# EXPLORATORY DRILLING

FS 2/24/05

Sunnyside Valley Irrigation District
Grandview Yard

Prepared For:
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NOVEMBER, 1995

WHITE SHIELD ENVIRONMENTAL

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# 1.0 Introduction

## 1.1 Purpose

The purpose of this report is to describe the drilling and sampling of five boreholes and the installation of three groundwater monitoring wells located at 405 Elm Street, Grandview, Washington. The objective of the work was to establish the vertical and horizontal extent of the remaining petroleum contamination in the soil and groundwater at Sunnyside Valley Irrigation District (SVID), Grandview Yard. Contamination was discovered during the removal of underground storage tanks in September 1994. Reference is made to a report entitled "LUST Closure/Interim Remedial Action Report" prepared by White Shield Inc., October 94.

## 1.2 Scope of work

The scope for the drilling phase of this project was to establish the boundaries of the remaining petroleum contamination in the groundwater at SVID, Grandview Yard and to install a minimum of three groundwater monitoring wells was required by WAC 173-340-450. To determine the boundaries and establish the required monitoring wells, White Shield contracted Boretec Inc., of Spokane, Washington, to drill five exploratory boreholes, sample the soil water interface, and establish three groundwater monitoring wells. WSI supervised and facilitated the drilling project, logging the boreholes and sampling of the soil water interface.

Subsurface explorations were conducted using a trailer mounted, modified B-24 Drill Rig, equipped for both auger and core drilling. The laboratory analysis was conducted using methods WTPH-HCID, WTPH-D, and WTPH-G/BTEX. The samples were analyzed by OnSite Environmental, Redmond, Washington.

# 2.0 Site History

## 2.1 Property Description

The site is described as the SW 1/4, SW 1/4, Section 13, T9N, R23E, W.M. Refer to Figure One, Site Location. The site is located at the Sunnyside Valley Irrigation District, Grandview Yard at 405 N. Elm Street, Grandview, Washington. Refer to Figure One, Site Location.

# Grandview Map

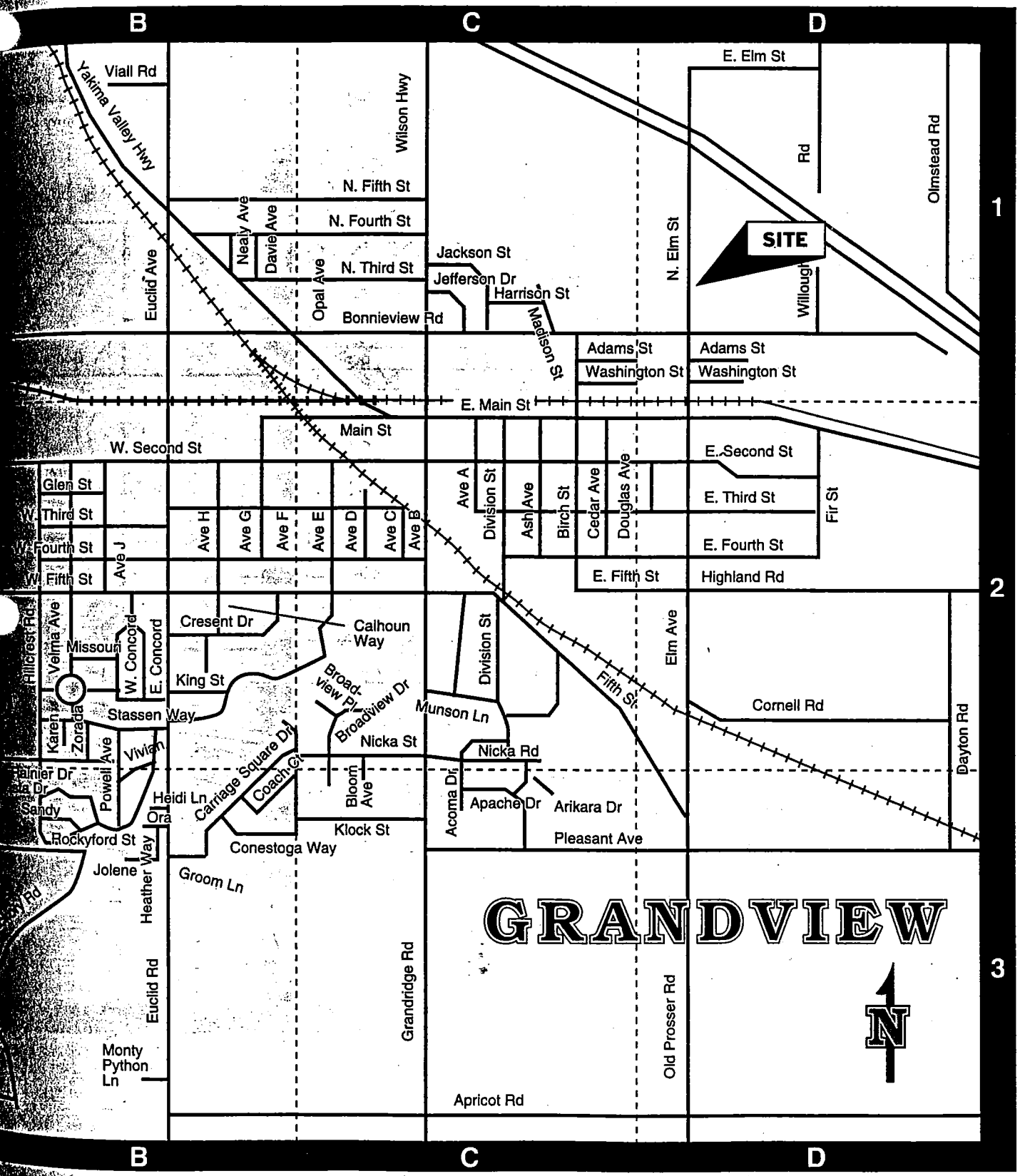



FIGURE 1 SITE LOCATION MAP

**WHITE SHIELD INC.**
P.O. BOX 477, 801 GRANDRIDGE ROAD, GRANDVIEW, WA 98930
TELEPHONE: (509) 882-1144 VOICE (509) 882-4566 FAX

