dust | All |

# 8. HEAT/COLD STRESS

## 8.1 MONITORING AND CONTROLS

Important factors in preventing heat stress-induced illnesses are acclimatization, consumption of copious quantities of fluids, and appropriate work/rest cycles. General controls will consist of making fluids readily available, use of the buddy system, and taking scheduled and unscheduled breaks in a temperature-controlled environment as necessary. The following specific steps will be taken to reduce the potential for heat stress-induced illness.

- If ambient temperatures exceed 70 degrees F, site training will include heat stress control, recognition of heat stress induced illness, and first aid for heat stress.

- If ambient temperatures exceed 70 degrees F, cool Gatorade or equivalent drink will be made conveniently available to site workers.

- If ambient temperatures exceed 70 degrees F, workers will be instructed to monitor their own and their buddy's condition relative to heat stress.

- Workers will be allowed to take unscheduled breaks, if needed.

- Workers wearing Tyvek® or other impermeable clothing when ambient temperatures exceed 70 degrees F will be monitored for heat stress by taking their pulses at the beginning of each rest period. If any worker's heart rate exceeds 110 beats per minute, the next work period will be shortened by one third [From NIOSH/OSHA/United States Coast Guard (USCG)/U.S. Environmental Protection Agency (EPA); Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities].

- An initial work rest cycle will be established for employees wearing impermeable clothing based on the adjusted air temperature [ta adj in degrees F = degrees F in shade + (13 × percent sunshine)]. The length of each work period will be as follows (From NIOSH/OSHA/USCG/EPA; Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities).

| ta adj in degrees F | work period |
|---|---|
| 72.5 to 77.5 degrees F | 120 minutes |
| 77.5 to 82.5 degrees F | 90 minutes |
| 82.5 to 87.5 degrees F | 60 minutes |
| 87.5 to 90 degrees F | 30 minutes |
| ≥90 degrees F | 15 minutes. |

Critical factors in preventing cold stress disorders are adequate clothing and staying dry. The SSHO and Field Task Leader will ensure the capability to quickly move individuals who become wet to a sheltered, warm area. The following specific steps will be taken (adapted from American Conference of Governmental Industrial Hygienists Threshold Limit Values booklet).

- If ambient temperatures are less than 40 degrees F, site training will include prevention of cold injury, cold injury symptoms, and cold injury first aid.

- A heated break area will be provided if ambient temperatures are less than 32 degrees F.
- As a minimum, breaks will be taken in a warm area every 120 minutes if ambient temperatures are less than 32 degrees F.
- Workers will be allowed to take unscheduled breaks, if needed, in a warm area.
- No outdoor work will be performed if the equivalent chill temperature (temperature combined with the effect of wind) is less than -29 degrees F.

## 8.2 HEAT/COLD STRESS INDUCED ILLNESS

Heat cramps are caused by heavy sweating and inadequate electrolyte replacement. Signs and symptoms include muscle spasms and pain in the hands, feet, and abdomen.

Heat exhaustion occurs from increased stress on various body organs. Signs and symptoms include:

- Pale, cool, moist skin
- Heavy sweating
- Dizziness, nausea
- Fainting

Heat stroke is the most serious form of heat-related illness and should always be treated as a medical emergency. The body's temperature regulation system fails, and the body temperature rapidly rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occurs. Signs and symptoms of heat stroke include:

- Red, hot, usually dry skin
- Lack of, or reduced perspiration
- Nausea
- Dizziness and confusion
- Strong, rapid pulse and confusion
- Coma

Hypothermia is the uncontrolled loss of body heat. As the body's core temperature decreases, bodily functions are slowed. The victim becomes weak and disoriented and may become comatose if steps are not taken to return the core temperature to the normal range. Hypothermia can occur whenever temperatures are below 45 degrees F and is most common during wet, windy conditions, with temperatures between 40 to 30 degrees F. The principal cause of hypothermia in these conditions is loss of insulating properties of clothing due to moisture, coupled with heat loss due to wind and evaporation of moisture on the skin.

Frostbite is the freezing of body tissue, which ranges from superficial freezing of surface skin layers to deep freezing of underlying tissue. Frostbite will only occur when ambient temperatures are below 32 degrees F. The risk of frostbite increases as the temperature drops and wind speed increases.

# 9. STANDARD OPERATING SAFETY PROCEDURES

This section presents those general safety rules that apply to all operations performed by subcontractors at the RVAAP installation. The provisions of the plan are mandatory for all on-site employees and visitors. This includes employees engaged in initial site reconnaissance, preliminary field investigations, mobilization, project operations, and demobilization.

## 9.1 SITE RULES

The following rules apply to all site activities.

- The OSHA poster #2203 will be prominently displayed on site.
- Daily safety briefings ("tailgate") will be held during field activities to inform personnel of new hazards or procedures.
- The SSHO or Field Operations Manager or Task Leader will conduct and document daily safety inspections.
- The SSHO, project personnel, or management personnel are responsible to suspend/stop work and require all personnel to evacuate the affected area if any of the following situations occur:
  - inadequate health and safety precautions on the part of any on-site personnel,
  - potential significant environmental insult as a result of planned activities.
- Personnel will perform only those tasks that they believe can be performed safely.
- Personnel will notify the SSHO of any medical conditions (e.g., allergic to bee stings, diabetes, pregnancy) that require special consideration.
- Personnel will maintain proper workplace housekeeping to minimize the potential for tripping and other accidents.
- Contact with potentially contaminated substances will be avoided. Site personnel in the exclusion zone will avoid walking through puddles, pools, mud, kneeling on the ground, and placing equipment on the ground.
- Spills will be prevented to the extent possible. In the event that a spill occurs, the material will be contained.
- All injuries and accidents requiring first aid will be reported to the SSHO, Field Operations Manager or Task Leader, and USACE.
- All workers in the exclusion zone or other hazardous areas will abide by a buddy system. Members of a buddy team will maintain verbal or visual contact.

## 9.2 PERMIT REQUIREMENTS

All permits necessary for the safe execution of this project be will obtained and/or coordinated with USACE. As a minimum, this will include digging permits/clearance from local utilities prior to any drilling, excavation, etc.

## 9.3 DRUM/CONTAINER HANDLING

Any drums used for the project will meet the requirements of the Facility-wide Sampling and Analysis Plan and its addenda.

## 9.4 CONFINED SPACE ENTRY

Any confined space entry will be performed in conformance with the requirements of 29 *CFR* 1910.146 and EM 385-1-1 Section O6I.

The applicable requirements are: completion of an entry permit, atmospheric testing for oxygen (must be 19.5 to 22 percent), atmospheric testing for toxic gases (must be less than 5 ppm), atmospheric testing for flammable gases (must be less than 10% LEL), and stationing an attendant nearby but outside the excavation.

## 9.5 HOT WORK, SOURCES OF IGNITION, FIRE PROTECTION

- This work will be conducted in accordance with EM 385-1-1 Section 9.
- Hot work (oxyfuel cutting) will be conducted using welder's helmet or shaded goggles, leather gloves, and long-sleeved shirt.
- A fire extinguisher rated not less than 10-ABC will be immediately available in the vicinity of hot work.
- Sources of ignition will be kept at least 15.2 meters (50 feet) from flammables storage areas.
- Flammables storage areas will be posted with signs indicating "No smoking or open flame."
- At least one fire extinguisher with a rating of not less than 20-B will be kept 7.6 to 22.9 meters (25 to 75 feet) from all flammables storage areas.
- An approved flammables cabinet will be used to store 94.6 or more liters (25 or more gallons) of flammable liquid.
- Flammable liquids (other than decontamination solvents) will be kept in safety containers with flame arresters.

## 9.6 ELECTRICAL SAFETY

- This work will be conducted in accordance with 29 *CFR* 1910 Subpart S and EM 385-1-1 Section 11.
- All portable electrical equipment will be double insulated or grounded and connected through a ground fault circuit interrupter.
- Conductive materials (drill rigs) will be kept clear of energized power lines. The following minimum distances will be observed: 0-50 kV (10 feet); 51-100 kV (12 feet); 101-200 kV (15 feet); 201-300 kV (20 feet); 301-500 kV (25 feet); 501-750 kV (35 feet); 750-1000 kV (45 feet).

## 9.7 MACHINE GUARDING

All equipment will be operated with all guards provided by the manufacturer and in compliance with 29 *CFR* 1910 Subpart O and EM 385-1-1 Section 16B. If any guarding must be removed for servicing, the equipment will be disabled to preclude movement or release of energy.

## 9.8 EXCAVATION AND TRENCH SAFETY

Trench excavation potentially poses the following hazards; contact with buried utilities, trench cave-in and engulfment, confined space hazards such as hazardous airborne concentrations of toxic chemicals, flammable concentrations of vapors or gases, and oxygen deficiency. No such activities are anticipated for this project.

## 9.9 LOCKOUT/TAGOUT

All potentially hazardous servicing or equipment repair will be governed by 29 *CFR* 1910.147 and EM 385-1-1 Section 12. No such activities anticipated for this prject.

## 9.10 FALL PROTECTION

Work areas with the potential for a fall of 1.2 meters (4 feet) or more will be provided with fall protection in compliance with EM 385-1-1 Section 21.A.15. This fall protection will consist of guardrails or personal fall protection. Personal fall protection will be used if it is necessary for drilling personnel to climb the mast or derrick.

## 9.11 HAZARD COMMUNICATION

Hazard communication will be governed 29 *CFR* 1910.1200 and EM 385-1-1 Section 8. As a minimum, the following steps will be taken.

- All hazardous materials on site will be labeled to comply with the hazard communication standard.
  - — clear labeling as to the contents,
  - — the appropriate hazard warning, and
  - — the name and address of the manufacturer.

- MSDSs will be available on site for all hazardous materials that are present.
- Site-specific training will include the hazards posed by site chemicals, protective measures, and emergency procedures.
- Copies of MSDSs for all hazardous chemicals (chemicals brought on site) will be maintained in the work area. MSDSs will be available to all employees for review during each work shift.

## 9.12 ILLUMINATION

All field work will be conducted during daylight hours (no earlier than 15 minutes after sunrise and no later than 15 minutes before sunset) and natural illumination will be used. Non-field work conducted in buildings will be illuminated to meet the following minimums stated in 29 *CFR* 1910.120(m) and EM 385-1-1 Section 7: general outdoors 3-foot candles, stairs and ladders 10-foot candles, offices 50-foot candles, and first aid areas 30-foot candles.

## 9.13 SANITATION

- Sanitation will comply with 29 *CFR* 1910.120(n) and EM 385-1-1 Section 2.
- Means for washing hands and faces prior to eating will be provided at the work site.
- Potable drinking water will be provided in labeled, sanitary dispensers.
- Toilets shall be provided according to the following: ≤20 employees = 2 toilets, 21 to 199 employees = 1 toilet seat and 1 urinal per 40 workers.

## 9.14 DRILL RIG OPERATIONS

### 9.14.1 General Drilling Practices

General Drilling Practices will comply with EM 385-1-1 Section 16M.

- Operating manuals will be present on site for each type of drill rig in use.
- Drill rigs will have at least two functional kill switches, one for the driller and one for the driller's helper. These switches will be confirmed to be functional each day that the rig is used.
- Drill rigs will have functional backup alarms.
- Drill rigs will be inspected weekly by the driller and this inspection will be confirmed by the SSHO.
- Only the driller, driller's helper, and personnel who have a critical need will be allowed near moving parts of the drill rig.

- Drill sites will be verified free of underground utilities by clearing each site with local utilities or appropriate installation personnel prior to beginning drilling.
- Drill-mounted fire fighting equipment will not be tampered with and will not be removed for other than the intended fire-fighting purposes or for servicing.
- Drilling crews and personnel who work near the drill rig will be trained in the location and use of the kill switches.
- If lubrication fittings are not accessible with guards in place, machinery will be stopped and disabled (locked out or ignition key removed) for oiling and greasing.
- Work areas and walkways will not be obstructed.

### 9.14.2 Hoisting Operations

- The derrick (mast) will not be raised unless the area is free of overhead obstructions and far enough (see Electrical Safety) from power lines.
- The derrick will not be raised until the rig has been blocked, leveled, and chocked.
- Rigging equipment for material handling will be checked prior to use on each shift and as often as necessary to ensure it is safe. Defective rigging will be removed from service.
- A hoisting line with a load imposed will not be permitted to be in direct contact with any derrick member or stationary equipment, unless it has been specifically designed for line contact.
- Workers will stand clear of the well bore when any wire line device is being run.
- No loads will be lifted over workers.

### 9.14.3 Cat Line Operations

- The cat head area will be kept free of obstructions and entanglements.
- The operator will not use more wraps than necessary to pick up the load. More than one layer of wrapping is not permitted.
- Personnel will not stand near, step over, or go under a cable or cat line that is under tension.

## 9.15 UNEXPLODED ORDNANCE

At a minimum, the unexploded ordnance (UX0) procedures listed below for work at the OB unit will be followed:

- All on-site workers will be trained to recognize the types of ordnance formerly handled on the facility.

- Subcontractors will not handle, move, or otherwise disturb ordnance or any items that cannot be identified as non-ordnance.

- If ordnance or potential ordnance is discovered, work will be stopped and the area will be evacuated and cordoned off.

- If ordnance or potential ordnance is discovered, the facility security organization will be notified immediately.

- If ordnance or potential ordnance is discovered, the USACE project manager will be notified immediately.

- For work in areas where UXO may reasonably be expected (former ordnance disposal sites), qualified EOD subcontractors will survey (visual and magnetometer) prior to intrusive work to preclude disturbing subsurface UXO.

## 10. SITE CONTROL MEASURES

The SSHO will be responsible for establishing the site control zones, as necessary, around areas that present physical or chemical hazards. Implementation of the site control zones will help to minimize the number of employees potentially exposed and to minimize the potential for the spread of contamination. The SSHO will monitor the implementation of the required site control work rules and will report any deviations from prescribed practice to the Field Operations Manager or Task Leader or stop work, as appropriate.

As a general rule, an exclusion zone will be established around any task or area that poses a potential to spread contamination or injure personnel.

### 10.1 EXCLUSION ZONE

The exclusion (contamination) zone is the area where the greatest potential exists for exposure to contamination or physical hazards. The periphery of the exclusion zone will be identified by barricade tape or rope suspended above the ground. An entry and exit checkpoint will be visually defined to regulate the flow of personnel and equipment. The entry and exit checkpoint will be delineated with barricade tape/rope and signs. Signs may include "Construction Area," or "High Noise Area," as deemed appropriate by the SSHO. The number of people and equipment in the exclusion zone will be minimized to control physical hazards and the spread of contamination.

The following standard rules will apply to all entry into the exclusion zone.

- The SSHO or Field Task Leader must approve (and log) entry into the exclusion zone.
- All personnel entering the exclusion zone will wear the prescribed level of protective clothing.
- All items and related paraphernalia intended to be placed on the face or in the mouth (cigarettes, lighters, matches, chewing tobacco, food, cosmetics, etc.) are prohibited in the exclusion zone.
- All personnel in the exclusion zone will follow the buddy system.

Exclusion zones will be established around drilling sites, areas of heavy equipment use, and all activities where contamination is a potential hazard. As a minimum, the exclusion zone will extend 25 feet from the hazard. For drilling operations, the exclusion zone will also be at least equal to the mast height in radius so that no part of an overturned drill rig will fall outside the zone. A larger exclusion zone will be used, as necessary, to protect bystanders and the public from chemical or other hazards. Exclusion zones for other activities will be appropriate to the hazard and surroundings.

### 10.2 CONTAMINATION REDUCTION ZONE

A contamination reduction (buffer) zone will be established, as necessary, outside the exclusion zone to provide a transition from and a buffer between the exclusion zone and the support zone. A formal contamination reduction zone for personnel will not be established unless Level D+ PPE or higher level (A, B, C) is used, or significant surface contamination is present or suspected. An entry and exit checkpoint will be visually defined at the periphery of the zone to regulate the flow of personnel and equipment. The entry

and exit checkpoint and the perimeter of the zone will be delineated with the use of ropes/barricade tape and signs. A contamination reduction zone will be established around the central equipment decontamination pad.

All personnel entering the contamination reduction zone will wear the prescribed level of protective clothing required for that zone. All items intended to be placed on the face or in the mouth (e.g., cigarettes, chewing tobacco, food, cosmetics, etc.) are prohibited in the contamination reduction zone. Doffing of protective clothing and personnel decontamination will occur in the contamination reduction zones.

## 10.3 SUPPORT ZONE

The support zone is the clean and relatively safe area surrounding the exclusion and contamination reduction zones. Entry requirements for the support zone consist of those required for entry into the general area of the facility. Primary functions of the support zone are:

- staging area for clean equipment and supplies and
- location for support services [e.g., office trailers, laboratory trailers, eating area(s), toilet facilities, parking, visitor area(s), etc.].

## 10.4 SITE VISITORS

Visitors will not be allowed inside controlled areas without specific approval of the SSHO and Field Manager. Visitors must meet all regulatory (specifically 29 *CFR* 1910.120) and site H&S requirements (proof of training, medical surveillance, etc.) to be considered for entry into an exclusion or contamination reduction zone. Visitors will sign in on the site entry log and will receive a health and safety briefing appropriate to the nature of the visit and the potential hazards associated with the visit. Visitors are requested to contact the Project Manager or Field Manager prior to visiting to convey information such as the date and purpose of the visit. If a visitor refuses to abide by these requirements, site operations will cease and the USACE Project Manager will be contacted.

## 10.5 SITE COMMUNICATION

Field personnel will be capable of contacting other field personnel and outside agencies. Communication on site will be assured by hand-held radio, portable air horns, or vehicle horns. Short blasts (less than 1/2 second) of an air horn or car horn will be used to request assistance. Prolonged blasts (more than 2 seconds) will be used to signal an evacuation. If phone service is not immediately available on the site, the crew will be equipped with a cellular phone.

## 11. PERSONNEL HYGIENE AND DECONTAMINATION

A system of procedures will be used to control the spread of contamination from the exclusion (contamination) zone and to ensure that workers are sufficiently free of contamination to preclude adverse health effects. PPE doffing and personnel decontamination are part of this system. The SSHO will ensure the construction of a decontamination station, as necessary, instruct personnel on its proper use, and verify that personnel follow the appropriate steps. This section presents basic requirements for personnel decontamination keyed to the level of protective clothing in use. Note that the levels of protective clothing required for particular tasks are specified in the Hazards Analysis Table (Table 2-2). These requirements may be modified by the SSHO if improvements are needed.

### 11.1 LEVEL D PROTECTION DECONTAMINATION

Station 1: Removal of disposable gloves and boot covers, if worn

Deposit disposable gloves and boot covers in a designated container. Note that this step is necessary only if gloves and boot covers are in use.

Station 2: Field wash

Wash face and hands prior to taking anything by mouth. This may be done with soap and water or disposable disinfectant towels.

### 11.2 LEVEL D+ PROTECTION DECONTAMINATION

Station 1: Tape removal

Remove all tape (if used) from outer clothing and place in appropriate waste container.

Station 2: Boot covers, outer disposable garment, and gloves removal

Carefully remove boot covers, outer contamination-resistant garment, and gloves.

Station 3: Field wash

Wash hands and face prior to eating, drinking, smoking, etc. This step may be accomplished with soap and water or disposable disinfectant wipes.

### 11.3 LEVEL C PROTECTION DECONTAMINATION

Station 1: Segregated equipment drop

Deposit equipment used on site (tools, sampling devices, containers, monitoring instruments, clipboards, etc.)

on plastic sheets or in different containers with plastic liners. Segregation of the equipment at the drop site reduces the possibility of cross-contamination.

Station 2: Outer boot and glove removal

Remove tape from outer boots and outer gloves. Remove outer boot covers and outer gloves. Deposit gloves and boot covers in plastic trash bags.

Station 3: Cartridge change

If a worker has left the exclusion zone for the sole purpose of changing a canister/cartridge of the respirator, this is the last step of the decontamination procedure. Once the worker's canister/cartridge has been replaced, the outer boots and gloves will be replaced and retaped so that all potential pathways to the skin are sealed.

Station 4: Disposable outer garment removal

Remove disposable outer garment, deposit in a plastic trash bag, and dispose in accordance with the project Field Sampling Plan.

Station 5: Respiratory protection and disposable inner glove removal

The respirator is the next-to-last item for removal. The cartridges/canisters are placed in a plastic trash bag and disposed of in accordance with the project Field Sampling Plan. The respirator is placed in a plastic bag dedicated for used respirators only. Remove disposable inner gloves last and deposit them in a plastic trash bag, in accordance with the project Field Sampling Plan.

Station 6: Field wash

Wash hands and face prior to eating, drinking, smoking, etc. This step may be accomplished with soap and water or disposable disinfectant wipes.

## 12. EQUIPMENT DECONTAMINATION

The central equipment decontamination station will be constructed so that liquids generated during decontamination will be contained. Sampling and related equipment will be decontaminated to a level sufficient to prevent cross-contamination of subsequent samples. This stringent requirement assures that decontaminated sampling equipment is sufficiently clean from a personnel contact perspective. Larger pieces of equipment, such as drill rigs, will be decontaminated with pressurized hot water/steam. The following description of the sampling equipment decontamination process is intended to provide only a general overview.

Steps will be taken to assure that transportation of sampling equipment does not spread contamination to previously uncontaminated areas. Sampling and related equipment will be screened for contamination prior to being transported to the decontamination station. Any equipment that is deemed to be heavily contaminated will be decontaminated in the immediate area of the sample collection, or will be wrapped in plastic during transit.

## 13. EMERGENCY PROCEDURES AND EQUIPMENT

The Field Operations Manager or Task Leader will remain in charge of all personnel during emergency activities. The Field Operations Manager or Task Leader will perform emergency notification of emergency medical services, fire department, USACE Project Manager, Health and Safety Manager, etc. In order to minimize the potential for accidents and injuries, daily safety and health inspections will be conducted by the Field Operations Manager or Task Leader or SSHO. If an emergency occurs, the Field Operations Manager or Task Leader, the SSHO, and the field team will participate in a briefing to discuss the event, identify the causes, identify corrective measures, and evaluate the responses.

In the event of an accident or incident, the Field Operations Manager or Task Leader or Project Manager will notify the USACE Project Manager immediately according to the requirements of EM 385-1-1. The required Accident Reports will be completed and submitted within two days.

In the event of an accident or incident, the Field Operations Manager or Project Manager will investigate and notify the USACE Project Manager immediately (within 24 hours) according to the requirements of EM 385-1-1. An accident investigation form (ENG Form 3394) will be completed and submitted in accordance with AR 385040 and Supplement and submitted to the USACE Occupational Safety and Health Office at the following address:

U.S. Army Corps of Engineers
Nashville District
Safety and Occupational Health
CEORN-SO (ATTN: Emmett E. Forte)
Nashville, TN 37202-1070
(615) 736-7179

An accident follow-up report will also be completed and submitted within one week of the incident and submitted to the same address.

All personnel working on site will be trained in the requirements of this section. This will include recognizing emergencies, reporting emergencies to the Field Operations Manager or Task Leader or SSHO, and responding to emergencies. Employees will also be informed of any changes in potential emergencies or response plans.

### 13.1 POTENTIAL EMERGENCIES

Credible potential emergencies for this project include fires, minor chemical spills, and personnel injury.

#### 13.1.1 Fires

Small quantities of flammable liquids [typically less than 18.9 liters (5 gallons)], such as, gasoline, and diesel fuel may be present on site. In the event of a fire, the local fire department will be notified immediately. If it is safe to do so, on-site personnel will attempt to extinguish the fire with the available fire extinguishers and isolate any nearby flammable materials. If there is any doubt about the safety of extinguishing the fire, site personnel will evacuate the area. The supervisor or knowledgeable employee will provide the fire department with relevant information when they arrive.

### 13.1.2 Spills

Potential spills include releases of fuels, and lubricants. In the event of a spill or leak, the employee making the discovery will immediately notify the SSHO and/or the Field Operations Manager or Task Leader. The Field Operations Manager or Task Leader will determine whether the leak poses an environmental risk or will exceed the capacity of on-site personnel and equipment. In the unlikely event that there is a probability that the spill will extend beyond the immediate area, result in an environmental insult, or exceed the capabilities of the on-site personnel, the Field Operations Manager or Task Leader will inform the local fire department and hazardous materials response team. If this is not the case, the on-site spill kit will be utilized to clean up the spill.

### 13.1.3 Medical Emergencies

Field crews will use a variety of equipment that could cause injuries. In the event of a medical emergency, the Field Operations Manager or Task Leader will notify the local emergency medical service immediately. At least two first aid/CPR-trained individuals will be on site at all times and these personnel will provide first aid pending release of the injured person to emergency medical staff. Contaminated injured personnel will be decontaminated to the extent feasible. Personnel with minor injuries will follow normal decontamination procedures. Personnel with serious injuries will be decontaminated, if necessary, by disrobing and wrapping in a blanket. Decontamination may be bypassed in the event of life-threatening injuries or illnesses.

## 13.2 EMERGENCY PHONE NUMBERS

Listed below are emergency groups and their telephone numbers. A telephone and 2-way radios will be present in the field and available for use. Silas Mason Co., Inc. will be contacted first for any emergency service. Silas Mason Co., Inc. will then coordinate the response.

**TABLE 13.1 EMERGENCY PHONE NUMBERS**

| Emergency Group | Telephone No. |
|---|---|
| Police (Mason and Hanger-Silas Co., Inc.) | 358-7406/7409<br>Pager: 216-626-0825 |
| Emergency medical service (Borowski Funeral Home, Ravenna) | 872-5050 |
| Hospital (Robinson Memorial, Ravenna) | 297-2449/0811 |
| Fire department (City of Ravenna) | 297-5738 |
| Hazardous materials response (Silas Mason Co., Inc.) | 358-7406/7409 |
| USACE, Nashville District | 615-736-2712 |
| Health and Safety Manager | |

Robinson Memorial Hospital is located approximately 32 km (20 miles) from the site at 6847 N. Chestnut Street in Ravenna, Ohio. It can be reached by taking Highway 5 E. approximately 11 km (7 miles), Highway

5 approximately 3.2 km (2 miles), Highway 76 approximately 16 km (10 miles), Highway 59, then right onto Highway 44 (Chestnut Street).

