
**APPENDIX A
WELL INVENTORY – JANUARY 2016**

**REMEDIAL INVESTIGATION REPORT
TACOMA COAL GASIFICATION SITE
TACOMA, WASHINGTON**

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MEMORANDUM

TO: Jackie Wetzsteon - PacifiCorp
John Rork - PSE

FROM: Matt Dalton

DATE: January 25, 2016

SUBJECT: Results of Well Inventory
A St. MGP, Tacoma, Washington

REF. NO: PAP-008-01 a,b

CC: Dave Copper (DOF)

We completed the well inventory in the vicinity of the former MGP located in the vicinity of South A St., Tacoma, Washington near the head of the Thea Foss Waterway. The inventory was completed in mid-January 2016 by Dave Cooper of Dalton, Olmsted & Fuglevand, Inc. (DOF). Well locations are shown on Figure A and the status of the monitoring wells is summarized in Table A. The general status of the known thirty-six monitoring wells (not including those wells installed by Hart-Crowser for WSDOT in the mid-1980s) is listed below:

- Eighteen (18) monitoring wells were found that appeared to be in good condition.
- Eleven (11) (assumed) abandoned monitoring wells were not observed.
- Seven (7) monitoring wells were not found.

None of the existing or wells that could not be located are listed in the Department of Ecology well log data base.

During the inventory, existing monitoring wells were observed as to their condition and their horizontal coordinates (State Plane System) were determined using a differential GPS. The condition of the monitoring wells are documented on the attached Field Well Inventory Data Sheets.

GENERAL NOTES

General observation and notes from the inventory are presented below:

- A-Street is barricaded off and marked as vacated beneath I-705. The western end is fenced-off crossing the railroad ROW.
- Many of the flush monuments were buried or grown over – a metal detector was used to find the buried or overgrown wells.
- The metal detector was used to “sweep” broad areas for the wells not found.
- A new waterfront park appeared to be built over MW-11 and MW-13. It is not known whether or how these wells were abandoned.
- Pruned back shrubbery to reveal shoreline wells.
- Replaced old hex-key-pin style screws with standard bolts (very difficult to remove)
- A-Street was flooded 1-3 feet deep at a low point under I-705, preventing access to MW-27, but the monument top appeared good.
- DOT-MW-4 is next to the railroad right-of-way.
- HC-MW-5 is in the WSDOT right-of-way and appeared to be in the same vicinity of the map, but has a more recent vintage monument – so either is a monument upgrade, replacement well, or coincidence.
- Observed a well on the shoulder of South 21st St. also.
- DNAPL was measured in wells MW-25 and MW-9 (consistent with historic measurements).
- All discovered wells appeared to be in generally good shape.

CLOSING

The services described in this memorandum were performed consistent with generally accepted professional consulting principles and practices. No other warranty, expressed or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this document.

ATTACHMENTS

Table A – Well Status Summary – All Wells

Table B – Well Status Summary – Existing Wells

Figure A – Well Location Map (Updated January 2016)

Figure B – Existing Well Location Map (Updated January 2016)

Well Inventory Data Sheets

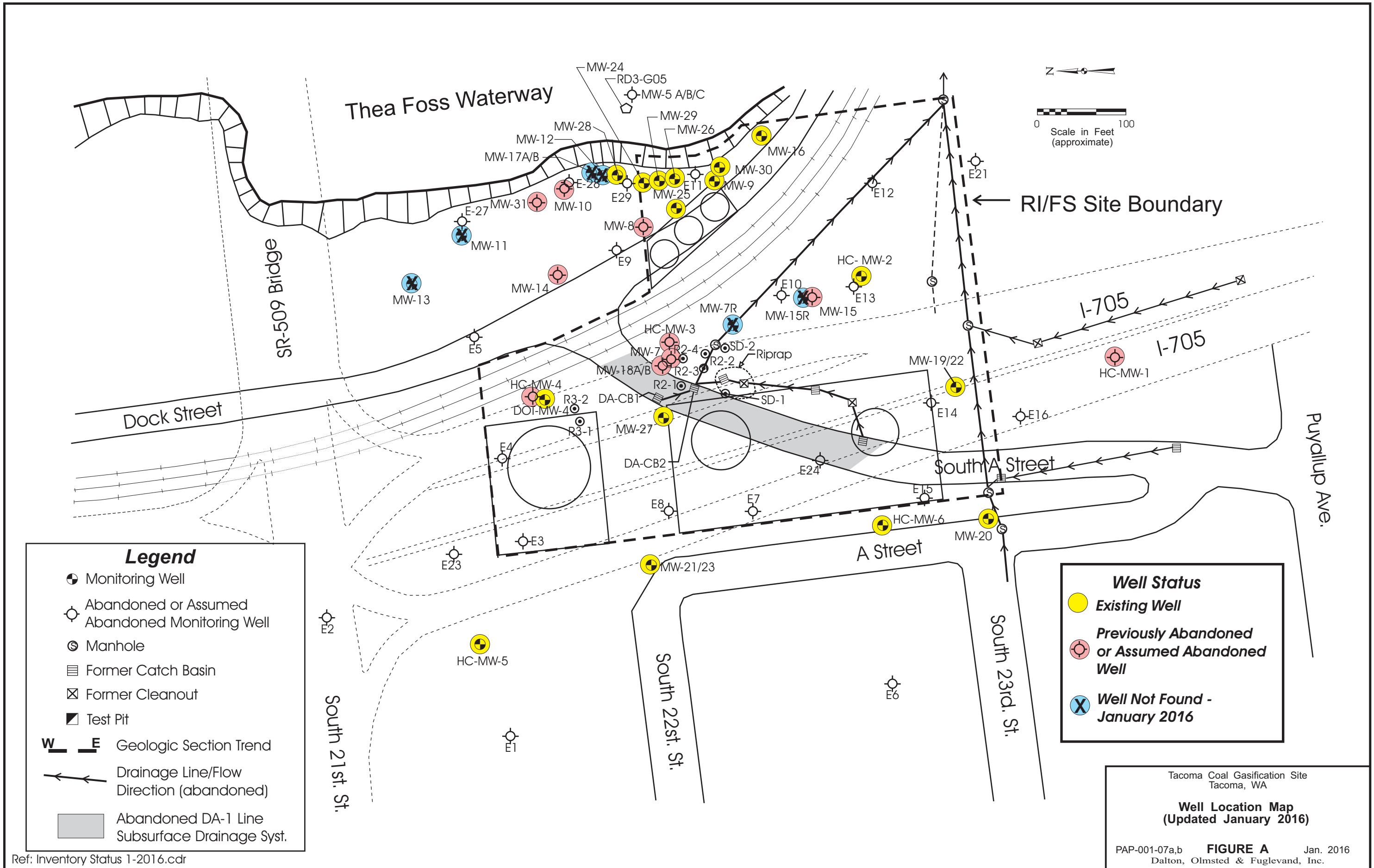
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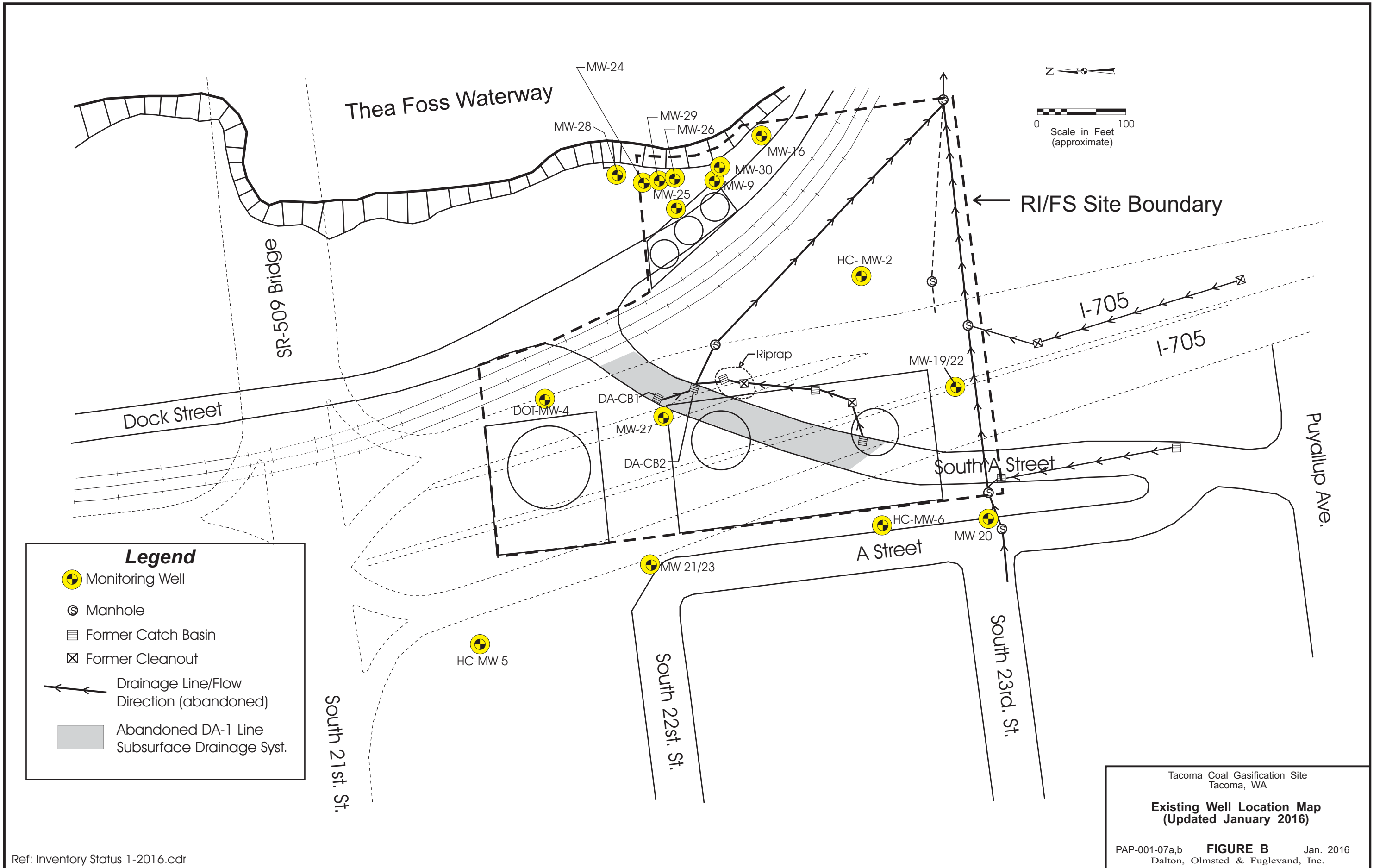
TABLE A - Well Status Summary - All Wells

Well No.	Horizontal Coordinates (NAD83)		Depth to Water (ft)	Measured Depth (ft)	DNAPL Present (Y/N)	Date Installed	By Whom	Depth (ft)	Screen Depth (ft)		Comment/Status (if known)
	Northing	Easting							Top	Bottom	
HC-MW1						Nov-87	Hart Crowser	22.4	15	25	Abandoned
HC- MW2	701781	1160267	15.2	21.3	N	Nov-87	Hart Crowser	29	15.5	25.5	Above-ground Monument, no Locking Cap
HC- MW3						Nov-87	Hart Crowser	22	5.5	15.5	Abandoned
HC-MW4						Nov-87	Hart Crowser	22	6	16	Abandoned
DOT MW-4	702134	1160123	7.3	20.3	N	Jan-96	Black & Veatch	28	10.5	20.5	Flush Monument - Good condition
HC-MW5	702228	1159859	15.6	24.1	N	Nov-87	Hart Crowser	23.5	11	20	Same vicinity - newer Flush Monument
HC-MW6	701754	1159987	18.3	31.1	N	Nov-87	Hart Crowser	32.9	19	29	Above-ground monument - Good condition
MW-7						Nov-93	Black & Veatch	27	5	21	Abandoned
MW-7R						Oct-98	Geoengineers	33.5	21	31	Not Found
MW-8						Nov-93	Black & Veatch	32	10	26	Abandoned
MW-9	701951	1160367	14.6	24.9	Y - 0.30	Nov-93	Black & Veatch	34	9	25	Flush Monument - Good condition
MW-10						Oct-93	Black & Veatch	42	6	22	Abandoned
MW-11						Nov-93	Black & Veatch	42	7	18	Not found (New Park)
MW-12						Oct-93	Black & Veatch	40	27.9	37.9	Not found
MW-13						Jan-96	Black & Veatch	30	9.5	29.5	Not found (New Park)
MW-14						Jan-96	Black & Veatch	35.5	11.5	31.5	Abandoned
MW-15						Jan-96	Black & Veatch	35.5	13.5	33.5	Abandoned
MW-15R						Oct-98	Geoengineers	34	23	33.5	Not Found
MW-16	701897	1160422	14.2	30	N	Jan-96	Black & Veatch	36.5	9.5	29.5	Flush Monument - Good condition
MW17A						Jan-96	Black & Veatch	72	47	52	Not Found
MW17B						Jan-96	Black & Veatch	72	58.5	68.5	Not Found
MW-18A						Jan-96	Black & Veatch	72.5	40.5	45.5	Abandoned
MW-18B						Jan-96	Black & Veatch	72.5	58.5	68.5	Abandoned
MW-19	701680	1160143	3.9	39.5	N	Mar-97	Black & Veatch	40	24.5	39.5	Flush Monument - Good condition
MW-20	701640	1159997	19.2	50.2	N	Mar-97	Black & Veatch	55	31.5	51.5	Flush Monument - Good condition
MW-21	702024	1159926	10.5	53.3	N	Mar-97	Black & Veatch	55	36.5	51.5	Flush Monument - Good condition
MW-22	701684	1160142	4.1	14.8	N	Mar-97	Black & Veatch	40	4.5	14.5	Flush Monument - Good condition
MW-23	702021	1159930	11.5	19.6	N	Mar-97	Black & Veatch	55	9.5	19.5	Flush Monument - Good condition
MW-24	702032	1160369	10.5	21.7	N	Jul-98	Black & Veatch	22	11.5	21.5	Flush Monument - Good condition
MW-25	701992	1160343	14.3	22	Y - 0.05'	Jul-98	Black & Veatch	23	12.5	22.5	Flush Monument - Good condition
MW-26	701995	1160374	10.2	25	N	Jul-98	Black & Veatch	25	14.5	24.5	Flush Monument - Good condition
MW-27	701993	1160101	-	-	-	Jul-98	Black & Veatch	27	11.5	26.5	Flush Monument Intact, but inaccessible due to flooding
MW-28	702062	1160377	9.3	42.8	N	Feb-99	Geoengineers	44	33.5	44	Flush Monument - Good condition
MW-29	702015	1160374	10.3	33.2	N	Feb-99	Geoengineers	33	22.5	33	Flush Monument - Good condition
MW-30	701943	1160387	8.7	31.2	N	Feb-99	Geoengineers	32	21.5	31	Flush Monument - Good condition
MW-31						Feb-99	Geoengineers	61.5	49.5	60	Abandoned

TABLE B - Well Status Summary - Existing Wells

Well No.	Horizontal Coordinates (NAD83)		Depth to Water (ft)	Measured Depth (ft)	DNAPL Present (Y/N)	Date Installed	By Whom	Depth (ft)	Screen Depth (ft)		Comment/Status (if known)
	Northing	Easting							Top	Bottom	
HC- MW2	701781	1160267	15.2	21.3	N	Nov-87	Hart Crowser	29	15.5	25.5	Above-ground Monument, no Locking Cap
DOT MW-4	702134	1160123	7.3	20.3	N	Jan-96	Black & Veatch	28	10.5	20.5	Flush Monument - Good condition
HC-MW5	702228	1159859	15.6	24.1	N	Nov-87	Hart Crowser	23.5	11	20	Same vicinity - newer Flush Monument
HC-MW6	701754	1159987	18.3	31.1	N	Nov-87	Hart Crowser	32.9	19	29	Above-ground monument - Good condition
MW-9	701951	1160367	14.6	24.9	Y - 0.30	Nov-93	Black & Veatch	34	9	25	Flush Monument - Good condition
MW-16	701897	1160422	14.2	30	N	Jan-96	Black & Veatch	36.5	9.5	29.5	Flush Monument - Good condition
MW-19	701680	1160143	3.9	39.5	N	Mar-97	Black & Veatch	40	24.5	39.5	Flush Monument - Good condition
MW-20	701640	1159997	19.2	50.2	N	Mar-97	Black & Veatch	55	31.5	51.5	Flush Monument - Good condition
MW-21	702024	1159926	10.5	53.3	N	Mar-97	Black & Veatch	55	36.5	51.5	Flush Monument - Good condition
MW-22	701684	1160142	4.1	14.8	N	Mar-97	Black & Veatch	40	4.5	14.5	Flush Monument - Good condition
MW-23	702021	1159930	11.5	19.6	N	Mar-97	Black & Veatch	55	9.5	19.5	Flush Monument - Good condition
MW-24	702032	1160369	10.5	21.7	N	Jul-98	Black & Veatch	22	11.5	21.5	Flush Monument - Good condition
MW-25	701992	1160343	14.3	22	Y - 0.05'	Jul-98	Black & Veatch	23	12.5	22.5	Flush Monument - Good condition
MW-26	701995	1160374	10.2	25	N	Jul-98	Black & Veatch	25	14.5	24.5	Flush Monument - Good condition
MW-27	701993	1160101	-	-	-	Jul-98	Black & Veatch	27	11.5	26.5	Flush Monument Intact, but inaccessible due to flooding
MW-28	702062	1160377	9.3	42.8	N	Feb-99	Geoengineers	44	33.5	44	Flush Monument - Good condition
MW-29	702015	1160374	10.3	33.2	N	Feb-99	Geoengineers	33	22.5	33	Flush Monument - Good condition
MW-30	701943	1160387	8.7	31.2	N	Feb-99	Geoengineers	32	21.5	31	Flush Monument - Good condition





0 100
Scale in Feet
(approximate)

RI/FS Site Boundary

I-705

I-705

South A Street

A Street

South 23rd. St.

South 22st. St.

South 21st. St.

Thea Foss Waterway

SR-509 Bridge

Dock Street

Puyallup Ave.

Legend

- Monitoring Well
- Manhole
- Former Catch Basin
- Former Cleanout
- Drainage Line/Flow Direction (abandoned)
- Abandoned DA-1 Line Subsurface Drainage Syst.

Tacoma Coal Gasification Site
Tacoma, WA
Existing Well Location Map
(Updated January 2016)
PAP-001-07a,b **FIGURE B** Jan. 2016
Dalton, Olmsted & Fuglevand, Inc.

Ref: Inventory Status 1-2016.cdr

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - HC-MW2

Date: 1/15/2016

Coordinates: N701781 E1160267 (NAD83)

WELL DATA

A Outside Monument Stick-up 2.5 feet

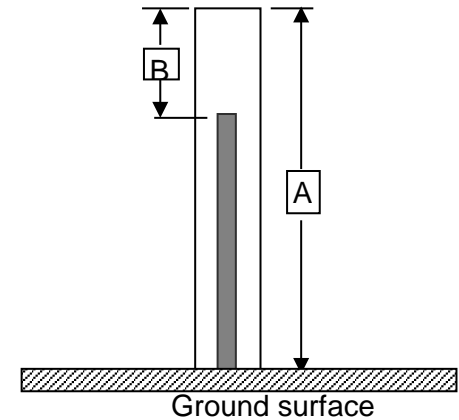
Type 8-inch steel casing

B Top of Well Casing offset -0.5 feet

Casing Diameter 2"

Casing Type SCH 40 PVC

Cap Type PVC slip cap



Measuring Point (MP) TOC high point

MP elevation

Water Level Below MP 15.5 feet

Depth to Well Bottom below MP 21.3 feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:

No Locking Cap



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - HC-MW5

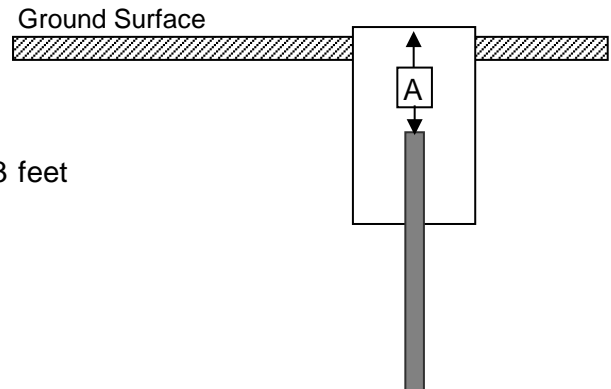
Date : 1/18/2016

Coordinates: N702228 E1159859 (NAD83)

WELL DATA

Flush Monument

Type 8" Diameter Morris



A Top of Well Casing offset -0.3 feet

Casing Diameter 2-inch

Casing Type SCH 40 PVC

Cap Type "J" plug - locked

Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP 15.6 feet

Depth to Well Bottom below MP 24.1 feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:

Newer monument than 1987

In WSDOT ROW



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

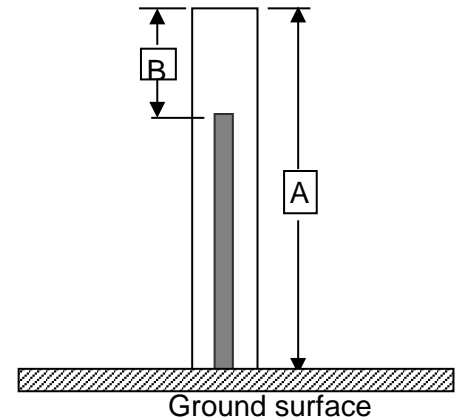
WELL DESIGNATION - HC-MW6

Date: 1/18/2016

Coordinates: N701754 E1159987 (NAD83)

WELL DATA

- A** Outside Monument Stick-up 0.8 feet
Type 8-inch steel casing
- B** Top of Well Casing offset -0.3 feet
Casing Diameter 2"
Casing Type SCH 80 PVC
Cap Type Locking Steel Cap



- Measuring Point (MP) TOC high point
MP elevation
Water Level Below MP 18.3 feet
Depth to Well Bottom below MP 31.1 feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - DOT-MW-4

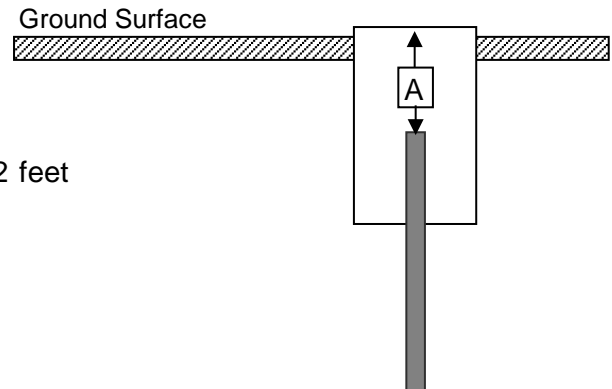
Date : 1/18/2016

Coordinates: N702134 E1160123 (NAD83)

WELL DATA

Flush Monument

Type 6" Diameter Pemco



A Top of Well Casing offset -0.2 feet

Casing Diameter 2-inch

Casing Type SCH 40 PVC

Cap Type "J" plug - locked

Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP 7.4 feet

Depth to Well Bottom below MP 20.3 feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:

In Railroad ROW



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - MW-9

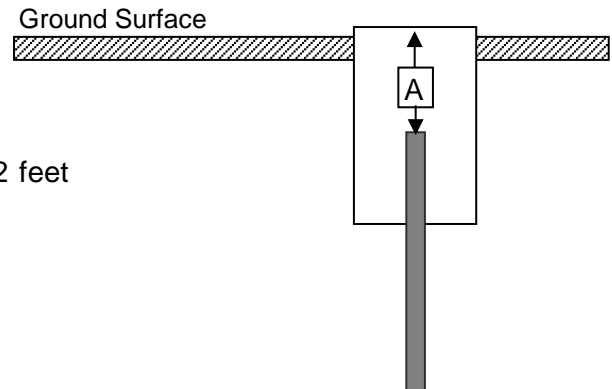
Date : 1/15/2016

Coordinates: N701951 E1160367 (NAD83)

WELL DATA

Flush Monument

Type 8" Diameter Morris



A Top of Well Casing offset -0.2 feet

Casing Diameter 2-inch

Casing Type SCH 40 PVC

Cap Type "J" plug - locked

Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP 14.6 feet

Depth to Well Bottom below MP 24.9 feet

0.3 DNAPL

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - MW-16

Date : 1/15/2016

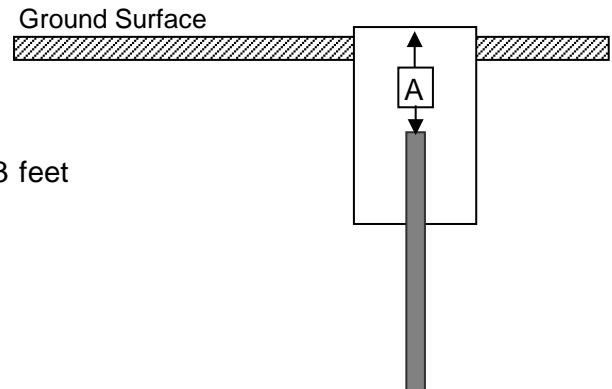
Coordinates: N701897 E1160422 (NAD83)

WELL DATA

Flush Monument

Type 8" Diameter Morris

A Top of Well Casing offset -0.3 feet
Casing Diameter 2-inch
Casing Type SCH 40 PVC
Cap Type "J" plug - locked



Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP 14.2 feet

Depth to Well Bottom below MP 30.0 feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - MW-19

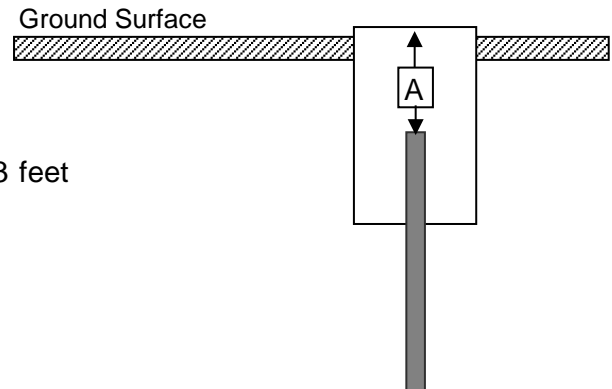
Date : 1/15/2016

Coordinates: N701680 E1160143 (NAD83)

WELL DATA

Flush Monument

Type 8" Diameter Morris



A Top of Well Casing offset -0.3 feet

Casing Diameter 2-inch

Casing Type SCH 40 PVC

Cap Type "J" plug - locked

Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP 3.9 feet

Depth to Well Bottom below MP 39.5 feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - MW-20

Date : 1/18/2016

Coordinates: N701640 E1159997 (NAD83)

WELL DATA

Flush Monument

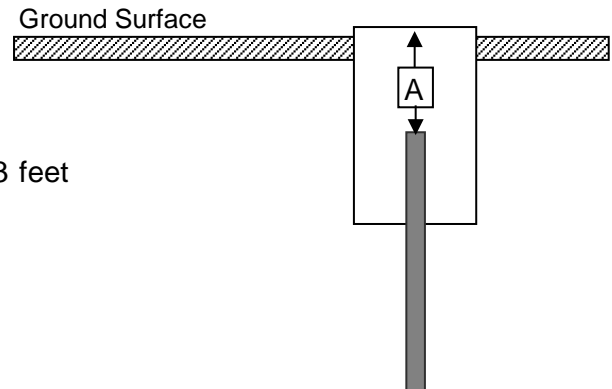
Type 8" Diameter Morris

A Top of Well Casing offset -0.3 feet

Casing Diameter 2-inch

Casing Type SCH 40 PVC

Cap Type "J" plug - locked



Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP 19.2 feet

Depth to Well Bottom below MP 50.2 feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - MW-21

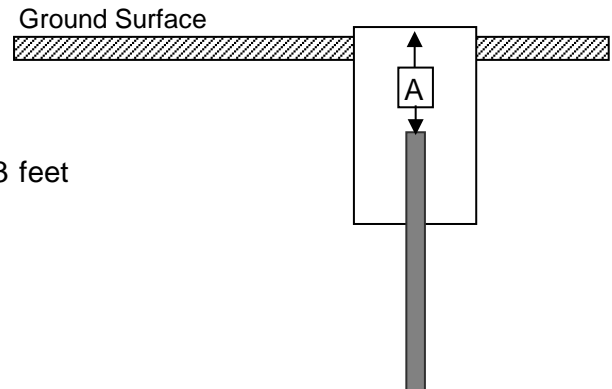
Date : 1/18/2016

Coordinates: N702024 E1159926 (NAD83)

WELL DATA

Flush Monument

Type 8" Diameter Morris



A Top of Well Casing offset -0.3 feet

Casing Diameter 2-inch

Casing Type SCH 40 PVC

Cap Type "J" plug - locked

Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP 10.5 feet

Depth to Well Bottom below MP 53.3 feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - MW-22

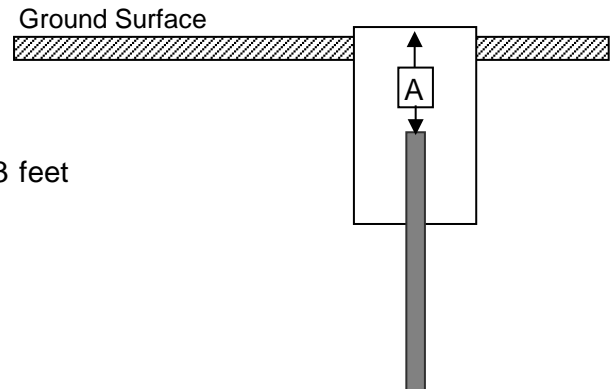
Date : 1/18/2016

Coordinates: N701684 E1160142 (NAD83)

WELL DATA

Flush Monument

Type 8" Diameter Morris



A Top of Well Casing offset -0.3 feet

Casing Diameter 2-inch

Casing Type SCH 40 PVC

Cap Type "J" plug - locked

Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP 4.1 feet

Depth to Well Bottom below MP 14.8 feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - MW-23

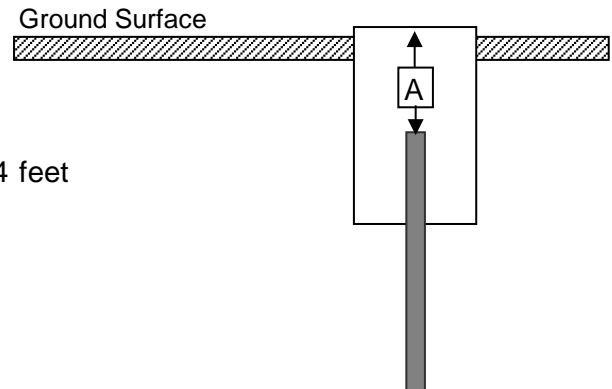
Date : 1/18/2016

Coordinates: N702021 E1159930 (NAD83)

WELL DATA

Flush Monument

Type 8" Diameter Morris



A Top of Well Casing offset -0.4 feet

Casing Diameter 2-inch

Casing Type SCH 40 PVC

Cap Type "J" plug - locked

Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP 11.5 feet

Depth to Well Bottom below MP 19.6 feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - MW-24

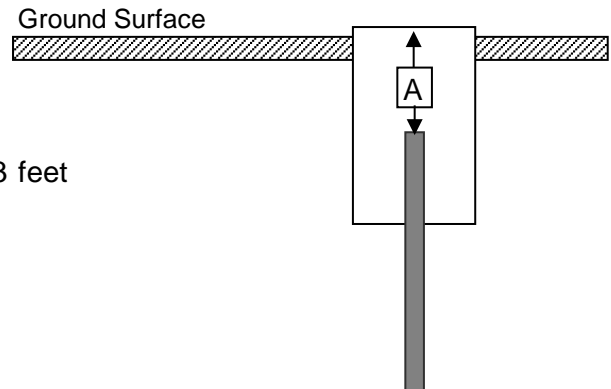
Date : 1/15/2016

Coordinates: N702032 E1160369 (NAD83)

WELL DATA

Flush Monument

Type 8" Diameter Morris



A Top of Well Casing offset -0.3 feet

Casing Diameter 2-inch

Casing Type SCH 40 PVC

Cap Type "J" plug - locked

Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP 10.5 feet

Depth to Well Bottom below MP 21.7 feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:

Inside Shrub



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - MW-25

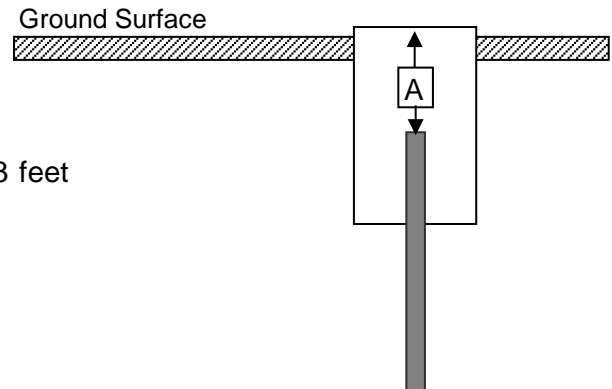
Date : 1/15/2016

Coordinates: N701992 E1160343 (NAD83)

WELL DATA

Flush Monument

Type 8" Diameter Morris



A Top of Well Casing offset -0.3 feet

Casing Diameter 2-inch

Casing Type SCH 40 PVC

Cap Type "J" plug - locked

Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP 14.3 feet

Depth to Well Bottom below MP 22.0 feet

0.05 DNAPL

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - MW-26

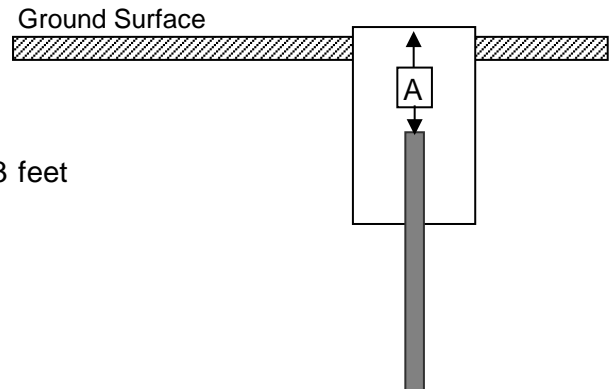
Date : 1/15/2016

Coordinates: N701995 E1160374 (NAD83)

WELL DATA

Flush Monument

Type 8" Diameter Morris



A Top of Well Casing offset -0.3 feet

Casing Diameter 2-inch

Casing Type SCH 40 PVC

Cap Type "J" plug - locked

Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP 10.2 feet

Depth to Well Bottom below MP 25.0 feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:

Inside Shrub



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - MW-27

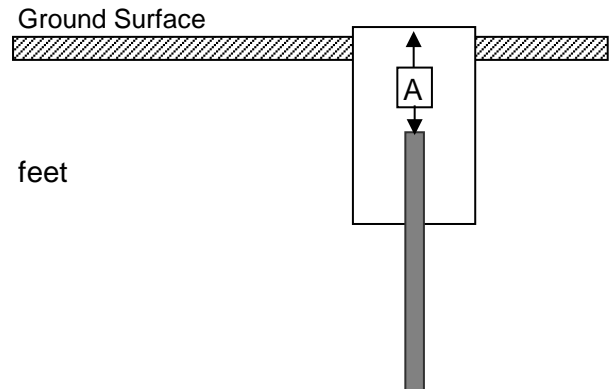
Date : 1/15/2016

Coordinates: N701993 E1160101 (NAD83)

WELL DATA

Flush Monument

Type 12" Diameter Morris



A Top of Well Casing offset feet
Casing Diameter
Casing Type
Cap Type

Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP feet

Depth to Well Bottom below MP feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:

Not Accessible due to
Flooding of A Street



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - MW-28

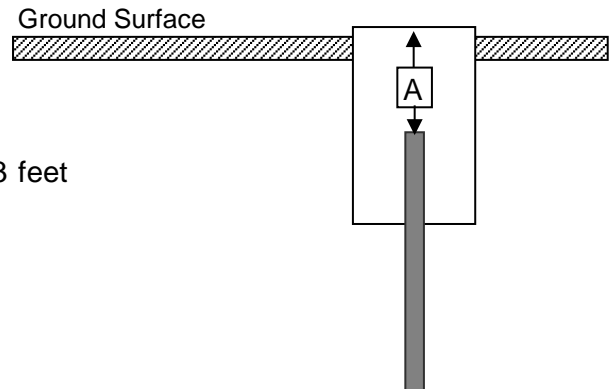
Date : 1/15/2016

Coordinates: N702061 E1160377 (NAD83)

WELL DATA

Flush Monument

Type 8" Diameter Morris



A Top of Well Casing offset -0.3 feet

Casing Diameter 2-inch

Casing Type SCH 40 PVC

Cap Type "J" plug - locked

Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP 9.3 feet

Depth to Well Bottom below MP 42.8 feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:

Inside shrub



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - MW-29

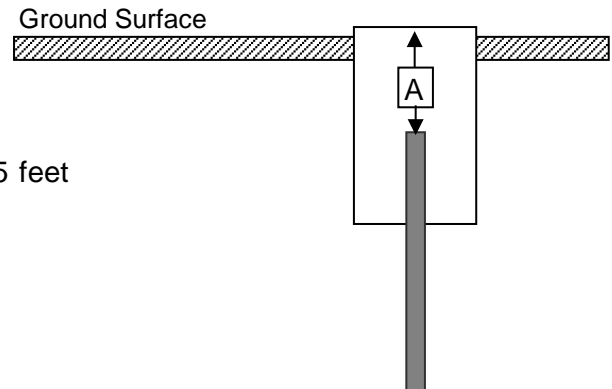
Date : 1/15/2016

Coordinates: N702015 E1160374 (NAD83)

WELL DATA

Flush Monument

Type 8" Diameter Morris



A Top of Well Casing offset -0.5 feet

Casing Diameter 2-inch

Casing Type SCH 40 PVC

Cap Type "J" plug - locked

Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP 10.3 feet

Depth to Well Bottom below MP 33.2 feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:

Inside shrub



PHOTO

Field Well Inventory Data Sheet

Former A Street MGP Site
Tacoma, Washington

WELL DESIGNATION - MW-30

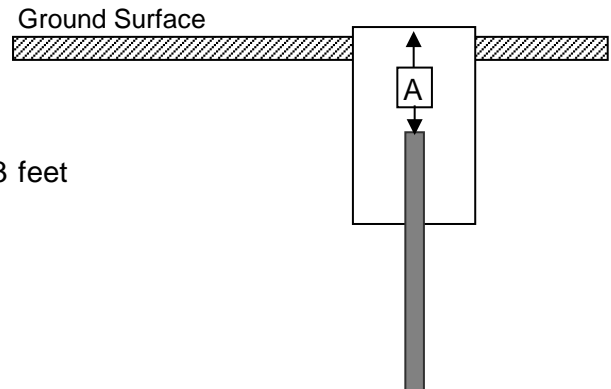
Date : 1/15/2016

Coordinates: N701943 E1160387 (NAD83)

WELL DATA

Flush Monument

Type 8" Diameter Morris



A Top of Well Casing offset -0.3 feet

Casing Diameter 2-inch

Casing Type SCH 40 PVC

Cap Type "J" plug - locked

Measuring Point (MP) - TOC high point

MP elevation

Water Level Below MP 8.7 feet

Depth to Well Bottom below MP 31.2 feet

Condition of Well Monument:

Good

Bail Observations:

Comment/Other Observations:



PHOTO

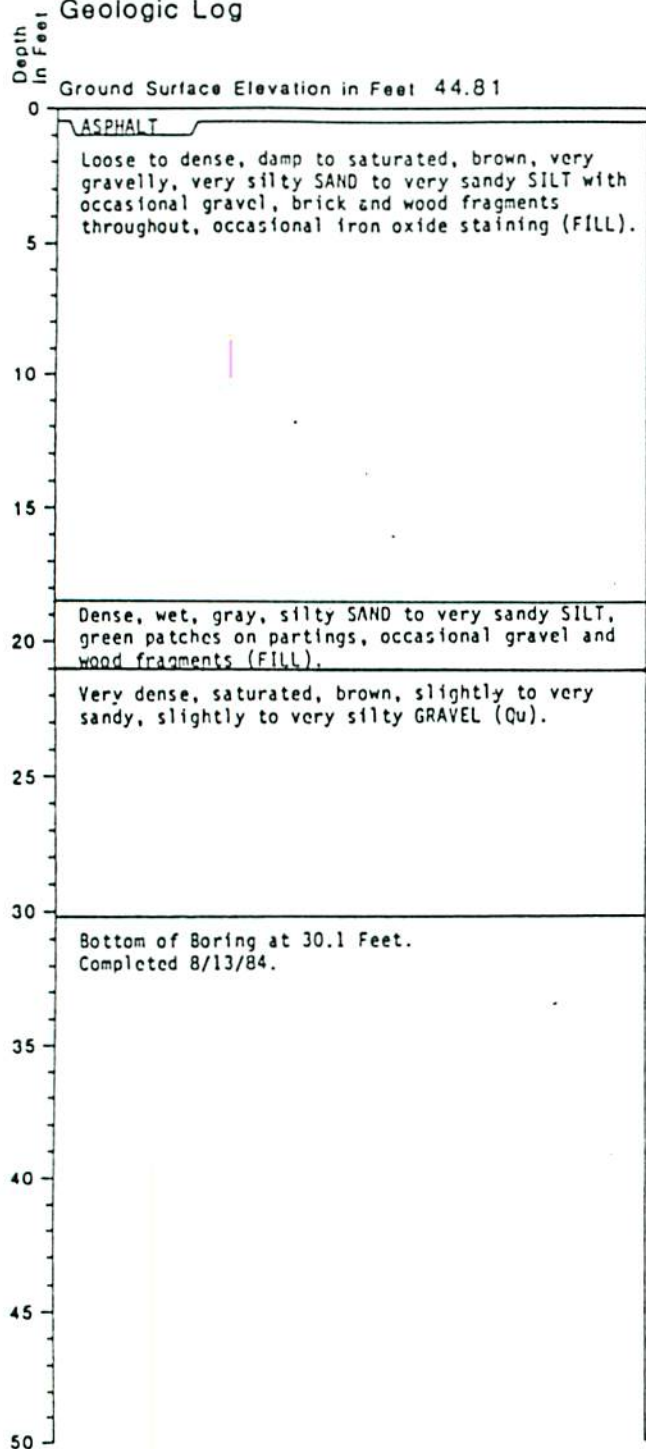
APPENDIX B
TEST PIT, BORING AND MONITORING WELL LOGS

REMEDIAL INVESTIGATION REPORT
TACOMA COAL GASIFICATION SITE
TACOMA, WASHINGTON

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Boring Log and Construction Data for Well E-1

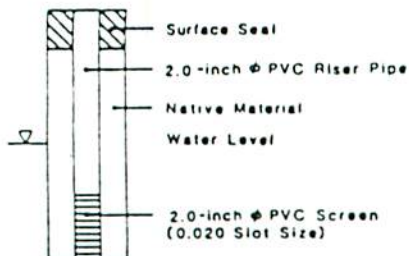
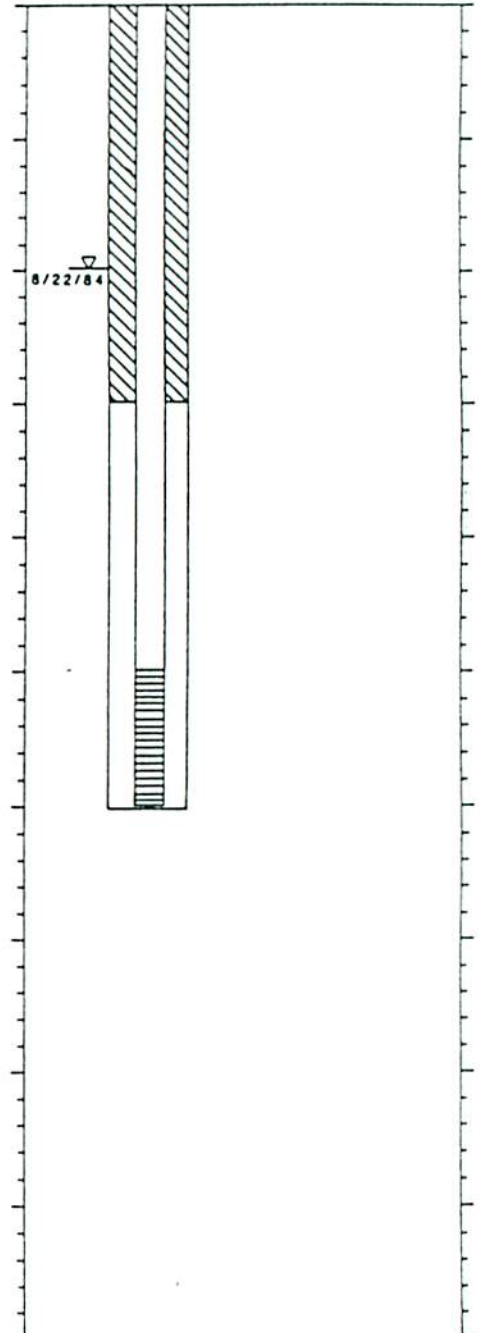
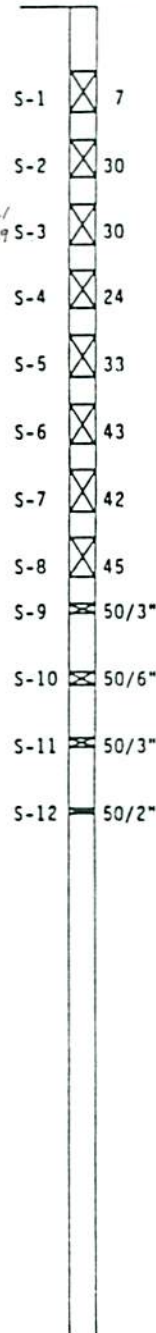
Geologic Log



Well Design

Top Casing Elevation in Feet 44.56
Casing Stickup in Feet -0.25

Sample N



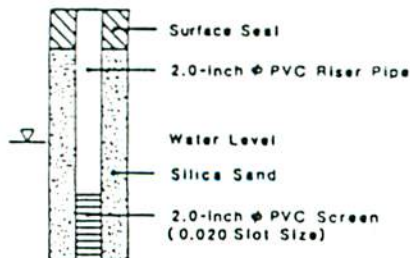
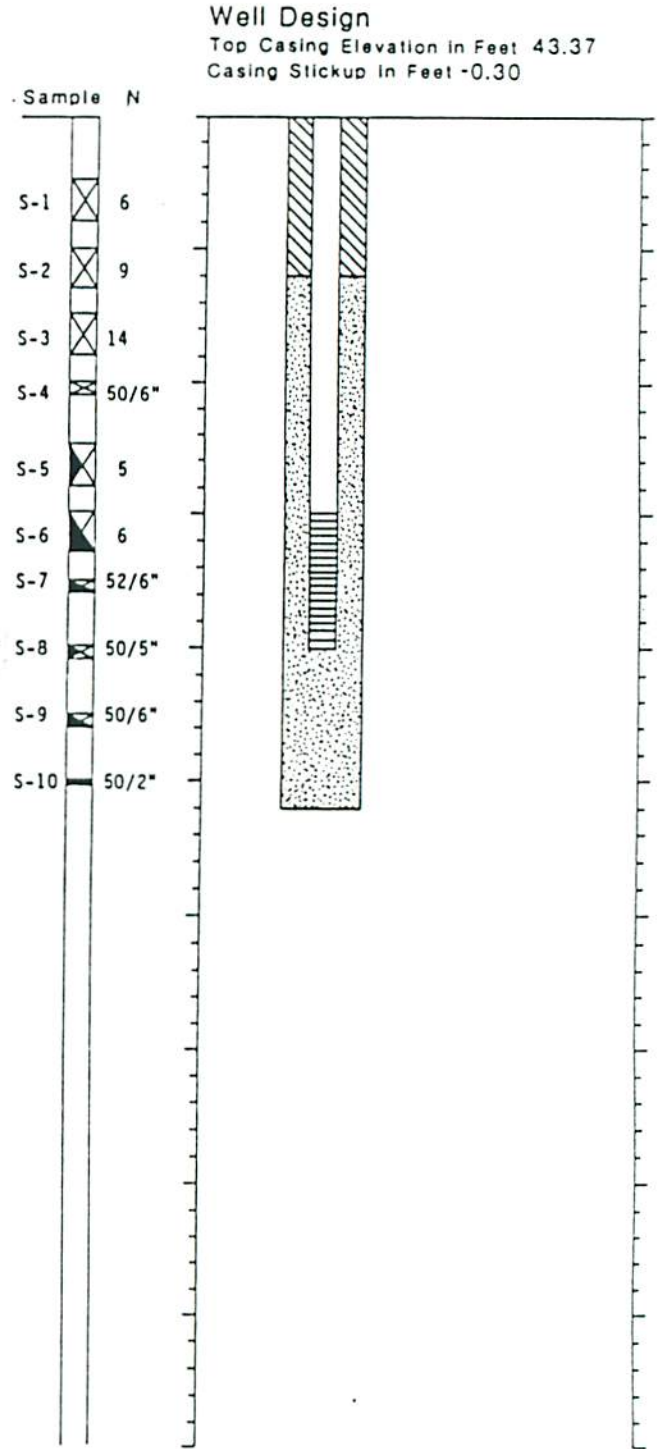
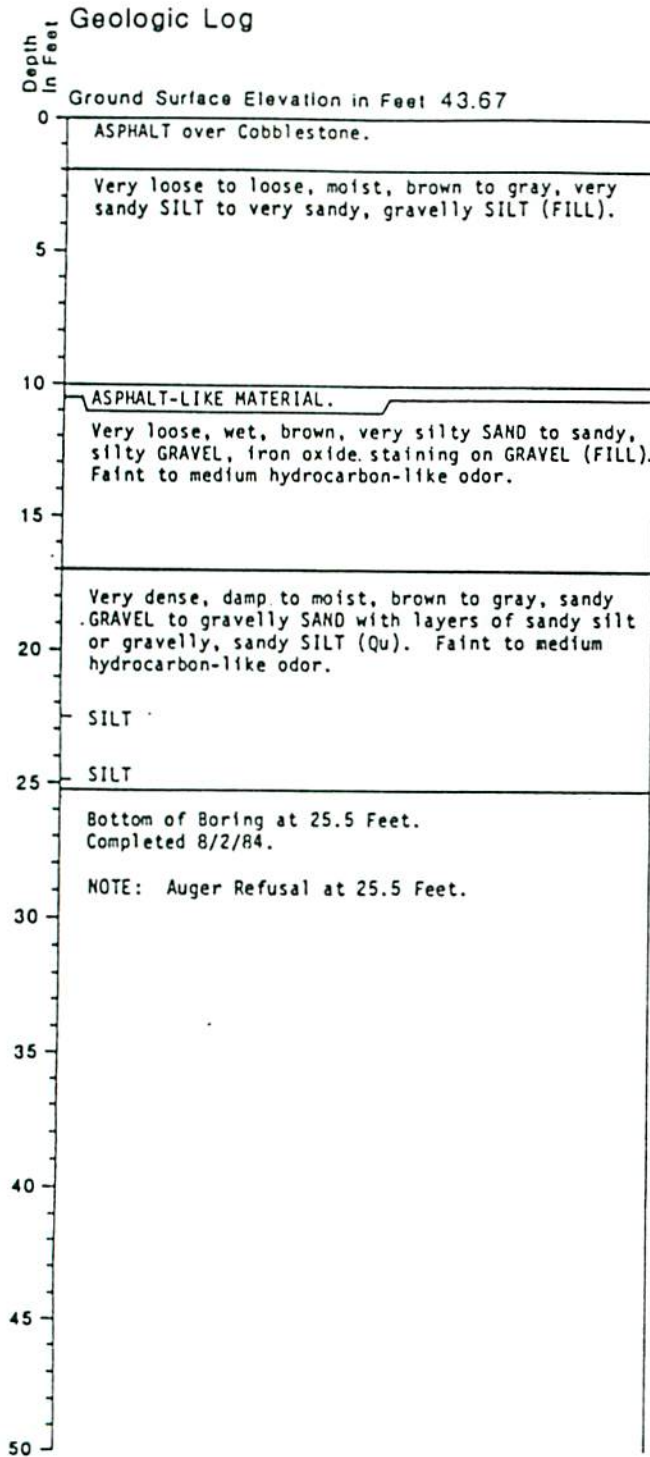
- 2-inch O.D. Split Spoon Sample
- No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits

NOTES:

1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

J-1210-09 August 1984
HART-CROWSER & associates, inc.
Figure A-1

Boring Log and Construction Data for Well E-2



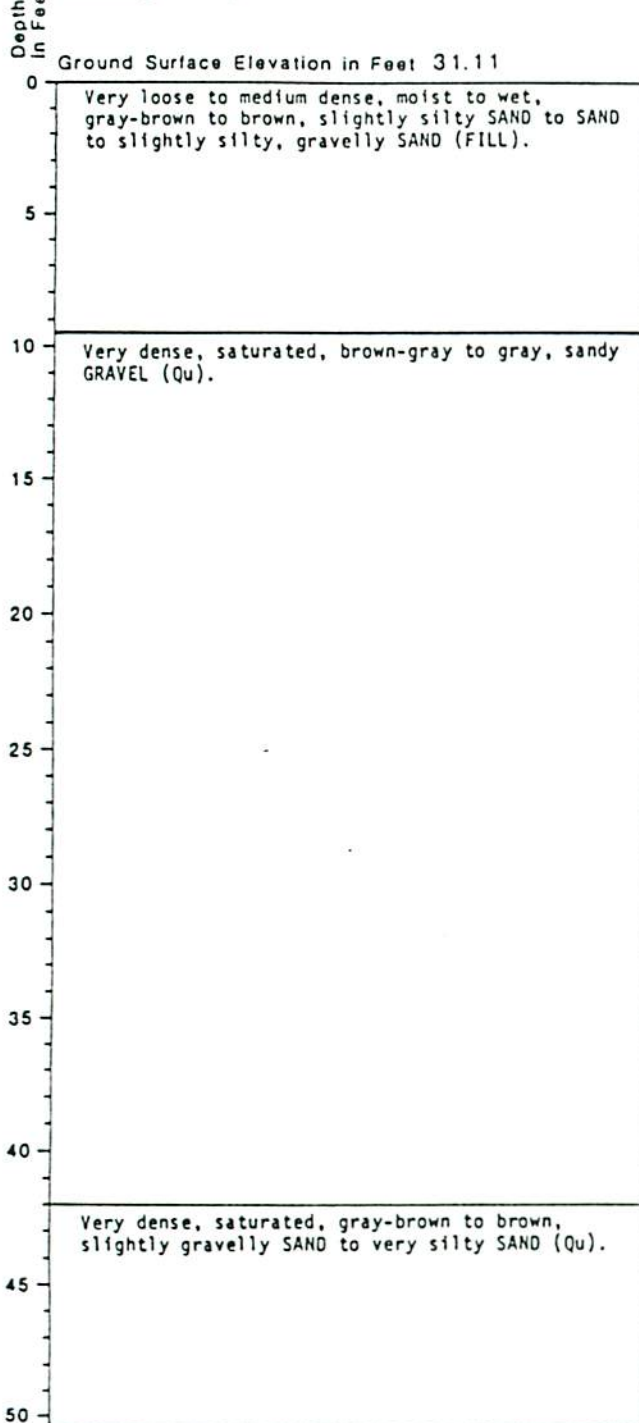
- 2-inch O.D. Split Spoon Sample
- No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Glacial Deposits

NOTES:

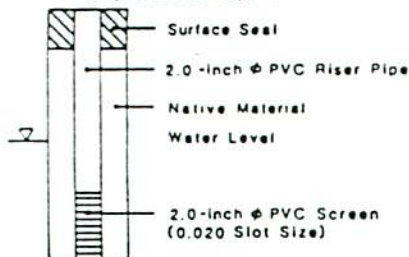
1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

Boring Log and Construction Data for Well E-3

Geologic Log



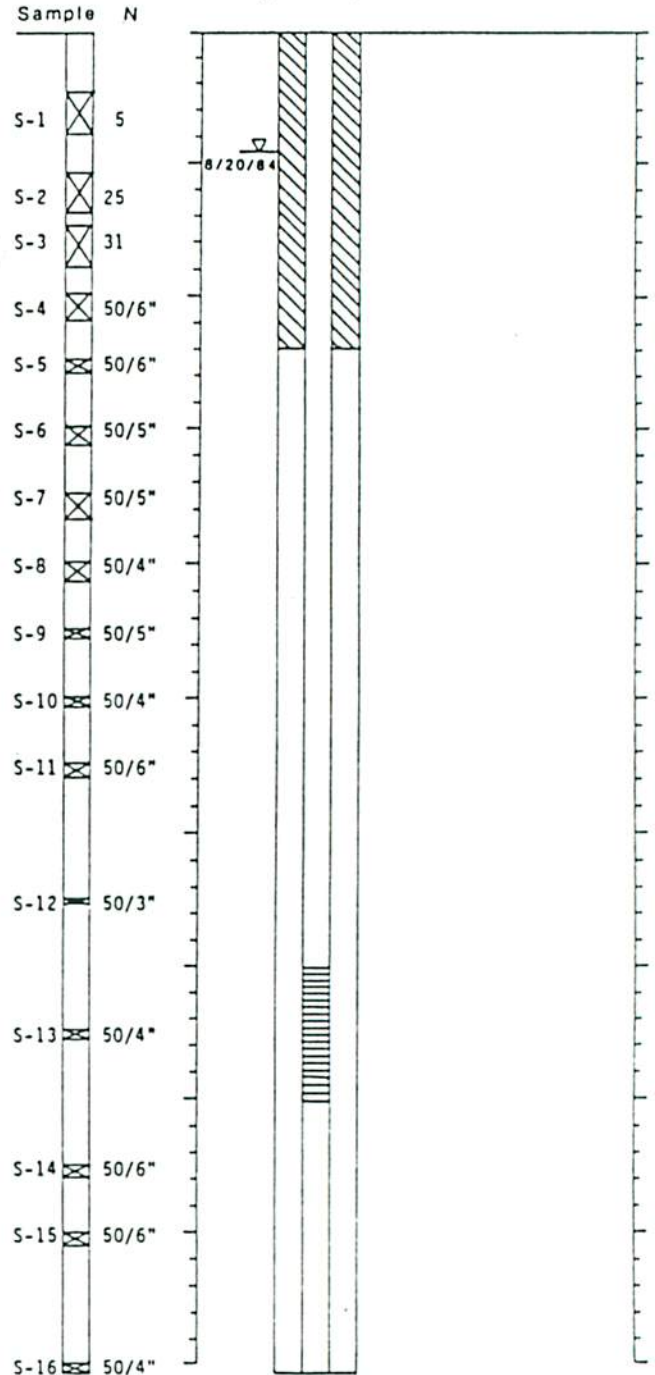
Bottom of Boring at 50.3 Feet.
Completed 8/31/84.