JOB SV-D-0745
SHEET NO. 1 OF 1
CALCULATED BY — DATE —
CHECKED BY — DATE —
SCALE NTS

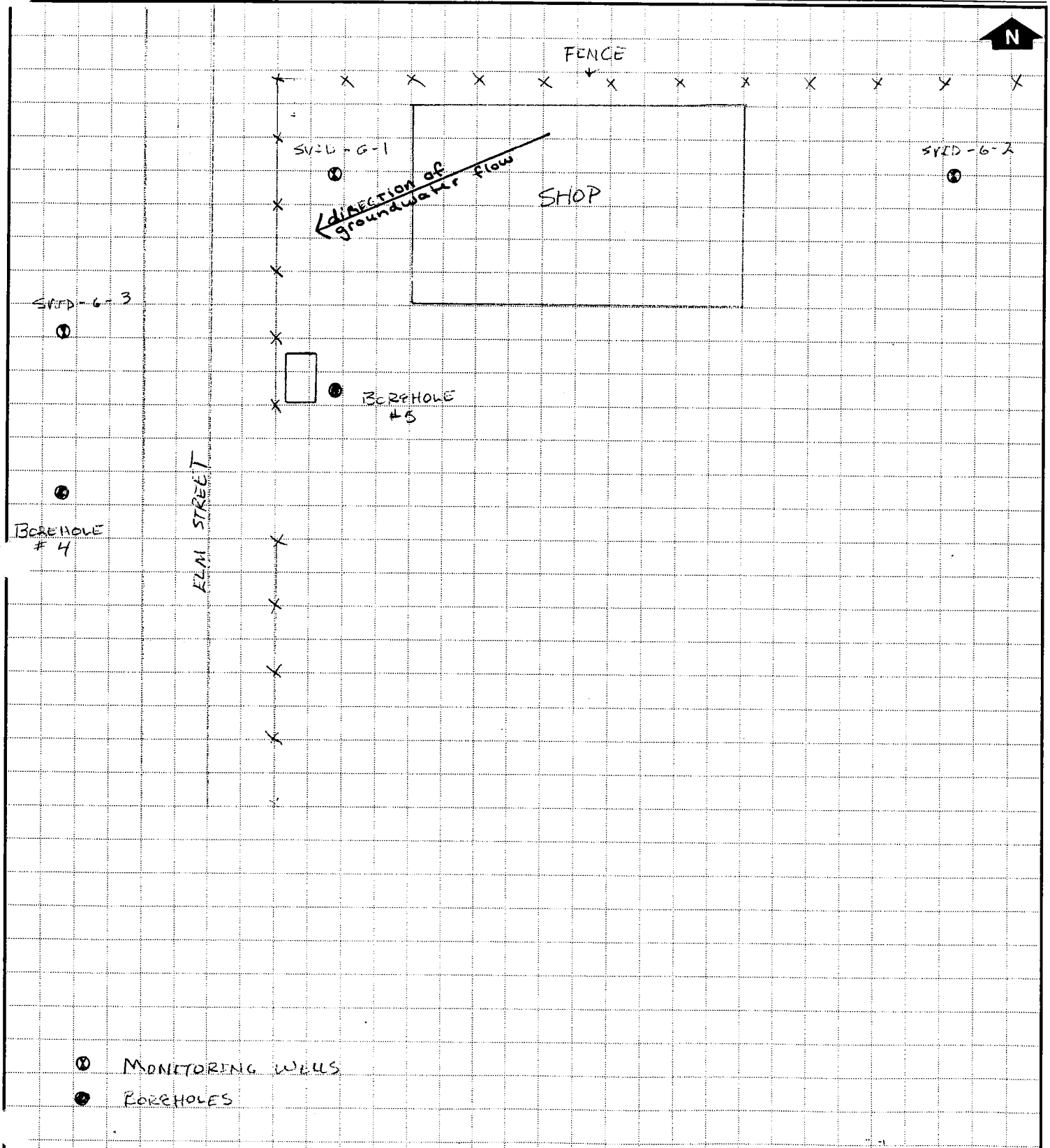



**FIGURE 2 - SITE SKETCH AND LOCATION OF WELLS**

The Grandview yard is located in the City of Grandview approximately 800 feet south west of the SVID Main Canal and approximately 500 feet north of an SVID lateral canal. The apparent groundwater flow is to the south west. The site is at the edge of a low density residential area, with residences on the north, east, and south. There is a alfalfa field located across Elm Street on the west. The Nazarene church is across Elm Street northwest of the site.

### 2.2 Site History

The underground storage tanks which were installed in 1985 were removed April 13, 1994. SVID personnel at the site thought there may have been some problems with leakage associated with an earlier UST system (prior to 1985) on the site. The older tanks (pre-1985) were removed before the installation of the USTs without completing any sampling or remediation and may be the cause of the soil and groundwater contamination described within this report.

The two 1985 USTs were located west of the shop building at the northwest corner of the property. They were oriented north and south in a single excavation. This UST system was used to fuel SVID equipment and vehicles. The entire yard is surrounded with chain link fence.

## 3.0 Field Activities

### 3.1 General Investigative Methods

The samples from the soil groundwater interface were collected by the following methods:

#### 3.1.2 Soil Sampling

1. Soil samples were retrieved using a clean split spoon sampler driven in the soil.

2. Select a laboratory certified clean sample jar for sample collection.

3. Using clean latex gloves and clean sampling utensils (tri-sodium phosphate, chlorine solution, tap water rinse and distilled water rinse cycle) tightly pack the soil sample in the sample jar (4 oz.) to the top of the jar to prevent any airspace.

4. Label the jar with the soil sample number, the type of laboratory test required, the date, name of site and sampler. The sample is then entered on the chain of custody form.

5. Cool the sample in wet ice to approximately 4 degrees centigrade.

6. Repack the samples for shipment to the laboratory in blue ice and a cooler.

7. Relinquish sample to courier for shipment to the laboratory.

3.1.3 Groundwater Sampling

Three wells were purged by removing at least three wetted well casing volumes prior to sample collection. After purging a well, the water level was allowed to equilibrate to its static level prior to sample collection. Well purging and sampling was conducted using a peristaltic pump and new Norprene Tubing. Purged water was pumped into 55 gallon drums, labelled and stored for proper disposal pending laboratory analyses of groundwater samples. Two Boreholes were also sampled using the procedure for collection of groundwater samples as follows:

1. Select a laboratory certified clean sample container with appropriate preservative for sample collection. For most environmental sampling, WSI uses borosilicate glass containers with PTFE (Teflon) lined caps.

2. Using new Norprene Tubing, the peristaltic pump and clean latex gloves, pump water into a sample container, overfill and cap it.

3. Invert the sample and ensure the absence of airspace.

4. Label the jar with the groundwater sample number, the type of laboratory test required, the date, name of site and the name of the sampler.

5. Cool the sample in wet ice to approximately 4° Centigrade. Care must be taken to ensure that the sample is not cooled to a temperature below 4° Centigrade.

6. Enter the sample on WSI chain of custody form.

7. Once the sample is cooled to approximately 4° Centigrade, repack the sample in an ice chest packed with blue ice for shipment.

8. When the ice chest is filled, or at the close of each work day, the ice chest shall be sealed.

9. Transport the ice chest to a commercial courier for shipment to the laboratory.

If the shipment is delayed due to holidays or weekends, the samples are stored in a refrigerator at WSI's laboratory and shipped as soon as possible. For each sample shipped to the laboratory, a duplicate sample is retained in a refrigerator at WSI's laboratory.

## 4.0 Description of the Borehole Data

### 4.1 Drilling

Drilling commenced on October 26, 1995 and was completed on October 27, 1995. A modified B-24 Drill rig with 4.25" internal diameter (ID) and 8.25" outer diameter (OD) auger was used for drilling.

#### 4.1.1 Borehole 1 - Monitoring Well #SVID-G-1

Borehole 1 was drilled on October 26, 1995 to a depth of 22.5'. This borehole was located 16' west of the office building. Refer to Figure 3 Monitoring Well and borehole locations. This borehole was converted to a permanent groundwater monitoring well, hereafter referred to as Monitor Well # SVID-G-1. The Resource Protection Well Report is included in Appendix C.

The soil material intersected in Borehole 1 from 1' to 22.5' was a brown silty clay with a small band of grey clayey silt between 8' and 9'. Groundwater was intercepted at approximately 9'. The monitoring well was constructed using blank 2" Schedule 40 PVC to a depth of 7.5' and .010 inch screen schedule 40 PVC from 7.5' to a depth of 22.5'. The well was sealed with bentonite from O' to 5.5', and a silica sand filter was emplaced between 7.5' and 22.5'.

Soil sample # SVID-0795-102s was collected at a depth of 8.5' for laboratory analysis. Analytical results of the soil sample showed no petroleum hydrocarbon contamination in the gasoline or diesel range. However, lead contamination was

detected at 96 parts per million (ppm). The Model Toxics Control Act, MTCA, clean up standard for lead in soil is 250 ppm. Refer to Appendix D, MTCA Cleanup Levels Soil.

Water samples were collected on November 3, 1995. Analytical results were 510 parts per billion TPH gasoline, no detectable amounts of benzene, 1 ppb toluene, 1.2 ppb ethyl benzene, 4.3 ppb total xylenes. These contamination levels are below the MTCA for TPH in groundwater, and we have enclosed Model Toxics Control Act Cleanup Levels for Groundwater as Appendix E.

4.1.2 Borehole 2 - Monitoring Well # SVID-G-2

Borehole 2 was drilled on October 26, 1995 to a depth of 22′. This borehole was located approximately 25′ east of the office building. Refer to Figure 2 Monitoring Well and Borehole Locations. This borehole was converted to a permanent groundwater monitoring well, hereafter referred to as Monitor Well # SVID-G-2.

The soil material intersected in Borehole 2 from 1′ to 22.5′ was a brown silty clay. Groundwater was intercepted at approximately 9′. The monitor well was constructed using blank 2″ Schedule 40 PVC to a depth of 7′ and .010 inch screen schedule 40 PVC from 7′ to a depth of 22′. The well was sealed with bentonite from 1.5′ to 5′, and a silica sand filter was emplaced between 5′ and 22′.

Soil and water samples were collected on October 26, and November 3, 1995, respectively. Laboratory analysis of the water sample showed no detectable petroleum hydrocarbons at this location. The soil sample was not analyzed due to the results of the groundwater sample.

4.1.3 Borehole 3 - Monitoring Well # SVID-G-3

Borehole 3 was drilled on October 26, 1995 to a depth of 22′. This borehole was located across the street to the west of the office building. Refer to Figure 3 Monitoring Well and Borehole Locations. This borehole was converted to a permanent groundwater monitoring well, hereafter referred to as Monitor Well # SVID-G-3.

