PHASE II SOIL AND GROUND WATER ASSESSMENT
7-ELEVEN STORE NUMBER 25821
1824 GEORGE WASHINGTON WAY
RICHLAND, WASHINGTON

September 11, 1989

Job Number 60-1049-02

Mr. Garry Woodman
Southland Corporation
7167 South Alton Way
Englewood, Colorado 80112

Dear Mr. Aveldson:

We are pleased to present our Phase II Soil and Ground Water Assessment Report for the 7-Eleven Store, Number 25821, located at 1824 George Washington Way in Richland, Washington. We trust the information in this report meets your needs at this time.

We appreciate the opportunity to have been of service to you. Should you have questions regarding this report, please contact us at your convenience.

Very truly yours,

Kleinfelder

Gary L. Brugger, P.E.
Senior Project Engineer

Rory L. Galloway, R.G.
Project Manager

A Report Prepared for:

Mr. Garry Woodman
Southland Corporation
7167 South Alton Way
Englewood, Colorado 80112

PHASE II SOIL AND GROUND WATER ASSESSMENT
STORE, NUMBER 25821
1824 GEORGE WASHINGTON WAY
RICHLAND, WASHINGTON

Kleinfelder Job No. 60-1049-02

Prepared by:

Rory L. Galloway
Project Manager

Reviewed by:

Gary L. Brugger, P.E.
Senior Project Engineer

and:

Brad C. Kleinfelder
Regional Manager

KLEINFELDER
1200 112th Avenue NE, Suite C226
Bellevue, Washington 98004
(206) 451-2877

September 11, 1989

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

Kleinfelder has completed a Phase II Soil and Ground Water Assessment of the 7-Eleven Store Number 25821, located at the corner of George Washington Way and McMurray Street in Richland, Washington. This assessment was performed to explore the extent of released gasoline in on-site soils and ground water. The release was discovered during the removal of underground gasoline storage tanks from the property.

This assessment included a limited subsurface exploration of the site and a review of Washington Department of Ecology files, to identify water supply wells within a one-half mile radius of the site. The subsurface exploration of the site included installation of five ground water monitoring wells, and sampling and development of these wells.

Physical evidence of hydrocarbon in the soil was found only in well MW05 where stained soil with a hydrocarbon odor was recovered from a depth of about 16 feet.

A ground water sample from each well was analyzed by EPA Method 602 for Benzene, Toluene, Ethylbenzene and Xylenes (BTEX), and by EPA Method 8015 (modified) for Total Petroleum Hydrocarbons TPH). BTEX was detected in ground water recovered from MW03 and MW05. The ground water sample from MW03 contained 0.7 mg/L meta and para xylene. The ground water sample from MW05 contained 0.8 mg/L ethylbenzene, 2.2 mg/L meta and para xylene, and 2.0 mg/L ortho xylene.

Ground water elevation contours, calculated from ground water depths measured on July 1, 1989, indicate a flow gradient to the southeast of 0.0015 foot.

A review of Washington Department of Ecology files, to identify water supply wells within a one-half mile radius of the site, discovered six wells. None of these wells are apparently down gradient from the site.

2.0 INTRODUCTION

Southland Corporation authorized Kleinfelder to perform a Phase II Ground Water Assessment for the 7-Eleven Store Number 25821, located at George Washington Way and McMurray Street in Richland, Washington (Plate 1). The scope of this work is presented in our proposal 60-YP9039, dated June 12, 1989.

The scope of our work, as identified above, was intended to explore the extent of soil and ground water contamination on the site by installing soil borings and ground water monitoring wells. In addition, we were to review existing ground water supply wells, known to the Washington Department of Ecology, within a one-half mile radius of the site.

Findings of this work are presented in this report.

3.0 BACKGROUND

Kleinfelder was contracted by Southland to observe and document the removal of underground gasoline storage tanks from the subject property. The results of this work are briefly discussed below and are presented in our report number 60-1049-01.

The tank removal contractor reported, to Kleinfelder and Southland personnel, that during the removal of the tanks, the pump island supply lines were intentionally broken by the contractor. This action resulted in about 5-gallons of product being spilled into the excavation.

During excavation of the soils impacted by this spill, obvious hydrocarbon contamination was discovered in the soils just above the water table (approximate depth 12 to 14 feet). Test pits in other areas of the tank vault also uncovered obvious contamination at similar depths. The discovery of hydrocarbon contamination at this depth and away from the area of the 5-gallon spill, suggested a secondary source. In addition, chemical analysis of a soil sample from the bottom of the excavation, just above the water table, indicated that the contamination may represent an aged gasoline product.

4.0 ASSESSMENT ACTIVITIES

The Kleinfelder Phase II Soil and Ground Water assessment, for the subject property, included exploring the extent of hydrocarbon contamination by installing and sampling five ground water monitoring wells on the property. Existing ground water wells within one-half mile of the site, as known to the Washington Department of Ecology, were also identified.

4.1 SOIL BORINGS AND MONITORING WELLS

A field exploration program was conducted on June 29, 30, and July 1, 1989. The program consisted of one air rotary boring and four hollow stem auger borings. All borings were converted to ground water monitoring wells. These wells were located in areas of historic underground storage tanks, pump islands, and dry wells (Plate 2). The well locations were intended to permit the calculation of ground water contours.

MW01 was installed in an area assumed to be down-gradient from the tank and pump island locations. MW02 was also located in a potential down gradient location. MW03 was located in a down-gradient location, which was also the location of a historic dry well. MW04 was installed in an assumed up-gradient location. MW05 was installed in a down-gradient location, which also was the location of historic underground tank vault.

Split spoon soil samples were collected at five foot intervals during drilling of borings MW01, MW02, and MW03. Split spoon soil samples were collected at depths of 15 and 20 feet in MW05. These samples were field screened for volatile organic compounds with a photoionization detector (PID). In addition, soil type and descriptions were logged. Split spoon soil samples were not collected from MW04, however, soil cuttings were logged and field screened. Results of the drilling program are discussed in Section 5.0 of this report. Appendix A presents details of the well installation, development, and sampling program.

4.2 GROUND WATER MONITORING WELL SAMPLES

A ground water sample was collected from each well and analyzed by EPA Method 602 for benzene, toluene, ethylbenzene, and xylenes (BTEX) and by EPA Method 8015 (modified) for Total Petroleum Hydrocarbons (TPH). Also for quality assurance/quality control (QA/QC) purposes, a blind duplicate sample from MW05 was collected and submitted for BTEX analysis. Results of these analyses are presented in Section 5.3 of this report. Details of the ground water sampling program are presented in Appendix A.

5.0 SITE EXPLORATION OBSERVATIONS AND FINDINGS

5.1 SOIL BORING FINDINGS

Soil borings generally encountered 3 to 5 feet of brown sand which was moderately sorted and medium to fine grained. Boring MW03 did not encounter any of this sand, but encountered brown sandy gravel throughout the boring. The other borings encountered sandy gravel from the base of the brown sand to the bottom of the boring, a maximum depth of 21.5 feet below the surface. Ground water was first observed at a depth of 13 to 15 feet in all the borings.

Physical evidence of hydrocarbon was only observed in a sample from MW05, taken at a depth of 15 to 16 feet. This sample was stained gray and had a hydrocarbon odor.

Boring/well locations are presented on Plate 2. Boring logs are presented in Plates 4 through 8. Each boring log also presents a schematic of the monitoring well installed in that boring.

5.2 GROUND WATER MONITORING WELL FINDINGS

Static water level measurements were made on the morning of July 1, 1989. From these measurements, ground water contours were calculated and plotted on the site map in feet above mean sea level (Plate 9). (Note: The contours represent one interpretation of the July 1, 1989 data. These contours may change with additional data or measurements, weather changes, seasons, changes in river level, construction activities, and other natural or man induced factors.) Plotted contours indicate a gradient to the southeast of 0.0015 foot (a vertical change of 1.5 feet for 1000 feet horizontally).

Physical evidence of hydrocarbon was detected in the ground water bailed from MW05. This evidence was an iridescent sheen on the water. Ground water depths and well construction details are presented in Table 1.

5.3 ANALYTICAL RESULTS

Analytical results indicate the presence of low levels of BTEX in the ground water samples collected from wells MW03 and MW05 (Tables 2 and 3). The sample from MW03 (MW0306309A) contained 0.7 mg/L meta and para xylene. The sample from MW05 (MW0507019A) contained 0.8 mg/L ethylbenzene, 2.2 mg/L meta and para xylene, and 2.0 mg/L ortho xylene. TPH was not detected in any of the ground water samples. The analytical laboratory test results are presented in Appendix B.

6.0 GROUND WATER SUPPLY WELL LOCATIONS

Water Well Reports for ground water supply wells within a one-half mile radius of the site were obtained from the Yakima Office of the Washington Department of Ecology. There were six water wells identified within this radius. The approximate locations of the six wells are presented on Plate 9. The Water Well Reports are attached as Appendix C.

7.0 LIMITATIONS

Kleinfelder has performed this work in accordance with the generally accepted standards of care that exist in Washington State at the time of this study. Judgements leading to conclusions and recommendations are generally made with an incomplete knowledge of the subsurface and/or historic conditions applicable to the study areas. More extensive studies including additional site exploration and/or soil and/or water sampling and/or chemical analyses may be used to supplement the information presented by this study. Kleinfelder should be notified for additional consultation if the Southland Corporation wishes to reduce uncertainties beyond the level associated with this study. Our assessment of the property may also change as new data becomes available during additional site exploration, remediation, and/or development. No warranty, express or implied, is made.