- 2-inch O.D. Split Spoon Sample
- * No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits

Well Design

Top Casing Elevation in Feet 30.85
Casing Stickup in Feet -0.26



NOTES:

1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

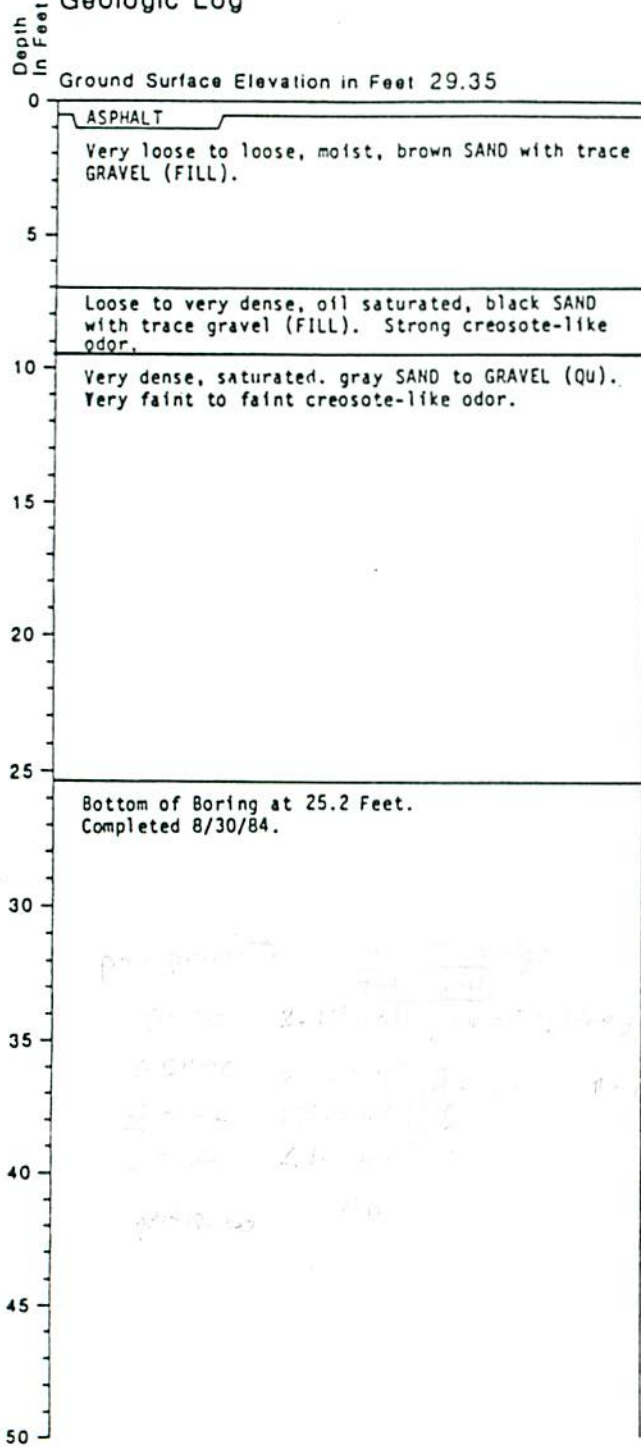
J-1210-09 August 1984

HART-CROWSER & associates, inc.

Figure A-3

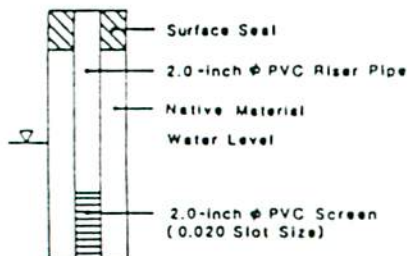
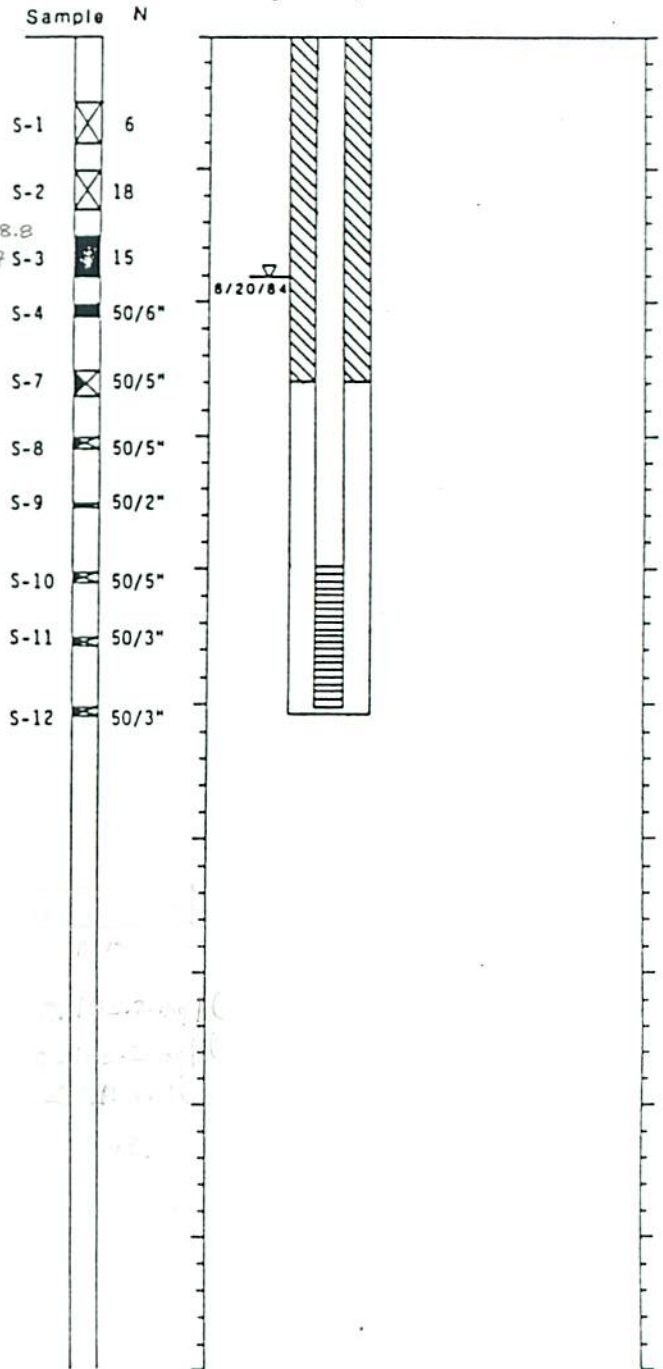
Boring Log and Construction Data for Well E-4

Geologic Log



Well Design

Top Casing Elevation in Feet 28.97
Casing Slickup in Feet -0.38



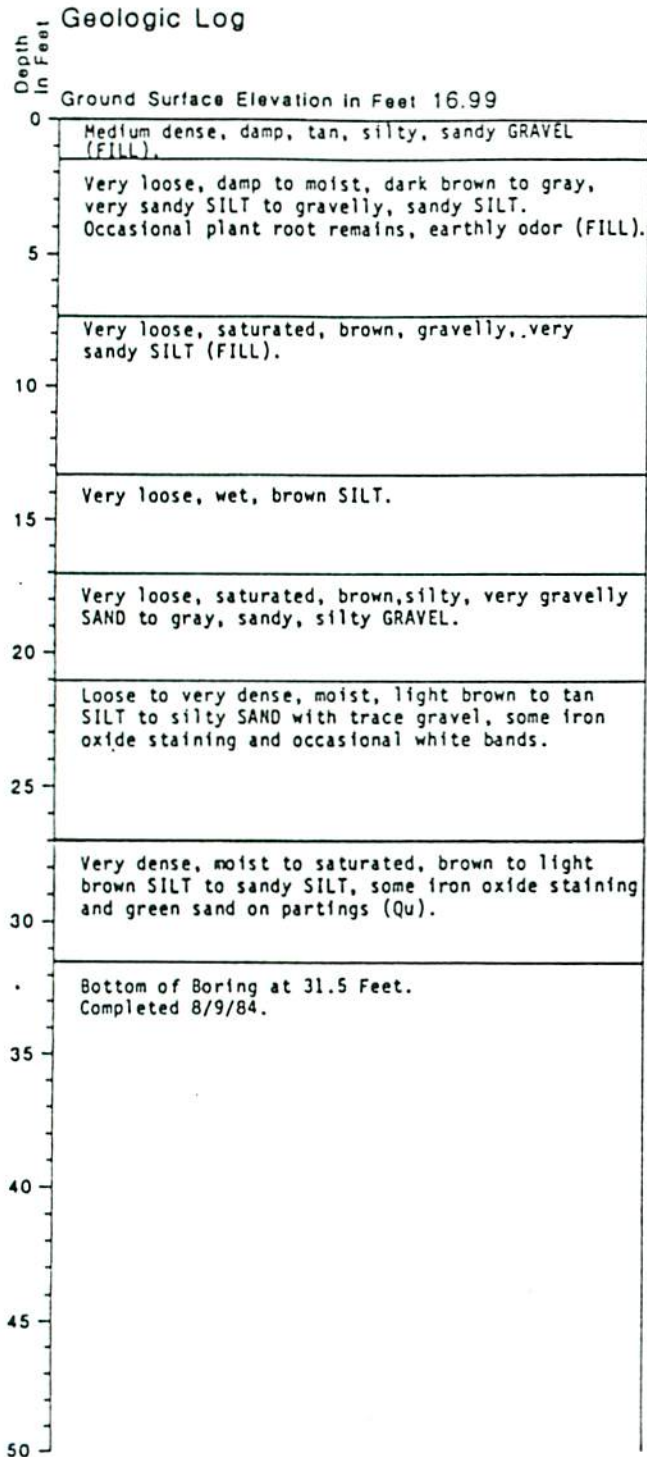
- ⊠ 2-inch O.D. Split Spoon Sample
- * No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits

NOTES:

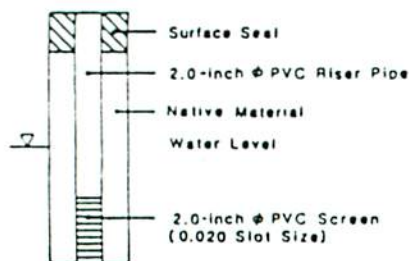
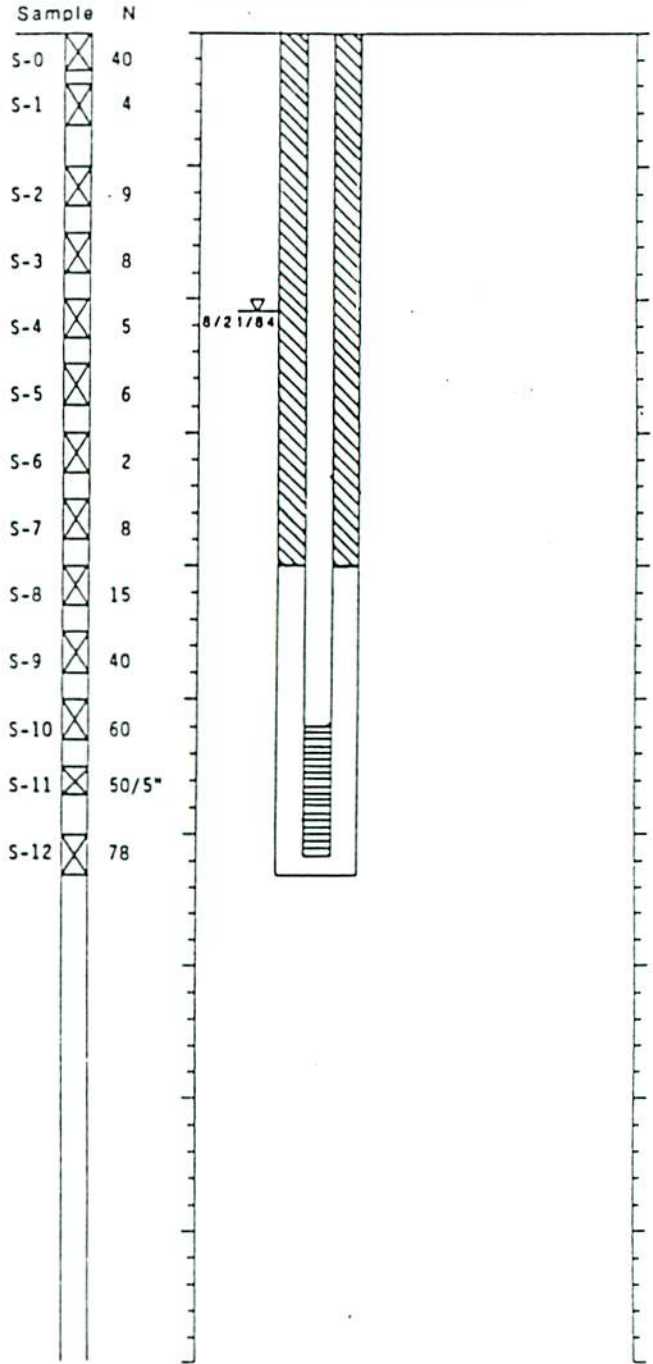
1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

J-1210-09 August 1984
HART-CROWSER & associates, inc.
Figure A-4

Boring Log and Construction Data for Well E-5



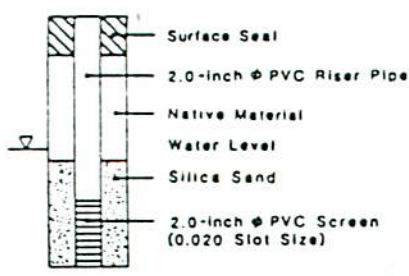
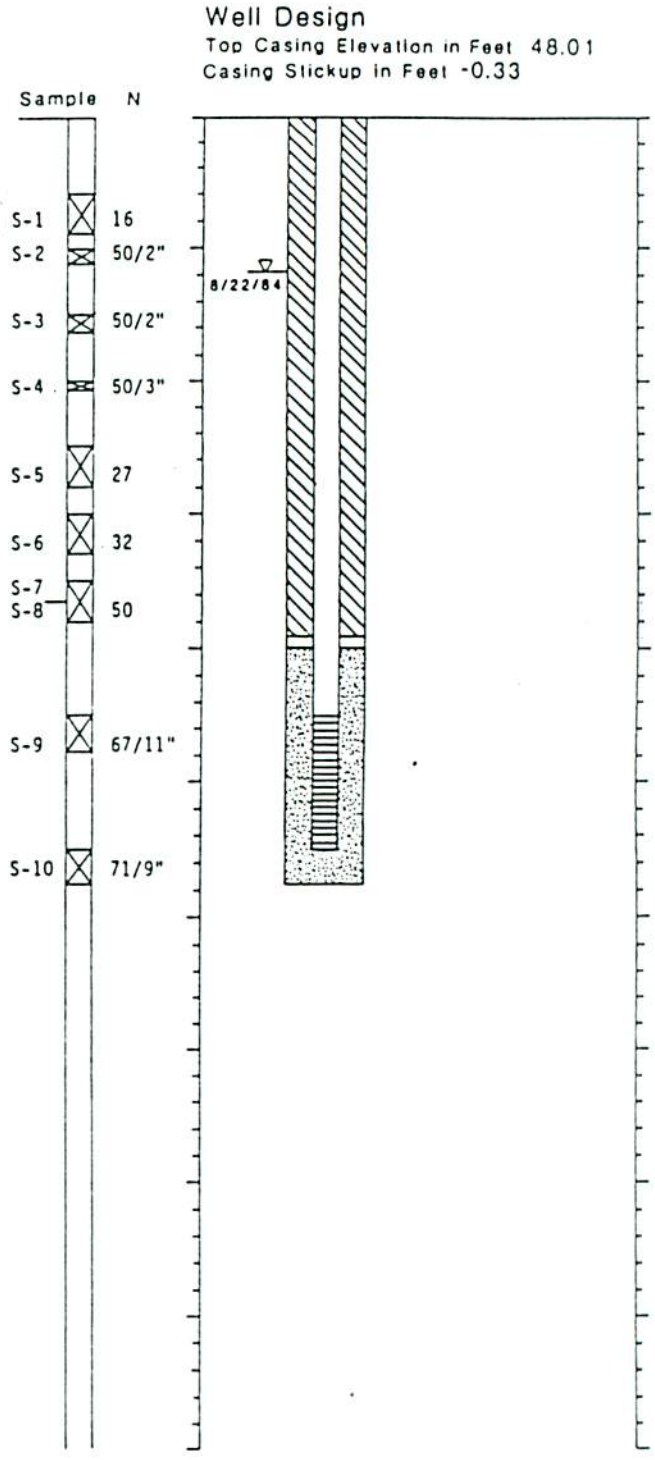
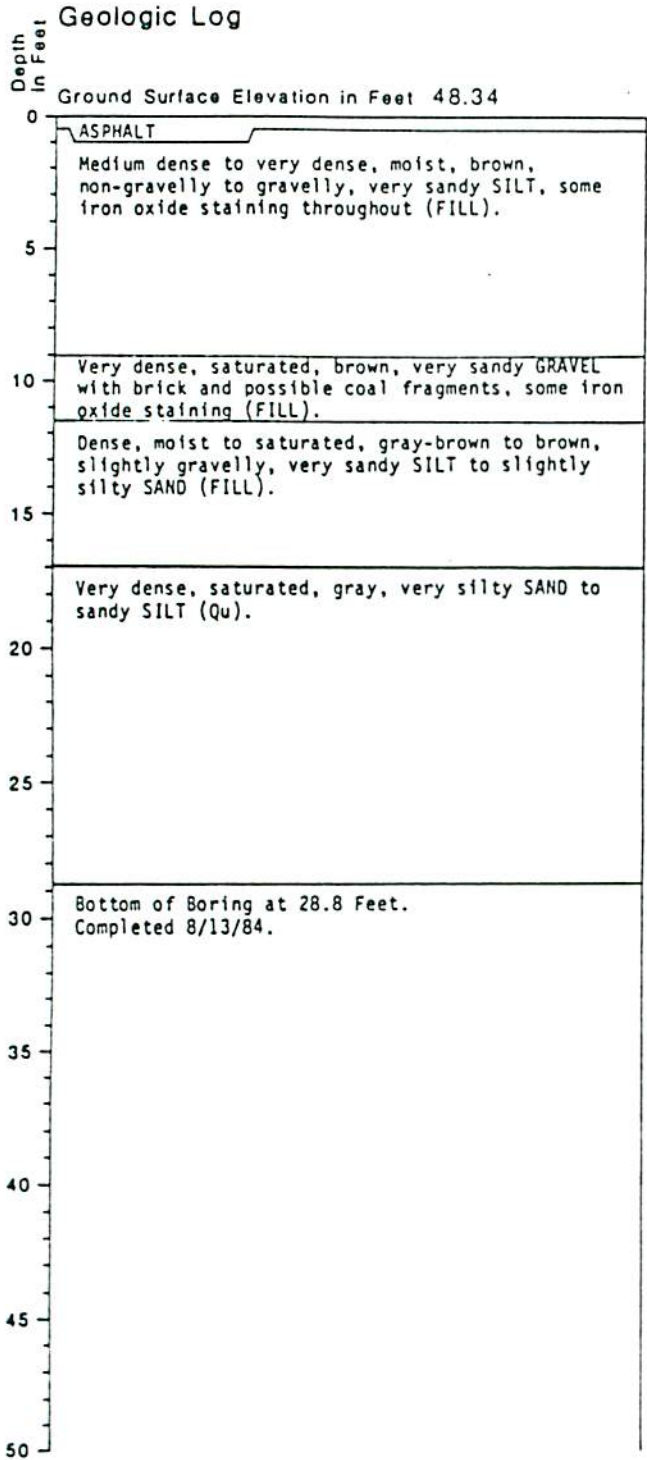
Well Design
 Top Casing Elevation in Feet 16.75
 Casing Stickup in Feet -0.24



- 2-inch O.D. Split Spoon Sample
- * No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits

NOTES:
 1. Soil descriptions are interpretive and actual changes may be gradual.
 2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

Boring Log and Construction Data for Well E-6



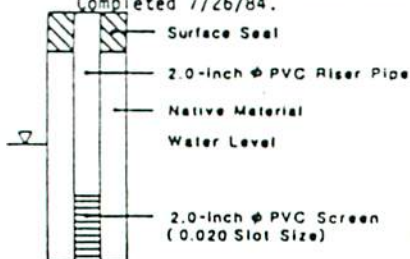
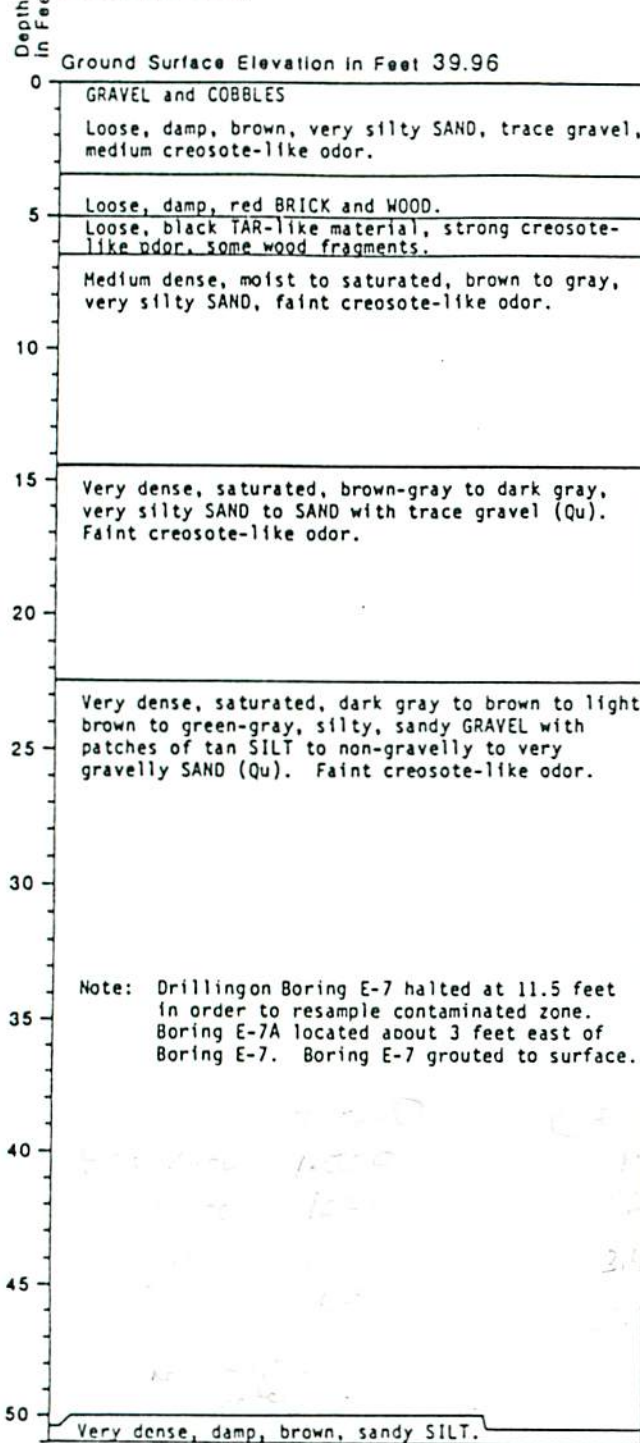
- 2-inch O.D. Split Spoon Sample
- No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits

NOTES:

1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

Boring Log and Construction Data for Well E-7/7A

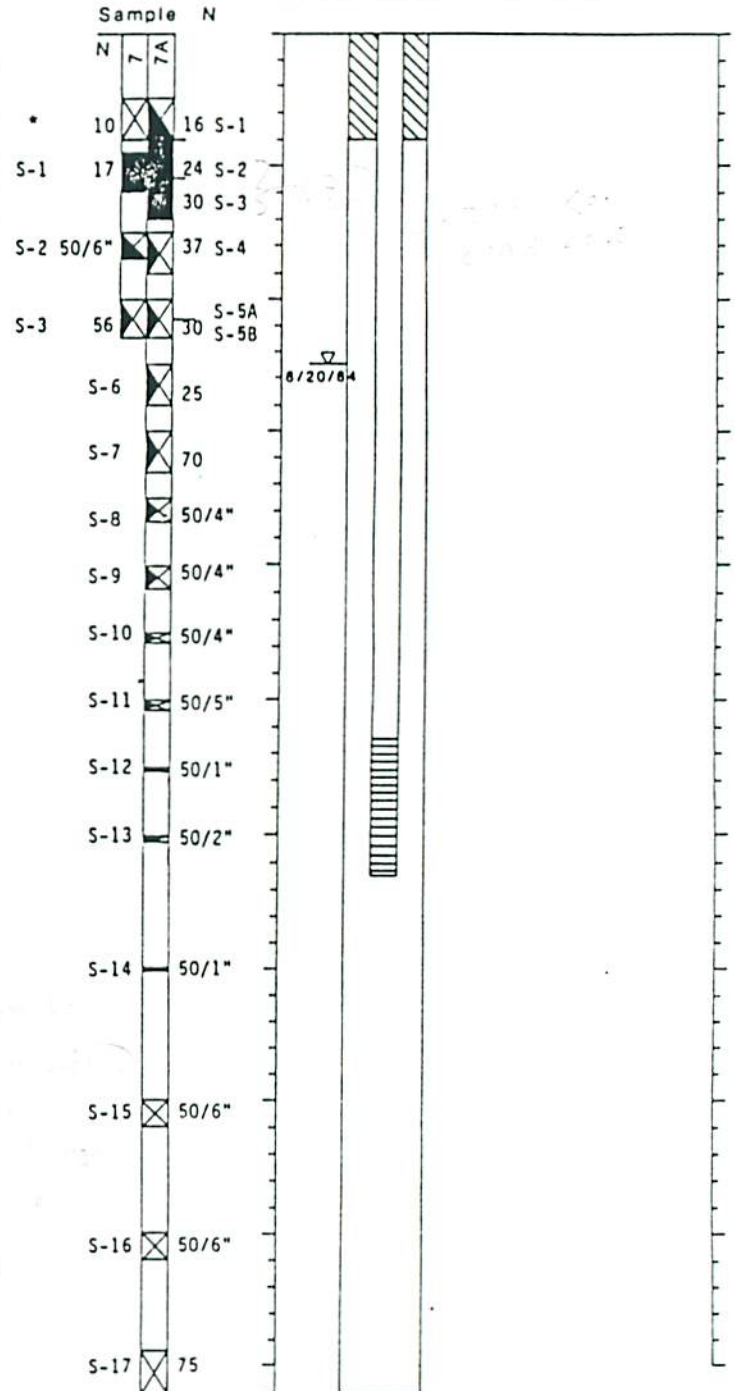
Geologic Log



- ☒ 2-inch O.D. Split Spoon Sample
- * No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits

Well Design

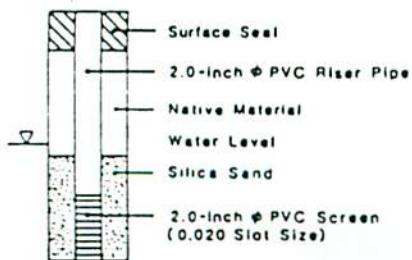
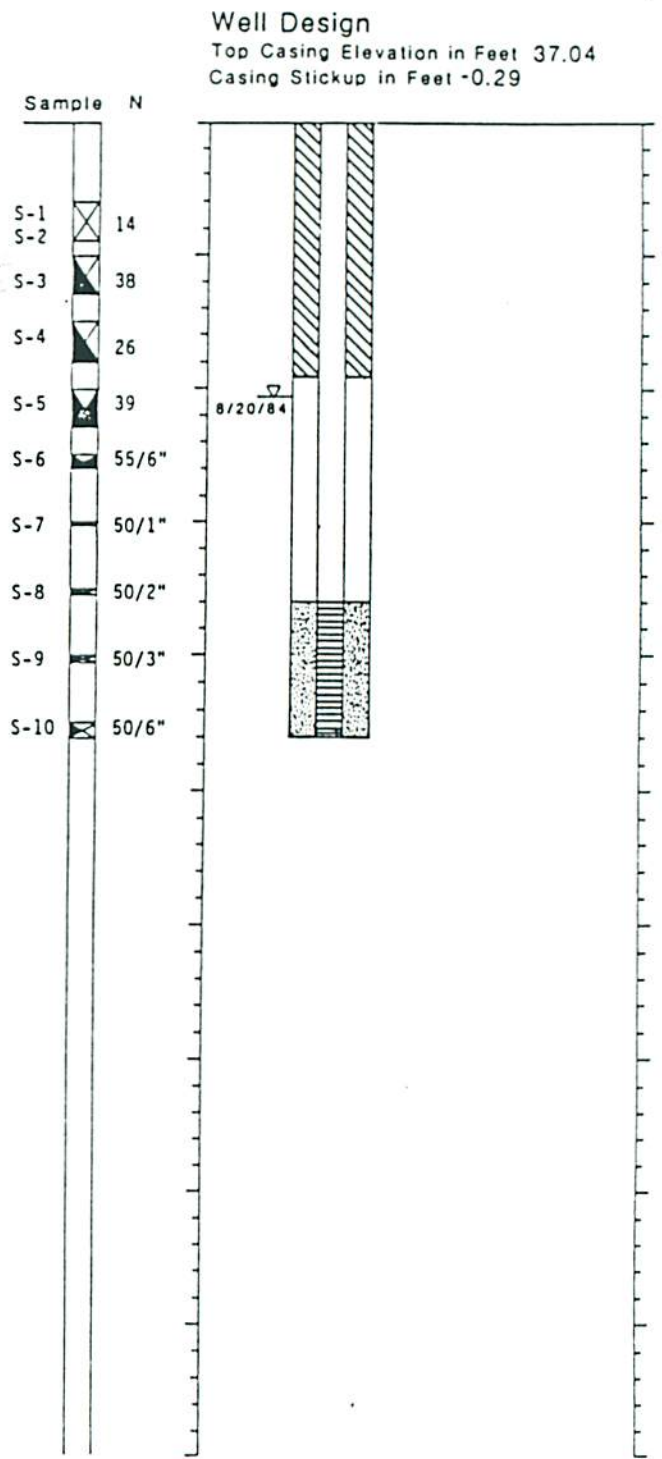
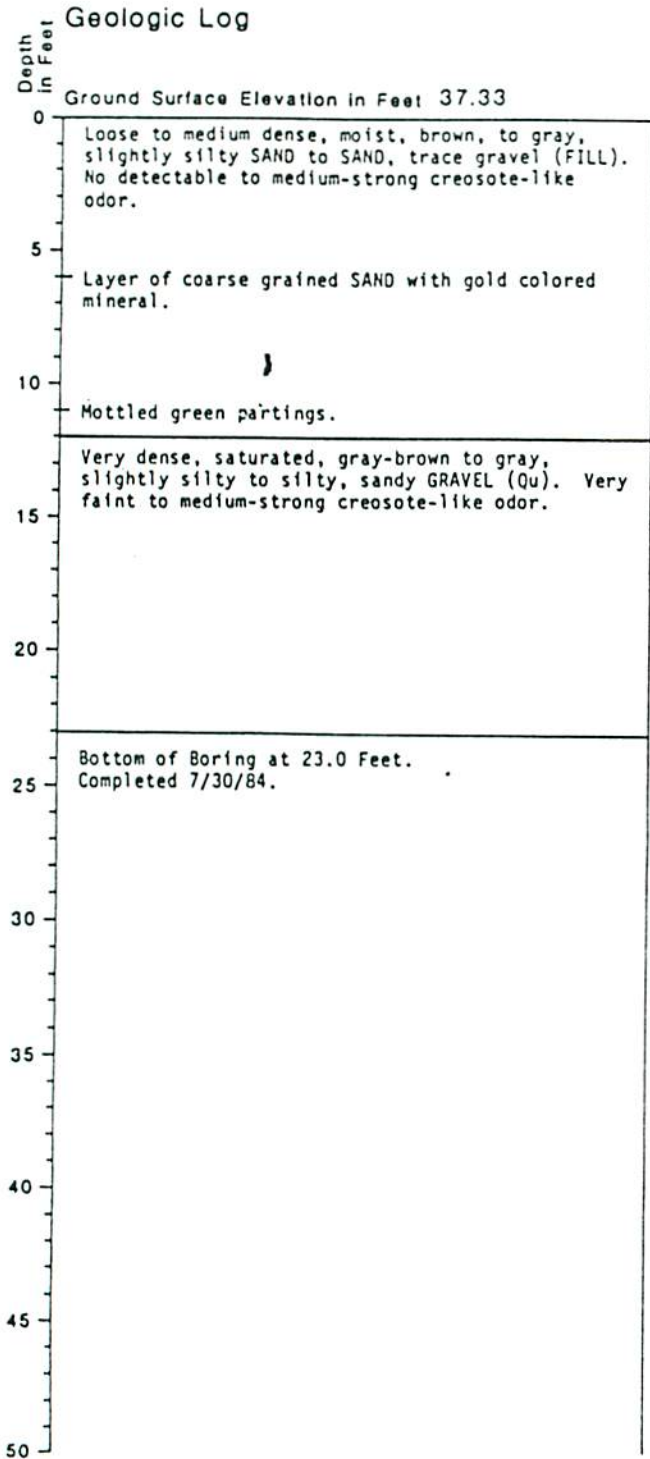
Top Casing Elevation in Feet 39.68
Casing Stickup in Feet -0.28



NOTES:

1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

Boring Log and Construction Data for Well E-8



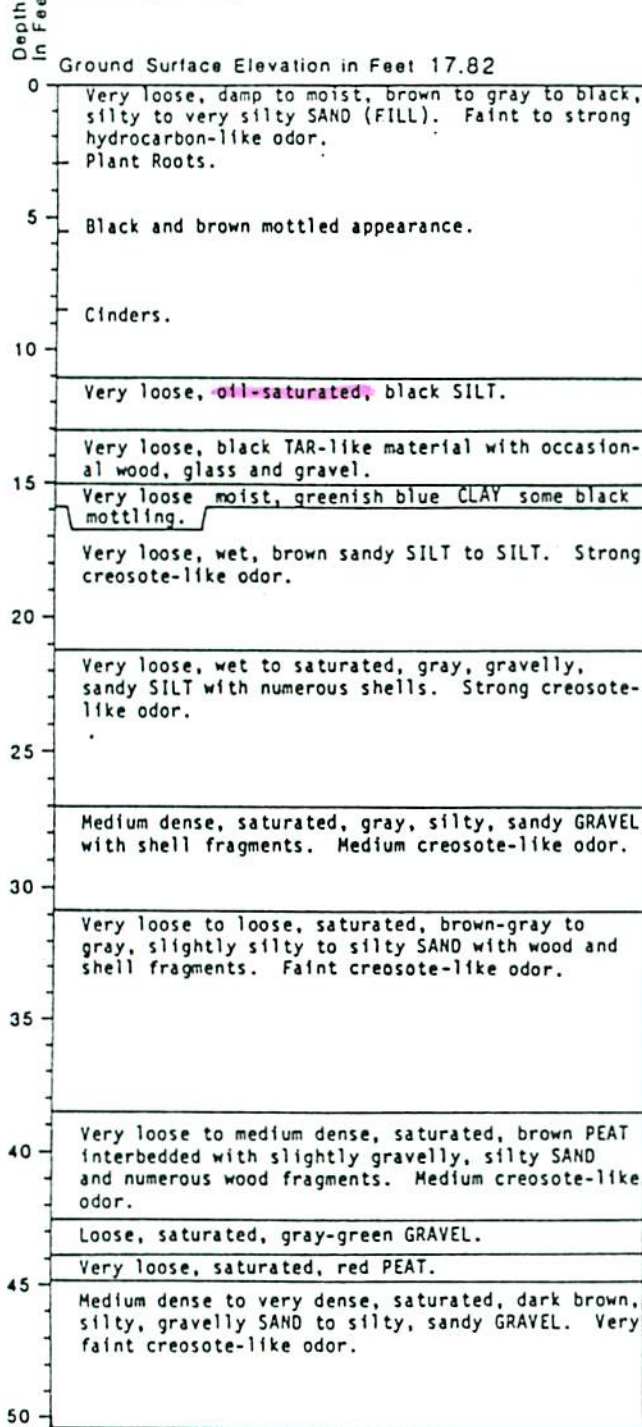
- 2-inch O.D. Split Spoon Sample
- * No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits

NOTES:

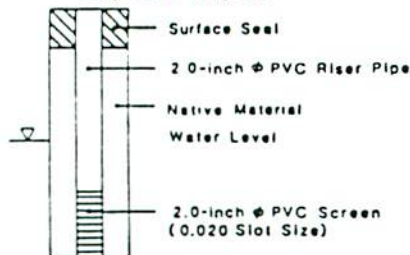
1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

Boring Log and Construction Data for Well E-9

Geologic Log



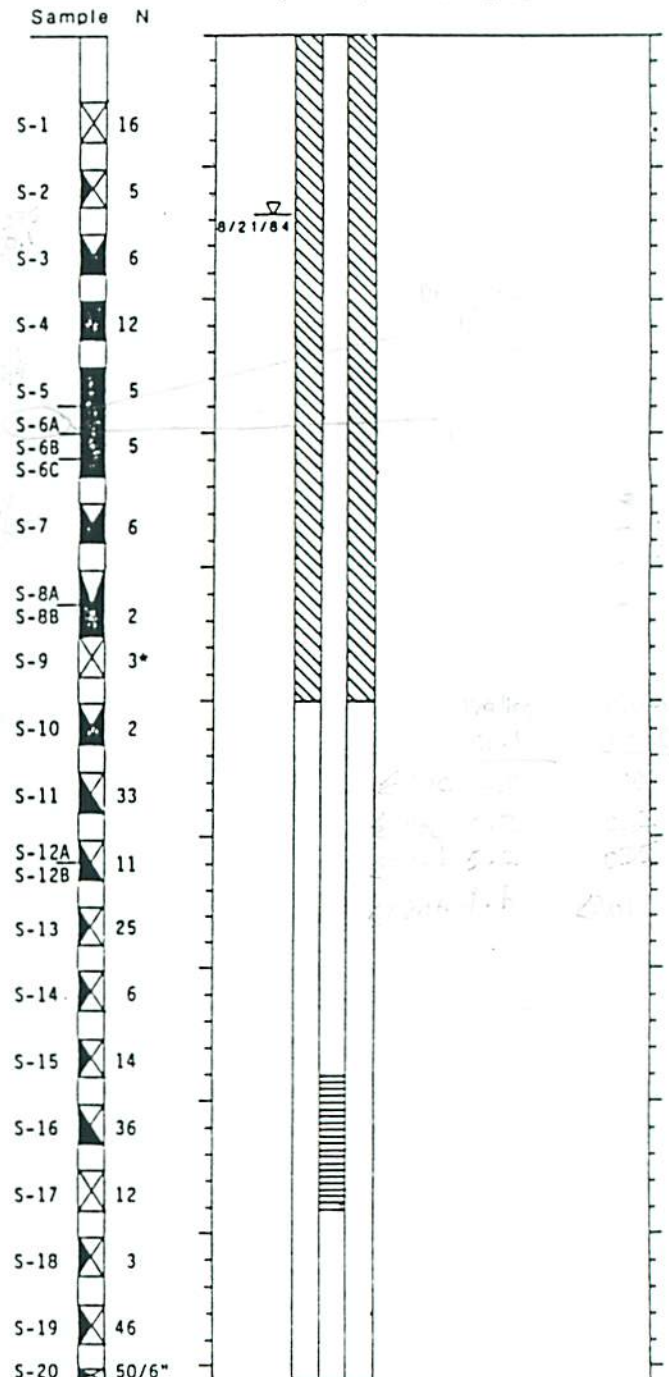
Bottom of Boring at 50.5 Feet.
Completed 8/7/84.



- 2-inch O.D. Split Spoon Sample
- * No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits

Well Design

Top Casing Elevation in Feet 17.36
Casing Slickup in Feet -0.46

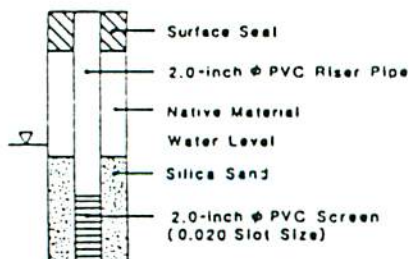
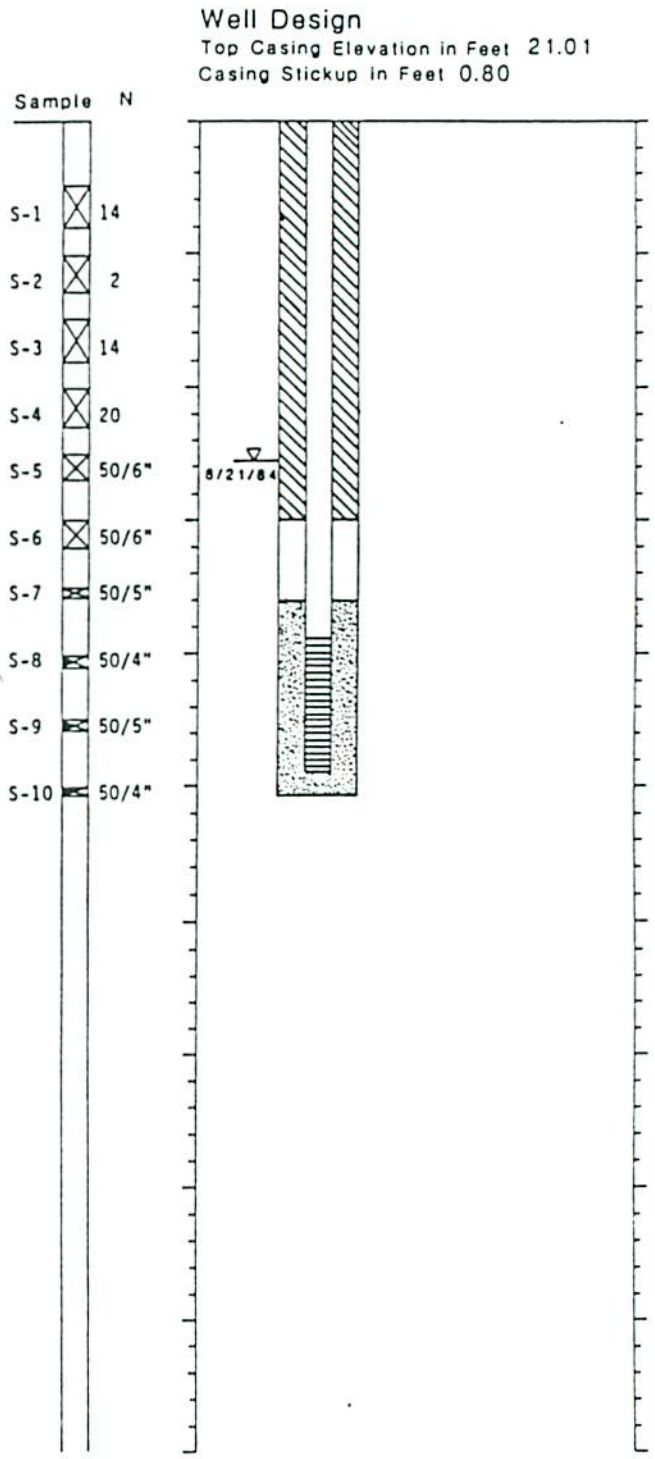
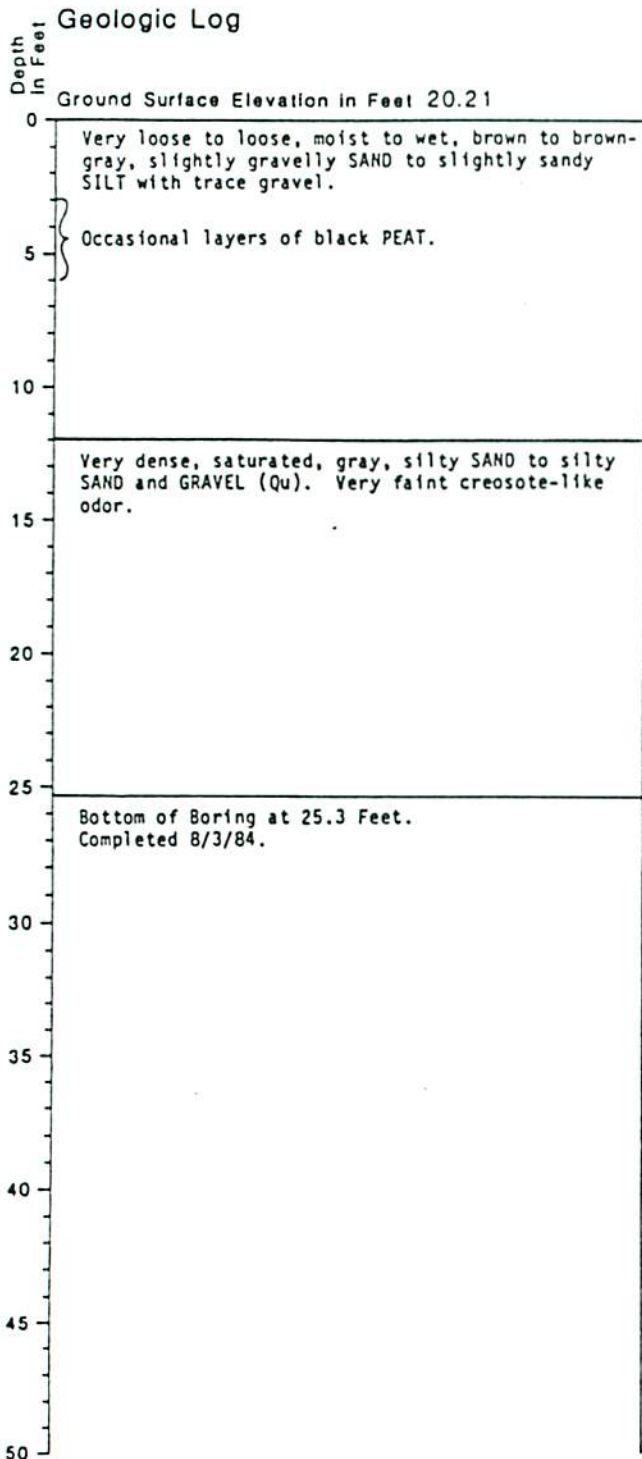


NOTES:

1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

J-1210-09 August 1984
HART-CROWSER & associates, inc.
Figure A-9

Boring Log and Construction Data for Well E-10



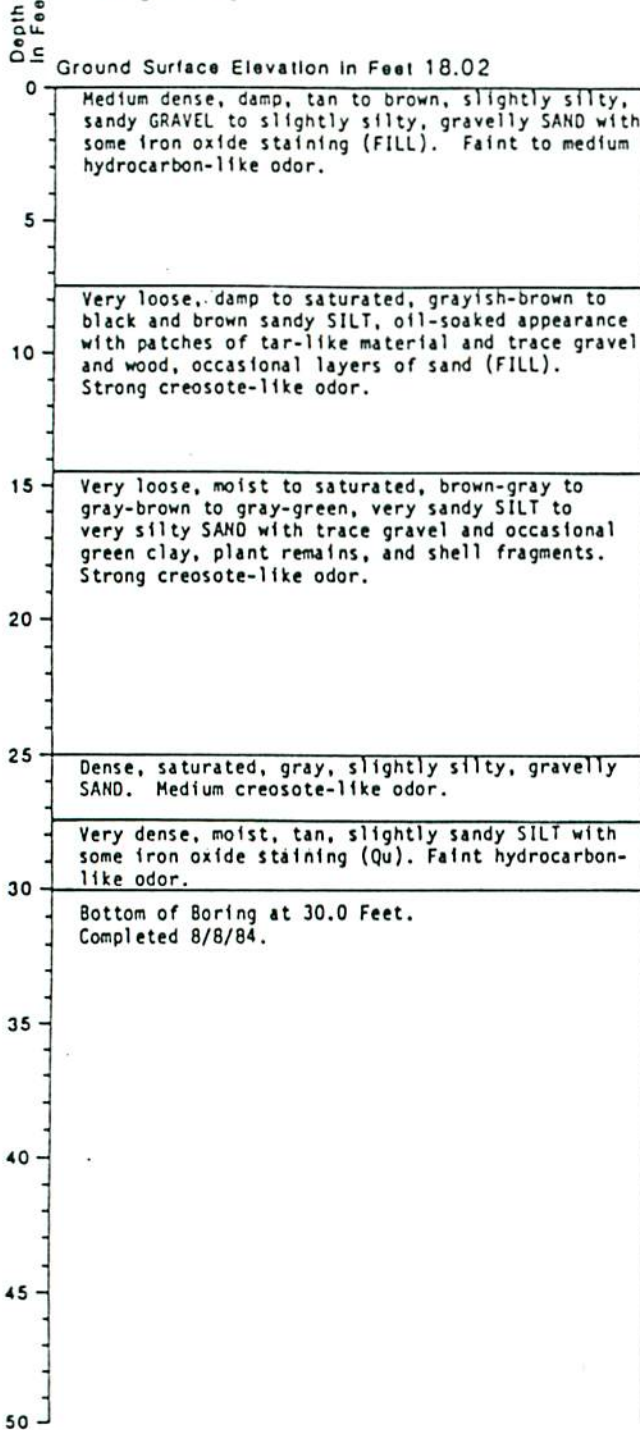
- 2-inch O.D. Split Spoon Sample
- * No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits

NOTES:

- Soil descriptions are interpretive and actual changes may be gradual.
- Water Level is for date indicated and may vary with time of year. ATO:At Time of Drilling

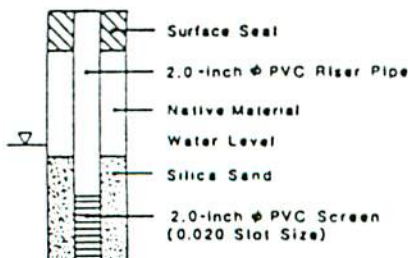
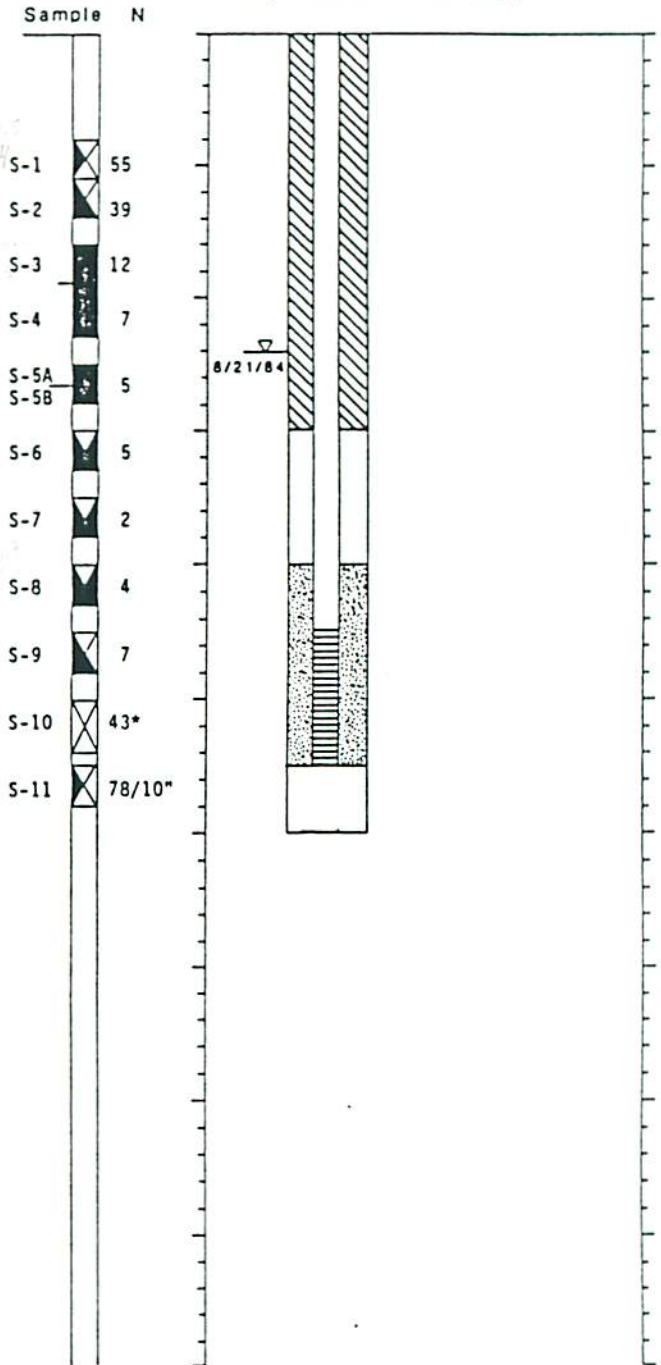
Boring Log and Construction Data for Well E-11

Geologic Log



Well Design

Top Casing Elevation in Feet 17.80
Casing Stickup in Feet -0.22



- 2-inch O.D. Split Spoon Sample
- No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits

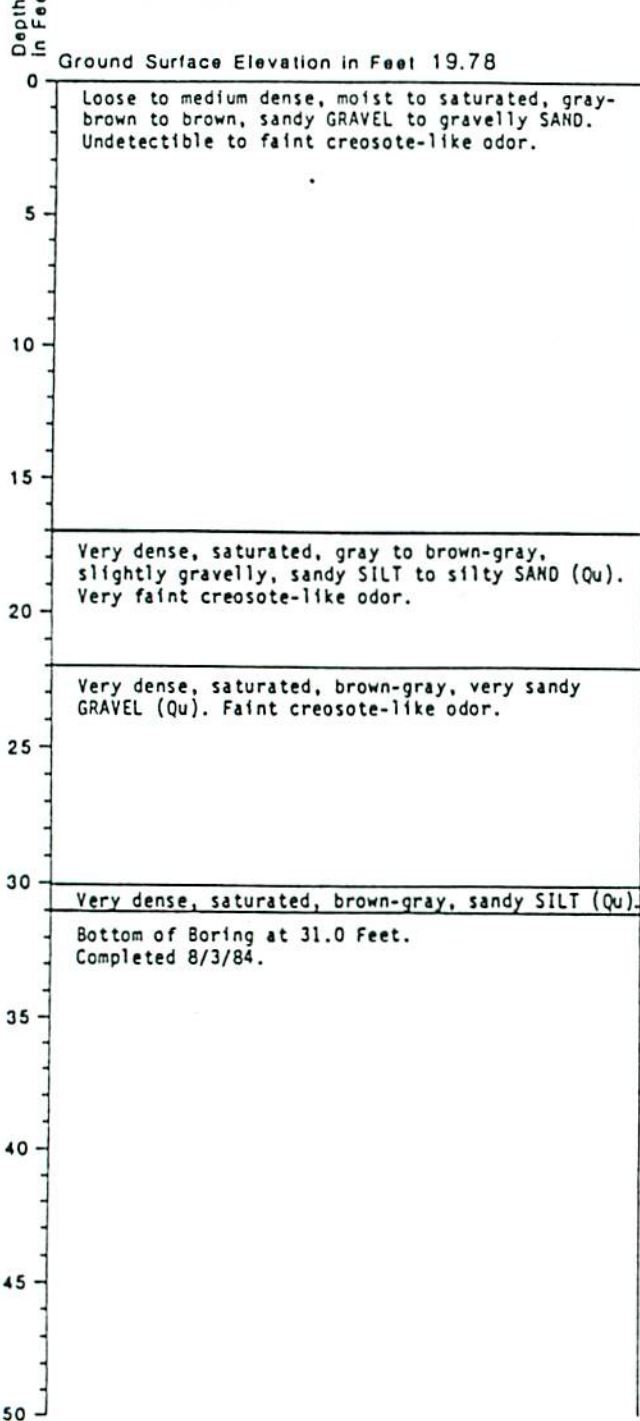
NOTES:

- Soil descriptions are interpretive and actual changes may be gradual.
- Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