The soil material intersected in Borehole 3 from 1′ to 22′ was a brown silty clay. Groundwater was intercepted at approximately 9′. The monitor well was constructed using blank 2″ Schedule 40 PVC to a depth of 7′ and .010 inch screen

schedule 40 PVC from 7′ to a depth of 22′. The well was sealed with bentonite from 1.5′ to 5′, and a silica sand filter was emplaced between 5′ and 22′.

Soil and water samples were collected on October 26, 1995, respectively. Laboratory analysis of the water sample showed no detectable petroleum hydrocarbons at this location. The soil sample was not analyzed due to the results of the groundwater sample.

4.1.4 Borehole 4

Borehole 4 was drilled on October 27, 1995 to a depth of 14′. This borehole was located across the street to the west of the office building south 21′ from MW # SVID-G-3. Refer to Figure 3, Monitor Well and Borehole Locations.

The soil material intersected in Borehole 4 from 1′ to 22′ was a brown silty clay. Groundwater was intercepted at approximately 9′.

Soil and groundwater samples were collected on October 27,1995. Laboratory analysis of the groundwater sample showed no detectable petroleum hydrocarbons at this location. The soil sample was not analyzed due to the results of the groundwater sample.

4.1.5 Borehole 5

Borehole 5 was drilled on October 27, 1995 to a depth of 14′. This borehole was located approximately 5′ east of concrete slab next to the entrance to the maintenance yard. Refer to Figure 3, Monitoring Well and Borehole Locations.

The soil material intersected in Borehole 5 from 1′ to 2′ was a brown sandy/silt loam, from 3′ to 14′ was a brown silty clay. Groundwater was intercepted at approximately 9′.

Soil and groundwater samples were collected on October 27,1995. Laboratory analysis of the sample showed no detectable petroleum hydrocarbons at this location. The soil sample was not analyzed due to the results of the groundwater sample.

## 5.0 Decontamination of Equipment

### 5.1 Decontamination of the Drilling Equipment

All drilling was decontaminated prior to arrival on site, and additional decontamination was performed on site prior to each drilling activity. The drill bits, auger flights, and sampling equipment were decontaminated with high pressure steam between boreholes.

Boretech accomplished the decontamination by steam cleaning the bits, augers and other equipment utilizing a portable steam cleaning machine mounted on a trailer. The water was collected and stored in 55 gallon drums. The drums were labeled and stored on site for disposal or recycling by the owner.

### 5.2 Decontamination of Sampling Equipment

All sampling equipment was additionally cleaned using a non phosphate, biodegradable soap and water scrub and double rinse with clean water between each sampling interval. Boretech stored the decontamination water in 55 gallon drums and stored it with the decontaminated water generated from the steam cleaning procedure.

### 5.3 Survey of the Groundwater Depth

Hari Sharma and Rick Funderburk (WSI) surveyed depth to groundwater on November 16, 1995. Results from this investigation show groundwater flows to the southwest in this area.

## 6.0 Reclamation of Boreholes

Boreholes were reclaimed using bentonite chips which were placed in the hole from the bottom of the drill hole to the ground surface. Each drill site was restored as near as possible to pre-drilling conditions prior to mobilizing to the next borehole. Three of the five boreholes were converted to monitoring wells as described in section four of this report.

## 7.0 Conclusion

### 7.1 Summary

The analytical results from groundwater samples collected from MW #SVID-G-1, revealed slight contamination. However, the contamination levels fall well below the MTCA Cleanup levels for TPH in groundwater.

The soil and groundwater samples collected from the remaining boreholes and monitoring wells are free of petroleum hydrocarbon contaminants.

### 7.2 Recommendations

The data presented reveals that the groundwater contamination levels on September, 1994 at 99,000 ppm of gasoline, have substantially decreased since the removal of the USTs. This decrease may be a direct result of the following reasons:

1. The majority of the contaminated soil was removed during the initial remediation effort.

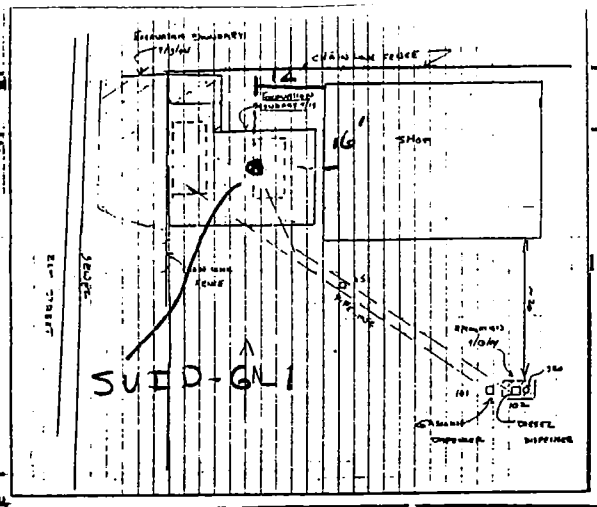
2. The excavation was allowed to remain open for an extended period of time. This allowed the natural bacteria adequate oxygen to encourage a natural bioremediation process.

3. Groundwater fluctuation may have contributed to the bioremediation process by continually flushing the soil.

WSI recommends continued sampling of the groundwater every 6 months for 5 years. This plan meets the Compliance Monitoring Requirements in Section WAC 173-340-410 of the Washington State Model Toxics Control Act, and establishes a body a evidence for review by the Washington State Department of Ecology.

# APPENDIX A

SHEET 1 OF




JOB NO. SVI007 CLIENT SVID
PROJECT NAME
BORING NO. 1

DRILLING METHOD: auger

SAMPLING METHOD: split spoon

| | | | | | START TIME | FINISH TIME |
|---|---|---|---|---|---|---|
| WATER LEVEL | 15' | | | | 8:45 | 9:25 |
| TIME | | | | | | |
| DATE | | | | | DATE 10/26 | DATE |
| CASING DEPTH | | | | | | |

DRILLING CONTRACTOR BORTEC
DRILLER Rich Gibson

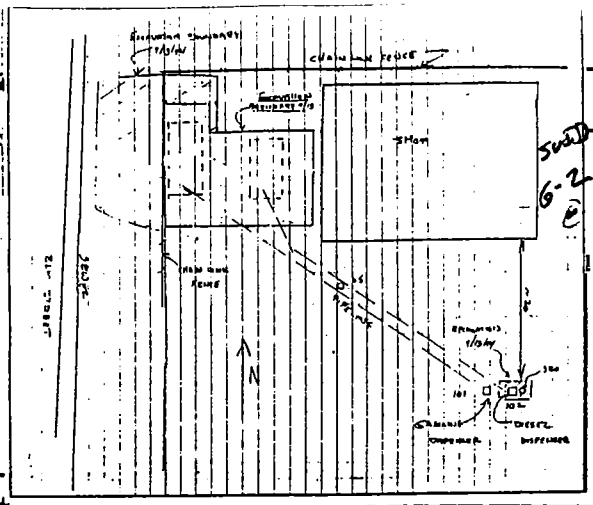
LOCATION
LOCATION
DATUM

SURFACE CONDITION dry Brown silt (moist)

| SAMPLE NO / SAMPLE TYPE | SAMPLE DEPTH | BLOWS PER 6 INCHES | INCHES DRIVEN / INCHES RECOVERED | NUMBER OF RINGS | DEPTH IN FEET | WELL CONST. | GRAPHIC LOG | CLASSIFICATION | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | | | | |
| | | | | | 1 | | | | |
| | | | | | 2 | | | | DAMP Brown SILTY CLAY 0-5' |
| | | | | | 3 | | | | |
| | | | | | 4 | | | | |
| | | - | .. | — . | 5 | Bent 0'-1' | | | ~~SX #103~~ |
| | | | | | 6 | | | | |
| | | | | | 7 | | | | |
| | | | | | 8 | Sand 21'-6' | | | |
| | | | | | 9 | | | CLAYEY | GREY SOIL WET w/ ORGANIC ODOR |
| | | 2/4/4/7 | | | 10 | | | | B wet SY #101 |
| | | | | | 11 | | | | |
| | | | | | 12 | | | | |
| | | | | | 13 | | | | |
| | | | | | 14 | Screen 8'-22' | | | |
| | | 2/5/5/10 | | | 15 | | | | SX-102 Brown SILTY CLAY - GW INTERSECTED |
| | | | | | 16 | | | | HEAVING SANDS ENCOUNTERED |
| | | | | | 17 | | | | |
| | | | | | 18 | | | | |
| | | | | | 19 | | | | |
| | | | | | 20 | | | | |