## 13.3 EMERGENCY ALERTING

Each team will have a means for generating an audible alarm, which will consist of a compressed gas horn or vehicle horn. These devices will be used to signal to other project personnel in the event of accidents or emergencies. Short blasts (less than 1/2 second) of the horn will be used to request assistance, while extended blasts (more than 2 seconds) will signal an evacuation.

## 13.4 EVACUATION

The SSHO or Field Operations Manager or Task Leader will designate the evacuation routes and an assembly area. All employees will be familiar with the evacuation routes and assembly area.

## 13.5 EMERGENCY EQUIPMENT

Several items of emergency equipment will be maintained at the work site. Any incident that is not clearly controllable by personnel wearing standard site clothing plus protective gloves and using the listed equipment will require reevaluation by the SSHO. If the SSHO does not feel that on-site personnel can safely control the emergency with the available equipment, the crew will use an alternate approach such as allowing a small fire to burn out or evacuating the site. The required emergency equipment includes:

- 16-unit first aid kit indoors or in weatherproof container, inspected weekly;
- compressed gas horns;
- emergency eye wash to meet American National Standards Institute standard if corrosives (water sample preservatives) are being poured;
- fire extinguisher(s) (at least 20-B) 7.6 to 22.9 meters (25 to 75 feet) from outside flammables storage (or use) area;
- basic spill kit suitable to handle small spills of decontamination fluids, hydraulic fluid, or fuels and containing sorbent pads, tubes, and nitrile or similar gloves; and
- telephone and 2-way radios.

## 14. LOGS, REPORTS, AND RECORD KEEPING

A system of reports and logs will be used to document activities related to site Health and Safety. Field team leaders and the SSHO will generate a brief weekly summary of Health and Safety issues and resolutions. These reports will include injuries, accidents, near accidents, interpretations of the regulations, interactions with auditors/regulators/USACE personnel, and any off-normal events. These reports will be limited to one page or less.

In addition to the weekly reports, the following documents will be generated and submitted to the USACE Project Manager.

- Training logs will contain information covered and the signatures of the trainer and those attending. These logs will contain documentation of pre-entry (project start) training, routine ("tailgate") safety briefings, and visitor training.

- Daily safety inspection logs will contain the dates of inspections, identity of the person doing the inspection, the examined areas/activities/equipment, any deficiencies, and any corrective actions taken.

- Equipment maintenance logs will contain the dates and types of routine maintenance performed on site equipment.

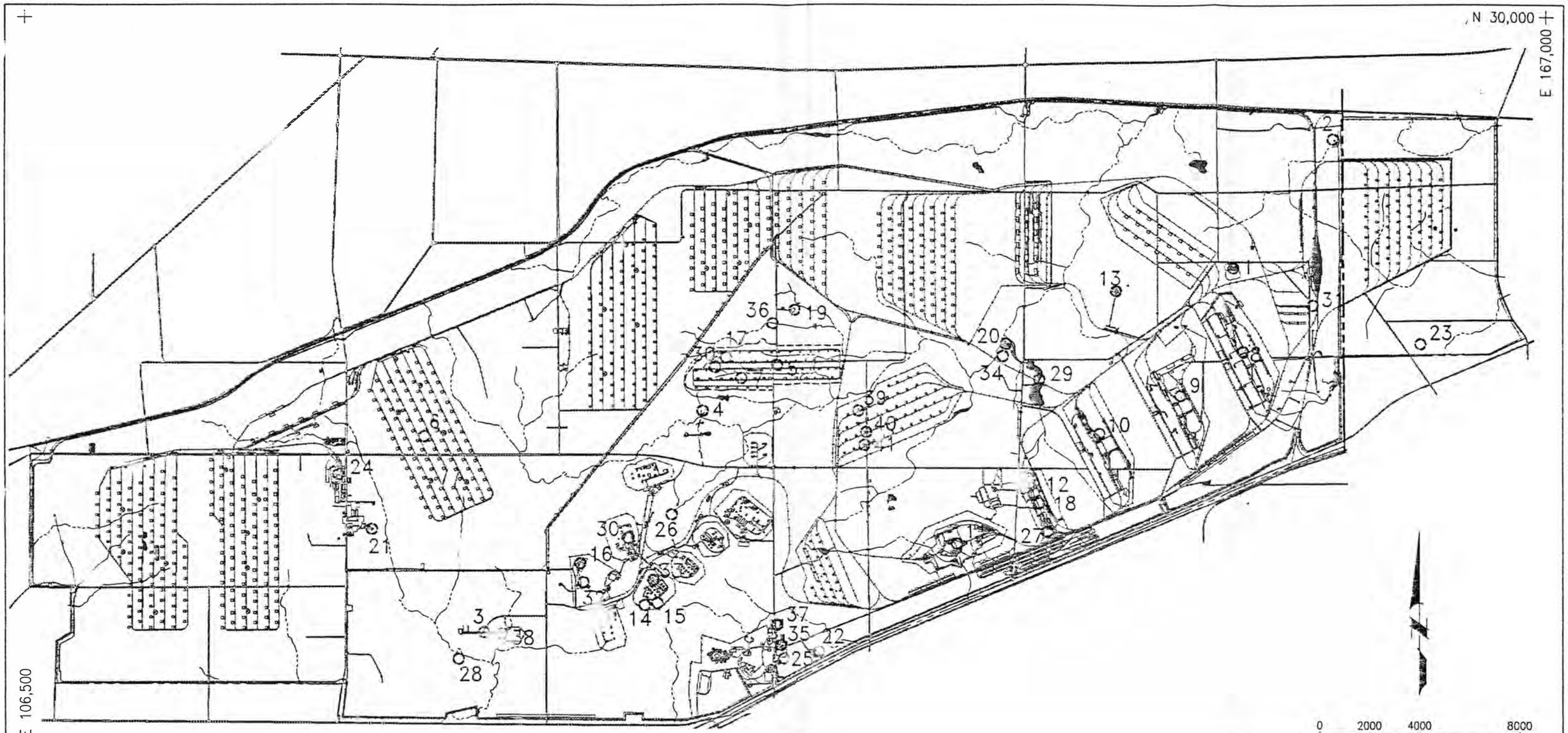
- Employee/visitor register will be a sign-in log for all site employees and visitors. It will contain the names of all personnel who perform on-site work or visit the site. It will not contain the names of delivery or similar personnel.

- Environmental and personal exposure monitoring/sampling results will be maintained in a log that will contain monitoring data, location and time of monitoring, types of work being done, calibration records, and the identities of personnel performing monitoring.

Reporting forms are included in Attachment C.

**ATTACHMENT A**

**SITE MAP**




## LEGEND OF SITES:

1 ..... RAMSDELL QUARRY LANDFILL
2 ..... ERIE BURNING GROUNDS
3 ..... DEMOLITIONS AREA #1
4 ..... DEMOLITIONS AREA #2
5 ..... WINKLEPECK BURNING GROUNDS
6 ..... C BLOCK QUARRY
7 ..... BLDG 1601 HAZARDOUS WASTE STORAGE
8 ..... LOAD LINE 1 AND DILUTION/SETTLING POND
9 ..... LOAD LINE 2 AND DILUTION/SETTLING POND
10 ..... LOAD LINE 3 AND DILUTION/SETTLING POND
11 ..... LOAD LINE 4 AND DILUTION/SETTLING POND
12 ..... LOAD LINE 12 AND DILUTION/SETTLING POND
13 ..... BLDG 1200 AND DILUTION/SETTLING POND
14 ..... LOAD LINE 6, EVAPORATION UNIT
15 ..... LOAD LINE 6, TREATMENT PLANT
16 ..... QUARRY LANDFILL/FORMER FUZE & BOOSTER BURNING PITS
17 ..... DEACTIVATION FURNACE
18 ..... LOAD LINE 12 PINK WASTE WATER TREATMENT
19 ..... LANDFILL NORTH OF WINKLEPECK BURNING GROUND
20 ..... SAND CREEK SEWAGE TREATMENT PLANT
21 ..... DEPOT SEWAGE TREATMENT PLANT
22 ..... GEORGE ROAD SEWAGE TREATMENT PLANT
23 ..... UNIT TRAINING SITE WASTE OIL TANK
24 RESERVE UNIT MAINTENANCE AREA WASTE OIL TANK
25 ..... BLDG 1034 MOTOR POOL WASTE OIL TANK
26 ..... FUZE BOOSTER AREA SETTLING TANKS
27 ..... BLDG 854-PCB STORAGE
28 ..... MUSTARD AGENT BURIAL SITE
29 ..... UPPER AND LOWER COBBS POND COMPLEX
30 ..... LOAD LINE 7 PINK WATER TREATMENT PLANT
31 ..... ORE PILE RETENTION POND
32 ..... 40 AND 60 MM FIRING RANGE
33 ..... FIRESTONE TEST FACILITY
34 ..... SAND CREEK DISPOSAL ROAD LANDFILL
35 ..... 1037 BUILDING-LAUNDRY WASTEWATER SUMP
36 ..... PISTOL RANGE
37 ..... PESTICIDE BUILDING S-44S2
38 ..... NACA TEST AREA
39 ..... BUILDING U-202
40 ..... BUILDING W-221
41 ..... BUILDING X-232

US Army Corps of Engineers Nashville District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NASHVILLE, TENNESSEE

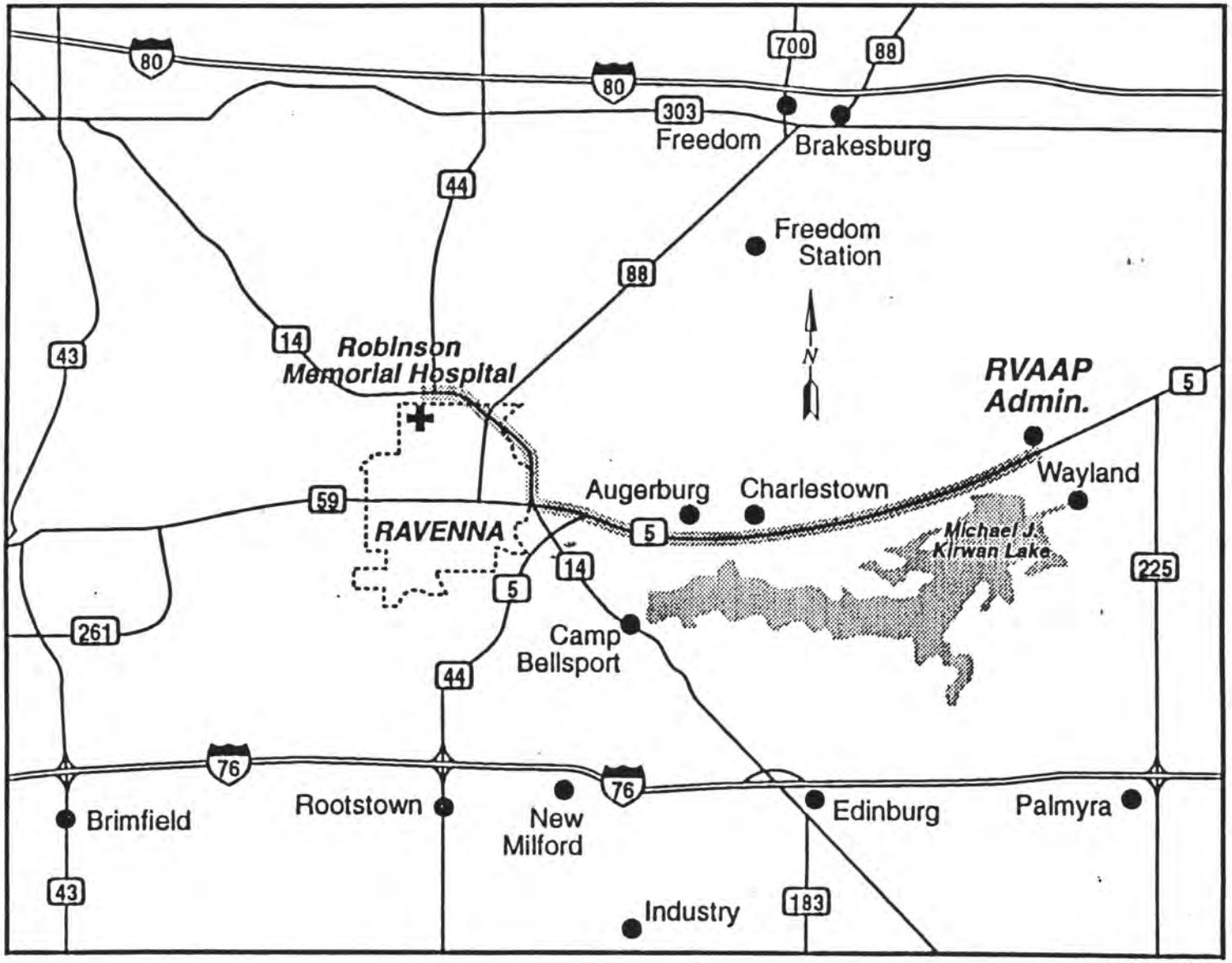
RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO
FACILITY MAP

| DRAWN BY: | PCP: | CAD FILE: |
|---|---|---|
| R. BEELER | 19111X17 | S:\RAVENNA\19111X17 |

**Facility Map**

## ATTACHMENT B

## ROUTE MAP TO PRE-NOTIFIED MEDICAL FACILITY




COE NASH RV 031

# ATTACHMENT C

# REPORTING FORMS

DAILY SAFETY INSPECTION

PROJECT: _____ Page 49 of 2

| N | Y | NA | Item |
|---|---|---|---|
| | | | OSHA poster #2203 displayed |
| | | | Daily safety briefing conducted |
| | | | Emergency numbers and route to hospital posted |
| | | | SSHP onsite, available to employees, and complete? |
| | | | Required exposure monitoring conducted and documented |
| | | | Monitoring instruments (PID, OVA, CGI) calibrated daily against known standard and documented |
| | | | 16 unit first aid kit available and inspected weekly |
| | | | Personnel wearing PPE required by SSHP for field work (at least safety shoes or boots, safety glasses with side shields, and nitrile or similar gloves to handle potentially contaminated material) |
| | | | Personnel using buddy system (maintain visual or verbal contact and able to render aid) |
| | | | If temperature >70°F: heat stress training conducted, cool fluids available, pulse rates of personnel wearing Tyvek are being monitored, work/rest cycle in SSHP being followed |
| | | | If temperature <40°F: cold stress training conducted, controls in SSHP implemented |
| | | | Personnel using appropriate biological hazard controls (See SSHP) |
| | | | Drill rig operating manual on site |
| | | | Drill rigs inspected weekly and documented |
| | | | Personnel near drill rig or other overhead hazards wearing hardhats |
| | | | Each of two drill rig kill switches tested daily |
| | | | Employees excluded from under lifted loads |
| | | | Unnecessary personnel excluded from hazardous areas, specifically near drill rigs |
| | | | Radius of exclusion zone around drill rig at least equal to mast height |
| | | | Personnel wearing hearing protection when within 25 ft of drill rigs, generators, or other noisy equipment |
| | | | Containers of flammable liquids closed and labeled properly |
| | | | Fully charged fire extinguisher available 25 to 50 ft from flammables storage area and inspected monthly |
| | | | Personnel exiting potentially contaminated areas washing hands and face before eating |
| | | | Personnel using steam washer wearing faceshield, hearing protection, heavy duty waterproof gloves, Saranax or rainsuit |
| | | | Portable electrical equipment double insulated or plugged to a GFCI |

DAILY SAFETY INSPECTION

PROJECT: _____ Page 50 of 2

| N | Y | NA | Item |
|---|---|---|---|
| | | | Electrical wiring covered by insulation or enclosure |
| | | | Three wire, UL approved, extension cords used |
| | | | Housekeeping adequate (walkways clear of loose, sharp or dangerous objects and trip hazards, work areas clear of objects that might fall on employees) |
| | | | Walking/working surfaces safe (not slippery, no unguarded holes, no trip hazards) |
| | | | Confined space entry (entry into trenches deeper than 4 ft) performed according to SSHP |
| | | | Excavations deeper than 5 ft shored or sloped (if personnel will enter) and in compliance with SSHP |
| | | | Moving (rotating) machinery guarded to prevent employee contact |
| | | | Fall protection provided for work at elevations greater than 4 ft |
| | | | All containers of hazardous material labeled to indicate contents and hazards |
| | | | MSDSs for hazardous materials on site |
| | | | If work is conducted in areas open to hunting (and during season) high visibility vests and other alerting systems such as lights, noise devices (radios) in use |
| | | | 15 minute eyewash (accessible and full) within 100 ft of areas where corrosive sample preservatives are poured |
| | | | Potable and non-potable water labeled |
| | | | Chainsaws have anti kick-back protection, personnel wearing cut resistant gloves, protective chaps |
| | | | Visitor access controlled |
| | | | Site hazards and controls consistent with SSHP |
| | | | Site hazard controls appropriate and sufficient |

Actions taken to correct or control any "N" responses

_____

Name Signature Date

## DAILY HEALTH AND SAFETY SUMMARY

**PROJECT NAME:** **PROJECT NO:**

NAME: DATE: M Tu W Th F Sa Su TIME:

TASKS PERFORMED:

OFF-NORMAL EVENTS:

## TAILGATE SAFETY MEETING LOG

**PROJECT NAME:** **PROJECT NO:**

DATE: M Tu W Th F Sa Su TIME:

WEATHER:

WORKING CONDITIONS:

PPE:

| ITEMS DISCUSSED: |
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| THE FOLLOWING INDIVIDUALS ATTENDED THE DAILY TAILGATE SAFETY MEETING (SIGNATURES) | | |
|---|---|---|
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SITE SAFETY AND HEALTH OFFICER

## VISITORS LOG

**PROJECT NAME:** **PROJECT NO:**

| DATE | NAME | COMPANY | BADGE # | TIME IN | TIME OUT | H&S BRIEFING | PURPOSE |
|---|---|---|---|---|---|---|---|
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## EQUIPMENT CALIBRATION

**PROJECT NAME:** **PROJECT NO:**

| IDENTIFIER | DESCRIPTION | BACKGROUND READING | PRE | ADJUSTMENT (IF NEEDED) | POST | NAME | DATE |
|---|---|---|---|---|---|---|---|
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## HEALTH AND SAFETY MONITORING LOG

**PROJECT NAME:** **PROJECT NO:**

| DATE | INSTRUMENT/NO. | RESULTS | TIME | REMARKS | NAME |
|---|---|---|---|---|---|
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## CALIBRATION STANDARD

**PROJECT NAME:** **PROJECT NO:**

| INCLUSIVE DATES FOR CALIBRATION MATERIAL USAGE | | INSTRUMENT DESCRIPTION | CALIBRATION MATERIAL | LOT # | NAME |
|---|---|---|---|---|---|
| Start | Finish | | | | |
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## EQUIPMENT INVENTORY

**PROJECT NAME:** **PROJECT NO:**

| UNIQUE IDENTIFIER | PROJECT IDENTIFIER | ITEM DESCRIPTION | LAST RECALL | NEXT RECALL | DATE | | COMMENTS |
|---|---|---|---|---|---|---|---|
| | | | | | IN SERVICE | OUT OF SERVICE | |
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# ACCIDENT INVESTIGATIONS REPORTS

# APPENDIX B

**Drilling Logs and Information Summary**
**Open Detonation Area #2 Monitoring Wells**
**DET-1 Through DET-4**

**(Copied from USAEHA, 1992)**

# APPENDIX E

# MONITORING WELL DRILLING LOGS

## List of Abbreviations Used in Drill Logs

| | |
|---|---|
| B.O.H | Bottom of Hole |
| bl | black |
| br | brown |
| c.s. | chemical sample |
| dk | dark |
| gr | gray |
| lt | light |
| occ | occasional |
| r | red or reddish |
| r b | reddish brown |
| rec | recovery |
| r y | reddish yellow |
| s.a.a. | same as above |
| s.s. | 2 foot split spoon |
| s.s.s | 5 foot split spoon sampler |
| tr | trace |
| v f | very fine |
| w | with |
| y | yellow |

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG
(The proponent of this form is HSHB-ES)

INSTALLATION Ravenna AAP
PROJECT NUMBER 38-26-KF95-92
LOCATION Northwest of Open Detonation Area
DRILL RIG Mobile B-53
DATE 28 April 92
GEOLOGIST Barrett Borry
DRILLERS W.Smithson, R. Kestner, M. Farro
BORE HOLE DET-1
WATER LEVEL 19.84 3 May 92
Sheet 1 of 2

| DEPTH | SAMPLE TYPE | DESCRIPTION | REMARKS |
|---|---|---|---|
| | 3" s.s.s. 3.5 ft rec | Silty clay, y br with r y mottles, damp | |
| 3.5 | 3" s.s.s. 5 ft rec | Clayey silt, y br, with faint r y mottles and occ gr sandstone rock fragment | |
| | 3" s.s.s. 5 ft rec | s.a.a. | |
| 18.0 | 3" s.s. | Silty clay and fine sand, gr wet | |

AEHA Form 130, 1 Nov 82
Replaces HSHB Form 78, 1 Jun 80, which will be used.

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG
(The proponent of this form is HSHB-ES)

INSTALLATION Ravenna AAP
PROJECT NUMBER 38-26-KF95-92
LOCATION Northwest of Open Detonation Area
DRILL RIG Mobile B-53
DATE 28 April 92
GEOLOGIST Barrett Borry
DRILLERS W.Smithson, R. Kestner, M. Farro
BORE HOLE DET-1
WATER LEVEL 19.84 3 May 92
Sheet 2 of 2

| DEPTH | SAMPLE TYPE | DESCRIPTION | REMARKS |
|---|---|---|---|
| | 3" s.s. | Clayey silt and fine sand, gr, wet sand lenses 1/2" - 1" thick within sample | |
| 39.0 | 3" s.s. | Fine sand and silt, tr clay, gr, wet<br>B.O.H. 39 ft | spoon refusal at 39 ft |

AEHA Form 130, 1 Nov 82
Replaces HSHB Form 78, 1 Jun 80, which will be used.

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG
(The proponent of this form is HSHB-ES)

INSTALLATION Ravenna AAP
PROJECT NUMBER 38-26-KF95-92
LOCATION East of Open Dentonation Area
DRILL RIG Mobile B-53
DATE 28 April 92
GEOLOGIST Barrett Borry
DRILLERS W.Smithson, R. Kestner, M. Farro
BORE HOLE DET-2
WATER LEVEL 29.27 3 May 92
Sheet 1 of 2

| DEPTH | SAMPLE TYPE | DESCRIPTION | REMARKS |
|---|---|---|---|
| 1.0 | 3" s.s.s. 0.2 ft rec | Crushed rock and slag fragment fill, gr to bl clayey silt, y br, moist | |
| | 3" s.s.s. 0.1 ft rec | | Sandstone rock jammed in end of sampler |
| | 3" s.s.s. 5.0 ft rec | Color change to gr at 11 ft | |
| 18.0 | | | |
| 20.0 | 2" s.s. | Clayey fine sand, y br w y r mottles, moist | |

AEHA Form 130, 1 Nov 82
Replaces HSHB Form 78, 1 Jun 80, which will be used.

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG
(The proponent of this form is HSHB-ES)

INSTALLATION Ravenna AAP
PROJECT NUMBER 38-26-KF95-92
LOCATION Northeast of Open Detonation Area
DRILL RIG Mobile B-53
Sheet 2 of 2

DATE 28 April 92
GEOLOGIST Barrett Borry
DRILLERS W.Smithson, R. Kestner, M. Farro
BORE HOLE DET-2
WATER LEVEL 29.27 3 May 92

| DEPTH | SAMPLE TYPE | DESCRIPTION | REMARKS |
|---|---|---|---|
| 20.0 | | Clayey silt, gr | |
| 28.0 | 2" s.s. | Clay, sandy, gr, moist | Spoon refusal at 29 ft<br>Auger cuttings wet at 31 ft |
| | 2" s.s. | | Auger cuttings dry at 34 ft |
| | | Recovered 0.1 ft of fine grained sandstone fragments | spoon refusal at 35 ft |
| 39.0 | | B.O.H. 39 ft | |

AEHA Form 130, 1 Nov 82
Replaces HSHB Form 78, 1 Jun 80, which will be used.

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG
(The proponent of this form is HSHB-ES)

INSTALLATION Ravenna AAP
PROJECT NUMBER 38-26-KF95-92
LOCATION Southeast of Open Detonation Area
DRILL RIG Mobile B-53
DATE 30 April 92
GEOLOGIST Barrett Borry
DRILLERS W.Smithson, R. Kestner, M. Farro
BORE HOLE DET-3
WATER LEVEL 5.73 3 May 92
Sheet 1 of 1

| DEPTH | SAMPLE TYPE | DESCRIPTION | REMARKS |
|---|---|---|---|
| 1.4 | 3" s.s.s. 3.7 ft rec | Clayey silt, y br, occ plant fragment moist | |
| | | Silty fine sand, moist to wet | Augers show wet return at 5 ft |
| 4.5 | 3" s.s.s. 2.5 ft rec | Clayey silt, y br w rock fragments, moist. Color change to dk gr at 5.1 ft | Bit chatter from 6 ft |
| 6.0 | | Coarse sand and rock fragments, weathered sandstone and siltsone, y and gr, wet | |
| | 3" s.s.s. 2.5 ft rec | | |
| 12.0 | | Weathered shale, dk gr | |
| 15.0 | | B.O.H. at 15 ft | Auger refusal at 15 ft |

AEHA Form 130, 1 Nov 82
Replaces HSHB Form 78, 1 Jun 80, which will be used.