J-1210-09 August 1984
HART-CROWSER & associates, inc.
Figure A-11

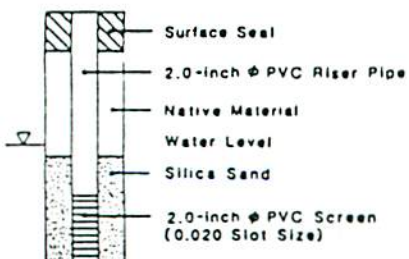
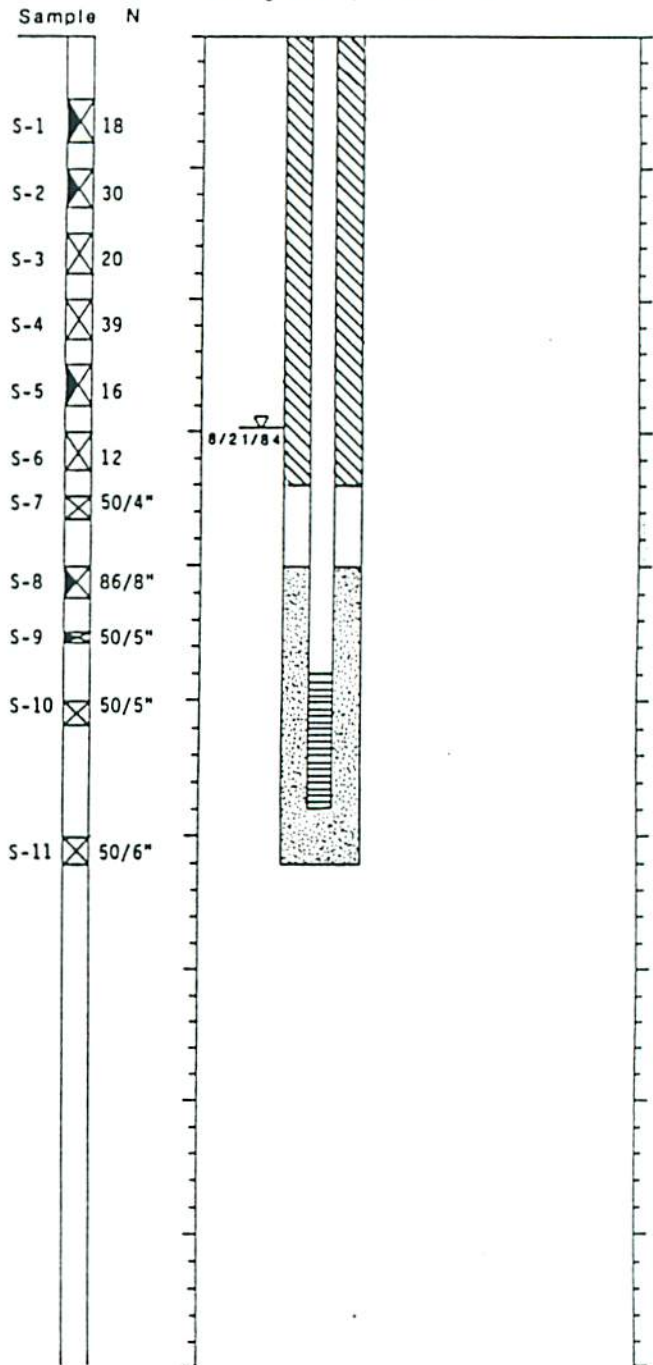
Boring Log and Construction Data for Well E-12

Geologic Log



Well Design

Top Casing Elevation in Feet 21.35
Casing Stickup in Feet 1.57



- 2-inch O.D. Split Spoon Sample
- No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits

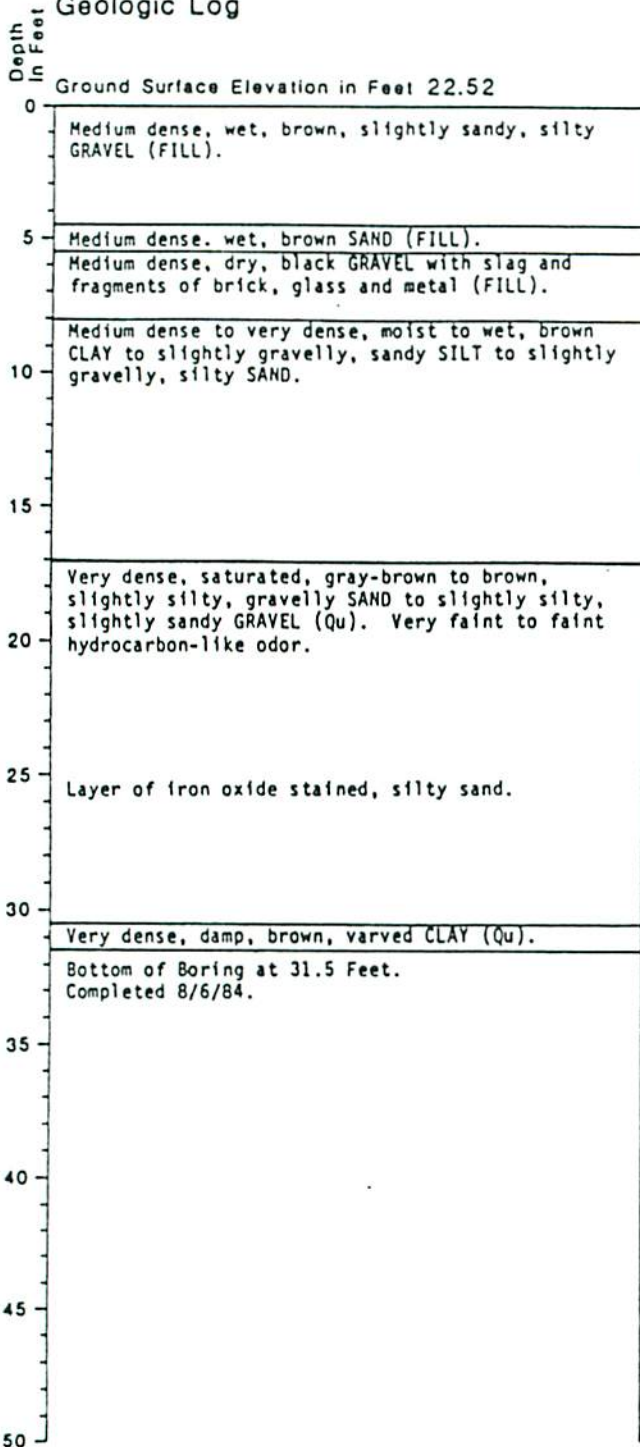
NOTES:

1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

J-1210-09 August 1984
HART-CROWSER & associates, inc.
Figure A-12

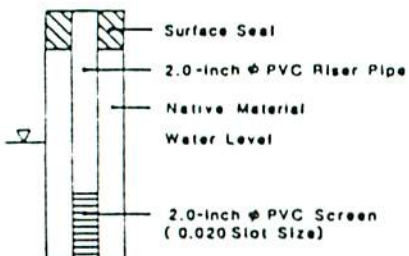
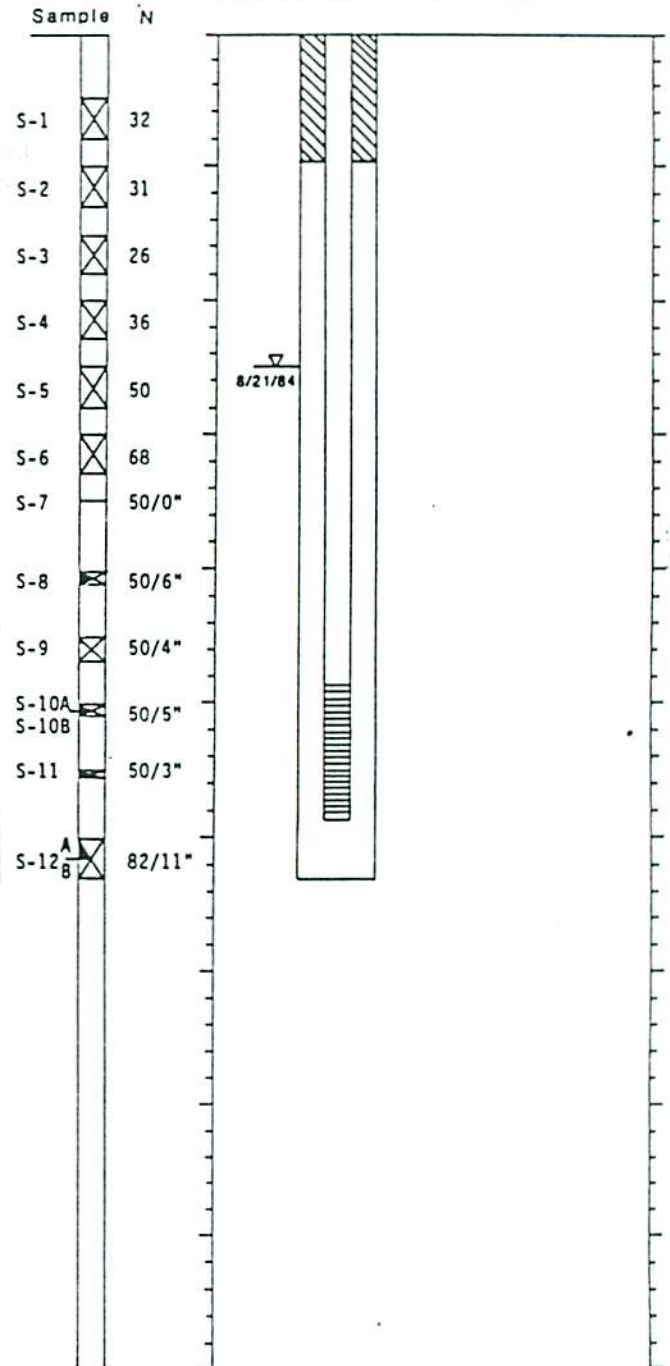
Boring Log and Construction Data for Well E-13

Geologic Log



Well Design

Top Casing Elevation in Feet 22.02
Casing Slickup in Feet -0.50



- 2-inch O.D. Split Spoon Sample
- No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits

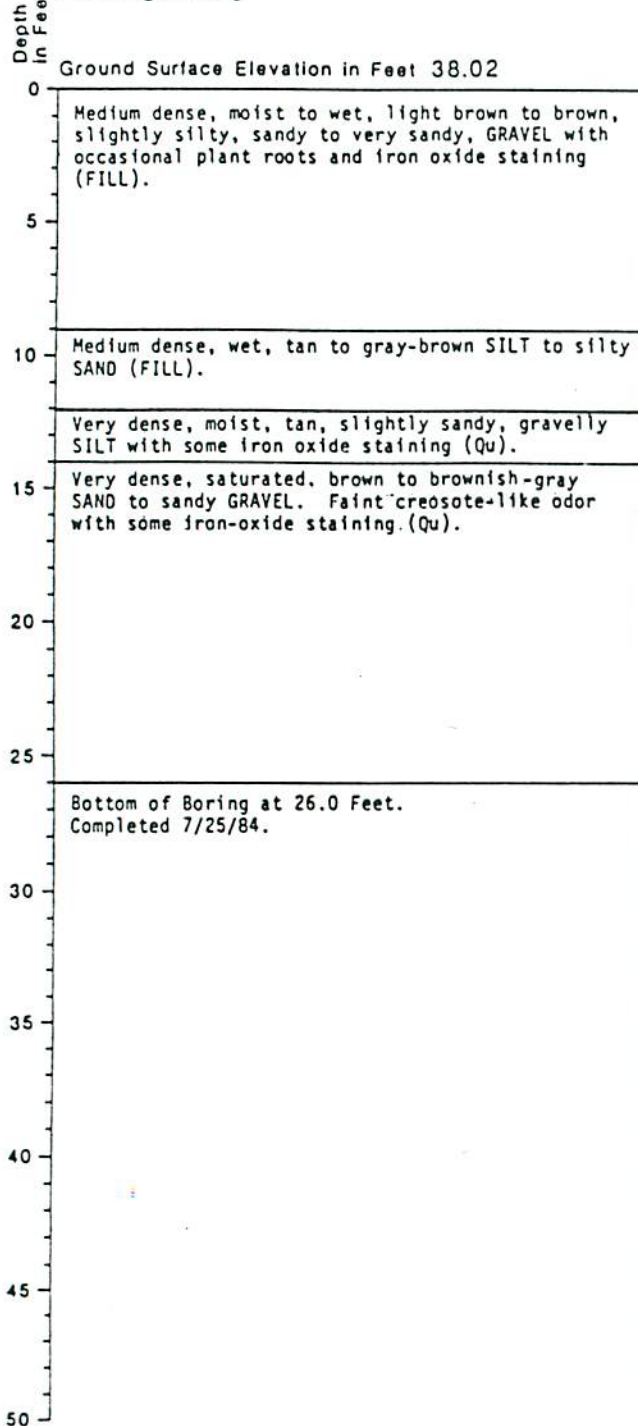
NOTES:

1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

J-1210-09 August 1984
HART-CROWSER & associates, inc.
Figure A-13

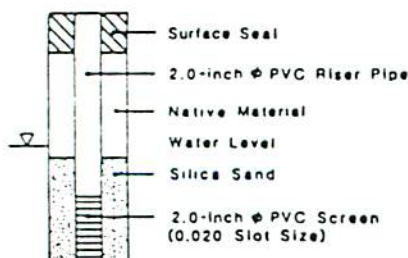
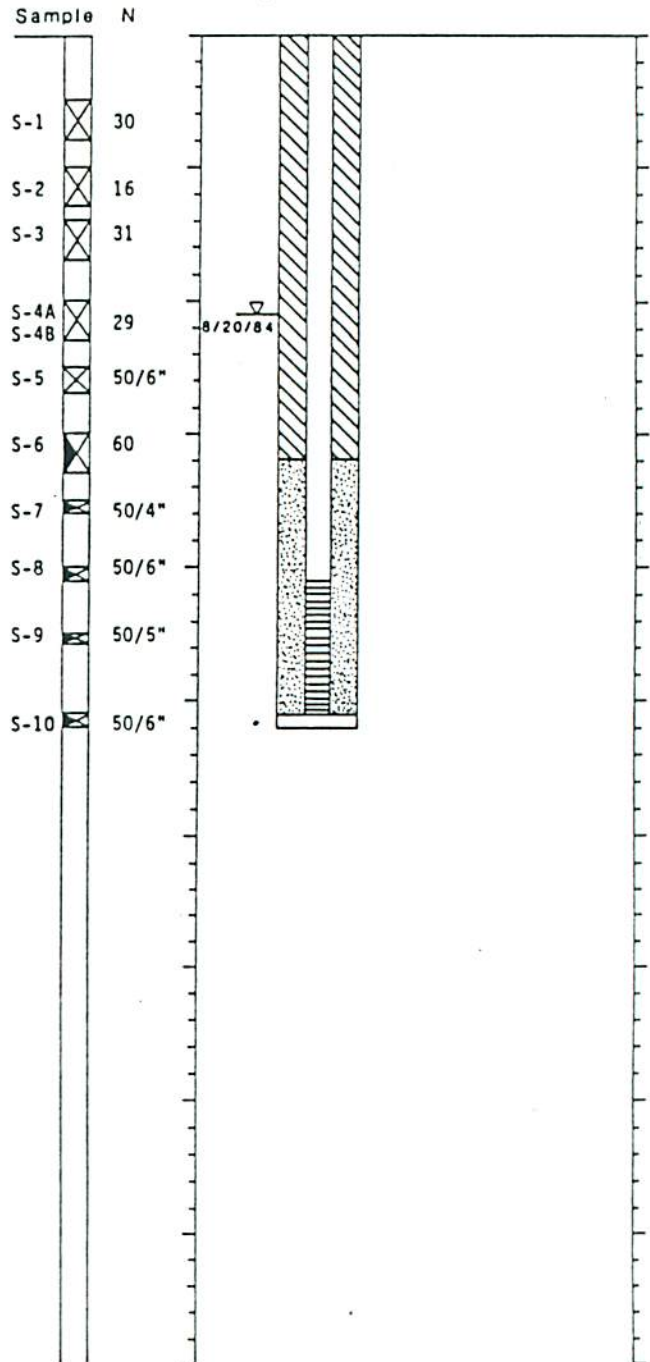
Boring Log and Construction Data for Well E-14

Geologic Log



Well Design

Top Casing Elevation in Feet 39.36
Casing Stickup in Feet 1.34



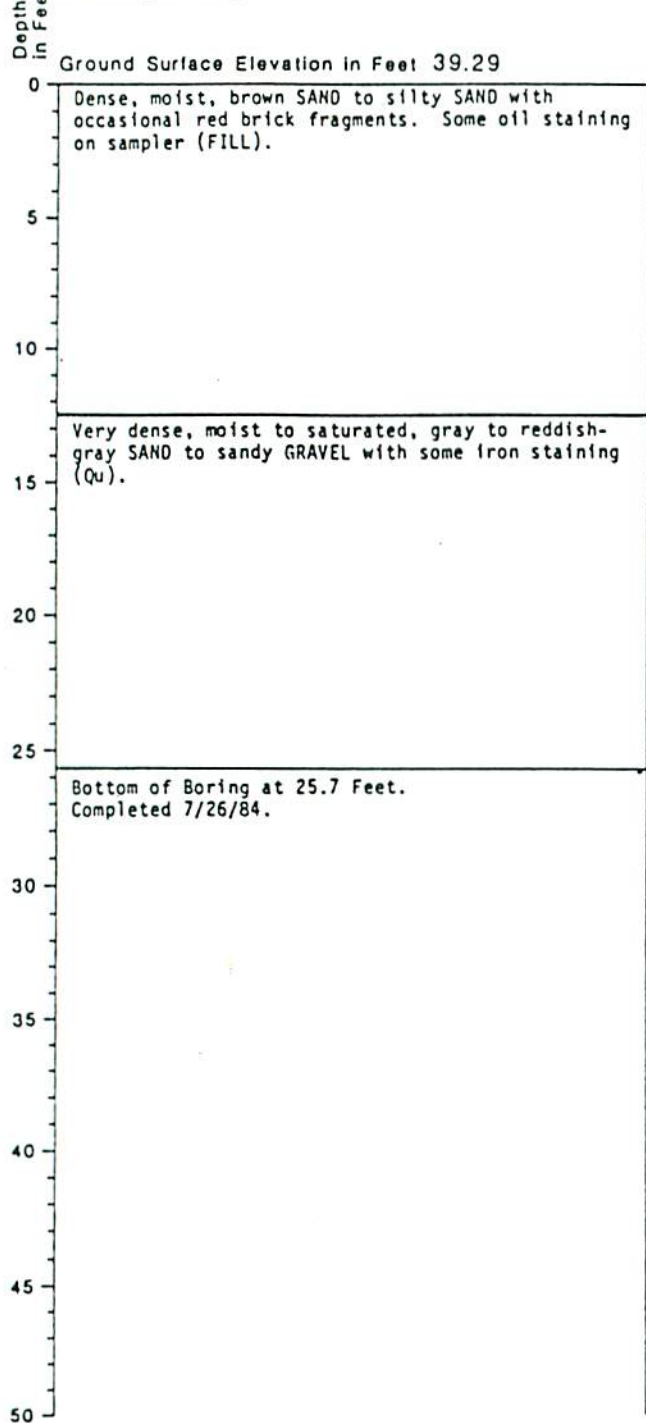
- 2-inch O.D. Split Spoon Sample
- No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits

NOTES:

1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

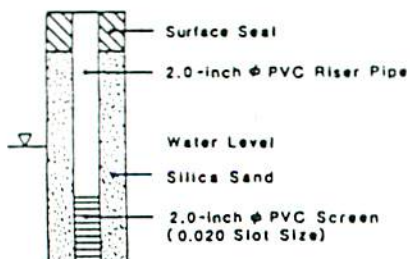
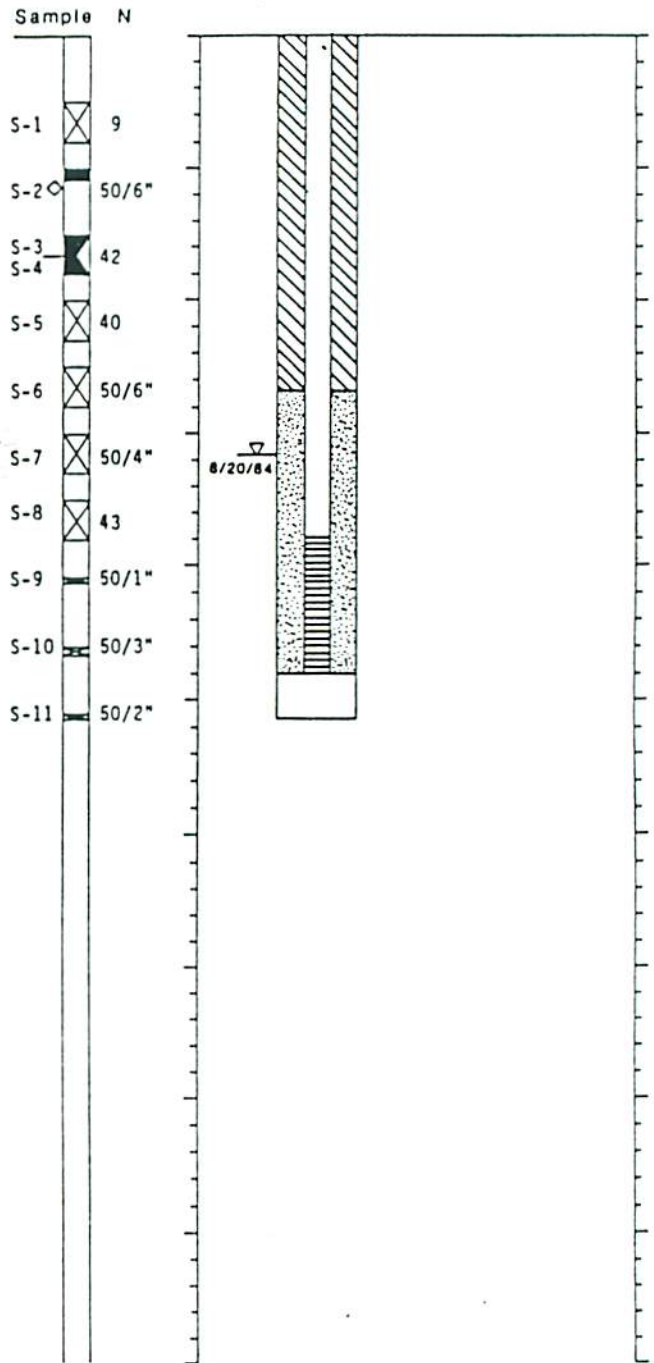
Boring Log and Construction Data for Well E-15

Geologic Log



Well Design

Top Casing Elevation in Feet 40.45
Casing Stickup in Feet 1.16



⊗ 2-inch O.D. Split Spoon Sample

• No Sample Recovery

N Standard Penetration Resistance, Blows per foot

GS Grain Size Analysis

K Permeability Test

Qu Glacial Deposits

◇ High blow count may be due to drilling obstructions, not considered to reflect actual density conditions.

NOTES:

1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

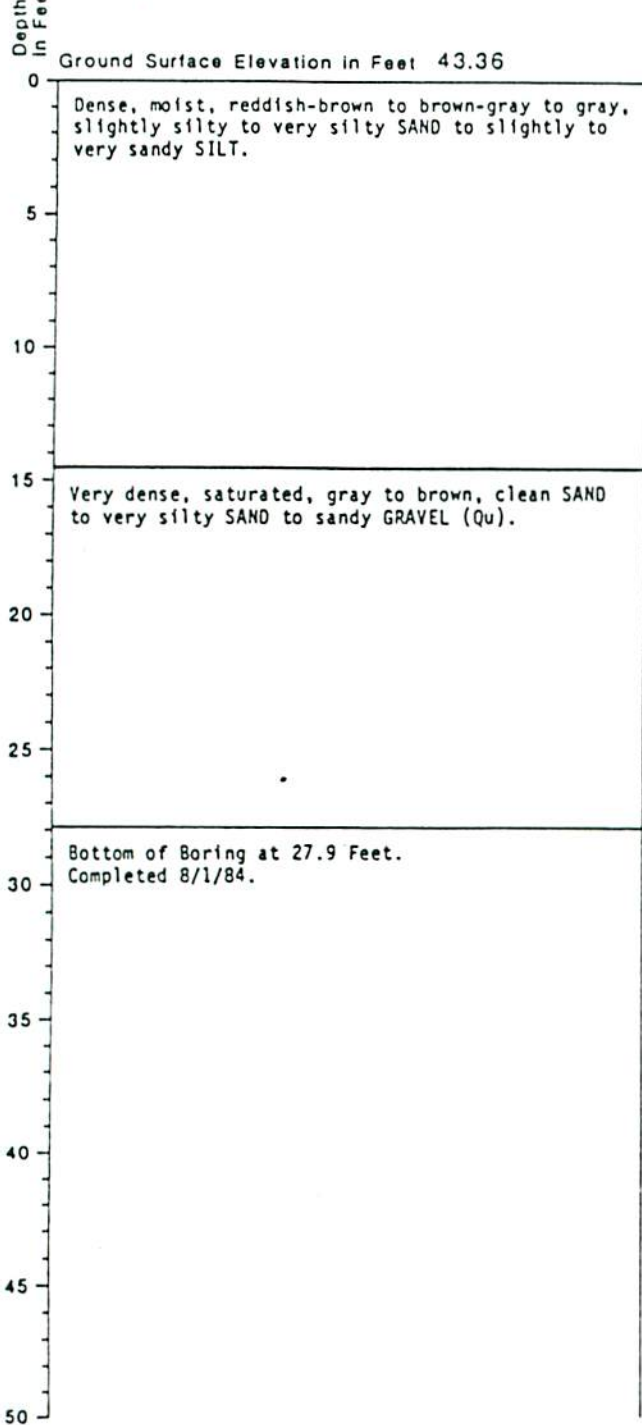
J-1210-09 August 1984

HART-CROWSER & associates, inc.

Figure A-15

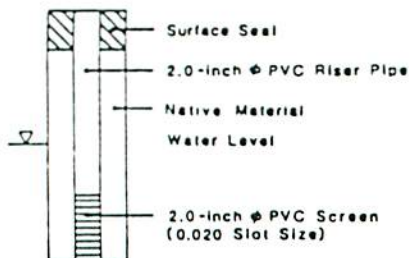
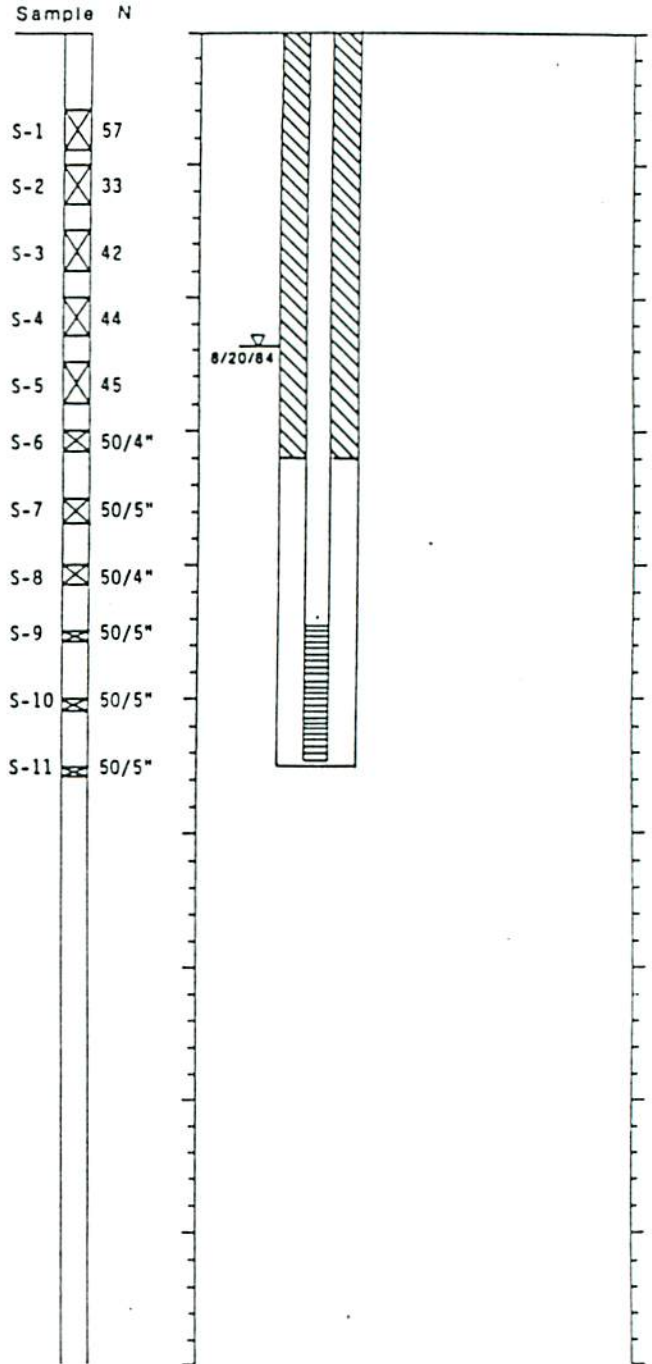
Boring Log and Construction Data for Well E-16

Geologic Log



Well Design

Top Casing Elevation in Feet 43.18
Casing Stickup in Feet -0.28

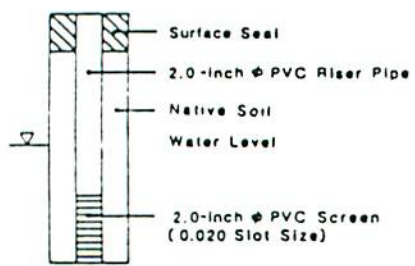
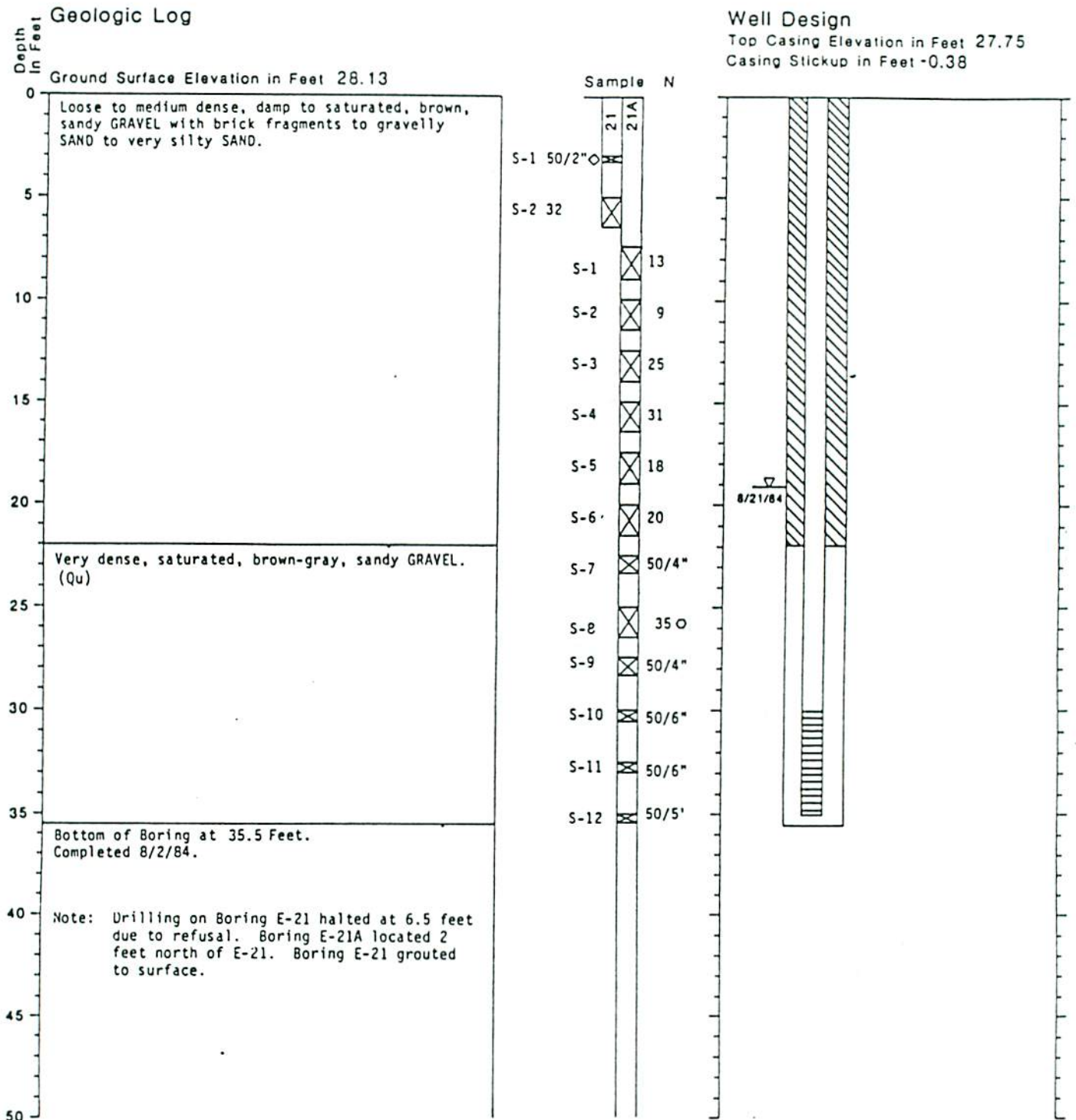


- 2-inch O.D. Split Spoon Sample
- No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits

NOTES:

1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year, ATD:At Time of Drilling

Boring Log and Construction Data for Well E-21/21A



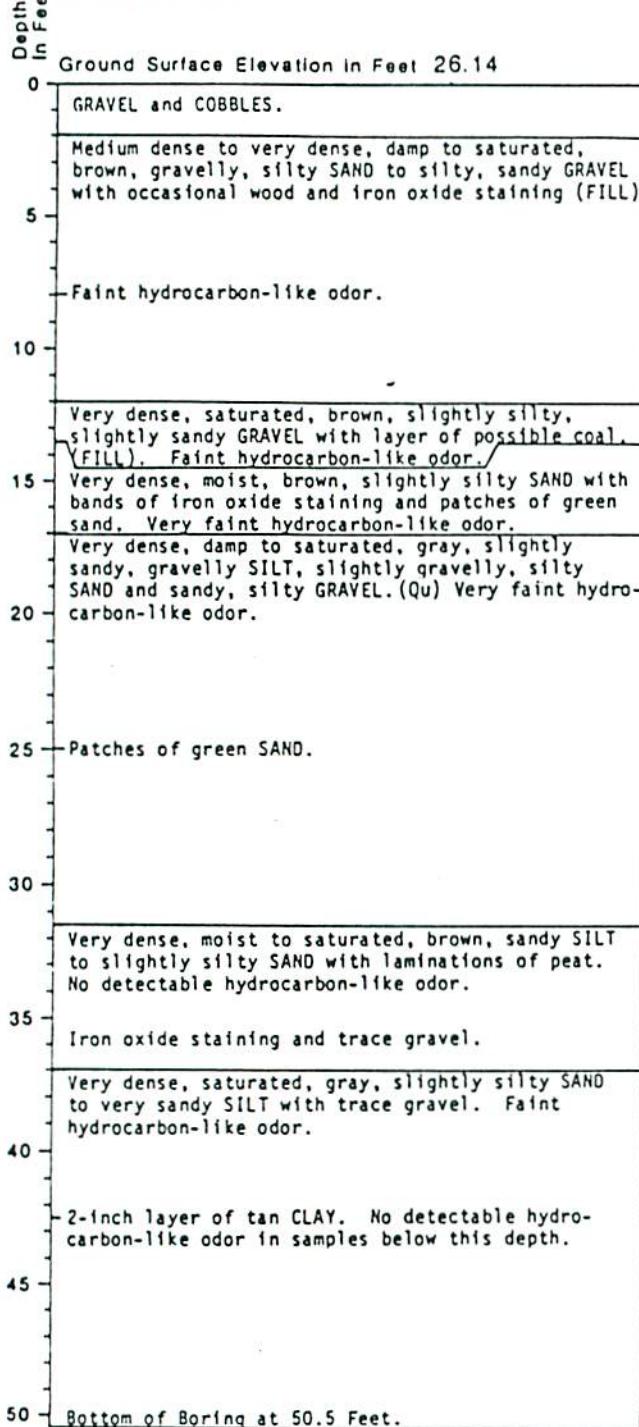
- ⊗ 2-inch O.D. Split Spoon Sample
- No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits
- High blow count may be due to drilling obstructions, not considered to reflect actual density conditions.
- Low blow count may be due to heaving conditions in borehole, not considered to reflect actual density conditions.

NOTES:
 1. Soil descriptions are interpretive and actual changes may be gradual.
 2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

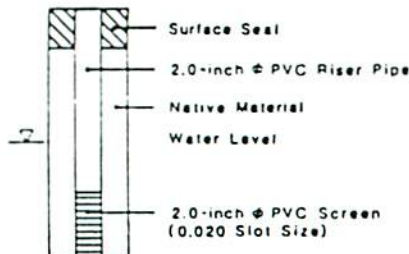
J-1210-09 August 1984
 HART-CROWSER & associates, inc.
 Figure A-21

Boring Log and Construction Data for Well E-23

Geologic Log



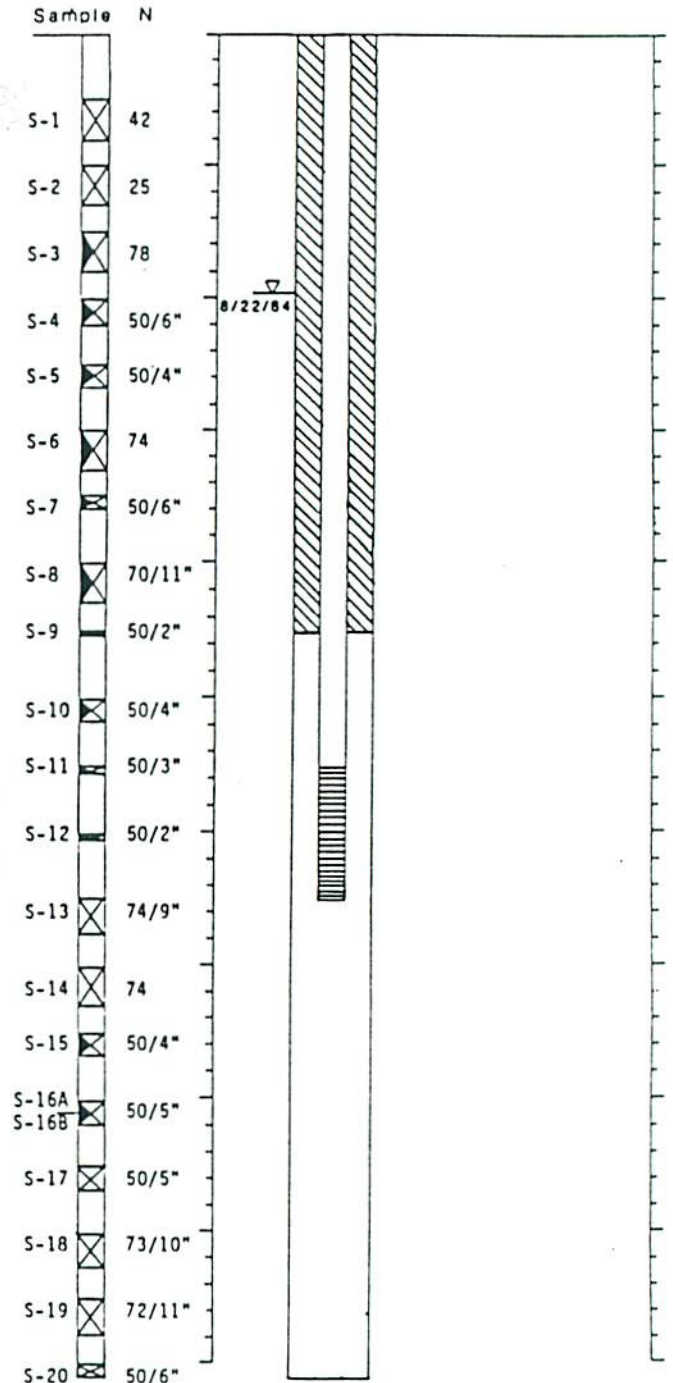
Completed 8/10/84.



- 2-inch O.D. Split Spoon Sample
- No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- Qu Glacial Deposits

Well Design

Top Casing Elevation in Feet 27.39
Casing Stickup in Feet 1.25



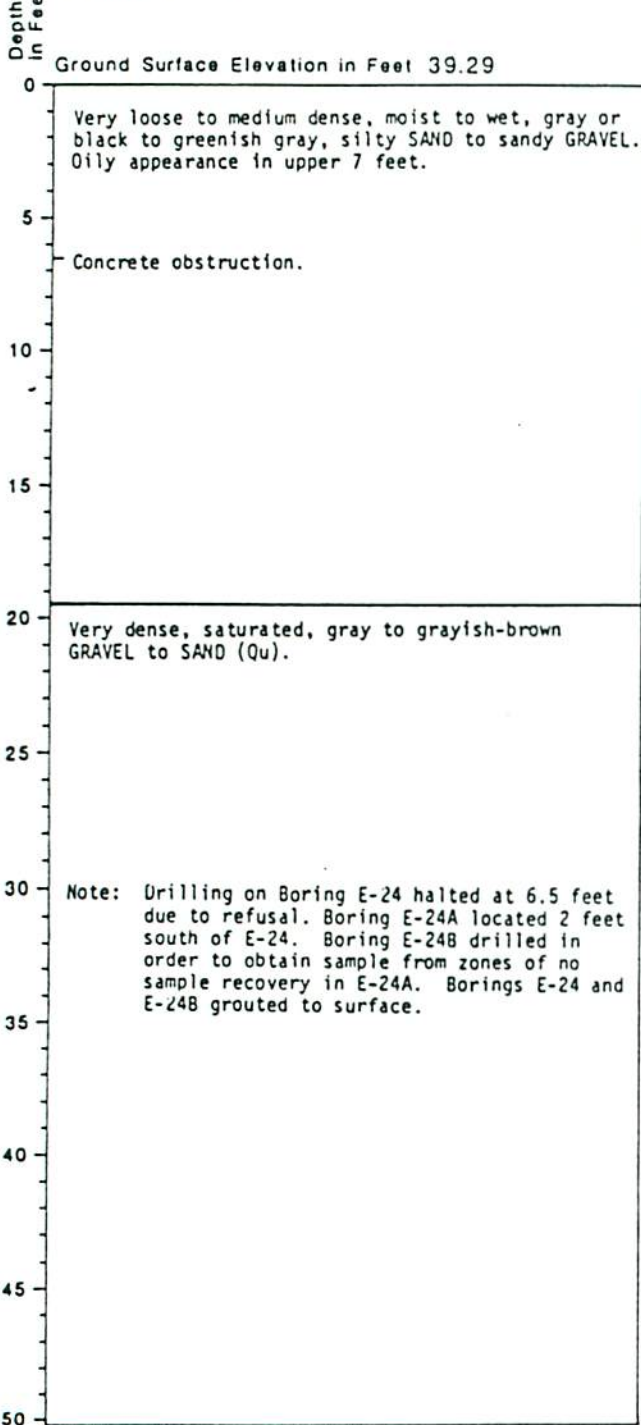
NOTES:

1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

J-1210-09 August 1984
HART-CROWSER & associates, inc.
Figure A-23

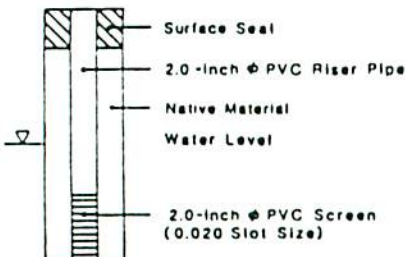
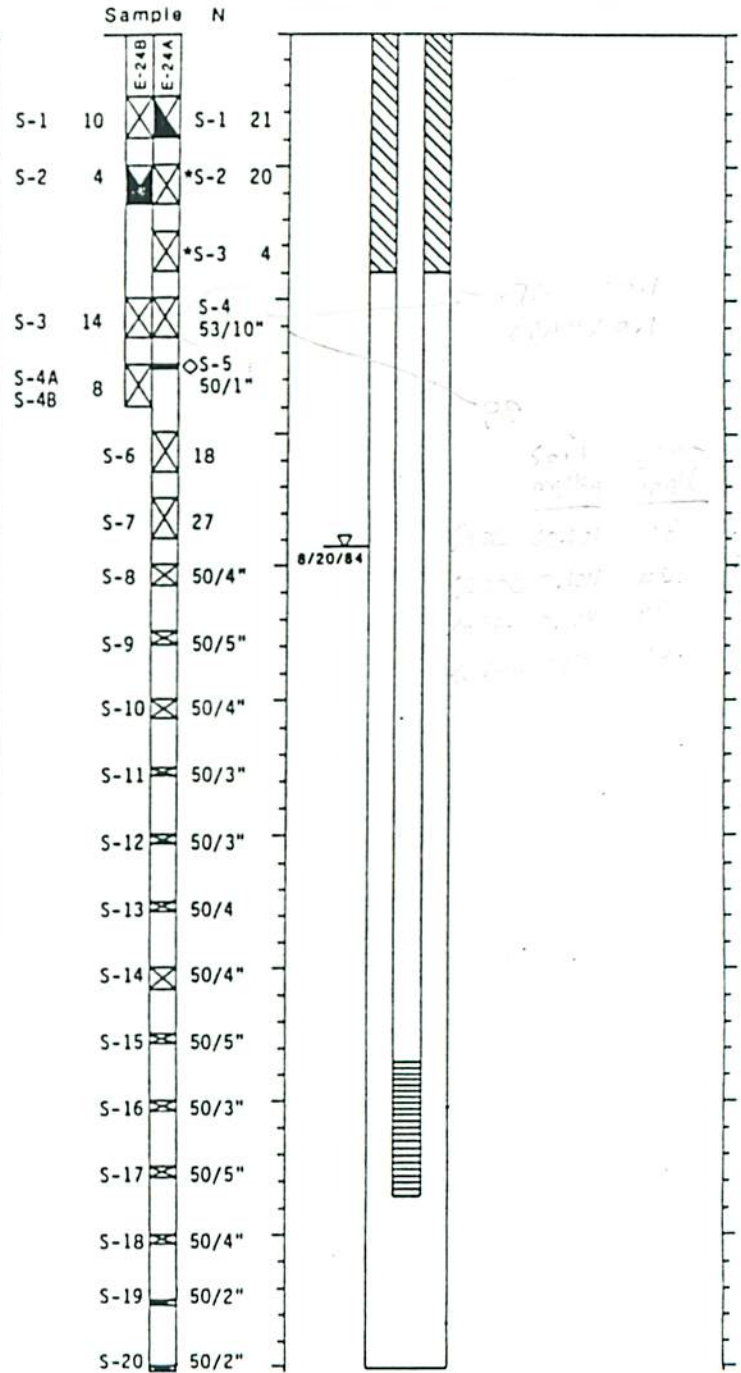
Boring Log and Construction Data for Well E-24A/24B

Geologic Log



Well Design

Top Casing Elevation in Feet 40.45
Casing Stickup in Feet 1.16



- 2-Inch O.D. Split Spoon Sample
- No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test
- High blow count may be due to drilling obstructions, not considered to reflect actual density conditions.
- Qu Glacial Deposits

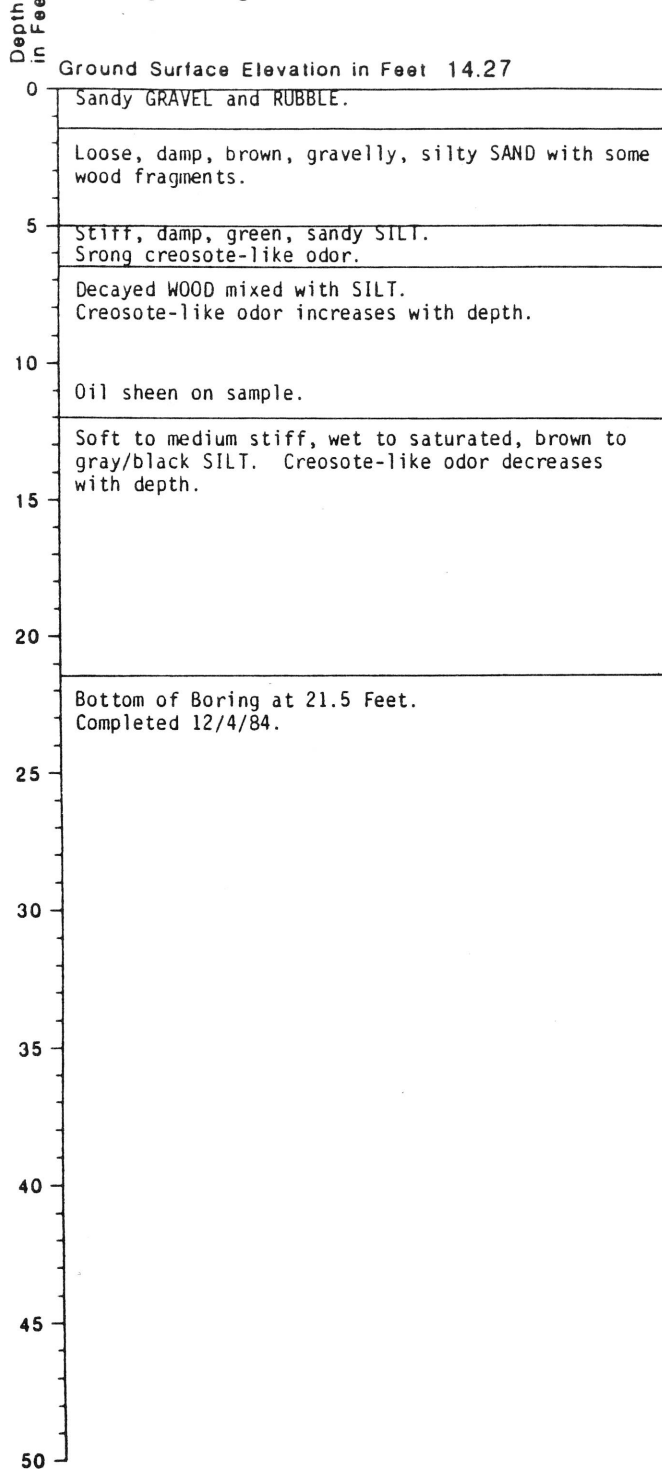
NOTES:

1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

J-1210-09 August 1984
HART-CROWSER & associates, inc.
Figure A-24

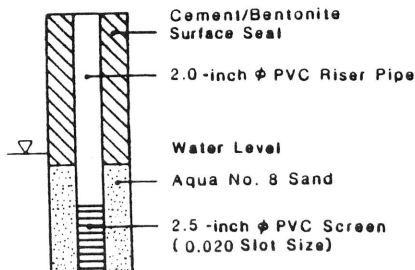
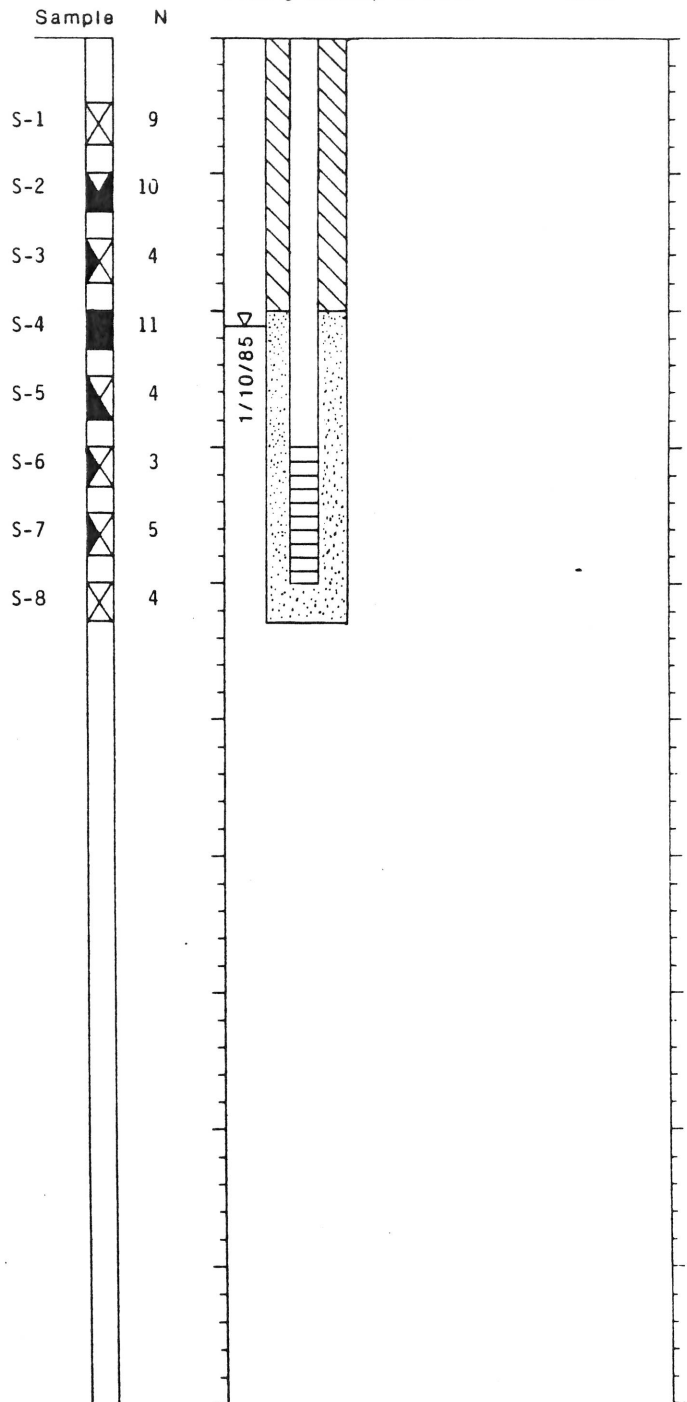
Boring Log and Construction Data for Well E-27

Geologic Log



Well Design

Top Casing Elevation in Feet 14.02
Casing Stickup in Feet -0.25



- 2-inch O.D. Split Spoon Sample
- * No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test

NOTES:

1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

J-1210-10 September 1985

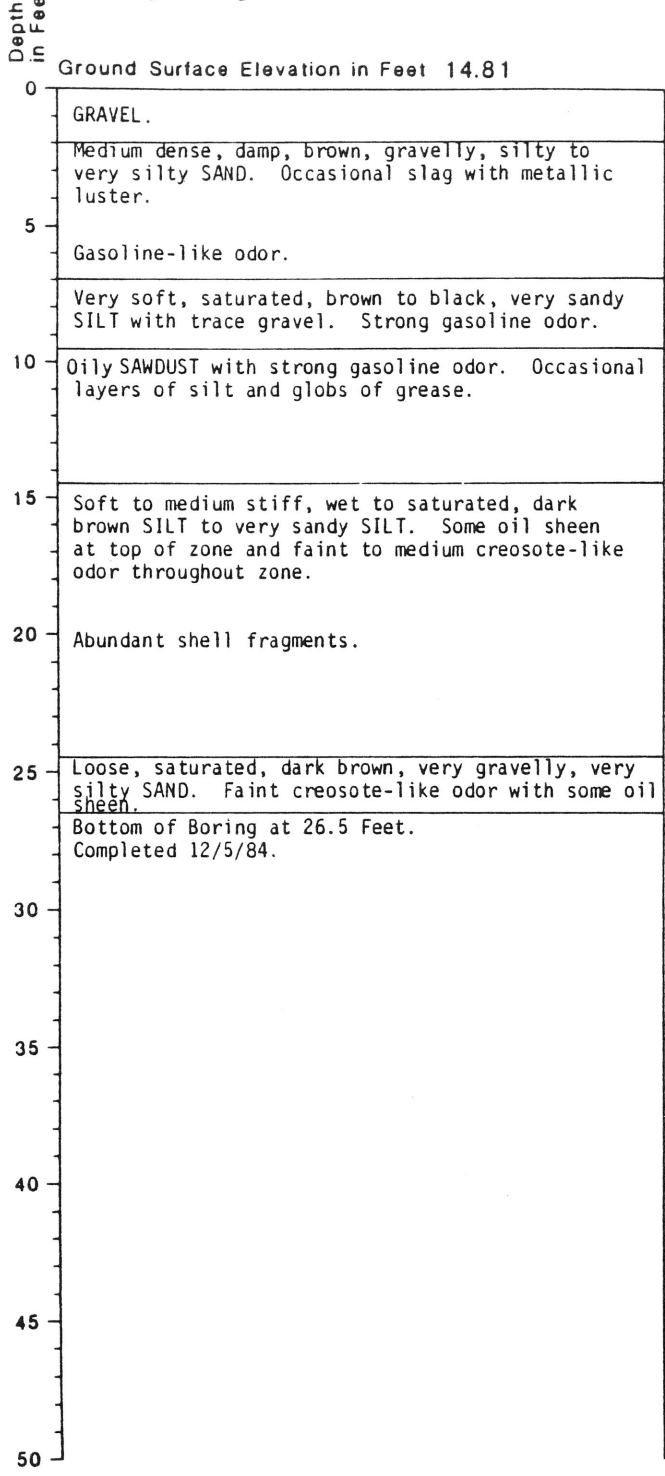
J-1210-09 December 1984

HART-CROWSER & associates, inc.