BY _____ DATE _____ CHKD BY _____

SHEET 1 OF



JOB NO. SVID07 CLIENT SVID. BORING NO. 2

PROJECT NAME

DRILLING METHOD: auger

SAMPLING METHOD: split spoon

| | | | | | START | FINISH |
|---|---|---|---|---|---|---|
| WATER LEVEL | | | | | TIME | TIME |
| TIME | ~~11:20~~ | | | | 11.28 | 12:20 |
| DATE | | | | | DATE | DATE |
| CASING DEPTH | | | | | 10/24/95 | |

DRILLING CONTRACTOR BORTEC

DRILLER Rick Gibson

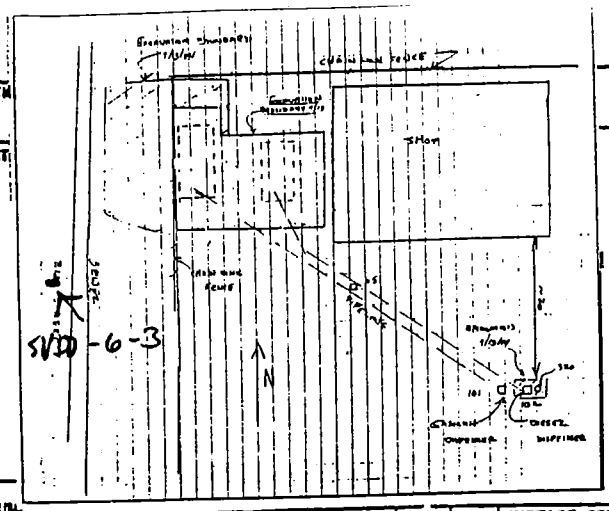
LOGGED BY

DATE

BY

| SAMPLE NO / SAMPLE TYPE | SAMPLE DEPTH | BLOWS PER 6 INCHES | INCHES DRIVEN / INCHES RECOVERED | NUMBER OF RUNS | DEPTH IN FEET | WELL CONST. | GRAPHIC LOG | CLASSIFICATION | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 | 1 RETURNED 1' | | | SURFACE CONDITION |
| | | | | | 2 | | | | 3"-4" GRAVEL → to BRN SILT |
| | | | | | 3 | | | | 3' BRN SILTY CLAY MOIST |
| | | | | | 4 | | | | |
| | | | | | 5 | | | | |
| | | | | | 6 | | | | |
| | | | | | 7 | | | | |
| | | | | | 8 | | | | |
| | | | | | 9 | | | | |
| | | 4/4/5/8 | | | 10 | | | | SX 103s. SPLIT SPOON COOL TO TOUCH |
| | | | | | 11 | | | | HEAVING SANDS |
| | | | | | 12 | | | | |
| | | | | | 13 | | | | |
| | | | | | 14 | 22' | | | |
| | | 3/3/5/6 | | | 15 | | | | SX - 104s Wet Brown Clayey |
| | | | | | 16 | | | | |
| | | | | | 17 | | | | |
| | | | | | 18 | | | | |
| | | | | | 19 | SCREEN 5' | | | |
| | | | | | 20 | 1 | | | |

SHEET 1 OF




JOB NO SVI007 CLIENT SVID BORING NO. 3

PROJECT NAME

DRILLING METHOD: auger

SAMPLING METHOD: split spoon

| | | | | | START | FINISH |
|---|---|---|---|---|---|---|
| | | | | | TIME | TIME |
| WATER LEVEL | | | | | 3:37 | 4:00 |
| TIME | | | | | | |
| DATE | | | | | DATE | DATE |
| CASING DEPTH | | | | | 10/26/95 | |

LOCATION

LOCATE

DATUM

DRILLING CONTRACTOR BORTEC

DRILLER Rick Gibson

| SAMPLE NO / SAMPLE TYPE | SAMPLE DEPTH | BLOWS PER 6 INCHES | INCHES DRIVEN / INCHES RECOVERED | NUMBER OF RUNS | DEPTH IN FEET | WELL CONST. | GRAPHIC LOG | CLASSIFICATION | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | Bentonite 0'→1' | | | SURFACE CONDITION |
| | | | | | 1 | | | | |
| | | | | | 2 | | | | |
| | | | | | 3 | | | | |
| | | | | | 4 | | | | 0 → 4' Brown CLAY SOLT LOAM |
| | | | | | 5 | | | | Brown CLAYEY SOLT LOAM Moist |
| | | | | | 6 | | | | |
| | | 1/5/5/7 | | | 10' | | | | SX -10ss. WET CLAYEY SILT SOIL |
| | | | | | | Screen 4' - 22' | | | GW INTERSECTED AT 14' |
| | | 3/4/6/8 | | | 15' | | | | SX -10ss WET CLAYEY BROWN SILT SANDS (HEAVY) |
| | | | | | 20' | | | | |

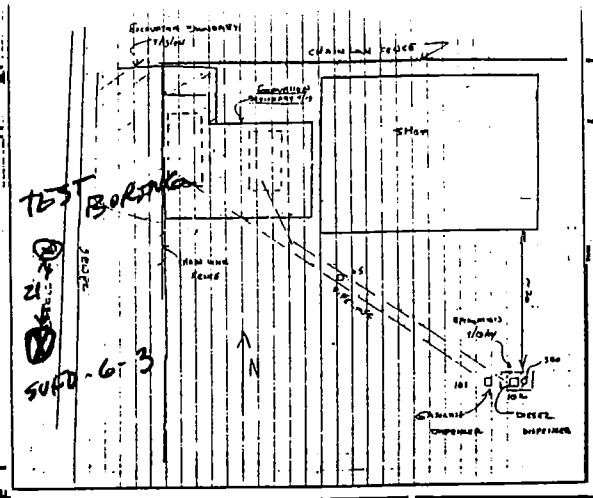
BY _____ CHKD BY _____

DATE _____

SHEET 1 OF

LOCATION

LOCATION




JOB NO. SVID07 CLIENT SVID BORING NO. 4

PROJECT NAME

DRILLING METHOD: auger
TEST BORINGS.

SAMPLING METHOD: [redacted] SPLIT SPOON & PERISTALTIC PUMP

| | | | | | START | FINISH |
|---|---|---|---|---|---|---|
| WATER LEVEL | | | | | TIME 7:45 | TIME 8:00 |
| TIME | | | | | | |
| DATE | | | | | DATE 10/27/94 | DATE |
| CASING DEPTH | | | | | | |

DATUM

DRILLING CONTRACTOR BORTEC
DRILLER Rick Gibson

BY _____ CHKD BY _____ DATE _____

SURFACE CONDITION

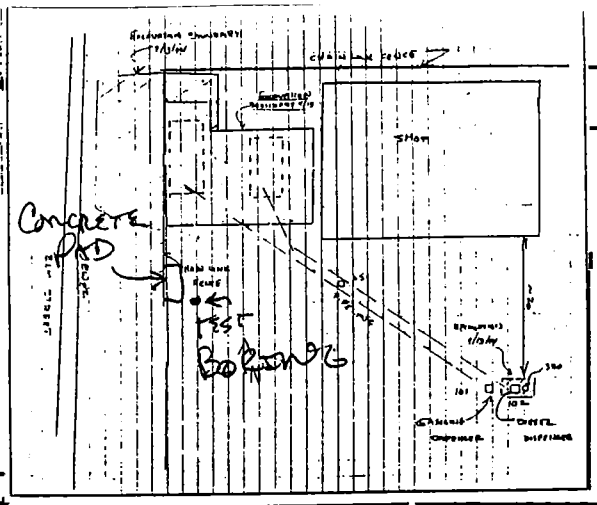
| SAMPLE NO. / SAMPLE TYPE | SAMPLE DEPTH | BLOWS PER 6 INCHES | INCHES DRIVEN / INCHES RECOVERED | NUMBER OF RINGS | DEPTH IN FEET | WELL CONST. | GRAPHIC LOG | CLASSIFICATION | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | | | | Brown CLAY SILT LOAM |
| | | | | | 1 | | | | |
| | | | | | 2 | | | | |
| | | | | | 3 | | | | |
| | | | | | 4 | | | | |
| | | | | | 5 | | | | 5' Moist CLAY SILT LOAM |
| | | | | | 6 | | | | |
| | | | | | 7 | | | | |
| | | | | | 8 | | | | |
| | | | | | 9 | | | | WATER Level 9.2' SK # 201W collected. |
| | | 3/4/6/8 | | | 10' | | | | WET CLAY SILTS Brown Soil Sample collected -1075 |
| | | | | | | | | | |
| | | | | | 14' | | | | |
| | | | | | | | | | |