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG
(The proponent of this form is HSHB-ES)

INSTALLATION Ravenna AAP
PROJECT NUMBER 38-26-KF95-92
LOCATION Directly South of Open Detonation Area
DRILL RIG Mobile B-53
DATE 30 April 92
GEOLOGIST Barrett Borry
DRILLERS W.Smithson, R. Kestner, M. Farro
BORE HOLE DET-4
WATER LEVEL 7.31 3 May 92
Sheet 1 of 1

| DEPTH | SAMPLE TYPE | DESCRIPTION | REMARKS |
|---|---|---|---|
| 0.2 | 3" | 0.0-0.2 crushed rock and | |
| 1.0 | s.s.s. | slag fragments gr to bl | |
| | 1.4 ft | clayey silt y br w pebbles | |
| | rec | Sand y br w r y mottles, moist | |
| | 3" s.s.s | Clay content increases at 5 ft | |
| 6.0 | 1.5 ft | | |
| | rec | Weathered sandstone fragments white and y | |
| | 3" s.s.s. | | |
| 11.0 | 0.2 ft rec | B.O.H. at 11 ft | Auger refusal at 11 ft |

AEHA Form 130, 1 Nov 82
Replaces HSHB Form 78, 1 Jun 80, which will be used.

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG
(The proponent of this form is HSHB-ES)

INSTALLATION Ravenna AAP
PROJECT NUMBER 38-26-KF95-92
LOCATION Approximately 100 ft Northwest of Open Burning Ground
DRILL RIG Mobile B-53
DATE 30 April 92
GEOLOGIST Barrett Borry
DRILLERS W.Smithson, R. Kestner, M. Farro
BORE HOLE OBG-1
WATER LEVEL 3.43 3 May 92
Sheet 1 of 1

| DEPTH | SAMPLE TYPE | DESCRIPTION | REMARKS |
|---|---|---|---|
| 0.2 | 3" s.s.s. 3.8 ft rec | Crushed rock and slag fragment fill, gr to bl Silty clay, r y, moist | |
| 3.0 | | Clayey fine sand, y br, wet | |
| 5.5 | 3" s.s.s. 5.0 ft rec | Clayey silt, y br, moist<br>Color change to gr at 8.5 ft | |
| 12.2 | 3" s.s.s. 3.2 ft rec | Sand, y br, wet | |
| 15.0 | 3" s.s.s. | Clayey silt, gr moist | |
| 17.0 | 3.2 ft rec | Sand, gr, wet | |
| 17.9 | | Clayey, silt, gr, moist | Drill chatter at 18 ft |
| 19.0 | | B.O.H. at 19 ft | |

AEHA Form 130, 1 Nov 82
Replaces HSHB Form 78, 1 Jun 80, which will be used.

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG
(The proponent of this form is HSHB-ES)

INSTALLATION Ravenna AAP
PROJECT NUMBER 38-26-KF95-92
LOCATION Eight ft North of OBG-1
DRILL RIG Mobile B-53
Sheet 1 of 1

DATE 21 April 92
GEOLOGIST Barrett Borry
DRILLERS W.Smithson, R. Kestner, M. Farro
BORE HOLE OBG-1A
WATER LEVEL

| DEPTH | SAMPLE TYPE | DESCRIPTION | REMARKS |
|---|---|---|---|
| 0.7 | 3" s.s.s. 4.4 ft rec | v f sand, lt y br, moist | |
| | | silty clay y br, moist | |
| 3.6 | | Clayey silt, dk gr br moist | |
| 4.4 | | Clayey, v f sand, mottled br y to v pale br wet | |
| 6.8 | 3" s.s.s. 5 ft rec | Silty clay, y br w occ rounded pebbles, moist<br>Color change to olive y at 8 ft | |
| 13.0 | 2" s.s. 0.2 ft rec | Sand y br poorly sorted, fine to coarse, wet | |
| 15.0 | | Clayey silt gr<br>Flowing sand and pebbles jammed between center stem and auger unable to attempt spoon at 18 ft | |
| 23.0 | | B.O.H. at 23 ft | Auger refusal at 23 ft |

AEHA Form 130, 1 Nov 82
Replaces HSHB Form 78, 1 Jun 80, which will be used.

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG
(The proponent of this form is HSHB-ES)

INSTALLATION Ravenna AAP
PROJECT NUMBER 38-26-KF95-92
LOCATION Northeast Corner of Open Burning Ground
DRILL RIG Mobile B-53
DATE 22 April 92
GEOLOGIST Barrett Borry
DRILLERS W.Smithson, R. Kestner, M. Farro
BORE HOLE OBG-2
WATER LEVEL 5.69 3 May 92
Sheet 1 of 1

| DEPTH | SAMPLE TYPE | DESCRIPTION | REMARKS |
|---|---|---|---|
| | 3" s.s.s. | Crushed rock and slag fill, gr to bl | |
| 2.0 | 3.0 ft rec | Clayey silt mottled br to y, moist | |
| | 3" s.s.s. 4.2 ft rec | Color change to y br at 5 ft | |
| 8.4 | | Silty clay y br occ rounded pebble, moist | |
| 10.0 | 3" s.s.s. 5.0 ft rec | Clayey silt, gr occ pebble, moist<br>y br between 14-15 ft | |
| | 3" s.s.s. 2.5 ft rec | gr at 15 ft, wet | Note: Auger turned up siltstone and shale fragments at 19 ft<br>Very slow auger penetration at 19 ft |
| | | Sand gr, wet | |
| 19.0 | | B.O.H. at 19 ft in weathered rock | |

AEHA Form 130, 1 Nov 82
Replaces HSHB Form 78, 1 Jun 80, which will be used.

US ARMY ENVIRONMENTAL HYGIENE AGENCY

# DRILLING LOG

(The proponent of this form is HSHB-ES)

INSTALLATION Ravenna AAP
PROJECT NUMBER 38-26-KF95-92
LOCATION Southeast Corner of Open Burning Grounds
DRILL RIG Mobile B-53
DATE 22 April 92
GEOLOGIST Barrett Borry
DRILLERS W.Smithson, R. Kestner, M. Farro
BORE HOLE OBG-3
WATER LEVEL 4.41 3 May 92
Sheet 1 of 1

| DEPTH | SAMPLE TYPE | DESCRIPTION | REMARKS |
|---|---|---|---|
| | | Crushed rock and slag fill, gr to bl | |
| 2.7 | 3" s.s.s. 2.5 ft rec | Clayey silt w occ pebble y br to br y w/faint mottles, moist | |
| 4.0 | | Silty clay, br y w/very pale br mottles, damp | |
| | 3" s.s.s. 5 ft rec | | |
| | | Color change to gr at 9.0 ft | |
| | 3" s.s.s. 5.0 ft rec | | |
| 14.1 | | Sand, r b, wet | |
| 14.2 | | Clayey silt,occ ss pebble,moist | |
| 15.0 | | | |
| 16.9 | 3" s.s.s. 4.4 ft rec | vf sand w/clay, occ pebble,br moist | |
| 16.9 | | Clayey silt, gr moist | Augers turned water at 19 ft |
| 18.4 | | Sand, pale yellow, wet | B.O.H. at 20 ft in weathered rock |
| 19.0 | | Clayey, silt, lt br gr | |
| 20.0 | | | |

AEHA Form 130, 1 Nov 82
Replaces HSHB Form 78, 1 Jun 80, which will be used.

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG
(The proponent of this form is HSHB-ES)

INSTALLATION Ravenna AAP
PROJECT NUMBER 38-26-KF95-92
LOCATION Along the Southern Boundary of the Open Burning Ground
DRILL RIG Mobile B-53
DATE 25 April 92
GEOLOGIST Barrett Borry
DRILLERS W.Smithson, R. Kestner, M. Farro
BORE HOLE OBG-4
WATER LEVEL 2.99 3 May 92
Sheet 1 of 1

| DEPTH | SAMPLE TYPE | DESCRIPTION | REMARKS |
|---|---|---|---|
| 1.0 | 3" s.s.s. 3.0 ft rec | Silty clay w/rock fragments,gr, moist | |
| 1.5 | | Clayey silt, lt olive br, moist | |
| 2.6 | | Silty clayey fine sand, br y w/r y mottles, wet | |
| | | Clayey silt br y w/r y mottles damp,color change to y br at 4 ft | |
| | 3" s.s.s. 5.0 ft rec | | |
| | 3" s.s.s. 2.0 ft rec | Color change to gr with r y mottles at 10.8 ft | |
| 14.0 | 3" s.s.s. 3.0 ft rec | Fine sand and clay, gr, wet | |
| 18.0 | | B.O.H. at 18 ft in weathered rock | Auger refusal at 18 ft |

AEHA Form 130, 1 Nov 82
Replaces HSHB Form 78, 1 Jun 80, which will be used.

U.S. ARMY ENVIRONMENTAL HYGIENE AGENCY
GROUND-WATER MONITORING WELL SUMMARY

INSTALLATION Ravenna AAP
PROJECT NUMBER 38-26-EF95-92

DATE April 92

| WELL NUMBER | DET-1 | DET-2 | DET-3 | DET-4 | |
|---|---|---|---|---|---|
| 1. Height of Monitoring Well Casing above ground level | 1.5 | 1.0 | 1.0 | 1.0 | |
| 2. Total Depth of Well below ground level | 39.0 | 39.0 | 12.0 | 11.0 | |
| 3. Depth to Top of Well Screen below ground level | 34.0 | 34.0 | 7.0 | 6.0 | |
| 4. Well Screen Length | 5.0 | 5.0 | 5.0 | 5.0 | |
| 5. Well Screen Slot Size (in) | 0.010 | 0.010 | 0.010 | 0.010 | |
| 6. Well Diameter (in) | 2 | 2 | 2 | 2 | |
| 7. Monitoring Well Casing Material | PVC | PVC | PVC | PVC | |
| 8. Monitoring Well Screen Material | PVC | PVC | PVC | PVC | |
| 9. Grout Thickness below ground level | N.A. | N.A. | N.A. | N.A. | |
| 10. Depth to Top of Bentonite Seal below ground level | 0.0 | 0.0 | 0.0 | 0.0 | |
| 11. Bentonite Seal Thickness | 30.0, see note | 23.1, see note | 5.5 | 4.9 | |
| 12. Depth to top of Sand Pack | 30.0 | 23.1 | 5.5 | 4.9 | |
| 13. Depth to bottom of sand pack | 36.0 | 29.0 | 9.5 | 11.0 | |
| 14. Elevation - top of monitoring well casing | 1065.85 | 1061.24 | 1036.81 | 1038.68 | |
| 15. Depth to Static Water Level | 19.84 | 29.27 | 5.73 | 7.31 | |
| a. Date Measured | 3 May 92 | 3 May 92 | 3 May 92 | 3 May 92 | |
| b. From top of monitoring well casing | 19.84 | 29.27 | 5.73 | 7.31 | |
| c. From ground level | 18.34 | 28.27 | 4.73 | 6.31 | |
| 16. Ground-water elevation | 1046.01 | 1031.97 | 1031.08 | 1031.37 | |

Comments
DET 1: Sand intervals within bentonite at depths of 22.0-22.8 ft and 25.7-26.3 ft below surface.
DET 2: Sand intervals within bentonite at depths of 17.4-18.2 ft and 20.2-20.9 ft below surface.

# APPENDIX C

**Generalized Open Detonation Area #2**
**Monitoring Well Construction Diagram**

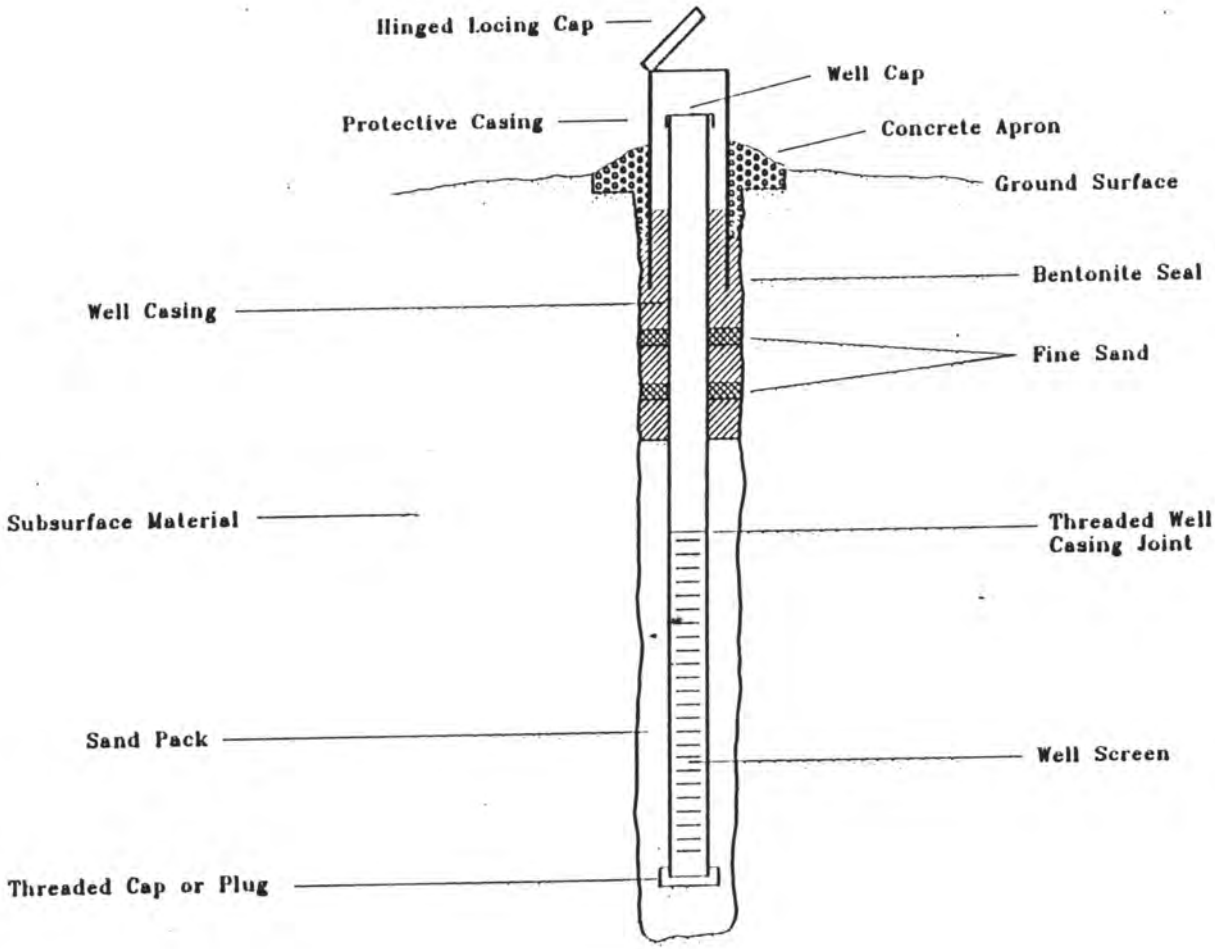


Figure F-1. Generalized Monitoring Well Construction for ODA showing Sand-Bentonite-Sand-Bentonite Sequence.