This assessment does not include: a radon gas survey; a worker exposure/health and safety evaluation; regulatory compliance review; sampling within buildings for PCBs, asbestos, or urea formaldehyde insulation; evaluations of sensitive areas such as vernal pools, archaeological sites, or wet lands; an engineering review of water supply and waste disposal systems; review of contamination from the operation of septic tank systems or from residual agricultural chemicals; structural integrity of site improvements; slope stability; building settlement; earthquake faults, flooding, or other geological hazards; or other services not specifically described in the Scope of Work presented above. Other environmental or geotechnical exploration services not provided within this specific scope can be provided for additional fees.

TABLE 1

GROUND WATER WELL OBSERVATIONS

7-ELEVEN STORE NUMBER 25821

Richland, Washington

WELL NUMBER	DEPTH TO WATER 7-1-89 (1)	TOP OF SLOTTED SECTION (2)	TOP OF SAND PACK (2)	BOTTOM OF SLOTTED SECTION (2)	WELL ELEVATION (MSL) (3)	GROUND WATER ELEVATION (MSL) (3)
MW01	14.56	10	6.5	20	362.38	347.82
MW02	14.44	10	7	20	362.32	347.88
MW03	14.19	10	7	20	362.13	347.94
MW04	13.74	9.5	6.5	19.5	361.83	348.08
MW05	14.05	10	7	20	362.01	347.96

(1) Depth measured from top of PVC well casing in feet.
(2) Depth measured from ground surface in feet.
(3) Top of PVC casing in feet. Elevation measured by Rogers Surveying, Inc., City of Richland Datum.

104902T1

TABLE 2

Results of BETX[1]

Analyses of Ground Water Samples from

7-Eleven Store Number 25821

Richland, Washington

Sample Number	Benzene	Ethyl-benzene	Toluene	Xylenes Meta & Para	Xylenes Ortho
MW0106309A	<0.5	<0.5	<0.5	<0.5	<0.5
MW0206309A	<0.5	<0.5	<0.5	<0.5	<0.5
MW0306309A	<0.5	<0.5	<0.5	**0.7**	<0.5
MW0406309A	<0.5	<0.5	<0.5	<0.5	<0.5
MW0507019A	<0.5	**0.8**	<0.5	**2.2**	**2.0**
MW0507019B[2]	<0.5	**0.9**	<0.5	**2.5**	**2.0**

[1]BETX by EPA Method 602, units ug/L.
[2]Denotes a blind duplicate sample from monitoring well MW05.
Laboratory report sheets are attached as Appendix B.
Samples collected on June 30 and July 1, 1989.

ATI# 8907-002
104902T2

TABLE 3

Results of Total Petroleum Hydrocarbons Analyses[1]

of Ground Water Samples from 7-Eleven Store Number 25821

Richland, Washington

SAMPLE NUMBER	MW0106309A	MW0206309A	MW0306309A	MW0406309A	MW0507019A
Fuel Hydrocarbons[2]	<1	<1	<1	<1	<1
Hydrocarbons Range[2]	-	-	-	-	-
Fuel Hydrocarbons[3]	<1	<1	<1	<1	<1
Hydrocarbons Range[3]	-	-	-	-	-

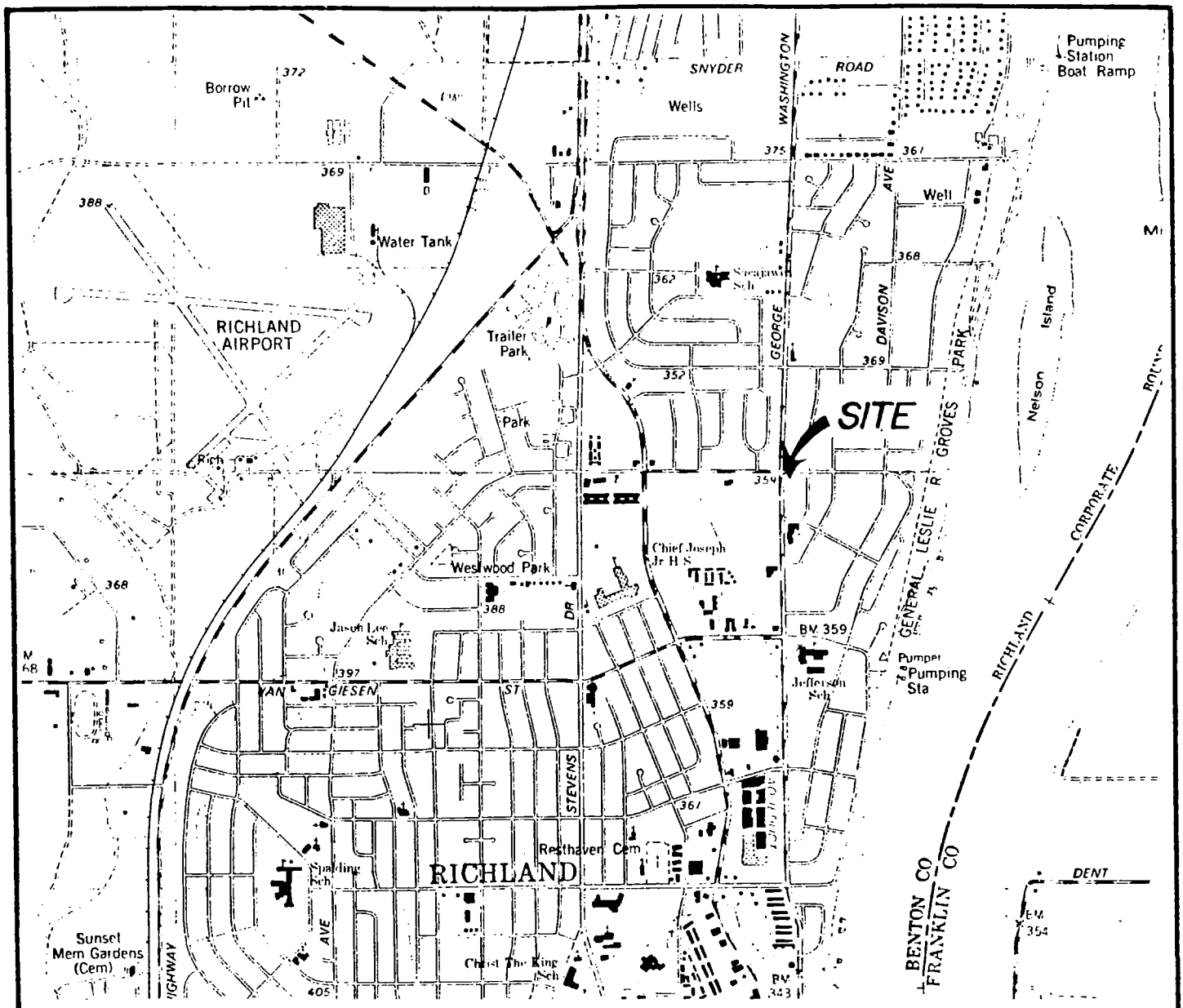
[1]Total Petroleum Hydrocarbon Analysis by EPA Method 8015 Modified, units mg/L.

[2]Hydrocarbons Quantified using a Gasoline standard.

[3]Hydrocarbons Quantified using a Diesel standard.

Samples collected on June 30 and July 1, 1989.

ATI# 8907-002
104902T3



REFERENCE:

U.S.G.S. TOPOGRAPHIC MAP;
RICHLAND WASHINGTON QUAD.
1978.

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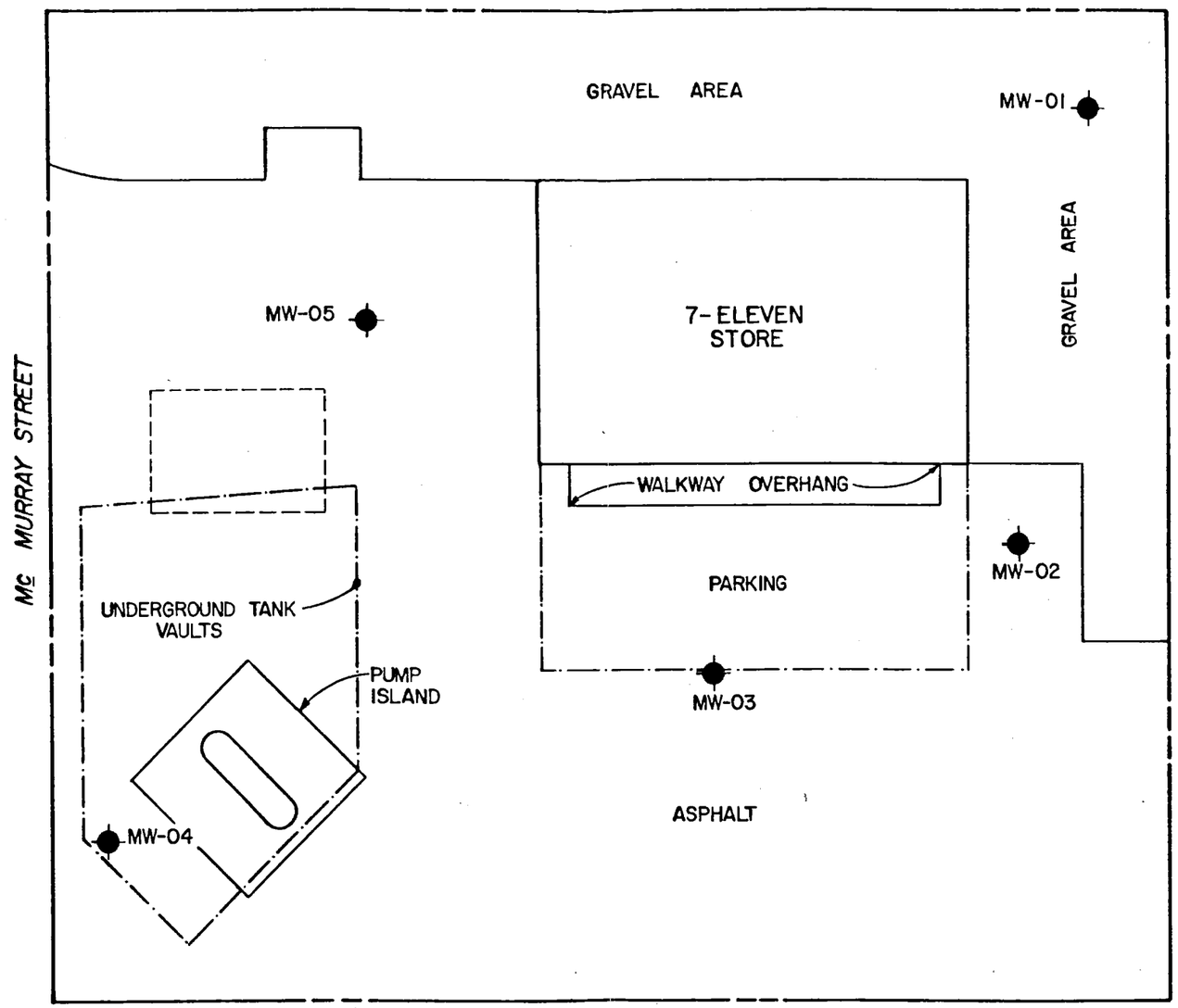
PROJECT NO. 60-1049-02