14' → 6' BENTONITE

SHEET 1 OF

LOCATION

LOCATION




| JOB NO. SVI007 | CLIENT SVID | BORING NO. 5 |
|---|---|---|
| PROJECT NAME | | |

DRILLING METHOD: auger
TEST BORING

SAMPLING METHOD: split spoon

| | | | | | START | FINISH |
|---|---|---|---|---|---|---|
| WATER LEVEL | 9'1.5" | | | | TIME 9:15 | TIME 9:30 |
| TIME | | | | | | |
| DATE | | | | | DATE 10/27/95 | DATE |
| CASING DEPTH | | | | | | |

DATUM

DRILLING CONTRACTOR BORTEC

DRILLER Rich Gibson

| SAMPLE NO / SAMPLE TYPE | SAMPLE DEPTH | BLOWS PER 6 INCHES | INCHES DRIVEN / INCHES RECOVERED | NUMBER OF RINGS | DEPTH IN FEET | WELL CONST. | GRAPHIC LOG |
|---|---|---|---|---|---|---|---|
| | | | | | 0 | | |
| | | | | | 1 | | |
| | | | | | 2 | | |
| | | | | | 3 | | |
| | | | | | 4 | | |
| | | | | | 5 | | |
| | | | | | 6 | | |
| | | 3/3/7/9 | | | 7 1/2 | | |
| | | | | | 8 | | |
| | | | | | 9 | | |
| | | | | | 10 | | |
| | | | | | 11 | | |
| | | | | | 12 | | |
| | | | | | 13 | | |
| | | | | | 14 | | |
| | | | | | 15 | | |

SURFACE CONDITION

CLASSIFICATION DESCRIPTION

Brown SANDY w/SOME LOAM

3" MOIST SILTY CLAY BROWN

WET SOFT CLAY Brown
SPLIT SPOON WARM TO TOUCH
#1098

WATER LEVEL 9' 1.5"

SX # 202W collected

BENTONITE 7' - 9'

BY _____ DATE _____ CHKD BY _____

# APPENDIX B

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**WTPH-HCID**

Date Extracted: 11-6-95
Date Analyzed: 11-6-95

Matrix: Soil

| Client ID | Lab ID | GC Characterization | o-terphenyl Surrogate Recovery | Flags |
|---|---|---|---|---|
| SVID-0795-103S | 11-024-2 | <20 ppm Gasoline range hydrocarbons<br><50 ppm Diesel range hydrocarbons<br><100 ppm Oil range hydrocarbons | 113% | |
| SVID-0795-108S | 11-024-5 | <20 ppm Gasoline range hydrocarbons<br><50 ppm Diesel range hydrocarbons<br><100 ppm Oil range hydrocarbons | 115% | |

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**WTPH-HCID**
**METHOD BLANK QUALITY CONTROL**

Date Extracted: 11-6-95
Date Analyzed: 11-6-95

Matrix: Soil

Lab ID: **MB1106S1**

| | GC Characterization | o-terphenyl Surrogate Recovery | Flags |
|---|---|---|---|
| Method Blank | <20 ppm Gasoline range hydrocarbons<br><50 ppm Diesel range hydrocarbons<br><100 ppm Oil range hydrocarbons | 116% | |

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**TPH-HCID**

Date Extracted. 11-6-95
Date Analyzed: 11-6-95

Matrix: Water

| Client ID | Lab ID | GC Characterization | o-terphenyl Surrogate Recovery | Flags |
|---|---|---|---|---|
| SVID-0795-102W | 11-024-7 | <0.20 ppm Gasoline range hydrocarbons<br><0.50 ppm Diesel range hydrocarbons<br><1.0 ppm Oil range hydrocarbons | 76% | |
| SVID-0795-202W | 11-024-10 | <0.20 ppm Gasoline range hydrocarbons<br><0.50 ppm Diesel range hydrocarbons<br><1.0 ppm Oil range hydrocarbons | 78% | |

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**TPH-HCID**
**METHOD BLANK QUALITY CONTROL**

Date Extracted: 11-6-95
Date Analyzed: 11-6-95

Matrix: Water

| Lab ID | GC Characterization | o-terphenyl Surrogate Recovery | Flags |
|---|---|---|---|
| MB1106W1 | <0.20 ppm Gasoline range hydrocarbons<br><0.50 ppm Diesel range hydrocarbons<br><1.0 ppm Oil range hydrocarbons | 100% | |

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**EPA 8020 & WTPH-G**

Date Extracted: 11-6-95
Date Analyzed: 11-6-95

Matrix: Soil
Units: mg/Kg (ppm)

| Lab ID | 11-024-1 | 11-024-3 | 11-024-4 | |
|---|---|---|---|---|
| Client ID | **SVID-0795-102S** | **SVID-0795-105S** | **SVID-0795-107S** | Method PQL |
| Dilution Factor | 50 | 50 | 50 | |
| Benzene | **ND** | **ND** | **ND** | .001 |
| Toluene | **ND** | **ND** | **ND** | .001 |
| Ethyl Benzene | **ND** | **ND** | **ND** | .001 |
| m,p-Xylene | **ND** | **ND** | **ND** | .001 |
| o-Xylene | **ND** | **ND** | **ND** | .001 |
| TPH-Gas | **ND** | **ND** | **ND** | .100 |
| 4-BFB Surrogate Recovery | 71% | 71% | 72% | |

*Note: Sample PQL(practical quantitation limit)= Method PQL x dilution factor*

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**EPA 8020 & WTPH-G**
**QUALITY CONTROL**

Date Extracted: 11-6-95
Date Analyzed: 11-6-95

Matrix: Soil
Units: mg/Kg (ppm)

| Lab ID | MB1106S1 | 11-022-1 | 11-022-1 | |
|---|---|---|---|---|
| | **Blank** | **Original** | **Duplicate** | **RPD** |
| Dilution Factor | 50 | 50 | 50 | |
| Benzene | **ND** | **ND** | **ND** | NA |
| Toluene | **ND** | **ND** | **ND** | NA |
| Ethyl Benzene | **ND** | **ND** | **ND** | NA |
| m,p-Xylene | **ND** | **ND** | **ND** | NA |
| o-Xylene | **ND** | **ND** | **ND** | NA |
| TPH-Gas | **ND** | **ND** | **ND** | NA |
| 4-BFB Surrogate Recovery | 89% | 82% | 80% | |

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**EPA 8020 & WTPH-G**
**MS/MSD QUALITY CONTROL**

Date Extracted: 11-6-95
Date Analyzed: 11-6-95

Matrix: Soil
Units: mg/Kg (ppm)

| Lab ID | 11-022-1 | | 11-022-1 | | |
|---|---|---|---|---|---|
| spiked @ 1 ppm | **MS** | Percent | **MSD** | Percent | |
| Dilution Factor | 50 | Recovery | 50 | Recovery | RPD |
| Benzene | **0.775** | **78%** | **0.805** | **81%** | 3.8 |
| Toluene | **0.820** | **82%** | **0.845** | **85%** | 3.0 |
| Ethyl Benzene | **0.815** | **82%** | **0.835** | **84%** | 2.4 |
| m,p-Xylene | **0.835** | **84%** | **0.855** | **86%** | 2.4 |
| o-Xylene | **0.840** | **84%** | **0.860** | **86%** | 2.4 |
| 4-BFB Surrogate Recovery | 77% | | 75% | | |

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**EPA 602 & WTPH-G**

Date Extracted: 11-6-95
Date Analyzed: 11-6-95

Matrix: Water
Units: ug/L (ppb)

| Lab ID | 11-024-6 | 11-024-8 | 11-024-9 | |
|---|---|---|---|---|
| Client ID | **SVID-0795-101W** | **SVID-0795-103W** | **SVID-0795-201W** | Method PQL |
| Dilution Factor | 1 | 1 | 1 | |
| Benzene | **ND** | **ND** | **ND** | 1.00 |
| Toluene | **1.0** | **ND** | **ND** | 1.00 |
| Ethyl Benzene | **1.2** | **ND** | **ND** | 1.00 |
| m,p-Xylene | **3.1** | **ND** | **ND** | 1.00 |
| o-Xylene | **1.2** | **ND** | **ND** | 1.00 |
| TPH-Gas | **510** | **ND** | **ND** | 100 |
| 4-BFB Surrogate Recovery | 93% | 92% | 85% | |