Figure A-1

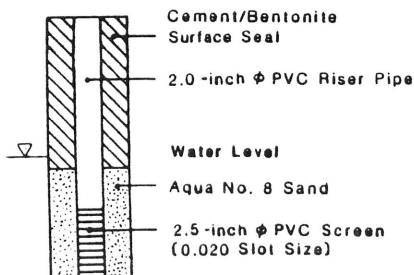
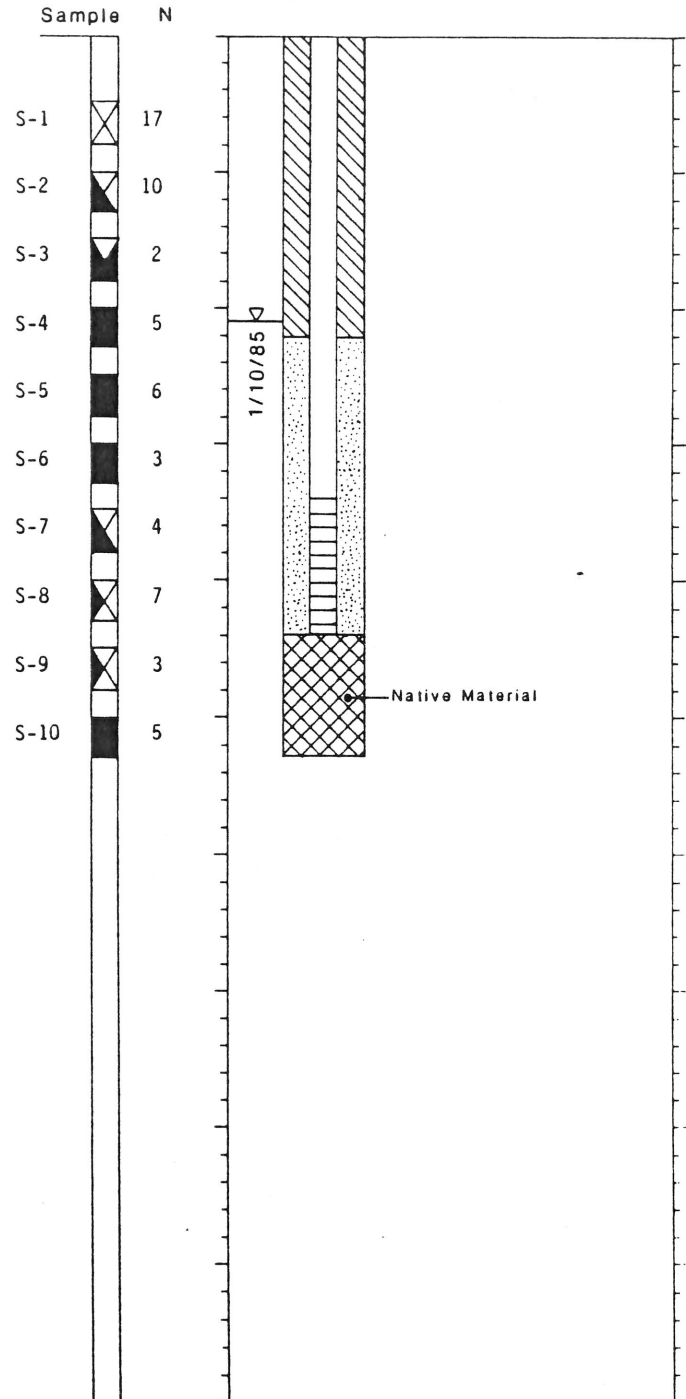
Boring Log and Construction Data for Well E-28

Geologic Log



Well Design

Top Casing Elevation in Feet 14.56
Casing Stickup in Feet -0.25



- 2-inch O.D. Split Spoon Sample
- * No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test

NOTES:

1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

J-1210-10 September 1985

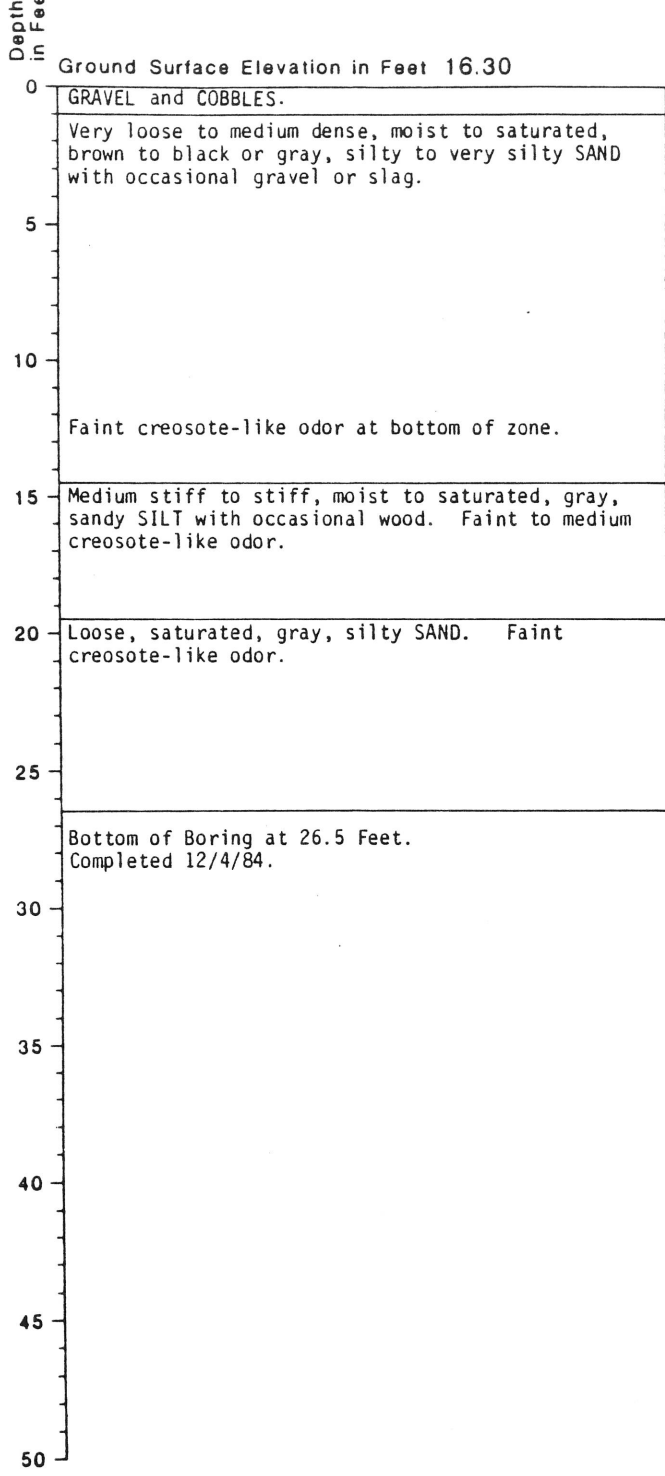
J-1210-09 December 1984

HART-CROWSER & associates, inc.

Figure A-2

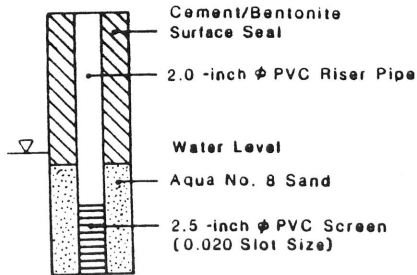
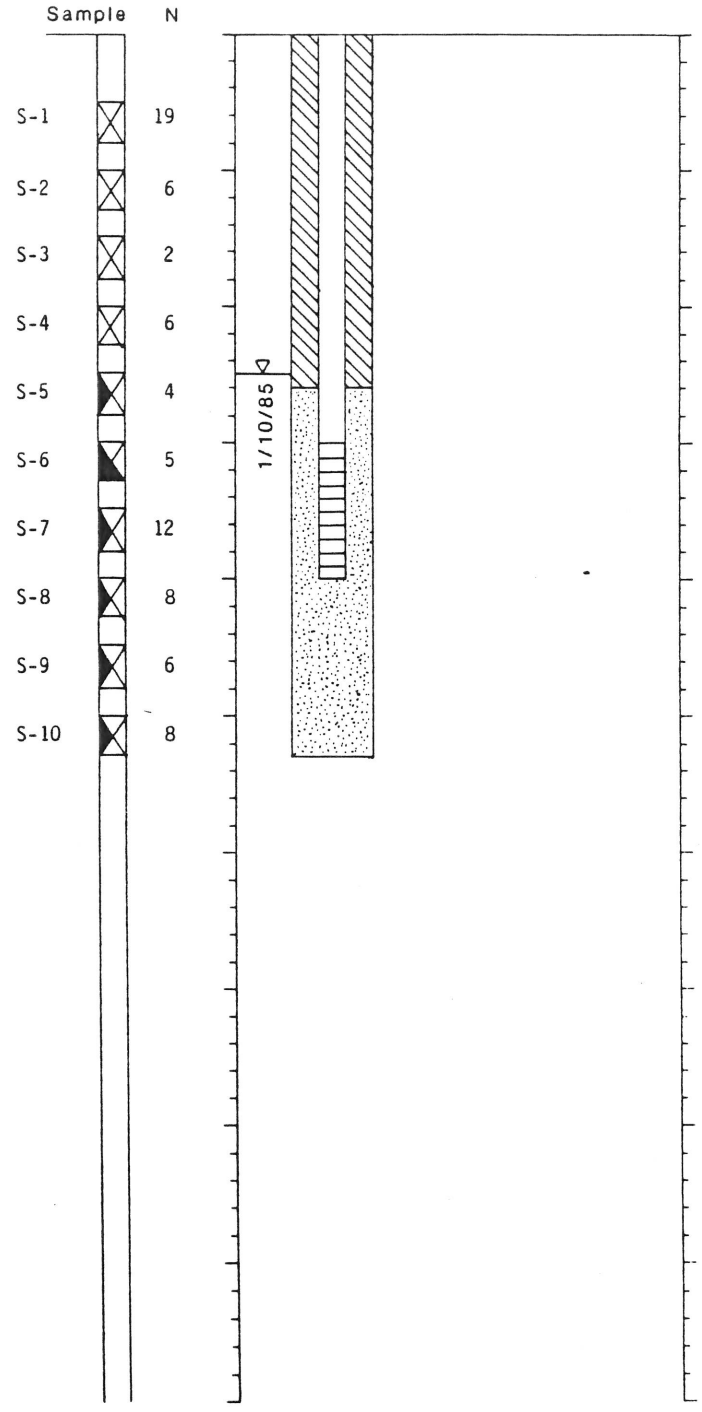
Boring Log and Construction Data for Well E-29

Geologic Log



Well Design

Top Casing Elevation in Feet 16.05
Casing Stickup in Feet -0.25



- 2-inch O.D. Split Spoon Sample
- * No Sample Recovery
- N Standard Penetration Resistance, Blows per foot
- GS Grain Size Analysis
- K Permeability Test

NOTES:

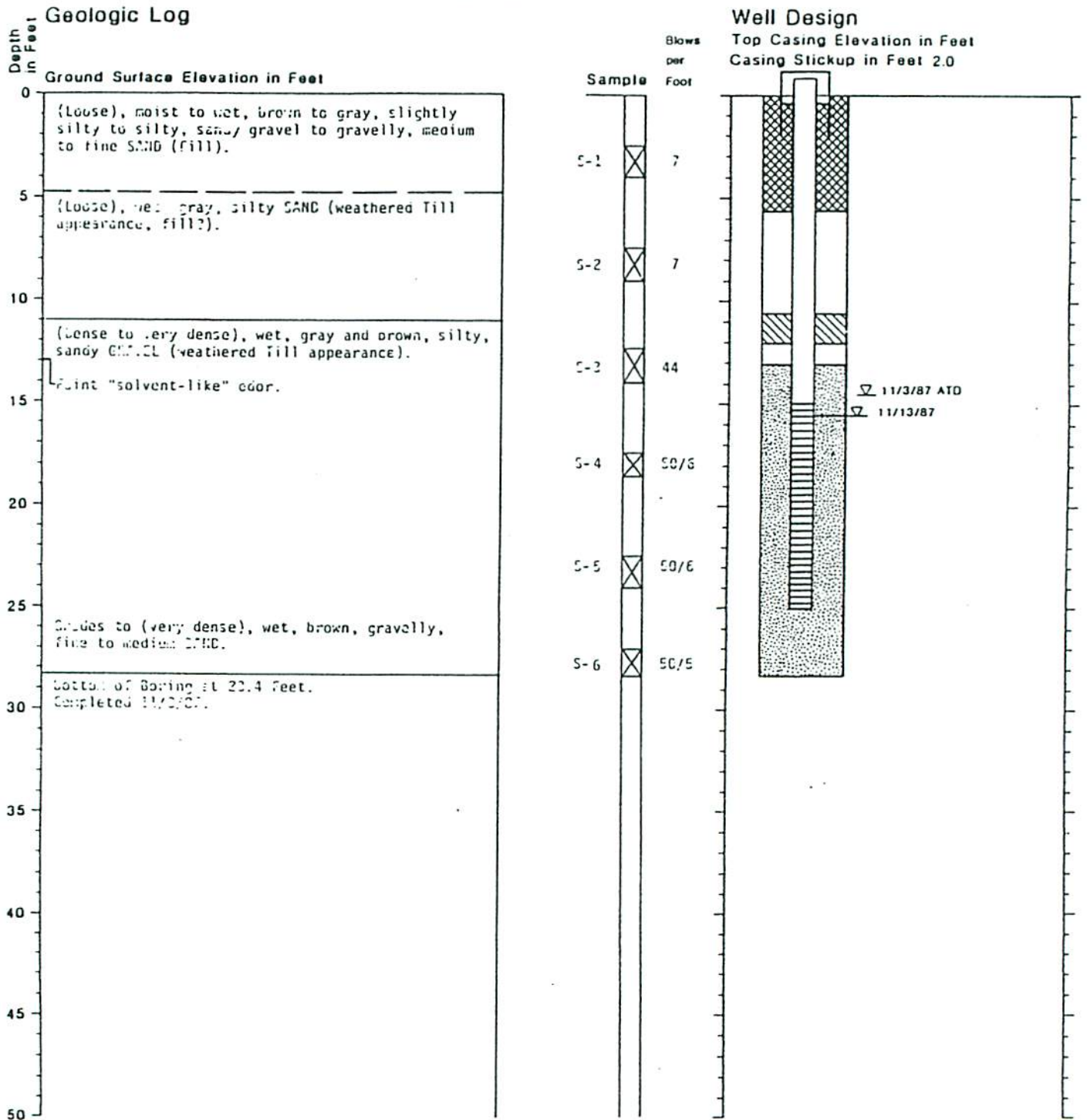
1. Soil descriptions are interpretive and actual changes may be gradual.
2. Water Level is for date indicated and may vary with time of year. ATD: At Time of Drilling

J-1210-10 September 1985
J-1210-09 December 1984
HART-CROWSER & associates, inc.

Figure A-3

Boring Log and Construction Data for Well MW-1

Replaces Wells E-17 and E-20, Hart Crowser Job No. J-1210-09



PSE 1279874

J-1210-13 March 1988

HART-CROWSER & associates, inc.

Figure A-2

FIGURE A-5
MONITORING WELL ABANDONMENT RECORD
HOLT DRILLING, INC.

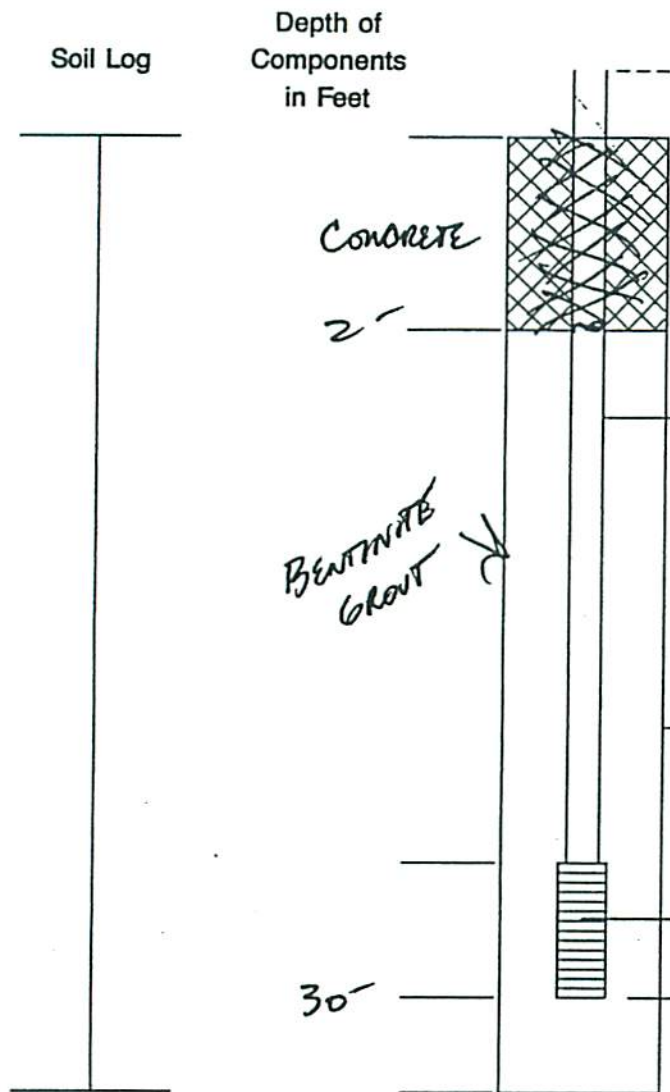
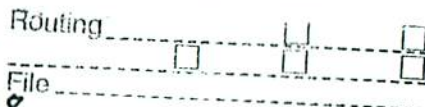
GEO ENGINEERS

DEC 01 1998

Resource Protection Well Report

Project Name DOCK ST. & A ST
 Well Identification # MW-1
 Drilling Method Abandonment
 Driller MIKE CYRIER
 License # 2081

Date 10-20-98
 County PIERCE, NE 1/4 NW 1/4
 Section 9 T. 20N R. 3E
 Start Card A 29095
 Consulting Firm GEO ENGINEERS



Stick up 2' on Monument Casing

Type of Surface Seal CONCRETE
 Amount 2'

ID of Riser Pipe _____
 Type of Riser Pipe _____
 Amount _____

Type of Connection _____

Type of Backfill around Riser _____
 Amount _____

Diameter of Borehole _____

Screen Size or Type _____

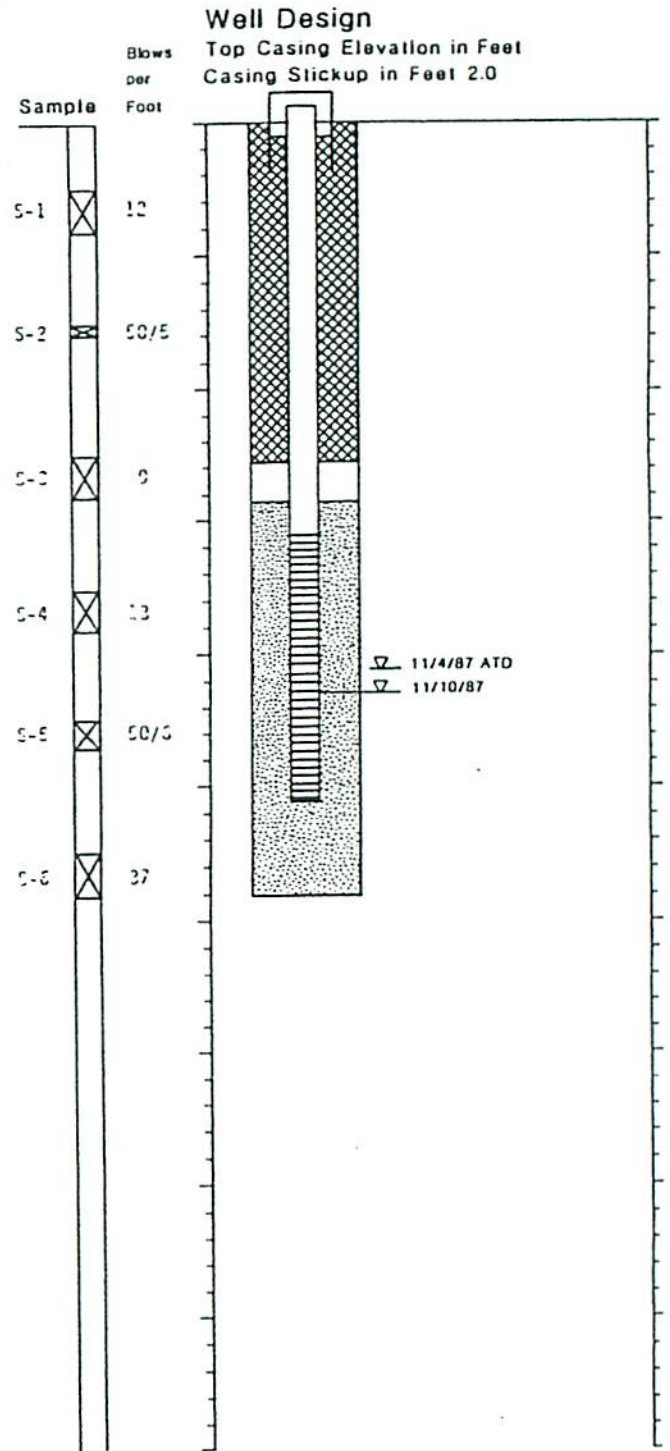
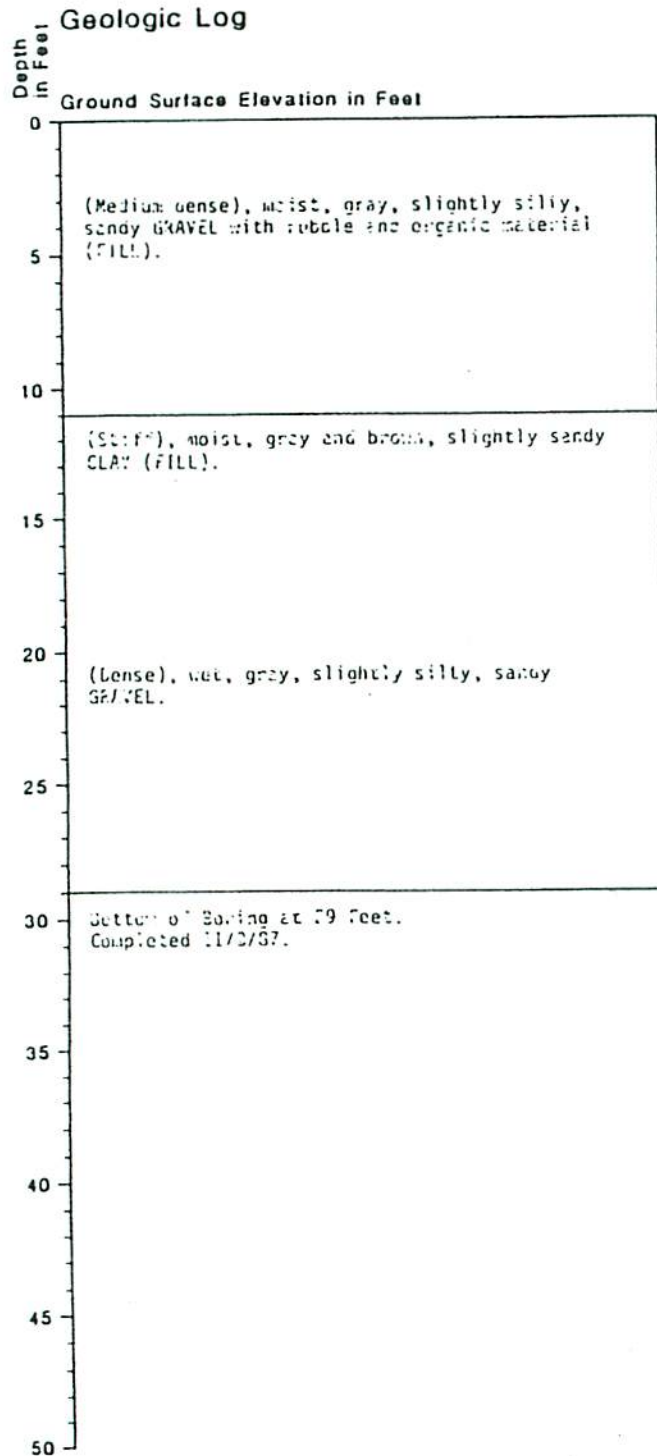
Type of Filter Material _____
 Amount _____

Remarks: SET TREMMIE PIPE 2 30' & TREMMIE BENTONITE GROUT
from bottom to top pull STICK UP MONUMENT & DIG OUT
CONCRETE TOP 2'

Signature *Mike Cyrier*

Boring Log and Construction Data for Well MW-2

Replaces Well E-13, Hart Crowser Job No. J-1210-09

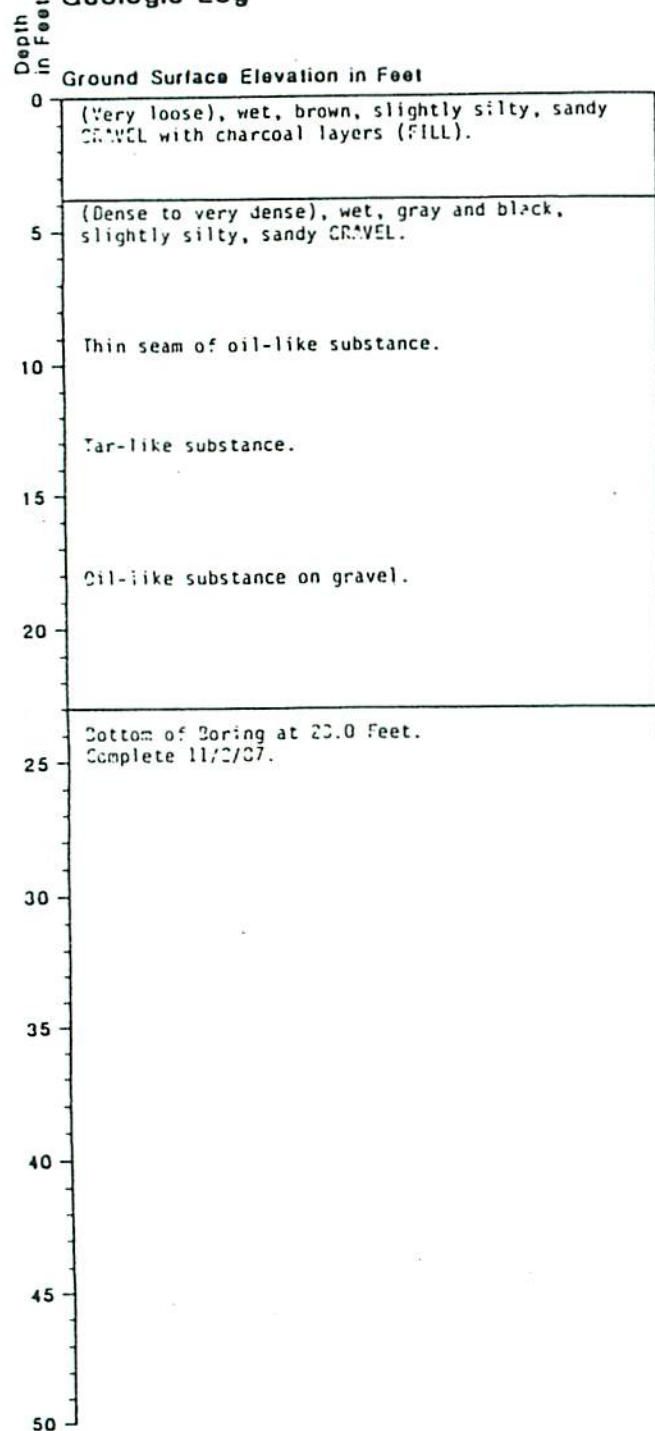


PSE 1279875

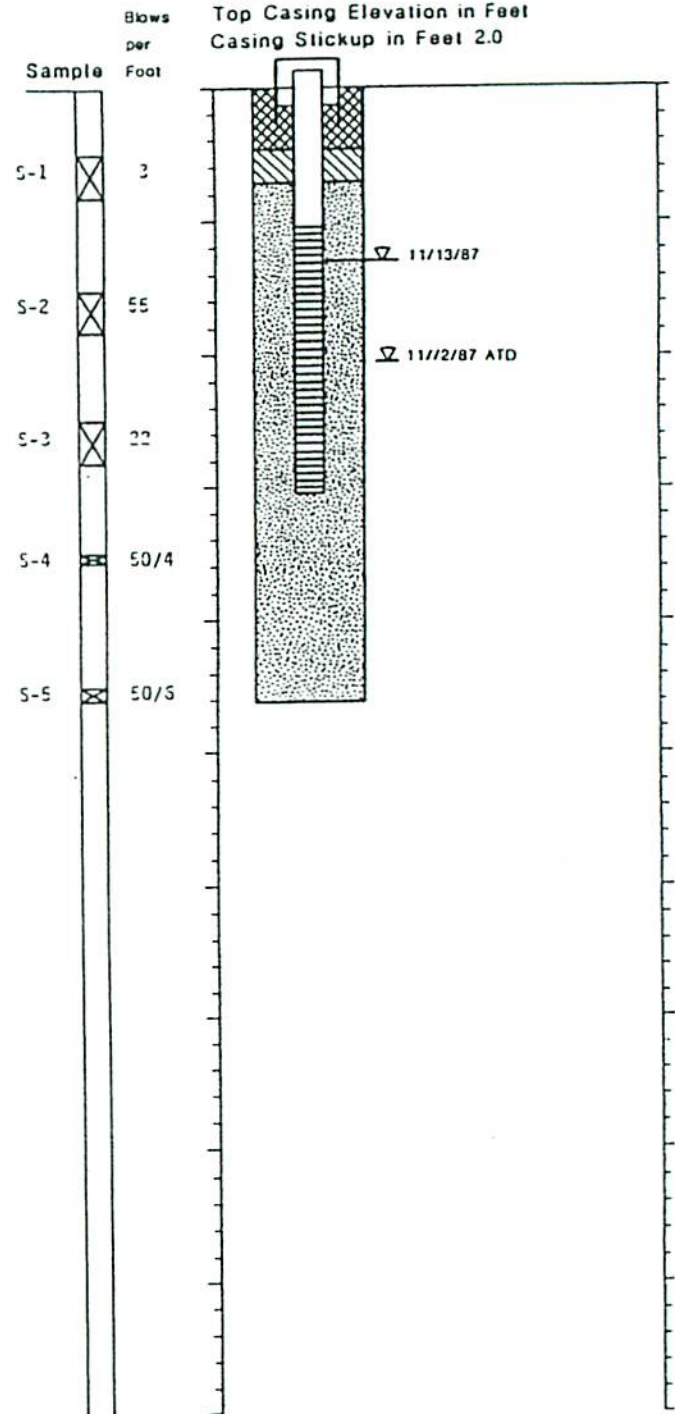
Boring Log and Construction Data for Well MW-3

Replaces Well E-10, Hart Crowser Job No. J-1210-09

Geologic Log



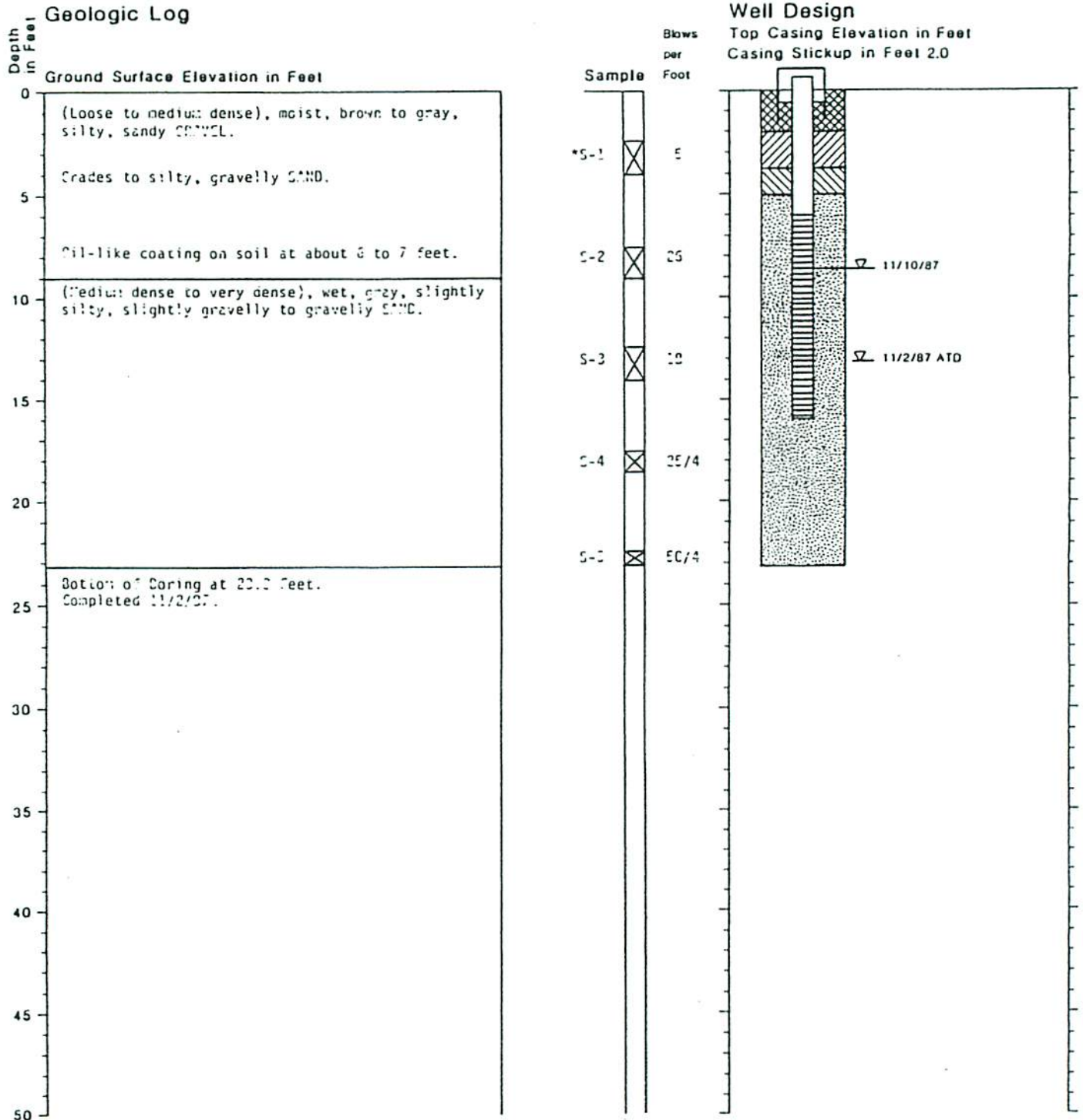
Well Design



PSE 1279876

Boring Log and Construction Data for Well MW-4

Replaces Well E-4, Hart Crowser Job. No. J-1210-09



PSE 1279877

BLACK & VEATCH Special Projects Corp.

LOG OF BORING

BORING NO. DOT MW-4
SHEET 1 OF 1

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40406.540	
PROJECT LOCATION Tacoma, Washington		COORDINATES N' E'		ELEVATION (DATUM) (msl)	
SURFACE CONDITIONS Gravel pad 60'N of intersection of S. A and Dock		LOGGED BY T. Mathis		TOTAL DEPTH 28.0 FEET	
				DATE START 01/27/96	
				DATE FINISH 01/27/96	

SAMPLING							CHECKED BY S. Martin			APPROVED BY A. Markos		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS	

CORING							DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD					

CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
							1			GRAVEL; dark grey; loose; well graded; fine to medium grained; subrounded; moist; some silt and sand (Fill).	Boring advanced w/8-3/4" OD, 4-1/4" ID hollow stem augers. Samples collected w/1-1/2" ID split barrel sampler driven w/140 lb. hammer.
							2				
							3			GRAVEL; dark gray; very dense; poorly graded; medium grained; subangular to angular; moist; some silt and sand.	
							4				
							5				
							6				
SPT	1	9	37	27	64	0.08	7				
							8				
							9				
							10				
CA	2	50	100/3"	--	>50	0.25	11				
							12			grading wet.	Water encountered at approximately 12'.
							13				
							14				
							15				
CA	3	50	50	69	119	0.33	16				
							17			grading w/trace wood fragments.	
							18				
							19				
							20				
							21				
CA	4	100	--	--	>50	0.0	22				
							23				
							24				
							25				
							26				
CA	5	89	--	--	>50	0.16	27			clayey SILT; dark yellowish brown; very stiff; moderately plastic; dry; trace fine sand.	
							28				
							29				

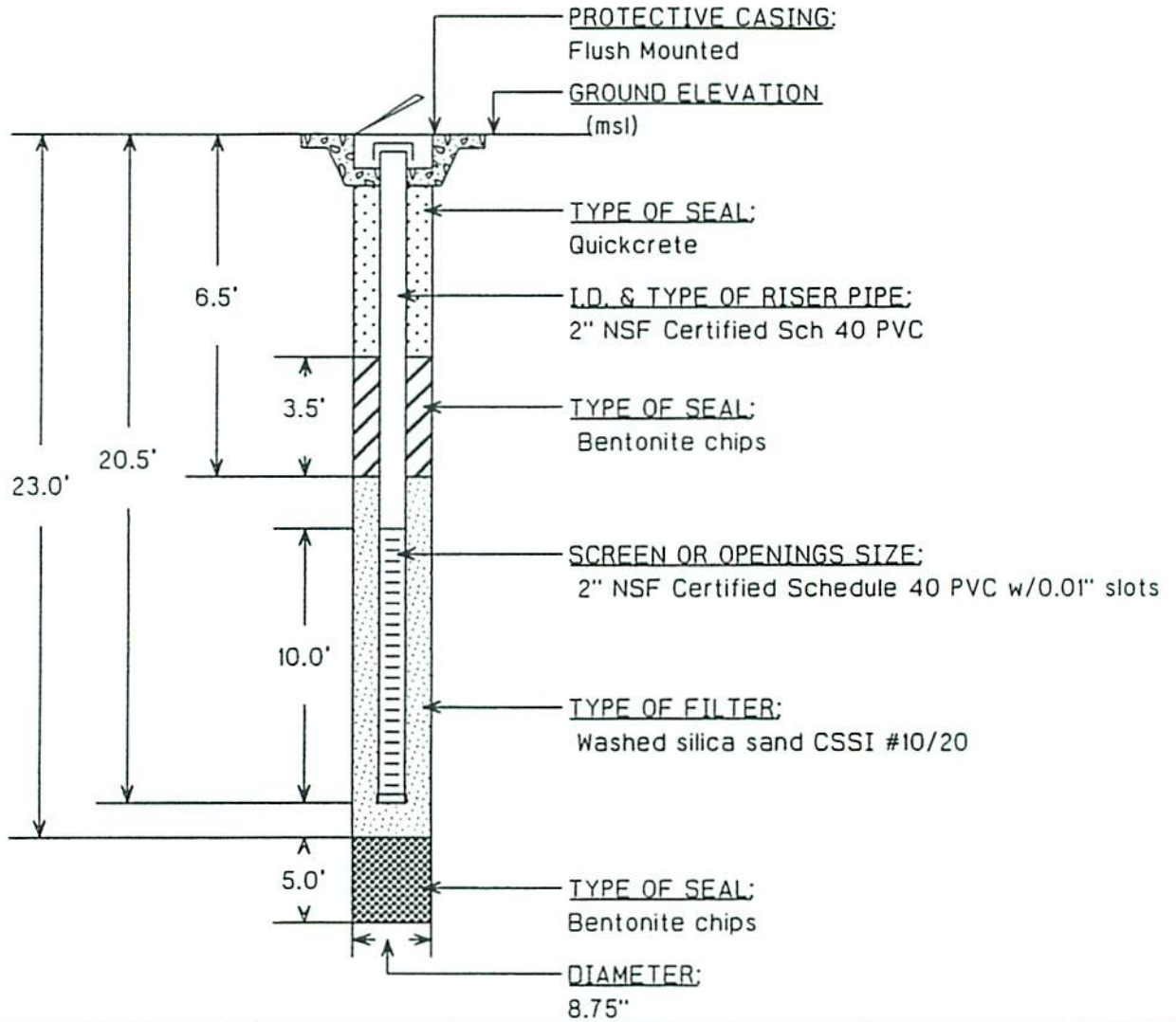
Bottom of boring @ 28.0'.
Water level not measured. Monitoring well constructed 1/27/96.



PIEZOMETER / WELL INSTALLATION LOG

NO. DOT MW-4

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40406.540	
PROJECT LOCATION Tacoma, Washington		COORDINATES N E		TOP OF RISER ELEVATION (DATUM) (msl)	
STRATUM MONITORED Gravel		LOGGED BY T. Mathis			
CHECKED BY S. Martin		APPROVED BY A. Markos			



METHOD OF INSTALLATION:

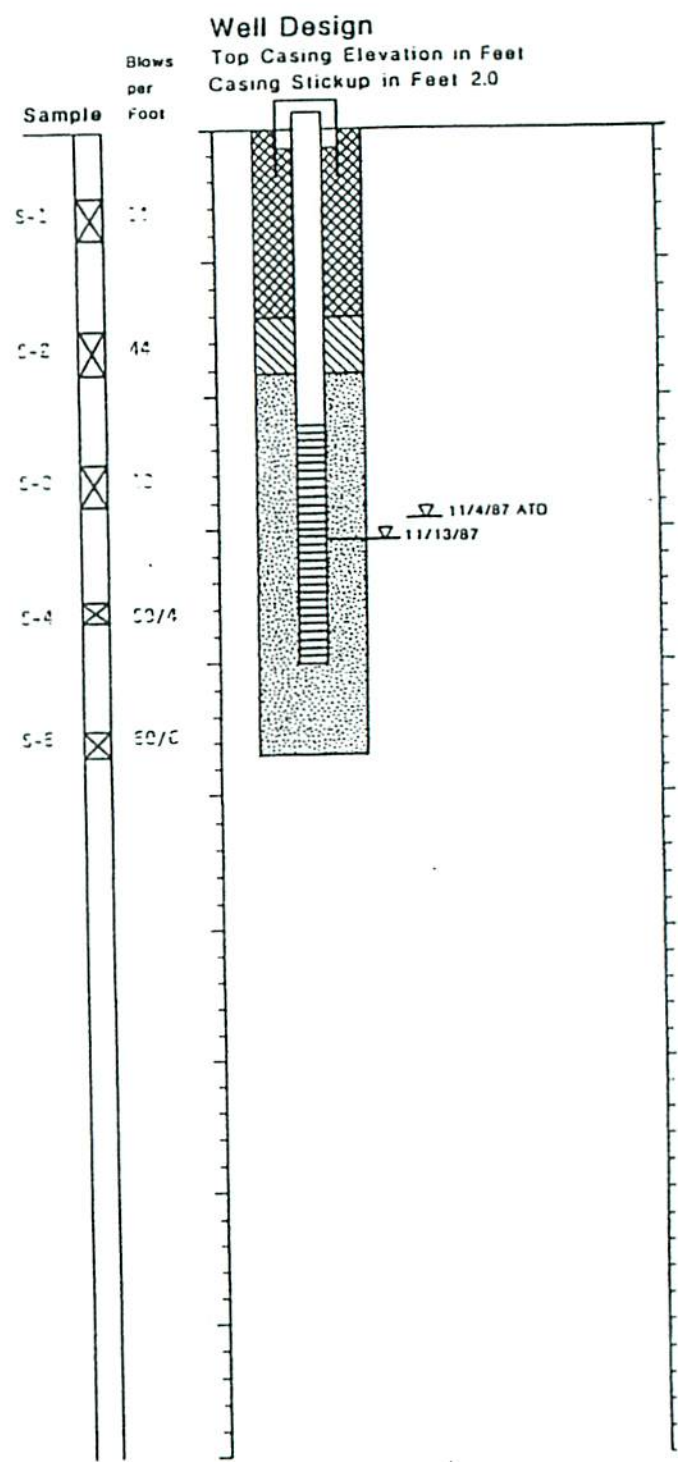
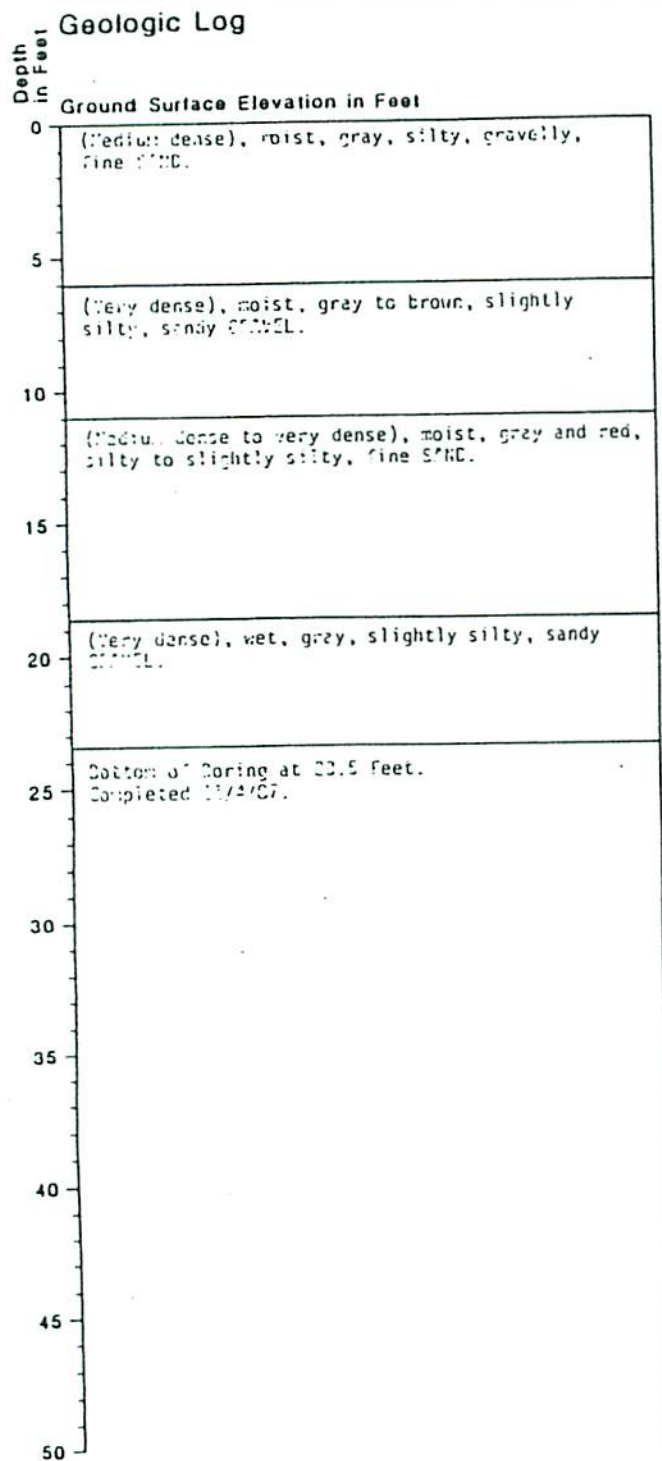
Boring drilled to completion; placed lower seal; set screen and riser pipe; placed filter pack and seal; set 8" diam. flush-mount housing and placed grout seal to surface.

REMARKS:

Well developed by surging and bailing. Removed 25 gallons of water (approx. 12 casing volumes). 6-inch riser pipe below screen. Dedicated bailer installed in well.

Boring Log and Construction Data for Well MW-5

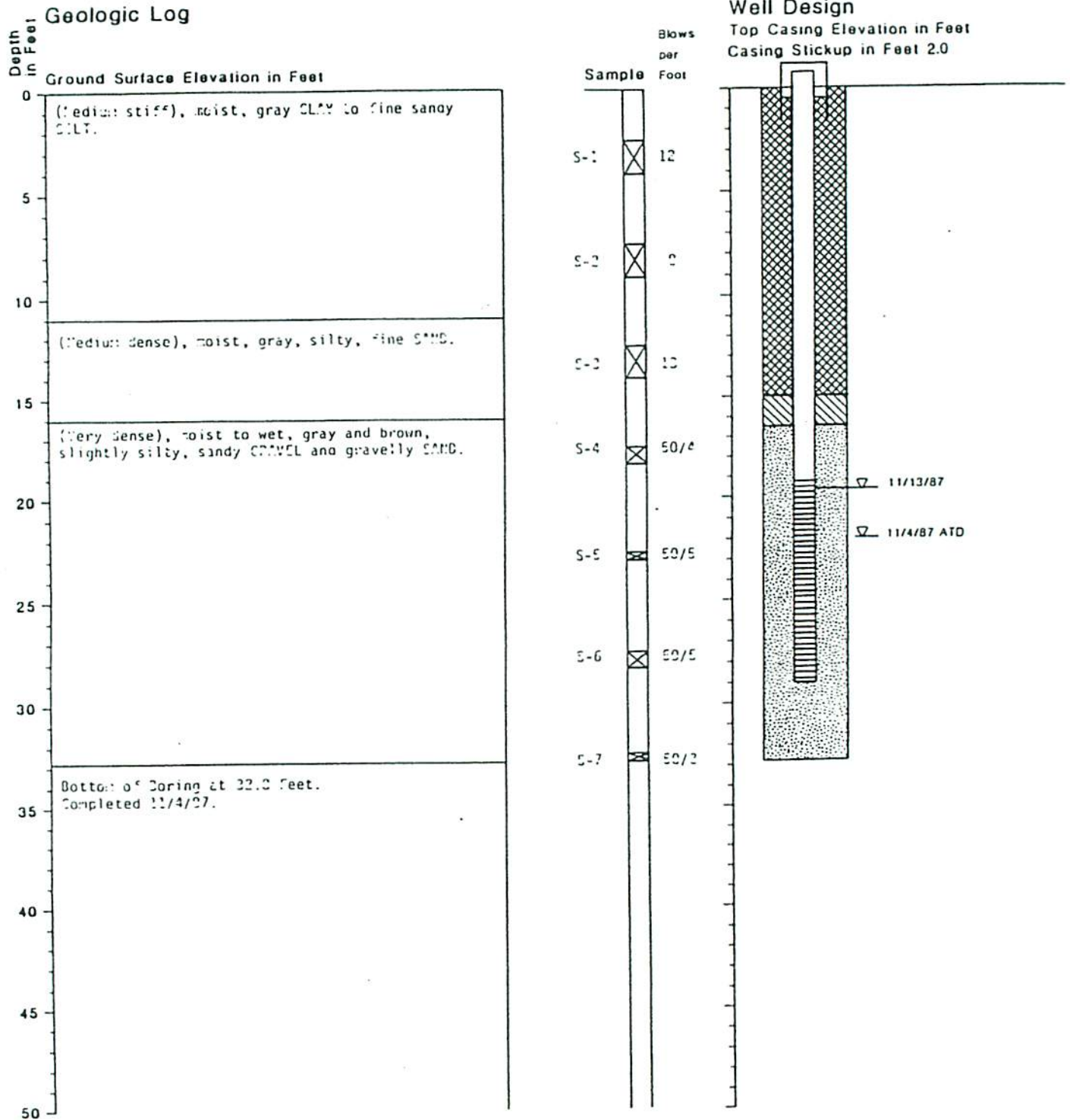
Replaces Well E-1, Hart Crowser Job No. J-1210-09



PSE 1279878

Boring Log and Construction Data for Well MW-6

Replaces Well E-15, Hart Crowser Job No. J-1210-09



PSE 1279879

LOG OF BORING

CLIENT City of Tacoma		PROJECT Tacoma Coal Gasification Site		PROJECT NO. 40406
PROJECT LOCATION Tacoma, Washington		COORDINATES N-702000; E-1160170	ELEVATION (DATUM) 18.00' (Tacoma)	TOTAL DEPTH 27.0'
SURFACE CONDITIONS Sloped, landscaped with bark, West side of Dock St.			INSPECTOR M. D'Andrea	DATE FINISH 11/04/93

SAMPLING								CHECKED BY		APPROVED BY		REMARKS
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY			B. Bailey			
CORING								DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD						
CA	1	30	66	59/32	125	1.1'	1			Gravelly SAND; brown; very dense; poorly graded; med-coarse grained; wet; w/ trace silt and organics.	Boring advanced w/a 4 1/4" ID, 8" OD hollow stem auger. Samples collected w/a 3" OD split spoon w/ 140 lb hammer.	
CA	2	16	20	24/28	44	2.0'	2			Silty SAND; black; dense; poorly graded; fine to coarse grained; moist; w/ trace gravel.		
CA	3	7	9	20/25	29	1.5'	3			Sawdust/wood chips	Organic & brick material.	
CA	4	6	7	9/5	16	1.3'	4			SAND; grey; medium dense; poorly graded; fine grained; moist; w/ trace gravel.	0-2' OVA 4 ppm.	
CA	5	4	8	8/12	16	2.0'	5			Grades wet with some silt.	2-4' OVA 100 ppm.	
CA	6	8	10	15/7	25	2.0'	6			Sandy SILT; grey; very stiff; low plasticity; wet; w/ trace gravels and clay.	Slag material, oil sheen 2-4'. OVA 700 ppm.	
CA	7	70	60/1"	--	--	0.8'	7			Gravelly SAND; grey; very dense; poorly graded; medium-coarse grained; wet; w/ trace silt and cobbles.	Water encountered @ 7.0'. OVA 700 ppm. Black/grey sheen.	
CA	8	70/5"	--	--	--	0.5'	8			Silty SAND; grey; medium dense; poorly graded; medium-coarse grained; wet; w/ some gravel.	Heavy grey sheen, OVA 250 ppm.	
CA	9	50	70/1"	--	--	1.0'	9			SAND; grey; very dense; poorly graded; fine grained; dry.	Grey sheen, OVA 250 ppm.	
							10				Grey sheen, OVA 200 ppm.	
							11				OVA 10 ppm.	
							12					
							13					
							14					
							15					
							16					
							17					
							18					
							19					
							20					
							21					
							22					
							23					
							24					
							25					
							26					
							27					
							28					
							29					
							30					

(2-9')
TAC. DATUM

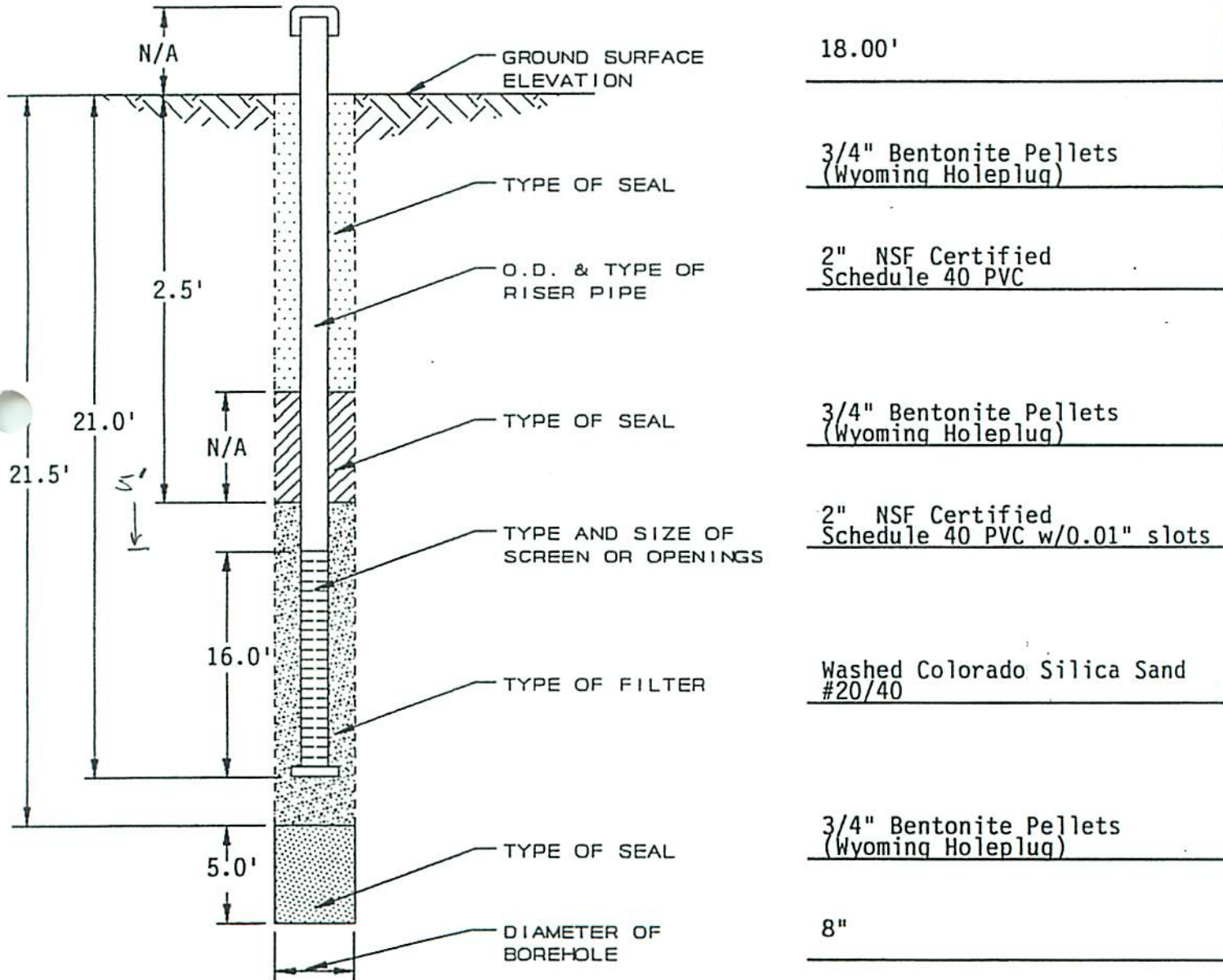
Boring completed @ 27.0'. Water level not recorded. Monitoring well installed on 11/04/93.



PIEZOMETER / WELL INSTALLATION LOG

NO. MW-7

CLIENT <p style="text-align: center;">City of Tacoma</p>	PROJECT <p style="text-align: center;">Tacoma Coal Gasification Site</p>	PROJECT NO. <p style="text-align: center;">40406</p>
PROJECT LOCATION <p style="text-align: center;">Tacoma, Washington</p>	COORDINATES <p style="text-align: center;">N-702000; E-1160170</p>	TOP OF RISER ELEVATION <p style="text-align: center;">17.72'</p>
STRATUM MONITORED <p style="text-align: center;">Near Surface Sands & Gravels</p>		INSPECTOR <p style="text-align: center;">M. D'Andrea</p>
CHECKED BY		APPROVED BY <p style="text-align: center;">B. Bailey</p>



METHOD OF INSTALLATION: Boring drilled to completion; Backfilled with bentonite pellets; riser and screen; Grouted to ground surface; Set flush protective casing; Concrete seal placed to 0.3' above ground surface.