# APPENDIX D

**Analytical Results from Ground Water Monitoring Samples Taken from the Open Detonation Area #2**

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-1 | 1,2DCE | 10/05/95 | 0.530 | UG/L |
| DET-1 | 1,2DCE | 12/14/95 | 0.600 | UG/L |
| DET-1 | 135 TNB | 09/23/92 | 2.400 | UG/L |
| DET-1 | Ag | 06/20/96 | 9.000 | MG/L |
| DET-1 | AmmoniaN | 05/04/92 | 100.000 | MG/L |
| DET-1 | AmmoniaN | 09/23/92 | 50.000 | MG/L |
| DET-1 | AmmoniaN | 01/28/93 | 100.000 | MG/L |
| DET-1 | AmmoniaN | 06/03/93 | 50.000 | MG/L |
| DET-1 | AmmoniaN | 08/31/93 | 50.000 | MG/L |
| DET-1 | AmmoniaN | 11/11/93 | 570.000 | MG/L |
| DET-1 | AmmoniaN | 09/23/94 | 54.000 | MG/L |
| DET-1 | AmmoniaN | 09/23/94 | 100.000 | MG/L |
| DET-1 | AmmoniaN | 12/22/94 | 180.000 | MG/L |
| DET-1 | AmmoniaN | 03/23/95 | 58.000 | MG/L |
| DET-1 | AmmoniaN | 06/28/95 | 43.000 | MG/L |
| DET-1 | AmmoniaN | 06/28/95 | 72.000 | MG/L |
| DET-1 | AmmoniaN | 10/05/95 | 29.000 | MG/L |
| DET-1 | AmmoniaN | 12/14/95 | 26.000 | MG/L |
| DET-1 | AmmoniaN | 12/14/95 | 34.000 | MG/L |
| DET-1 | AmmoniaN | 03/21/96 | 32.000 | MG/L |
| DET-1 | As | 05/04/92 | 7.000 | MG/L |
| DET-1 | As | 01/28/93 | 14.000 | MG/L |
| DET-1 | As | 06/03/93 | 12.000 | MG/L |
| DET-1 | As | 03/09/94 | 7.000 | MG/L |
| DET-1 | As | 03/09/94 | 11.000 | MG/L |
| DET-1 | As | 06/28/94 | 17.000 | MG/L |
| DET-1 | As | 09/23/94 | 15.000 | MG/L |
| DET-1 | As | 09/23/94 | 19.000 | MG/L |
| DET-1 | As | 12/22/94 | 5.000 | MG/L |
| DET-1 | As | 03/23/95 | 8.000 | MG/L |
| DET-1 | As | 06/28/95 | 12.000 | MG/L |
| DET-1 | As | 06/28/95 | 14.000 | MG/L |
| DET-1 | As | 10/05/95 | 10.000 | MG/L |
| DET-1 | As | 12/14/95 | 8.000 | MG/L |
| DET-1 | As | 12/14/95 | 8.000 | MG/L |
| DET-1 | As | 03/21/96 | 8.000 | MG/L |
| DET-1 | As | 06/20/96 | 8.000 | MG/L |
| DET-1 | Ba | 05/04/92 | 20.000 | MG/L |
| DET-1 | Ba | 03/09/94 | 23.000 | MG/L |
| DET-1 | Ba | 03/09/94 | 26.000 | MG/L |
| DET-1 | Ba | 06/28/94 | 32.000 | MG/L |
| DET-1 | Ba | 09/23/94 | 26.000 | MG/L |
| DET-1 | Ba | 09/23/94 | 26.000 | MG/L |
| DET-1 | Ba | 12/22/94 | 24.000 | MG/L |
| DET-1 | Ba | 03/23/95 | 23.000 | MG/L |
| DET-1 | Ba | 06/28/95 | 25.000 | MG/L |
| DET-1 | Ba | 06/28/95 | 23.000 | MG/L |
| DET-1 | Ba | 10/05/95 | 26.000 | MG/L |
| DET-1 | Ba | 12/14/95 | 27.000 | MG/L |
| DET-1 | Ba | 12/14/95 | 28.000 | MG/L |
| DET-1 | Ba | 03/21/96 | 26.000 | MG/L |
| DET-1 | Ba | 06/20/96 | 28.000 | MG/L |
| DET-1 | Be | 03/21/96 | 4.000 | MG/L |
| DET-1 | COD | 11/11/93 | 5600.000 | MG/L |
| DET-1 | COD | 03/23/95 | 5600.000 | MG/L |
| DET-1 | Ca | 05/04/92 | 74000.000 | MG/L |
| DET-1 | Ca | 09/23/92 | 71000.000 | MG/L |
| DET-1 | Ca | 01/28/93 | 66000.000 | MG/L |
| DET-1 | Ca | 06/03/93 | 81000.000 | MG/L |
| DET-1 | Ca | 08/31/93 | 120000.000 | MG/L |
| DET-1 | Ca | 11/11/93 | 49000.000 | MG/L |
| DET-1 | Ca | 11/11/93 | 54000.000 | MG/L |
| DET-1 | Ca | 03/09/94 | 50000.000 | MG/L |
| DET-1 | Ca | 03/09/94 | 23000.000 | MG/L |
| DET-1 | Ca | 06/28/94 | 66000.000 | MG/L |
| DET-1 | Ca | 09/23/94 | 73000.000 | MG/L |
| DET-1 | Ca | 09/23/94 | 69000.000 | MG/L |
| DET-1 | Ca | 12/22/94 | 66000.000 | MG/L |
| DET-1 | Ca | 03/23/95 | 58000.000 | MG/L |
| DET-1 | Ca | 06/28/95 | 60000.000 | MG/L |
| DET-1 | Ca | 06/28/95 | 57000.000 | MG/L |
| DET-1 | Ca | 10/05/95 | 62000.000 | MG/L |
| DET-1 | Ca | 12/14/95 | 60000.000 | MG/L |
| DET-1 | Ca | 12/14/95 | 59000.000 | MG/L |
| DET-1 | Ca | 03/21/96 | 58000.000 | MG/L |
| DET-1 | Ca | 06/20/96 | 57000.000 | MG/L |
| DET-1 | CaCO3 | 05/04/92 | 220000.000 | MG/L |
| DET-1 | CaCO3 | 09/23/92 | 210000.000 | MG/L |
| DET-1 | CaCO3 | 01/28/93 | 210000.000 | MG/L |
| DET-1 | CaCO3 | 06/03/93 | 210000.000 | MG/L |
| DET-1 | CaCO3 | 08/31/93 | 210000.000 | MG/L |
| DET-1 | CaCO3 | 11/11/93 | 180000.000 | MG/L |
| DET-1 | CaCO3 | 11/11/93 | 200000.000 | MG/L |
| DET-1 | CaCO3 | 03/09/94 | 180000.000 | MG/L |
| DET-1 | CaCO3 | 03/09/94 | 200000.000 | MG/L |
| DET-1 | CaCO3 | 06/28/94 | 210000.000 | MG/L |
| DET-1 | CaCO3 | 09/23/94 | 210000.000 | MG/L |
| DET-1 | CaCO3 | 09/23/94 | 210000.000 | MG/L |
| DET-1 | CaCO3 | 12/22/94 | 210000.000 | MG/L |
| DET-1 | CaCO3 | 03/23/95 | 210000.000 | MG/L |
| DET-1 | CaCO3 | 06/28/95 | 210000.000 | MG/L |
| DET-1 | CaCO3 | 06/28/95 | 210000.000 | MG/L |
| DET-1 | CaCO3 | 10/05/95 | 210000.000 | MG/L |
| DET-1 | CaCO3 | 12/14/95 | 210000.000 | MG/L |
| DET-1 | CaCO3 | 12/14/95 | 210000.000 | MG/L |
| DET-1 | CaCO3 | 03/21/96 | 210000.000 | MG/L |
| DET-1 | CaCO3 | 06/20/96 | 230000.000 | MG/L |
| DET-1 | Chloride | 01/28/93 | 1000.000 | MG/L |
| DET-1 | Chloride | 06/03/93 | 1500.000 | MG/L |
| DET-1 | Chloride | 11/11/93 | 1300.000 | MG/L |
| DET-1 | Chloride | 11/11/93 | 1000.000 | MG/L |
| DET-1 | Chloride | 03/09/94 | 1000.000 | MG/L |
| DET-1 | Chloride | 03/09/94 | 2000.000 | MG/L |
| DET-1 | Chloride | 09/23/94 | 1700.000 | MG/L |
| DET-1 | Chloride | 09/23/94 | 1600.000 | MG/L |
| DET-1 | Chloride | 12/22/94 | 1600.000 | MG/L |
| DET-1 | Chloride | 03/23/95 | 2000.000 | MG/L |
| DET-1 | Chloride | 06/28/95 | 1600.000 | MG/L |
| DET-1 | Chloride | 06/28/95 | 1600.000 | MG/L |
| DET-1 | Chloride | 10/05/95 | 1900.000 | MG/L |
| DET-1 | Chloride | 06/20/96 | 67.000 | MG/L |
| DET-1 | Cond F | 05/04/92 | 388.000 | umhos/ |
| DET-1 | Cond L | 05/04/92 | 560.000 | umhos/ |
| DET-1 | Cond L | 09/23/92 | 546.000 | umhos/ |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-1 | Cond L | 01/28/93 | 490.000 | umhos/ |
| DET-1 | Cond L | 06/03/93 | 514.000 | umhos/ |
| DET-1 | Cond L | 08/31/93 | 519.000 | umhos/ |
| DET-1 | Cond L | 11/11/93 | 395.000 | umhos/ |
| DET-1 | Cond L | 11/11/93 | 413.000 | umhos/ |
| DET-1 | Cond L | 03/09/94 | 536.000 | umhos/ |
| DET-1 | Cond L | 03/09/94 | 539.000 | umhos/ |
| DET-1 | Cond L | 06/28/94 | 380.000 | umhos/ |
| DET-1 | Cond L | 09/23/94 | 480.000 | umhos/ |
| DET-1 | Cond L | 09/23/94 | 510.000 | umhos/ |
| DET-1 | Cond L | 12/22/94 | 470.000 | umhos/ |
| DET-1 | Cond L | 03/23/95 | 460.000 | umhos/ |
| DET-1 | Cond L | 06/28/95 | 500.000 | umhos/ |
| DET-1 | Cond L | 06/28/95 | 500.000 | umhos/ |
| DET-1 | Cond L | 10/05/95 | 440.000 | umhos/ |
| DET-1 | Cond L | 12/14/95 | 510.000 | umhos/ |
| DET-1 | Cond L | 12/14/95 | 530.000 | umhos/ |
| DET-1 | Cond L | 03/21/96 | 420.000 | umhos/ |
| DET-1 | Cond L | 06/20/96 | 540.000 | umhos/ |
| DET-1 | Cr | 05/04/92 | 20.000 | MG/L |
| DET-1 | Cr | 06/28/94 | 6.000 | MG/L |
| DET-1 | Cr | 10/05/95 | 4.000 | MG/L |
| DET-1 | Cr | 12/14/95 | 2.000 | MG/L |
| DET-1 | Cr | 12/14/95 | 2.000 | MG/L |
| DET-1 | Cr | 03/21/96 | 1.000 | MG/L |
| DET-1 | Cu | 01/28/93 | 10.000 | MG/L |
| DET-1 | Cu | 06/03/93 | 10.000 | MG/L |
| DET-1 | Cu | 11/11/93 | 14.000 | MG/L |
| DET-1 | Cu | 03/09/94 | 10.000 | MG/L |
| DET-1 | Cu | 03/09/94 | 11.000 | MG/L |
| DET-1 | Cu | 06/28/94 | 8.000 | MG/L |
| DET-1 | Cu | 09/23/94 | 6.000 | MG/L |
| DET-1 | Cu | 10/05/95 | 5.000 | MG/L |
| DET-1 | Cu | 03/21/96 | 1.000 | MG/L |
| DET-1 | Fe | 01/28/93 | 550.000 | MG/L |
| DET-1 | Fe | 06/03/93 | 1400.000 | MG/L |
| DET-1 | Fe | 08/31/93 | 1100.000 | MG/L |
| DET-1 | Fe | 11/11/93 | 860.000 | MG/L |
| DET-1 | Fe | 11/11/93 | 2500.000 | MG/L |
| DET-1 | Fe | 03/09/94 | 610.000 | MG/L |
| DET-1 | Fe | 03/09/94 | 2200.000 | MG/L |
| DET-1 | Fe | 06/28/94 | 4800.000 | MG/L |
| DET-1 | Fe | 09/23/94 | 1800.000 | MG/L |
| DET-1 | Fe | 09/23/94 | 206000.000 | MG/L |
| DET-1 | Fe | 12/22/94 | 400.000 | MG/L |
| DET-1 | Fe | 03/23/95 | 790.000 | MG/L |
| DET-1 | Fe | 06/28/95 | 3400.000 | MG/L |
| DET-1 | Fe | 06/28/95 | 2200.000 | MG/L |
| DET-1 | Fe | 10/05/95 | 1600.000 | MG/L |
| DET-1 | Fe | 12/14/95 | 730.000 | MG/L |
| DET-1 | Fe | 12/14/95 | 730.000 | MG/L |
| DET-1 | Fe | 03/21/96 | 220.000 | MG/L |
| DET-1 | Fe | 06/20/96 | 410.000 | MG/L |
| DET-1 | GWL | 05/04/92 | 1046.010 | feet |
| DET-1 | GWL | 09/23/92 | 1046.430 | feet |
| DET-1 | GWL | 01/28/93 | 1046.750 | feet |
| DET-1 | GWL | 06/03/93 | 1049.180 | feet |
| DET-1 | GWL | 08/31/93 | 1044.350 | feet |
| DET-1 | GWL | 11/11/93 | 1045.700 | feet |
| DET-1 | GWL | 03/09/94 | 1045.510 | feet |
| DET-1 | GWL | 06/28/94 | 1044.600 | feet |
| DET-1 | GWL | 09/23/94 | 1045.600 | feet |
| DET-1 | GWL | 09/23/94 | 1045.600 | feet |
| DET-1 | GWL | 12/22/94 | 1046.180 | feet |
| DET-1 | GWL | 03/23/95 | 1046.100 | feet |
| DET-1 | GWL | 06/28/95 | 1046.350 | feet |
| DET-1 | GWL | 06/28/95 | 1046.350 | feet |
| DET-1 | GWL | 10/05/95 | 1044.850 | feet |
| DET-1 | GWL | 12/14/95 | 1044.100 | feet |
| DET-1 | GWL | 03/21/96 | 1048.180 | feet |
| DET-1 | GWL | 06/20/96 | 1049.350 | feet |
| DET-1 | K | 05/04/92 | 3200.000 | MG/L |
| DET-1 | K | 09/23/92 | 2100.000 | MG/L |
| DET-1 | K | 01/28/93 | 2200.000 | MG/L |
| DET-1 | K | 06/03/93 | 2100.000 | MG/L |
| DET-1 | K | 08/31/93 | 1900.000 | MG/L |
| DET-1 | K | 11/11/93 | 1200.000 | MG/L |
| DET-1 | K | 11/11/93 | 1600.000 | MG/L |
| DET-1 | K | 03/09/94 | 1700.000 | MG/L |
| DET-1 | K | 03/09/94 | 1800.000 | MG/L |
| DET-1 | K | 06/28/94 | 2000.000 | MG/L |
| DET-1 | K | 09/23/94 | 1700.000 | MG/L |
| DET-1 | K | 09/23/94 | 1500.000 | MG/L |
| DET-1 | K | 12/22/94 | 1400.000 | MG/L |
| DET-1 | K | 03/23/95 | 1500.000 | MG/L |
| DET-1 | K | 06/28/95 | 1600.000 | MG/L |
| DET-1 | K | 06/28/95 | 1500.000 | MG/L |
| DET-1 | K | 10/05/95 | 1700.000 | MG/L |
| DET-1 | K | 12/14/95 | 1700.000 | MG/L |
| DET-1 | K | 12/14/95 | 1700.000 | MG/L |
| DET-1 | K | 03/21/96 | 1600.000 | MG/L |
| DET-1 | K | 06/20/96 | 1500.000 | MG/L |
| DET-1 | Mg | 05/04/92 | 28000.000 | MG/L |
| DET-1 | Mg | 09/23/92 | 32000.000 | MG/L |
| DET-1 | Mg | 01/28/93 | 27000.000 | MG/L |
| DET-1 | Mg | 06/03/93 | 25000.000 | MG/L |
| DET-1 | Mg | 08/31/93 | 40000.000 | MG/L |
| DET-1 | Mg | 11/11/93 | 16000.000 | MG/L |
| DET-1 | Mg | 11/11/93 | 17000.000 | MG/L |
| DET-1 | Mg | 03/09/94 | 24000.000 | MG/L |
| DET-1 | Mg | 03/09/94 | 26000.000 | MG/L |
| DET-1 | Mg | 06/28/94 | 28000.000 | MG/L |
| DET-1 | Mg | 09/23/94 | 26000.000 | MG/L |
| DET-1 | Mg | 09/23/94 | 25000.000 | MG/L |
| DET-1 | Mg | 12/22/94 | 26000.000 | MG/L |
| DET-1 | Mg | 03/23/95 | 24000.000 | MG/L |
| DET-1 | Mg | 06/28/95 | 25000.000 | MG/L |
| DET-1 | Mg | 06/28/95 | 23000.000 | MG/L |
| DET-1 | Mg | 10/05/95 | 27000.000 | MG/L |
| DET-1 | Mg | 12/14/95 | 26000.000 | MG/L |
| DET-1 | Mg | 12/14/95 | 26000.000 | MG/L |
| DET-1 | Mg | 03/21/96 | 23000.000 | MG/L |
| DET-1 | Mg | 06/20/96 | 26000.000 | MG/L |
| DET-1 | Mn | 05/04/92 | 260.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-1 | Mn | 09/23/92 | 200.000 | MG/L |
| DET-1 | Mn | 01/28/93 | 210.000 | MG/L |
| DET-1 | Mn | 06/03/93 | 240.000 | MG/L |
| DET-1 | Mn | 08/31/93 | 200.000 | MG/L |
| DET-1 | Mn | 11/11/93 | 18.000 | MG/L |
| DET-1 | Mn | 11/11/93 | 93.000 | MG/L |
| DET-1 | Mn | 03/09/94 | 190.000 | MG/L |
| DET-1 | Mn | 03/09/94 | 310.000 | MG/L |
| DET-1 | Mn | 06/28/94 | 290.000 | MG/L |
| DET-1 | Mn | 09/23/94 | 250.000 | MG/L |
| DET-1 | Mn | 09/23/94 | 260.000 | MG/L |
| DET-1 | Mn | 12/22/94 | 210.000 | MG/L |
| DET-1 | Mn | 03/23/95 | 190.000 | MG/L |
| DET-1 | Mn | 06/28/95 | 240.000 | MG/L |
| DET-1 | Mn | 06/28/95 | 220.000 | MG/L |
| DET-1 | Mn | 10/05/95 | 250.000 | MG/L |
| DET-1 | Mn | 12/14/95 | 220.000 | MG/L |
| DET-1 | Mn | 12/14/95 | 220.000 | MG/L |
| DET-1 | Mn | 03/21/96 | 190.000 | MG/L |
| DET-1 | Mn | 06/20/96 | 210.000 | MG/L |
| DET-1 | NO3/NO2 | 09/23/92 | 18.000 | MG/L |
| DET-1 | NO3/NO2 | 11/11/93 | 260.000 | MG/L |
| DET-1 | NO3/NO2 | 11/11/93 | 240.000 | MG/L |
| DET-1 | NO3/NO2 | 03/09/94 | 44.000 | MG/L |
| DET-1 | NO3/NO2 | 03/09/94 | 64.000 | MG/L |
| DET-1 | NO3/NO2 | 06/28/94 | 55.000 | MG/L |
| DET-1 | NO3/NO2 | 09/23/94 | 73.000 | MG/L |
| DET-1 | NO3/NO2 | 09/23/94 | 32.000 | MG/L |
| DET-1 | NO3/NO2 | 12/22/94 | 44.000 | MG/L |
| DET-1 | NO3/NO2 | 03/23/95 | 110.000 | MG/L |
| DET-1 | NO3/NO2 | 06/28/95 | 44.000 | MG/L |
| DET-1 | NO3/NO2 | 06/28/95 | 39.000 | MG/L |
| DET-1 | NO3/NO2 | 10/05/95 | 29.000 | MG/L |
| DET-1 | NO3/NO2 | 12/14/95 | 28.000 | MG/L |
| DET-1 | NO3/NO2 | 12/14/95 | 30.000 | MG/L |
| DET-1 | NO3/NO2 | 03/21/96 | 14.000 | MG/L |
| DET-1 | NO3/NO2 | 06/20/96 | 36.000 | MG/L |
| DET-1 | Na | 05/04/92 | 7500.000 | MG/L |
| DET-1 | Na | 09/23/92 | 1100.000 | MG/L |
| DET-1 | Na | 01/28/93 | 6300.000 | MG/L |
| DET-1 | Na | 06/03/93 | 7800.000 | MG/L |
| DET-1 | Na | 08/31/93 | 6900.000 | MG/L |
| DET-1 | Na | 11/11/93 | 5300.000 | MG/L |
| DET-1 | Na | 11/11/93 | 5600.000 | MG/L |
| DET-1 | Na | 03/09/94 | 110000.000 | MG/L |
| DET-1 | Na | 03/09/94 | 150000.000 | MG/L |
| DET-1 | Na | 06/28/94 | 6000.000 | MG/L |
| DET-1 | Na | 09/23/94 | 5100.000 | MG/L |
| DET-1 | Na | 09/23/94 | 407000.000 | MG/L |
| DET-1 | Na | 12/22/94 | 5700.000 | MG/L |
| DET-1 | Na | 03/23/95 | 5700.000 | MG/L |
| DET-1 | Na | 06/28/95 | 5100.000 | MG/L |
| DET-1 | Na | 06/28/95 | 4800.000 | MG/L |
| DET-1 | Na | 10/05/95 | 6300.000 | MG/L |
| DET-1 | Na | 12/14/95 | 6300.000 | MG/L |
| DET-1 | Na | 12/14/95 | 6300.000 | MG/L |
| DET-1 | Na | 03/21/96 | 220000.000 | MG/L |
| DET-1 | Na | 06/20/96 | 6300.000 | MG/L |
| DET-1 | Ni | 06/03/93 | 10.000 | MG/L |
| DET-1 | Ni | 08/31/93 | 16.000 | MG/L |
| DET-1 | Ni | 11/11/93 | 17.000 | MG/L |
| DET-1 | Ni | 11/11/93 | 24.000 | MG/L |
| DET-1 | Ni | 06/28/94 | 5.000 | MG/L |
| DET-1 | Ni | 10/05/95 | 2.000 | MG/L |
| DET-1 | Ni | 12/14/95 | 2.000 | MG/L |
| DET-1 | Ni | 12/14/95 | 2.000 | MG/L |
| DET-1 | Ni | 03/21/96 | 2.000 | MG/L |
| DET-1 | Oil & G | 09/23/92 | 1000.000 | MG/L |
| DET-1 | Oil & G | 12/22/94 | 2200.000 | MG/L |
| DET-1 | Oil & G | 06/20/96 | 65.000 | MG/L |
| DET-1 | PO4 | 05/04/92 | 170.000 | MG/L |
| DET-1 | PO4 | 01/28/93 | 20.000 | MG/L |
| DET-1 | PO4 | 06/28/94 | 70.000 | MG/L |
| DET-1 | PO4 | 09/23/94 | 29.000 | MG/L |
| DET-1 | PO4 | 09/23/94 | 110.000 | MG/L |
| DET-1 | PO4 | 12/22/94 | 25.000 | MG/L |
| DET-1 | PO4 | 06/28/95 | 17.000 | MG/L |
| DET-1 | PO4 | 06/28/95 | 13.000 | MG/L |
| DET-1 | PO4 | 10/05/95 | 64.000 | MG/L |
| DET-1 | PO4 | 12/14/95 | 61.000 | MG/L |
| DET-1 | Pb | 03/09/94 | 2.000 | MG/L |
| DET-1 | Pb | 06/28/94 | 4.000 | MG/L |
| DET-1 | Pb | 09/23/94 | 3.000 | MG/L |
| DET-1 | Pb | 09/23/94 | 8.000 | MG/L |
| DET-1 | Pb | 12/22/94 | 2.000 | MG/L |
| DET-1 | Pb | 06/28/95 | 1.000 | MG/L |
| DET-1 | Pb | 10/05/95 | 1.000 | MG/L |
| DET-1 | Pb | 12/14/95 | 2.000 | MG/L |
| DET-1 | Pb | 12/14/95 | 4.000 | MG/L |
| DET-1 | Pb | 03/21/96 | 2.000 | MG/L |
| DET-1 | Phenols | 09/23/94 | 12.000 | MG/L |
| DET-1 | Phenols | 09/23/94 | 10.000 | MG/L |
| DET-1 | Phenols | 12/22/94 | 10.000 | MG/L |
| DET-1 | Phenols | 03/23/95 | 9.000 | MG/L |
| DET-1 | Phenols | 06/28/95 | 9.000 | MG/L |
| DET-1 | Phenols | 06/28/95 | 24.000 | MG/L |
| DET-1 | Phenols | 12/14/95 | 5.000 | MG/L |
| DET-1 | RDX | 03/09/94 | 1.400 | UG/L |
| DET-1 | RDX | 03/09/94 | 1.100 | UG/L |
| DET-1 | SO4 | 05/04/92 | 99000.000 | MG/L |
| DET-1 | SO4 | 09/23/92 | 89000.000 | MG/L |
| DET-1 | SO4 | 01/28/93 | 91000.000 | MG/L |
| DET-1 | SO4 | 06/03/93 | 88000.000 | MG/L |
| DET-1 | SO4 | 08/31/93 | 85000.000 | MG/L |
| DET-1 | SO4 | 11/11/93 | 36000.000 | MG/L |
| DET-1 | SO4 | 11/11/93 | 47000.000 | MG/L |
| DET-1 | SO4 | 03/09/94 | 89000.000 | MG/L |
| DET-1 | SO4 | 03/09/94 | 100000.000 | MG/L |
| DET-1 | SO4 | 06/28/94 | 68000.000 | MG/L |
| DET-1 | SO4 | 09/23/94 | 66000.000 | MG/L |
| DET-1 | SO4 | 09/23/94 | 50000.000 | MG/L |
| DET-1 | SO4 | 12/22/94 | 80000.000 | MG/L |
| DET-1 | SO4 | 03/23/95 | 71000.000 | MG/L |
| DET-1 | SO4 | 06/28/95 | 80000.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-1 | SO4 | 06/28/95 | 78000.000 | MG/L |
| DET-1 | SO4 | 10/05/95 | 72000.000 | MG/L |
| DET-1 | SO4 | 12/14/95 | 104000.000 | MG/L |
| [illegible]-1 | SO4 | 12/14/95 | 96000.000 | MG/L |
| [illegible]-1 | SO4 | 03/21/96 | 72000.000 | MG/L |
| DET-1 | SO4 | 06/20/96 | 37000.000 | MG/L |
| DET-1 | Sb | 12/14/95 | 4.000 | MG/L |
| DET-1 | Sb | 12/14/95 | 4.000 | MG/L |
| DET-1 | Sb | 06/20/96 | 6.000 | MG/L |
| DET-1 | Se | 06/28/95 | 1.000 | MG/L |
| DET-1 | TDS | 05/04/92 | 380000.000 | MG/L |
| DET-1 | TDS | 09/23/92 | 342000.000 | MG/L |
| DET-1 | TDS | 01/28/93 | 329000.000 | MG/L |
| DET-1 | TDS | 06/03/93 | 320000.000 | MG/L |
| DET-1 | TDS | 08/31/93 | 328000.000 | MG/L |
| DET-1 | TDS | 11/11/93 | 232000.000 | MG/L |
| DET-1 | TDS | 11/11/93 | 229000.000 | MG/L |
| DET-1 | TDS | 03/09/94 | 311000.000 | MG/L |
| DET-1 | TDS | 03/09/94 | 315000.000 | MG/L |
| DET-1 | TDS | 06/28/94 | 460000.000 | MG/L |
| DET-1 | TDS | 09/23/94 | 340000.000 | MG/L |
| DET-1 | TDS | 09/23/94 | 330000.000 | MG/L |
| DET-1 | TDS | 12/22/94 | 310000.000 | MG/L |
| DET-1 | TDS | 03/23/95 | 300000.000 | MG/L |
| DET-1 | TDS | 06/28/95 | 330000.000 | MG/L |
| DET-1 | TDS | 06/28/95 | 310000.000 | MG/L |
| DET-1 | TDS | 10/05/95 | 360000.000 | MG/L |
| DET-1 | TDS | 12/14/95 | 350000.000 | MG/L |
| [illegible]T-1 | TDS | 12/14/95 | 310000.000 | MG/L |
| [illegible]T-1 | TDS | 03/21/96 | 370000.000 | MG/L |
| DET-1 | TDS | 06/20/96 | 340000.000 | MG/L |
| DET-1 | TKN | 06/28/94 | 350.000 | MG/L |
| DET-1 | TKN | 09/23/94 | 570.000 | MG/L |
| DET-1 | TKN | 09/23/94 | 650.000 | MG/L |
| DET-1 | TKN | 12/22/94 | 210.000 | MG/L |
| DET-1 | TKN | 03/23/95 | 150.000 | MG/L |
| DET-1 | TKN | 06/28/95 | 5000.000 | MG/L |
| DET-1 | TKN | 06/28/95 | 720.000 | MG/L |
| DET-1 | TKN | 03/21/96 | 500.000 | MG/L |
| DET-1 | TKN | 06/20/96 | 95.000 | MG/L |
| DET-1 | TOC | 05/04/92 | 12000.000 | MG/L |
| DET-1 | TOC | 06/28/94 | 790.000 | MG/L |
| DET-1 | TOC | 09/23/94 | 1300.000 | MG/L |
| DET-1 | TOC | 09/23/94 | 1100.000 | MG/L |
| DET-1 | TOC | 12/22/94 | 860.000 | MG/L |
| DET-1 | TOC | 03/23/95 | 1200.000 | MG/L |
| DET-1 | TOC | 06/28/95 | 1300.000 | MG/L |
| DET-1 | TOX | 01/28/93 | 10.000 | MG/L |
| DET-1 | TOX | 06/03/93 | 30.000 | MG/L |
| DET-1 | TOX | 09/23/94 | 10.000 | MG/L |
| DET-1 | TOX | 06/28/95 | 30.000 | MG/L |
| DET-1 | TOX | 12/14/95 | 10.000 | MG/L |
| [illegible]ET-1 | TOX | 12/14/95 | 20.000 | MG/L |
| DET-1 | TOX | 03/21/96 | 27.000 | MG/L |
| DET-1 | TOX | 06/20/96 | 110.000 | MG/L |
| DET-1 | Tl | 12/22/94 | 3.000 | MG/L |
| DET-1 | Turb | 01/28/93 | 2.000 | NTU |
| DET-1 | Turb | 06/03/93 | 1.300 | NTU |
| DET-1 | Turb | 08/31/93 | 3.100 | NTU |
| DET-1 | Turb | 11/11/93 | 2.700 | NTU |
| DET-1 | Turb | 11/11/93 | 4.000 | NTU |
| DET-1 | Turb | 03/09/94 | 0.360 | NTU |
| DET-1 | Turb | 03/09/94 | 2.300 | NTU |
| DET-1 | Turb | 06/28/94 | 17.000 | NTU |
| DET-1 | Turb | 09/23/94 | 18.000 | NTU |
| DET-1 | Turb | 09/23/94 | 95.000 | NTU |
| DET-1 | Turb | 12/22/94 | 12.000 | NTU |
| DET-1 | Turb | 03/23/95 | 6.600 | NTU |
| DET-1 | Turb | 06/28/95 | 13.000 | NTU |
| DET-1 | Turb | 06/28/95 | 78.000 | NTU |
| DET-1 | Turb | 10/05/95 | 21.000 | NTU |
| DET-1 | Turb | 12/14/95 | 150.000 | NTU |
| DET-1 | Turb | 12/14/95 | 150.000 | NTU |
| DET-1 | Turb | 03/21/96 | 19.000 | NTU |
| DET-1 | Turb | 06/20/96 | 14.000 | NTU |
| DET-1 | Zn | 09/23/92 | 20.000 | MG/L |
| DET-1 | Zn | 01/28/93 | 40.000 | MG/L |
| DET-1 | Zn | 06/03/93 | 18.000 | MG/L |
| DET-1 | Zn | 08/31/93 | 13.000 | MG/L |
| DET-1 | Zn | 11/11/93 | 45.000 | MG/L |
| DET-1 | Zn | 11/11/93 | 710.000 | MG/L |
| DET-1 | Zn | 03/09/94 | 24.000 | MG/L |
| DET-1 | Zn | 03/09/94 | 34.000 | MG/L |
| DET-1 | Zn | 06/28/94 | 51.000 | MG/L |
| DET-1 | Zn | 09/23/94 | 37.000 | MG/L |
| DET-1 | Zn | 09/23/94 | 28.000 | MG/L |
| DET-1 | Zn | 12/22/94 | 25.000 | MG/L |
| DET-1 | Zn | 03/23/95 | 20.000 | MG/L |
| DET-1 | Zn | 06/28/95 | 30.000 | MG/L |
| DET-1 | Zn | 06/28/95 | 22.000 | MG/L |
| DET-1 | Zn | 10/05/95 | 14.000 | MG/L |
| DET-1 | Zn | 12/14/95 | 19.000 | MG/L |
| DET-1 | Zn | 12/14/95 | 18.000 | MG/L |
| DET-1 | Zn | 03/21/96 | 26.000 | MG/L |
| DET-1 | Zn | 06/20/96 | 15.000 | MG/L |
| DET-1 | pH | 05/04/92 | 7.500 | SU |
| DET-1 | pH | 09/23/92 | 7.110 | SU |
| DET-1 | pH | 01/28/93 | 7.110 | SU |
| DET-1 | pH | 06/03/93 | 7.360 | SU |
| DET-1 | pH | 08/31/93 | 7.610 | SU |
| DET-1 | pH | 11/11/93 | 7.660 | SU |
| DET-1 | pH | 11/11/93 | 7.630 | SU |
| DET-1 | pH | 03/09/94 | 7.700 | SU |
| DET-1 | pH | 03/09/94 | 7.660 | SU |
| DET-1 | pH | 06/28/94 | 8.100 | SU |
| DET-1 | pH | 09/23/94 | 7.500 | SU |
| DET-1 | pH | 09/23/94 | 7.500 | SU |
| DET-1 | pH | 12/22/94 | 7.500 | SU |
| DET-1 | pH | 03/23/95 | 7.700 | SU |
| DET-1 | pH | 06/28/95 | 7.500 | SU |
| DET-1 | pH | 06/28/95 | 7.500 | SU |
| DET-1 | pH | 10/05/95 | 7.500 | SU |
| DET-1 | pH | 12/14/95 | 7.600 | SU |