*Note: Sample PQL(practical quantitation limit)= Method PQL x dilution factor*

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**EPA 602 & WTPH-G**
**QUALITY CONTROL**

Date Extracted: 11-6-95
Date Analyzed: 11-6-95

Matrix: Water
Units: ug/L (ppb)

| Lab ID | MB1106W1 | 11-023-1 | 11-023-1 | |
|---|---|---|---|---|
| | **Blank** | **Original** | **Duplicate** | **RPD** |
| Dilution Factor | 1 | 10 | 10 | |
| Benzene | **ND** | **2700E** | **2600E** | 3.0 |
| Toluene | **ND** | **720** | **700** | 2.8 |
| Ethyl Benzene | **ND** | **190** | **180** | 2.8 |
| m,p-Xylene | **ND** | **500** | **480** | 3.5 |
| o-Xylene | **ND** | **150** | **150** | 2.6 |
| TPH-Gas | **ND** | **5600** | **5500** | 2.0 |
| 4-BFB Surrogate Recovery | 98% | 97% | 95% | |

E-Value reported exceeds the quantitation range. Value is an estimate.

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**EPA 602 & WTPH-G**
**QUALITY CONTROL**

Date Extracted: 11-6-95
Date Analyzed: 11-6-95

Matrix: Water
Units: ug/L (ppb)

| Lab ID | 11-023-1 | | 11-023-1 | | |
|---|---|---|---|---|---|
| spiked @ 50 ppb | **MS** | Percent | **MSD** | Percent | |
| Dilution Factor | 10 | Recovery | 10 | Recovery | RPD |
| Benzene | **3110** | **A** | **3070** | **A** | 9.3 |
| Toluene | **1200** | **A** | **1190** | **A** | 3.7 |
| Ethyl Benzene | **671** | **A** | **664** | **A** | 1.5 |
| m,p-Xylene | **983** | **A** | **969** | **A** | 2.8 |
| o-Xylene | **629** | **A** | **624** | **A** | 1.1 |
| 4-BFB Surrogate Recovery | 95% | | 104% | | |

A-Amount spiked insufficient for meaningful MS/MSD data recovery

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**WTPH-D**

Date Extracted: 11-06-95
Date Analyzed: 11-06-95

Matrix: Soil
Units: mg/Kg (ppm)

| Client ID | Lab ID | Dilution Factor | Total Petroleum Hydrocarbons | Surrogate Recovery | Flags | MRL |
|---|---|---|---|---|---|---|
| SVID-0795-102S | 11-024-1 | 1.0 | **ND** | 84% | | 25 |
| SVID-0795-105S | 11-024-3 | 1.0 | **ND** | 95% | | 25 |
| SVID-0795-107S | 11-024-4 | 1.0 | **ND** | 82% | | 25 |

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**WTPH-D**
**METHOD BLANK QUALITY CONTROL**

Date Extracted: 11-06-95
Date Analyzed: 11-06-95

Matrix: Soil
Units: mg/Kg (ppm)

Lab ID: MB1106S1

| | Dilution Factor | Total Petroleum Hydrocarbons | Surrogate Recovery | Flags | MRL |
|---|---|---|---|---|---|
| Method Blank | 1.0 | ND | 104% | | 25 |

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**WTPH-D**
**DUPLICATE QUALITY CONTROL**

Date Extracted: 11-06-95
Date Analyzed: 11-06-95

Matrix: Soil
Units: mg/Kg (ppm)

Lab ID: 11-024-4

| | Dilution Factor | Total Petroleum Hydrocarbons | Surrogate Recovery | Flags | MRL |
|---|---|---|---|---|---|
| Sample | 1.0 | ND | 82% | | 25 |
| Duplicate | 1.0 | ND | 75% | | 25 |
| RPD | | NA | | | |

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**WTPH-D**
**SPIKE BLANK QUALITY CONTROL**

Date Extracted: 11-06-95
Date Analyzed: 11-06-95

Matrix: Soil
Units: mg/Kg (ppm)

Lab ID: SB1106S1

| | Dilution Factor | Total Petroleum Hydrocarbons | Percent Recovery | Surrogate Recovery | Flags | MRL |
|---|---|---|---|---|---|---|
| Spike Blank @ 100 ppm | 1.0 | 98.4 | 98% | 118% | | 25 |

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**WTPH-D**

Date Extracted: 11-06-95
Date Analyzed: 11-06-95

Matrix: Water
Units: mg/L (ppm)

| Client ID | Lab ID | Dilution Factor | Total Petroleum Hydrocarbons | Surrogate Recovery | Flags | MRL |
|---|---|---|---|---|---|---|
| SVID-0795-101W | 11-024-6 | 0.02 | **ND** | 79% | | 0.50 |
| SVID-0795-103W | 11-024-8 | 0.02 | **ND** | 93% | | 0.50 |
| SVID-0795-201W | 11-024-9 | 0.02 | **ND** | 82% | | 0.50 |

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**WTPH-D**
**METHOD BLANK QUALITY CONTROL**

Date Extracted: 11-06-95
Date Analyzed: 11-06-95

Matrix: Water
Units: mg/L (ppm)

Lab ID: MB1106W1

| | Dilution Factor | Total Petroleum Hydrocarbons | Surrogate Recovery | Flags | MRL |
|---|---|---|---|---|---|
| Method Blank | 0.02 | ND | 100% | | 0.50 |

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**WTPH-D**
**DUPLICATE QUALITY CONTROL**

Date Extracted: 10-31-95
Date Analyzed: 10-31-95

Matrix: Water
Units: mg/L (ppm)

Lab ID: 10-139-1

| | Dilution Factor | Total Petroleum Hydrocarbons | Surrogate Recovery | Flags | MRL |
|---|---|---|---|---|---|
| Sample | 0.02 | ND | 104% | | 0.50 |
| Duplicate | 0.02 | ND | 87% | | 0.50 |
| RPD | | NA | | | |

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**WTPH-D**
**SPIKE BLANK QUALITY CONTROL**

Date Extracted: 11-06-95
Date Analyzed: 11-06-95

Matrix: Water
Units: mg/L (ppm)

Lab ID: SB1106W1

| | Dilution Factor | Total Petroleum Hydrocarbons | Percent Recovery | Surrogate Recovery | Flags | MRL |
|---|---|---|---|---|---|---|
| Spike @ 2 ppm | 0.02 | 1.94 | 97% | 116% | | 0.50 |

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**EPA 6010**

Date Extracted: 11-6-95
Date Analyzed: 11-6-95

Matrix: Soil
Units: mg/kg (ppm)

| Client ID | Dilution Factor | Total Lead | PQL |
|---|---|---|---|
| SVID-0795-102s | 50 | **96** | 5.0 |

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

**EPA 6010**
**QUALITY CONTROL**

Date Extracted: 11-6-95
Date Analyzed: 11-6-95

Matrix: Soil
Units: mg/kg (ppm)

| Client ID | Dilution Factor | Total Lead | Flags | PQL |
|---|---|---|---|---|
| Method Blank | 50 | ND | | 5.0 |
| Sample: 11-021-2 | 50 | 47.4 | | 5.0 |
| Duplicate | 50 | 47.1 | | 5.0 |
| RPD | | 0.6% | | |
| Matrix Spike @ 125 ppm | 50 | 110 | | 5.0 |
| Percent Recovery | | 63% | I | |
| Matrix Spike Duplicate | 50 | 110 | | 5.0 |
| Percent Recovery | | 63% | I | |
| RPD | | 0.0% | | |

I-MS/MSD recoveries are outside of control limits due to matrix effects. The blank spike recovered at 82%.