REMARKS: Screen length includes 1' of sump. Well developed by air-lift and surging, 10.4 well volumes removed. Dedicated bailer installed.

MONITORING WELL MW-7R

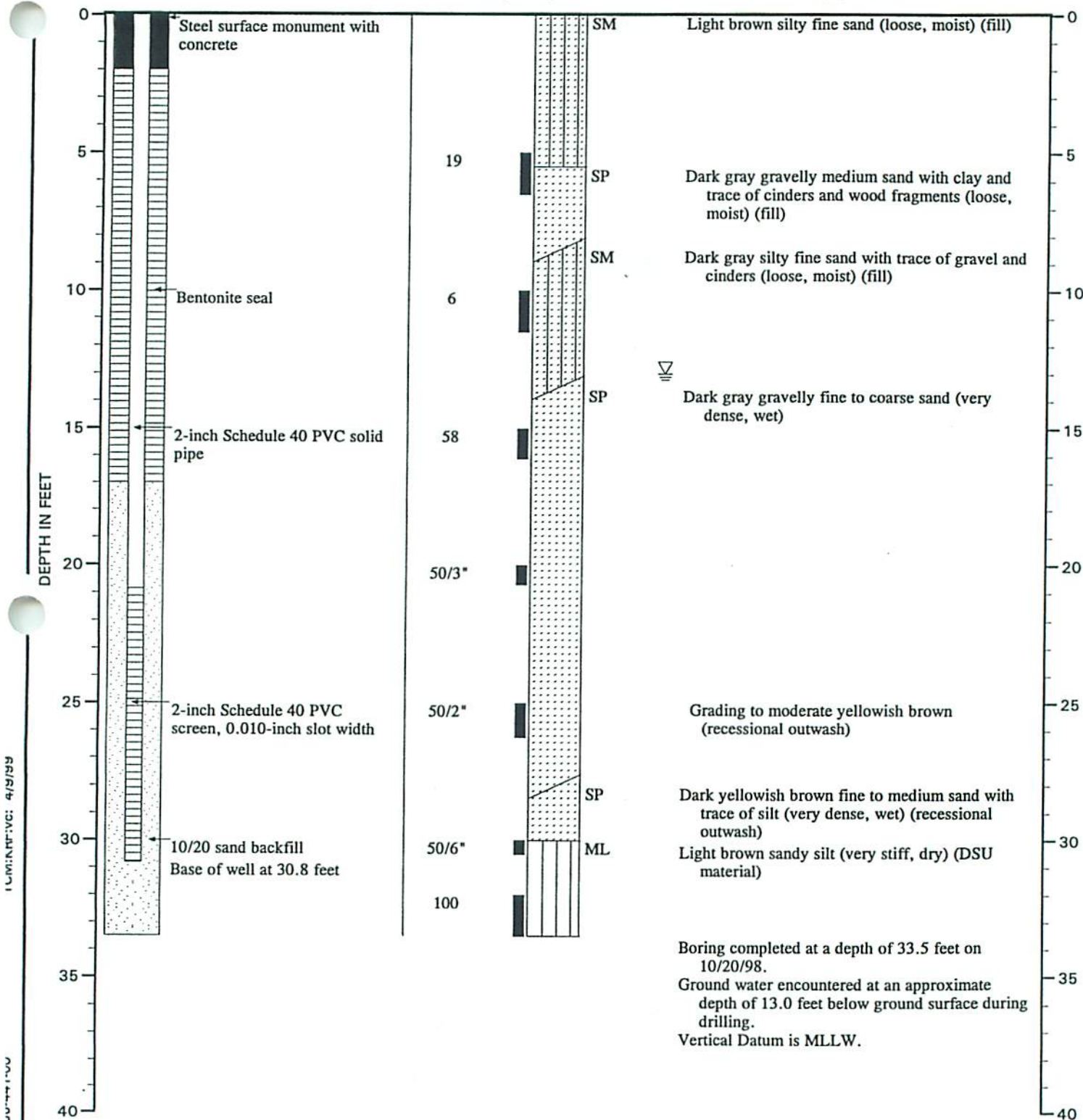
WELL SCHEMATIC

Casing Elevation (ft.): 27.80

Casing Stickup (ft.): -0.6

DESCRIPTION

Surface Elevation (ft.): 28.39



Note: See Figure A-2 for explanation of symbols



LOG OF MONITORING WELL

FIGURE A-3

LOG OF BORING

BORING NO. MW-8
SHEET 1 OF 2

CLIENT City of Tacoma		PROJECT Tacoma Coal Gasification Site		PROJECT NO. 40406	
PROJECT LOCATION Tacoma, Washington		COORDINATES N-702029; E-1160320		ELEVATION (DATUM) 17.44' (Tacoma)	TOTAL DEPTH 32'
SURFACE CONDITIONS Flat, grass East side of Dock Street.				INSPECTOR M. D'Andrea	DATE FINISH 11/02/93

SAMPLE TYPE	SAMPLE NUMBER	SAMPLING			N VALUE	SAMPLE RECOVERY	CHECKED BY	APPROVED BY B. Bailey	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
		SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES									
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD							
CA	1	20	50	30/0"	--	0.6'							Borehole advanced w/a 4 1/4" ID, 8" OD hollow stem auger.
CA	2	50	70/0"	--	--	0.5'							Samples collected w/a 3" OD split spoon.
CA	3	55	66	45/30	111	1.7'							Sampler driven w/a 140 lb. hammer.
CA	4	20	16	10/10	26	1.3'							Roots/organic material OVA 35 ppm.
CA	5	6	7	11/11	18	2.0'							Slag material @ 6-8'. Slag & brick material. OVA 70 ppm.
CA	6	5	5	8/12	13	1.7'							OVA 100 ppm.
CA	7	6	7	7/9	14	1.8'							Coal/tar pieces, sheen on sample. Water encountered @ 14-16'.
CA	8	5	6	7/9	13	1.8'							Heavy sheen on sampler.
CA	9	8	10	20/20	30	2.0'							
CA	10	6	5	11/11	17	2.0'							

LOG OF BORING

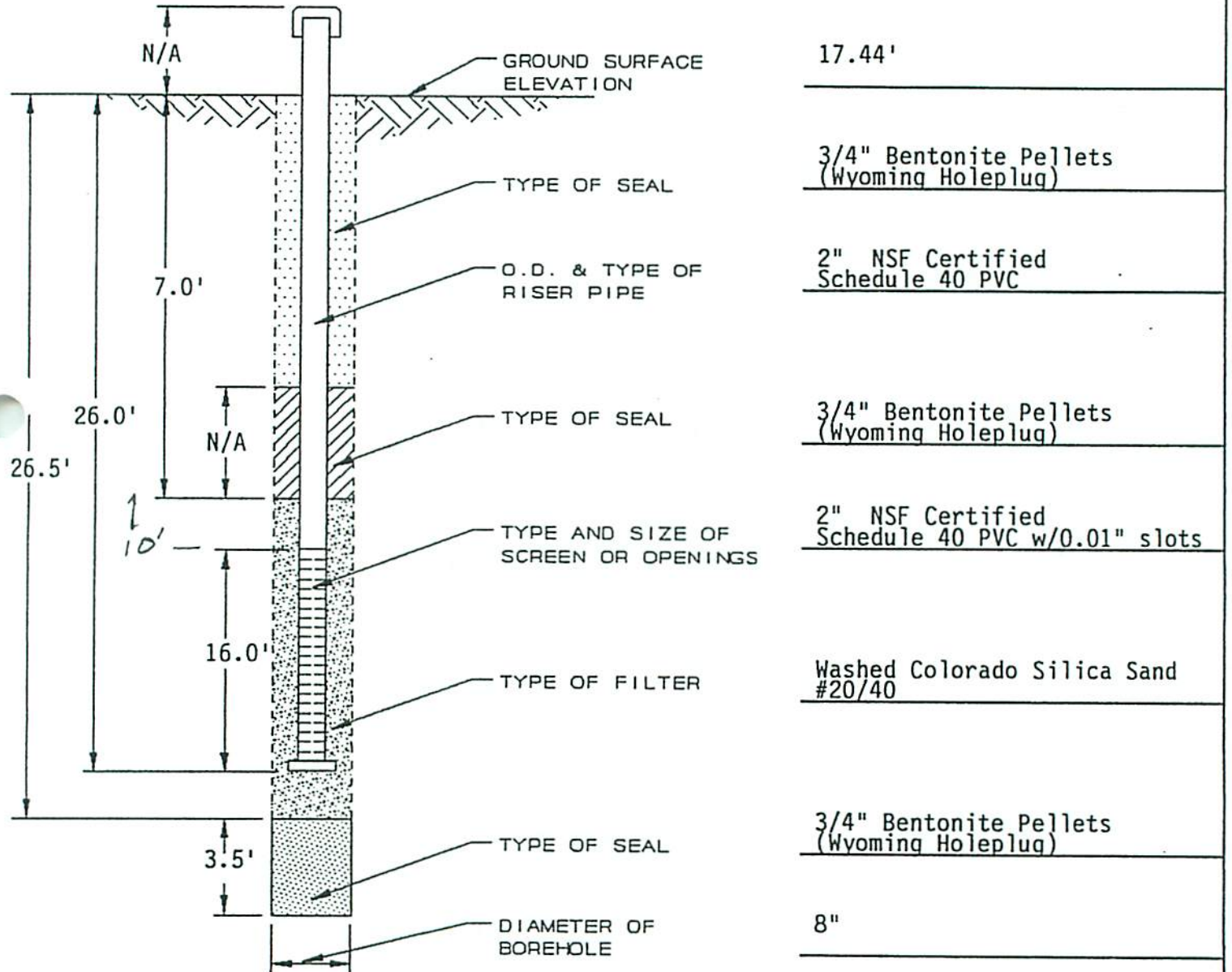
CLIENT City of Tacoma				PROJECT Tacoma Coal Gasification Site				PROJECT NO. 40406	
PROJECT LOCATION Tacoma, Washington			COORDINATES N-702029; E-1160320			ELEVATION (DATUM) 17.44' (Tacoma)		TOTAL DEPTH 32'	DATE START 11/02/93
SURFACE CONDITIONS Flat, grass East side of Dock Street.						INSPECTOR M. D'Andrea		DATE FINISH 11/02/93	
SAMPLE TYPE		SAMPLE NUMBER		SET		CHECKED BY		APPROVED BY B. Bailey	
CORE SIZE		RUN NUMBER		RUN LENGTH		DEPTH IN FEET		CLASSIFICATION OF MATERIAL	
RUN NUMBER		RUN LENGTH		RQD RECOVERY		SAMPLE TYPE			
RUN LENGTH		RQD RECOVERY		PERCENT RECOVERY		GRAPHIC LOG		REMARKS	
RQD		PERCENT RECOVERY		RQD		REMARKS			
CA	11	10	30	50/50	80	2.0'		Borehole completed @ 32.0'. Water level recorded @ 21.8'. Monitoring well installed on 11/02/93.	



PIEZOMETER / WELL INSTALLATION LOG

NO. MW-8

CLIENT <p style="text-align: center;">City of Tacoma</p>	PROJECT <p style="text-align: center;">Tacoma Coal Gasification Site</p>	PROJECT NO. <p style="text-align: center;">40406</p>
PROJECT LOCATION <p style="text-align: center;">Tacoma, Washington</p>	COORDINATES <p style="text-align: center;">N-702029; E-1160320</p>	TOP OF RISER ELEVATION <p style="text-align: center;">17.19'</p>
STRATUM MONITORED <p style="text-align: center;">Near Surface Sands & Gravels</p>		INSPECTOR <p style="text-align: center;">M. D'Andrea</p>
CHECKED BY		APPROVED BY <p style="text-align: center;">B. Bailey</p>



METHOD OF INSTALLATION: Boring drilled to completion; Backfilled with bentonite pellets; riser and screen; Grouted to ground surface; Set flush protective casing; Concrete seal placed to 0.3' above ground surface.

REMARKS: Screen length includes 1' of sump. Well developed by air-lift and surging, 18.5 well volumes removed. Dedicated bailer installed.

LOG OF BORING

CLIENT				PROJECT				PROJECT NO.			
City of Tacoma				Tacoma Coal Gasification Site				40406			
PROJECT LOCATION				COORDINATES		ELEVATION (DATUM)		TOTAL DEPTH		DATE START	
Tacoma, Washington				N-701949; E-1160365		17.33' (Tacoma)		34.0'		11/03/93	
SURFACE CONDITIONS								INSPECTOR		DATE FINISH	
Sloped grass surface, East side of Dock Street.								M. D'Andrea		11/03/93	
SAMPLING								CHECKED BY		APPROVED BY	
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY					
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD		DEPTH IN FEET		CLASSIFICATION OF MATERIAL	
CA	1	14	22	45/50	67	1.3'		1	SAND; brown; very dense; well graded; fine-coarse grained; moist; w/ trace gravel & organics.	Boring advanced w/a 4 1/4" ID, 8" OD hollow stem auger.	
CA	2	24	50	36/60	86	1.7'		2		Samples collected w/a 3" OD split spoon.	
CA	3	50	50	50/0"	--	1.5'		3	Gravelly SAND; brown; very dense; poorly graded; medium-coarse grained; moist; w/ trace organics.	Sampler driven w/a 140 lb. hammer.	
CA	4	20	26	30/14	56	1.5'		4	organics grade out.	Organic material 0-0.3'. 0-2' OVA 9 ppm. 4-6' OVA 20 ppm.	
CA	5	16	17	18/14	35	1.5'		5	SAND; brown; very dense; poorly graded; fine - coarse grained; moist; w/ some gravel trace silt.	OVA 100 ppm.	
CA	6	8	12	14/20	26	2.0'		6	SILT; black; hard; low plasticity; moist; w/ trace gravels and clay.		
CA	7	3	5	7/8	12	1.3'		7	Sandy SILT; black; very stiff; low plasticity; moist; w/ trace gravels.	OVA 300 ppm, Sheen on soil.	
CA	8	8	10	20/20	30	0.3'		8	grades very stiff & wet.	Water encountered @ 14.0'. Heavy sheen. Oil saturated soil 14-18'.	
CA	9	18	18	20/28	38	0.1'		9	grades hard.		
CA	10	8	10	12/80	22	2.0'		10	Silty SAND; black; dense; poorly graded; fine grained; wet.	OVA 100 ppm.	
								1	wood	Wood core 21-22'. Sheen on soil sample.	
CA	11	35	50	45/60	95	1.0'		2	Gravelly SAND; brown; very dense; poorly graded; medium-coarse grained; wet; w/ trace wood.	Sheen on soil sample.	

LOG OF BORING

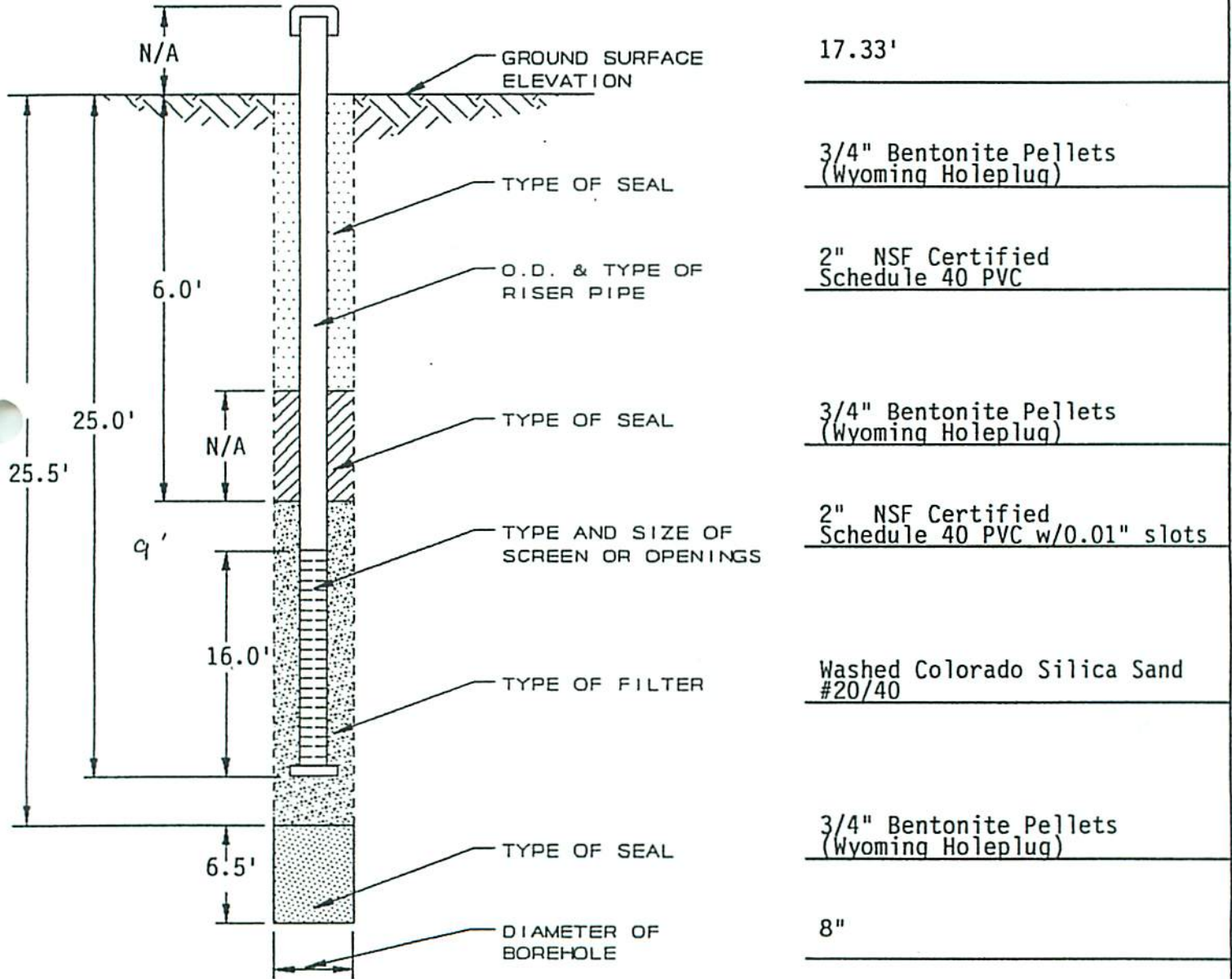
CLIENT City of Tacoma				PROJECT Tacoma Coal Gasification Site				PROJECT NO. 40406															
PROJECT LOCATION Tacoma, Washington			COORDINATES N-701949; E-1160365			ELEVATION (DATUM) 17.33' (Tacoma)		TOTAL DEPTH 34.0'	DATE START 11/03/93														
SURFACE CONDITIONS Sloped grass surface, East side of Dock Street.						INSPECTOR M. D'Andrea		DATE FINISH 11/03/93															
SAMPLE TYPE		SAMPLE NUMBER		SET 6 INCHES		2ND 6 INCHES		3RD 6 INCHES		N VALUE		SAMPLE RECOVERY		CHECKED BY		APPROVED BY B. Bailey							
CORE SIZE		RUN NUMBER		RUN LENGTH		CORING RECOVERY		RQD RECOVERY		PERCENT RECOVERY		RQD		DEPTH IN FEET		SAMPLE TYPE		GRAPHIC LOG		CLASSIFICATION OF MATERIAL		REMARKS	
CA	12	50	50/0"	--	--	0.8'							1		SAND; brown; very dense; poorly graded; fine grained; wet; w/ trace silt. grades grey and dry.								
CA	13	50	100/2"	--	0						2												
												3											
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													5										Bottom of boring @ 34.0'. Water level not recorded. Monitoring well installed 11/03/93.
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PIEZOMETER / WELL INSTALLATION LOG

NO. MW-9

CLIENT City of Tacoma	PROJECT Tacoma Coal Gasification Site	PROJECT NO. 40406
PROJECT LOCATION Tacoma, Washington	COORDINATES N-701949; E-1160365	TOP OF RISER ELEVATION 17.06'
STRATUM MONITORED Near Surface Sands & Gravels		INSPECTOR M. D'Andrea
CHECKED BY	APPROVED BY B. Bailey	



METHOD OF INSTALLATION: Boring drilled to completion; Backfilled with bentonite pellets; riser and screen; Grouted to ground surface; Set flush protective casing; Concrete seal placed to 0.3' above ground surface.

REMARKS: Screen length includes 1' of sump. Well developed by air-lift and surging, 10.7 well volumes removed. Dedicated bailer installed.

LOG OF BORING

CLIENT				PROJECT				PROJECT NO.			
City of Tacoma				Tacoma Coal Gasification Site				40406			
PROJECT LOCATION				COORDINATES		ELEVATION (DATUM)		TOTAL DEPTH		DATE START	
Tacoma, Washington				N-702118; E-1160360		14.11' (Tacoma)		42.0'		10/27/93	
SURFACE CONDITIONS								INSPECTOR		DATE FINISH	
Flat, vegetated (grasses), West bank, Thea Foss Waterway								M. D'Andrea		10/27/93	
SAMPLING								CHECKED BY		APPROVED BY	
										B. Bailey	
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CA	1	14	38	45/28	83	1.3'	1			SAND; very dense; poorly graded; medium to fine grained; moist; w/ some silt, trace gravel (fill).	Boring advanced w/a 4 1/4" ID, 8" OD hollow stem auger. Samples collected w/a 3" OD split spoon w/ 140 lb. hammer.
CA	2	14	28	17/24	45	1.5'	2				
CA	3	13	5	1/4	6	0.6'	3			Silty SAND; black; dense; poorly graded; fine grained; moist; grading loose, w/ some organic material.	Root and grass layer 0-0.3'. Hardened tar and slag material from 0-2'. Hardened tar material.
CA	4	4	4	6/8	10	1.1'	4				
CA	5	6	7	8/10	15	1.1'	5			Clayey SILT; black; stiff; low plasticity; moist; w/ some sand.	Slag and hardened tar material 8 - 10'.
CA	6	5	8	10/12	18	1.6'	6			grades grey; stiff; w/ trace sand.	
CA	7	10	12	50/0"		1.7'	7			Gravelly SAND; redish-brown; medium dense; poorly graded; medium to coarse grained; moist; w/ trace silt.	
CA	8	6	10	8/10	18	0.1'	8			Wood, yellow pine.	Solid core of wood recovered. Soft, decomposing. Water encountered @ 15.0'.
CA	9	12	10	10/12	20	1.5'	9			SILT; black; very stiff; low plastic; wet; trace wood, sand, and gravel.	
CA	10	8	12	10/12	22	1.6'	10				Strong odors- OVA 400 ppm.
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OVA >1000 ppm.

LOG OF BORING

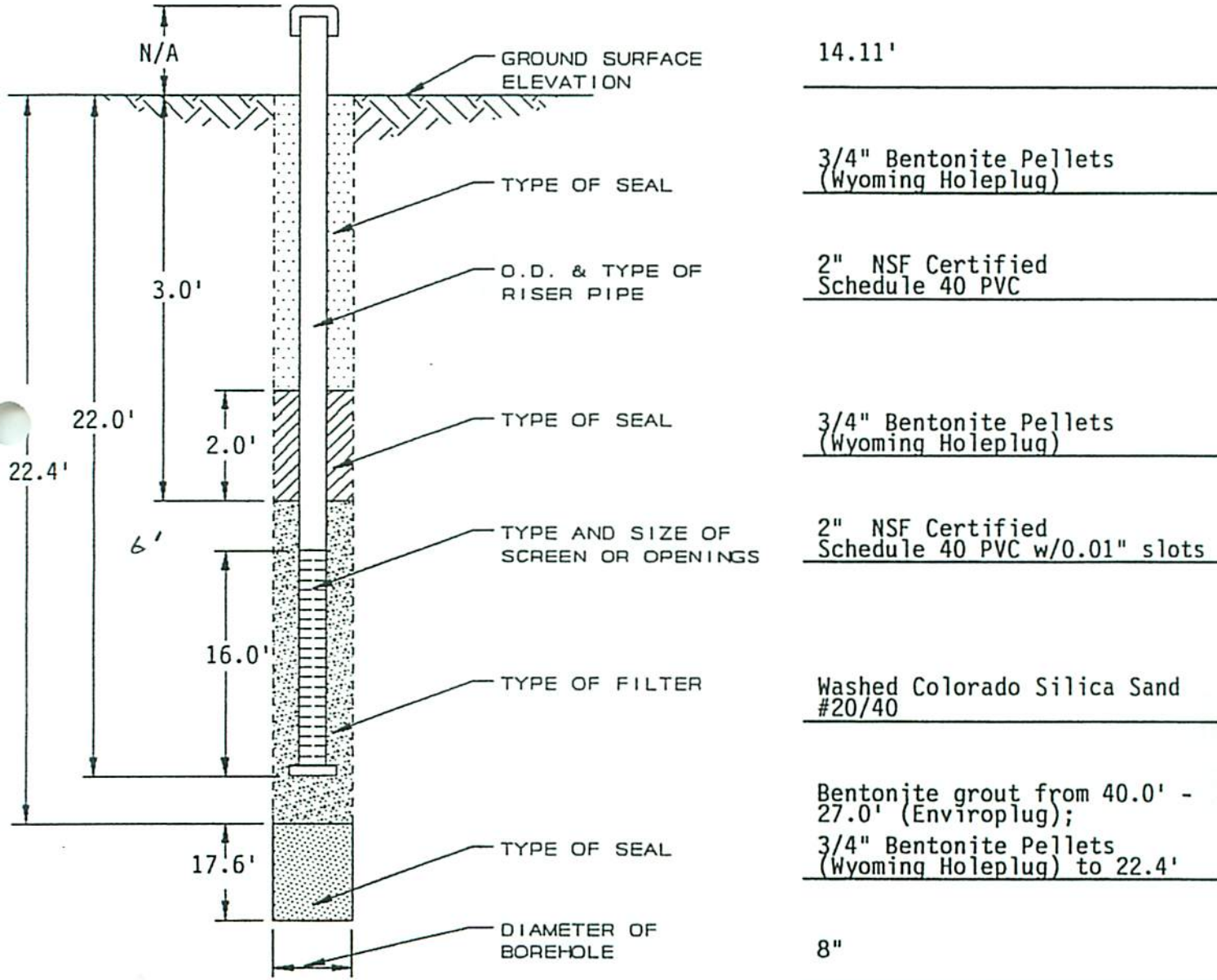
CLIENT City of Tacoma					PROJECT Tacoma Coal Gasification Site					PROJECT NO. 40406																												
PROJECT LOCATION Tacoma, Washington					COORDINATES N-702118; E-1160360					ELEVATION (DATUM) 14.11' (Tacoma)					TOTAL DEPTH 42.0'					DATE START 10/27/93																		
SURFACE CONDITIONS Flat, vegetated (grasses), West bank, Thea Foss Waterway										INSPECTOR M. D'Andrea					DATE FINISH 10/27/93																							
SAMPLE TYPE		SAMPLE NUMBER		SET 6 INCHES		2ND 6 INCHES		3RD 6 INCHES		N VALUE		SAMPLE RECOVERY		CHECKED BY					APPROVED BY B. Bailey																			
CORE SIZE		RUN NUMBER		RUN LENGTH		RUN RECOVERY		RQD RECOVERY		PERCENT RECOVERY		RQD		DEPTH IN FEET					SAMPLE TYPE					GRAPHIC LOG					CLASSIFICATION OF MATERIAL					REMARKS				
CA		11		20		27		17/11		34		1.7'		1					Gravelly SAND; dense; poorly graded; fine to medium grained; w/ some shells, trace silt and wood.					OVA 100 ppm. OVA 900 ppm.														
CA		12		17		16		13/20		29		2.0'		2					Sandy SILT; redish-brown; very stiff; low plastic; wet; w/ some wood, shells, and trace gravels.					OVA 300 ppm.														
		13		10		15		50/50		65		0.9'		3					grading grey; hard; shells and wood grade out					OVA 100 ppm.														
														4										Borehole completed @ 42.0'. Water level not recorded. Monitoring well installed 11/01/93.														
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PIEZOMETER / WELL INSTALLATION LOG

NO. MW-10

CLIENT City of Tacoma	PROJECT Tacoma Coal Gasification Site	PROJECT NO. 40406
PROJECT LOCATION Tacoma, Washington	COORDINATES N-702118; E-1160360	TOP OF RISER ELEVATION 13.90'
STRATUM MONITORED Near Surface Sands & Gravels		DATE 11-01-93
CHECKED BY		INSPECTOR M. D'Andrea
APPROVED BY B. Bailey		



HOD OF INSTALLATION: Boring drilled to completion; Borehole tremie grouted to 27.0' w/ bentonite slurry. Bentonite pellets placed to 22.4'. Set riser and screen. Grouted to ground surface. Set flush mount protective casing. Concrete seal placed to 0.3' above grd.

REMARKS: Screen length includes 1' of sump. Well developed by air-lift and surging, 32.8 well volumes removed. Dedicated bailer installed.

LOG OF BORING

CLIENT		PROJECT			PROJECT NO.								
City of Tacoma		Tacoma Coal Gasification Site			40406								
PROJECT LOCATION		COORDINATES		ELEVATION (DATUM)	TOTAL DEPTH	DATE START							
Tacoma, Washington		N-702236; E-1160308		13.69' (Tacoma)	42.0'	11/01/93							
SURFACE CONDITIONS				INSPECTOR		DATE FINISH							
Flat, vegetated, West bank of Thea Foss Waterway.				M. D'Andrea		11/01/93							
SAMPLING								CHECKED BY		APPROVED BY			
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY			B. Bailey				
CORING								DEPTH IN FEET		CLASSIFICATION OF MATERIAL		REMARKS	
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL		REMARKS	
CA	1	19	24	19/10	43	1.2'	1			SAND; brown; dense; poorly graded; fine-coarse grained; moist; w/ trace silt and gravels.	Borehole advanced w/a 4 1/4" ID, 8" OD hollow stem auger. Samples collected w/a 3" OD split spoon w/ 140 lb. hammer.		
CA	2	18	10	6/5	16	0.4'	2			grading medium dense.	Roots and organic material 0 - 0.3'.		
CA	3	10	11	14/20	25	1.1'	3				Black staining.		
CA	4	4	7	5/10	12	1.2'	4			Sandy SILT; lt. tan; very stiff; low plastic; moist; w/ trace gravels.	Coal seam 6.5 - 6.6'.		
CA	5	4	5	7/7	12	1.1'	5			Clayey SILT; lt. tan; stiff; low plastic; moist; w/ trace gravels.	Wood core 6.5 - 6.8'.		
CA	6	10	19	20/19	39	1.1'	6			Sandy Silt; black; stiff; low plastic; moist; w/ some wood and trace gravel.	Wood cores throughout from 10 - 12'.		
							7				Water encountered @ 10'.		
							8						
CA	7	22	20	17/20	37	0.0'	9						
CA	8	10	11	13/13	24	0.8'	10				OVA 100 ppm.		
TH	9	-	-	-	-	-	11			SILT; black; very stiff; low plastic; wet; w/ trace sand, clay, and wood.	Shelby taken 19 - 21'.		
							12				Borehole overdrilled w/ 8 1/4" ID, 12" OD, set @ 20'. chipped w/ bentonite pellets.		
							13				Borehole continues w/ 4 1/2" ID HSA.		
CA	10	8	10	7/9	17	2.0'	14			wood grades out.			
							15						
							16						
							17			Silty SAND; black; medium dense; poorly graded; fine to medium grained; w/ trace gravel and shells.	OVA 250 ppm.		
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LOG OF BORING

CLIENT City of Tacoma					PROJECT Tacoma Coal Gasification Site					PROJECT NO. 40406																												
PROJECT LOCATION Tacoma, Washington					COORDINATES N-702236; E-1160308					ELEVATION (DATUM) 13.69' (Tacoma)					TOTAL DEPTH 42.0'					DATE START 11/01/93																		
SURFACE CONDITIONS Flat, vegetated, West bank of Thea Foss Waterway.										INSPECTOR M. D'Andrea					DATE FINISH 11/01/93																							
SAMPLE TYPE		SAMPLE NUMBER		SET 6 INCHES		2ND 6 INCHES		3RD 6 INCHES		N VALUE		SAMPLE RECOVERY		CHECKED BY					APPROVED BY B. Bailey																			
CORE SIZE		RUN NUMBER		RUN LENGTH		RUN RECOVERY		RQD RECOVERY		PERCENT RECOVERY		RQD		DEPTH IN FEET					SAMPLE TYPE					GRAPHIC LOG					CLASSIFICATION OF MATERIAL					REMARKS				
CA		11		11		50		50/3"		-		1.3'		1					grades very dense.																			
CA		12		20		30		50/50		80		0.8'		4					SAND; tan; very dense; poorly graded; fine grained; wet.																			
		13		20		20		50/50		70		0.9'		40																								
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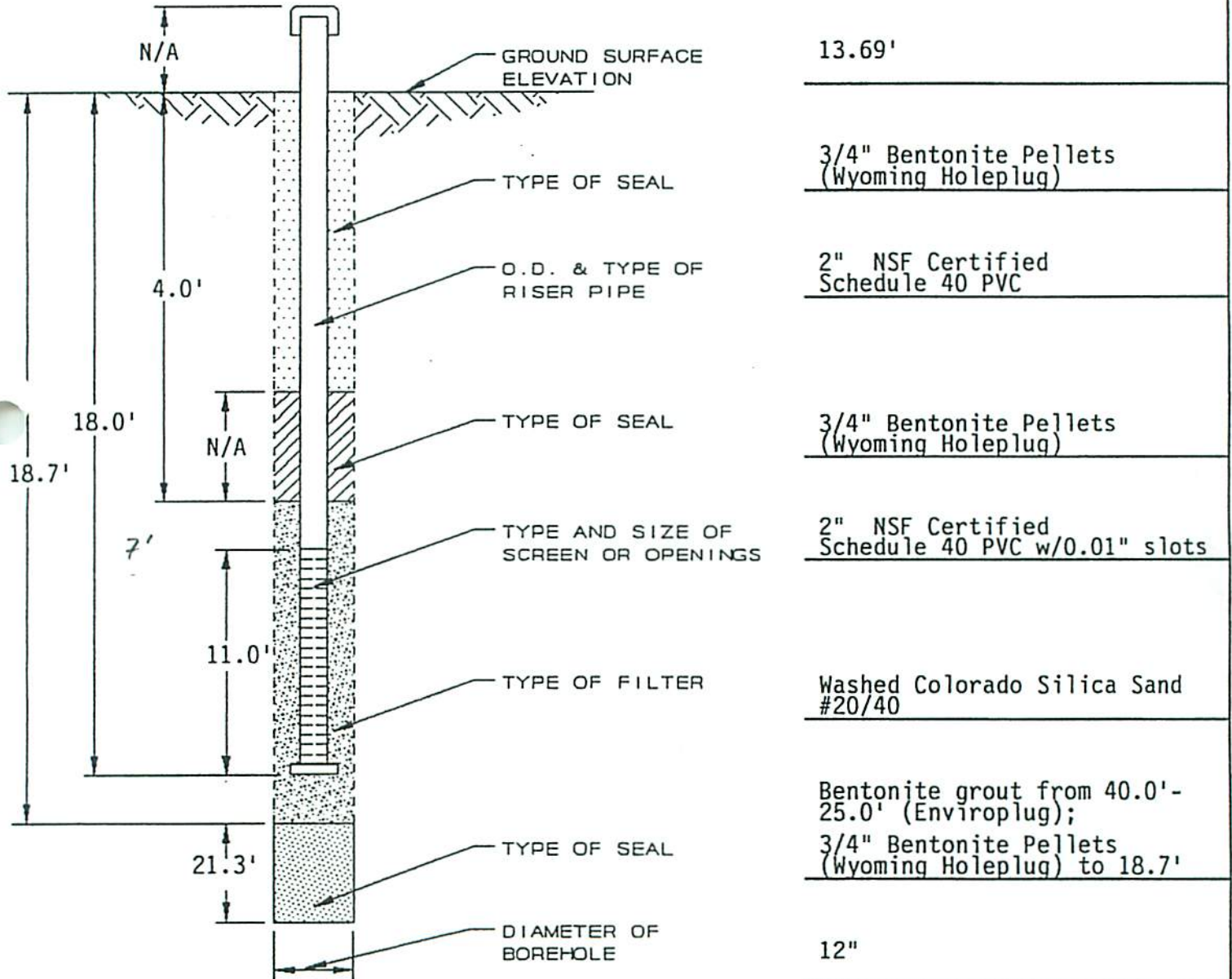
Borehole completed @ 42.0'.
Water level not recorded.
Monitoring well installed on 11/02/93.



PIEZOMETER / WELL INSTALLATION LOG

NO. MW-11

TOWN <p style="text-align: center;">City of Tacoma</p>	PROJECT <p style="text-align: center;">Tacoma Coal Gasification Site</p>	PROJECT NO. <p style="text-align: center;">40406</p>
PROJECT LOCATION <p style="text-align: center;">Tacoma, Washington</p>	COORDINATES <p style="text-align: center;">N-702236; E-1160308</p>	TOP OF RISER ELEVATION <p style="text-align: center;">13.36'</p>
STRATUM MONITORED <p style="text-align: center;">Near Surface Sands & Gravels</p>		INSPECTOR <p style="text-align: center;">M. D'Andrea</p>
CHECKED BY		APPROVED BY <p style="text-align: center;">B. Bailey</p>



METHOD OF INSTALLATION: Boring drilled to completion; Borehole tremie grouted to 25.0' w/ Bentonite slurry. Bentonite pellets placed to 18.7'. Set riser and screen. Grouted to ground surface. Set flush mount protective casing. Concrete seal placed to 0.3' above ground.

REMARKS: Screen length includes 1' of sump. Well developed by air-lift and surging, 32.8 well volumes removed. Dedicated bailer installed.

LOG OF BORING

CLIENT		PROJECT			PROJECT NO.						
City of Tacoma		Tacoma Coal Gasification Site			40406						
PROJECT LOCATION		COORDINATES		ELEVATION (DATUM)	TOTAL DEPTH	DATE START					
Tacoma, Washington		N-702078; E-1160375		14.13' (Tacoma)	40.0'	10/25/93					
SURFACE CONDITIONS				INSPECTOR		DATE FINISH					
Flat, adjacent to north concrete walkway/dock area.				M. D'Andrea		10/26/93					
SAMPLE TYPE	SAMPLE NUMBER	SAMPLING			N VALUE	SAMPLE RECOVERY	CHECKED BY		APPROVED BY		
		SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES					B. Bailey		
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CA	1	30	50	50/20	70	1.0'	1		Gravelly SAND; lt. brown; very dense; poorly graded; fine to medium grained; moist; w/ trace cobbles and organics. (fill)	Boring advanced w/a 4 1/4" ID, 8" OD hollow stem auger. Samples collected w/a 3" OD split spoon w/ 140 lb. hammer.	
CA	2	16	24	15/13	39	1.1'	2		grading dense		
CA	3	2	4	8/9	12	1.3'	3				
CA	4	6	7	17/16	24	1.5'	4		Silty SAND; brown; medium dense; poorly graded; fine grained; moist; w/ trace gravels.	grades lt. brown.	
CA	5	8	10	26/24	36	0.6'	5				
CA	6	16	17	7/8	24	0.2'	6		Gravelly SAND; black; dense; well graded; fine to coarse grained; wet.	Black coating (organic). Oil like odor, brick and shell fragments.	
CA	7	20	20	15/15	35	0.2'	7			10-12' recovery all brick fragments.	
CA	8	6	6	7/8	13	2.0'	8		SAND; redish-brown; dense; poorly graded; medium grained; wet; w/ trace gravels and brick.	Water encountered @ 9.0'.	
CA	9	7	8	10/14	18	1.1'	9		Gravelly SAND; redish-brown; medium dense; well graded; fine to coarse grained; wet.	Oily odor/sheen noted (16-18').	
CA	10	12	12	20/20	32	1.3'	10		grades black.		
CA	11	6	12	17/18	29	1.1'	11		Sandy SILT; black; very stiff; low plastic; moist; w/ trace gravels and organics.	Tar encountered. OVA 30 ppm.	
CA	12	5	5	7/12	12	1.1'	12		Gravelly SAND; black; medium dense; poorly graded; medium to coarse grained; wet.	OVA 20 ppm.	
CA	13	18	28	50/50	78	1.8'	13			wood and shell fragments.	
	14	20	30	50/50	80	0.3'	14		SILT; black; hard; low plastic; moist; w/ trace organics and gravels.	24-26' 50 % wood.	
CA	15	30	40	45/50	85	0.3'	15		Gravelly SAND; black; very dense; poorly graded; medium to coarse grained; wet; w/ some wood and organics.		
							30		wood and shells grade out.		

LOG OF BORING

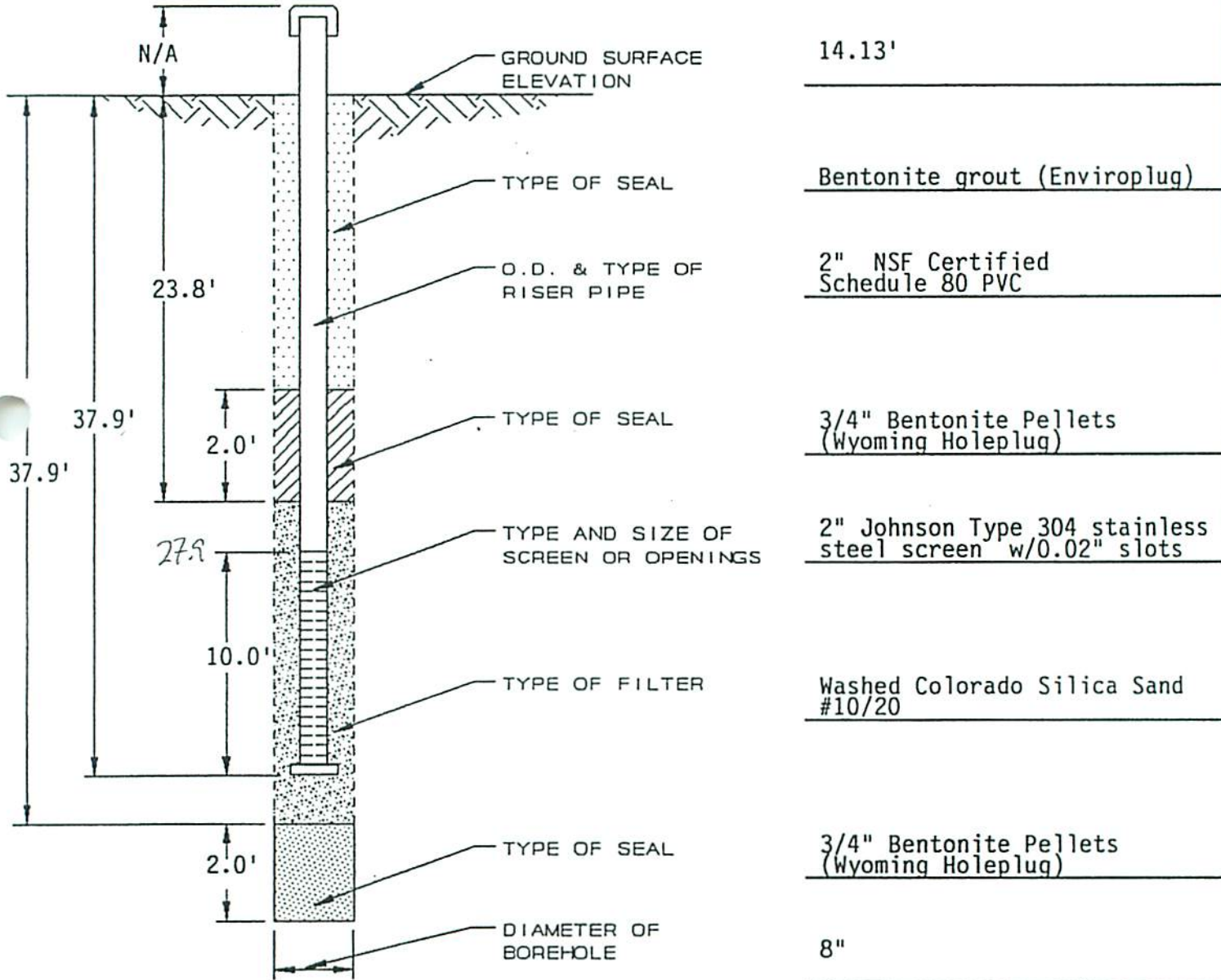
CLIENT City of Tacoma					PROJECT Tacoma Coal Gasification Site					PROJECT NO. 40406				
PROJECT LOCATION Tacoma, Washington			COORDINATES N-702078; E-1160375			ELEVATION (DATUM) 14.13' (Tacoma)		TOTAL DEPTH 40.0'		DATE START 10/25/93				
SURFACE CONDITIONS Flat, adjacent to north concrete walkway/dock area.								INSPECTOR M. D'Andrea		DATE FINISH 10/26/93				
SAMPLE TYPE	SAMPLE NUMBER	SAMPLING SET		2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	CHECKED BY				APPROVED BY B. Bailey		
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL			REMARKS	
CA	16	40	45	50/50	95	0.3'	1							Sample 30% wood.
CA	17	20	17	24/20	41	1.3'	2							OVA > 10 ppm.
CA	18	35	38	45/50	83	1.3'	3			Sandy SILT; grey; hard; low plastic; moist; w/ some gravels.				OVA 100 ppm.
CA	19	12	20	28/20	48	2.0'	4			Gravelly SAND; black; very dense; poorly graded; medium to coarse grained; wet; w/ trace silt and organics.				
CA	20	12	15	18/22	33	1.5'	5			SILT; black; hard; low plastic; moist; w/ some sand; trace wood and clay.				OVA 450 ppm, Oil like odor.
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							1							Borehole completed @ 40.0'. Water level not recorded. Monitoring well installed 10/26/93.
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PIEZOMETER / WELL INSTALLATION LOG

NO. MW-12

CLIENT <p style="text-align: center;">City of Tacoma</p>	PROJECT <p style="text-align: center;">Tacoma Coal Gasification Site</p>	PROJECT NO. <p style="text-align: center;">40406</p>
PROJECT LOCATION <p style="text-align: center;">Tacoma, Washington</p>	COORDINATES <p style="text-align: center;">N-702078; E-1160375</p>	TOP OF RISER ELEVATION <p style="text-align: center;">13.79'</p>
STRATUM MONITORED <p style="text-align: center;">Near Surface Sands & Gravels</p>		INSPECTOR <p style="text-align: center;">M. D'Andrea</p>
CHECKED BY		APPROVED BY <p style="text-align: center;">B. Bailey</p>



METHOD OF INSTALLATION: Boring drilled to completion. Set riser pipe & screen. placed filterpack and seal, grouted to ground surface. Set flush mounted protective casing. Concrete seal placed to 0.5' above ground surface

REMARKS: To prevent migration of DNAPL's, lower seal placed to 0.1' below bottom of screen openings. well developed by air-lift and surging, 12.3 well volumes removed. Dedicated bailer installed. Screen length includes 1' of sump.

BLACK & VEATCH Special Projects Corp.

LOG OF BORING

BORING NO. MW-13
SHEET 1 OF 1

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40406.540	
PROJECT LOCATION Tacoma, Washington		COORDINATES N 702293.755' E 1160252.389'		ELEVATION (DATUM) 14.37' (msl)	TOTAL DEPTH 30.0 FEET
SURFACE CONDITIONS Rough dirt surface 100' S 1 509 and 100' E Dock ST				LOGGED BY T. Mathis	DATE FINISH 01/08/96

SAMPLING							CHECKED BY S. Martin			APPROVED BY A. Markos		
----------	--	--	--	--	--	--	-------------------------	--	--	--------------------------	--	--

SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CA	1	41	30	22	52	1.5	1			sandy GRAVEL; dark brown; loose; poorly graded; fine grained; subangular; moist; some silt.	Boring advanced w/8-3/4" OD, 4-1/4" ID hollow stem augers. Samples collected w/2-1/2" ID California Modified Sampler.
CA	2	3	3	3	6	1.5	4			silty SAND; dark yellowish brown; poorly graded; fine grained; subrounded; moist; some wood fragments.	Napthalene odor from wood.
CA	3	6	6	7	13	1.5	9			grading wet.	Encountered water @ 9'.
CA	4	4	5	6	11	1.5	14			silty CLAY; dark grey to dark brown; stiff; highly plastic; wet; trace barnacle shells.	
CA	5	3	3	3	6	1.5	19			grading firm.	
CA	6	65	--	--	>50	0.5	24			grading soft.	
CA							27				Bottom of boring @ 30.0'.
CA							28			silty SAND; moderate yellowish brown; very dense; poorly graded; fine grained; subangular; moist.	Water level not measured. Monitoring well constructed 1/8/96.

*TCPAH
(mg/kg)*

0.14

NO

NO

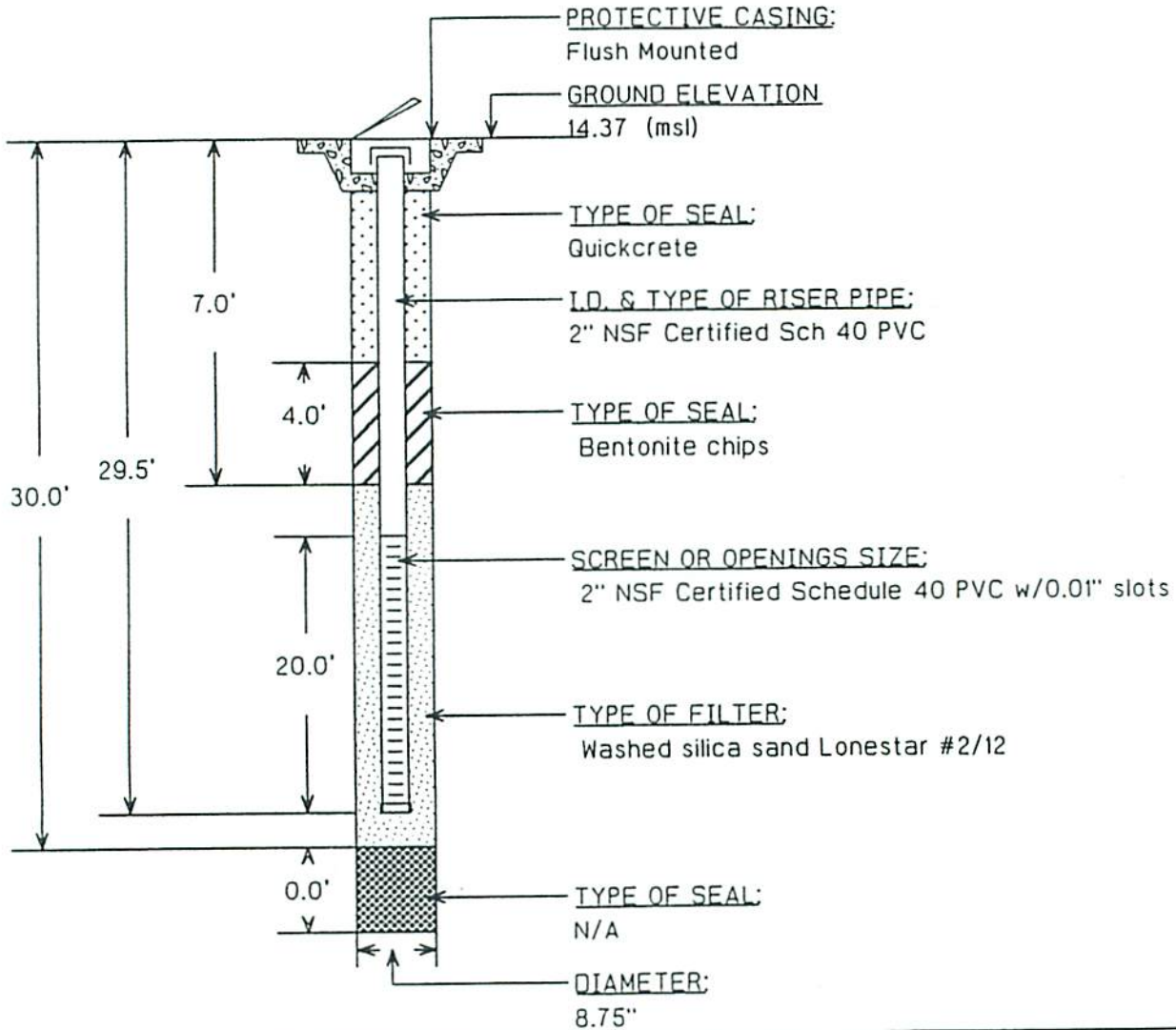
4.8



PIEZOMETER / WELL INSTALLATION LOG

NO. MW-13

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40406.540	
PROJECT LOCATION Tacoma, Washington		COORDINATES N 702293.755 E 1160252.389		TOP OF RISER ELEVATION (DATUM) 13.97 (msl)	
STRATUM MONITORED Sand			LOGGED BY T. Mathis		
CHECKED BY S. Martin			APPROVED BY A. Markos		



METHOD OF INSTALLATION:

Boring drilled to completion; set screen and riser pipe; placed filter pack and seal; set 8" diam. flush-mount housing and placed grout seal to surface.

REMARKS:

Well developed by surging, bailing, and pumping. Removed 52 gallons of water (approx. 14 casing volumes). 6-inch riser pipe below screen. Dedicated bailer installed in well.

BLACK & VEATCH Special Projects Corp.

LOG OF BORING

BORING NO. MW-14
SHEET 1 OF 2

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40406.540
PROJECT LOCATION Tacoma, Washington		COORDINATES N 702126.881' E 1160263.488'	ELEVATION (DATUM) 17.45' (msl)	TOTAL DEPTH 35.5 FEET
SURFACE CONDITIONS Concrete sidewalk, East of South A St. and Dock St			LOGGED BY T. Mathis	DATE FINISH 01/09/96

SAMPLING								CHECKED BY			APPROVED BY		
SAMPLE TYPE	SAMPLE NUMBER	SET Ø INCHES	2ND Ø INCHES	3RD Ø INCHES	N VALUE	SAMPLE RECOVERY	S. Martin			A. Markos			
CORING								DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS	
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD							
CA	1	20	14	11	25	1.5	1			4-inch thick concrete sidewalk.	Boring advanced w/8-3/4" OD, 4-1/4" ID hollow stem augers. Samples collected w/2-1/2" ID california modified sampler driven w/140-lb hammer.		
							2			sandy GRAVEL; dark grey to dark brown; dense; well graded; fine to medium grained; subrounded; moist; trace silt and concrete fragments.			
							3						
							4						
							5						
							6						
							7						
							8						
CA	2	15	9	7	16	1.5	9			silty SAND; dark brown to black; loose; well graded; fine to coarse grained; subrounded; moist; some clinker.	22.0		
							10						
							11						
							12						
							13			grading wet w/some wood fragments	encountered water @ 13'.		
CA	3	9	9	15	24	1.5	14				29.2		
							15						
							16						
							17						
							18						
CA	4	26	50/3"	--	>50	1.0	19			SILT; blue-grey; hard; slightly plastic; wet; some wood; trace barnacle shells.			
							20						
							21						
							22						
							23						
CA	5	40	50/4"	--	>50	0.7	24			SAND; dark blue-grey; very dense; poorly graded; medium grained; subrounded; wet.			
							25						
							26						
							27						
							28				drilling rate slows.		
							29						

TCPAH
3-2

22.0

29.2

encountered water @ 13'.

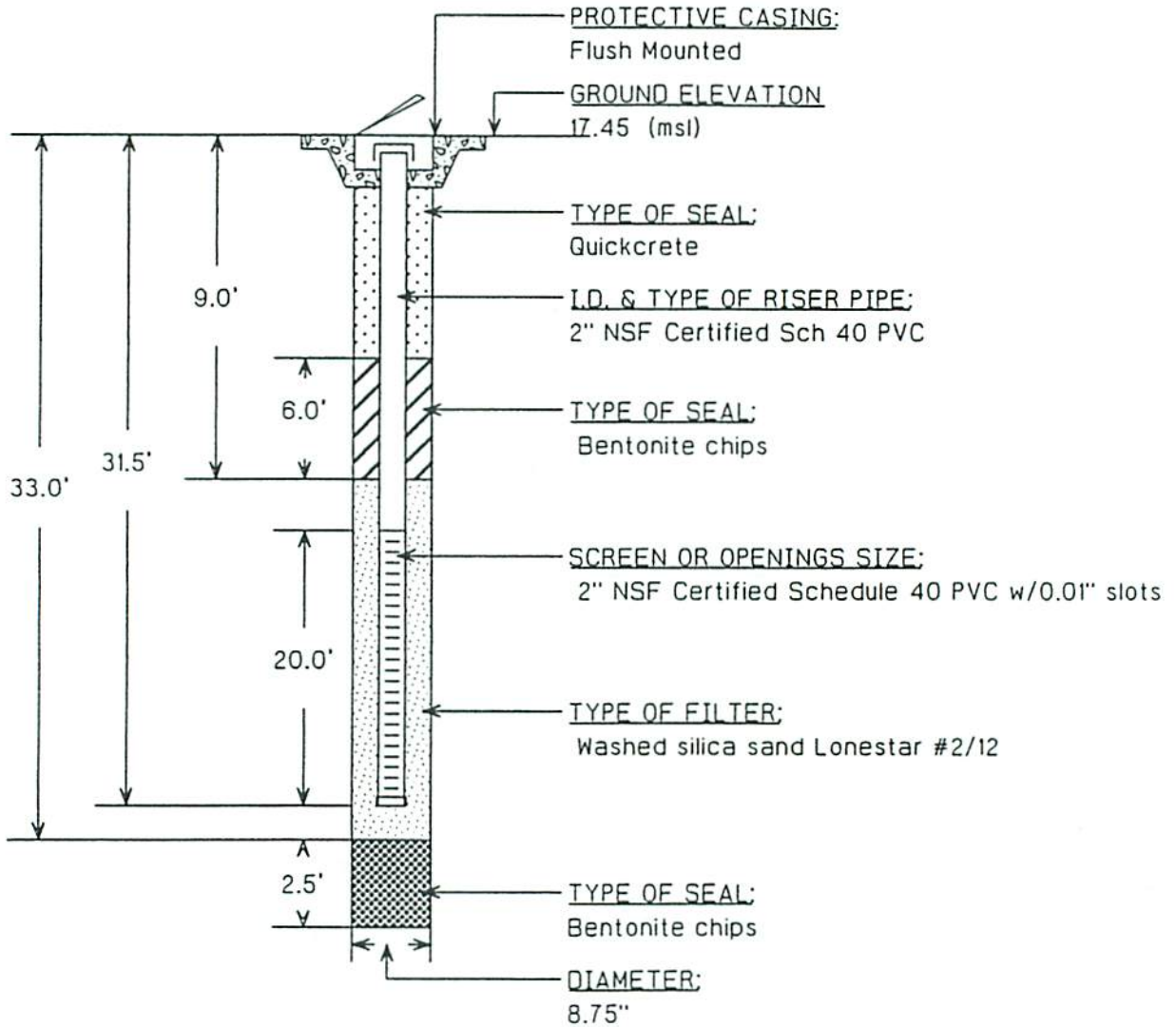
drilling rate slows.