| DET-1 | pH | 12/14/95 | 7.700 | SU |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-1 | pH | 03/21/96 | 7.600 | SU |
| DET-1 | pH | 06/20/96 | 7.600 | SU |
| DET-2 | 1,2DCE | 10/05/95 | 0.810 | UG/L |
| [illegible]-2 | 1,2DCE | 10/05/95 | 0.780 | UG/L |
| [illegible]-2 | 1,2DCE | 12/14/95 | 0.900 | UG/L |
| DET-2 | Ag | 06/20/96 | 7.000 | MG/L |
| DET-2 | Ag | 06/20/96 | 5.000 | MG/L |
| DET-2 | AmmoniaN | 05/04/92 | 170.000 | MG/L |
| DET-2 | AmmoniaN | 09/23/92 | 110.000 | MG/L |
| DET-2 | AmmoniaN | 01/28/93 | 180.000 | MG/L |
| DET-2 | AmmoniaN | 06/03/93 | 60.000 | MG/L |
| DET-2 | AmmoniaN | 06/03/93 | 60.000 | MG/L |
| DET-2 | AmmoniaN | 08/31/93 | 70.000 | MG/L |
| DET-2 | AmmoniaN | 11/11/93 | 570.000 | MG/L |
| DET-2 | AmmoniaN | 09/23/94 | 130.000 | MG/L |
| DET-2 | AmmoniaN | 12/22/94 | 520.000 | MG/L |
| DET-2 | AmmoniaN | 12/22/94 | 460.000 | MG/L |
| DET-2 | AmmoniaN | 03/23/95 | 100.000 | MG/L |
| DET-2 | AmmoniaN | 03/23/95 | 68.000 | MG/L |
| DET-2 | AmmoniaN | 06/28/95 | 94.000 | MG/L |
| DET-2 | AmmoniaN | 10/05/95 | 49.000 | MG/L |
| DET-2 | AmmoniaN | 10/05/95 | 67.000 | MG/L |
| DET-2 | AmmoniaN | 12/14/95 | 70.000 | MG/L |
| DET-2 | AmmoniaN | 03/21/96 | 88.000 | MG/L |
| DET-2 | AmmoniaN | 03/21/96 | 43.000 | MG/L |
| DET-2 | AmmoniaN | 06/20/96 | 130.000 | MG/L |
| DET-2 | AmmoniaN | 06/20/96 | 180.000 | MG/L |
| DET-2 | As | 09/23/92 | 12.000 | MG/L |
| [illegible]T-2 | As | 01/28/93 | 20.000 | MG/L |
| [illegible]T-2 | As | 06/03/93 | 18.000 | MG/L |
| DET-2 | As | 06/03/93 | 17.000 | MG/L |
| DET-2 | As | 03/09/94 | 7.000 | MG/L |
| DET-2 | As | 06/28/94 | 6.000 | MG/L |
| DET-2 | As | 06/28/94 | 26.000 | MG/L |
| DET-2 | As | 09/23/94 | 17.000 | MG/L |
| DET-2 | As | 12/22/94 | 21.000 | MG/L |
| DET-2 | As | 12/22/94 | 28.000 | MG/L |
| DET-2 | As | 03/23/95 | 11.000 | MG/L |
| DET-2 | As | 03/23/95 | 21.000 | MG/L |
| DET-2 | As | 06/28/95 | 21.000 | MG/L |
| DET-2 | As | 10/05/95 | 9.000 | MG/L |
| DET-2 | As | 10/05/95 | 11.000 | MG/L |
| DET-2 | As | 12/14/95 | 5.000 | MG/L |
| DET-2 | As | 03/21/96 | 7.000 | MG/L |
| DET-2 | As | 03/21/96 | 7.000 | MG/L |
| DET-2 | As | 06/20/96 | 6.000 | MG/L |
| DET-2 | Ba | 05/04/92 | 40.000 | MG/L |
| DET-2 | Ba | 03/09/94 | 44.000 | MG/L |
| DET-2 | Ba | 06/28/94 | 25.000 | MG/L |
| DET-2 | Ba | 06/28/94 | 63.000 | MG/L |
| DET-2 | Ba | 09/23/94 | 45.000 | MG/L |
| DET-2 | Ba | 12/22/94 | 58.000 | MG/L |
| [illegible]T-2 | Ba | 12/22/94 | 73.000 | MG/L |
| DET-2 | Ba | 03/23/95 | 40.000 | MG/L |
| DET-2 | Ba | 03/23/95 | 41.000 | MG/L |
| DET-2 | Ba | 06/28/95 | 59.000 | MG/L |
| DET-2 | Ba | 10/05/95 | 43.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-2 | Ba | 10/05/95 | 47.000 | MG/L |
| DET-2 | Ba | 12/14/95 | 37.000 | MG/L |
| DET-2 | Ba | 03/21/96 | 41.000 | MG/L |
| DET-2 | Ba | 03/21/96 | 37.000 | MG/L |
| DET-2 | Ba | 06/20/96 | 41.000 | MG/L |
| DET-2 | Ba | 06/20/96 | 45.000 | MG/L |
| DET-2 | Be | 03/21/96 | 6.000 | MG/L |
| DET-2 | Be | 03/21/96 | 10.000 | MG/L |
| DET-2 | COD | 05/04/92 | 48000.000 | MG/L |
| DET-2 | COD | 11/11/93 | 5600.000 | MG/L |
| DET-2 | COD | 06/28/94 | 3600.000 | MG/L |
| DET-2 | COD | 09/23/94 | 17000.000 | MG/L |
| DET-2 | COD | 12/22/94 | 5400.000 | MG/L |
| DET-2 | COD | 12/22/94 | 6800.000 | MG/L |
| DET-2 | COD | 06/28/95 | 20000.000 | MG/L |
| DET-2 | COD | 06/20/96 | 19000.000 | MG/L |
| DET-2 | COD | 06/20/96 | 24000.000 | MG/L |
| DET-2 | Ca | 05/04/92 | 91000.000 | MG/L |
| DET-2 | Ca | 09/23/92 | 91000.000 | MG/L |
| DET-2 | Ca | 01/28/93 | 90000.000 | MG/L |
| DET-2 | Ca | 06/03/93 | 92000.000 | MG/L |
| DET-2 | Ca | 06/03/93 | 96000.000 | MG/L |
| DET-2 | Ca | 08/31/93 | 170000.000 | MG/L |
| DET-2 | Ca | 11/11/93 | 68000.000 | MG/L |
| DET-2 | Ca | 03/09/94 | 74000.000 | MG/L |
| DET-2 | Ca | 06/28/94 | 64000.000 | MG/L |
| DET-2 | Ca | 06/28/94 | 81000.000 | MG/L |
| DET-2 | Ca | 09/23/94 | 93000.000 | MG/L |
| DET-2 | Ca | 12/22/94 | 88000.000 | MG/L |
| DET-2 | Ca | 12/22/94 | 84000.000 | MG/L |
| DET-2 | Ca | 03/23/95 | 78000.000 | MG/L |
| DET-2 | Ca | 03/23/95 | 78000.000 | MG/L |
| DET-2 | Ca | 06/28/95 | 76000.000 | MG/L |
| DET-2 | Ca | 10/05/95 | 79000.000 | MG/L |
| DET-2 | Ca | 10/05/95 | 81000.000 | MG/L |
| DET-2 | Ca | 12/14/95 | 78000.000 | MG/L |
| DET-2 | Ca | 03/21/96 | 84000.000 | MG/L |
| DET-2 | Ca | 03/21/96 | 86000.000 | MG/L |
| DET-2 | Ca | 06/20/96 | 79000.000 | MG/L |
| DET-2 | Ca | 06/20/96 | 80000.000 | MG/L |
| DET-2 | CaCO3 | 05/04/92 | 280000.000 | MG/L |
| DET-2 | CaCO3 | 09/23/92 | 260000.000 | MG/L |
| DET-2 | CaCO3 | 01/28/93 | 260000.000 | MG/L |
| DET-2 | CaCO3 | 06/03/93 | 260000.000 | MG/L |
| DET-2 | CaCO3 | 06/03/93 | 260000.000 | MG/L |
| DET-2 | CaCO3 | 08/31/93 | 270000.000 | MG/L |
| DET-2 | CaCO3 | 11/11/93 | 230000.000 | MG/L |
| DET-2 | CaCO3 | 03/09/94 | 270000.000 | MG/L |
| DET-2 | CaCO3 | 06/28/94 | 210000.000 | MG/L |
| DET-2 | CaCO3 | 06/28/94 | 210000.000 | MG/L |
| DET-2 | CaCO3 | 09/23/94 | 270000.000 | MG/L |
| DET-2 | CaCO3 | 12/22/94 | 270000.000 | MG/L |
| DET-2 | CaCO3 | 12/22/94 | 270000.000 | MG/L |
| DET-2 | CaCO3 | 03/23/95 | 270000.000 | MG/L |
| DET-2 | CaCO3 | 03/23/95 | 270000.000 | MG/L |
| DET-2 | CaCO3 | 06/28/95 | 270000.000 | MG/L |
| DET-2 | CaCO3 | 10/05/95 | 270000.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-2 | CaCO3 | 10/05/95 | 290000.000 | MG/L |
| DET-2 | CaCO3 | 12/14/95 | 260000.000 | MG/L |
| DET-2 | CaCO3 | 03/21/96 | 270000.000 | MG/L |
| DET-2 | CaCO3 | 03/21/96 | 270000.000 | MG/L |
| DET-2 | CaCO3 | 06/20/96 | 290000.000 | MG/L |
| DET-2 | CaCO3 | 06/20/96 | 290000.000 | MG/L |
| DET-2 | Cd | 12/22/94 | 1.000 | MG/L |
| DET-2 | Cd | 12/22/94 | 1.000 | MG/L |
| DET-2 | Cd | 10/05/95 | 1.000 | MG/L |
| DET-2 | Cd | 10/05/95 | 1.000 | MG/L |
| DET-2 | Chloride | 05/04/92 | 1500.000 | MG/L |
| DET-2 | Chloride | 09/23/92 | 1000.000 | MG/L |
| DET-2 | Chloride | 01/28/93 | 3000.000 | MG/L |
| DET-2 | Chloride | 06/03/93 | 2500.000 | MG/L |
| DET-2 | Chloride | 06/03/93 | 2500.000 | MG/L |
| DET-2 | Chloride | 08/31/93 | 3500.000 | MG/L |
| DET-2 | Chloride | 11/11/93 | 2000.000 | MG/L |
| DET-2 | Chloride | 03/09/94 | 2500.000 | MG/L |
| DET-2 | Chloride | 06/28/94 | 3700.000 | MG/L |
| DET-2 | Chloride | 06/28/94 | 4100.000 | MG/L |
| DET-2 | Chloride | 09/23/94 | 3000.000 | MG/L |
| DET-2 | Chloride | 12/22/94 | 3000.000 | MG/L |
| DET-2 | Chloride | 12/22/94 | 2900.000 | MG/L |
| DET-2 | Chloride | 03/23/95 | 3100.000 | MG/L |
| DET-2 | Chloride | 03/23/95 | 3200.000 | MG/L |
| DET-2 | Chloride | 06/28/95 | 28000.000 | MG/L |
| DET-2 | Chloride | 10/05/95 | 3000.000 | MG/L |
| DET-2 | Chloride | 10/05/95 | 3400.000 | MG/L |
| DET-2 | Chloride | 03/21/96 | 1600.000 | MG/L |
| DET-2 | Chloride | 03/21/96 | 1900.000 | MG/L |
| DET-2 | Chloride | 06/20/96 | 2600.000 | MG/L |
| DET-2 | Chloride | 06/20/96 | 2800.000 | MG/L |
| DET-2 | Cond F | 05/04/92 | 532.000 | umhos/ |
| DET-2 | Cond L | 05/04/92 | 700.000 | umhos/ |
| DET-2 | Cond L | 09/23/92 | 618.000 | umhos/ |
| DET-2 | Cond L | 01/28/93 | 598.000 | umhos/ |
| DET-2 | Cond L | 06/03/93 | 632.000 | umhos/ |
| DET-2 | Cond L | 06/03/93 | 627.000 | umhos/ |
| DET-2 | Cond L | 08/31/93 | 654.000 | umhos/ |
| DET-2 | Cond L | 11/11/93 | 528.000 | umhos/ |
| DET-2 | Cond L | 03/09/94 | 683.000 | umhos/ |
| DET-2 | Cond L | 06/28/94 | 360.000 | umhos/ |
| DET-2 | Cond L | 06/28/94 | 390.000 | umhos/ |
| DET-2 | Cond L | 09/23/94 | 600.000 | umhos/ |
| DET-2 | Cond L | 12/22/94 | 590.000 | umhos/ |
| DET-2 | Cond L | 12/22/94 | 590.000 | umhos/ |
| DET-2 | Cond L | 03/23/95 | 580.000 | umhos/ |
| DET-2 | Cond L | 03/23/95 | 560.000 | umhos/ |
| DET-2 | Cond L | 06/28/95 | 620.000 | umhos/ |
| DET-2 | Cond L | 10/05/95 | 540.000 | umhos/ |
| DET-2 | Cond L | 10/05/95 | 540.000 | umhos/ |
| DET-2 | Cond L | 12/14/95 | 660.000 | umhos/ |
| DET-2 | Cond L | 03/21/96 | 560.000 | umhos/ |
| DET-2 | Cond L | 03/21/96 | 560.000 | umhos/ |
| DET-2 | Cond L | 06/20/96 | 660.000 | umhos/ |
| DET-2 | Cond L | 06/20/96 | 660.000 | umhos/ |
| DET-2 | Cr | 05/04/92 | 20.000 | MG/L |
| DET-2 | Cr | 06/03/93 | 22.000 | MG/L |
| DET-2 | Cr | 06/03/93 | 23.000 | MG/L |
| DET-2 | Cr | 08/31/93 | 20.000 | MG/L |
| DET-2 | Cr | 03/09/94 | 26.000 | MG/L |
| DET-2 | Cr | 06/28/94 | 19.000 | MG/L |
| DET-2 | Cr | 09/23/94 | 7.000 | MG/L |
| DET-2 | Cr | 12/22/94 | 22.000 | MG/L |
| DET-2 | Cr | 03/23/95 | 8.000 | MG/L |
| DET-2 | Cr | 06/28/95 | 20.000 | MG/L |
| DET-2 | Cr | 10/05/95 | 6.000 | MG/L |
| DET-2 | Cr | 10/05/95 | 7.000 | MG/L |
| DET-2 | Cr | 12/14/95 | 2.000 | MG/L |
| DET-2 | Cr | 03/21/96 | 3.000 | MG/L |
| DET-2 | Cr | 03/21/96 | 2.000 | MG/L |
| DET-2 | Cr | 06/20/96 | 3.000 | MG/L |
| DET-2 | Cr | 06/20/96 | 4.000 | MG/L |
| DET-2 | Cu | 09/23/92 | 30.000 | MG/L |
| DET-2 | Cu | 01/28/93 | 40.000 | MG/L |
| DET-2 | Cu | 06/03/93 | 31.000 | MG/L |
| DET-2 | Cu | 06/03/93 | 30.000 | MG/L |
| DET-2 | Cu | 08/31/93 | 23.000 | MG/L |
| DET-2 | Cu | 11/11/93 | 10.000 | MG/L |
| DET-2 | Cu | 03/09/94 | 38.000 | MG/L |
| DET-2 | Cu | 06/28/94 | 5.000 | MG/L |
| DET-2 | Cu | 06/28/94 | 26.000 | MG/L |
| DET-2 | Cu | 09/23/94 | 10.000 | MG/L |
| DET-2 | Cu | 12/22/94 | 11.000 | MG/L |
| DET-2 | Cu | 12/22/94 | 27.000 | MG/L |
| DET-2 | Cu | 03/23/95 | 10.000 | MG/L |
| DET-2 | Cu | 03/23/95 | 8.000 | MG/L |
| DET-2 | Cu | 06/28/95 | 20.000 | MG/L |
| DET-2 | Cu | 10/05/95 | 11.000 | MG/L |
| DET-2 | Cu | 10/05/95 | 13.000 | MG/L |
| DET-2 | Cu | 03/21/96 | 4.000 | MG/L |
| DET-2 | Cu | 03/21/96 | 6.000 | MG/L |
| DET-2 | Cu | 06/20/96 | 3.000 | MG/L |
| DET-2 | Cu | 06/20/96 | 4.000 | MG/L |
| DET-2 | Cyanide | 12/14/95 | 6.000 | MG/L |
| DET-2 | Fe | 09/23/92 | 11000.000 | MG/L |
| DET-2 | Fe | 01/28/93 | 23000.000 | MG/L |
| DET-2 | Fe | 06/03/93 | 24000.000 | MG/L |
| DET-2 | Fe | 06/03/93 | 28000.000 | MG/L |
| DET-2 | Fe | 08/31/93 | 9800.000 | MG/L |
| DET-2 | Fe | 03/09/94 | 1300.000 | MG/L |
| DET-2 | Fe | 06/28/94 | 710.000 | MG/L |
| DET-2 | Fe | 06/28/94 | 27000.000 | MG/L |
| DET-2 | Fe | 09/23/94 | 8500.000 | MG/L |
| DET-2 | Fe | 12/22/94 | 14000.000 | MG/L |
| DET-2 | Fe | 12/22/94 | 22000.000 | MG/L |
| DET-2 | Fe | 03/23/95 | 5800.000 | MG/L |
| DET-2 | Fe | 03/23/95 | 6500.000 | MG/L |
| DET-2 | Fe | 06/28/95 | 18000.000 | MG/L |
| DET-2 | Fe | 10/05/95 | 5200.000 | MG/L |
| DET-2 | Fe | 10/05/95 | 7100.000 | MG/L |
| DET-2 | Fe | 12/14/95 | 670.000 | MG/L |
| DET-2 | Fe | 03/21/96 | 1500.000 | MG/L |
| DET-2 | Fe | 03/21/96 | 1100.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-2 | Fe | 06/20/96 | 1200.000 | MG/L |
| DET-2 | Fe | 06/20/96 | 2300.000 | MG/L |
| DET-2 | GWL | 05/04/92 | 1031.970 | feet |
| DET-2 | GWL | 09/23/92 | 1031.240 | feet |
| DET-2 | GWL | 01/28/93 | 1030.940 | feet |
| DET-2 | GWL | 06/03/93 | 1030.240 | feet |
| DET-2 | GWL | 08/31/93 | 1029.740 | feet |
| DET-2 | GWL | 11/11/93 | 1030.640 | feet |
| DET-2 | GWL | 03/09/94 | 1030.240 | feet |
| DET-2 | GWL | 06/28/94 | 1031.240 | feet |
| DET-2 | GWL | 09/23/94 | 1030.910 | feet |
| DET-2 | GWL | 12/22/94 | 1032.240 | feet |
| DET-2 | GWL | 12/22/94 | 1032.240 | feet |
| DET-2 | GWL | 03/23/95 | 1031.490 | feet |
| DET-2 | GWL | 03/23/95 | 1031.490 | feet |
| DET-2 | GWL | 06/28/95 | 1031.410 | feet |
| DET-2 | GWL | 10/05/95 | 1031.320 | feet |
| DET-2 | GWL | 10/05/95 | 1031.320 | feet |
| DET-2 | GWL | 12/14/95 | 1030.990 | feet |
| DET-2 | GWL | 03/21/96 | 1033.910 | feet |
| DET-2 | GWL | 03/21/96 | 1033.910 | feet |
| DET-2 | GWL | 06/20/96 | 1029.240 | feet |
| DET-2 | Hg | 06/28/94 | 1.000 | MG/L |
| DET-2 | K | 05/04/92 | 5300.000 | MG/L |
| DET-2 | K | 09/23/92 | 3200.000 | MG/L |
| DET-2 | K | 01/28/93 | 5400.000 | MG/L |
| DET-2 | K | 06/03/93 | 3800.000 | MG/L |
| DET-2 | K | 06/03/93 | 3500.000 | MG/L |
| DET-2 | K | 08/31/93 | 3400.000 | MG/L |
| DET-2 | K | 11/11/93 | 2100.000 | MG/L |
| DET-2 | K | 03/09/94 | 2500.000 | MG/L |
| DET-2 | K | 06/28/94 | 1600.000 | MG/L |
| DET-2 | K | 06/28/94 | 3900.000 | MG/L |
| DET-2 | K | 09/23/94 | 3200.000 | MG/L |
| DET-2 | K | 12/22/94 | 3200.000 | MG/L |
| DET-2 | K | 12/22/94 | 3800.000 | MG/L |
| DET-2 | K | 03/23/95 | 2800.000 | MG/L |
| DET-2 | K | 03/23/95 | 2600.000 | MG/L |
| DET-2 | K | 06/28/95 | 3700.000 | MG/L |
| DET-2 | K | 10/05/95 | 3100.000 | MG/L |
| DET-2 | K | 10/05/95 | 3300.000 | MG/L |
| DET-2 | K | 12/14/95 | 2600.000 | MG/L |
| DET-2 | K | 03/21/96 | 2900.000 | MG/L |
| DET-2 | K | 03/21/96 | 2300.000 | MG/L |
| DET-2 | K | 06/20/96 | 2800.000 | MG/L |
| DET-2 | K | 06/20/96 | 2800.000 | MG/L |
| DET-2 | Mg | 05/04/92 | 32000.000 | MG/L |
| DET-2 | Mg | 09/23/92 | 38000.000 | MG/L |
| DET-2 | Mg | 01/28/93 | 33000.000 | MG/L |
| DET-2 | Mg | 06/03/93 | 32000.000 | MG/L |
| DET-2 | Mg | 06/03/93 | 33000.000 | MG/L |
| DET-2 | Mg | 08/31/93 | 48000.000 | MG/L |
| DET-2 | Mg | 11/11/93 | 19000.000 | MG/L |
| DET-2 | Mg | 03/09/94 | 29000.000 | MG/L |
| DET-2 | Mg | 06/28/94 | 27000.000 | MG/L |
| DET-2 | Mg | 06/28/94 | 35000.000 | MG/L |
| DET-2 | Mg | 09/23/94 | 30000.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-2 | Mg | 12/22/94 | 31000.000 | MG/L |
| DET-2 | Mg | 12/22/94 | 31000.000 | MG/L |
| DET-2 | Mg | 03/23/95 | 28000.000 | MG/L |
| DET-2 | Mg | 03/23/95 | 29000.000 | MG/L |
| DET-2 | Mg | 06/28/95 | 29000.000 | MG/L |
| DET-2 | Mg | 10/05/95 | 32000.000 | MG/L |
| DET-2 | Mg | 10/05/95 | 33000.000 | MG/L |
| DET-2 | Mg | 12/14/95 | 31000.000 | MG/L |
| DET-2 | Mg | 03/21/96 | 30000.000 | MG/L |
| DET-2 | Mg | 03/21/96 | 28000.000 | MG/L |
| DET-2 | Mg | 06/20/96 | 31000.000 | MG/L |
| DET-2 | Mg | 06/20/96 | 32000.000 | MG/L |
| DET-2 | Mn | 05/04/92 | 180.000 | MG/L |
| DET-2 | Mn | 09/23/92 | 450.000 | MG/L |
| DET-2 | Mn | 01/28/93 | 540.000 | MG/L |
| DET-2 | Mn | 06/03/93 | 410.000 | MG/L |
| DET-2 | Mn | 06/03/93 | 460.000 | MG/L |
| DET-2 | Mn | 08/31/93 | 400.000 | MG/L |
| DET-2 | Mn | 11/11/93 | 220.000 | MG/L |
| DET-2 | Mn | 03/09/94 | 430.000 | MG/L |
| DET-2 | Mn | 06/28/94 | 200.000 | MG/L |
| DET-2 | Mn | 06/28/94 | 750.000 | MG/L |
| DET-2 | Mn | 09/23/94 | 410.000 | MG/L |
| DET-2 | Mn | 12/22/94 | 390.000 | MG/L |
| DET-2 | Mn | 12/22/94 | 500.000 | MG/L |
| DET-2 | Mn | 03/23/95 | 290.000 | MG/L |
| DET-2 | Mn | 03/23/95 | 240.000 | MG/L |
| DET-2 | Mn | 06/28/95 | 440.000 | MG/L |
| DET-2 | Mn | 10/05/95 | 300.000 | MG/L |
| DET-2 | Mn | 10/05/95 | 340.000 | MG/L |
| DET-2 | Mn | 12/14/95 | 230.000 | MG/L |
| DET-2 | Mn | 03/21/96 | 210.000 | MG/L |
| DET-2 | Mn | 03/21/96 | 200.000 | MG/L |
| DET-2 | Mn | 06/20/96 | 280.000 | MG/L |
| DET-2 | Mn | 06/20/96 | 300.000 | MG/L |
| DET-2 | NO3/NO2 | 09/23/92 | 16.000 | MG/L |
| DET-2 | NO3/NO2 | 03/09/94 | 18.000 | MG/L |
| DET-2 | NO3/NO2 | 06/28/94 | 96.000 | MG/L |
| DET-2 | NO3/NO2 | 06/28/94 | 47.000 | MG/L |
| DET-2 | NO3/NO2 | 09/23/94 | 32.000 | MG/L |
| DET-2 | NO3/NO2 | 12/22/94 | 10.000 | MG/L |
| DET-2 | NO3/NO2 | 12/22/94 | 22.000 | MG/L |
| DET-2 | NO3/NO2 | 06/28/95 | 51.000 | MG/L |
| DET-2 | NO3/NO2 | 10/05/95 | 11.000 | MG/L |
| DET-2 | NO3/NO2 | 12/14/95 | 37.000 | MG/L |
| DET-2 | NO3/NO2 | 03/21/96 | 25.000 | MG/L |
| DET-2 | NO3/NO2 | 03/21/96 | 35.000 | MG/L |
| DET-2 | NO3/NO2 | 06/20/96 | 48.000 | MG/L |
| DET-2 | NO3/NO2 | 06/20/96 | 36.000 | MG/L |
| DET-2 | Na | 05/04/92 | 15000.000 | MG/L |
| DET-2 | Na | 09/23/92 | 1900.000 | MG/L |
| DET-2 | Na | 01/28/93 | 11000.000 | MG/L |
| DET-2 | Na | 06/03/93 | 12000.000 | MG/L |
| DET-2 | Na | 06/03/93 | 11000.000 | MG/L |
| DET-2 | Na | 08/31/93 | 13000.000 | MG/L |
| DET-2 | Na | 11/11/93 | 8000.000 | MG/L |
| DET-2 | Na | 03/09/94 | 170000.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-2 | Na | 06/28/94 | 6100.000 | MG/L |
| DET-2 | Na | 06/28/94 | 6400.000 | MG/L |
| DET-2 | Na | 09/23/94 | 10000.000 | MG/L |
| DET-2 | Na | 12/22/94 | 12000.000 | MG/L |
| DET-2 | Na | 12/22/94 | 11000.000 | MG/L |
| DET-2 | Na | 03/23/95 | 11000.000 | MG/L |
| DET-2 | Na | 03/23/95 | 11000.000 | MG/L |
| DET-2 | Na | 06/28/95 | 10000.000 | MG/L |
| DET-2 | Na | 10/05/95 | 13000.000 | MG/L |
| DET-2 | Na | 10/05/95 | 13000.000 | MG/L |
| DET-2 | Na | 12/14/95 | 13000.000 | MG/L |
| DET-2 | Na | 03/21/96 | 420000.000 | MG/L |
| DET-2 | Na | 03/21/96 | 350000.000 | MG/L |
| DET-2 | Na | 06/20/96 | 17000.000 | MG/L |
| DET-2 | Na | 06/20/96 | 17000.000 | MG/L |
| DET-2 | Ni | 09/23/92 | 20.000 | MG/L |
| DET-2 | Ni | 01/28/93 | 20.000 | MG/L |
| DET-2 | Ni | 06/03/93 | 32.000 | MG/L |
| DET-2 | Ni | 06/03/93 | 28.000 | MG/L |
| DET-2 | Ni | 08/31/93 | 13.000 | MG/L |
| DET-2 | Ni | 11/11/93 | 18.000 | MG/L |
| DET-2 | Ni | 06/28/94 | 24.000 | MG/L |
| DET-2 | Ni | 09/23/94 | 9.000 | MG/L |
| DET-2 | Ni | 12/22/94 | 10.000 | MG/L |
| DET-2 | Ni | 12/22/94 | 18.000 | MG/L |
| DET-2 | Ni | 03/23/95 | 6.000 | MG/L |
| DET-2 | Ni | 03/23/95 | 6.000 | MG/L |
| DET-2 | Ni | 10/05/95 | 6.000 | MG/L |
| DET-2 | Ni | 10/05/95 | 7.000 | MG/L |
| DET-2 | Ni | 12/14/95 | 2.000 | MG/L |
| DET-2 | Ni | 03/21/96 | 3.000 | MG/L |
| DET-2 | Ni | 03/21/96 | 2.000 | MG/L |
| DET-2 | Ni | 06/20/96 | 1.000 | MG/L |
| DET-2 | Oil & G | 09/23/92 | 1000.000 | MG/L |
| DET-2 | Oil & G | 11/11/93 | 2000.000 | MG/L |
| DET-2 | Oil & G | 06/28/94 | 2100.000 | MG/L |
| DET-2 | Oil & G | 06/28/94 | 2100.000 | MG/L |
| DET-2 | Oil & G | 09/23/94 | 1700.000 | MG/L |
| DET-2 | Oil & G | 12/22/94 | 1500.000 | MG/L |
| DET-2 | Oil & G | 12/22/94 | 1500.000 | MG/L |
| DET-2 | PO4 | 05/04/92 | 790.000 | MG/L |
| DET-2 | PO4 | 09/23/92 | 240.000 | MG/L |
| DET-2 | PO4 | 01/28/93 | 170.000 | MG/L |
| DET-2 | PO4 | 06/03/93 | 150.000 | MG/L |
| DET-2 | PO4 | 06/03/93 | 150.000 | MG/L |
| DET-2 | PO4 | 08/31/93 | 160.000 | MG/L |
| DET-2 | PO4 | 11/11/93 | 40.000 | MG/L |
| DET-2 | PO4 | 03/09/94 | 330.000 | MG/L |
| DET-2 | PO4 | 06/28/94 | 50.000 | MG/L |
| DET-2 | PO4 | 06/28/94 | 130.000 | MG/L |
| DET-2 | PO4 | 09/23/94 | 300.000 | MG/L |
| DET-2 | PO4 | 12/22/94 | 200.000 | MG/L |
| DET-2 | PO4 | 12/22/94 | 120.000 | MG/L |
| DET-2 | PO4 | 03/23/95 | 26.000 | MG/L |
| DET-2 | PO4 | 03/23/95 | 180.000 | MG/L |
| DET-2 | PO4 | 06/28/95 | 200.000 | MG/L |
| DET-2 | PO4 | 10/05/95 | 47.000 | MG/L |
| DET-2 | PO4 | 10/05/95 | 58.000 | MG/L |
| DET-2 | PO4 | 12/14/95 | 100.000 | MG/L |
| DET-2 | PO4 | 03/21/96 | 280.000 | MG/L |
| DET-2 | PO4 | 03/21/96 | 120.000 | MG/L |
| DET-2 | Pb | 06/03/93 | 15.000 | MG/L |
| DET-2 | Pb | 06/28/94 | 1.000 | MG/L |
| DET-2 | Pb | 06/28/94 | 12.000 | MG/L |
| DET-2 | Pb | 09/23/94 | 4.000 | MG/L |
| DET-2 | Pb | 12/22/94 | 6.000 | MG/L |
| DET-2 | Pb | 12/22/94 | 20.000 | MG/L |
| DET-2 | Pb | 03/23/95 | 2.000 | MG/L |
| DET-2 | Pb | 06/28/95 | 7.000 | MG/L |
| DET-2 | Pb | 10/05/95 | 3.000 | MG/L |
| DET-2 | Pb | 10/05/95 | 4.000 | MG/L |
| DET-2 | Pb | 12/14/95 | 2.000 | MG/L |
| DET-2 | Pb | 03/21/96 | 4.000 | MG/L |
| DET-2 | Pb | 03/21/96 | 3.000 | MG/L |
| DET-2 | Pb | 06/20/96 | 2.000 | MG/L |
| DET-2 | Pb | 06/20/96 | 2.000 | MG/L |
| DET-2 | Phenols | 05/04/92 | 10.000 | MG/L |
| DET-2 | Phenols | 06/28/94 | 17.000 | MG/L |
| DET-2 | Phenols | 09/23/94 | 10.000 | MG/L |
| DET-2 | Phenols | 12/22/94 | 10.000 | MG/L |
| DET-2 | Phenols | 12/22/94 | 10.000 | MG/L |
| DET-2 | Phenols | 03/23/95 | 11.000 | MG/L |
| DET-2 | Phenols | 06/20/96 | 17.000 | MG/L |
| DET-2 | Phenols | 06/20/96 | 28.000 | MG/L |
| DET-2 | RDX | 03/09/94 | 1.900 | UG/L |
| DET-2 | RDX | 10/05/95 | 3.300 | UG/L |
| DET-2 | SO4 | 05/04/92 | 96000.000 | MG/L |
| DET-2 | SO4 | 09/23/92 | 110000.000 | MG/L |
| DET-2 | SO4 | 01/28/93 | 120000.000 | MG/L |
| DET-2 | SO4 | 06/03/93 | 110000.000 | MG/L |
| DET-2 | SO4 | 06/03/93 | 110000.000 | MG/L |
| DET-2 | SO4 | 08/31/93 | 110000.000 | MG/L |
| DET-2 | SO4 | 11/11/93 | 70000.000 | MG/L |
| DET-2 | SO4 | 03/09/94 | 120000.000 | MG/L |
| DET-2 | SO4 | 06/28/94 | 59000.000 | MG/L |
| DET-2 | SO4 | 06/28/94 | 65000.000 | MG/L |
| DET-2 | SO4 | 09/23/94 | 88000.000 | MG/L |
| DET-2 | SO4 | 12/22/94 | 82000.000 | MG/L |
| DET-2 | SO4 | 12/22/94 | 89000.000 | MG/L |
| DET-2 | SO4 | 03/23/95 | 84000.000 | MG/L |
| DET-2 | SO4 | 03/23/95 | 95000.000 | MG/L |
| DET-2 | SO4 | 06/28/95 | 19000.000 | MG/L |
| DET-2 | SO4 | 10/05/95 | 104000.000 | MG/L |
| DET-2 | SO4 | 10/05/95 | 120000.000 | MG/L |
| DET-2 | SO4 | 12/14/95 | 85000.000 | MG/L |
| DET-2 | SO4 | 03/21/96 | 89000.000 | MG/L |
| DET-2 | SO4 | 03/21/96 | 98000.000 | MG/L |
| DET-2 | SO4 | 06/20/96 | 100000.000 | MG/L |
| DET-2 | SO4 | 06/20/96 | 120000.000 | MG/L |
| DET-2 | Sb | 06/20/96 | 10.000 | MG/L |
| DET-2 | Se | 12/22/94 | 3.000 | MG/L |
| DET-2 | Se | 03/21/96 | 3.000 | MG/L |
| DET-2 | TDS | 05/04/92 | 440000.000 | MG/L |