SITE LOCATION MAP
7-ELEVEN STORE NO. 25821
1824 GEORGE WASHINGTON WAY
RICHLAND, WASHINGTON

PLATE 1



SCALE

0' 5' 10' 20'

N

LEGEND

APPRX. LOCATION OF HISTORIC TANK VAULT

CONCRETE PAD

MW-01 MONITORING WELL

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SCHEMATIC SITE PLAN
7-ELEVEN STORE NO. 25821
1824 GEORGE WASHINGTON WAY
RICHLAND, WASHINGTON

PLATE 2

M-7

BORING LOG LEGEND

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)							
MAJOR DIVISIONS		LTR	DESCRIPTION	MAJOR DIVISIONS		LTR	DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well graded gravels or gravel sand mixtures, little or no fines	COARSE GRAINED SOILS	SILTS AND CLAYS LL < 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
		GP	Poorly graded gravels or gravel sand mixtures, little or no fines.			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		GM	Silty gravels, gravel sand clay mixtures			OL	Organic silts and organic silt-clays of low plasticity.
		GC	Clayey gravels, gravel sand clay mixtures.		SILTS AND CLAYS LL > 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
	SAND AND SANDY SOILS	SW	Well graded sands or gravelly sands, little or no fines.			CH	Inorganic clays of high plasticity, fat clays.
		SP	Poorly graded sands or gravelly sands, little or no fines.			OH	Organic clays of medium to high plasticity.
		SM	Silty sands, sand silt mixtures.	HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils.
		SC	Clayey sands, sand clay mixtures.				

Disturbed, bag, bulk, or grab sample

Standard penetration split spoon sample

Modified California Sampler (Porter)

Shelby Tube sample

Water level observed during drilling

Water level observed after drilling

OVA — Organic Vapor Analyzer

PID — Photoionization Detector

ppmv — Parts Per Million by Volume

Note: Blows per foot is the number of blows used to drive a sampler through the last 12 inches of an 18 inch sampling attempt. One blow is a 30 inch fall of a 140 pound hammer.

Note: The line separating strata on the logs represents approximate boundaries only. The actual transition may be gradual. No warranty is provided as to the continuity of the strata between borings. Logs represent the soil section observed at the boring location on the date of drilling only.

Blank casing

Screened casing

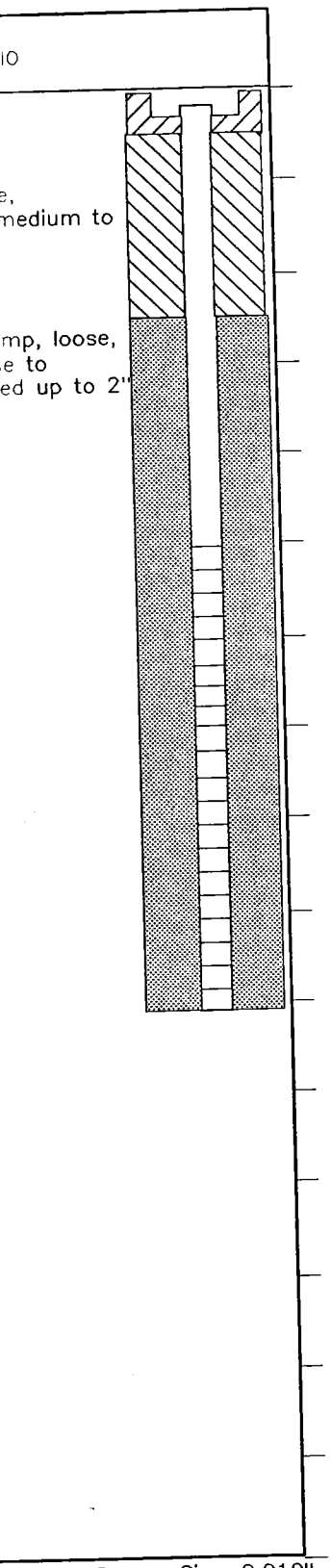
Cement grout

Bentonite

Sand pack or gravel pack

Surface conductor casing

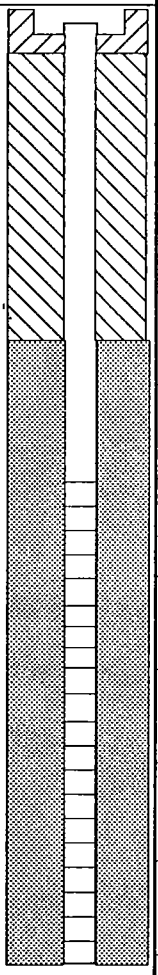
Boring Log Legend **Plate: 3**



Screen Size: 0.010"
Casing Size: 2" PVC

Plate 4

RY	BLOWS/ FOOT	SAMPLE NUMBER	USCS	DESCRIPTION
			--	Asphalt and subgrade 6"
			SP	SAND: Brown, damp, loose, moderately sorted, sand medium to fine grained.
	50/5"	A		Sandy GRAVEL: Brown, damp, loose, poorly sorted, sand coarse to medium, gravel subrounded up to 2".
	50/5"	--	GW	
	42	--		▽ Wet
	37	B		

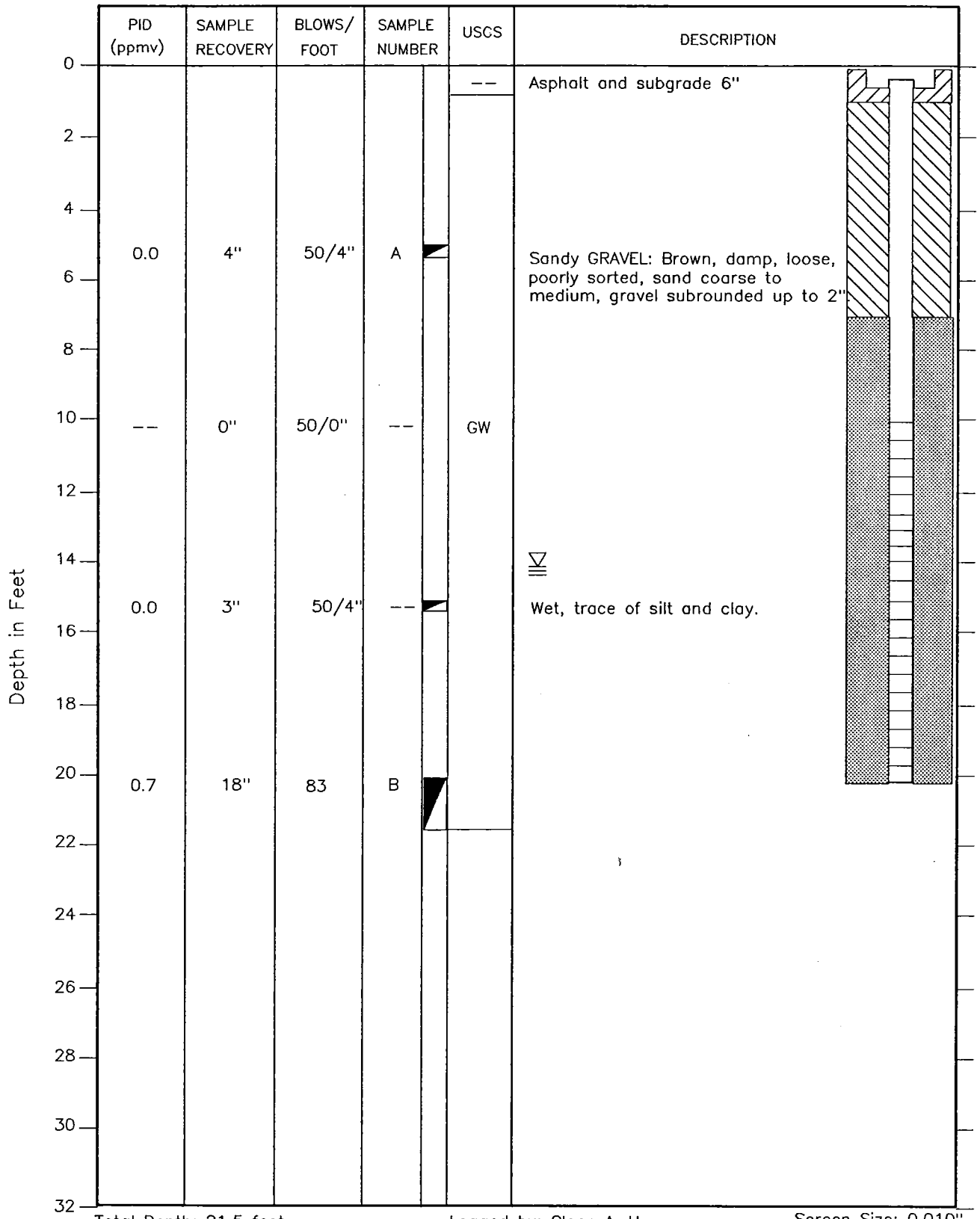


Logged by: Glenn A. Hayman
Boring Diameter: 6"
Drilling Method: Hollow-Stem Auger