PIEZOMETER / WELL INSTALLATION LOG

NO. MW-14

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40406.540
PROJECT LOCATION Tacoma, Washington		COORDINATES N 702128.881 E 1160263.488		TOP OF RISER ELEVATION (DATUM) 17.05 (msl)
STRATUM MONITORED Sand		LOGGED BY T. Mathis		
CHECKED BY S. Martin		APPROVED BY A. Markos		



METHOD OF INSTALLATION:

Boring drilled to completion; placed lower seal; set screen and riser pipe; placed filter pack and seal; set 8" diam. flush-mount housing and placed grout seal to surface.

REMARKS:

Well developed by surging, bailing, and pumping. Removed 55 gallons of water (approx. 17.7 casing volumes). 6-inch riser pipe installed below screen. Dedicated bailer installed in well.

BLACK & VEATCH Special Projects Corp.

LOG OF BORING

BORING NO. MW-15
SHEET 1 OF 2

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40406.540	
PROJECT LOCATION Tacoma, Washington		COORDINATES N 701846.057' E 1160243.484'	ELEVATION (DATUM) 25.66' (msl)	TOTAL DEPTH 35.5 FEET	DATE START 01/09/96
SURFACE CONDITIONS Grassy area 200' S of intersection S "A" & Dock St			LOGGED BY T. Mathis	DATE FINISH 01/09/96	

SAMPLING							CHECKED BY S. Martin			APPROVED BY A. Markos		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS	

CORING							DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD					

CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CA	1	32	37	50/4"	87	1.5	1-4			gravelly SAND; dark brown; very dense; well graded; subrounded; fine to coarse grained; moist; some black oily nodules, some clay.	Boring advanced w/8-3/4" OD, 4-1/4" ID hollow stem augers. Samples collected w/2-1/2" ID california modified sampler driven w/140 lb. hammer.
CA	2	40	50/3"	--	>50	1.5	5-9			grading mottled; pale yellowish brown to dark brown; trace brick; black oily nodules grade out.	
CA	3	20	31	37	68	0.3	10-14				
CA	4	37	50	--	>50	1.0	15-19			silty SAND; olive grey to grey brown; very dense; poorly graded; subrounded; fined grained; moist; some clay.	
CA	5	60	--	--	>50	0.5	20-24			grading wet.	
							24-25			grading some gravel.	Encountered water @ 23'.
							25-27				
							27-28			sandy GRAVEL; dark grey; very dense; poorly graded; subrounded; medium grained; wet.	
							28-29				
							29				

BLACK & VEATCH Special Projects Corp.

LOG OF BORING

BORING NO. MW-15
SHEET 2 OF 2

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40406.540	
PROJECT LOCATION Tacoma, Washington		COORDINATES N 701846.057' E 1160243.484'		ELEVATION (DATUM) 25.66' (msl)	TOTAL DEPTH 35.5 FEET
SURFACE CONDITIONS Grassy area 200' S of intersection S "A" & Dock St				LOGGED BY T. Mathis	
				DATE START 01/09/96	
				DATE FINISH 01/09/96	

SAMPLING							CHECKED BY S. Martin		APPROVED BY A. Markos		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD					
							31				Drilling rate slows.
							32				
							33				
							34				Drilling rate slows further.
							35				
							36				Bottom of boring @ 35.5'. Water level not measured.
							37				
							38				
							39				
							40				
							41				
							42				
							43				
							44				
							45				
							46				
							47				
							48				
							49				
							50				
							51				
							52				
							53				
							54				
							55				
							56				
							57				
							58				
							59				

silty SAND; dark yellowish brown w/dark green staining on fractures; very dense; poorly graded; fine grained; moderate cementation; subrounded; trace clay; moist.

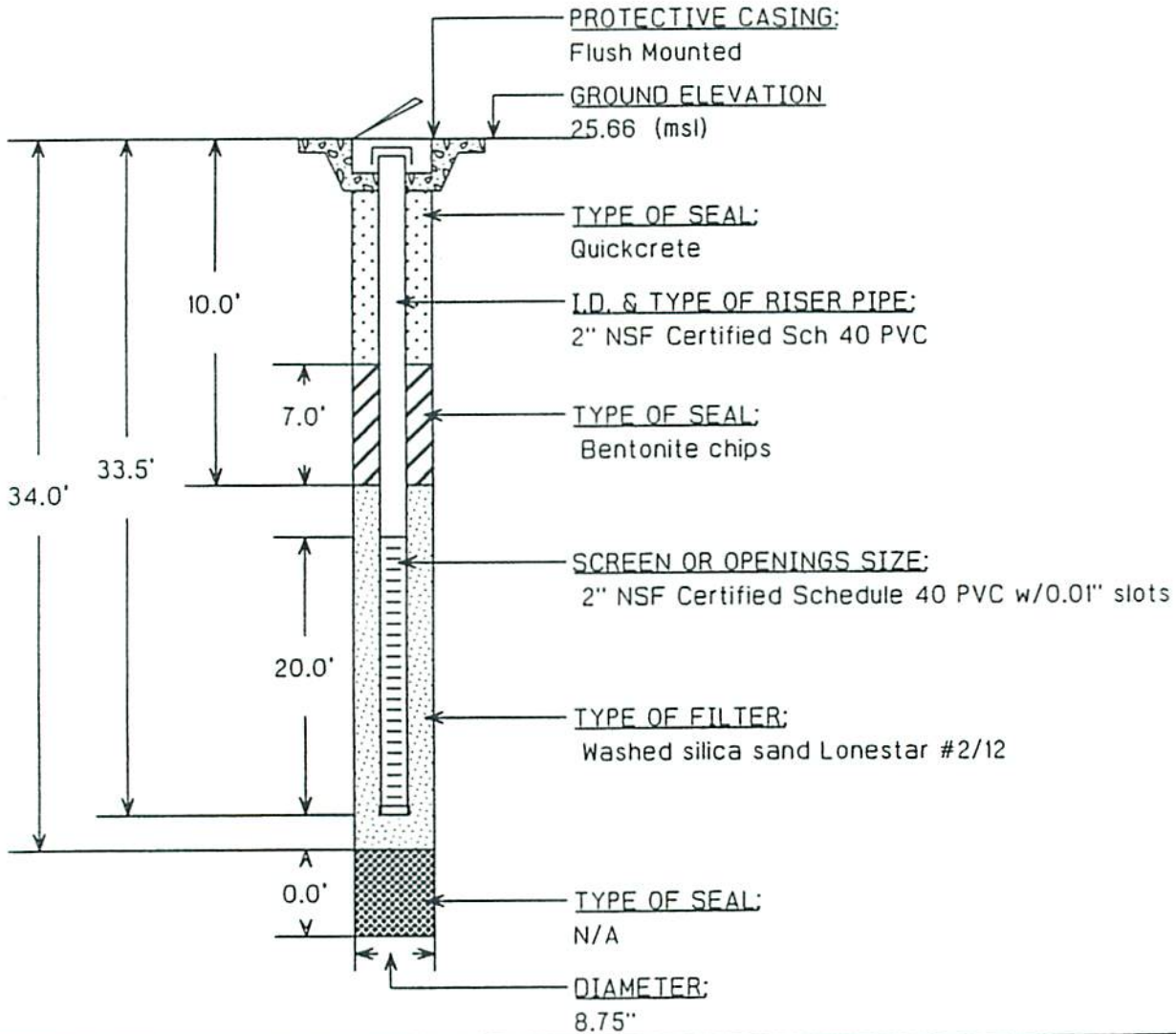
Boring abandoned on 1/9/96. Monitoring well constructed adjacent to abandoned boring on 1/17/96.



PIEZOMETER / WELL INSTALLATION LOG

NO. MW-15

CLIENT City of Tacoma		PROJECT Tacoma FMGP	PROJECT NO. 40406.540
PROJECT LOCATION Tacoma, Washington	COORDINATES N 701846.057 E 1160243.484	TOP OF RISER ELEVATION (DATUM) 25.26 (msl)	DATE 1/17/96
STRATUM MONITORED Sand/Gravel		LOGGED BY T. Mathis	
CHECKED BY S. Martin		APPROVED BY A. Markos	



METHOD OF INSTALLATION:

Boring drilled to completion; set screen and riser pipe; placed filter pack and seal; set 8" diam. flush-mount housing and placed grout seal to surface.

REMARKS:

Well developed by surging, bailing, and pumping. Removed 25 gallons of water (approx. 7.1 casing volumes). 6-inch riser pipe installed below screen. Dedicated bailer installed in well.

MONITORING WELL MW-15R

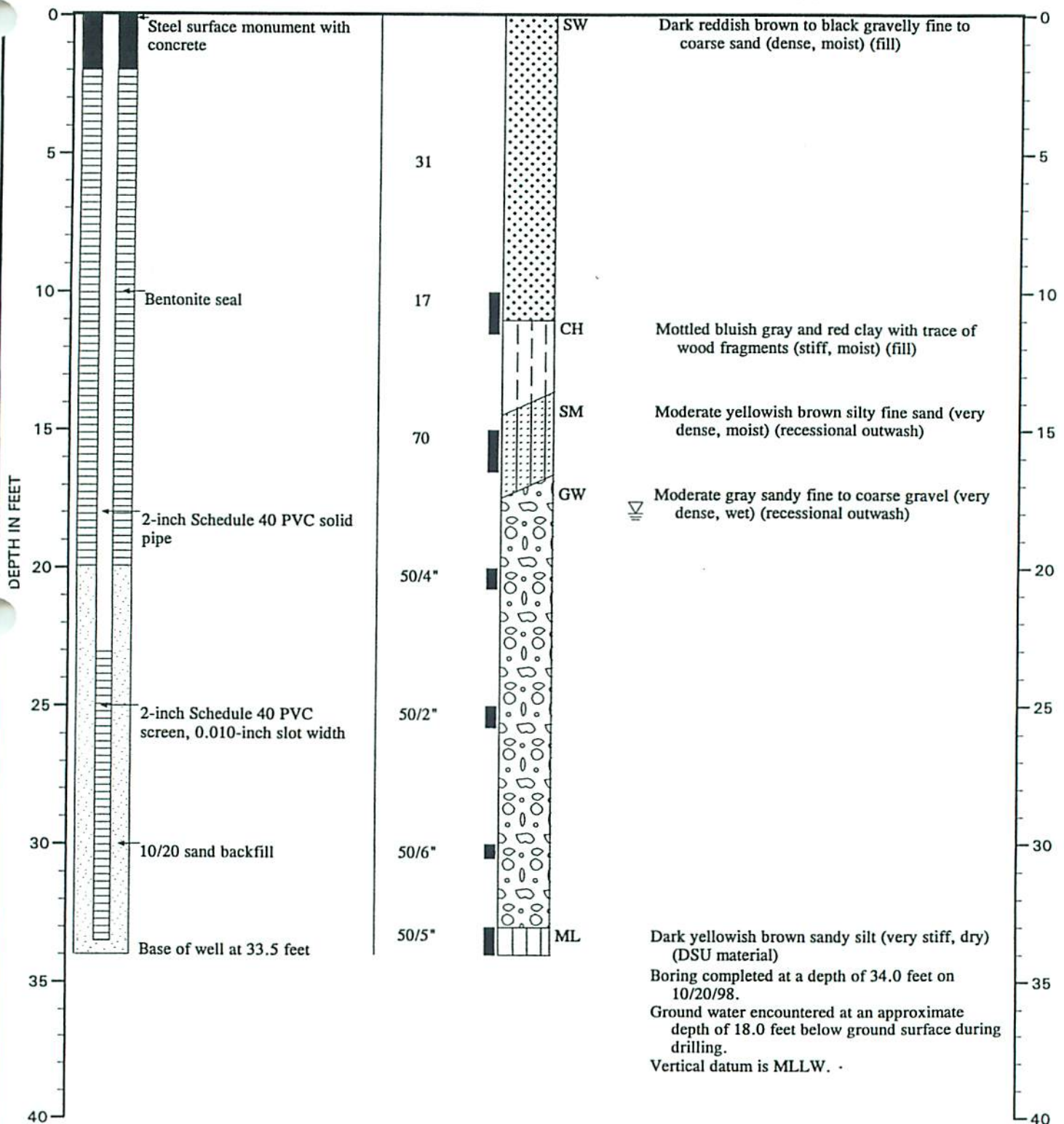
WELL SCHEMATIC

Casing Elevation (ft.): 30.27

Casing Stickup (ft.): -0.4

DESCRIPTION

Surface Elevation (ft.): 30.66



Note: See Figure A-2 for explanation of symbols

BLACK & VEATCH Special Projects Corp.

LOG OF BORING

BORING NO. MW-16
SHEET 1 OF 2

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40406.540
PROJECT LOCATION Tacoma, Washington		COORDINATES N 701895.647' E 1160421.304'	ELEVATION (DATUM) 17.47' (msl)	TOTAL DEPTH 36.5 FEET
SURFACE CONDITIONS Concrete sidewalk 30' N of NE bridge abutment			LOGGED BY T. Mathis	DATE START 01/08/96
				DATE FINISH 01/08/96

SAMPLING								CHECKED BY S. Martin			APPROVED BY A. Markos		
----------	--	--	--	--	--	--	--	-------------------------	--	--	--------------------------	--	--

SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CA	1	50/3"	--	--	>50	0.08	1			4-inch thick concrete sidewalk.	Boring advanced w/8-3/4" OD, 4-1/4" ID hollow stem augers. Samples collected w/2-1/2" ID California Modified sampler driven w/140 lb. hammer.
CA	2	6	8	9	15	1.5	2			gravelly SAND; greyish-brown; very dense; poorly graded; medium grained; subrounded; moist; trace silt (Fill).	
CA	3	4	5	6	11	1.5	3			clayey SAND; dark brown to greyish brown; loose; well graded; fine to coarse grained; rounded; moist; some gravel; trace brick and wood (Fill).	
CA	4	10	11	15	26	1.5	4			grading bluish gray.	
CA	5	10	10	15	25	1.5	5			grading wet.	Water encountered at 15'. <i>0.79</i>
CA	6	37	50	--	>50	1.0	6			clayey SILT; bluish grey; stiff; high plasticity; wet; trace barnacles.	
							7			silty GRAVEL; blue-gray; very dense; poorly graded; medium grained; rounded; wet; trace clay.	
							8			SAND; blue-gray; dense; poorly graded; medium grained; subrounded; wet; trace silt.	

TCPAH
4.0

1.8

1.06

BLACK & VEATCH Special Projects Corp.

LOG OF BORING

BORING NO. MW-16
SHEET 2 OF 2

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40408.540
PROJECT LOCATION Tacoma, Washington		COORDINATES N 701895.647' E 1160421.304'	ELEVATION (DATUM) 17.47' (msl)	TOTAL DEPTH 36.5 FEET
SURFACE CONDITIONS Concrete sidewalk 30' N of NE bridge abutment			LOGGED BY T. Mathis	DATE START 01/08/96
DATE FINISH 01/08/96				

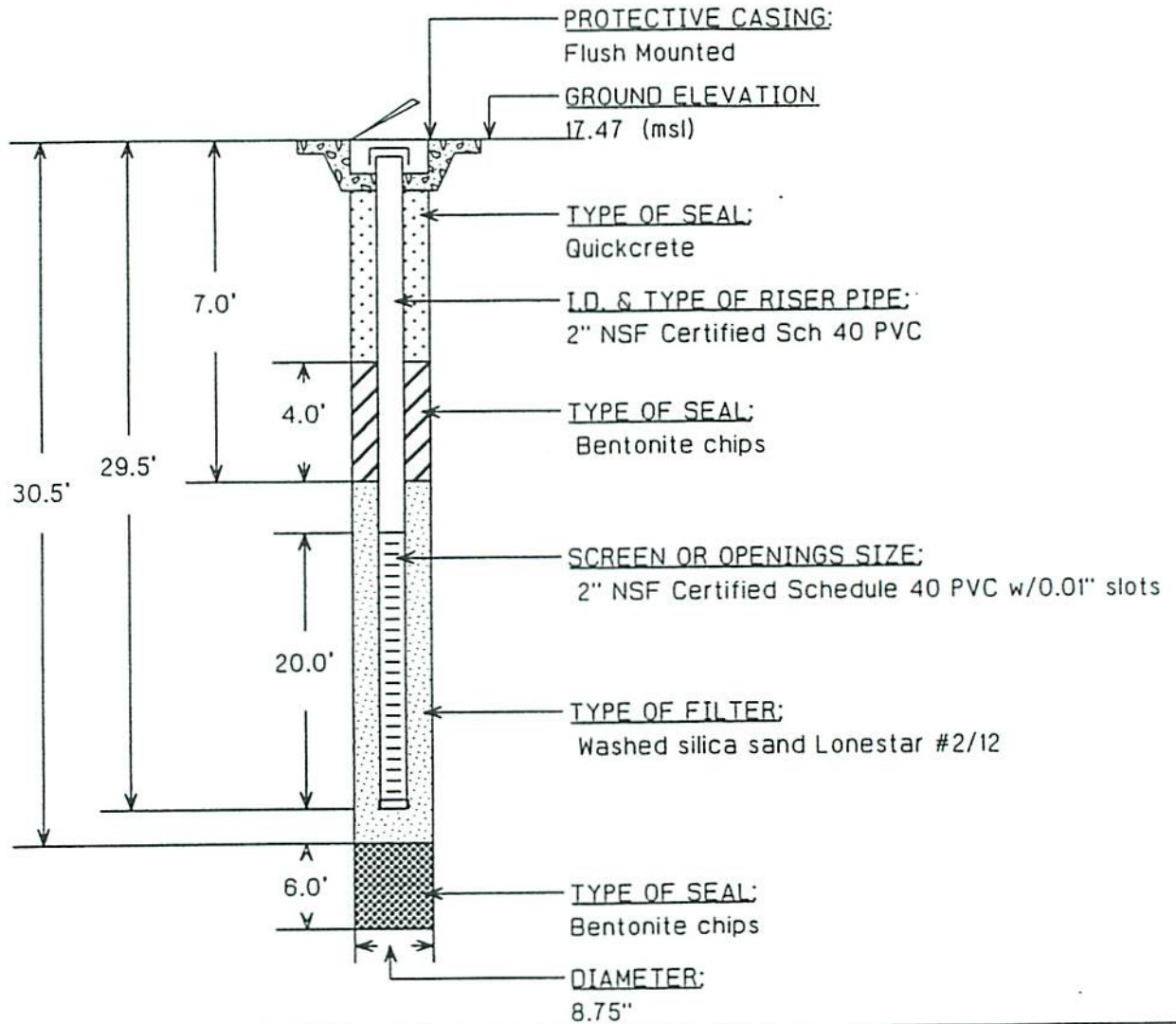
SAMPLING							CHECKED BY S. Martin		APPROVED BY A. Markos		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORING											
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD					
CA	7	37	50/5"	--	>50	0.83	31				
CA	8	50	--	--	>50	0.5	35		grading moist.		
							36		sandy SILT; pale yellowish orange; very stiff; low plasticity; slightly dilatant; moist.		
							37				Bottom of boring @ 36.5'
							38				Water level not measured.
							39				Monitoring well constructed 1/8/96.
							40				
							41				
							42				
							43				
							44				
							45				
							46				
							47				
							48				
							49				
							50				
							51				
							52				
							53				
							54				
							55				
							56				
							57				
							58				
							59				



PIEZOMETER / WELL INSTALLATION LOG

NO. MW-18

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40408.540
PROJECT LOCATION Tacoma, Washington		COORDINATES N 701895.647 E 1160421.304		TOP OF RISER ELEVATION (DATUM) 17.07 (msl)
STRATUM MONITORED Sand/Gravel		LOGGED BY T. Mathis		
CHECKED BY S. Martin		APPROVED BY A. Markos		



METHOD OF INSTALLATION:

Boring drilled to completion; placed lower seal; set screen and riser pipe; placed filter pack and seal; set 8" diam. flush-mount housing and placed grout seal to surface.

REMARKS:

Well developed by surging, bailing, and pumping. Removed 55 gallons of water (approx. 21.6 casing volumes). 6-inch riser pipe installed below screen. Dedicated bailer installed in well.

BLACK & VEATCH Special Projects Corp.

LOG OF BORING

BORING NO. MW-17A/B
SHEET 1 OF 3

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40406.540
PROJECT LOCATION Tacoma, Washington		COORDINATES N 702090.915' E 1160378.208'	ELEVATION (DATUM) 14.03/14.07' (msl)	TOTAL DEPTH 72.0 FEET
SURFACE CONDITIONS Landsaped area NW of NW corner of City Dock			LOGGED BY T. Mathis	DATE START 01/16/96
			APPROVED BY A. Markos	DATE FINISH 01/17/96

SAMPLING								CHECKED BY S. Martin			APPROVED BY A. Markos		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS		
CORING													
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RGD RECOVERY	PERCENT RECOVERY	RGD							
CA	1	6	8	9	17	1.5	1-5		gravelly SAND; dark brown to black; loose; poorly graded; coarse grained; subangular; moist; some wood fragments; trace clay and brick.	Boring advanced w/8-3/4" OD, 4-1/4" ID hollow stem augers to 28', then reamed w/10-3/4" OD, 8-1/4" ID hollow stem augers. Samples collected w/2-1/2" ID California Modified sampler driven w/140 lb. hammer.			
CA	2	11	16	15	31	0.25	5-10		GRAVEL; black to dark brown; medium dense; poorly graded; fine grained; angular; wet; some-brick and sand.	Water encountered @ approx. 8'.			
CA	3	12	15	18	32	1.5	10-15		Brick (fire brick) and wood fragments; mottled red; white and black; poorly graded; medium grained; angular; wet; heavy sheen.				
CA	4	26	50	--	>50	1.5	15-20		SILT; light olive grey; very stiff; slightly plastic; wet; light sheen; trace barnacle shells.				
CA	5	20	26	32	58	1.5	20-25						

LOG OF BORING

BORING NO. MW-17A/B
SHEET 2 OF 3

CLIENT City of Tacoma	PROJECT Tacoma FMGP	PROJECT NO. 40406.540
PROJECT LOCATION Tacoma, Washington	COORDINATES N 702090.915' E 1160378.208'	ELEVATION (DATUM) 14.03/14.07' (msl)
SURFACE CONDITIONS Landscaped area NW of NW corner of City Dock		TOTAL DEPTH 72.0 FEET
LOGGED BY T. Mathis		DATE START 01/16/96
		DATE FINISH 01/17/96

SAMPLING								CHECKED BY S. Martin			APPROVED BY A. Markos		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS		
CORING													
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD							
CA	6	42	50/5"	--	>50	0.42	31			grading some gravel.			
							32						
							33						
							34			sandy GRAVEL; dark grey to black; dense; poorly graded; fine grained; subrounded; wet; some silt; slight sheen.			
CA	7	38	40	43	83	1.5	35						
							36						
							37						
							38						
							39			silty CLAY; dark brown; very stiff; moderately plastic; wet; trace wood fragments and fine sand.			
CA	8	6	16	25	41	0.75	40						
							41						
							42						
							43			SAND; dark grey to black; medium dense; well graded; fine to coarse grained; subrounded; wet; trace carbonized wood; trace silt.			
CA	9	25	27	32	59	1.5	45						
							46						
							47						
							48						
							49						
CA	10	30	34	30	64	1.5	50						
							51						
							52						
							53						
							54						
CA	11	30	36	33	69	1.5	55			grading some silt.			
							56						
CA	12	28	33	36	69	1.5	57						
							58						
							59						

BLACK & VEATCH Special Projects Corp.

LOG OF BORING

BORING NO. MW-17A/B
SHEET 3 OF 3

CLIENT City of Tacoma	PROJECT Tacoma FMGP	PROJECT NO. 40406.540
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PROJECT LOCATION Tacoma, Washington	COORDINATES N 702090.915' E 1180378.208'	ELEVATION (DATUM) 14.03/14.07' (msl)	TOTAL DEPTH 72.0 FEET	DATE START 01/16/96
--	---	---	--------------------------	------------------------

SURFACE CONDITIONS Landscaped area NW of NW corner of City Dock	LOGGED BY T. Mathis	DATE FINISH 01/17/96
--	------------------------	-------------------------

SAMPLING							CHECKED BY S. Martin	APPROVED BY A. Markos
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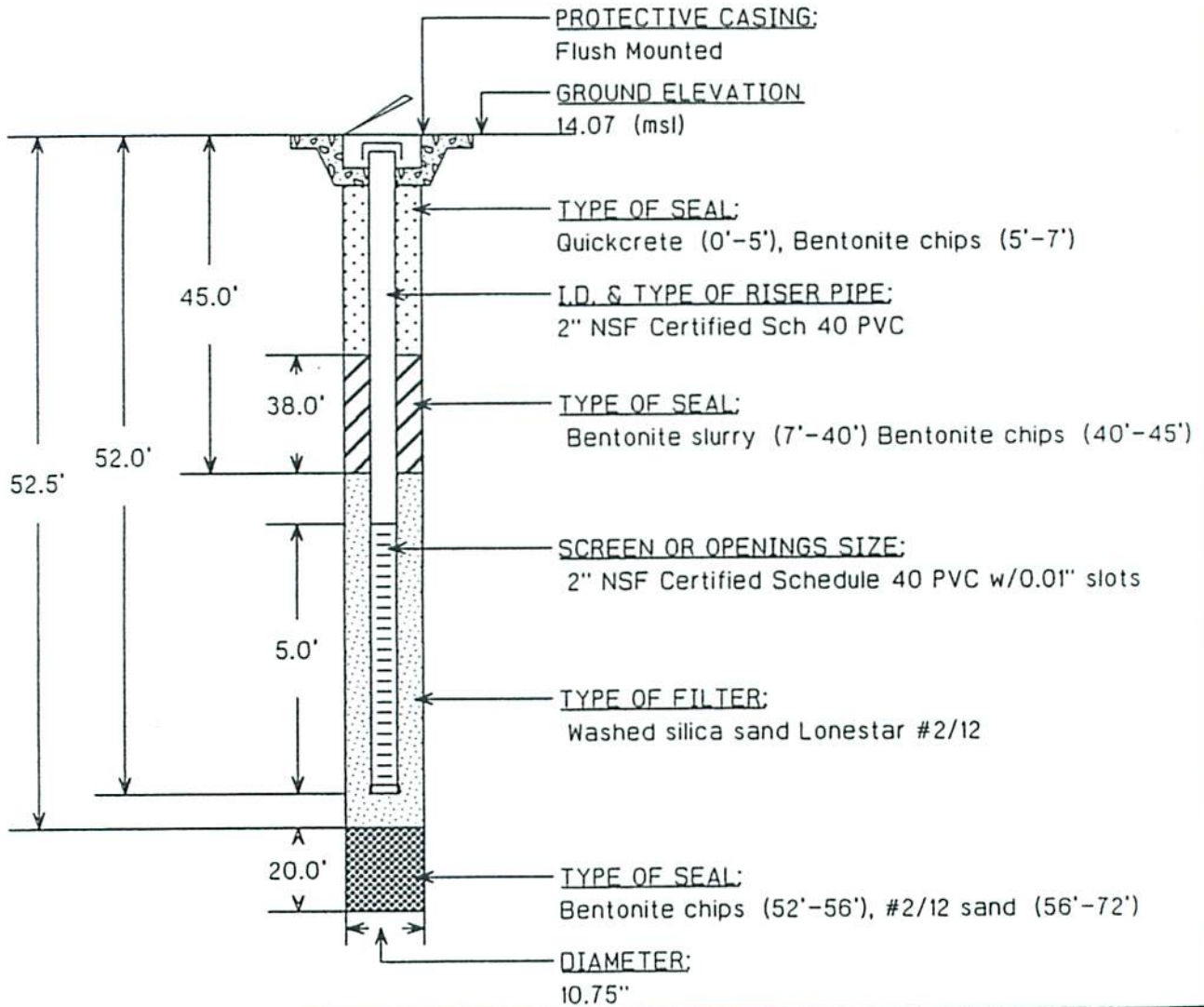
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD					
CA	13	5	6	7	13	1.5	61			silty SAND; dark grey w/dark green mottling; loose; poorly graded; fine grained; subrounded; wet; trace wood fragments.	
							62				
							63			gravelly SAND; dark grey; very dense; poorly graded; coarse grained; subrounded; wet.	
							64				
CA	14	200	--	--	>50	0.33	65				
							66				
							67				
							68				
							69				
CA	15	200/3'	--	--	>50	0.25	70				
CA	16	300	--	--	>50	0.5	71				
							72				
							73				Bottom of boring @ 72.0'.
							74				Water level not measured.
							75				Monitoring wells constructed 1/17/96.
							76				
							77				
							78				
							79				
							80				
							81				
							82				
							83				
							84				
							85				
							86				
							87				
							88				
							89				



PIEZOMETER / WELL INSTALLATION LOG

NO. MW-17A

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40406.540
PROJECT LOCATION Tacoma, Washington	COORDINATES N 702090.915 E 1160379.208		TOP OF RISER ELEVATION (DATUM) 13.67 (msl)	DATE 1/17/96
STRATUM MONITORED Sand			LOGGED BY T. Mathis	
CHECKED BY S. Martin			APPROVED BY A. Markos	



METHOD OF INSTALLATION:

Boring drilled to completion; set screen and riser pipe; placed filter pack and seal for MW-17B; placed riser pipe and screen for MW-17A; placed filter pack and seal; set 12" diam. flush mount housing.

REMARKS:

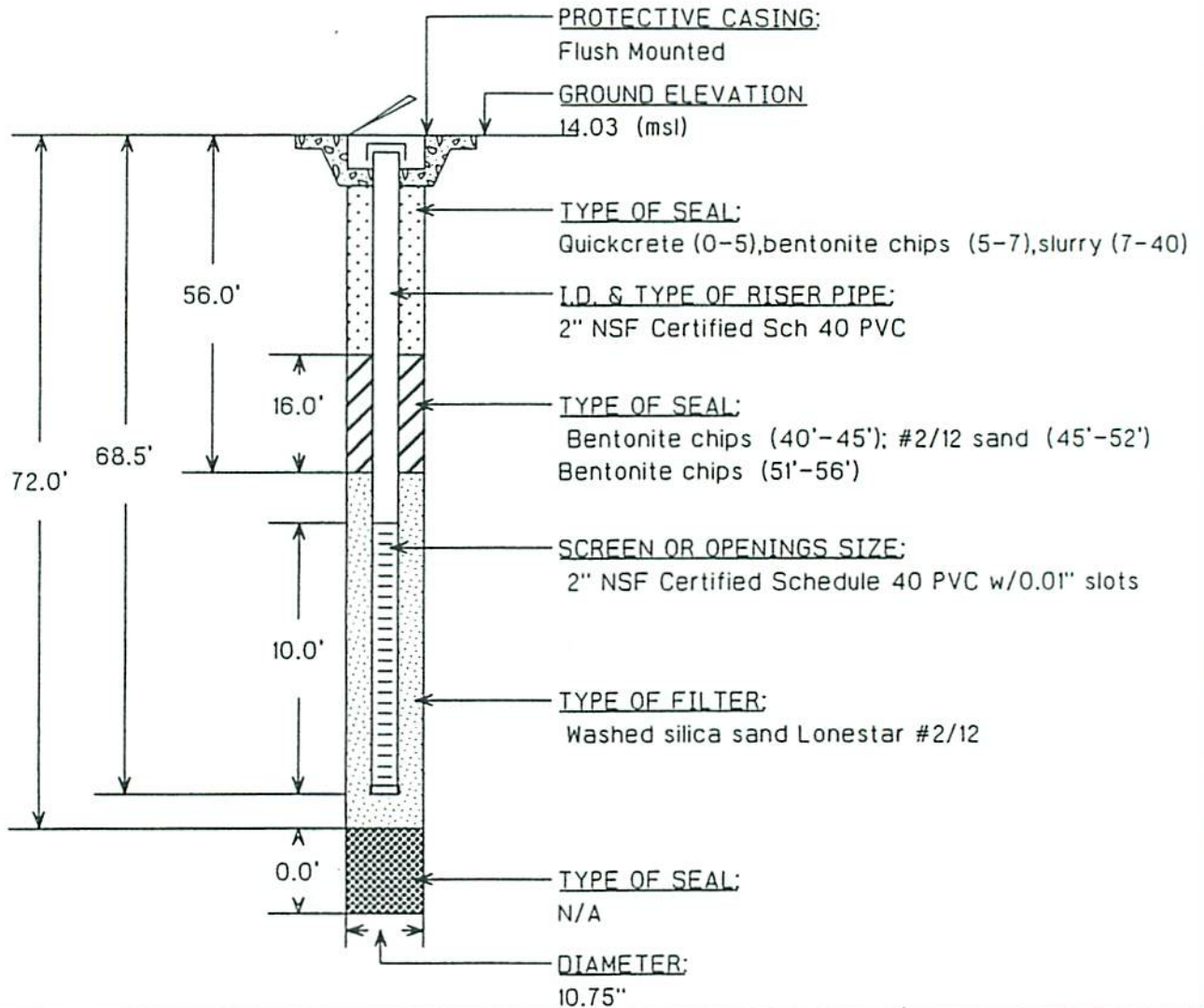
Well developed by surging, bailing, and pumping. Removed 30 gallons of water (approx. 3.7 casing volumes). 6-inch riser pipe installed below screen. Dedicated bailer installed in well.



PIEZOMETER / WELL INSTALLATION LOG

NO. MW-17B

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40406.540	
PROJECT LOCATION Tacoma, Washington		COORDINATES N 702090.915 E 1160379.208		TOP OF RISER ELEVATION (DATUM) 13.63 (msl)	
STRATUM MONITORED Sand		LOGGED BY T. Mathis			
CHECKED BY S. Martin		APPROVED BY A. Markos			



METHOD OF INSTALLATION:

Boring drilled to completion; set screen and riser pipe; placed filter pack and seal; placed riser pipe and screen, and filter pack for MW-17A; placed upper seal; set 12" diam flush mount housing.

REMARKS:

Well developed by surging, bailing, and pumping. Removed 25 gallons of water (approx. 2.3 casing volumes). 6-inch riser pipe installed below screen. Dedicated bailer installed in well.

BLACK & VEATCH Special Projects Corp.

LOG OF BORING

BORING NO. MW-18A/B
SHEET 1 OF 3

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40406.540	
PROJECT LOCATION Tacoma, Washington		COORDINATES N 702090.915' E 1160378.658'		ELEVATION (DATUM) 17.86/17.86' (msl)	
SURFACE CONDITIONS Unpaved surface 150' W of A St. and Dock St. inter		LOGGED BY T. Mathis		TOTAL DEPTH 72.5 FEET	
				DATE START 01/15/96	
				DATE FINISH 01/15/96	

SAMPLING			CHECKED BY S. Martin		APPROVED BY A. Markos	
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY

CORING							DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD					
CA	1	6	6	6	12	1.5	1			sandy GRAVEL; moderate brown; loose; poorly graded; fine grained; subangular; moist; some clay.	Boring advanced w/15" OD, 11" ID hollow stem augers. Samples collected w/2-1/2" ID California Modified sampler driven w/140 lb. hammer.
							2				
							3				
							4			silty SAND; dark gray to dark brown; loose; well graded; fine to coarse grained; subangular; moist; some gravel.	
CA	2	3	3	4	7	1.5	5			sandy SILT; blue-grey; firm; moderate plasticity; moist; trace gravel; some clay.	Water encountered @ approx. 13'.
							6				
							7				
							8				
CA	3	6	6	8	14	1.5	9			silty SAND; dark grey to dark brown; loose; well graded; fine to coarse grained; subangular; wet; some gravel; trace wood.	Set 12" welded isolation casing to 28'. Boring advanced below 28' w/ 10-3/4" OD, 8-1/4" ID hollow stem augers.
							10				
							11				
							12				
CA	4	6	8	11	19	1.5	13			SAND; dark gray to black; loose; well graded; fine to coarse grained; subangular; wet; some silt and gravel.	
							14				
							15				
							16				
CA	5	70	--	--	>50	0.5	17			silty SAND; dark brown; very dense; poorly graded; fine grained; subangular; moist.	
							18				
							19				
							20				
							21				
							22				
							23				
							24				
							25				
							26				
							27				
							28				
							29				

BLACK & VEATCH Special Projects Corp.

LOG OF BORING

BORING NO. MW-18A/B
SHEET 2 OF 3

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40406.540	
PROJECT LOCATION Tacoma, Washington		COORDINATES N 702090.915' E 1160378.658'		ELEVATION (DATUM) 17.86/17.86' (msl)	TOTAL DEPTH 72.5 FEET
SURFACE CONDITIONS Unpaved surface 150' W of A St. and Dock St. inter				LOGGED BY T. Mathis	
				DATE START 01/15/96	
				DATE FINISH 01/15/96	

SAMPLING								CHECKED BY S. Martin			APPROVED BY A. Markos		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS		
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RGD RECOVERY	PERCENT RECOVERY	RGD							
CA	6	60	100/4"	--	>50	0.0	31			SILT; moderate yellowish brown w/light gray mottling; very stiff; slightly plastic; moist.			
							32						
							33			sandy SILT; moderate yellowish brown; very stiff; slightly plastic; moist.			
							34						
CA	7	100	--	--	>50	0.5	35						
							36						
							37						
							38			SAND; dark grey to black; very dense; well graded; fine to medium grained; subangular; wet; trace fine gravel.	Drilling rate increases.		
							39						
CA	8	50	--	--	>50	0.5	40						
							41						
							42						
							43						
							44						
CA	9	200/3'	--	--	>50	0.25	45						
							46						
							47						
							48						
							49						
CA	10	100/4"	--	--	>50	0.33	50			grading some gravel.			
							51						
							52						
							53						
							54						
CA	11	200	--	--	>50	0.0	55						
							56						
							57						
							58						
							59						

BLACK & VEATCH Special Projects Corp.

LOG OF BORING

BORING NO. MW-18A/B
SHEET 3 OF 3

CLIENT City of Tacoma	PROJECT Tacoma FMGP	PROJECT NO. 40406.540
PROJECT LOCATION Tacoma, Washington	COORDINATES N 702090.915' E 1160378.658'	ELEVATION (DATUM) 17.86/17.86' (msl)
SURFACE CONDITIONS Unpaved surface 150' W of A St. and Dock St. inter	LOGGED BY T. Mathis	TOTAL DEPTH 72.5 FEET
		DATE START 01/15/96
		DATE FINISH 01/15/96

SAMPLING						CHECKED BY S. Martin	APPROVED BY A. Markos
SAMPLE TYPE	SAMPLE NUMBER	SET 8 INCHES	2ND 8 INCHES	3RD 8 INCHES	N VALUE	SAMPLE RECOVERY	

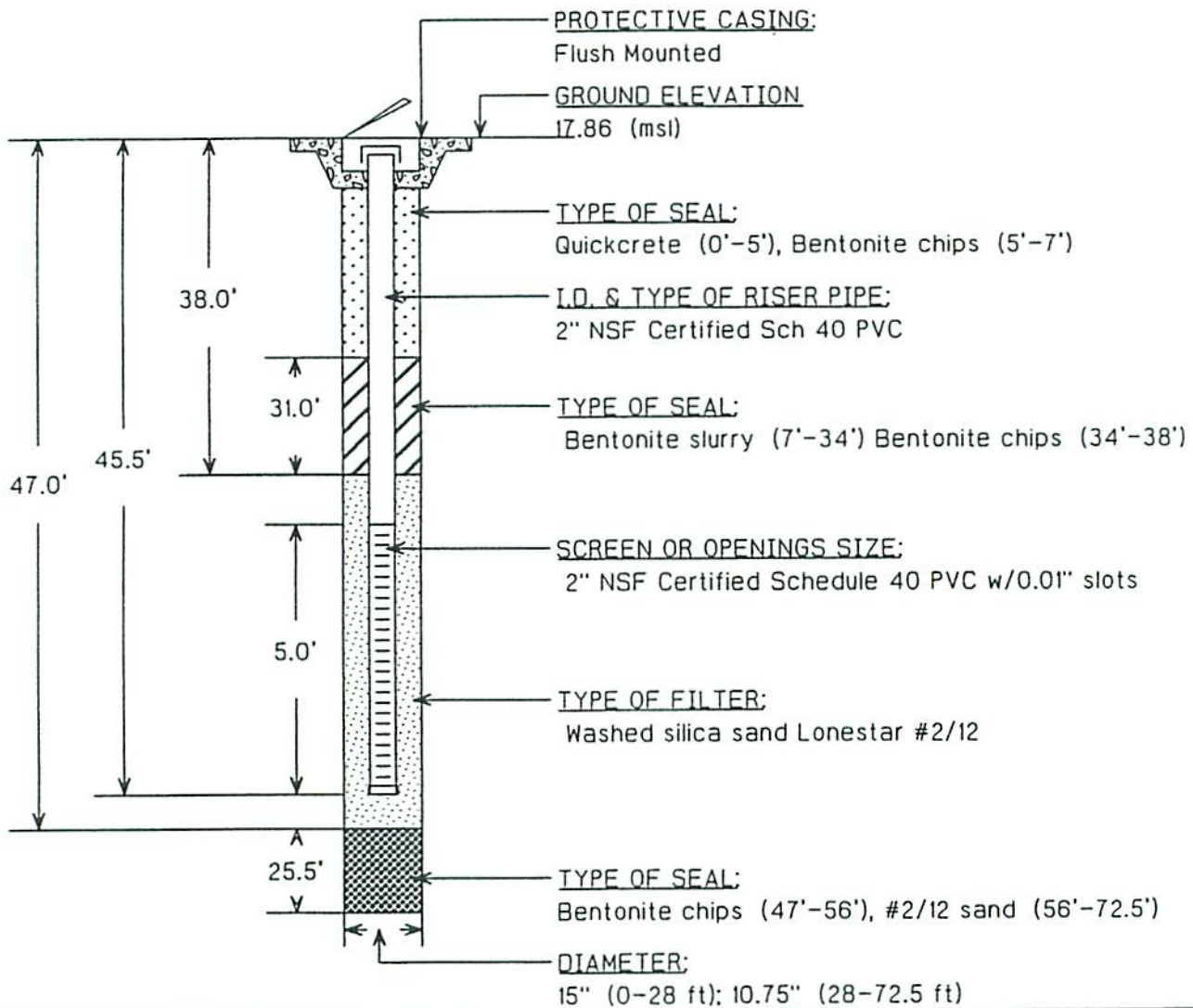
CORING							DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD					
CA	12	100/3"	--	--	>50	0.25	61		sandy GRAVEL; dark grey; very dense; well graded; fine to medium grained; subangular; moist.		
CA	13	120/4"	--	--	>50	0.33	62				
							63				
							64				
							65				
CA	14	120/3"	--	--	>50	0.25	66				
							67				
							68				
CA	15	200	--	--	>50	0.5	69				
							70				
							71				
							72				
							73			Bottom of boring @ 72.5'	
							74			Water level not measured.	
							75			Monitoring wells constructed 1/15/96.	
							76				
							77				
							78				
							79				
							80				
							81				
							82				
							83				
							84				
							85				
							86				
							87				
							88				
							89				



PIEZOMETER / WELL INSTALLATION LOG

NO. MW-18A

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40408.540
PROJECT LOCATION Tacoma, Washington		COORDINATES N 702005.195 E 1160168.658		TOP OF RISER ELEVATION (DATUM) 17.46 (msl)
STRATUM MONITORED Sand		LOGGED BY T. Mathis		
CHECKED BY S. Martin		APPROVED BY A. Markos		



METHOD OF INSTALLATION:

Boring drilled to 28'; set 12" diam isolation casing; boring drilled to 72.5'; set riser pipe, screen, filter pack, and upper seal for MW-18B. Set riser pipe and screen for MW-18A. Placed filter pack and upper seal; pulled isolation casing; placed grout seal to surface; set 12" diam. flush mount housing.

REMARKS:

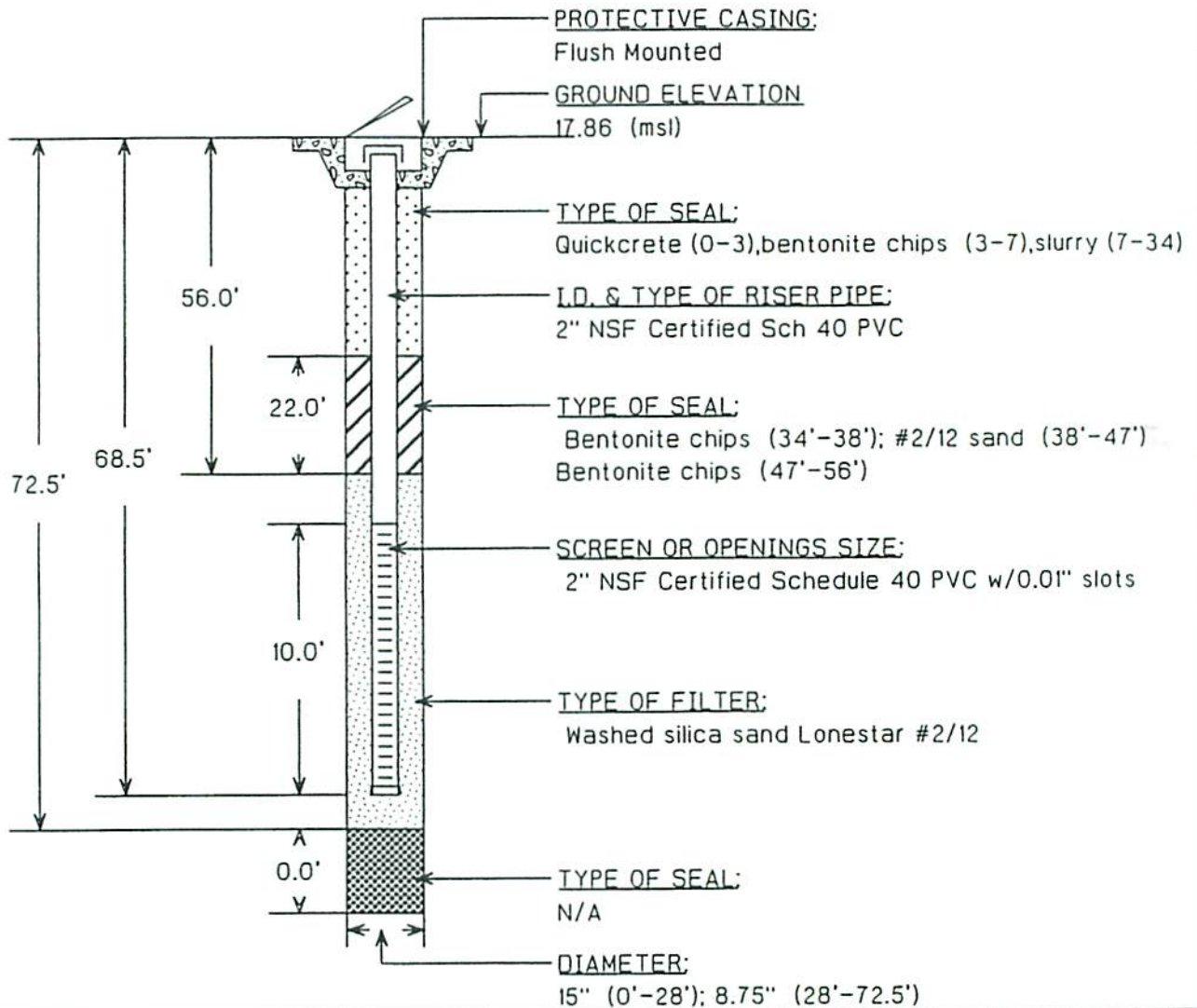
Well developed by surging, bailing, and pumping. Removed 17 gallons of water (approx. 2.6 casing volumes). 6-inch riser pipe installed below screen. Dedicated bailer installed in well.



PIEZOMETER / WELL INSTALLATION LOG

NO. MW-18B

CLIENT City of Tacoma		PROJECT Tacoma FMGP		PROJECT NO. 40406.540
PROJECT LOCATION Tacoma, Washington		COORDINATES N 702005.195 E 1160168.658		TOP OF RISER ELEVATION (DATUM) 17.46 (msl)
STRATUM MONITORED Sand/Gravel			LOGGED BY T. Mathis	
CHECKED BY S. Martin			APPROVED BY A. Markos	



METHOD OF INSTALLATION:

Boring drilled to 28'; set 12" isolation casing; boring drilled to 72.5'; set riser pipe and screen; placed filter pack and seal; placed riser pipe, screen and filter pack for MW-18A; placed upper seal; pulled isolation casing; placed grout seal to surface; set 12" diam. flush mount housing.

REMARKS:

well developed by surging, bailing, and pumping. Removed 55 gallons of water (approx. 4.7 casing volumes). 6-inch riser pipe installed below screen. Dedicated bailer installed in well.



BLACK & VEATCH

LOG OF BORING

BORING NO. MW-19
SHEET 1 OF 2

CLIENT Washington Natural Gas		PROJECT Tacoma FMGP		PROJECT NO. 40786.123
PROJECT LOCATION Tacoma, Washington		COORDINATES N' E'	ELEVATION (DATUM) ' (msl)	TOTAL DEPTH 40.0 FEET
SURFACE CONDITIONS Paved parking lot			LOGGED BY T. Mathis	DATE FINISH 03/14/97

SAMPLING		CHECKED BY S. Martin	APPROVED BY T. Mathis
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SAMPLE TYPE	SAMPLE NUMBER	SET	CORING			N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
			1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES							
CA	1	42	50	--	--	>50	0.4	1-5	[Hatched pattern]	Silty SAND; light yellowish brown; very dense; well graded; fine to coarse grained; subrounded; moist.	Boring advanced w/8-3/4" OD, 4-1/4" ID hollow stem augers. Samples collected w/2-1/2" ID California modified sampler driven w/300 lb. hammer.	
CA	2	75	--	--	--	>75	0.4	5-10	[Dotted pattern]	SAND; dark grey; very dense; poorly graded; medium grained; subrounded; wet.	Encountered groundwater @ 8.0' bgs.	
CA	3	60	--	--	--	>60	0.4	10-15	[Hatched pattern]	Clayey SAND; mottled dark grey and moderate yellowish brown; very dense; poorly graded; medium grained; some wood fragments; wet.		
CA	4	100	--	--	--	>100	0.4	15-20	[Dotted pattern]	SAND; dark grey; very dense; poorly graded; medium grained; subrounded; wet.		
CA	5	100	--	--	--	>100	0.4	20-25	[Dotted pattern]	Gravelly SAND; dark grey; very dense; poorly graded; medium grained; subrounded; wet.		

DRAFT

RFU

MW-19

ROD

MW-19



BLACK & VEATCH

LOG OF BORING

BORING NO. MW-19
SHEET 2 OF 2

CLIENT Washington Natural Gas		PROJECT Tacoma FMGP		PROJECT NO. 40788.123
PROJECT LOCATION Tacoma, Washington		COORDINATES N E	ELEVATION (DATUM) (msl)	TOTAL DEPTH 40.0 FEET
SURFACE CONDITIONS Paved parking lot			LOGGED BY T. Mathis	DATE START 03/14/97
			APPROVED BY T. Mathis	DATE FINISH 03/14/97

CHECKED BY S. Martin

SAMPLING							DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY					

CORING

CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD
-----------	------------	------------	--------------	--------------	------------------	-----

CA	6	100	--	--	>100	0.4	31		DRAFT	
CA	7	100	--	--	>100	0.4	35			
CA	8	120	--	--	>120	0.4	40			
							41			Bottom of boring @ 40.0' bgs.
							42			Water level not measured.
							43			Monitoring well installed on 03/14/97.
							44			
							45			
							46			
							47			
							48			
							49			
							50			
							51			
							52			
							53			
							54			
							55			
							56			
							57			
							58			
							59			

SILT; dark grey; hard; nonplastic; moist.

ROD Bot/DSU

FILE COPY

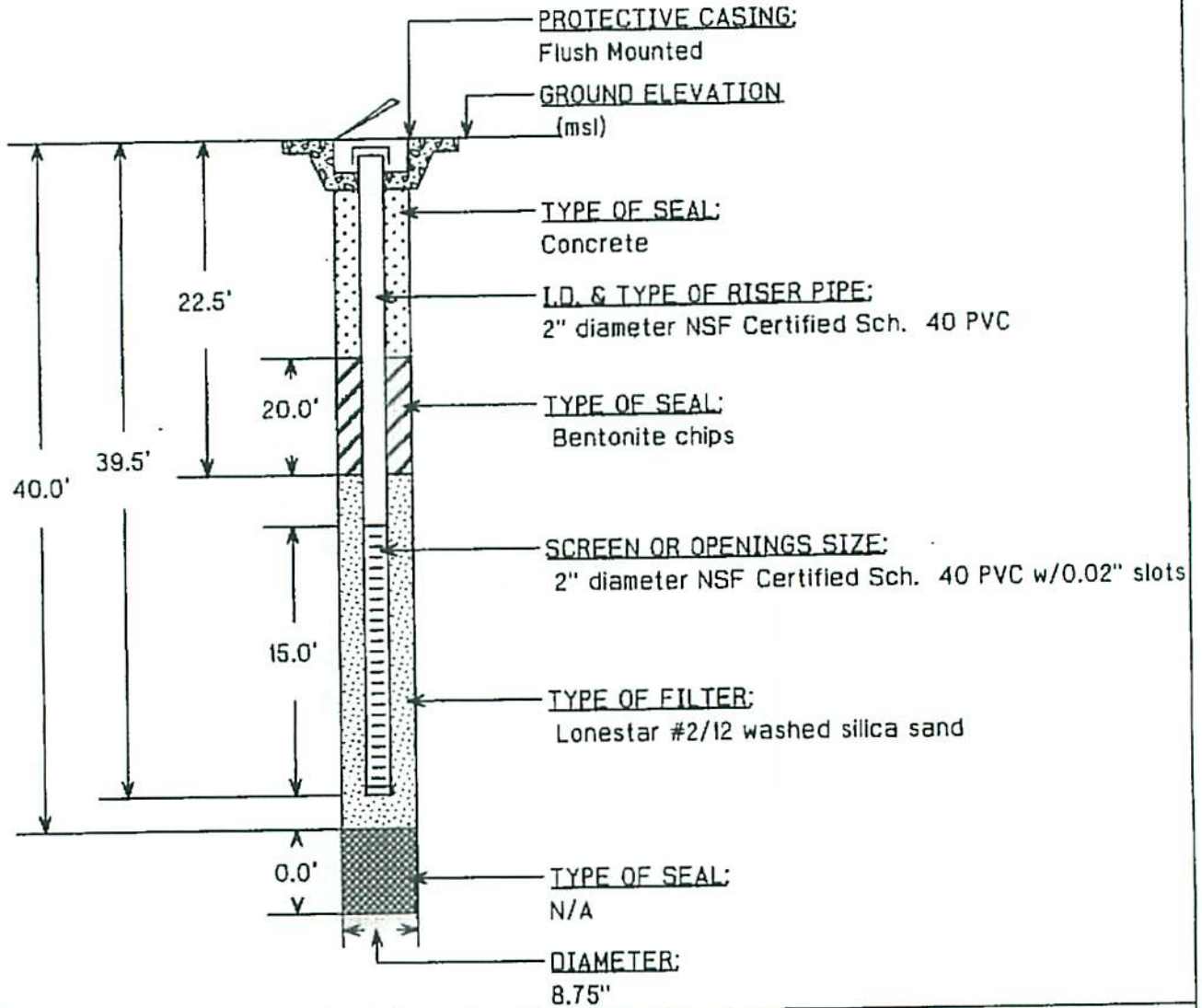


BLACK & VEATCH

NO. MW-19

PIEZOMETER / WELL INSTALLATION LOG

CLIENT Washington Natural Gas		PROJECT Tacoma FMGP		PROJECT NO. 40788.123
PROJECT LOCATION Tacoma, Washington	COORDINATES N E		TOP OF RISER ELEVATION (DATUM) (msl)	DATE 03/14/97
STRATUM MONITORED Gravelly Sand (39.5' - 24.5')			LOGGED BY T. Mathis	
CHECKED BY S. Martin			APPROVED BY T. Mathis	



METHOD OF INSTALLATION:

Boring drilled to completion; set screen and riser pipe; placed filter pack and seal. Placed bentonite chips to 2.5 feet below ground surface. Set flush-mount surface housing. Concrete surface seal placed to 0.1 feet above ground surface.