Date of Report: November 9, 1995
Samples Submitted: November 4, 1995
Lab Traveler: 11-024
Project: SVID-0795

Date Analyzed: 11-6-95

**% MOISTURE**

| Client ID | % Moisture |
|---|---|
| SVID-0795-102s | 20 |
| SVID-0795-105s | 22 |
| SVID-0795-107s | 22 |

# APPENDIX C

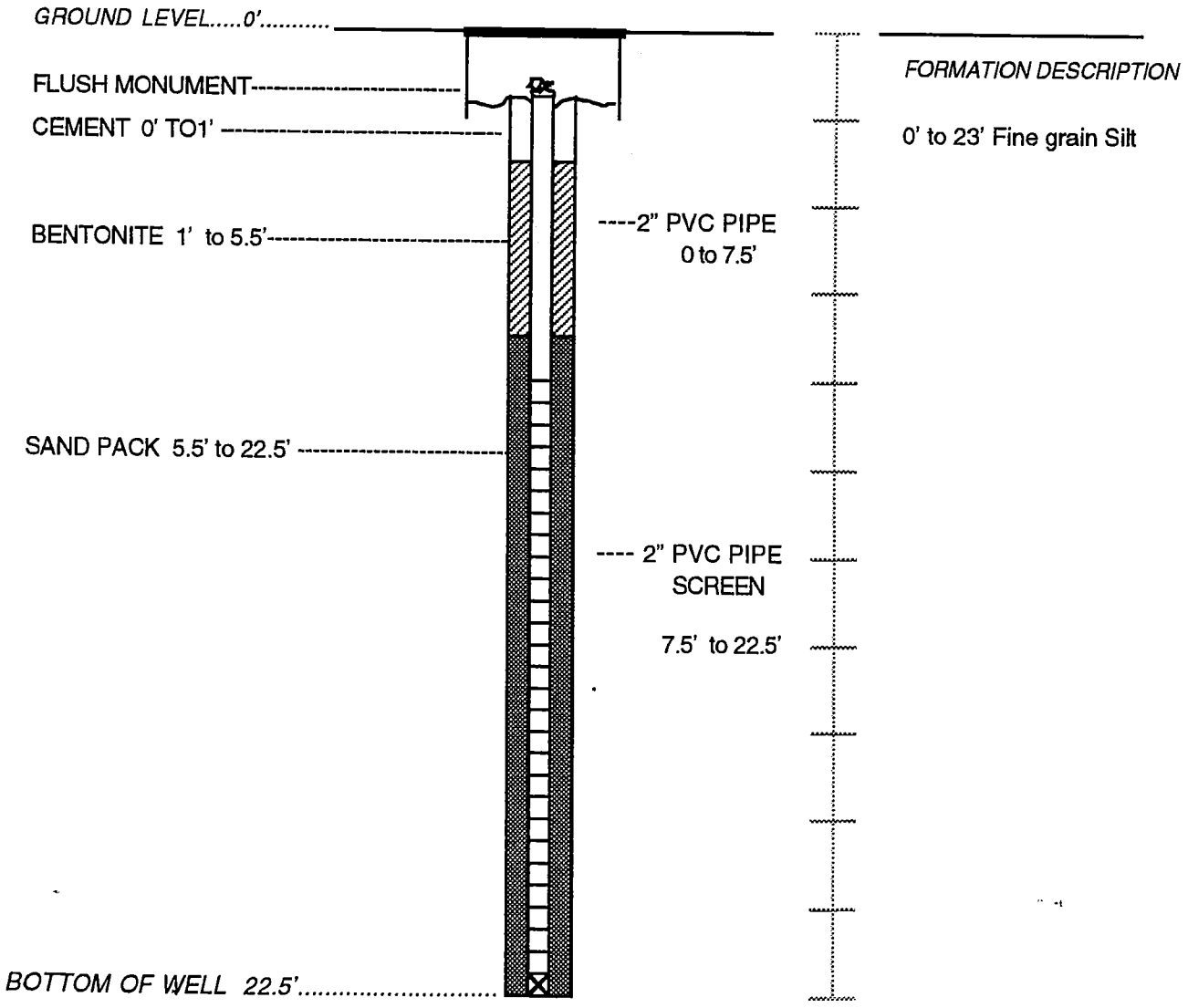
**BORETEC, INC.**
*Drilling & Sampling*

# RESOURCE PROTECTION WELL REPORT

*START CARD NO.* *R26222*

| | | | |
|---|---|---|---|
| PROJECT NAME: | Sunnyside Irragation | COUNTY: | Yakima |
| WELL ID. NO.. | SVID #1 | LOCATION: | SW, SW, SEC 13, T9N, R23E |
| DRILLER: | Ritch Gibson | STREET ADDRESS: | 405 ELM St., Grandview, Wa. |
| FIRM: | Boretec, Inc. | | |
| SIGNATURE: | | WATER LEVEL: | Approx. 9' |
| CONSULTING FIRM: | White Sheild | DATE INSTALLED: | 10-27-95 |
| REPRESENTATIVE: | Terry Miller | DEVELOPED: | No |

## WELL DATA



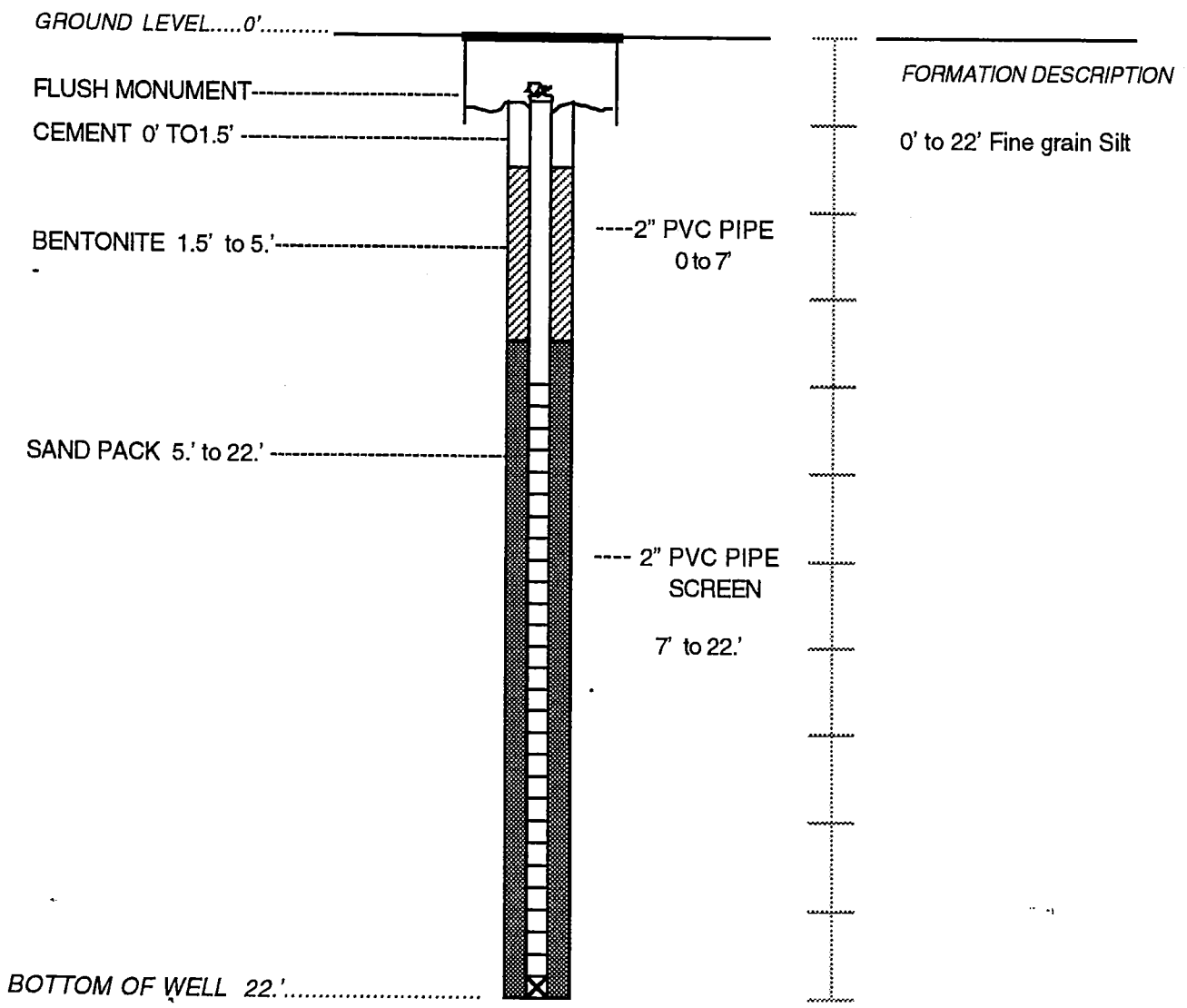
**BORETEC, INC.**
*Drilling & Sampling*

# RESOURCE PROTECTION WELL REPORT

*START CARD NO.* *R26222*

| | | | |
|---|---|---|---|
| PROJECT NAME: | Sunnyside Irragation | COUNTY: | Yakima |
| WELL ID. NO.. | SVID #2 | LOCATION: | SW, SW, SEC 13, T9N, R23E |
| DRILLER: | Ritch Gibson | STREET ADDRESS: | 405 ELM St., |
| FIRM: | Boretec, Inc. | | Grandview, Wa. |
| SIGNATURE: | | WATER LEVEL: | Approx. 9' |
| CONSULTING FIRM: | White Sheild | DATE INSTALLED: | 10-27-95 |
| REPRESENTATIVE: | Terry Miller | DEVELOPED: | No |