| DET-2 | TDS | 09/23/92 | 433000.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-2 | TDS | 01/28/93 | 422000.000 | MG/L |
| DET-2 | TDS | 06/03/93 | 420000.000 | MG/L |
| DET-2 | TDS | 06/03/93 | 420000.000 | MG/L |
| DET-2 | TDS | 08/31/93 | 414000.000 | MG/L |
| DET-2 | TDS | 11/11/93 | 338000.000 | MG/L |
| DET-2 | TDS | 03/09/94 | 405000.000 | MG/L |
| DET-2 | TDS | 06/28/94 | 470000.000 | MG/L |
| DET-2 | TDS | 06/28/94 | 410000.000 | MG/L |
| DET-2 | TDS | 09/23/94 | 400000.000 | MG/L |
| DET-2 | TDS | 12/22/94 | 410000.000 | MG/L |
| DET-2 | TDS | 12/22/94 | 410000.000 | MG/L |
| DET-2 | TDS | 03/23/95 | 390000.000 | MG/L |
| DET-2 | TDS | 03/23/95 | 340000.000 | MG/L |
| DET-2 | TDS | 06/28/95 | 410000.000 | MG/L |
| DET-2 | TDS | 10/05/95 | 460000.000 | MG/L |
| DET-2 | TDS | 10/05/95 | 440000.000 | MG/L |
| DET-2 | TDS | 12/14/95 | 360000.000 | MG/L |
| DET-2 | TDS | 03/21/96 | 480000.000 | MG/L |
| DET-2 | TDS | 03/21/96 | 530000.000 | MG/L |
| DET-2 | TDS | 06/20/96 | 490000.000 | MG/L |
| DET-2 | TDS | 06/20/96 | 480000.000 | MG/L |
| DET-2 | TKN | 05/04/92 | 1000.000 | MG/L |
| DET-2 | TKN | 08/31/93 | 1400.000 | MG/L |
| DET-2 | TKN | 06/28/94 | 390.000 | MG/L |
| DET-2 | TKN | 06/28/94 | 450.000 | MG/L |
| DET-2 | TKN | 09/23/94 | 1300.000 | MG/L |
| DET-2 | TKN | 12/22/94 | 590.000 | MG/L |
| DET-2 | TKN | 12/22/94 | 560.000 | MG/L |
| DET-2 | TKN | 03/23/95 | 310.000 | MG/L |
| DET-2 | TKN | 03/23/95 | 390.000 | MG/L |
| DET-2 | TKN | 06/28/95 | 600.000 | MG/L |
| DET-2 | TKN | 10/05/95 | 340.000 | MG/L |
| DET-2 | TKN | 10/05/95 | 380.000 | MG/L |
| DET-2 | TKN | 03/21/96 | 860.000 | MG/L |
| DET-2 | TKN | 03/21/96 | 620.000 | MG/L |
| DET-2 | TKN | 06/20/96 | 880.000 | MG/L |
| DET-2 | TKN | 06/20/96 | 640.000 | MG/L |
| DET-2 | TOC | 05/04/92 | 11000.000 | MG/L |
| DET-2 | TOC | 06/28/94 | 720.000 | MG/L |
| DET-2 | TOC | 06/28/94 | 720.000 | MG/L |
| DET-2 | TOC | 09/23/94 | 1400.000 | MG/L |
| DET-2 | TOC | 12/22/94 | 1300.000 | MG/L |
| DET-2 | TOC | 12/22/94 | 1100.000 | MG/L |
| DET-2 | TOC | 03/23/95 | 1200.000 | MG/L |
| DET-2 | TOC | 03/23/95 | 2000.000 | MG/L |
| DET-2 | TOC | 06/28/95 | 1500.000 | MG/L |
| DET-2 | TOX | 01/28/93 | 20.000 | MG/L |
| DET-2 | TOX | 06/28/95 | 40.000 | MG/L |
| DET-2 | TOX | 12/14/95 | 30.000 | MG/L |
| DET-2 | TOX | 03/21/96 | 20.000 | MG/L |
| DET-2 | TOX | 03/21/96 | 20.000 | MG/L |
| DET-2 | TOX | 06/20/96 | 10.000 | MG/L |
| DET-2 | TOX | 06/20/96 | 60.000 | MG/L |
| DET-2 | Tl | 12/22/94 | 2.000 | MG/L |
| DET-2 | Turb | 09/23/92 | 1.300 | NTU |
| DET-2 | Turb | 01/28/93 | 3.700 | NTU |
| DET-2 | Turb | 06/03/93 | 1.600 | NTU |
| DET-2 | Turb | 06/03/93 | 1.500 | NTU |
| DET-2 | Turb | 08/31/93 | 2.400 | NTU |
| DET-2 | Turb | 11/11/93 | 1.100 | NTU |
| DET-2 | Turb | 03/09/94 | 2.800 | NTU |
| DET-2 | Turb | 06/28/94 | 190.000 | NTU |
| DET-2 | Turb | 06/28/94 | 270.000 | NTU |
| DET-2 | Turb | 09/23/94 | 140.000 | NTU |
| DET-2 | Turb | 12/22/94 | 190.000 | NTU |
| DET-2 | Turb | 12/22/94 | 120.000 | NTU |
| DET-2 | Turb | 03/23/95 | 58.000 | NTU |
| DET-2 | Turb | 03/23/95 | 18.000 | NTU |
| DET-2 | Turb | 06/28/95 | 250.000 | NTU |
| DET-2 | Turb | 10/05/95 | 52.000 | NTU |
| DET-2 | Turb | 10/05/95 | 97.000 | NTU |
| DET-2 | Turb | 12/14/95 | 390.000 | NTU |
| DET-2 | Turb | 03/21/96 | 680.000 | NTU |
| DET-2 | Turb | 03/21/96 | 650.000 | NTU |
| DET-2 | Turb | 06/20/96 | 2200.000 | NTU |
| DET-2 | Turb | 06/20/96 | 2200.000 | NTU |
| DET-2 | Zn | 09/23/92 | 60.000 | MG/L |
| DET-2 | Zn | 01/28/93 | 90.000 | MG/L |
| DET-2 | Zn | 06/03/93 | 79.000 | MG/L |
| DET-2 | Zn | 06/03/93 | 78.000 | MG/L |
| DET-2 | Zn | 08/31/93 | 77.000 | MG/L |
| DET-2 | Zn | 11/11/93 | 92.000 | MG/L |
| DET-2 | Zn | 03/09/94 | 80.000 | MG/L |
| DET-2 | Zn | 06/28/94 | 42.000 | MG/L |
| DET-2 | Zn | 06/28/94 | 120.000 | MG/L |
| DET-2 | Zn | 09/23/94 | 51.000 | MG/L |
| DET-2 | Zn | 12/22/94 | 310.000 | MG/L |
| DET-2 | Zn | 12/22/94 | 94.000 | MG/L |
| DET-2 | Zn | 03/23/95 | 30.000 | MG/L |
| DET-2 | Zn | 03/23/95 | 30.000 | MG/L |
| DET-2 | Zn | 06/28/95 | 60.000 | MG/L |
| DET-2 | Zn | 10/05/95 | 23.000 | MG/L |
| DET-2 | Zn | 10/05/95 | 21.000 | MG/L |
| DET-2 | Zn | 12/14/95 | 28.000 | MG/L |
| DET-2 | Zn | 03/21/96 | 45.000 | MG/L |
| DET-2 | Zn | 03/21/96 | 36.000 | MG/L |
| DET-2 | Zn | 06/20/96 | 24.000 | MG/L |
| DET-2 | Zn | 06/20/96 | 20.000 | MG/L |
| DET-2 | pH | 05/04/92 | 7.400 | SU |
| DET-2 | pH | 09/23/92 | 7.310 | SU |
| DET-2 | pH | 01/28/93 | 7.130 | SU |
| DET-2 | pH | 06/03/93 | 6.940 | SU |
| DET-2 | pH | 06/03/93 | 7.100 | SU |
| DET-2 | pH | 08/31/93 | 7.510 | SU |
| DET-2 | pH | 11/11/93 | 7.510 | SU |
| DET-2 | pH | 03/09/94 | 7.380 | SU |
| DET-2 | pH | 06/28/94 | 7.600 | SU |
| DET-2 | pH | 06/28/94 | 7.500 | SU |
| DET-2 | pH | 09/23/94 | 7.300 | SU |
| DET-2 | pH | 12/22/94 | 7.300 | SU |
| DET-2 | pH | 12/22/94 | 7.300 | SU |
| DET-2 | pH | 03/23/95 | 7.400 | SU |
| DET-2 | pH | 03/23/95 | 7.400 | SU |
| DET-2 | pH | 06/28/95 | 7.300 | SU |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-2 | pH | 10/05/95 | 7.300 | SU |
| DET-2 | pH | 10/05/95 | 7.300 | SU |
| DET-2 | pH | 12/14/95 | 7.500 | SU |
| DET-2 | pH | 03/21/96 | 7.300 | SU |
| [illegible]-2 | pH | 03/21/96 | 7.400 | SU |
| [illegible]-2 | pH | 06/20/96 | 7.400 | SU |
| DET-2 | pH | 06/20/96 | 7.400 | SU |
| DET-3 | Ag | 06/20/96 | 6.000 | MG/L |
| DET-3 | AmmoniaN | 05/04/92 | 280.000 | MG/L |
| DET-3 | AmmoniaN | 09/23/92 | 120.000 | MG/L |
| DET-3 | AmmoniaN | 01/28/93 | 100.000 | MG/L |
| DET-3 | AmmoniaN | 06/03/93 | 60.000 | MG/L |
| DET-3 | AmmoniaN | 08/31/93 | 60.000 | MG/L |
| DET-3 | AmmoniaN | 08/31/93 | 60.000 | MG/L |
| DET-3 | AmmoniaN | 11/11/93 | 560.000 | MG/L |
| DET-3 | AmmoniaN | 06/28/94 | 29.000 | MG/L |
| DET-3 | AmmoniaN | 09/23/94 | 170.000 | MG/L |
| DET-3 | AmmoniaN | 12/22/94 | 60.000 | MG/L |
| DET-3 | AmmoniaN | 03/23/95 | 27.000 | MG/L |
| DET-3 | AmmoniaN | 06/28/95 | 74.000 | MG/L |
| DET-3 | AmmoniaN | 10/05/95 | 65.000 | MG/L |
| DET-3 | AmmoniaN | 12/14/95 | 58.000 | MG/L |
| DET-3 | AmmoniaN | 03/21/96 | 130.000 | MG/L |
| DET-3 | AmmoniaN | 06/20/96 | 100.000 | MG/L |
| DET-3 | As | 05/04/92 | 9.000 | MG/L |
| DET-3 | As | 09/23/92 | 21.000 | MG/L |
| DET-3 | As | 01/28/93 | 290.000 | MG/L |
| DET-3 | As | 06/03/93 | 29.000 | MG/L |
| DET-3 | As | 06/28/94 | 79.000 | MG/L |
| [illegible]T-3 | As | 09/23/94 | 29.000 | MG/L |
| [illegible]-3 | As | 12/22/94 | 19.000 | MG/L |
| DET-3 | As | 03/23/95 | 7.000 | MG/L |
| DET-3 | As | 06/28/95 | 95.000 | MG/L |
| DET-3 | As | 10/05/95 | 58.000 | MG/L |
| DET-3 | As | 12/14/95 | 16.000 | MG/L |
| DET-3 | Ba | 05/04/92 | 50.000 | MG/L |
| DET-3 | Ba | 01/28/93 | 200.000 | MG/L |
| DET-3 | Ba | 03/09/94 | 88.000 | MG/L |
| DET-3 | Ba | 06/28/94 | 140.000 | MG/L |
| DET-3 | Ba | 09/23/94 | 150.000 | MG/L |
| DET-3 | Ba | 12/22/94 | 140.000 | MG/L |
| DET-3 | Ba | 03/23/95 | 74.000 | MG/L |
| DET-3 | Ba | 06/28/95 | 93.000 | MG/L |
| DET-3 | Ba | 10/05/95 | 80.000 | MG/L |
| DET-3 | Ba | 12/14/95 | 48.000 | MG/L |
| DET-3 | Ba | 03/21/96 | 36.000 | MG/L |
| DET-3 | Ba | 06/20/96 | 51.000 | MG/L |
| DET-3 | Be | 03/21/96 | 7.000 | MG/L |
| DET-3 | COD | 05/04/92 | 350000.000 | MG/L |
| DET-3 | COD | 11/11/93 | 3700.000 | MG/L |
| DET-3 | COD | 03/09/94 | 5600.000 | MG/L |
| DET-3 | COD | 06/28/94 | 9400.000 | MG/L |
| [illegible]T-3 | COD | 09/23/94 | 4900.000 | MG/L |
| [illegible]ET-3 | COD | 12/22/94 | 14000.000 | MG/L |
| DET-3 | COD | 03/23/95 | 2100.000 | MG/L |
| DET-3 | COD | 06/28/95 | 17000.000 | MG/L |
| DET-3 | COD | 10/05/95 | 3500.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-3 | Ca | 05/04/92 | 91000.000 | MG/L |
| DET-3 | Ca | 09/23/92 | 92000.000 | MG/L |
| DET-3 | Ca | 01/28/93 | 84000.000 | MG/L |
| DET-3 | Ca | 06/03/93 | 110000.000 | MG/L |
| DET-3 | Ca | 08/31/93 | 140000.000 | MG/L |
| DET-3 | Ca | 08/31/93 | 160000.000 | MG/L |
| DET-3 | Ca | 11/11/93 | 93000.000 | MG/L |
| DET-3 | Ca | 03/09/94 | 250000.000 | MG/L |
| DET-3 | Ca | 06/28/94 | 93000.000 | MG/L |
| DET-3 | Ca | 09/23/94 | 99000.000 | MG/L |
| DET-3 | Ca | 12/22/94 | 340000.000 | MG/L |
| DET-3 | Ca | 03/23/95 | 280000.000 | MG/L |
| DET-3 | Ca | 06/28/95 | 74000.000 | MG/L |
| DET-3 | Ca | 10/05/95 | 79000.000 | MG/L |
| DET-3 | Ca | 12/14/95 | 72000.000 | MG/L |
| DET-3 | Ca | 03/21/96 | 280000.000 | MG/L |
| DET-3 | Ca | 06/20/96 | 240000.000 | MG/L |
| DET-3 | CaCO3 | 05/04/92 | 340000.000 | MG/L |
| DET-3 | CaCO3 | 09/23/92 | 240000.000 | MG/L |
| DET-3 | CaCO3 | 01/28/93 | 230000.000 | MG/L |
| DET-3 | CaCO3 | 06/03/93 | 230000.000 | MG/L |
| DET-3 | CaCO3 | 08/31/93 | 240000.000 | MG/L |
| DET-3 | CaCO3 | 08/31/93 | 240000.000 | MG/L |
| DET-3 | CaCO3 | 11/11/93 | 190000.000 | MG/L |
| DET-3 | CaCO3 | 03/09/94 | 460000.000 | MG/L |
| DET-3 | CaCO3 | 06/28/94 | 240000.000 | MG/L |
| DET-3 | CaCO3 | 09/23/94 | 280000.000 | MG/L |
| DET-3 | CaCO3 | 12/22/94 | 400000.000 | MG/L |
| DET-3 | CaCO3 | 03/23/95 | 450000.000 | MG/L |
| DET-3 | CaCO3 | 06/28/95 | 250000.000 | MG/L |
| DET-3 | CaCO3 | 10/05/95 | 240000.000 | MG/L |
| DET-3 | CaCO3 | 12/14/95 | 240000.000 | MG/L |
| DET-3 | CaCO3 | 03/21/96 | 430000.000 | MG/L |
| DET-3 | CaCO3 | 06/20/96 | 470000.000 | MG/L |
| DET-3 | Cd | 12/22/94 | 1.000 | MG/L |
| DET-3 | Cd | 03/23/95 | 1.000 | MG/L |
| DET-3 | Cd | 10/05/95 | 3.000 | MG/L |
| DET-3 | Cd | 03/21/96 | 1.000 | MG/L |
| DET-3 | Chloride | 05/04/92 | 1500.000 | MG/L |
| DET-3 | Chloride | 01/28/93 | 1500.000 | MG/L |
| DET-3 | Chloride | 06/03/93 | 2500.000 | MG/L |
| DET-3 | Chloride | 08/31/93 | 2000.000 | MG/L |
| DET-3 | Chloride | 08/31/93 | 2000.000 | MG/L |
| DET-3 | Chloride | 11/11/93 | 2000.000 | MG/L |
| DET-3 | Chloride | 03/09/94 | 6500.000 | MG/L |
| DET-3 | Chloride | 06/28/94 | 4200.000 | MG/L |
| DET-3 | Chloride | 09/23/94 | 2200.000 | MG/L |
| DET-3 | Chloride | 12/22/94 | 4800.000 | MG/L |
| DET-3 | Chloride | 03/23/95 | 5300.000 | MG/L |
| DET-3 | Chloride | 06/28/95 | 2600.000 | MG/L |
| DET-3 | Chloride | 10/05/95 | 3000.000 | MG/L |
| DET-3 | Chloride | 03/21/96 | 3700.000 | MG/L |
| DET-3 | Chloride | 06/20/96 | 2400.000 | MG/L |
| DET-3 | Cond F | 05/04/92 | 440.000 | umhos/ |
| DET-3 | Cond L | 05/04/92 | 660.000 | umhos/ |
| DET-3 | Cond L | 09/23/92 | 801.000 | umhos/ |
| DET-3 | Cond L | 01/28/93 | 544.000 | umhos/ |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-3 | Cond L | 06/03/93 | 578.000 | umhos/ |
| DET-3 | Cond L | 08/31/93 | 602.000 | umhos/ |
| DET-3 | Cond L | 08/31/93 | 611.000 | umhos/ |
| DET-3 | Cond L | 11/11/93 | 434.000 | umhos/ |
| DET-3 | Cond L | 03/09/94 | 1643.000 | umhos/ |
| DET-3 | Cond L | 06/28/94 | 460.000 | umhos/ |
| DET-3 | Cond L | 09/23/94 | 620.000 | umhos/ |
| DET-3 | Cond L | 12/22/94 | 1300.000 | umhos/ |
| DET-3 | Cond L | 03/23/95 | 1300.000 | umhos/ |
| DET-3 | Cond L | 06/28/95 | 58.000 | umhos/ |
| DET-3 | Cond L | 10/05/95 | 490.000 | umhos/ |
| DET-3 | Cond L | 12/14/95 | 650.000 | umhos/ |
| DET-3 | Cond L | 03/21/96 | 1400.000 | umhos/ |
| DET-3 | Cond L | 06/20/96 | 1500.000 | umhos/ |
| DET-3 | Cr | 05/04/92 | 10.000 | MG/L |
| DET-3 | Cr | 01/28/93 | 20.000 | MG/L |
| DET-3 | Cr | 08/31/93 | 22.000 | MG/L |
| DET-3 | Cr | 08/31/93 | 30.000 | MG/L |
| DET-3 | Cr | 03/09/94 | 22.000 | MG/L |
| DET-3 | Cr | 06/28/94 | 28.000 | MG/L |
| DET-3 | Cr | 09/23/94 | 66.000 | MG/L |
| DET-3 | Cr | 03/23/95 | 9.000 | MG/L |
| DET-3 | Cr | 06/28/95 | 20.000 | MG/L |
| DET-3 | Cr | 10/05/95 | 13.000 | MG/L |
| DET-3 | Cr | 12/14/95 | 2.000 | MG/L |
| DET-3 | Cr | 06/20/96 | 2.000 | MG/L |
| DET-3 | Cu | 09/23/92 | 30.000 | MG/L |
| DET-3 | Cu | 01/28/93 | 50.000 | MG/L |
| DET-3 | Cu | 06/03/93 | 16.000 | MG/L |
| DET-3 | Cu | 08/31/93 | 39.000 | MG/L |
| DET-3 | Cu | 08/31/93 | 53.000 | MG/L |
| DET-3 | Cu | 11/11/93 | 10.000 | MG/L |
| DET-3 | Cu | 03/09/94 | 34.000 | MG/L |
| DET-3 | Cu | 06/28/94 | 48.000 | MG/L |
| DET-3 | Cu | 09/23/94 | 78.000 | MG/L |
| DET-3 | Cu | 12/22/94 | 21.000 | MG/L |
| DET-3 | Cu | 03/23/95 | 15.000 | MG/L |
| DET-3 | Cu | 06/28/95 | 30.000 | MG/L |
| DET-3 | Cu | 10/05/95 | 26.000 | MG/L |
| DET-3 | Cu | 03/21/96 | 3.000 | MG/L |
| DET-3 | Cu | 06/20/96 | 3.000 | MG/L |
| DET-3 | Fe | 09/23/92 | 16000.000 | MG/L |
| DET-3 | Fe | 01/28/93 | 95000.000 | MG/L |
| DET-3 | Fe | 06/03/93 | 15000.000 | MG/L |
| DET-3 | Fe | 08/31/93 | 12000.000 | MG/L |
| DET-3 | Fe | 08/31/93 | 20000.000 | MG/L |
| DET-3 | Fe | 11/11/93 | 1200.000 | MG/L |
| DET-3 | Fe | 03/09/94 | 50.000 | MG/L |
| DET-3 | Fe | 06/28/94 | 47000.000 | MG/L |
| DET-3 | Fe | 09/23/94 | 73000.000 | MG/L |
| DET-3 | Fe | 12/22/94 | 25000.000 | MG/L |
| DET-3 | Fe | 03/23/95 | 9400.000 | MG/L |
| DET-3 | Fe | 06/28/95 | 28000.000 | MG/L |
| DET-3 | Fe | 10/05/95 | 17000.000 | MG/L |
| DET-3 | Fe | 12/14/95 | 2200.000 | MG/L |
| DET-3 | Fe | 03/21/96 | 380.000 | MG/L |
| DET-3 | Fe | 06/20/96 | 650.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-3 | GWL | 05/04/92 | 1031.080 | feet |
| DET-3 | GWL | 09/23/92 | 1028.890 | feet |
| DET-3 | GWL | 01/28/93 | 1029.510 | feet |
| DET-3 | GWL | 06/03/93 | 1029.310 | feet |
| DET-3 | GWL | 08/31/93 | 1029.110 | feet |
| DET-3 | GWL | 11/11/93 | 1029.480 | feet |
| DET-3 | GWL | 03/09/94 | 1029.470 | feet |
| DET-3 | GWL | 06/28/94 | 1028.560 | feet |
| DET-3 | GWL | 09/23/94 | 1028.560 | feet |
| DET-3 | GWL | 12/22/94 | 1029.060 | feet |
| DET-3 | GWL | 03/23/95 | 1029.480 | feet |
| DET-3 | GWL | 06/28/95 | 1030.730 | feet |
| DET-3 | GWL | 10/05/95 | 1030.310 | feet |
| DET-3 | GWL | 12/14/95 | 1030.140 | feet |
| DET-3 | GWL | 03/21/96 | 1030.060 | feet |
| DET-3 | GWL | 06/20/96 | 1029.310 | feet |
| DET-3 | HMX | 12/22/94 | 1.100 | UG/L |
| DET-3 | K | 05/04/92 | 2000.000 | MG/L |
| DET-3 | K | 09/23/92 | 2200.000 | MG/L |
| DET-3 | K | 01/28/93 | 4700.000 | MG/L |
| DET-3 | K | 06/03/93 | 2200.000 | MG/L |
| DET-3 | K | 08/31/93 | 2600.000 | MG/L |
| DET-3 | K | 08/31/93 | 2700.000 | MG/L |
| DET-3 | K | 11/11/93 | 1500.000 | MG/L |
| DET-3 | K | 03/09/94 | 1600.000 | MG/L |
| DET-3 | K | 06/28/94 | 4300.000 | MG/L |
| DET-3 | K | 09/23/94 | 7400.000 | MG/L |
| DET-3 | K | 12/22/94 | 2800.000 | MG/L |
| DET-3 | K | 03/23/95 | 2400.000 | MG/L |
| DET-3 | K | 06/28/95 | 3300.000 | MG/L |
| DET-3 | K | 10/05/95 | 3400.000 | MG/L |
| DET-3 | K | 12/14/95 | 2000.000 | MG/L |
| DET-3 | K | 03/21/96 | 2700.000 | MG/L |
| DET-3 | K | 06/20/96 | 3200.000 | MG/L |
| DET-3 | Mg | 05/04/92 | 32000.000 | MG/L |
| DET-3 | Mg | 09/23/92 | 42000.000 | MG/L |
| DET-3 | Mg | 01/28/93 | 31000.000 | MG/L |
| DET-3 | Mg | 06/03/93 | 28000.000 | MG/L |
| DET-3 | Mg | 08/31/93 | 46000.000 | MG/L |
| DET-3 | Mg | 08/31/93 | 52000.000 | MG/L |
| DET-3 | Mg | 11/11/93 | 16000.000 | MG/L |
| DET-3 | Mg | 03/09/94 | 40000.000 | MG/L |
| DET-3 | Mg | 06/28/94 | 36000.000 | MG/L |
| DET-3 | Mg | 09/23/94 | 37000.000 | MG/L |
| DET-3 | Mg | 12/22/94 | 59000.000 | MG/L |
| DET-3 | Mg | 03/23/95 | 55000.000 | MG/L |
| DET-3 | Mg | 06/28/95 | 27000.000 | MG/L |
| DET-3 | Mg | 10/05/95 | 31000.000 | MG/L |
| DET-3 | Mg | 12/14/95 | 28000.000 | MG/L |
| DET-3 | Mg | 03/21/96 | 47000.000 | MG/L |
| DET-3 | Mg | 06/20/96 | 50000.000 | MG/L |
| DET-3 | Mn | 05/04/92 | 320.000 | MG/L |
| DET-3 | Mn | 09/23/92 | 550.000 | MG/L |
| DET-3 | Mn | 01/28/93 | 700.000 | MG/L |
| DET-3 | Mn | 06/03/93 | 300.000 | MG/L |
| DET-3 | Mn | 08/31/93 | 600.000 | MG/L |
| DET-3 | Mn | 08/31/93 | 650.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-3 | Mn | 11/11/93 | 130.000 | MG/L |
| DET-3 | Mn | 03/09/94 | 720.000 | MG/L |
| DET-3 | Mn | 06/28/94 | 640.000 | MG/L |
| DET-3 | Mn | 09/23/94 | 1400.000 | MG/L |
| DET-3 | Mn | 12/22/94 | 4200.000 | MG/L |
| DET-3 | Mn | 03/23/95 | 1000.000 | MG/L |
| DET-3 | Mn | 06/28/95 | 470.000 | MG/L |
| DET-3 | Mn | 10/05/95 | 450.000 | MG/L |
| DET-3 | Mn | 12/14/95 | 250.000 | MG/L |
| DET-3 | Mn | 03/21/96 | 2800.000 | MG/L |
| DET-3 | Mn | 06/20/96 | 1700.000 | MG/L |
| DET-3 | NO3/NO2 | 08/31/93 | 30.000 | MG/L |
| DET-3 | NO3/NO2 | 08/31/93 | 50.000 | MG/L |
| DET-3 | NO3/NO2 | 11/11/93 | 20.000 | MG/L |
| DET-3 | NO3/NO2 | 03/09/94 | 35.000 | MG/L |
| DET-3 | NO3/NO2 | 06/28/94 | 30.000 | MG/L |
| DET-3 | NO3/NO2 | 09/23/94 | 24.000 | MG/L |
| DET-3 | NO3/NO2 | 12/22/94 | 30.000 | MG/L |
| DET-3 | NO3/NO2 | 06/28/95 | 32.000 | MG/L |
| DET-3 | NO3/NO2 | 03/21/96 | 35.000 | MG/L |
| DET-3 | NO3/NO2 | 06/20/96 | 63.000 | MG/L |
| DET-3 | Na | 05/04/92 | 13000.000 | MG/L |
| DET-3 | Na | 09/23/92 | 2200.000 | MG/L |
| DET-3 | Na | 01/28/93 | 13000.000 | MG/L |
| DET-3 | Na | 06/03/93 | 11000.000 | MG/L |
| DET-3 | Na | 08/31/93 | 11000.000 | MG/L |
| DET-3 | Na | 08/31/93 | 11000.000 | MG/L |
| DET-3 | Na | 11/11/93 | 8600.000 | MG/L |
| DET-3 | Na | 03/09/94 | 280000.000 | MG/L |
| DET-3 | Na | 06/28/94 | 11000.000 | MG/L |
| DET-3 | Na | 09/23/94 | 9900.000 | MG/L |
| DET-3 | Na | 12/22/94 | 14000.000 | MG/L |
| DET-3 | Na | 03/23/95 | 14000.000 | MG/L |
| DET-3 | Na | 06/28/95 | 8600.000 | MG/L |
| DET-3 | Na | 10/05/95 | 12000.000 | MG/L |
| DET-3 | Na | 12/14/95 | 12000.000 | MG/L |
| DET-3 | Na | 03/21/96 | 550000.000 | MG/L |
| DET-3 | Na | 06/20/96 | 16000.000 | MG/L |
| DET-3 | Ni | 09/23/92 | 20.000 | MG/L |
| DET-3 | Ni | 01/28/93 | 20.000 | MG/L |
| DET-3 | Ni | 06/03/93 | 18.000 | MG/L |
| DET-3 | Ni | 08/31/93 | 22.000 | MG/L |
| DET-3 | Ni | 08/31/93 | 35.000 | MG/L |
| DET-3 | Ni | 11/11/93 | 16.000 | MG/L |
| DET-3 | Ni | 06/28/94 | 32.000 | MG/L |
| DET-3 | Ni | 09/23/94 | 3.000 | MG/L |
| DET-3 | Ni | 12/22/94 | 16.000 | MG/L |
| DET-3 | Ni | 03/23/95 | 9.000 | MG/L |
| DET-3 | Ni | 10/05/95 | 14.000 | MG/L |
| DET-3 | Ni | 12/14/95 | 1.000 | MG/L |
| DET-3 | Ni | 03/21/96 | 3.000 | MG/L |
| DET-3 | Oil & G | 09/23/92 | 2000.000 | MG/L |
| DET-3 | Oil & G | 11/11/93 | 2000.000 | MG/L |
| DET-3 | Oil & G | 12/22/94 | 1800.000 | MG/L |
| DET-3 | Oil & G | 12/14/95 | 8100.000 | MG/L |
| DET-3 | PO4 | 05/04/92 | 4000.000 | MG/L |
| DET-3 | PO4 | 09/23/92 | 480.000 | MG/L |
| DET-3 | PO4 | 01/28/93 | 1020.000 | MG/L |
| DET-3 | PO4 | 06/03/93 | 140.000 | MG/L |
| DET-3 | PO4 | 08/31/93 | 360.000 | MG/L |
| DET-3 | PO4 | 08/31/93 | 490.000 | MG/L |
| DET-3 | PO4 | 03/09/94 | 77.000 | MG/L |
| DET-3 | PO4 | 06/28/94 | 470.000 | MG/L |
| DET-3 | PO4 | 09/23/94 | 480.000 | MG/L |
| DET-3 | PO4 | 12/22/94 | 1500.000 | MG/L |
| DET-3 | PO4 | 03/23/95 | 65.000 | MG/L |
| DET-3 | PO4 | 06/28/95 | 45.000 | MG/L |
| DET-3 | PO4 | 10/05/95 | 55.000 | MG/L |
| DET-3 | PO4 | 12/14/95 | 110.000 | MG/L |
| DET-3 | PO4 | 03/21/96 | 83.000 | MG/L |
| DET-3 | Pb | 06/28/94 | 23.000 | MG/L |
| DET-3 | Pb | 09/23/94 | 26.000 | MG/L |
| DET-3 | Pb | 12/22/94 | 38.000 | MG/L |
| DET-3 | Pb | 03/23/95 | 3.000 | MG/L |
| DET-3 | Pb | 06/28/95 | 19.000 | MG/L |
| DET-3 | Pb | 10/05/95 | 14.000 | MG/L |
| DET-3 | Pb | 12/14/95 | 2.000 | MG/L |
| DET-3 | Pb | 03/21/96 | 3.000 | MG/L |
| DET-3 | Phenols | 06/28/94 | 220.000 | MG/L |
| DET-3 | Phenols | 09/23/94 | 14.000 | MG/L |
| DET-3 | Phenols | 12/22/94 | 10.000 | MG/L |
| DET-3 | Phenols | 06/28/95 | 7.000 | MG/L |
| DET-3 | Phenols | 10/05/95 | 8.000 | MG/L |
| DET-3 | Phenols | 03/21/96 | 11.000 | MG/L |
| DET-3 | Phenols | 06/20/96 | 11.000 | MG/L |
| DET-3 | RDX | 12/22/94 | 4.100 | UG/L |
| DET-3 | SO4 | 05/04/92 | 120000.000 | MG/L |
| DET-3 | SO4 | 09/23/92 | 102000.000 | MG/L |
| DET-3 | SO4 | 01/28/93 | 100000.000 | MG/L |
| DET-3 | SO4 | 06/03/93 | 100000.000 | MG/L |
| DET-3 | SO4 | 08/31/93 | 110000.000 | MG/L |
| DET-3 | SO4 | 08/31/93 | 110000.000 | MG/L |
| DET-3 | SO4 | 11/11/93 | 50000.000 | MG/L |
| DET-3 | SO4 | 03/09/94 | 560000.000 | MG/L |
| DET-3 | SO4 | 06/28/94 | 65000.000 | MG/L |
| DET-3 | SO4 | 09/23/94 | 98000.000 | MG/L |
| DET-3 | SO4 | 12/22/94 | 410000.000 | MG/L |
| DET-3 | SO4 | 03/23/95 | 390000.000 | MG/L |
| DET-3 | SO4 | 06/28/95 | 73000.000 | MG/L |
| DET-3 | SO4 | 10/05/95 | 120000.000 | MG/L |
| DET-3 | SO4 | 12/14/95 | 99000.000 | MG/L |
| DET-3 | SO4 | 03/21/96 | 120000.000 | MG/L |
| DET-3 | SO4 | 06/20/96 | 550000.000 | MG/L |
| DET-3 | Sb | 05/04/92 | 14.000 | MG/L |
| DET-3 | Sb | 09/23/94 | 15.000 | MG/L |
| DET-3 | Se | 06/28/95 | 2.000 | MG/L |
| DET-3 | Se | 03/21/96 | 3.000 | MG/L |
| DET-3 | Se | 06/20/96 | 2.000 | MG/L |
| DET-3 | TDS | 05/04/92 | 400000.000 | MG/L |
| DET-3 | TDS | 09/23/92 | 392000.000 | MG/L |
| DET-3 | TDS | 01/28/93 | 376000.000 | MG/L |
| DET-3 | TDS | 06/03/93 | 390000.000 | MG/L |
| DET-3 | TDS | 08/31/93 | 376000.000 | MG/L |