REMARKS:

Well developed by pumping with Brainard-Kilman pump. Removed 50 gallons of water (approx. 10 casing volumes). 8-inch riser pipe installed below screen.



BLACK & VEATCH

LOG OF BORING

BORING NO. MW-20
SHEET 1 OF 2

CLIENT Washington Natural Gas		PROJECT Tacoma FMGP		PROJECT NO. 40788.123
PROJECT LOCATION Tacoma, Washington		COORDINATES N' E'	ELEVATION (DATUM) (msl)	TOTAL DEPTH 55.0 FEET
SURFACE CONDITIONS Grassy road shoulder, east side of "A" street.			LOGGED BY T. Mathis	DATE FINISH 03/13/97

SAMPLING							CHECKED BY S. Martin			APPROVED BY T. Mathis		
----------	--	--	--	--	--	--	-------------------------	--	--	--------------------------	--	--

SAMPLE TYPE	SAMPLE NUMBER	SET 8 INCHES	2ND 8 INCHES	3RD 8 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CA	1	8	8	8	12	1.1	1-5			Sandy CLAY; moderate yellowish brown; stiff; moderately plastic; moist.	Boring advanced w/8-3/4" OD, 4-1/4" ID hollow stem augers. Samples collected w/2-1/2" ID California modified sampler driven w/300 lb. hammer.
CA	2	4	8	28	32	1.2	5-10		Clayey SILT; light yellowish brown; very stiff; slightly plastic; moist; some fine sand.		
CA	3	34	38	38	74	1.2	10-15		SILT; dark brown; hard; slightly plastic; moist; some fine sand.		
CA	4	38	38	38	74	1.0	15-20				
CA	5	80	--	--	80	0.5	20-25		Clayey GRAVEL; dark grey to black with greenish mottling; very dense; fine to coarse grained; well graded; subangular; moist.		

DRAFT

RFU

ROD



BLACK & VEATCH

LOG OF BORING

BORING NO. MW-20
SHEET 2 OF 2

CLIENT Washington Natural Gas	PROJECT Tacoma FMGP	PROJECT NO. 40788.123
PROJECT LOCATION Tacoma, Washington	COORDINATES N E	ELEVATION (DATUM) (msl)
SURFACE CONDITIONS Grassy road shoulder, east side of "A" street.		TOTAL DEPTH 55.0 FEET
LOGGED BY T. Mathis		DATE START 03/13/97
		DATE FINISH 03/13/97

SAMPLING						CHECKED BY S. Martin	APPROVED BY T. Mathis
----------	--	--	--	--	--	-------------------------	--------------------------

SAMPLE TYPE	SAMPLE NUMBER	SET Ø INCHES	2ND Ø INCHES	3RD Ø INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD					
CA	8	100	--	--	100	0.6	31				
CA	7	45	50	--	>50	0.7	35			GRAVEL: dark grey to black; very dense; poorly graded; medium grained; subrounded; wet.	
CA	8	38	50	--	>50	0.8	40			SAND: dark grey to black; medium grained; very dense; poorly graded; subrounded; wet; some gravel.	
CA	9	50	--	--	>80	0.5	45				
CA	10	80	--	--	>80	0.4	50				
CA	11	150	--	--	>150	0.2	55				
							56				Bottom of boring @ 55.0' bgs.
							57			SILT; dark grey; very hard; slightly plastic; moist.	
							58				
							59				

DRAFT

ROD
Bot/BSU

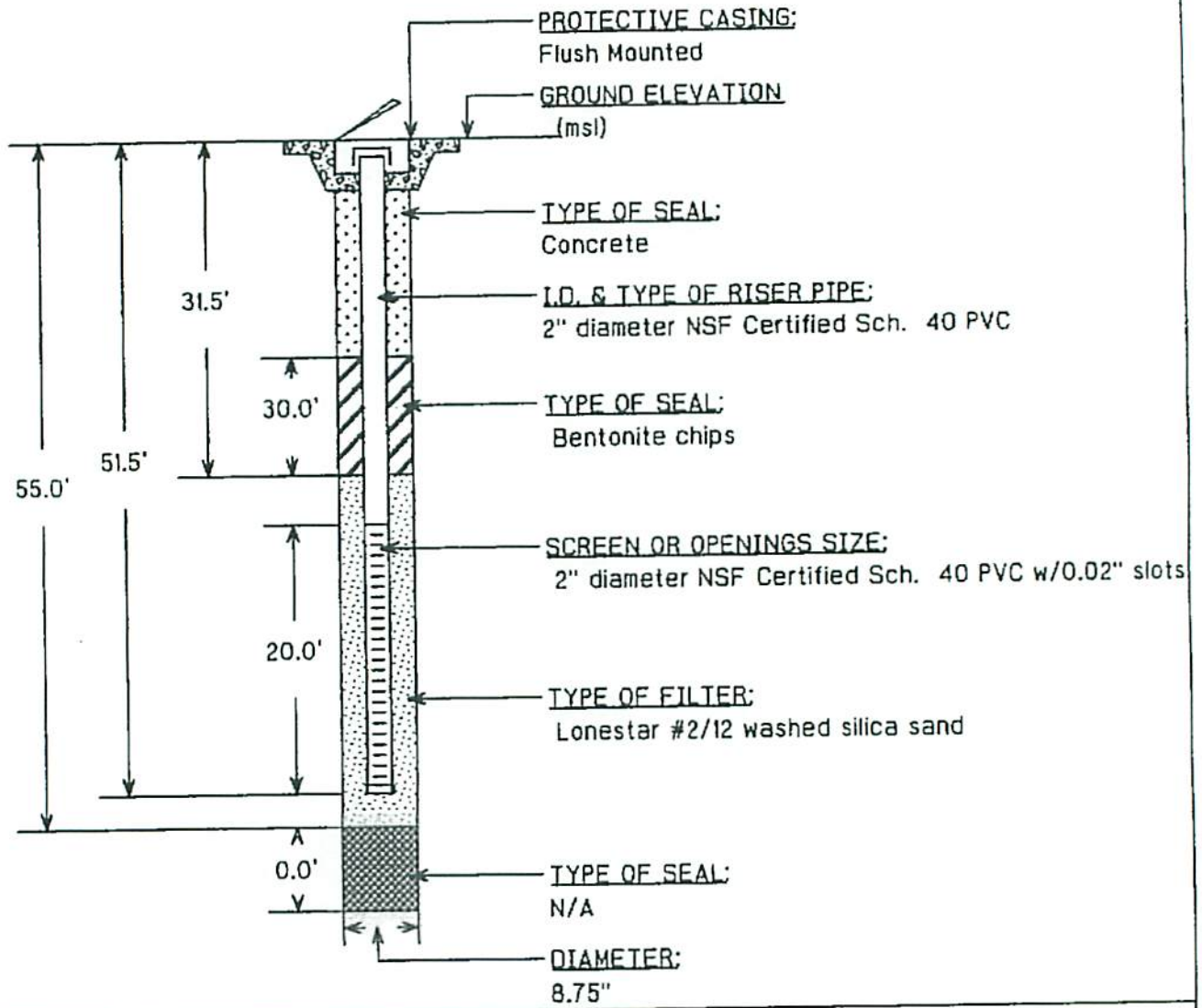


BLACK & VEATCH

NO. MW-20

PIEZOMETER / WELL INSTALLATION LOG

CLIENT Washington Natural Gas		PROJECT Tacoma FMGP		PROJECT NO. 40786.123	
PROJECT LOCATION Tacoma, Washington		COORDINATES N E		TOP OF RISER ELEVATION (DATUM) (msl)	
STRATUM MONITORED Sand (51.5' - 38.0'); Gravel (38.0' - 33.0')				LOGGED BY T. Mathis	
CHECKED BY S. Martin				APPROVED BY T. Mathis	



METHOD OF INSTALLATION: Boring drilled to completion; set screen and riser pipe. Placed ~~sand~~ ^{filter} pack and seal. Placed bentonite chips to 1.5 feet below ground surface. Set flush-mount surface housing. Concrete surface seal placed to 0.1 feet above ground surface.

REMARKS: Well developed by pumping with Brainard-Kilman pump. Removed 50 gallons of water (approx. 8 casing volumes). 8-inch riser pipe installed below screen.



BLACK & VEATCH

LOG OF BORING

BORING NO. MW-21
SHEET 1 OF 2

CLIENT Washington Natural Gas		PROJECT Tacoma FMGP		PROJECT NO. 40766.123
PROJECT LOCATION Tacoma, Washington		COORDINATES N ° E °	ELEVATION (DATUM) (msl)	TOTAL DEPTH 55.0 FEET
SURFACE CONDITIONS Unpaved traffic island in 22 street right of way.			LOGGED BY T. Mathis	DATE FINISH 03/13/97

SAMPLING		CHECKED BY S. Martin	APPROVED BY T. Mathis
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CORING								DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD						
CA	1	42	50	--	>50	0.4	1				Boring advanced w/8-3/4" OD, 4-1/4" ID hollow stem augers. Samples collected w/2-1/2" ID California modified sampler driven w/300 lb. hammer.	
							2					
							3					
							4					
							5					
							6					
							7					
							8					
							9					
CA	2	80	--	--	>80	0.4	10					
							11					
							12					
							13					
							14					
							15					
CA	3	100	--	--	>100	0.4	16					
							17					
							18					
							19					
							20					
CA	4	80	--	--	>80	0.4	21					
							22					
							23					
							24					
CA	5	100	--	--	>100	0.4	25					
							26					
							27					
							28					
							29					

DRAFT

RFU

MW-23

ROD



BLACK & VEATCH

LOG OF BORING

BORING NO. MW-21
SHEET 2 OF 2

CLIENT Washington Natural Gas		PROJECT Tacoma FMGP		PROJECT NO. 40788.123
PROJECT LOCATION Tacoma, Washington		COORDINATES N' E'	ELEVATION (DATUM) (msl)	TOTAL DEPTH 55.0 FEET
SURFACE CONDITIONS Unpaved traffic island in 22 street right of way.			LOGGED BY T. Mathis	DATE FINISH 03/13/97

SAMPLING		CHECKED BY S. Martin	APPROVED BY T. Mathis
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SAMPLE TYPE	SAMPLE NUMBER	SET Ø INCHES	2ND Ø INCHES	3RD Ø INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CA	6	90	--	--	>90	0.4	31			Gravelly SAND; dark grey; very dense; poorly graded; medium grained; subrounded; wet.	DRAFT
CA	7	90	--	--	>90	0.5	32				
CA	8	100	--	--	>100	0.4	33				
CA	8	100	--	--	>100	0.4	34				
CA	8	100	--	--	>100	0.4	35				
CA	8	100	--	--	>100	0.4	36				
CA	8	100	--	--	>100	0.4	37				
CA	8	100	--	--	>100	0.4	38				
CA	8	100	--	--	>100	0.4	39				
CA	8	100	--	--	>100	0.4	40				
CA	8	100	--	--	>100	0.4	41				
CA	10	100	--	--	>100	0.4	42				
CA	10	100	--	--	>100	0.4	43				
CA	10	100	--	--	>100	0.4	44				
CA	10	100	--	--	>100	0.4	45				
CA	10	100	--	--	>100	0.4	46				
CA	10	100	--	--	>100	0.4	47				
CA	10	100	--	--	>100	0.4	48				
CA	10	100	--	--	>100	0.4	49				
CA	10	100	--	--	>100	0.4	50				
CA	11	150	--	--	>150	0.4	51				
CA	11	150	--	--	>150	0.4	52				
CA	11	150	--	--	>150	0.4	53				
CA	11	150	--	--	>150	0.4	54				
CA	11	150	--	--	>150	0.4	55				
CA	11	150	--	--	>150	0.4	56				
CA	11	150	--	--	>150	0.4	57				
CA	11	150	--	--	>150	0.4	58				
CA	11	150	--	--	>150	0.4	59				

MW-21

ROD

ROD/BOT

Bottom of boring @ 55.0' bgs.
 Water level not measured.
 Monitoring well installed 3/13/97.

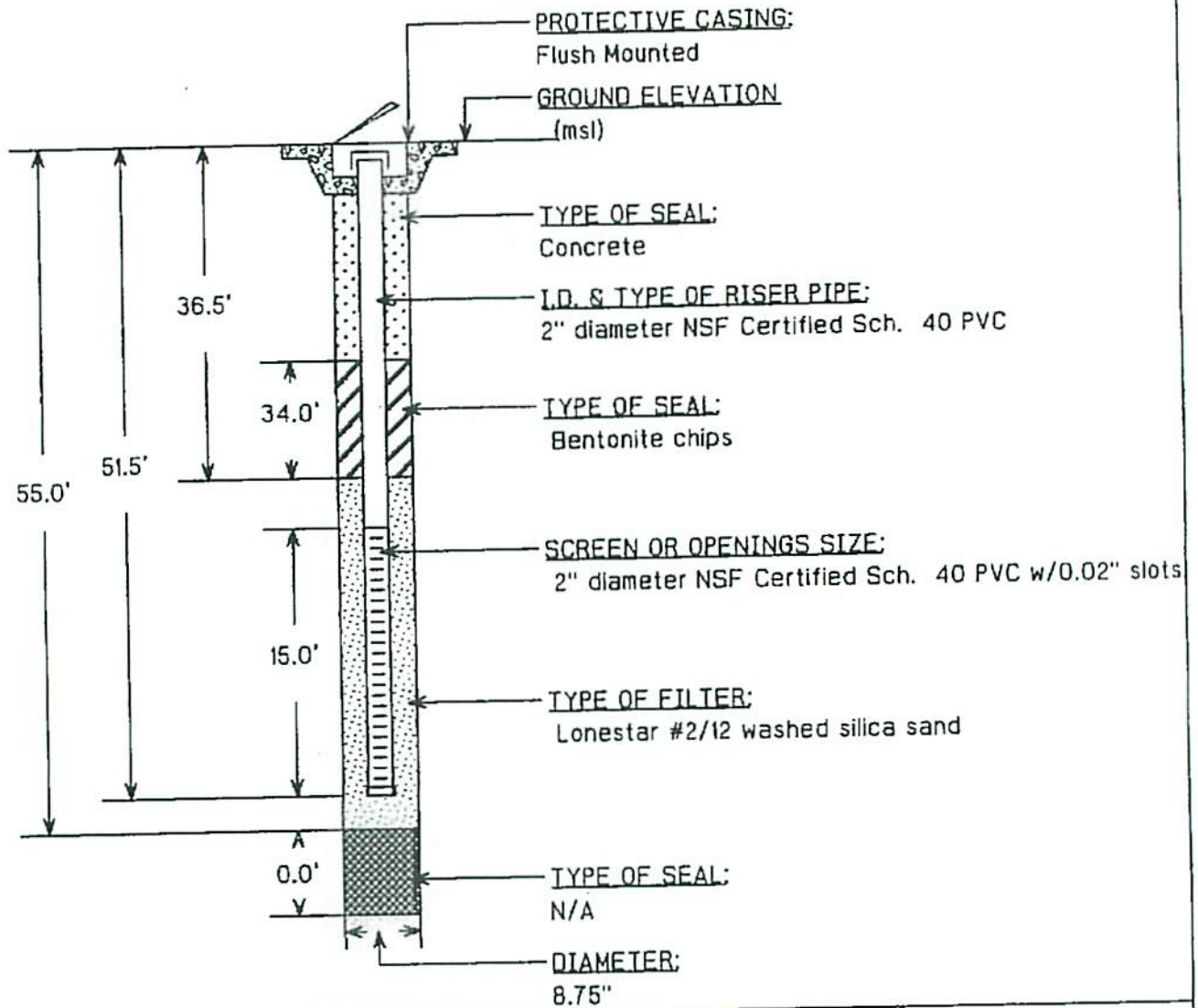


BLACK & VEATCH

NO. MW-21

PIEZOMETER / WELL INSTALLATION LOG

CLIENT Washington Natural Gas		PROJECT Tacoma FMGP		PROJECT NO. 40788.123
PROJECT LOCATION Tacoma, Washington	COORDINATES N E		TOP OF RISER ELEVATION (DATUM) (msl)	DATE 03/13/97
STRATUM MONITORED Gravelly Sand (51.5' - 38.5')			LOGGED BY T. Mathis	
CHECKED BY S. Martin			APPROVED BY T. Mathis	



METHOD OF INSTALLATION: Pac K
 Boring drilled to completion; set screen and riser pipe; placed filter and seal. Placed bentonite chips to 2.5 feet below ground surface. Set flush-mount surface housing. Concrete surface seal placed to 0.1 feet above ground surface.

REMARKS:
 Well developed by pumping with Brainard-Kilman pump. Removed 50 gallons of water (approx. 8 casing volumes). 8-inch riser pipe installed below screen.

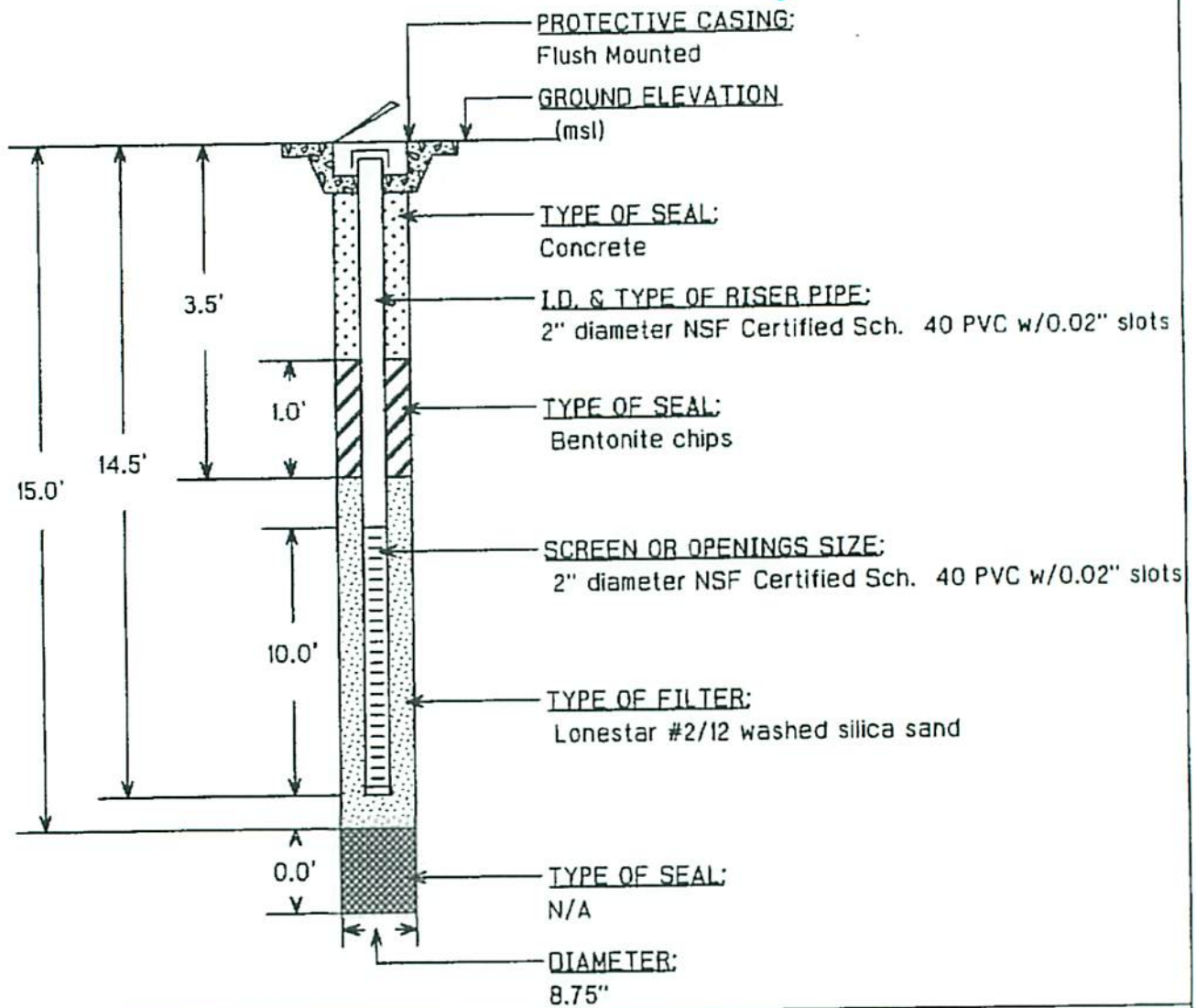


BLACK & VEATCH

PIEZOMETER / WELL INSTALLATION LOG

NO. MW-22

CLIENT Washington Natural Gas		PROJECT Tacoma FHGP		PROJECT NO. 40788.123
PROJECT LOCATION Tacoma, Washington	COORDINATES N E		TOP OF RISER ELEVATION (DATUM) (msl)	DATE 03/14/97
STRATUM MONITORED Clayey Sand (14.0' - 14.5'); Sand (14.0' - 8.0')			LOGGED BY T. Mathis	
CHECKED BY S. Martin			APPROVED BY T. Mathis	



METHOD OF INSTALLATION: Pack Boring drilled to completion; set screen and riser pipe; placed filter sand and seal. Placed bentonite chips to 2.5 feet below ground surface. Set flush-mount surface housing. Concrete surface seal placed to 0.1 feet above ground surface.

REMARKS: Well developed by pumping with Brainard-Kilman pump. Removed 50 gallons of water (approx. 45 casing volumes). 8-inch riser pipe installed below screen. For lithologic information refer to boring log for MW-19.

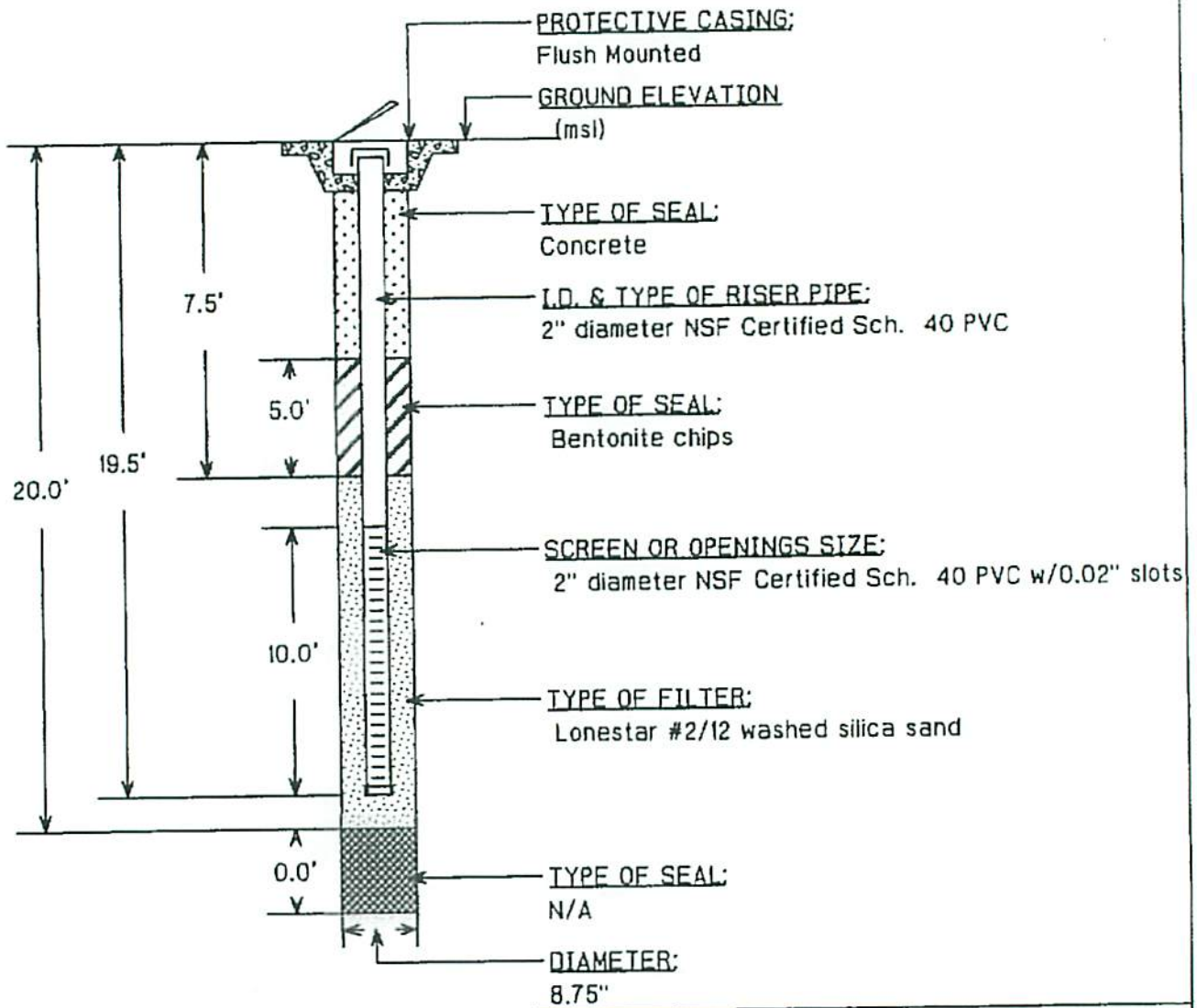


BLACK & VEATCH

NO. MW-23

PIEZOMETER / WELL INSTALLATION LOG

CLIENT Washington Natural Gas		PROJECT Tacoma FMGP		PROJECT NO. 40788.123
PROJECT LOCATION Tacoma, Washington		COORDINATES N E		TOP OF RISER ELEVATION (DATUM) (msl)
STRATUM MONITORED Sand (10.5' - 13.0'); Clayey Silt (13.0' - 0.5')			LOGGED BY T. Mathis	
CHECKED BY S. Merlin			APPROVED BY T. Mathis	



METHOD OF INSTALLATION: Boring drilled to completion; set screen and riser pipe. Placed ^{filter} sand pack and seal. Placed bentonite chips to 2.5 feet below ground surface. Set flush-mount surface housing. Concrete surface seal placed to 0.1 feet above ground surface.

REMARKS: Well developed by pumping with Brainard-Kilman pump. Removed 50 gallons of water (approx. 40 casing volumes). 6-inch riser pipe installed below screen. For lithologic information refer to boring log for MW-21.



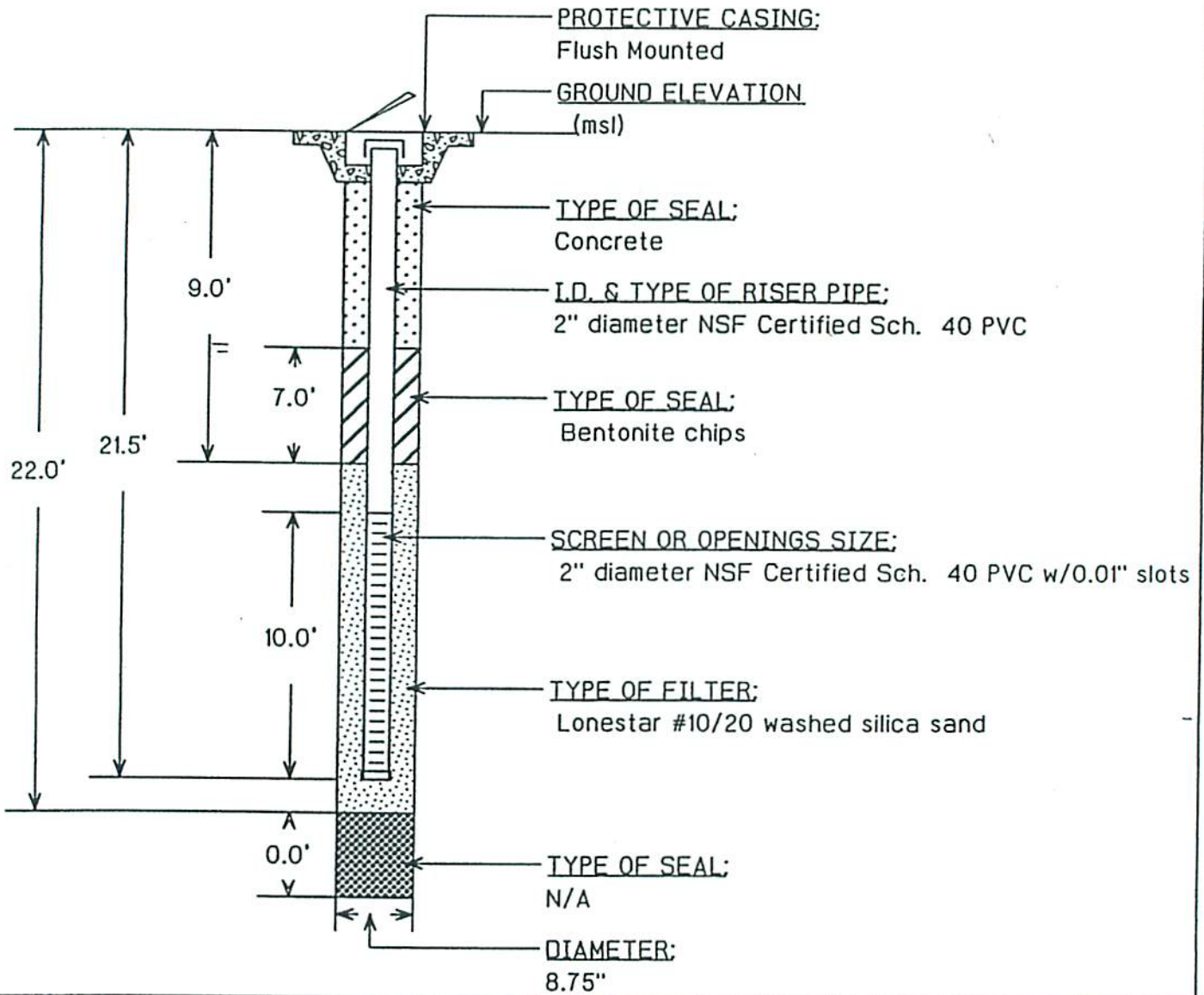
CLIENT Puget Sound Energy		PROJECT Tacoma FMGP		PROJECT NO. 40786.141
PROJECT LOCATION Tacoma, Washington		COORDINATES N 702,031 E 1,160,368	ELEVATION (DATUM) 21.35'(mllw)	TOTAL DEPTH 22.0 FEET
SURFACE CONDITIONS Concrete sidewalk in City park			LOGGED BY T. Mathis	DATE FINISH 07/14/98

SAMPLING								CHECKED BY S. Martin			APPROVED BY S. Martin		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS		
CORING								DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS	
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD							
CA	1	12	12	13	25	1.0'	1-5			4-inch thick concrete sidewalk.	Boring advanced w/8-3/4" OD, 4-1/4" ID hollow stem augers. Samples collected w/2-1/2" ID california modified sampler driven w/300-lb hammer.		
CA	2	3	3	3	6	1.5'	5-10			Gravelly SAND: moderate yellowish brown; medium dense; well graded; fine to coarse grained; rounded; moist; some silt; trace brick (fill).			
CA	3	10	7	6	13	1.5'	10-15			Sandy GRAVEL: reddish brown; loose; well graded; fine to coarse grained; angular; moist; some cinders; some brick (fill).			
CA	4	6	6	6	12	1.2'	15-20			Silty CLAY: dark gray; stiff; high plasticity; moist; some wood fragments; alternating light and dark bedding.			
							18				Encountered water at 18 ft below ground surface.		
							20-21			Clayey GRAVEL: dark gray; loose; poorly graded; fine grained; rounded; wet; trace shells.			
							22				Bottom of boring @ 22.0' below ground surface.		
							24				Water level measured at 18.5' below ground surface at 12:45 hrs on 7/14/98.		
							27				Monitoring well constructed 7/14/98.		



PIEZOMETER / WELL INSTALLATION LOG

CLIENT Puget Sound Energy		PROJECT Tacoma FMGP		PROJECT NO. 40786.141
PROJECT LOCATION Tacoma, Washington	COORDINATES N 702,031 E 1,160,368	TOP OF RISER ELEVATION (DATUM) 21.35'(mllw)		DATE 07/14/98
STRATUM MONITORED Clayey GRAVEL (22.0'-18.0'); Silty CLAY (18.0'-13')			LOGGED BY T. Mathis	
CHECKED BY S. Martin		APPROVED BY S. Martin		



METHOD OF INSTALLATION:

Boring drilled to completion; set screen and riser pipe. Placed sandpack and seal. Placed bentonite chips to 2.0 feet below ground surface. Set flush-mount surface housing. Concrete surface seal placed to 0.1 feet above ground surface.

REMARKS:

Well developed by pumping with Brainard-Kilman pump. Removed 10 gallons of water (approximately 17 casing volumes). 6-inch riser pipe installed below screen.



LOG OF BORING

BORING NO. MW-25
SHEET 1 OF 1

CLIENT Puget Sound Energy		PROJECT Tacoma FMGP		PROJECT NO. 40786.141	
PROJECT LOCATION Tacoma, Washington		COORDINATES N 701,991 E 1,160,342		ELEVATION (DATUM) 23.77'(mllw)	
SURFACE CONDITIONS Lawn in City park		LOGGED BY T. Mathis		TOTAL DEPTH 23.0 FEET	
				DATE START 07/14/98	
				DATE FINISH 07/14/98	

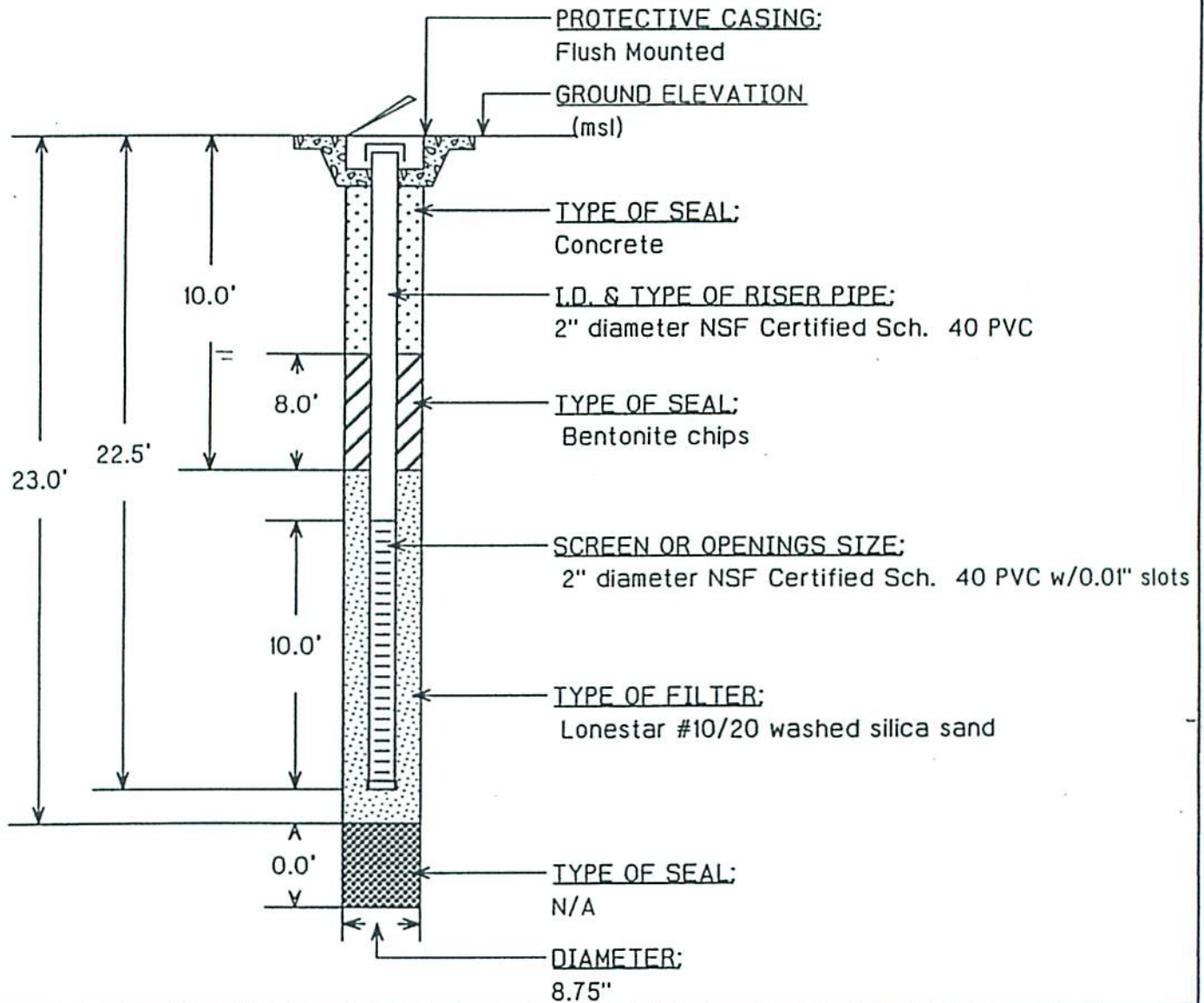
SAMPLING								CHECKED BY S. Martin			APPROVED BY S. Martin		
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS		
CORING													
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	ROD RECOVERY	PERCENT RECOVERY	ROD							
CA	1	35	37	40	77	1.1'	1				Boring advanced w/8-3/4" OD, 4-1/4" ID hollow stem augers. Samples collected w/2-1/2" ID california modified sampler driven w/300-lb hammer.		
							2						
							3						
							4						
							5			Clayey SAND: dark yellowish brown to medium gray; very dense; well graded; fine to medium grained; rounded; moist; some gravel; trace brick (fill).			
							6						
							7						
							8						
CA	2	4	4	5	9	1.1'	9			Sandy CLAY: dark gray; firm; high plasticity; moist; some decomposed plants; trace gravel (fill).			
							10						
							11						
							12						
							13						
							14						
CA	3	5	5	5	10	1.4'	15			grading w/trace oily staining			
							16						
							17						
							18						
							19						
CA	4	3	3	4	7	1.4'	20			Silty CLAY: light gray; firm; high plasticity; wet; trace decomposed wood and seaweed (deltaic sediments)			
							21				Encountered water at 21 ft below ground surface.		
							22						
							23						
							24				Bottom of boring @ 23.0' below ground surface.		
							25				Water level measured at 16.4' below ground surface at 09:10 hrs on 7/14/98.		
							26						
							27						
							28				Monitoring well constructed 7/14/98.		
							29						



PIEZOMETER / WELL INSTALLATION LOG

NO. MW-25

CLIENT Puget Sound Energy		PROJECT Tacoma FMGP	PROJECT NO. 40788.141
PROJECT LOCATION Tacoma, Washington	COORDINATES N 701,991 E 1,160,342	TOP OF RISER ELEVATION (DATUM) 23.77'(mllw)	DATE 07/14/98
STRATUM MONITORED Silty CLAY (23.0'-18.5'); Sandy CLAY (18.5'-11.5')		LOGGED BY T. Mathis	
CHECKED BY S. Martin		APPROVED BY S. Martin	



METHOD OF INSTALLATION:
 Boring drilled to completion; set screen and riser pipe. Placed sandpack and seal. Placed bentonite chips to 2.0 feet below ground surface. Set flush-mount surface housing. Concrete surface seal placed to 0.1 feet above ground surface.

REMARKS:
 Well developed by pumping with Brainard-Kilman pump. Removed 10 gallons of water (approximately 9 casing volumes). 8-inch riser pipe installed below screen.



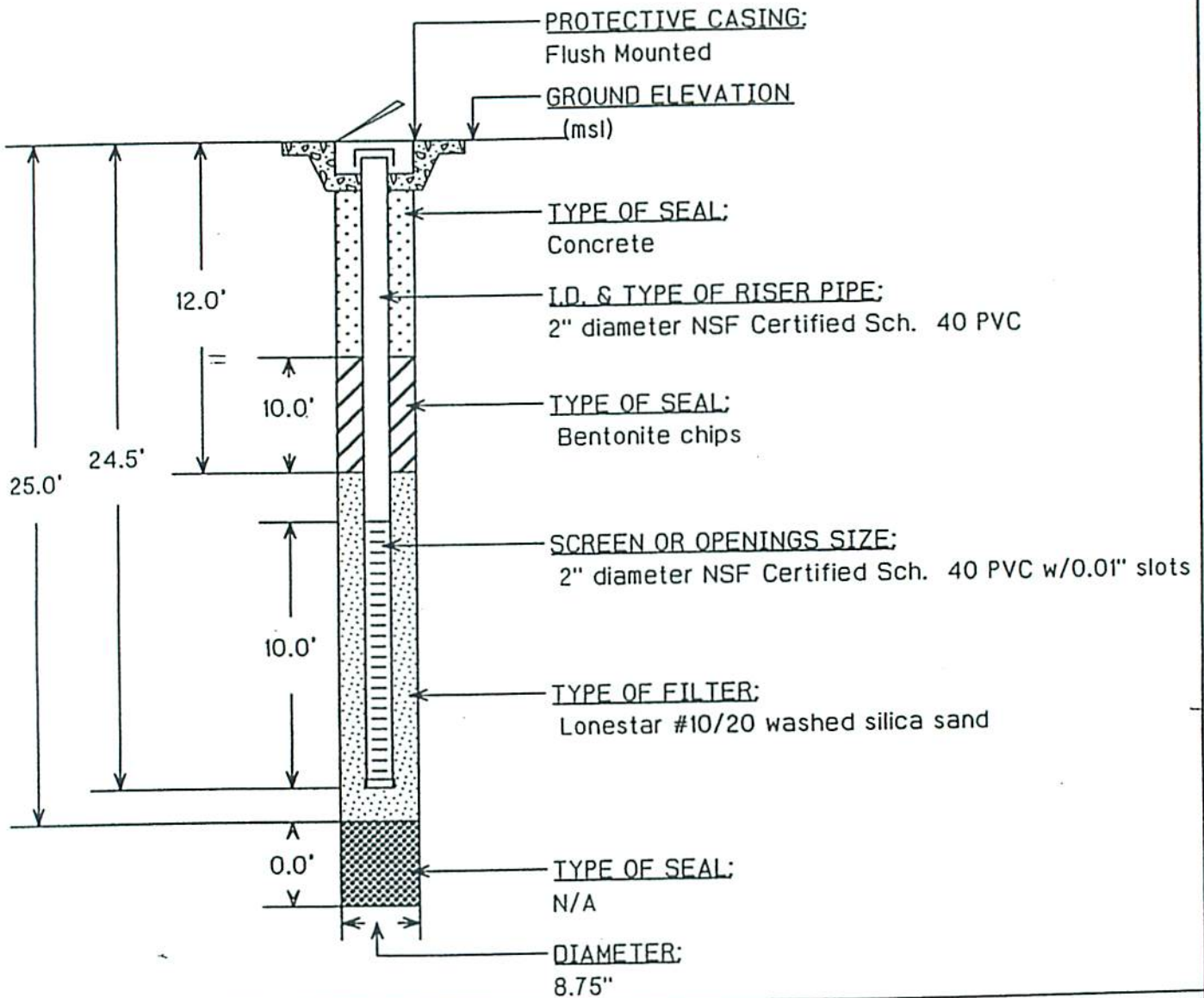
CLIENT Puget Sound Energy		PROJECT Tacoma FMGP		PROJECT NO. 40786.141
PROJECT LOCATION Tacoma, Washington		COORDINATES N 701,995 E 1,160,374	ELEVATION (DATUM) 21.67'(mlw)	TOTAL DEPTH 25.0 FEET
SURFACE CONDITIONS Concrete sidewalk in City park			LOGGED BY T. Mathis	DATE START 07/14/98
			APPROVED BY S. Martin	DATE FINISH 07/14/98

SAMPLING								CHECKED BY		APPROVED BY		DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	S. Martin		S. Martin							
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RGD RECOVERY	PERCENT RECOVERY	RGD										
CA	1	10	16	7	23	1.5'										Boring advanced w/8-3/4" OD, 4-1/4" ID hollow stem augers. Samples collected w/2-1/2" ID california modified sampler driven w/300-lb hammer.
CA	2	3	4	3	7	1.5'										
CA	3	4	10	10	20	1.5'										
CA	4	2	3	4	7	1.5'										
CA	5	3	3	3	6	1.5'										
																4-inch thick concrete sidewalk.
																grading loose; grading w/some coal and wood fragments.
																Silty SAND: dark yellowish brown; medium dense; well graded; fine to medium grained; moist; some gravel; trace brick and cinders (fill).
																Silty CLAY: light gray; stiff; high plasticity; moist; some decomposed plant material; trace gravel.
																Clayey SILT: dark gray; firm; low plasticity; wet; some shells; trace gravel.
																SAND: dark gray; loose; well graded; fine to coarse grained; subangular; wet; some silt; trace gravel; trace bark and twigs.
																Encountered water at 18.5 ft below ground surface.
																Bottom of boring @ 25.0' below ground surface.
																Water level measured at 21.0' below ground surface on 7/14/98.
																Monitoring well constructed 7/14/98.



PIEZOMETER / WELL INSTALLATION LOG

CLIENT Puget Sound Energy		PROJECT Tacoma FMGP	PROJECT NO. 40786.141
PROJECT LOCATION Tacoma, Washington	COORDINATES N 701,995 E 1,160,374	TOP OF RISER ELEVATION (DATUM) 21.67'(mllw)	DATE 07/14/98
STRATUM MONITORED Clayey SILT (24.0'-18.5'); Silty CLAY (18.5'-14.5')		LOGGED BY T. Mathis	
CHECKED BY S. Martin		APPROVED BY S. Martin	



METHOD OF INSTALLATION:

Boring drilled to completion; set screen and riser pipe. Placed sandpack and seal. Placed bentonite chips to 2.0 feet below ground surface. Set flush-mount surface housing. Concrete surface seal placed to 0.1 feet above ground surface.

REMARKS:

developed by pumping with Brinard-Kilman pump. Removed 20 gallons of water (approximately 30 casing volumes). 6-inch riser pipe installed below screen.



LOG OF BORING

BORING NO. MW-27
SHEET 1 OF 1

CLIENT Puget Sound Energy		PROJECT Tacoma FMGP		PROJECT NO. 40786.141
PROJECT LOCATION Tacoma, Washington		COORDINATES N 702,004 E 1,160,107	ELEVATION (DATUM) 23.55'(mlw)	TOTAL DEPTH 27.0 FEET
SURFACE CONDITIONS Dirt surface adjacent to I-705 abutment			LOGGED BY T. Mathis	DATE START 07/14/98
			APPROVED BY S. Martin	DATE FINISH 07/14/98

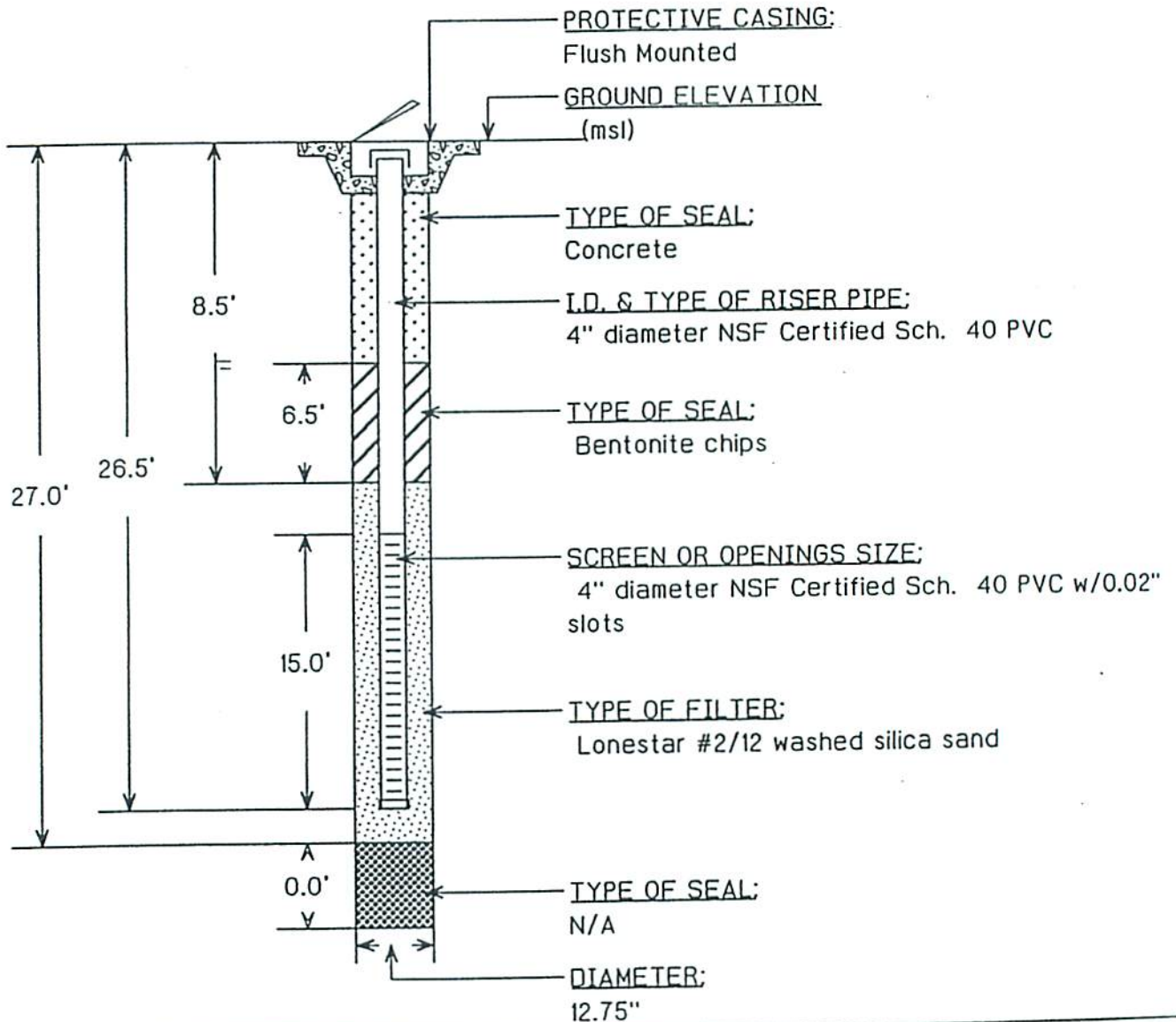
SAMPLING								CHECKED BY S. Martin			APPROVED BY S. Martin	
SAMPLE TYPE	SAMPLE NUMBER	SET Ø INCHES	2ND Ø INCHES	3RD Ø INCHES	N VALUE	SAMPLE RECOVERY	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS	
CORING								DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RØD RECOVERY	PERCENT RECOVERY	RØD	DEPTH IN FEET	SAMPLE TYPE	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	REMARKS	
CA	1	9	12	40	52	1.0'	1-5			Sandy GRAVEL: dark gray; dense; well graded; fine to medium grained; subangular; moist; some silt (fill).	Boring advanced w/12-3/4" OD, 8-1/4" I hollow stem augers. Samples collected w/2-1/2" ID california modified sampler driven w/300-lb hammer.	
CA	2	70/6"	---	---	---	0.9'	5-10				Sampler choked with cobble.	
CA	3	26	40	50/3"	>50	0.8'	10-15			Clayey SILT: dark yellowish brown; hard; high plasticity; wet; some gravel.	Encountered water at 10.0 ft below ground surface.	
CA	4	42	50/3"	---	---	1.1'	15-20			Gravelly SAND: dark gray; very dense; poorly graded; coarse grained; angular; wet.		
CA	5	36	50/3"	---	---	1.2'	20-26			SAND: dark gray; very dense; poorly graded; medium grained; subangular; wet; visible free oil globules.	July 98'	
							26-27			Silty CLAY: moderate yellowish brown; hard; low plasticity; moist; trace wood fragments.	Bottom of boring @ 27.0 ft below ground surface. Water level not measured. Monitoring well constructed 7/14/98.	



PIEZOMETER / WELL INSTALLATION LOG

NO. MW-27

CLIENT Puget Sound Energy		PROJECT Tacoma FMGP		PROJECT NO. 40786.141
PROJECT LOCATION Tacoma, Washington		COORDINATES N 702,004 E 1,160,107	TOP OF RISER ELEVATION (DATUM) 23.55'(mlw)	DATE 07/14/98
STRATUM MONITORED SAND (26.0'-23.5'); gravelly SAND (24.5'-18.0')			LOGGED BY T. Mathis	
CHECKED BY S. Martin		APPROVED BY S. Martin		



METHOD OF INSTALLATION:

Boring drilled to completion; set screen and riser pipe. Placed sandpack and seal. Placed bentonite chips to 2.0 feet below ground surface. Set flush-mount surface housing. Concrete surface seal placed to 0.1 feet above ground surface.

REMARKS:

Well developed by bailing with a 3.5-inch diameter bailer. Removed 55 gallons of water (approximately 5 casing volumes). 6-inch riser pipe installed below screen.