## WELL DATA



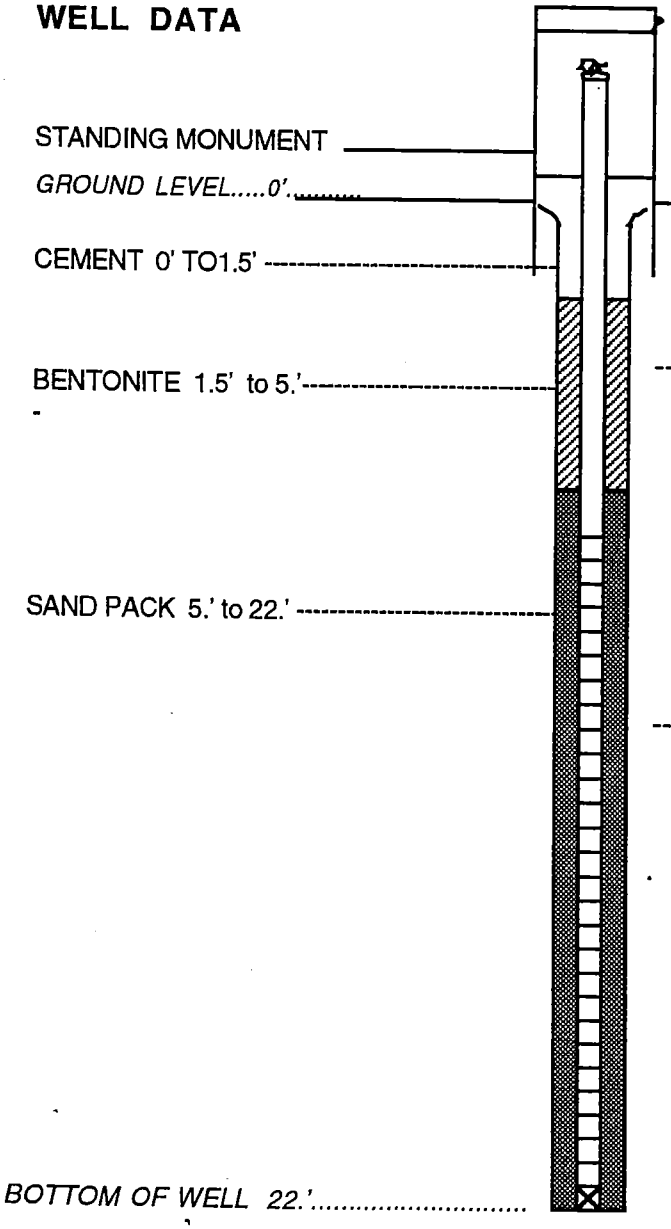
**BORETEC, INC.**
*Drilling & Sampling*

# RESOURCE PROTECTION WELL REPORT

*START CARD NO.* *R26222*

| | | | |
|---|---|---|---|
| PROJECT NAME: | Sunnyside Irragation | COUNTY: | Yakima |
| WELL ID. NO.. | SVID #3 | LOCATION: | SW, SW, SEC 13, T9N, R23E |
| DRILLER: | Ritch Gibson | STREET ADDRESS: | 405 ELM St., |
| FIRM: | Boretec, Inc. | | Grandview, Wa. |
| SIGNATURE: | | WATER LEVEL: | Approx. 9' |
| CONSULTING FIRM: | White Sheild | DATE INSTALLED: | 10-27-95 |
| REPRESENTATIVE: | Terry Miller | DEVELOPED: | No |

## WELL DATA




*FORMATION DESCRIPTION*

0' to 22' Fine grain Silt

# APPENDIX D

## Method A Cleanup Levels - Soil [a]

| Hazardous Substance | CAS Number | Cleanup Level |
|---|---|---|
| Arsenic | 7440-38-2 | 20.0 mg/kg [b] |
| Benzene | 71-43-2 | 0.5 mg/kg [c] |
| Cadmium | 7440-43-9 | 2.0 mg/kg [d] |
| Chromium | 7440-47-3 | 100.0 mg/kg [e] |
| DDT | 50-29-3 | 1.0 mg/kg [f] |
| Ethylbenzene | 100-41-4 | 20.0 mg/kg [g] |
| Ethylene dibromide | 106-93-4 | 0.001 mg/kg [h] |
| Lead | 7439-92-1 | 250.0 mg/kg [i] |
| Lindane | 58-89-9 | 1.0 mg/kg [j] |
| Methylene chloride | 75-09-2 | 0.5 mg/kg [k] |
| Mercury (inorganic) | 7439-97-6 | 1.0 mg/kg [l] |
| PAHs (carcinogenic) | | 1.0 mg/kg [m] |
| PCB Mixtures | | 1.0 mg/kg [n] |
| Tetrachloroethylene | 127-18-4 | 0.5 mg/kg [o] |
| Toluene | 108-88-3 | 40.0 mg/kg [p] |
| TPH (gasoline) | | 100.0 mg/kg [q] |
| TPH (diesel) | | 200.0 mg/kg [r] |
| TPH (other) | | 200.0 mg/kg [s] |
| 1,1,1 Trichloroethane | 71-55-6 | 20.0 mg/kg [t] |
| Trichloroethylene | 79-01-5 | 0.5 mg/kg [u] |
| Xylenes | 1330-20-7 | 20.0 mg/kg [v] |

# APPENDIX E

Method A Cleanup Levels – Ground Water[a]

| Hazardous Substance | CAS Number | Cleanup Level |
|---|---|---|
| Arsenic | 7440–38–2 | 5.0 ug/liter[b] |
| Benzene | 71–43–2 | 5.0 ug/liter[c] |
| Cadmium | 7440–43–9 | 5.0 ug/liter[d] |
| Chromium (Total) | 7440–47–3 | 50.0 ug/liter[e] |
| DDT | 50–29–3 | 0.1 ug/liter[f] |
| 1,2 Dichloroethane | 107–06–2 | 5.0 ug/liter[g] |
| Ethylbenzene | 100–41–4 | 30.0 ug/liter[h] |
| Ethylene dibromide | 106–93–4 | 0.01 ug/liter[i] |
| Gross Alpha Particle Activity | | 15.0 pCi/liter[j] |
| Gross Beta Particle Activity | | 4.0 mrem/yr[k] |
| Lead | 7439–92–1 | 5.0 ug/liter[l] |
| Lindane | 58–89–9 | 0.2 ug/liter[m] |
| Methylene chloride | 75–09–2 | 5.0 ug/liter[n] |
| Mercury | 7439–97–6 | 2.0 ug/liter[o] |
| PAHs (carcinogenic) | | 0.1 ug/liter[p] |
| PCB mixtures | | 0.1 ug/liter[q] |
| Radium 226 and 228 | | 5.0 pCi/liter[r] |
| Radium 226 | | 3.0 pCi/liter[s] |
| Tetrachloroethylene | 127–18–4 | 5.0 ug/liter[t] |
| Toluene | 108–88–3 | 40.0 ug/liter[u] |
| Total Petroleum Hydrocarbons | | 1000.0 ug/liter[v] |
| 1,1,1 Trichloroethane | 71–55–6 | 200.0 ug/liter[w] |
| Trichloroethylene | 79–01–5 | 5.0 ug/liter[x] |
| Vinyl chloride | 75–01–4 | 0.2 ug/liter[y] |
| Xylenes | 1330–20–7 | 20.0 ug/liter[z] |

[a] Caution on misusing method A tables. Method A tables have been developed for specific purposes. They are intended to provide conservative cleanup levels for sites undergoing routine cleanup actions or those sites with relatively few hazardous substances. The tables may not be appropriate for defining cleanup levels at other sites. For these reasons, the values in these tables should not automatically be used to define cleanup levels that must be met for financial, real estate, insurance coverage or placement, or similar transactions or purposes. Exceedances of the values in these tables do not necessarily trigger requirements for cleanup action under this chapter.