Screen Size: 0.010"
Casing Size: 2" PVC

Boring No. MW02

Plate 5

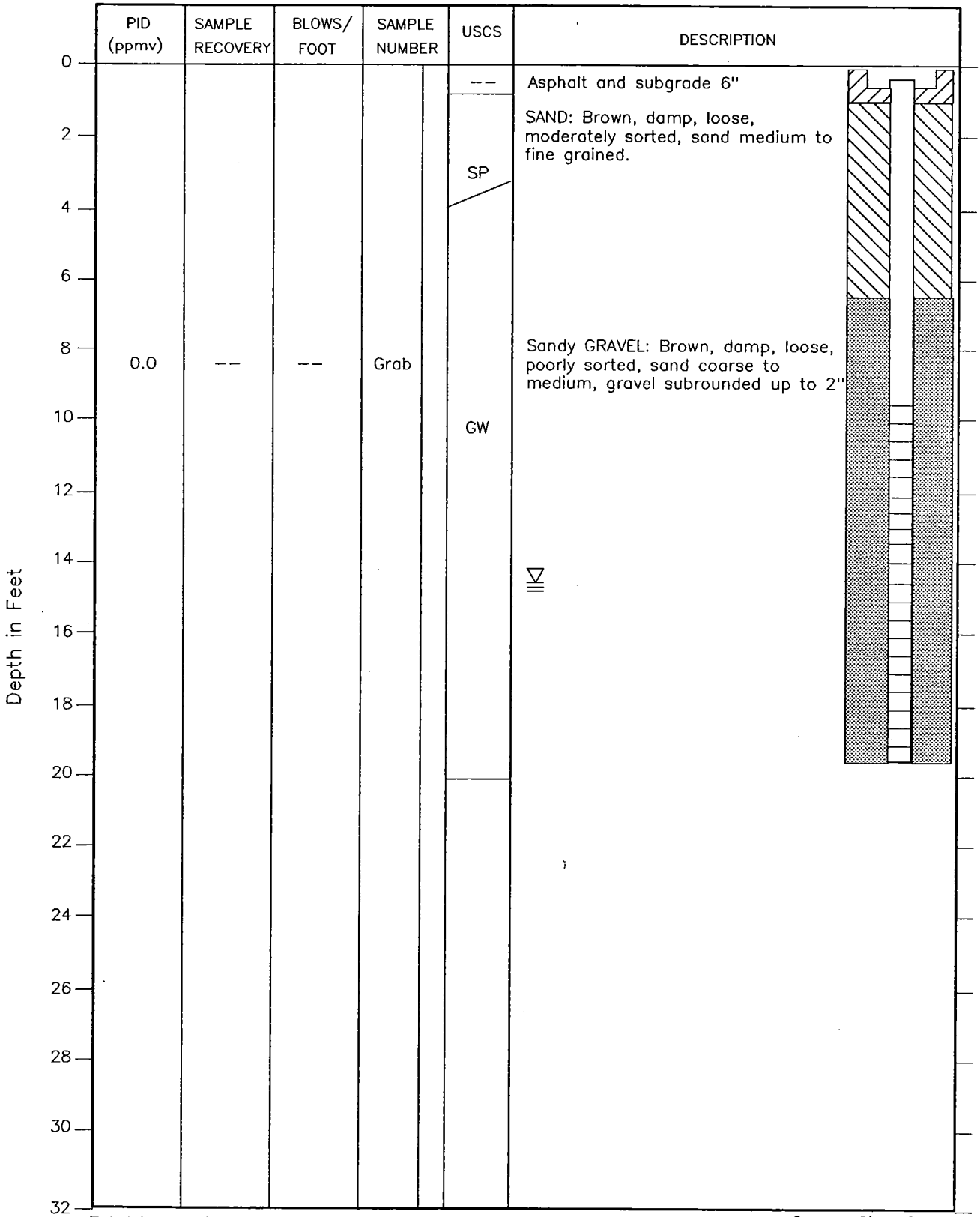


Total Depth: 21.5 feet
Date Drilled: 6/30/89
Sheet 1 of 1
File # 10490203.MW
Project # 60-1049-02

Logged by: Glenn A. Hayman
Boring Diameter: 6"
Drilling Method: Hollow-Stem Auger

Screen Size: 0.010"
Casing Size: 2" PVC

Boring No. MW03 **Plate 6**

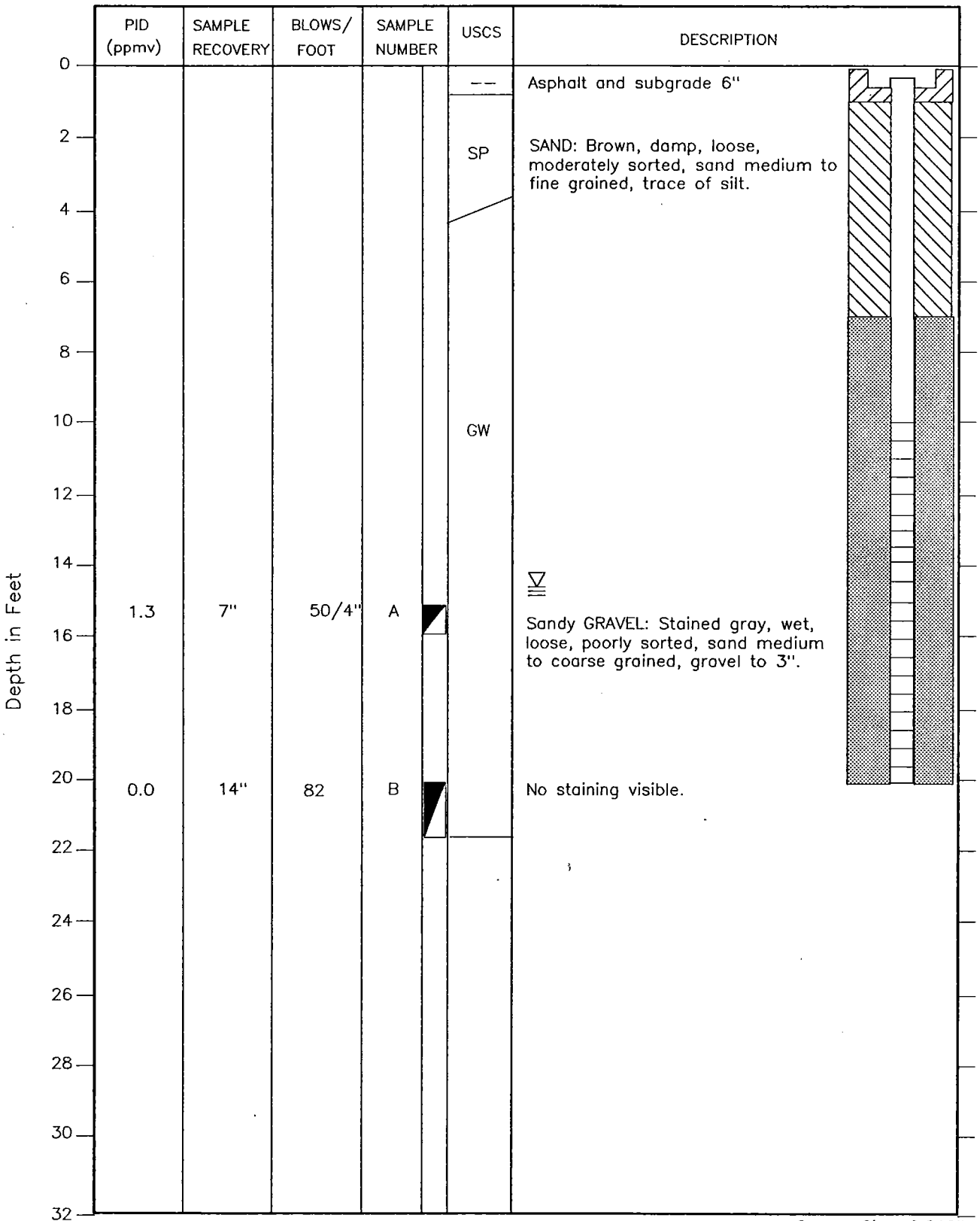


Total Depth: 20 feet
Date Drilled: 6/30/89
Sheet 1 of 1
File # 10400204.MW
Project # 60-1049-02

Logged by: Glenn A. Hayman
Boring Diameter: 6"
Drilling Method: Hollow-Stem Auger