| DET-3 | TDS | 08/31/93 | 387000.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-3 | TDS | 11/11/93 | 273000.000 | MG/L |
| DET-3 | TDS | 03/09/94 | 1210000.000 | MG/L |
| DET-3 | TDS | 06/28/94 | 550000.000 | MG/L |
| DET-3 | TDS | 09/23/94 | 460000.000 | MG/L |
| [illegible]-3 | TDS | 12/22/94 | 1100000.000 | MG/L |
| [illegible]-3 | TDS | 03/23/95 | 1000000.000 | MG/L |
| DET-3 | TDS | 06/28/95 | 380000.000 | MG/L |
| DET-3 | TDS | 10/05/95 | 440000.000 | MG/L |
| DET-3 | TDS | 12/14/95 | 370000.000 | MG/L |
| DET-3 | TDS | 03/21/96 | 1600000.000 | MG/L |
| DET-3 | TDS | 06/20/96 | 1200000.000 | MG/L |
| DET-3 | TKN | 05/04/92 | 7800.000 | MG/L |
| DET-3 | TKN | 08/31/93 | 1100.000 | MG/L |
| DET-3 | TKN | 06/28/94 | 1100.000 | MG/L |
| DET-3 | TKN | 09/23/94 | 1200.000 | MG/L |
| DET-3 | TKN | 12/22/94 | 1800.000 | MG/L |
| DET-3 | TKN | 03/23/95 | 210.000 | MG/L |
| DET-3 | TKN | 06/28/95 | 9100.000 | MG/L |
| DET-3 | TKN | 03/21/96 | 840.000 | MG/L |
| DET-3 | TKN | 06/20/96 | 61.000 | MG/L |
| DET-3 | TOC | 05/04/92 | 89000.000 | MG/L |
| DET-3 | TOC | 03/09/94 | 3800.000 | MG/L |
| DET-3 | TOC | 06/28/94 | 770.000 | MG/L |
| DET-3 | TOC | 09/23/94 | 1400.000 | MG/L |
| DET-3 | TOC | 12/22/94 | 6200.000 | MG/L |
| DET-3 | TOC | 03/23/95 | 4200.000 | MG/L |
| DET-3 | TOC | 06/28/95 | 1200.000 | MG/L |
| DET-3 | TOC | 10/05/95 | 1000.000 | MG/L |
| DET-3 | TOC | 03/21/96 | 4000.000 | MG/L |
| [illegible]T-3 | TOX | 01/28/93 | 20.000 | MG/L |
| [illegible]-3 | TOX | 03/09/94 | 20.000 | MG/L |
| DET-3 | TOX | 12/22/94 | 20.000 | MG/L |
| DET-3 | TOX | 06/28/95 | 10.000 | MG/L |
| DET-3 | TOX | 10/05/95 | 10.000 | MG/L |
| DET-3 | TOX | 06/20/96 | 50.000 | MG/L |
| DET-3 | Tl | 12/22/94 | 6.000 | MG/L |
| DET-3 | Tl | 12/14/95 | 6.000 | MG/L |
| DET-3 | Turb | 09/23/92 | 1.500 | NTU |
| DET-3 | Turb | 01/28/93 | 4.300 | NTU |
| DET-3 | Turb | 06/03/93 | 2.000 | NTU |
| DET-3 | Turb | 08/31/93 | 2.400 | NTU |
| DET-3 | Turb | 08/31/93 | 3.500 | NTU |
| DET-3 | Turb | 11/11/93 | 1.000 | NTU |
| DET-3 | Turb | 03/09/94 | 0.800 | NTU |
| DET-3 | Turb | 06/28/94 | 180.000 | NTU |
| DET-3 | Turb | 09/23/94 | 105.000 | NTU |
| DET-3 | Turb | 12/22/94 | 130.000 | NTU |
| DET-3 | Turb | 03/23/95 | 23.000 | NTU |
| DET-3 | Turb | 06/28/95 | 150.000 | NTU |
| DET-3 | Turb | 10/05/95 | 110.000 | NTU |
| DET-3 | Turb | 12/14/95 | 260.000 | NTU |
| DET-3 | Turb | 03/21/96 | 390.000 | NTU |
| [illegible]T-3 | Turb | 06/20/96 | 1200.000 | NTU |
| [illegible]T-3 | Zn | 09/23/92 | 60.000 | MG/L |
| DET-3 | Zn | 01/28/93 | 160.000 | MG/L |
| DET-3 | Zn | 06/03/93 | 37.000 | MG/L |
| DET-3 | Zn | 08/31/93 | 81.000 | MG/L |
| DET-3 | Zn | 08/31/93 | 120.000 | MG/L |
| DET-3 | Zn | 11/11/93 | 28.000 | MG/L |
| DET-3 | Zn | 03/09/94 | 88.000 | MG/L |
| DET-3 | Zn | 06/28/94 | 150.000 | MG/L |
| DET-3 | Zn | 09/23/94 | 230.000 | MG/L |
| DET-3 | Zn | 12/22/94 | 100.000 | MG/L |
| DET-3 | Zn | 03/23/95 | 50.000 | MG/L |
| DET-3 | Zn | 06/28/95 | 100.000 | MG/L |
| DET-3 | Zn | 10/05/95 | 49.000 | MG/L |
| DET-3 | Zn | 12/14/95 | 10.000 | MG/L |
| DET-3 | Zn | 03/21/96 | 46.000 | MG/L |
| DET-3 | Zn | 06/20/96 | 33.000 | MG/L |
| DET-3 | pH | 05/04/92 | 7.400 | SU |
| DET-3 | pH | 09/23/92 | 6.900 | SU |
| DET-3 | pH | 01/28/93 | 6.870 | SU |
| DET-3 | pH | 06/03/93 | 7.040 | SU |
| DET-3 | pH | 08/31/93 | 7.430 | SU |
| DET-3 | pH | 08/31/93 | 7.910 | SU |
| DET-3 | pH | 11/11/93 | 7.480 | SU |
| DET-3 | pH | 03/09/94 | 6.800 | SU |
| DET-3 | pH | 06/28/94 | 7.600 | SU |
| DET-3 | pH | 09/23/94 | 6.800 | SU |
| DET-3 | pH | 12/22/94 | 6.700 | SU |
| DET-3 | pH | 03/23/95 | 6.900 | SU |
| DET-3 | pH | 06/28/95 | 7.300 | SU |
| DET-3 | pH | 10/05/95 | 7.300 | SU |
| DET-3 | pH | 12/14/95 | 7.400 | SU |
| DET-3 | pH | 03/21/96 | 6.700 | SU |
| DET-3 | pH | 06/20/96 | 6.800 | SU |
| DET-4 | 1,2DCE | 10/05/95 | 0.730 | UG/L |
| DET-4 | Ag | 06/20/96 | 5.000 | MG/L |
| DET-4 | AmmoniaN | 05/04/92 | 190.000 | MG/L |
| DET-4 | AmmoniaN | 09/23/92 | 80.000 | MG/L |
| DET-4 | AmmoniaN | 01/28/93 | 220.000 | MG/L |
| DET-4 | AmmoniaN | 06/03/93 | 60.000 | MG/L |
| DET-4 | AmmoniaN | 08/31/93 | 80.000 | MG/L |
| DET-4 | AmmoniaN | 09/23/94 | 1600.000 | MG/L |
| DET-4 | AmmoniaN | 12/22/94 | 330.000 | MG/L |
| DET-4 | AmmoniaN | 03/23/95 | 45.000 | MG/L |
| DET-4 | AmmoniaN | 06/28/95 | 67.000 | MG/L |
| DET-4 | AmmoniaN | 10/05/95 | 450.000 | MG/L |
| DET-4 | AmmoniaN | 12/14/95 | 73.000 | MG/L |
| DET-4 | AmmoniaN | 03/21/96 | 53.000 | MG/L |
| DET-4 | AmmoniaN | 06/20/96 | 53.000 | MG/L |
| DET-4 | As | 09/23/92 | 15.000 | MG/L |
| DET-4 | As | 01/28/93 | 15.000 | MG/L |
| DET-4 | As | 08/31/93 | 15.000 | MG/L |
| DET-4 | As | 03/09/94 | 8.000 | MG/L |
| DET-4 | As | 06/28/94 | 63.000 | MG/L |
| DET-4 | As | 09/23/94 | 53.000 | MG/L |
| DET-4 | As | 12/22/94 | 250.000 | MG/L |
| DET-4 | As | 03/23/95 | 37.000 | MG/L |
| DET-4 | As | 10/05/95 | 23.000 | MG/L |
| DET-4 | As | 12/14/95 | 4.000 | MG/L |
| DET-4 | As | 03/21/96 | 14.000 | MG/L |
| DET-4 | As | 06/20/96 | 7.000 | MG/L |
| DET-4 | Ba | 05/04/92 | 7000.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-4 | Ba | 09/23/92 | 21000.000 | MG/L |
| DET-4 | Ba | 01/28/93 | 390.000 | MG/L |
| DET-4 | Ba | 03/09/94 | 62.000 | MG/L |
| DET-4 | Ba | 06/28/94 | 160.000 | MG/L |
| DET-4 | Ba | 09/23/94 | 120.000 | MG/L |
| DET-4 | Ba | 12/22/94 | 130.000 | MG/L |
| DET-4 | Ba | 03/23/95 | 84.000 | MG/L |
| DET-4 | Ba | 06/28/95 | 31.000 | MG/L |
| DET-4 | Ba | 10/05/95 | 110.000 | MG/L |
| DET-4 | Ba | 12/14/95 | 36.000 | MG/L |
| DET-4 | Ba | 03/21/96 | 45.000 | MG/L |
| DET-4 | Ba | 06/20/96 | 49.000 | MG/L |
| DET-4 | Be | 03/21/96 | 3.000 | MG/L |
| DET-4 | COD | 05/04/92 | 140000.000 | MG/L |
| DET-4 | COD | 09/23/92 | 18000.000 | MG/L |
| DET-4 | COD | 06/28/94 | 5700.000 | MG/L |
| DET-4 | COD | 12/22/94 | 2700.000 | MG/L |
| DET-4 | COD | 03/23/95 | 3900.000 | MG/L |
| DET-4 | COD | 10/05/95 | 16000.000 | MG/L |
| DET-4 | Ca | 05/04/92 | 180000.000 | MG/L |
| DET-4 | Ca | 09/23/92 | 160000.000 | MG/L |
| DET-4 | Ca | 01/28/93 | 200000.000 | MG/L |
| DET-4 | Ca | 06/03/93 | 190000.000 | MG/L |
| DET-4 | Ca | 08/31/93 | 170000.000 | MG/L |
| DET-4 | Ca | 11/11/93 | 90000.000 | MG/L |
| DET-4 | Ca | 03/09/94 | 70000.000 | MG/L |
| DET-4 | Ca | 06/28/94 | 97000.000 | MG/L |
| DET-4 | Ca | 09/23/94 | 100000.000 | MG/L |
| DET-4 | Ca | 12/22/94 | 89000.000 | MG/L |
| DET-4 | Ca | 03/23/95 | 79000.000 | MG/L |
| DET-4 | Ca | 06/28/95 | 150000.000 | MG/L |
| DET-4 | Ca | 10/05/95 | 100000.000 | MG/L |
| DET-4 | Ca | 12/14/95 | 130000.000 | MG/L |
| DET-4 | Ca | 03/21/96 | 74000.000 | MG/L |
| DET-4 | Ca | 06/20/96 | 68000.000 | MG/L |
| DET-4 | CaCO3 | 05/04/92 | 380000.000 | MG/L |
| DET-4 | CaCO3 | 09/23/92 | 350000.000 | MG/L |
| DET-4 | CaCO3 | 01/28/93 | 320000.000 | MG/L |
| DET-4 | CaCO3 | 06/03/93 | 300000.000 | MG/L |
| DET-4 | CaCO3 | 08/31/93 | 270000.000 | MG/L |
| DET-4 | CaCO3 | 11/11/93 | 210000.000 | MG/L |
| DET-4 | CaCO3 | 03/09/94 | 230000.000 | MG/L |
| DET-4 | CaCO3 | 06/28/94 | 240000.000 | MG/L |
| DET-4 | CaCO3 | 09/23/94 | 250000.000 | MG/L |
| DET-4 | CaCO3 | 12/22/94 | 240000.000 | MG/L |
| DET-4 | CaCO3 | 03/23/95 | 240000.000 | MG/L |
| DET-4 | CaCO3 | 06/28/95 | 330000.000 | MG/L |
| DET-4 | CaCO3 | 10/05/95 | 250000.000 | MG/L |
| DET-4 | CaCO3 | 12/14/95 | 270000.000 | MG/L |
| DET-4 | CaCO3 | 03/21/96 | 210000.000 | MG/L |
| DET-4 | CaCO3 | 06/20/96 | 280000.000 | MG/L |
| DET-4 | Cd | 10/05/95 | 8.000 | MG/L |
| DET-4 | Chloride | 05/04/92 | 4000.000 | MG/L |
| DET-4 | Chloride | 09/23/92 | 4000.000 | MG/L |
| DET-4 | Chloride | 01/28/93 | 5000.000 | MG/L |
| DET-4 | Chloride | 06/03/93 | 2500.000 | MG/L |
| DET-4 | Chloride | 08/31/93 | 1000.000 | MG/L |
| DET-4 | Chloride | 11/11/93 | 4000.000 | MG/L |
| DET-4 | Chloride | 03/09/94 | 1500.000 | MG/L |
| DET-4 | Chloride | 06/28/94 | 4700.000 | MG/L |
| DET-4 | Chloride | 09/23/94 | 2800.000 | MG/L |
| DET-4 | Chloride | 12/22/94 | 2800.000 | MG/L |
| DET-4 | Chloride | 03/23/95 | 2600.000 | MG/L |
| DET-4 | Chloride | 06/28/95 | 2700.000 | MG/L |
| DET-4 | Chloride | 10/05/95 | 3500.000 | MG/L |
| DET-4 | Chloride | 03/21/96 | 1600.000 | MG/L |
| DET-4 | Chloride | 06/20/96 | 2500.000 | MG/L |
| DET-4 | Cond F | 05/04/92 | 699.000 | umhos/ |
| DET-4 | Cond L | 05/04/92 | 940.000 | umhos/ |
| DET-4 | Cond L | 09/23/92 | 574.000 | umhos/ |
| DET-4 | Cond L | 01/28/93 | 725.000 | umhos/ |
| DET-4 | Cond L | 06/03/93 | 730.000 | umhos/ |
| DET-4 | Cond L | 08/31/93 | 670.000 | umhos/ |
| DET-4 | Cond L | 11/11/93 | 673.000 | umhos/ |
| DET-4 | Cond L | 03/09/94 | 628.000 | umhos/ |
| DET-4 | Cond L | 06/28/94 | 460.000 | umhos/ |
| DET-4 | Cond L | 09/23/94 | 590.000 | umhos/ |
| DET-4 | Cond L | 12/22/94 | 540.000 | umhos/ |
| DET-4 | Cond L | 03/23/95 | 580.000 | umhos/ |
| DET-4 | Cond L | 06/28/95 | 900.000 | umhos/ |
| DET-4 | Cond L | 10/05/95 | 500.000 | umhos/ |
| DET-4 | Cond L | 12/14/95 | 730.000 | umhos/ |
| DET-4 | Cond L | 03/21/96 | 560.000 | umhos/ |
| DET-4 | Cond L | 06/20/96 | 630.000 | umhos/ |
| DET-4 | Cr | 05/04/92 | 2.000 | MG/L |
| DET-4 | Cr | 09/23/92 | 50.000 | MG/L |
| DET-4 | Cr | 01/28/93 | 160.000 | MG/L |
| DET-4 | Cr | 06/03/93 | 38.000 | MG/L |
| DET-4 | Cr | 08/31/93 | 29.000 | MG/L |
| DET-4 | Cr | 06/28/94 | 38.000 | MG/L |
| DET-4 | Cr | 09/23/94 | 22.000 | MG/L |
| DET-4 | Cr | 03/23/95 | 14.000 | MG/L |
| DET-4 | Cr | 10/05/95 | 29.000 | MG/L |
| DET-4 | Cr | 12/14/95 | 3.000 | MG/L |
| DET-4 | Cr | 03/21/96 | 2.000 | MG/L |
| DET-4 | Cr | 06/20/96 | 2.000 | MG/L |
| DET-4 | Cu | 09/23/92 | 220.000 | MG/L |
| DET-4 | Cu | 01/28/93 | 310.000 | MG/L |
| DET-4 | Cu | 06/03/93 | 59.000 | MG/L |
| DET-4 | Cu | 08/31/93 | 73.000 | MG/L |
| DET-4 | Cu | 11/11/93 | 16.000 | MG/L |
| DET-4 | Cu | 03/09/94 | 23.000 | MG/L |
| DET-4 | Cu | 06/28/94 | 58.000 | MG/L |
| DET-4 | Cu | 09/23/94 | 39.000 | MG/L |
| DET-4 | Cu | 12/22/94 | 11.000 | MG/L |
| DET-4 | Cu | 03/23/95 | 23.000 | MG/L |
| DET-4 | Cu | 10/05/95 | 63.000 | MG/L |
| DET-4 | Cu | 03/21/96 | 10.000 | MG/L |
| DET-4 | Cu | 06/20/96 | 4.000 | MG/L |
| DET-4 | Fe | 09/23/92 | 41000.000 | MG/L |
| DET-4 | Fe | 01/28/93 | 240000.000 | MG/L |
| DET-4 | Fe | 06/03/93 | 57000.000 | MG/L |
| DET-4 | Fe | 08/31/93 | 22000.000 | MG/L |
| DET-4 | Fe | 11/11/93 | 5200.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-4 | Fe | 03/09/94 | 5800.000 | MG/L |
| DET-4 | Fe | 06/28/94 | 55000.000 | MG/L |
| DET-4 | Fe | 09/23/94 | 37000.000 | MG/L |
| DET-4 | Fe | 12/22/94 | 61000.000 | MG/L |
| [illegible]-4 | Fe | 03/23/95 | 21000.000 | MG/L |
| [illegible]-4 | Fe | 06/28/95 | 2000.000 | MG/L |
| DET-4 | Fe | 10/05/95 | 41000.000 | MG/L |
| DET-4 | Fe | 12/14/95 | 1600.000 | MG/L |
| DET-4 | Fe | 03/21/96 | 1900.000 | MG/L |
| DET-4 | Fe | 06/20/96 | 1400.000 | MG/L |
| DET-4 | GWL | 05/04/92 | 1031.370 | feet |
| DET-4 | GWL | 09/23/92 | 1028.600 | feet |
| DET-4 | GWL | 01/28/93 | 1029.930 | feet |
| DET-4 | GWL | 06/03/93 | 1028.680 | feet |
| DET-4 | GWL | 08/31/93 | 1027.580 | feet |
| DET-4 | GWL | 11/11/93 | 1029.850 | feet |
| DET-4 | GWL | 03/09/94 | 1029.600 | feet |
| DET-4 | GWL | 06/28/94 | 1031.510 | feet |
| DET-4 | GWL | 09/23/94 | 1031.760 | feet |
| DET-4 | GWL | 12/22/94 | 1033.180 | feet |
| DET-4 | GWL | 03/23/95 | 1032.350 | feet |
| DET-4 | GWL | 06/28/95 | 1030.600 | feet |
| DET-4 | GWL | 10/05/95 | 1030.430 | feet |
| DET-4 | GWL | 12/14/95 | 1030.100 | feet |
| DET-4 | GWL | 03/21/96 | 1033.100 | feet |
| DET-4 | GWL | 06/20/96 | 1033.100 | feet |
| DET-4 | K | 05/04/92 | 3200.000 | MG/L |
| DET-4 | K | 09/23/92 | 2400.000 | MG/L |
| DET-4 | K | 01/28/93 | 11000.000 | MG/L |
| [illegible]T-4 | K | 06/03/93 | 2900.000 | MG/L |
| [illegible]-4 | K | 08/31/93 | 3000.000 | MG/L |
| DET-4 | K | 11/11/93 | 1900.000 | MG/L |
| DET-4 | K | 03/09/94 | 1800.000 | MG/L |
| DET-4 | K | 06/28/94 | 5200.000 | MG/L |
| DET-4 | K | 09/23/94 | 3700.000 | MG/L |
| DET-4 | K | 12/22/94 | 2600.000 | MG/L |
| DET-4 | K | 03/23/95 | 3100.000 | MG/L |
| DET-4 | K | 06/28/95 | 1600.000 | MG/L |
| DET-4 | K | 10/05/95 | 4900.000 | MG/L |
| DET-4 | K | 12/14/95 | 1900.000 | MG/L |
| DET-4 | K | 03/21/96 | 1800.000 | MG/L |
| DET-4 | K | 06/20/96 | 1600.000 | MG/L |
| DET-4 | Mg | 05/04/92 | 36000.000 | MG/L |
| DET-4 | Mg | 09/23/92 | 47000.000 | MG/L |
| DET-4 | Mg | 01/28/93 | 57000.000 | MG/L |
| DET-4 | Mg | 06/03/93 | 35000.000 | MG/L |
| DET-4 | Mg | 08/31/93 | 53000.000 | MG/L |
| DET-4 | Mg | 11/11/93 | 28000.000 | MG/L |
| DET-4 | Mg | 03/09/94 | 28000.000 | MG/L |
| DET-4 | Mg | 06/28/94 | 38000.000 | MG/L |
| DET-4 | Mg | 09/23/94 | 34000.000 | MG/L |
| DET-4 | Mg | 12/22/94 | 30000.000 | MG/L |
| [illegible]T-4 | Mg | 03/23/95 | 30000.000 | MG/L |
| [illegible]T-4 | Mg | 06/28/95 | 30000.000 | MG/L |
| DET-4 | Mg | 10/05/95 | 29000.000 | MG/L |
| DET-4 | Mg | 12/14/95 | 30000.000 | MG/L |
| DET-4 | Mg | 03/21/96 | 25000.000 | MG/L |
| DET-4 | Mg | 06/20/96 | 26000.000 | MG/L |
| DET-4 | Mn | 05/04/92 | 900.000 | MG/L |
| DET-4 | Mn | 09/23/92 | 2300.000 | MG/L |
| DET-4 | Mn | 01/28/93 | 3700.000 | MG/L |
| DET-4 | Mn | 06/03/93 | 1300.000 | MG/L |
| DET-4 | Mn | 08/31/93 | 820.000 | MG/L |
| DET-4 | Mn | 11/11/93 | 430.000 | MG/L |
| DET-4 | Mn | 03/09/94 | 340.000 | MG/L |
| DET-4 | Mn | 06/28/94 | 820.000 | MG/L |
| DET-4 | Mn | 09/23/94 | 730.000 | MG/L |
| DET-4 | Mn | 12/22/94 | 420.000 | MG/L |
| DET-4 | Mn | 03/23/95 | 420.000 | MG/L |
| DET-4 | Mn | 06/28/95 | 510.000 | MG/L |
| DET-4 | Mn | 10/05/95 | 1900.000 | MG/L |
| DET-4 | Mn | 12/14/95 | 190.000 | MG/L |
| DET-4 | Mn | 03/21/96 | 280.000 | MG/L |
| DET-4 | Mn | 06/20/96 | 260.000 | MG/L |
| DET-4 | NO3/NO2 | 03/09/94 | 40.000 | MG/L |
| DET-4 | NO3/NO2 | 06/28/94 | 43.000 | MG/L |
| DET-4 | NO3/NO2 | 09/23/94 | 24.000 | MG/L |
| DET-4 | NO3/NO2 | 12/22/94 | 58.000 | MG/L |
| DET-4 | NO3/NO2 | 06/28/95 | 28.000 | MG/L |
| DET-4 | NO3/NO2 | 10/05/95 | 91.000 | MG/L |
| DET-4 | NO3/NO2 | 12/14/95 | 26.000 | MG/L |
| DET-4 | NO3/NO2 | 06/20/96 | 31.000 | MG/L |
| DET-4 | Na | 05/04/92 | 7000.000 | MG/L |
| DET-4 | Na | 09/23/92 | 16000.000 | MG/L |
| DET-4 | Na | 01/28/93 | 6100.000 | MG/L |
| DET-4 | Na | 06/03/93 | 8300.000 | MG/L |
| DET-4 | Na | 08/31/93 | 12000.000 | MG/L |
| DET-4 | Na | 11/11/93 | 11000.000 | MG/L |
| DET-4 | Na | 03/09/94 | 140000.000 | MG/L |
| DET-4 | Na | 06/28/94 | 11000.000 | MG/L |
| DET-4 | Na | 09/23/94 | 9300.000 | MG/L |
| DET-4 | Na | 12/22/94 | 10000.000 | MG/L |
| DET-4 | Na | 03/23/95 | 10000.000 | MG/L |
| DET-4 | Na | 06/28/95 | 7800.000 | MG/L |
| DET-4 | Na | 10/05/95 | 9100.000 | MG/L |
| DET-4 | Na | 12/14/95 | 13000.000 | MG/L |
| DET-4 | Na | 03/21/96 | 360000.000 | MG/L |
| DET-4 | Na | 06/20/96 | 12000.000 | MG/L |
| DET-4 | Ni | 09/23/92 | 50.000 | MG/L |
| DET-4 | Ni | 01/28/93 | 150.000 | MG/L |
| DET-4 | Ni | 06/03/93 | 30.000 | MG/L |
| DET-4 | Ni | 08/31/93 | 36.000 | MG/L |
| DET-4 | Ni | 11/11/93 | 28.000 | MG/L |
| DET-4 | Ni | 06/28/94 | 42.000 | MG/L |
| DET-4 | Ni | 09/23/94 | 32.000 | MG/L |
| DET-4 | Ni | 12/22/94 | 10.000 | MG/L |
| DET-4 | Ni | 03/23/95 | 17.000 | MG/L |
| DET-4 | Ni | 10/05/95 | 26.000 | MG/L |
| DET-4 | Ni | 12/14/95 | 3.000 | MG/L |
| DET-4 | Ni | 03/21/96 | 6.000 | MG/L |
| DET-4 | Ni | 06/20/96 | 5.000 | MG/L |
| DET-4 | Oil & G | 09/23/92 | 1000.000 | MG/L |
| DET-4 | Oil & G | 06/28/94 | 1000.000 | MG/L |
| DET-4 | Oil & G | 12/22/94 | 1200.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-4 | Oil & G | 06/20/96 | 100.000 | MG/L |
| DET-4 | PO4 | 05/04/92 | 3300.000 | MG/L |
| DET-4 | PO4 | 09/23/92 | 2100.000 | MG/L |
| DET-4 | PO4 | 01/28/93 | 980.000 | MG/L |
| DET-4 | PO4 | 06/03/93 | 220.000 | MG/L |
| DET-4 | PO4 | 08/31/93 | 760.000 | MG/L |
| DET-4 | PO4 | 03/09/94 | 150.000 | MG/L |
| DET-4 | PO4 | 06/28/94 | 60.000 | MG/L |
| DET-4 | PO4 | 09/23/94 | 740.000 | MG/L |
| DET-4 | PO4 | 12/22/94 | 240.000 | MG/L |
| DET-4 | PO4 | 03/23/95 | 110.000 | MG/L |
| DET-4 | PO4 | 06/28/95 | 63.000 | MG/L |
| DET-4 | PO4 | 10/05/95 | 59.000 | MG/L |
| DET-4 | PO4 | 12/14/95 | 250.000 | MG/L |
| DET-4 | PO4 | 03/21/96 | 64.000 | MG/L |
| DET-4 | Pb | 09/23/92 | 110.000 | MG/L |
| DET-4 | Pb | 01/28/93 | 190.000 | MG/L |
| DET-4 | Pb | 06/03/93 | 26.000 | MG/L |
| DET-4 | Pb | 06/28/94 | 27.000 | MG/L |
| DET-4 | Pb | 09/23/94 | 19.000 | MG/L |
| DET-4 | Pb | 12/22/94 | 12.000 | MG/L |
| DET-4 | Pb | 03/23/95 | 7.000 | MG/L |
| DET-4 | Pb | 06/28/95 | 2.000 | MG/L |
| DET-4 | Pb | 10/05/95 | 38.000 | MG/L |
| DET-4 | Pb | 12/14/95 | 4.000 | MG/L |
| DET-4 | Pb | 03/21/96 | 9.000 | MG/L |
| DET-4 | Pb | 06/20/96 | 4.000 | MG/L |
| DET-4 | Phenols | 05/04/92 | 20.000 | MG/L |
| DET-4 | Phenols | 06/28/94 | 17.000 | MG/L |
| DET-4 | Phenols | 09/23/94 | 14.000 | MG/L |
| DET-4 | Phenols | 12/22/94 | 10.000 | MG/L |
| DET-4 | Phenols | 03/23/95 | 7.000 | MG/L |
| DET-4 | Phenols | 06/28/95 | 10.000 | MG/L |
| DET-4 | Phenols | 06/20/96 | 17.000 | MG/L |
| DET-4 | SO4 | 05/04/92 | 170000.000 | MG/L |
| DET-4 | SO4 | 09/23/92 | 140000.000 | MG/L |
| DET-4 | SO4 | 01/28/93 | 146000.000 | MG/L |
| DET-4 | SO4 | 06/03/93 | 130000.000 | MG/L |
| DET-4 | SO4 | 08/31/93 | 120000.000 | MG/L |
| DET-4 | SO4 | 11/11/93 | 170000.000 | MG/L |
| DET-4 | SO4 | 03/09/94 | 110000.000 | MG/L |
| DET-4 | SO4 | 06/28/94 | 86000.000 | MG/L |
| DET-4 | SO4 | 09/23/94 | 93000.000 | MG/L |
| DET-4 | SO4 | 12/22/94 | 72000.000 | MG/L |
| DET-4 | SO4 | 03/23/95 | 87000.000 | MG/L |
| DET-4 | SO4 | 06/28/95 | 92000.000 | MG/L |
| DET-4 | SO4 | 10/05/95 | 63000.000 | MG/L |
| DET-4 | SO4 | 12/14/95 | 170000.000 | MG/L |
| DET-4 | SO4 | 03/21/96 | 72000.000 | MG/L |
| DET-4 | SO4 | 06/20/96 | 110000.000 | MG/L |
| DET-4 | Sb | 06/28/94 | 20.000 | MG/L |
| DET-4 | Se | 12/22/94 | 2.000 | MG/L |
| DET-4 | TDS | 05/04/92 | 620000.000 | MG/L |
| DET-4 | TDS | 09/23/92 | 564000.000 | MG/L |
| DET-4 | TDS | 01/28/93 | 528000.000 | MG/L |
| DET-4 | TDS | 06/03/93 | 480000.000 | MG/L |
| DET-4 | TDS | 08/31/93 | 430000.000 | MG/L |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-4 | TDS | 11/11/93 | 457000.000 | MG/L |
| DET-4 | TDS | 03/09/94 | 390000.000 | MG/L |
| DET-4 | TDS | 06/28/94 | 560000.000 | MG/L |
| DET-4 | TDS | 09/23/94 | 410000.000 | MG/L |
| DET-4 | TDS | 12/22/94 | 390000.000 | MG/L |
| DET-4 | TDS | 03/23/95 | 360000.000 | MG/L |
| DET-4 | TDS | 06/28/95 | 650000.000 | MG/L |
| DET-4 | TDS | 10/05/95 | 450000.000 | MG/L |
| DET-4 | TDS | 12/14/95 | 450000.000 | MG/L |
| DET-4 | TDS | 03/21/96 | 470000.000 | MG/L |
| DET-4 | TDS | 06/20/96 | 390000.000 | MG/L |
| DET-4 | TKN | 05/04/92 | 5700.000 | MG/L |
| DET-4 | TKN | 06/28/94 | 820.000 | MG/L |
| DET-4 | TKN | 09/23/94 | 1900.000 | MG/L |
| DET-4 | TKN | 12/22/94 | 260.000 | MG/L |
| DET-4 | TKN | 03/23/95 | 510.000 | MG/L |
| DET-4 | TKN | 06/28/95 | 780.000 | MG/L |
| DET-4 | TKN | 10/05/95 | 1700.000 | MG/L |
| DET-4 | TKN | 12/14/95 | 140.000 | MG/L |
| DET-4 | TKN | 03/21/96 | 700.000 | MG/L |
| DET-4 | TOC | 05/04/92 | 26000.000 | MG/L |
| DET-4 | TOC | 09/23/92 | 1800.000 | MG/L |
| DET-4 | TOC | 01/28/93 | 3000.000 | MG/L |
| DET-4 | TOC | 08/31/93 | 1500.000 | MG/L |
| DET-4 | TOC | 11/11/93 | 1100.000 | MG/L |
| DET-4 | TOC | 03/09/94 | 1500.000 | MG/L |
| DET-4 | TOC | 06/28/94 | 790.000 | MG/L |
| DET-4 | TOC | 09/23/94 | 1900.000 | MG/L |
| DET-4 | TOC | 12/22/94 | 1300.000 | MG/L |
| DET-4 | TOC | 03/23/95 | 1200.000 | MG/L |
| DET-4 | TOC | 06/28/95 | 2300.000 | MG/L |
| DET-4 | TOC | 10/05/95 | 2400.000 | MG/L |
| DET-4 | TOC | 12/14/95 | 2100.000 | MG/L |
| DET-4 | TOC | 06/20/96 | 1400.000 | MG/L |
| DET-4 | TOX | 01/28/93 | 20.000 | MG/L |
| DET-4 | TOX | 03/09/94 | 20.000 | MG/L |
| DET-4 | TOX | 06/28/95 | 20.000 | MG/L |
| DET-4 | TOX | 12/14/95 | 10.000 | MG/L |
| DET-4 | TOX | 03/21/96 | 20.000 | MG/L |
| DET-4 | TOX | 06/20/96 | 40.000 | MG/L |
| DET-4 | Tl | 12/22/94 | 5.000 | MG/L |
| DET-4 | Tl | 12/14/95 | 4.000 | MG/L |
| DET-4 | Turb | 09/23/92 | 5.600 | NTU |
| DET-4 | Turb | 01/28/93 | 3.500 | NTU |
| DET-4 | Turb | 06/03/93 | 2.700 | NTU |
| DET-4 | Turb | 08/31/93 | 2.500 | NTU |
| DET-4 | Turb | 11/11/93 | 1.300 | NTU |
| DET-4 | Turb | 03/09/94 | 5.200 | NTU |
| DET-4 | Turb | 06/28/94 | 190.000 | NTU |
| DET-4 | Turb | 09/23/94 | 220.000 | NTU |
| DET-4 | Turb | 12/22/94 | 130.000 | NTU |
| DET-4 | Turb | 03/23/95 | 80.000 | NTU |
| DET-4 | Turb | 06/28/95 | 150.000 | NTU |
| DET-4 | Turb | 10/05/95 | 330.000 | NTU |
| DET-4 | Turb | 12/14/95 | 130.000 | NTU |
| DET-4 | Turb | 03/21/96 | 130.000 | NTU |
| DET-4 | Turb | 06/20/96 | 190.000 | NTU |