Screen Size: 0.010"
Casing Size: 2" PVC

Boring No. MW04 **Plate 7**

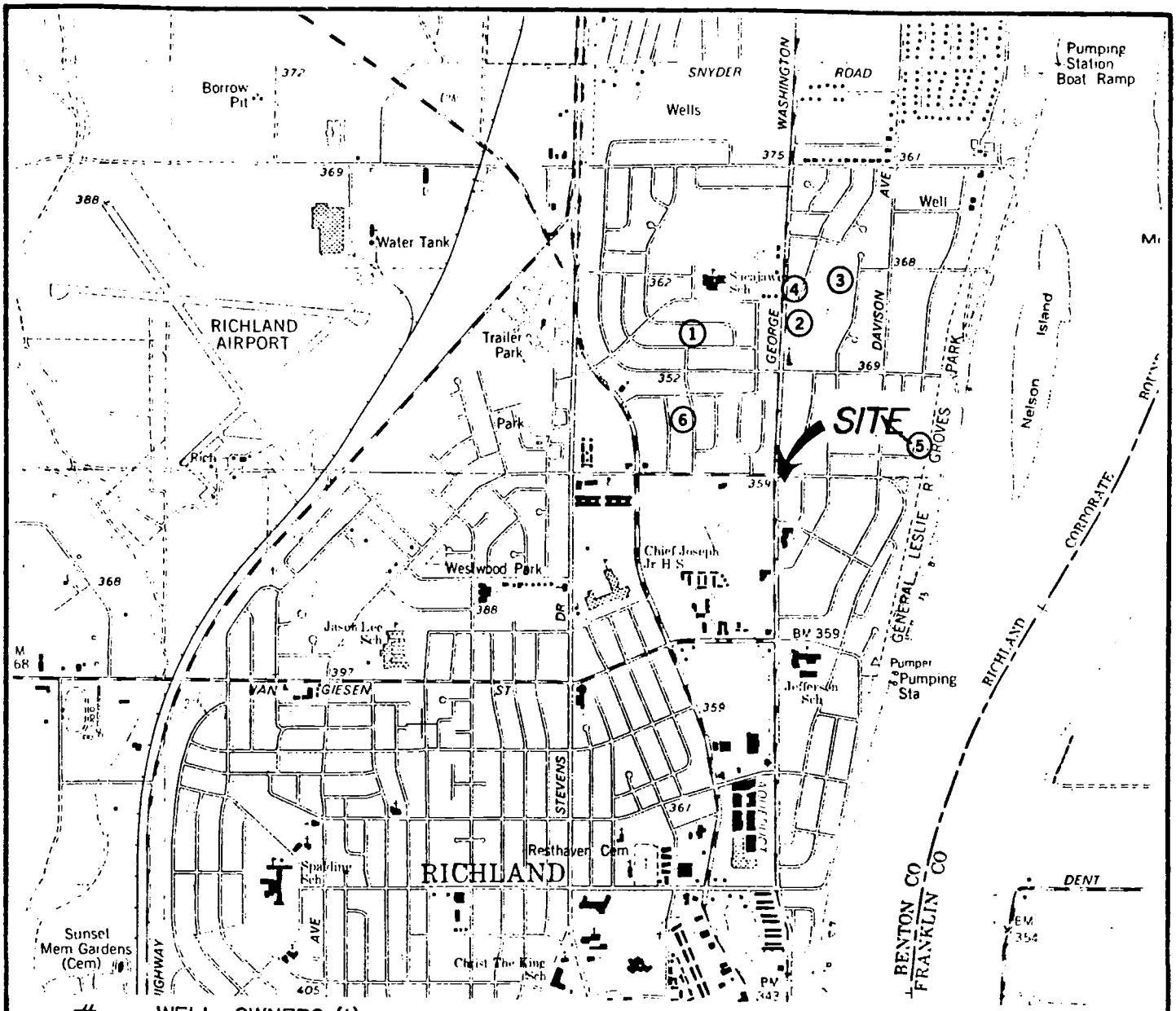


Total Depth: 21.5 feet
Date Drilled: 6/30/89
Sheet 1 of 1
File # 10490205.MW
Project # 60-1049-02

Logged by: Glenn A. Hayman
Boring Diameter: 6"
Drilling Method: Hollow-Stem Auger

Screen Size: 0.010"
Casing Size: 2" PVC

Boring No. MW05 **Plate 8**



#	WELL OWNERS (1)
1	DENNIS & MARIETTA STRACHAN
2	NORMAN J. ROY
3	KARL M. ILLIG
4	HARVEY HUEISENGH
5	BRIAN W. SMITH
6	LUTHER SENIOR CENTER

LEGEND

(#) IDENTIFIED GROUND WATER WELLS WITHIN 1/2 MILE OF SITE

SCALE

0' 1000' 2000'

N

REFERENCE:

U.S.G.S. TOPOGRAPHIC MAP; RICHLAND WASHINGTON QUAD. 1978.

(1) SEE APPENDIX C FOR WELL LOGS.

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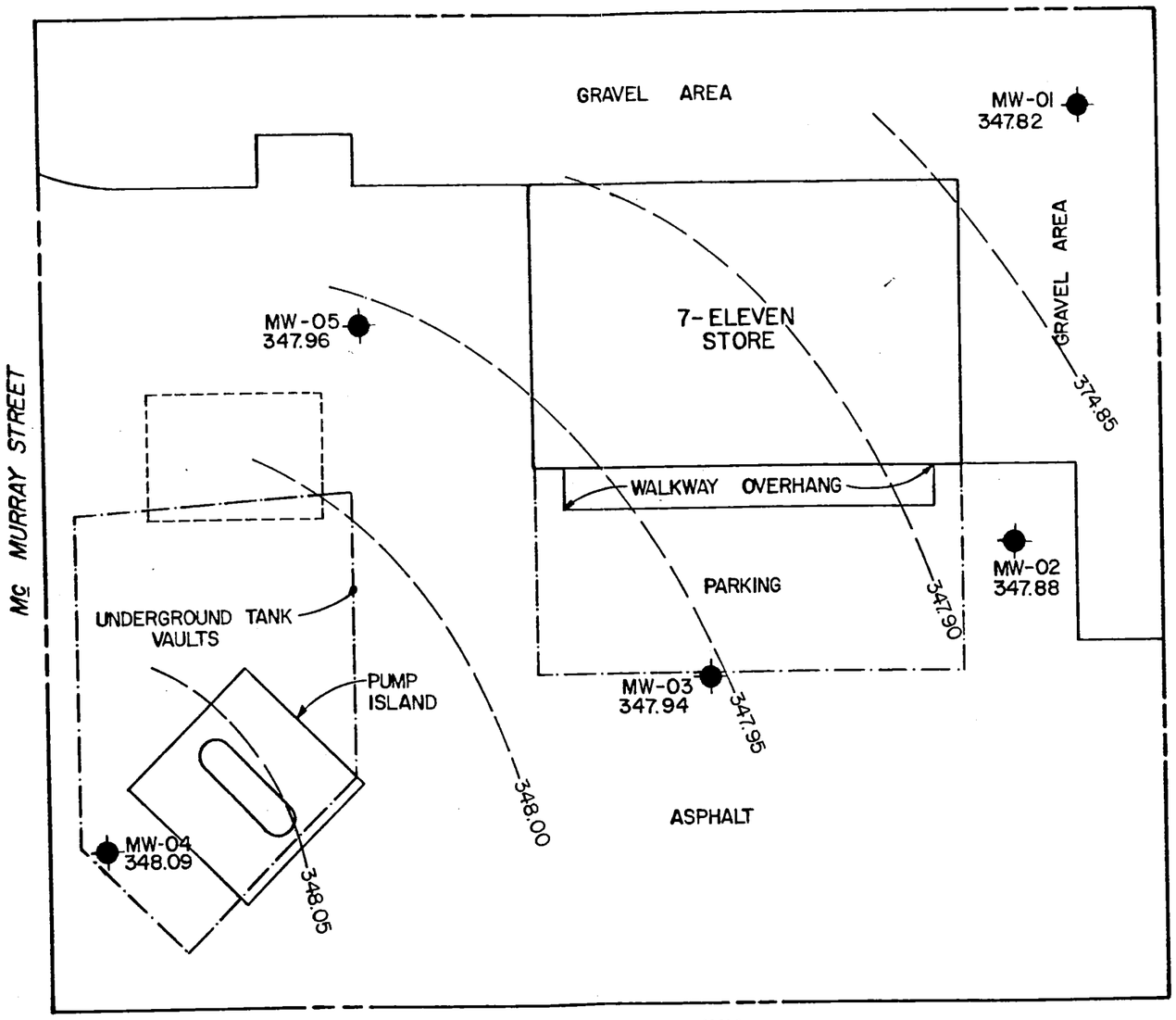
OFF-SITE GROUND WATER WELLS
7-ELEVEN STORE NO. 25821
1824 GEORGE WASHINGTON WAY
RICHLAND, WASHINGTON

PLATE 10



LEGEND

MW-3 168.00 — MONITORING WELL GROUND WATER ELEVATION 7/1/89

— — — INFERRED GROUND WATER CONTOUR 7/1/89

----- APPRX. LOCATION OF HISTORIC TANK VAULT

—·— CONCRETE PAD

SCALE

0' 5' 10' 20'

N

NOTE: Contours present an interpretation of available data on date of measurement. Contours may change with additional data points, weather changes, tidal action, construction activities, etc.

KLEINFELDER

PROJECT NO. 60-1049-02

GROUND WATER TABLE CONTOUR MAP
7-ELEVEN STORE NO. 25821
1824 GEORGE WASHINGTON WAY
RICHLAND, WASHINGTON

PLATE 9

M-7

APPENDIX A

APPENDIX A
SITE EXPLORATION METHODS

1.0 Hollow-Stem Auger Borings

Soil borings were drilled using truck mounted, 12-inch outside diameter, hollow-stem auger drilling equipment, provided by Onwego Drilling Kennewick, Washington. A Kleinfelder geologist was present during the drilling and assisted in obtaining samples of the subsurface materials, maintained a continuous log of boring, made detailed observations of site conditions, and provided technical assistance, as required.

A field health and safety plan was developed for this project prior to the start of field work. For the protection of the geologist and technician, a Photoionization Detector (PID, Model 580 A OVM, with a 10 ev lamp, calibrated with a 250 ppm isobutylene standard) was also used to screen volatile organic concentrations in the breathing zone during the drilling of the borings. The PID measures ionizable compounds in the air in parts per million by volume (ppmv).

All drilling and sampling equipment was steam-cleaned prior to mobilization and between borings to reduce the potential for cross contamination. In addition, the sampling equipment was cleaned with a trisodium phosphate wash and distilled water rinse prior to the collection of each soil sample.

2.0 Hollow-Stem Auger Soil Sampling

Relatively undisturbed samples were obtained by means of a Split Spoon Sampler which contained brass liners (sample tubes). Samples were attempted at 5 foot intervals to identify the subsurface material. Soils were classified according to the Unified Soil Classification System.

Collected soil samples were visually inspected for evidence of contamination, indicated by noticeable odor or visible product on the soil sampler and/or in the soil sample. A portion of each soil sample was also placed into plastic zip-lock bags and the collected vapors drawn through the PID for qualitative screening of volatile organic emissions. The PID measures volatile organic compounds in the air in parts per million by volume (ppmv). The vapor reading was then noted as the field screening result.

Another portion of the collected soil samples (sample from the same depth but contained in a separate 6-inch liner tube) were covered with Teflon film and a plastic cap at each end;, labeled with a sample number, date, time, sampler name; and stored in a ice chest containing frozen "blue ice". Appropriate Chain-of-Custody documentation was also completed.

3.0 Ground Water Observation Well Construction

Soil borings completed as shallow ground water observation wells were constructed in accordance with the following protocol:

- The well casing materials used were 2-inch inside diameter, flush-threaded, schedule 40 PVC pipe.
- The well screen sections were perforated with 0.010-inch factory-cut slots.
- All PVC pipe was steam-cleaned prior to installation.
- The screened section was fitted with a bottom cap, attached to blank riser casing, and lowered into the boring (inside the hollow-stem auger) to the planned depth. An attempt was made to place the top of the slotted section a minimum of two feet above the static water level, to allow floating products or phase separated hydrocarbon (if present) to enter the well casing.
- The annular space between the screen and the wall of the boring was backfilled with clean, coarse sand to approximately 1 to 2 feet above the top of the perforated section.
- A 1 to 2-foot granular bentonite seal was placed above the sand pack.
- The remaining annular space was filled with granular bentonite grout to approximately 6-inches below the ground surface.
- A tamper resistant steel utility box was set over the well flush to the ground surface. The utility box was grouted with cement.
- A reference point was marked on the top of the PVC well casing for consistent ground water depth measurements.
- The well name was written onto the water-tight well cap.
- The well was developed by bailing to stabilize well screen materials and to increase well yields.

4.0 Water Level Measurements

Ground water depths were measured in wells from the top of the PVC well casing. A water level probe (conductivity type, Solinst Model 101, Flat Tape Water Level Meter) was used for water level measurements.

5.0 Ground Water Well Sampling

Ground water wells were sampled in accordance with the following protocol:

- o A minimum of five casing volumes of water were removed (by a stainless steel bailer) from the well. Temperature, pH, and specific conductance were allowed to stabilize prior to sample collection.

- o The ground water parameters of pH, temperature, and specific conductance were recorded. (Standards of known pH and specific conductance were used in the calibration of the field meter prior to field parameter measurement.)

- o Ground water samples were collected by a clean stainless steel bailer.

- o Sample bottles were opened only as long as necessary to collect the samples and were filled with water.

- o Sample bottles were labeled with a sample number, date, time, sampler name and stored in a ice chest containing frozen "blue ice". Appropriate Chain-of-Custody documentation was also completed.

- o Clean latex gloves were worn when handling sample bottles.

- o To reduce the potential for cross-contamination, all developing and sampling equipment were washed in a trisodium phosphate solution, rinsed with tap water, and final rinsed with distilled water prior to use.

APPENDIX B

Analytical **Technologies,** Inc. 560 Naches Avenue, S.W., Suite 101, Renton, WA 98055, (206) 228-8335

ATI I.D. # 8907-002

July 14, 1989

Kleinfelder
1200 112th Avenue N.E.
Suite C226
Bellevue, WA 98004

Attention : Rory Galloway

Project Number : 60-1049-02

Project Name : Southland

On July 3, 1989 Analytical Technologies, Inc. received six water samples for analyses. The samples were analyzed with EPA methodology or equivalent methods as specified in the attached analytical schedule. The results, sample cross reference, and the quality control data are enclosed.

Karen L. Mixon
Project Manager

Frederick W. Grothkopp
Technical Manager

FWG/tpj

Analytical**Technologies,**Inc.

ATI I.D. # 8907-002

SAMPLE CROSS REFERENCE SHEET

CLIENT : KLEINFELDER
PROJECT # : 60-1049-02
PROJECT NAME : SOUTHLAND

ATI #	CLIENT DESCRIPTION	MATRIX	DATE SAMPLED
8907-002-1	MW0106309A	WATER	06/30/89
8907-002-2	MW0206309A	WATER	06/30/89
8907-002-3	MW0306309A	WATER	06/30/89
8907-002-4	MW0406309A	WATER	06/30/89
8907-002-5	MW0507019A	WATER	07/01/89
8907-002-6	MW0507019B	WATER	07/01/89

----- TOTALS -----

MATRIX	# SAMPLES
WATER	6

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical**Technologies,**Inc.

ATI I.D. # 8907-002

ANALYTICAL SCHEDULE

CLIENT : KLEINFELDER
PROJECT # : 60-1049-02
PROJECT NAME : SOUTHLAND

ANALYSIS	TECHNIQUE	REFERENCE/METHOD
BETX	GC/PID	EPA 602
FUEL HYDROCARBONS	GC/FID	EPA 8015 MODIFIED

Analytical**Technologies,**Inc.

ATI I.D. # 8907-002

PURGEABLE AROMATICS ANALYSIS
DATA SUMMARY

CLIENT	: KLEINFELDER	DATE SAMPLED	: N/A
PROJECT #	: 60-1049-02	DATE RECEIVED	: N/A
PROJECT NAME	: SOUTHLAND	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 07/05/89
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 602 (BETX)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
META & PARA XYLENE	<0.5
ORTHO XYLENE	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	93

Analytical**Technologies,**Inc.

ATI I.D. # 8907-002-1

PURGEABLE AROMATICS ANALYSIS
DATA SUMMARY

CLIENT	: KLEINFELDER	DATE SAMPLED	: 06/30/89
PROJECT #	: 60-1049-02	DATE RECEIVED	: 07/03/89
PROJECT NAME	: SOUTHLAND	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW0106309A	DATE ANALYZED	: 07/05/89
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 602 (BETX)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
META & PARA XYLENE	<0.5
ORTHO XYLENE	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	111

Analytical Technologies, Inc.

ATI I.D. # 8907-002-2

PURGEABLE AROMATICS ANALYSIS
DATA SUMMARY

CLIENT	: KLEINFELDER	DATE SAMPLED	: 06/30/89
PROJECT #	: 60-1049-02	DATE RECEIVED	: 07/03/89
PROJECT NAME	: SOUTHLAND	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW0206309A	DATE ANALYZED	: 07/05/89
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 602 (BETX)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
META & PARA XYLENE	<0.5
ORTHO XYLENE	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	102

Analytical**Technologies,**Inc.

ATI I.D. # 8907-002-3

PURGEABLE AROMATICS ANALYSIS
DATA SUMMARY

CLIENT	: KLEINFELDER	DATE SAMPLED	: 06/30/89
PROJECT #	: 60-1049-02	DATE RECEIVED	: 07/03/89
PROJECT NAME	: SOUTHLAND	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW0306309A	DATE ANALYZED	: 07/05/89
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 602 (BETX)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
META & PARA XYLENE	0.7
ORTHO XYLENE	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	98

Analytical Technologies, Inc.

ATI I.D. # 8907-002-4

PURGEABLE AROMATICS ANALYSIS
DATA SUMMARY

CLIENT	: KLEINFELDER	DATE SAMPLED	: 06/30/89
PROJECT #	: 60-1049-02	DATE RECEIVED	: 07/03/89
PROJECT NAME	: SOUTHLAND	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW0406309A	DATE ANALYZED	: 07/05/89
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 602 (BETX)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
META & PARA XYLENE	<0.5
ORTHO XYLENE	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	101

Analytical**Technologies,**Inc.

ATI I.D. # 8907-002-5

PURGEABLE AROMATICS ANALYSIS
DATA SUMMARY

CLIENT	: KLEINFELDER	DATE SAMPLED	: 07/01/89
PROJECT #	: 60-1049-02	DATE RECEIVED	: 07/03/89
PROJECT NAME	: SOUTHLAND	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW0507019A	DATE ANALYZED	: 07/05/89
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 602 (BETX)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<0.5
ETHYLBENZENE	0.8
TOLUENE	<0.5
META & PARA XYLENE	2.2
ORTHO XYLENE	2.0

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	97

Analytical Technologies, Inc.