| Well | Parameter | Samp_dat | Real_data | Units |
|---|---|---|---|---|
| DET-4 | Zn | 09/23/92 | 240.000 | MG/L |
| DET-4 | Zn | 01/28/93 | 720.000 | MG/L |
| DET-4 | Zn | 06/03/93 | 120.000 | MG/L |
| DET-4 | Zn | 08/31/93 | 130.000 | MG/L |
| [illegible]-4 | Zn | 11/11/93 | 64.000 | MG/L |
| [illegible]4 | Zn | 03/09/94 | 68.000 | MG/L |
| DET-4 | Zn | 06/28/94 | 170.000 | MG/L |
| DET-4 | Zn | 09/23/94 | 140.000 | MG/L |
| DET-4 | Zn | 12/22/94 | 72.000 | MG/L |
| DET-4 | Zn | 03/23/95 | 74.000 | MG/L |
| DET-4 | Zn | 10/05/95 | 86.000 | MG/L |
| DET-4 | Zn | 12/14/95 | 22.000 | MG/L |
| DET-4 | Zn | 03/21/96 | 330.000 | MG/L |
| DET-4 | Zn | 06/20/96 | 13.000 | MG/L |
| DET-4 | pH | 05/04/92 | 7.000 | SU |
| DET-4 | pH | 09/23/92 | 6.520 | SU |
| DET-4 | pH | 01/28/93 | 6.590 | SU |
| DET-4 | pH | 06/03/93 | 6.810 | SU |
| DET-4 | pH | 08/31/93 | 6.920 | SU |
| DET-4 | pH | 11/11/93 | 7.460 | SU |
| DET-4 | pH | 03/09/94 | 7.360 | SU |
| DET-4 | pH | 06/28/94 | 7.900 | SU |
| DET-4 | pH | 09/23/94 | 7.300 | SU |
| DET-4 | pH | 12/22/94 | 7.300 | SU |
| DET-4 | pH | 03/23/95 | 7.400 | SU |
| DET-4 | pH | 06/28/95 | 6.900 | SU |
| DET-4 | pH | 10/05/95 | 6.900 | SU |
| DET-4 | pH | 12/14/95 | 7.100 | SU |
| DET-4 | pH | 03/21/96 | 7.000 | SU |
| [illegible]T-4 | pH | 06/20/96 | 7.300 | SU |