ATI I.D. # 8907-002-6

PURGEABLE AROMATICS ANALYSIS
DATA SUMMARY

CLIENT	: KLEINFELDER	DATE SAMPLED	: 07/01/89
PROJECT #	: 60-1049-02	DATE RECEIVED	: 07/03/89
PROJECT NAME	: SOUTHLAND	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW0507019B	DATE ANALYZED	: 07/05/89
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 602 (BETX)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<0.5
ETHYLBENZENE	0.9
TOLUENE	<0.5
META & PARA XYLENE	2.5
ORTHO XYLENE	2.0

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	85

Analytical Technologies, Inc.

ATI I.D. # 8907-002

PURGEABLE AROMATICS
QUALITY CONTROL DATA

CLIENT	: KLEINFELDER	SAMPLE I.D.	: 8907-002-1
PROJECT #	: 60-1049-02	DATE ANALYZED	: 07/05/89
PROJECT NAME	: SOUTHLAND	SAMPLE MATRIX	: WATER
EPA METHOD	: 602 (BETX)	UNITS	: ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED SAMPLE	% REC	DUP SPIKED SAMPLE	DUP % REC	RPD
BENZENE	<0.5	8.00	8.36	105	8.18	102	2
CHLOROBENZENE	<0.5	8.00	8.70	109	8.43	105	3
TOLUENE	<0.5	8.00	8.82	110	8.45	106	4
META & PARA XYLENE	<0.5	21.9	24.2	111	23.5	107	3

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

APPENDIX C

Analytical**Technologies,**Inc.
San Diego ● Phoenix ● Seattle

Chain of Custody

DATE 5-3-89 PAGE 1 OF 1

PROJ. MGR. Rocy Galloway
COMPANY Klein Felder
ADDRESS 1200 112th Ave NE
Bellevue WA 98004

SAMPLERS (SIGNATURE) [signature] (PHONE NO.) 451-2479

SAMPLE ID.	DATE	TIME	MATRIX	LAB ID.	BASE/NEU/ACID CMPDS. GC/MS/ 625/8270	VOLATILE CMPDS. GC/MS/ 624/8240	PESTICIDES/PCB 608/8080	POLYNUCLEAR AROMATIC 610/8310	PHENOLS, SUB PHENOLS 604/8040	HALOGENATED VOLATILES 601/8010	AROMATIC VOLATILES 602/8020	TOTAL ORGANIC CARBON 415/9060	TOTAL ORGANIC HALIDES 9020	PETROLEUM HYDROCARBONS 418	BTEX 8020	Fuel Fingerprint Modified 8015	PRIORITY POLLUTANT METALS (13)	CAM METALS (18) TTLC/STLC	EP TOX METALS (8)	SWDA-INORGANICS PRIMARY/SECONDARY	HAZARDOUS WASTE PROFILE				NUMBER OF CONTAINERS
MW01063089A	6-30	AM	H_2O	-1											X	X									3
MW02063089A	6-30	AM	"	-2											X	X									3
MW03063089A	"	PM	"	-3											X	X									3
MW04063089A	"	"	"	-4											X	X									3
MW05070189A	7-1	AM	"	-5											X	X									3
MW05070189B	"	"	"	-6											X										2

ANALYSIS REQUEST

PROJECT INFORMATION

PROJECT: 60-1049-02
PQ NO.
SHIPPING ID. NO.
VIA:

SAMPLE RECEIPT

TOTAL NO. OF CONTAINERS	17
CHAIN OF CUSTODY SEALS	U
REC'D GOOD CONDITION/COLD	Y
CONFORMS TO RECORD	Y
LAB NO.	8907-002

SPECIAL INSTRUCTIONS/COMMENTS:
SOUTHLAND

FAX RESULTS

INVOICE TO:

RELINQUISHED BY
[signature] 7:40
(Signature) (Time)
Gleave A. Hoppen 7-5
(Printed Name) (Date)
Klein Felder
(Company)

RECEIVED BY
(Signature) (Time)
(Printed Name) (Date)
(Company)

RELINQUISHED BY
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (LABORATORY)
Donna M. McKinney 9:40
(Signature) (Time)
DONNA M McKINNEY 7/5
(Printed Name)
ANALYTICAL TECHNOLOGIES, INC.

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. 1
Permit No. ....

(1) OWNER: Name Dennis & Marietta STRACHAN Address 2132 Cascade Richland

(2) LOCATION OF WELL: County Benton — NW¼ NW¼ Sec. 35 T. 10 N., R. 28E W.M.

Bearing and distance from section or subdivision corner NW corner of Sec. 35

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 66 ft. Depth of completed well 66 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +1 ft. to 61 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type 304 Stainless Model No. 304
Diam. 6 Slot size 20 from 61 ft. to 66 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 24 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 34 ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 20 gal./min. with 1 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date 8/18/81
Temperature of water 54° Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Blow Sand, Top Soil	0	5
Sand 30% Gravels 70%	5	21
Cemented Sand & Gravel	21	35
Sand Silt and Gravel	35	40
70% Sand 30% Gravel	40	57
50% Sand 50% Gravels	57	66
Sand Fine to coarse gravels to 1½"		

Work started Aug 19 81 Completed Aug 19 81

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Hatch Drilling Co Inc
(Person, firm, or corporation) (Type or print)
Address 6417 W. Court St Pasco
[Signed] (Well Driller)
License No. 0176 Date 8/20 19 81

(USE ADDITIONAL SHEETS IF NECESSARY) Dave Garcia

ECY 050-1-20

OK cD 9-16-81

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. 2

Permit No. ....

(1) OWNER: Name Norman J. Roy Address 2136 Hoxie, Richland, WA.

(2) LOCATION OF WELL: County Benton SW¼ NE¼ Sec. 35 T. 10 N., R. 28 E. W.M.

ing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☑ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 37 inches.
Drilled 48 ft. Depth of completed well 47 ft.
38 39

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from +1 ft. to 47 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☑ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☑
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☑
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☑ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☑ No ☐ To what depth? ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... 460 Apprx ft.
Static level 10 ft. below top of well Date 12/79
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☑ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 30 gal./min. with 0 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date Dec 79
Temperature of water 59 Was a chemical analysis made? Yes ☐ No ☑

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Loose Brown Sand & Gravel	0	8
Brown Sand & Medium Cobbles	8	16
Cemented Sandy Clay & Cobbles.	16	22
Sand & Gravel	22	32
Brown Fine Sand, Silt And Gravel	32	35
Clean Coarse Sand & Gravel	35	37

Work started Dec, 19 79. Completed Dec, 19 79

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Hayden Drilling Co Inc.
(Person, firm, or corporation) (Type or print)

Address 6417 W. Court St. Pasco

[Signed] (Well Driller)

License No. 0176 Date 12/11, 19 79

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

3

(1) OWNER: Name Karl M. Illig Address 2012 Howell, Richland, WA 99352

(2) LOCATION OF WELL: County BENTON SE NW ¼ SE ¼ Sec. 35 T. 10 N., R. 28E W.M.

Bearing and distance from section or subdivision corner K

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 60 ft. Depth of completed well 40 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +1 ft. to 39 ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☒ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 19 ft.
Material used in seal bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 20 ft. below top of well Date 9/25/85
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: 25 gal./min. with ..... ft. drawdown after ..... hrs.
" ESTIMATED AIRLIFT " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Topsoil	0	1
Sand, gravel, & cobble	1	20
Sand, gravel & Cobble w/water	20	46
Sand, fine with water	46	60
NO PVC Liner Installed		
6" Drive shoe installed		

RECEIVED
OCT - 3 1985
DEPARTMENT OF ECOLOGY
CENTRAL REGION

Work started 9/24, 19 85 Completed 9/25, 19 85

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME PONDEROSA DRILLING & DEVELOPMENT INC.
(Person, firm, or corporation) (Type or print)

Address E. 6010 Broadway, Spokane, WA 99212

[Signed] Lynnwood E. Hendrick (Well Driller)
Lynnwood E. Hendrick

License No. 1351 Date 9/25/ , 19 85

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

3

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. 4

Permit No.

(1) OWNER: Name Harvey Hueisengh Address 2018 Geo. Wash. Way Richland

) LOCATION OF WELL: County Benton — SE ¼ SE ¼ Sec. 35 T. 10 N., R. 28 W.M.

ing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☑ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 75 ft. Depth of completed well 70 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +1 ft. to 70 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☑ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☑
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☑ No ☐ Johnson
Manufacturer's Name
Type Stainless Steel Model No. 304
Diam. 6 Slot size 20 from 45 ft. to 55 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☑ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☑ No ☐ To what depth? 18' + ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... 490' appx ft.
Static level 30 ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☑ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 30 4
Bailer test gal./min. with ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☑

(10) WELL LOG: R

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Sand, Gravels, cobbles	0	13
Cemented Sand & Gravel	13	27
Sand, gravels, large cobbles	27	37
Ringold, Gravel (w/sand Lenses, water bearing	37	56
Brown firm clay, dry	56	75

RECEIVED
JUL 14 1980

Work started July, 1980 Completed July, 1980

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Hatch Drilling Co. Inc.
(Person, firm, or corporation) (Type or print)

Address 6417 W. Court St. Pasco

[Signed] Harvey L Hatch
(Well Driller)

License No. 0176 Date 7/11, 1980

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

3

5

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Brian W. Smith Address 1926 Hetrick, Richland, WA 99352

LOCATION OF WELL: County Benton — SE ¼ SE ¼ Sec. 35 T. 10 N., R. 28E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☒X

(4) TYPE OF WORK: Owner's number of well (if more than one).... 1
New well ☒X Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒X Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 39 ft. Depth of completed well 39 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +1 ft. to 39 ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☒ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☒X No ☐
Type of perforator used torch cut
SIZE of perforations ¼" in. by 12 in.
50 perforations from 20 ft. to 39 ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name.....
Type..... Model No.....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☐X Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal bentonite
Did any strata contain unusable water? Yes ☐ No ☒X
Type of water? ..... Depth of strata.....
Method of sealing strata off.....

(7) PUMP: Manufacturer's Name.....
Type: ..... H.P.....

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ..... ft.
Static level -0- ft. below top of well Date 6/13/83
Artesian pressure ..... lbs. per square inch Date.....
Artesian water is controlled by..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?.....
Yield: -0- gal./min. with ft. drawdown after hrs.
" DRY HOLE " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test..... gal./min. with..... ft. drawdown after..... hrs.
Artesian flow..... g.p.m. Date.....
Temperature of water..... Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Sand & gravel	0	39
NO PVC Liner Installed		
6" Drive shoe Installed		
DISBURSEMENT WELL - HEAT PUMP		

Work started 6/13/ 19 83 Completed 6/13/ 19 83

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME PONDEROSA DRILLING &DEVELOPMENT INC.
(Person, firm, or corporation) (Type or print)

Address E. 6010 Broadway, Spokane, WA 99212

[Signed] Tom Richardson
Tom Richardson (Well Driller)

License No. 1295 Date June 13, 19 83

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

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File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

(509) 946-7515 (EF) Type Address 6

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No G4-28222P

(1) OWNER: Name Luther Senior Center Address .....

2) LOCATION OF WELL: County Benton — SW¼ SE¼ ¼ Sec. 35 T. 10 N., R. 28 W.M.

Bearing and distance from section or subdivision corner 625 Brookshire Pl. & Luther St. & McMurray N?

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☒ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....

New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 39 ft. Depth of completed well 25 ft.

(6) CONSTRUCTION DETAILS: 96

Casing installed: 8 " Diam. from +1 ft. to [redacted] ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☒ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type STAINLESS Model No .....
Diam. ..... Slot size 50 from 20 ft. to 25 ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 18 ft.
Material used in seal BENTONITE + SAND
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 3 ft. below top of well Date 10-21-83
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Driller
Yield: 85 gal./min. with 12 ft. drawdown after 30 min hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Silty SAND	0	3
BLACK SAND 5" minus grav	3	25
FINE TAN SAND 4" gravel R. rigid	25	37
well off off Luther Pl		

Work started 10-19, 1983. Completed 10-21, 1983.

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Nelson Well Drilling Inc
(Person, firm, or corporation) (Type or print)

Address 10036 W. ARGENT PASCO WN

[Signed] Bruce L. Wilson
(Well Driller)

License No. 0659 Date 10-24, 1983

(USE ADDITIONAL SHEETS IF NECESSARY) OK 4/19/84

ECY 050-1-20

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Analytical Technologies, Inc.

ATI I.D. # 8907-002

PURGEABLE AROMATICS
QUALITY CONTROL DATA

CLIENT	: KLEINFELDER	SAMPLE I.D.	: BLANK 6/27
PROJECT #	: 60-1049-02	DATE ANALYZED	: 06/27/89
PROJECT NAME	: SOUTHLAND	SAMPLE MATRIX	: WATER
EPA METHOD	: 602 (BETX)	UNITS	: ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED SAMPLE	% REC	DUP SPIKED SAMPLE	DUP % REC	RPD
BENZENE	<0.5	8.00	8.59	107	8.49	106	1
CHLOROBENZENE	<0.5	8.00	8.74	109	8.66	108	1
TOLUENE	<0.5	8.00	8.55	107	9.02	113	5
META & PARA XYLENE	<0.5	21.9	23.5	107	23.1	106	2

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

ATI I.D. # 8907-002

FUEL HYDROCARBONS ANALYSIS
DATA SUMMARY

CLIENT	: KLEINFELDER	DATE SAMPLED	: N/A
PROJECT #	: 60-1049-02	DATE RECEIVED	: N/A
PROJECT NAME	: SOUTHLAND	DATE EXTRACTED	: 07/06/89
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 07/07/89
SAMPLE MATRIX	: WATER	UNITS	: mg/L
EPA METHOD	: 8015 MODIFIED	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<1
HYDROCARBON RANGE	-
HYDROCARBONS QUANTITATED USING	GASOLINE
FUEL HYDROCARBONS	<1
HYDROCARBON RANGE	-
HYDROCARBONS QUANTITATED USING	DIESEL

Analytical**Technologies,**Inc.

ATI I.D. # 8907-002-1

FUEL HYDROCARBONS ANALYSIS
DATA SUMMARY

CLIENT	: KLEINFELDER	DATE SAMPLED	: 06/30/89
PROJECT #	: 60-1049-02	DATE RECEIVED	: 07/03/89
PROJECT NAME	: SOUTHLAND	DATE EXTRACTED	: 07/06/89
CLIENT I.D.	: MW0106309A	DATE ANALYZED	: 07/07/89
SAMPLE MATRIX	: WATER	UNITS	: mg/L
EPA METHOD	: 8015 MODIFIED	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<1
HYDROCARBON RANGE	-
HYDROCARBONS QUANTITATED USING	GASOLINE
FUEL HYDROCARBONS	<1
HYDROCARBON RANGE	-
HYDROCARBONS QUANTITATED USING	DIESEL

ATI I.D. # 8907-002-2

FUEL HYDROCARBONS ANALYSIS
DATA SUMMARY

CLIENT	: KLEINFELDER	DATE SAMPLED	: 06/30/89
PROJECT #	: 60-1049-02	DATE RECEIVED	: 07/03/89
PROJECT NAME	: SOUTHLAND	DATE EXTRACTED	: 07/06/89
CLIENT I.D.	: MW0206309A	DATE ANALYZED	: 07/07/89
SAMPLE MATRIX	: WATER	UNITS	: mg/L
EPA METHOD	: 8015 MODIFIED	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<1
HYDROCARBON RANGE	-
HYDROCARBONS QUANTITATED USING	GASOLINE
FUEL HYDROCARBONS	<1
HYDROCARBON RANGE	-
HYDROCARBONS QUANTITATED USING	DIESEL

Analytical**Technologies,**Inc.

ATI I.D. # 8907-002-3

FUEL HYDROCARBONS ANALYSIS
DATA SUMMARY

CLIENT	: KLEINFELDER	DATE SAMPLED	: 06/30/89
PROJECT #	: 60-1049-02	DATE RECEIVED	: 07/03/89
PROJECT NAME	: SOUTHLAND	DATE EXTRACTED	: 07/06/89
CLIENT I.D.	: MW0306309A	DATE ANALYZED	: 07/07/89
SAMPLE MATRIX	: WATER	UNITS	: mg/L
EPA METHOD	: 8015 MODIFIED	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<1
HYDROCARBON RANGE	-
HYDROCARBONS QUANTITATED USING	GASOLINE
FUEL HYDROCARBONS	<1
HYDROCARBON RANGE	-
HYDROCARBONS QUANTITATED USING	DIESEL

Analytical Technologies, Inc.

ATI I.D. # 8907-002-4

FUEL HYDROCARBONS ANALYSIS
DATA SUMMARY

CLIENT	: KLEINFELDER	DATE SAMPLED	: 06/30/89
PROJECT #	: 60-1049-02	DATE RECEIVED	: 07/03/89
PROJECT NAME	: SOUTHLAND	DATE EXTRACTED	: 07/06/89
CLIENT I.D.	: MW0406309A	DATE ANALYZED	: 07/07/89
SAMPLE MATRIX	: WATER	UNITS	: mg/L
EPA METHOD	: 8015 MODIFIED	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<1
HYDROCARBON RANGE	-
HYDROCARBONS QUANTITATED USING	GASOLINE
FUEL HYDROCARBONS	<1
HYDROCARBON RANGE	-
HYDROCARBONS QUANTITATED USING	DIESEL

Analytical Technologies, Inc.

ATI I.D. # 8907-002-5

FUEL HYDROCARBONS ANALYSIS
DATA SUMMARY

CLIENT	: KLEINFELDER	DATE SAMPLED	: 07/01/89
PROJECT #	: 60-1049-02	DATE RECEIVED	: 07/03/89
PROJECT NAME	: SOUTHLAND	DATE EXTRACTED	: 07/06/89
CLIENT I.D.	: MW0507019A	DATE ANALYZED	: 07/07/89
SAMPLE MATRIX	: WATER	UNITS	: mg/L
EPA METHOD	: 8015 MODIFIED	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<1
HYDROCARBON RANGE	-
HYDROCARBONS QUANTITATED USING	GASOLINE
FUEL HYDROCARBONS	<1
HYDROCARBON RANGE	-
HYDROCARBONS QUANTITATED USING	DIESEL

Analytical Technologies, Inc.

ATI I.D. # 8907-002

FUEL HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: KLEINFELDER	DATE EXTRACTED	: 07/06/89
PROJECT NAME	: SOUTHLAND	DATE ANALYZED	: 07/07/89
EPA METHOD	: 8015 MODIFIED	SAMPLE MATRIX	: WATER
SAMPLE ID	: BLANK	UNITS	: mg/L

COMPOUND	SAMPLE RESULT	CONC SPIKED	SPIKED SAMPLE	% REC	DUP SPIKED SAMPLE	DUP % RECOVERY	RPD
FUEL HYDROCARBONS	<1	100	64.0	64	N/A	N/A	N/A

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$