MONITORING WELL MW-28

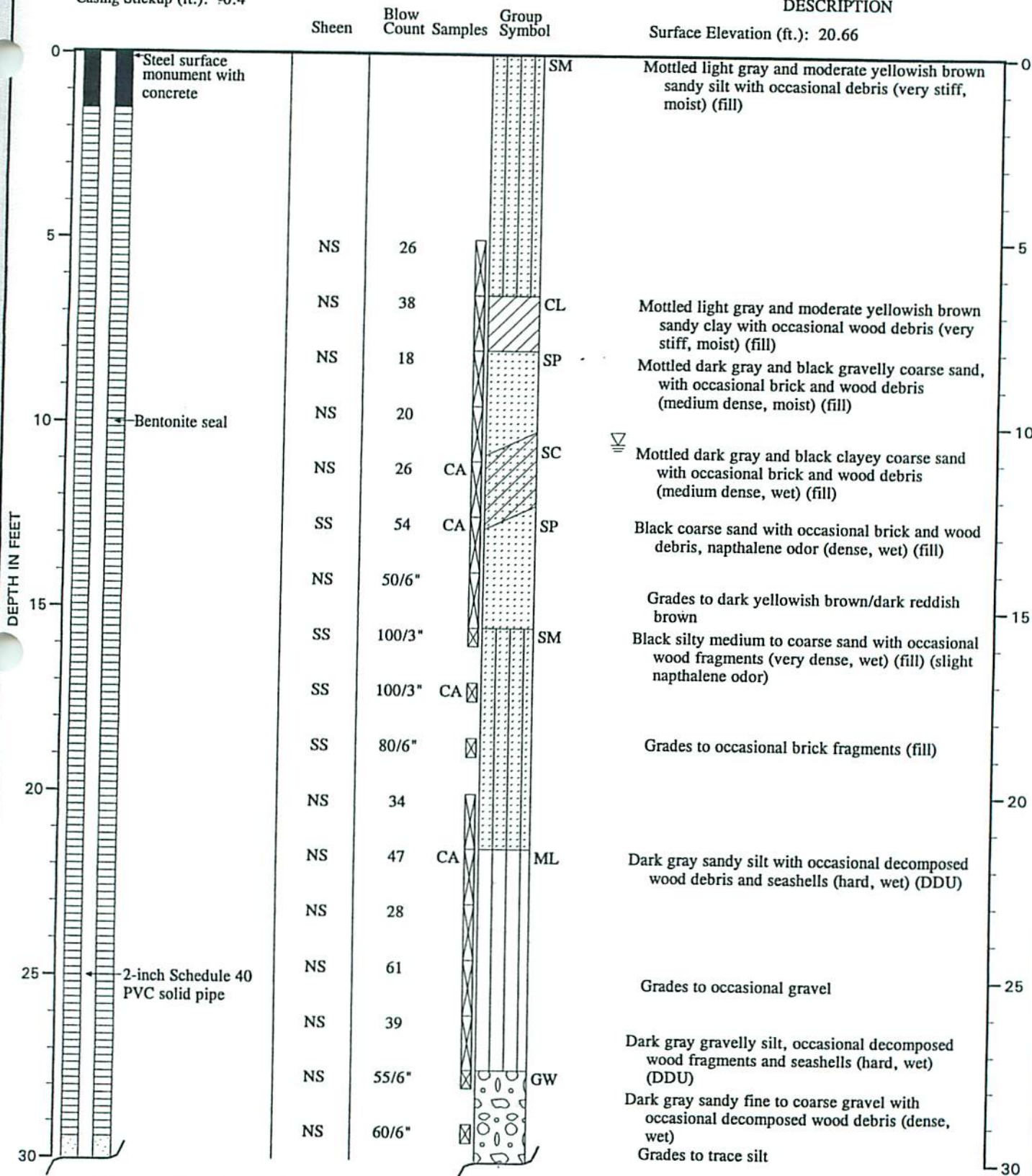
WELL SCHEMATIC

Casing Elevation (ft.): 20.25

Casing Stickup (ft.): -0.4

DESCRIPTION

Surface Elevation (ft.): 20.66

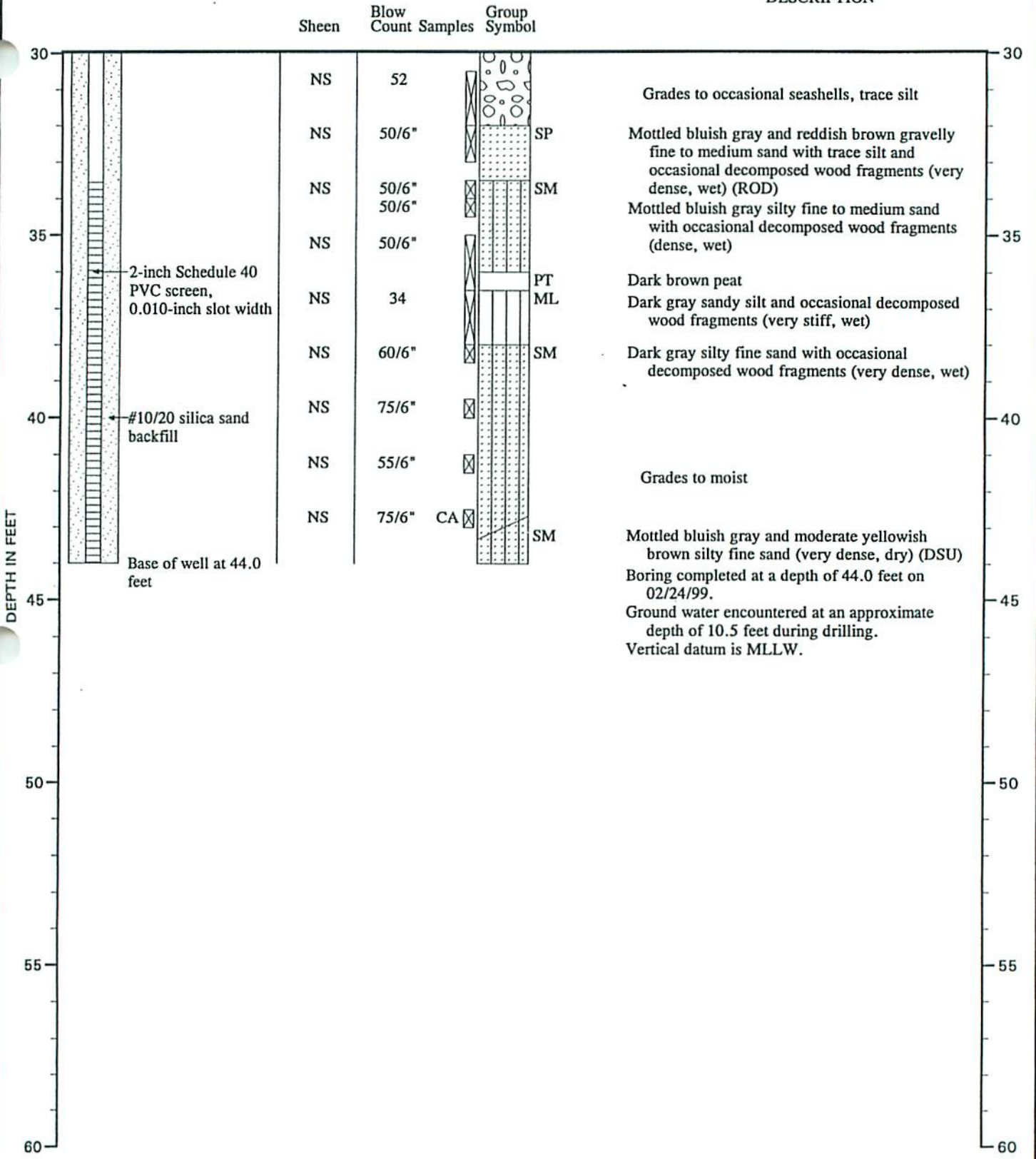


Note: See Figure A-2 for explanation of symbols

**MONITORING WELL MW-28
(Continued)**

WELL SCHEMATIC

DESCRIPTION



Note: See Figure A-2 for explanation of symbols



LOG OF MONITORING WELL

FIGURE A-3

MONITORING WELL MW-29

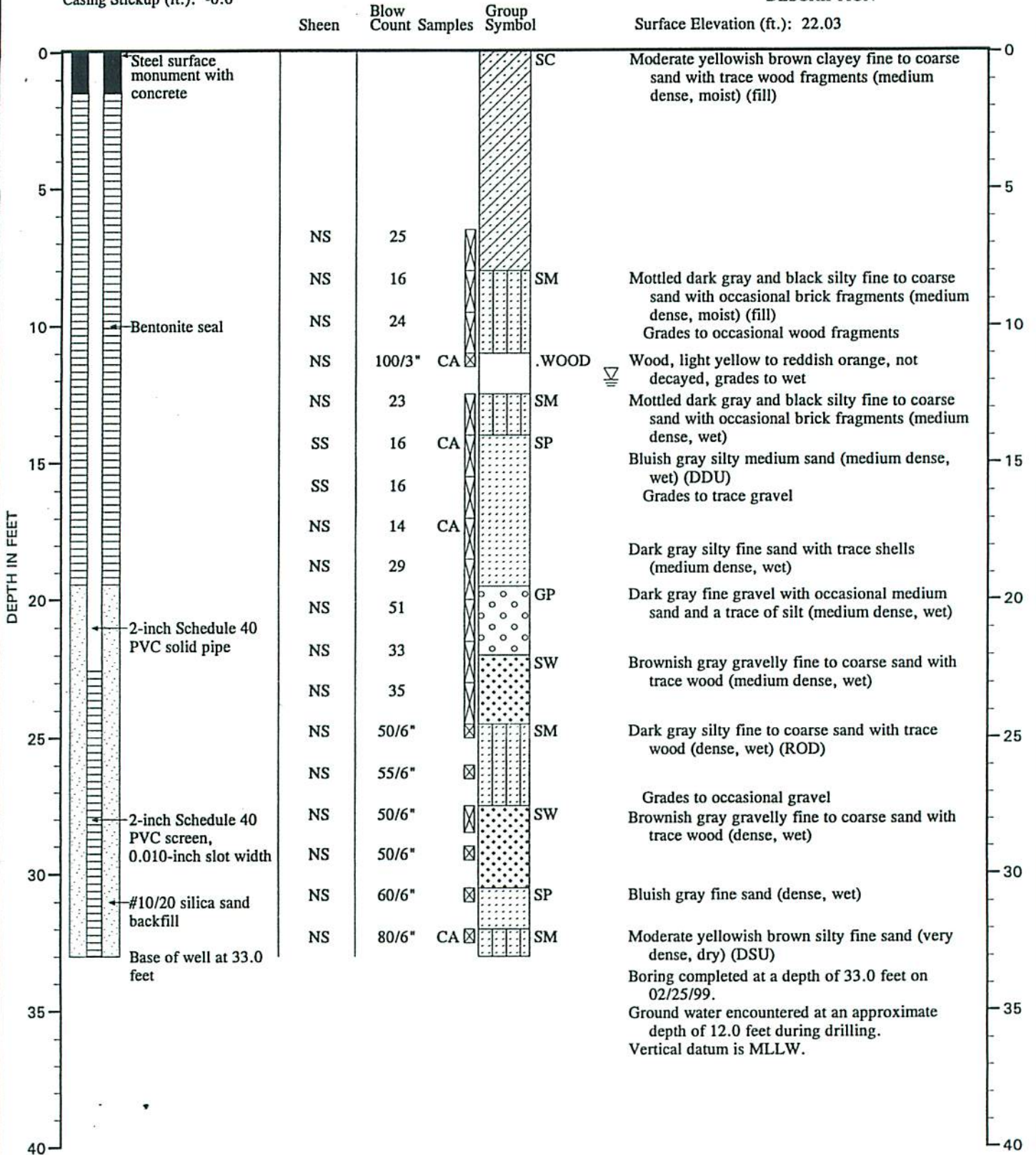
WELL SCHEMATIC

Casing Elevation (ft.): 21.41

Casing Stickup (ft.): -0.6

DESCRIPTION

Surface Elevation (ft.): 22.03



Note: See Figure A-2 for explanation of symbols



LOG OF MONITORING WELL

FIGURE A-4

SBS/TCM:KHF:vc: 4/15/99 0186-44T-00-1ask 1-4 NFMW-40

MONITORING WELL MW-30

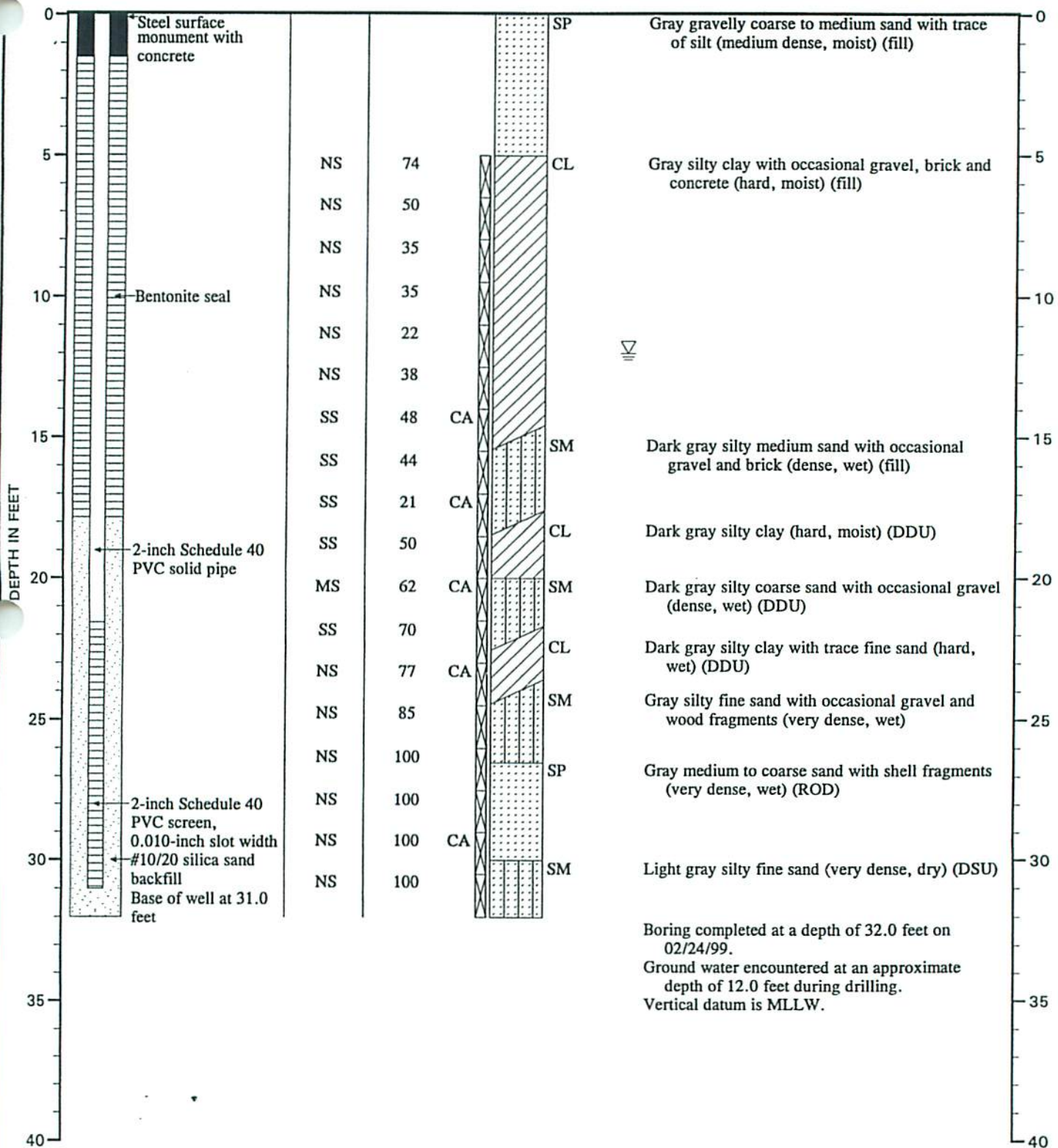
WELL SCHEMATIC

Casing Elevation (ft.): 21.87

Casing Stickup (ft.): -0.4

DESCRIPTION

Surface Elevation (ft.): 22.22



Note: See Figure A-2 for explanation of symbols



LOG OF MONITORING WELL

FIGURE A-5

MONITORING WELL MW-31

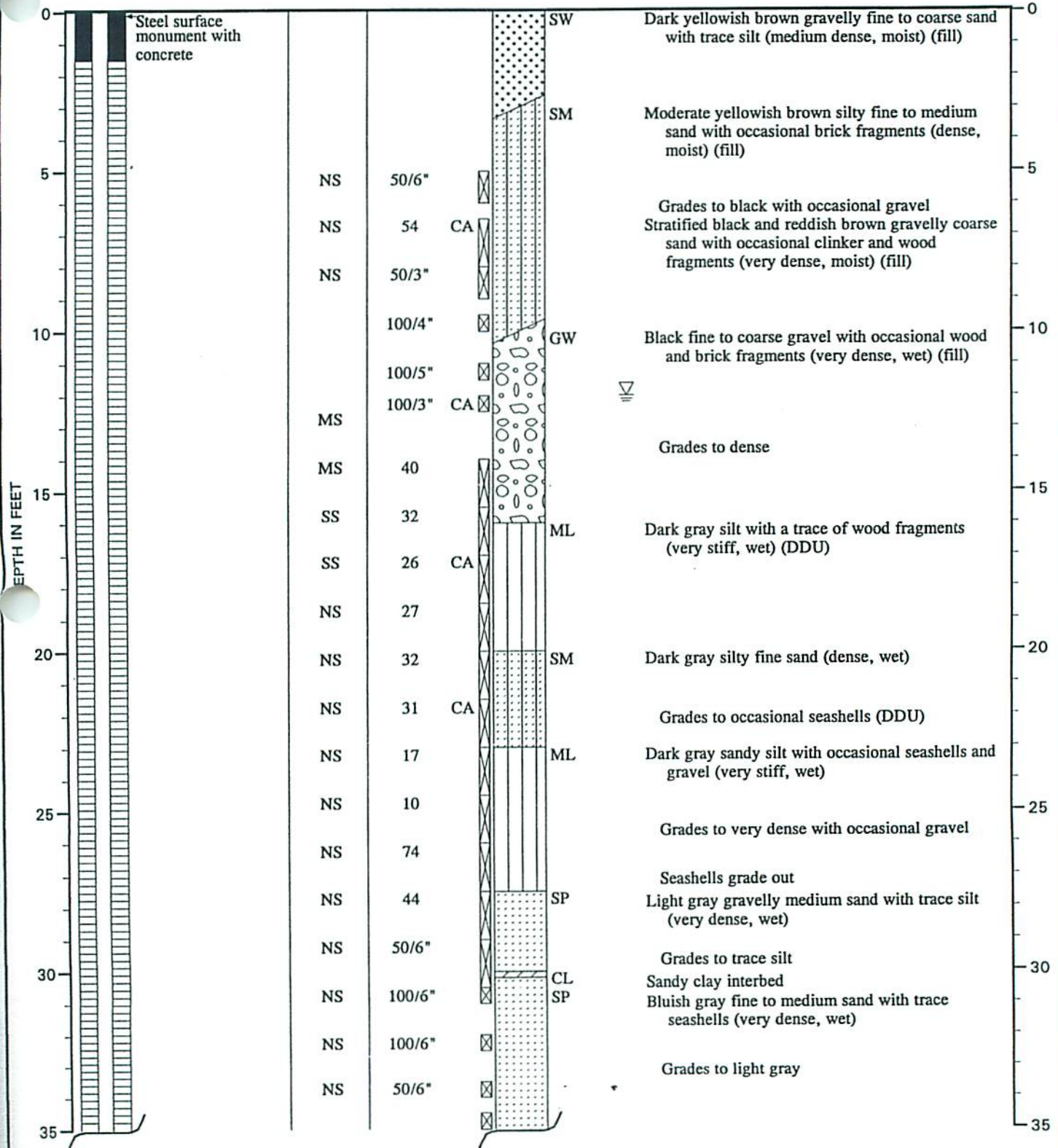
WELL SCHEMATIC

Casing Elevation (ft.): 19.41

Casing Stickup (ft.): -0.57

DESCRIPTION

Surface Elevation (ft.): 19.98

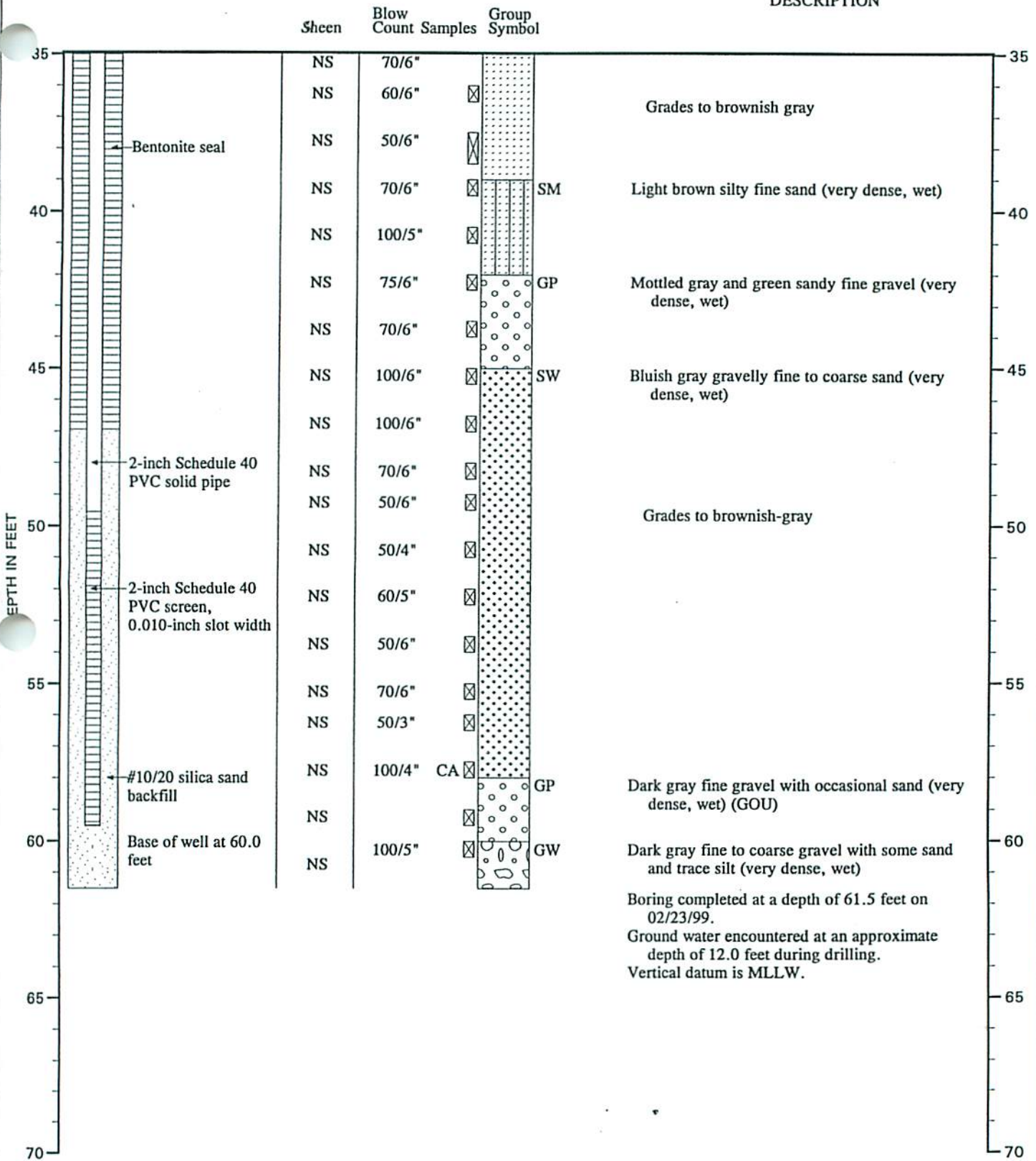


Note: See Figure A-2 for explanation of symbols

WELL SCHEMATIC

MONITORING WELL MW-31
(Continued)

DESCRIPTION



Note: See Figure A-2 for explanation of symbols

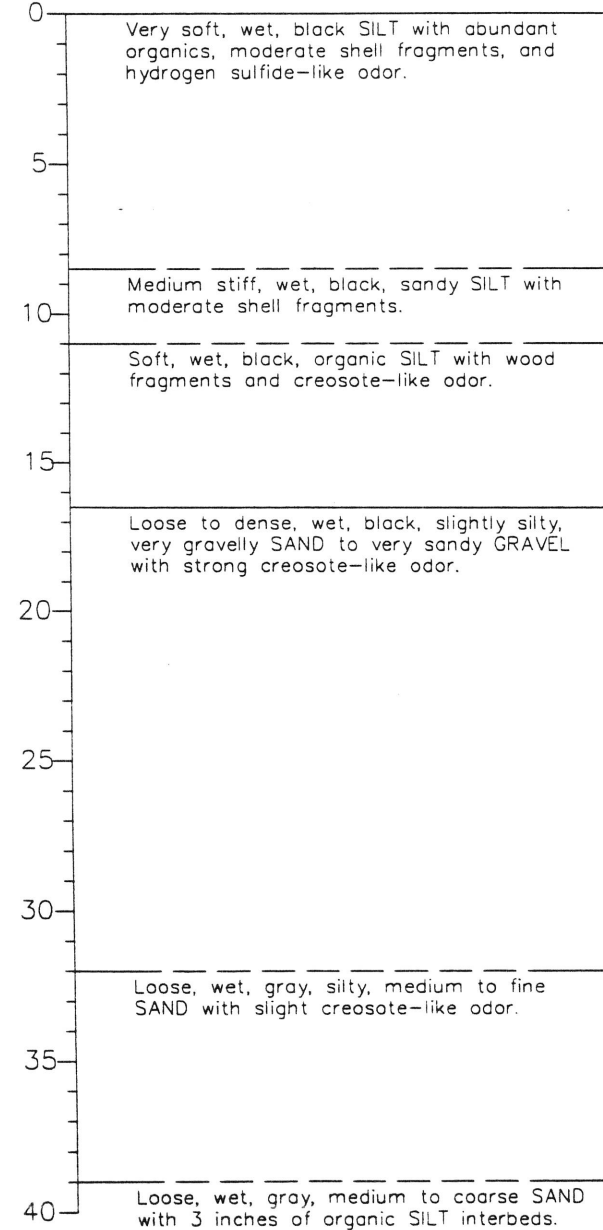
Boring Log and Construction Data for Monitoring Wells RD3-MW5A, 5B, and 5C

Geologic Log

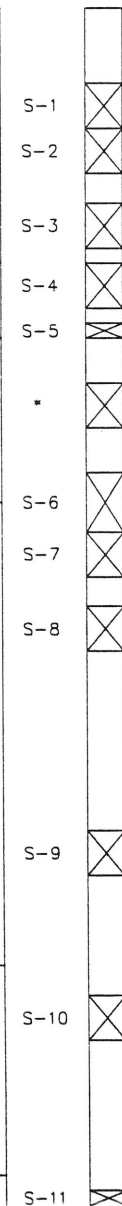
N 702,055
E 1,160,456

Mudline Elevation in Feet: -9.0 (MLLW)

Depth in Feet



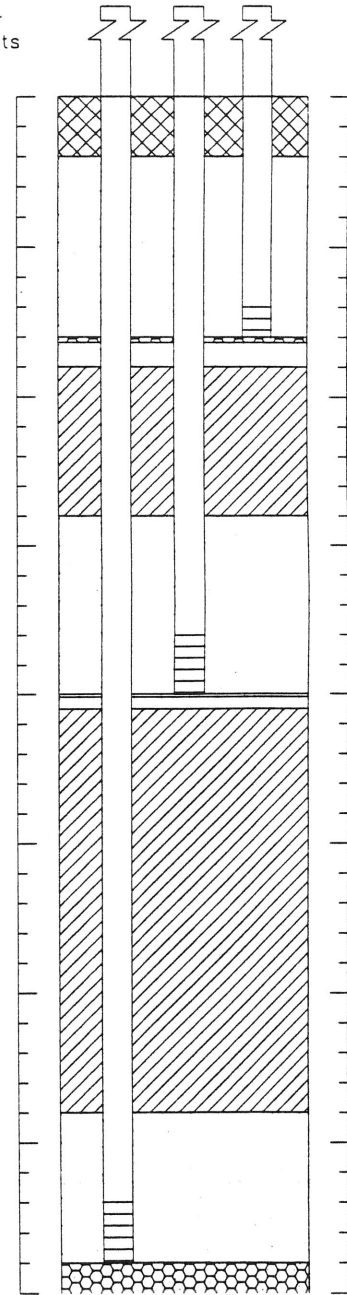
Sample N Lab Water
(SPT) Tests Contents



Monitoring Well Design

Top of Casing in Feet (MLLW): 17.15 16.65 17.48

5C 5B 5A



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
4. Horizontal control based on NAD 83 (South Zone) datum using DGPS.

1=1
407219_WELLS\RD3\MW5ABC



HARTCROWSER

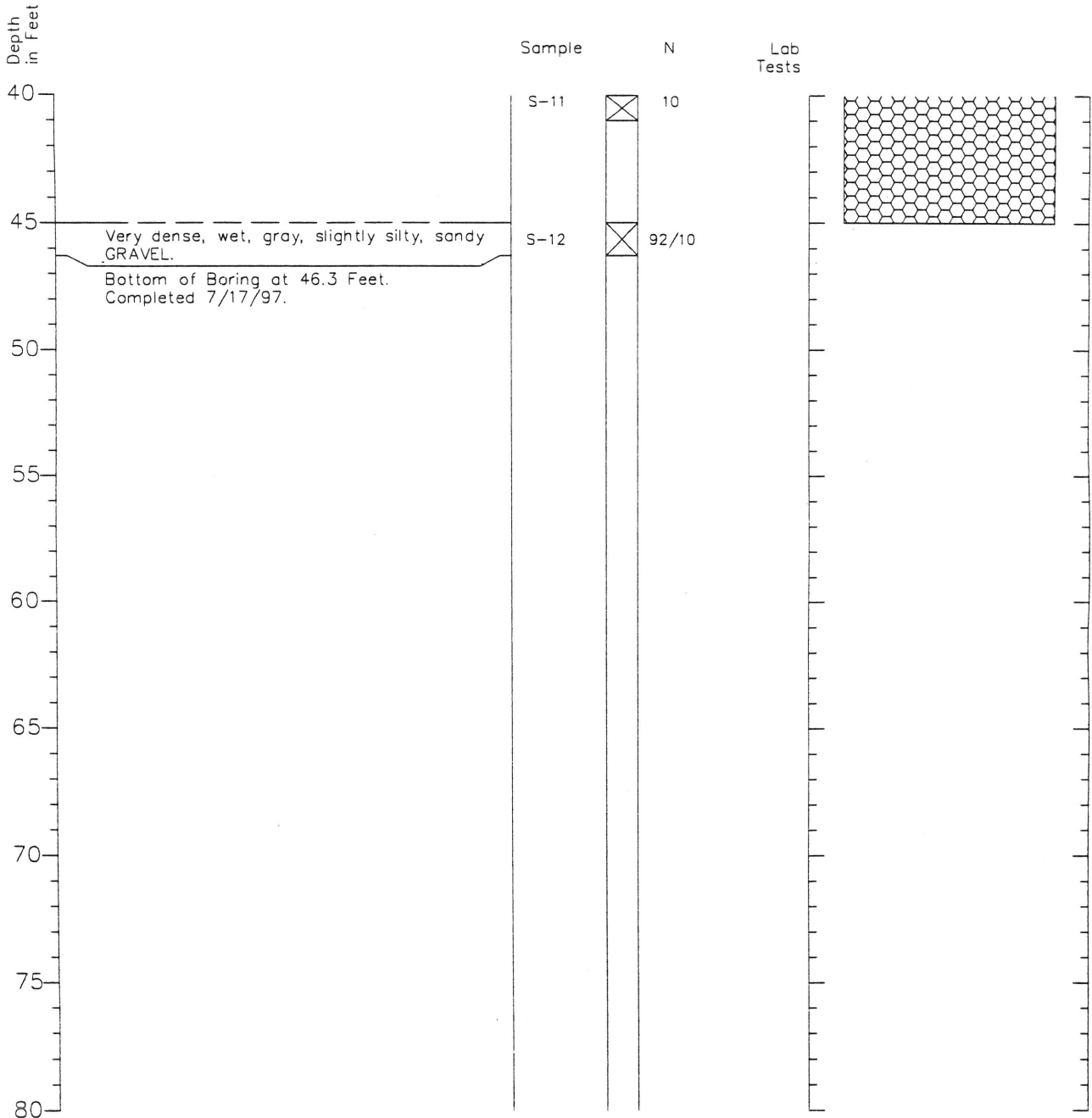
J-4072-18 7/97

Figure A-65 1/2

Boring Log and Construction Data for Monitoring Wells RD3-MW5A, 5B, and 5C

Geologic Log

Monitoring Well Design



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.



J-4072-19 7/97
Figure A-65 2/2



CLIENT City of Tacoma		PROJECT Gas Plant RI		PROJECT NO. 40406.540
PROJECT LOCATION Tacoma, WA	COORDINATES N 702302 E 1160285	ELEVATION (DATUM) 12.0 (msl)	TOTAL DEPTH 14.0 ft	DATE 12/20/95

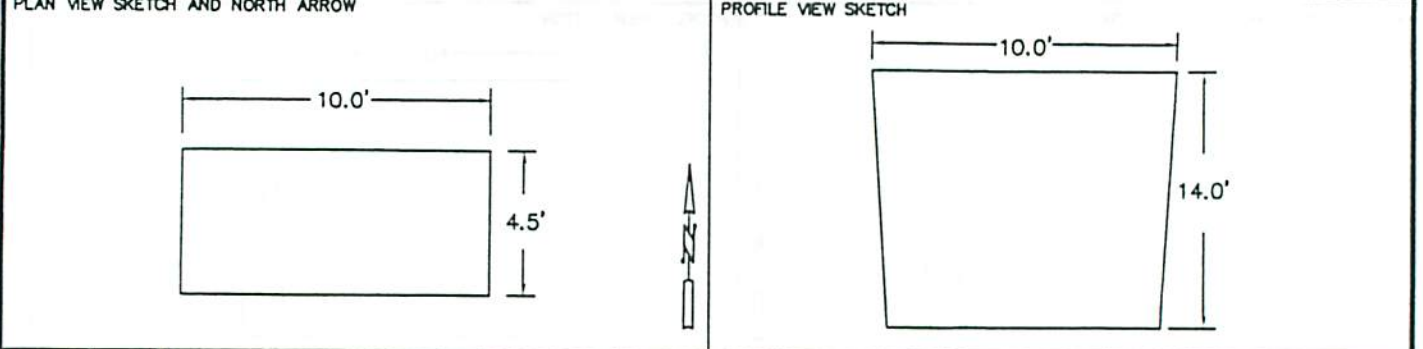
SURFACE CONDITIONS
Level gravel surface in SW corner of laydown yard

INSPECTOR
T. Mathis

METHOD OF EXCAVATION
CAT 225 Trackhoe

CHECKED BY
S. Martin

APPROVED BY
A. Markos



SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		1	2	3	4	5	6	7	8	9	
Comp TP-1-2	2	Sandy CLAY; moderate yellowish brown; stiff, low to medium plasticity; moist; some wood, iron & brick fragments (fill).									
Comp TP-1-4	4										
	6	CLAY; bluish gray to gray green; stiff; highly plastic; moist; some fine sand; trace wood fragments (fill).									
Comp TP-1-14	8	Grading dark gray to black; some stratification (native material).									
	14										
		Bottom of excavation @14ft, test pit backfilled with excavated soil.									

REMARKS:
CLAY @ 14.0' IS VERY MOIST, BUT NO GROUNDWATER INFLOW OBSERVED.
SOME FLOW INTO PIT FROM WATER @ SURFACE TO 4.0'.



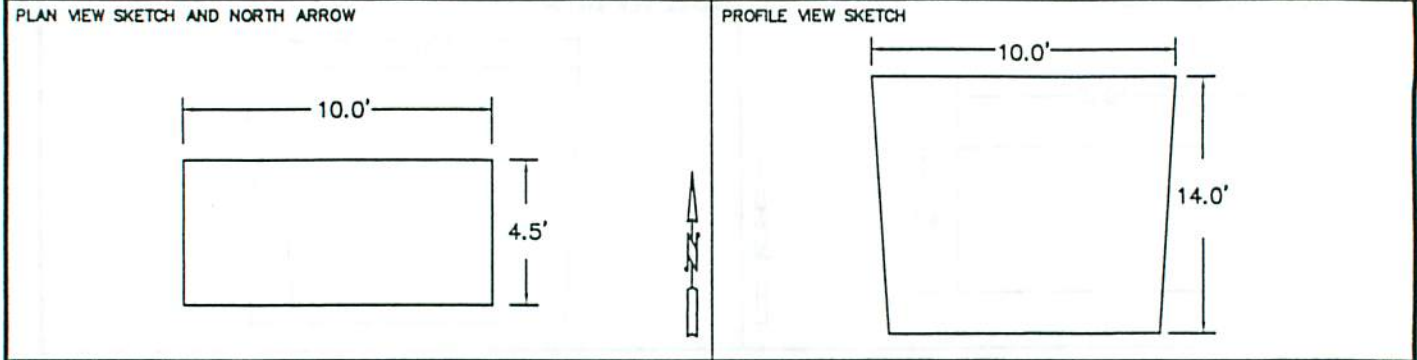
CLIENT City of Tacoma	PROJECT Gas Plant RI	PROJECT NO. 40406.540
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PROJECT LOCATION Tacoma, WA	COORDINATES N 702298 E 1160255	ELEVATION (DATUM) 14.0 (msl)	TOTAL DEPTH 14.0 ft	DATE 12/19/95
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SURFACE CONDITIONS Mounded dirt surface approx. 50 yds south of 509 construction	INSPECTOR T. Mathis
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METHOD OF EXCAVATION CAT 205 LC Trackhoe

CHECKED BY S. Martin	APPROVED BY A. Markos
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SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		1	2	3	4	5	6	7	8	9	
Comp TP-2-2	2	Clayey GRAVEL; moderate yellowish brown; medium dense; well graded; fine to coarse grained; subrounded; moist; some iron-staining and silt nodules (fill).									
Comp TP-2-4	4	SAWDUST/WOOD CHIPS; dark brown; loose; moist; some sand & silt (fill).									
	6	Clayey SILT; blue gray to gray green; medium stiff; low plasticity; moist; trace fine sand and debris (bottles & old shoes) (fill).									
Comp TP-2-14	12	Silty CLAY; dark brown to black; soft; moderate plasticity; moist.									
	14	Bottom of excavation @14ft, test pit backfilled with excavated soil.									

REMARKS: UNABLE TO DIG PAST 14.0'. REACHED MAXIMUM EXTENSION OF TRACKHOE.



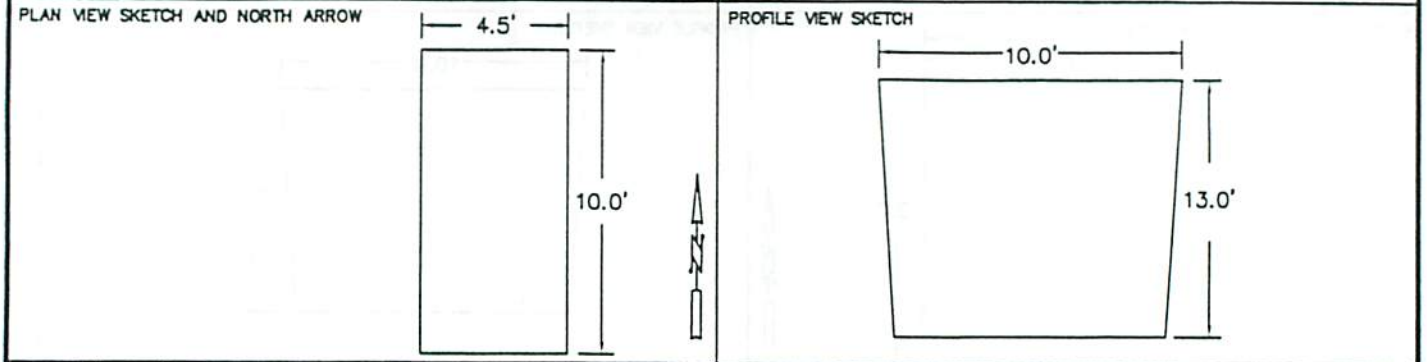
CLIENT City of Tacoma	PROJECT Gas Plant RI	PROJECT NO. 40406.540
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PROJECT LOCATION Tacoma, WA	COORDINATES N 702295 E 1160228	ELEVATION (DATUM) 15.0 (msl)	TOTAL DEPTH 13.0 ft	DATE 12/19/95
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SURFACE CONDITIONS Mounded dirt surface approx. 50 yds south of 509 construction	INSPECTOR T. Mathis
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METHOD OF EXCAVATION CAT 205 LC Trackhoe

CHECKED BY S. Martin	APPROVED BY A. Markos
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SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		1	2	3	4	5	6	7	8	9	
Comp TP-2-2	0	Sandy GRAVEL; dark gray to light gray, medium dense; well graded; fine to coarse grained; subrounded; moist; some clay and silt (fill).									
Comp TP-2-4	2	Clayey GRAVEL; moderate yellowish brown; medium dense; well graded; fine to coarse grained; subrounded; moist; some medium sand (fill). Grades dark brown to black; grading some concrete & brick.									
	4	SAWDUST/WOOD CHIPS (fill).									
Comp TP-2-14	6	Clayey SILT; blue gray to gray green; medium stiff, low plasticity; moist; trace fine sand (fill).									
	13.0	Grading wet @13.0'									
	13.0	Bottom of excavation @13ft, test pit backfilled with excavated soil.									

REMARKS:



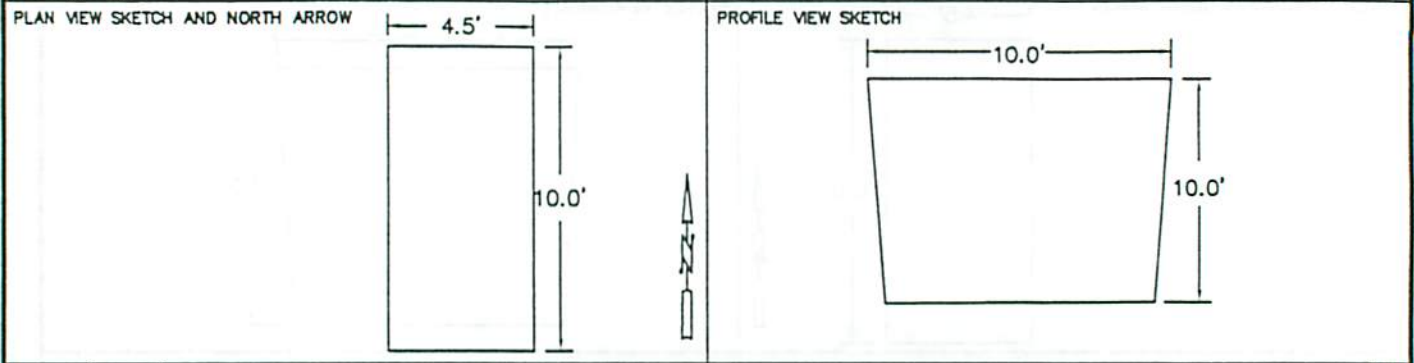
CLIENT City of Tacoma	PROJECT Gas Plant RI	PROJECT NO. 40406.540
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PROJECT LOCATION Tacoma, WA	COORDINATES N 702240 E 1160306	ELEVATION (DATUM) 14.0 (msl)	TOTAL DEPTH 10.0 ft	DATE 12/19/95
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SURFACE CONDITIONS Rough fill surface covered with blackberry bushes	INSPECTOR T. Mathis
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METHOD OF EXCAVATION CAT 205 LC Trackhoe

CHECKED BY S. Martin	APPROVED BY A. Markos
-------------------------	--------------------------



SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		1	2	3	4	5	6	7	8	9	
TP-4-02	1	Gravelly SAND; dark brown; medium dense to loose; poorly graded; medium grained; subrounded; moist; some roots; trace debris (fill).									
TP-4-04	3	SAND; reddish brown to black; medium dense; poorly graded; coarse grained; subrounded; moist; some rusted iron piping and ductwork (fill).									
TP-4-10	6	SILT; pale yellowish orange; medium stiff; low plasticity; moist; trace firebrick fragments (fill).									
	7	Silty SAND; dark brown to black; medium dense; poorly graded; fine grained; subrounded; moist; some wood piling fragments (fill).									
	10	Grading wet @10.0'									
		Bottom of excavation @10ft, test pit backfilled with excavated soil.									

REMARKS:



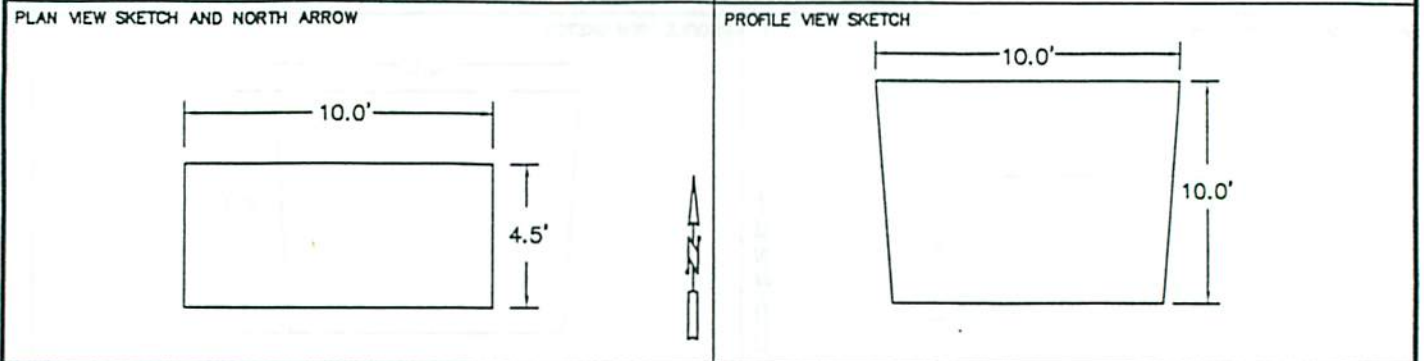
CLIENT City of Tacoma	PROJECT Gas Plant RI	PROJECT NO. 40406.540
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PROJECT LOCATION Tacoma, WA	COORDINATES N 702238 E 1160281	ELEVATION (DATUM) 15.0 (msl)	TOTAL DEPTH 10.0 ft	DATE 12/19/95
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SURFACE CONDITIONS Level gravel surface in laydown yard	INSPECTOR T. Mathis
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METHOD OF EXCAVATION CAT 205 LC Trackhoe

CHECKED BY S. Martin	APPROVED BY A. Markos
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SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		1	2	3	4	5	6	7	8	9	
Comp TP-5-02	1	Gravelly SAND; moderate yellowish brown; medium dense; poorly graded; coarse grained; subrounded; moist; some silt (fill).									
	2	Sandy CLAY; dark brown; medium stiff; low plasticity; moist; trace wood fragments (fill).									
Comp TP-5-04	3	Silty SAND; pale orangish yellow to moderate yellowish brown; medium dense; poorly graded; fine grained; subrounded; moist; some firebrick & metal fragments (fill).									
	4										
	5	Clayey SILT; black to dark brown; soft; moderate plasticity; some wood fragments; moist; w/ some black oily material, mothball-like odor (fill).									
	6										
Comp TP-5-11	7										
	8										
	9										
	10										
	11	Grading wet @11.0'									
	12	Bottom of excavation @11ft, test pit backfilled with excavated soil.									

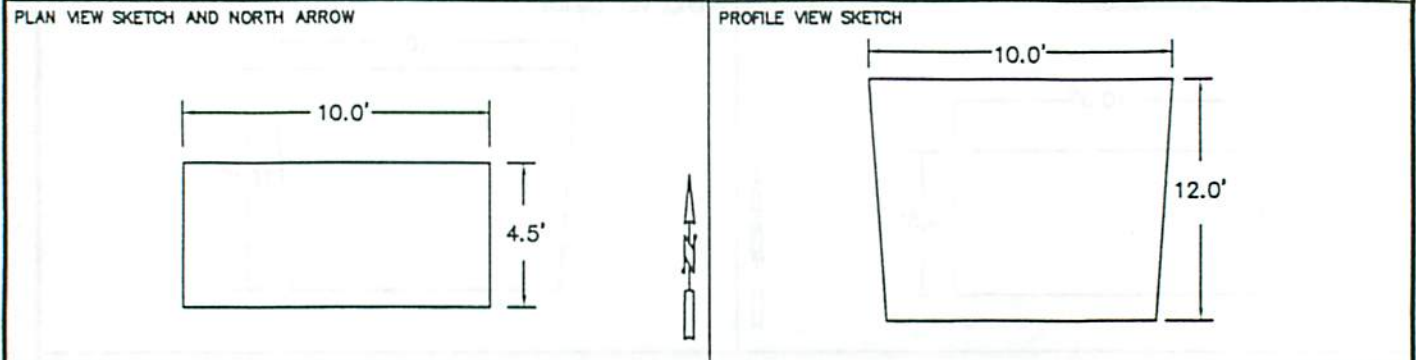
REMARKS:



CLIENT City of Tacoma		PROJECT Gas Plant Ri		PROJECT NO. 40406.530
PROJECT LOCATION Tacoma, WA	COORDINATES N 702236 E 1160251	ELEVATION (DATUM) 15.0 (msl)	TOTAL DEPTH 12.0 ft	DATE 12/19/95
SURFACE CONDITIONS			INSPECTOR T. Mathis	

METHOD OF EXCAVATION
CAT 205 LC Trackhoe

CHECKED BY S. Martin	APPROVED BY A. Markos
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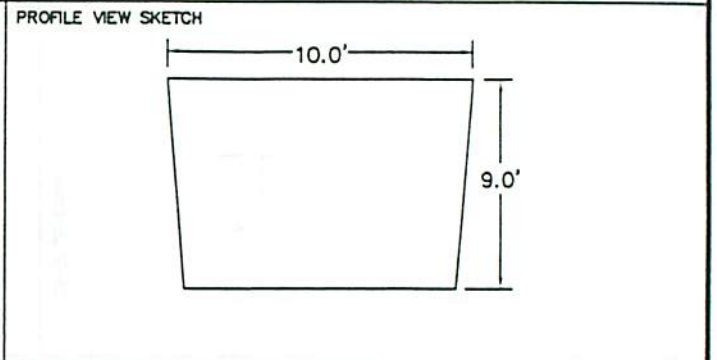
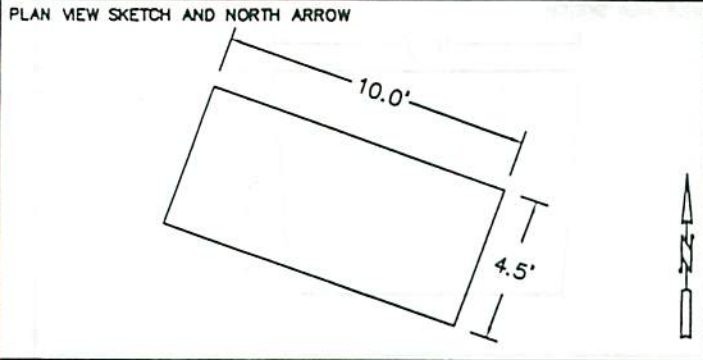


SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		1	2	3	4	5	6	7	8	9	
Comp TP-6-02	1	Sandy GRAVEL; moderate yellowish brown; medium dense; well graded; fine to coarse grained; subrounded; moist (fill).									
	2	Clayey GRAVEL; black to dark brown; medium dense; well graded; fine to coarse grained; subrounded; moist (fill).									
Comp TP-6-04	3	Silty SAND; pale orangish yellow; loose; poorly graded; fine grained; subrounded; moist; some firebrick & clinker (fill).									
	4	Clayey SAND; dark brown to black; medium dense; poorly graded; fine grained; moist; some wood & brick fragments; trace clinker (fill).									
	5										
	6	BARK; dark brown to black; soft; moist; some silt and fine sand (fill).									
	7	Clayey SILT; blue gray to gray green; stiff; low plasticity; moist; trace fine sand (fill).									
	8										
Comp TP-6-12	9										
	10										
	11										
	12	Grading wet @12.0'									
		Bottom of excavation @12ft, test pit backfilled with excavated soil.									

REMARKS: ENCOUNTERED WOOD DECKING @ 12.0' @ BOTTOM OF HOLE.



CLIENT City of Tacoma		PROJECT Gas Plant RI		PROJECT NO. 40406.540
PROJECT LOCATION Tacoma, WA	COORDINATES N 702149 E 1160334	ELEVATION (DATUM) 14.0 (msl)	TOTAL DEPTH 9.0 ft	DATE 12/19/95
SURFACE CONDITIONS Flat grassy surface on edge of laydown yard			INSPECTOR T. Mathis	
METHOD OF EXCAVATION CAT 205 LC Trackhoe				
CHECKED BY S. Martin			APPROVED BY A. Markos	

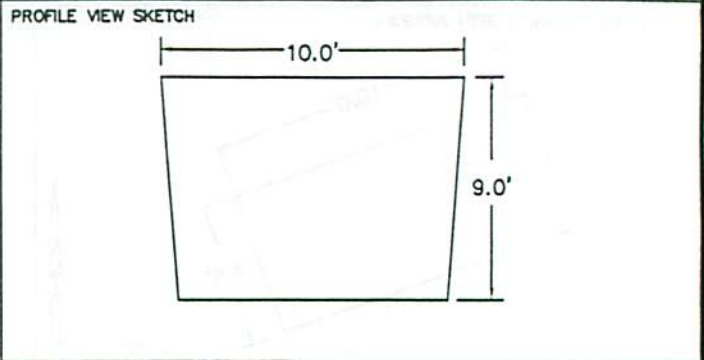
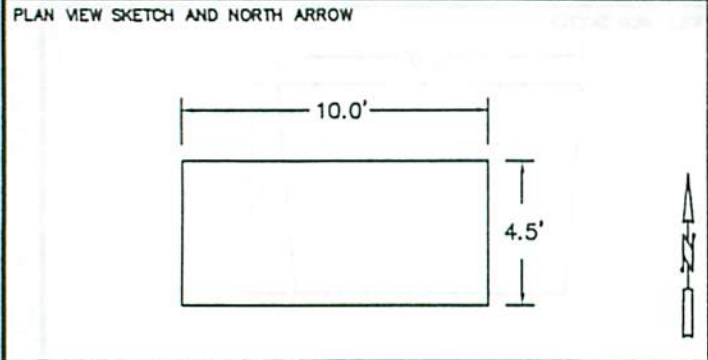


SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		1	2	3	4	5	6	7	8	9	
Comp TP-6-02	1	Sandy GRAVEL; moderate yellowish brown; medium dense; poorly graded; fine grained; rounded; moist; some wire & wood fragments (fill).									
	2	Clayey SILT; bluish gray to gray green; stiff; low plasticity; moist; some fine sand.									
Comp TP-7-04	3	Silty SAND; dark brown to black; medium dense; well graded; fine to coarse grained; subrounded; moist; some wood; trace clinker									
	4	Clayey SAND; moderate yellowish brown; stiff; moderate plasticity; moist; some brick fragments									
	5	Clayey SAND; moderate yellowish brown; medium dense; poorly graded; fine grained; subrounded; moist; some wood & brick fragments (fill).									
	6	Silty SAND; dark brown to black; medium dense; poorly graded; fine grained; subrounded; moist; some wood & brick fragments (fill).									
Comp TP-7-09	7	Clayey SILT; bluish gray to gray green; stiff; low plasticity; moist; trace fine sand (fill).									
	8										
	9	Grading wet @9.0'									
	9	Bottom of excavation @9.0ft, test pit backfilled with excavated soil.									
	10										
	11										
	12										

REMARKS: SLIGHT SHEEN ON GROUNDWATER IN TEST PIT



CLIENT City of Tacoma		PROJECT Gas Plant RI		PROJECT NO. 40406.540	
PROJECT LOCATION Tacoma, WA		COORDINATES N 702144 E 1160307		ELEVATION (DATUM) 15.0 (msl)	
SURFACE CONDITIONS Level gravel surface in laydown yard		TOTAL DEPTH 9.0 ft			
METHOD OF EXCAVATION CAT 205 LC Trackhoe		INSPECTOR T. Mathis			
CHECKED BY S. Martin			APPROVED BY A. Markos		

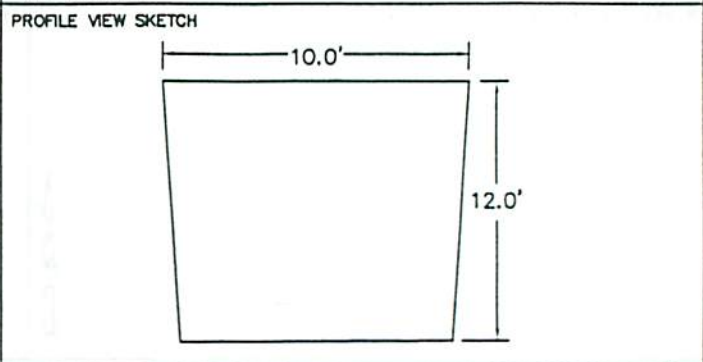
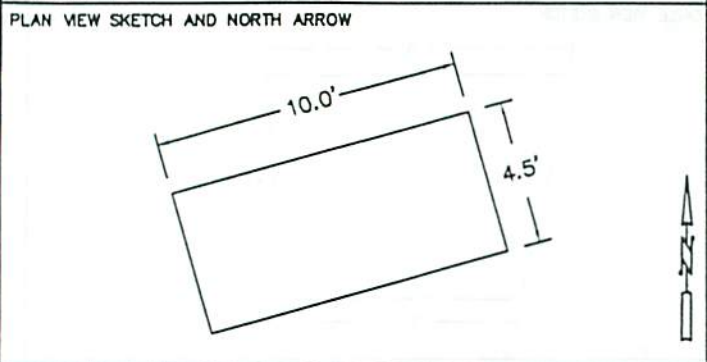


SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		1	2	3	4	5	6	7	8	9	
Comp TP-8-02	1	Sandy GRAVEL; moderate yellowish brown; medium dense; poorly graded; fine grained; subrounded; moist (fill).									
	2	Clayey SILT; bluish gray to gray green; stiff; low plasticity moist (fill).									
Comp TP-8-04	3	Silty SAND; dark brown to moderate yellowish brown; medium dense; well graded; fine to coarse grained; subrounded; moist; some brick & wood fragments (fill).									
	4	Clayey SAND; bluish gray to gray; medium dense; fine grained; subrounded; moist; some fire-brick & wood fragments (fill)									
	5										
Comp TP-8-09	7										Silty SAND; dark brown to black; medium dense; poorly graded; fine grained; subrounded; moist; some wood fragments; black staining (fill).
	9	Grading wet @ 9.0'									
		Bottom of excavation @ 9.0ft, test pit backfilled with excavated soil.									

REMARKS:



CLIENT City of Tacoma		PROJECT Gas Plant RI		PROJECT NO. 40406.540
PROJECT LOCATION Tacoma, WA	COORDINATES N 702146 E 1160290	ELEVATION (DATUM) 16.0 (msl)	TOTAL DEPTH 12.0 ft	DATE 12/20/95
SURFACE CONDITIONS Level gravel surface in laydown yard			INSPECTOR T. Mathis	
METHOD OF EXCAVATION CAT 205 LC Trackhoe				
CHECKED BY S. Martin		APPROVED BY A. Markos		

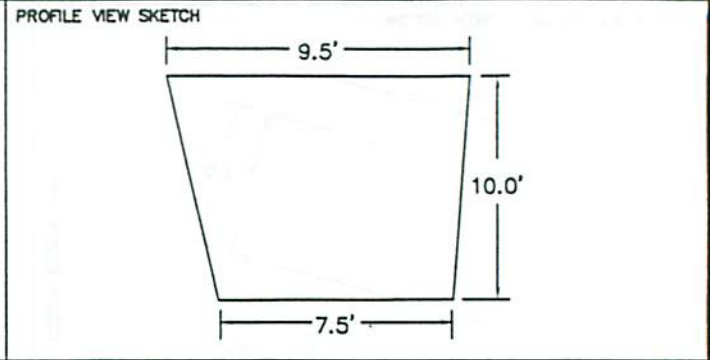
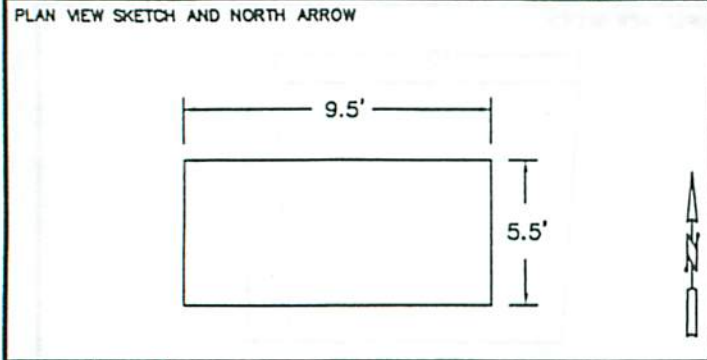


SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		1	2	3	4	5	6	7	8	9	
Comp TP-9-02	1	Sandy GRAVEL; moderate yellowish brown; medium dense; poorly graded; fine grained; subrounded; moist (fill).									
	2	Clayey SILT; bluish gray to gray green; stiff; slightly plastic; moist; some firebrick, brick & wood fragments (fill).									
Comp TP-9-04	3	WOOD FRAGMENTS & BARK; dark brown to black; soft; moist; some sandy silt, wire & brick (fill).									
	4	Silty SAND; moderate yellowish brown to dark brown; medium dense; well graded; fine to coarse grained; subrounded; moist (fill).									
	5										
	6										
Comp TP-9-12	7										
	8										
	9	WOOD FRAGMENTS & BARK; dark brown to black; soft; moist; sheen & mothball smell; some sandy silt (fill).									
	10										
	11										
	12	Bottom of excavation @12.0ft, test pit backfilled with excavated soil.									

REMARKS: SOME SHEEN ON GROUNDWATER @ BOTTOM OF PIT; MOTHBALL-LIKE SMELL @ 4.0'.



CLIENT City of Tacoma		PROJECT Gas Plant RI		PROJECT NO. 40406.530
PROJECT LOCATION Tacoma, WA	COORDINATES N 702092 E 1160160	ELEVATION (DATUM) 19.0 (msl)	TOTAL DEPTH 10.0 ft	DATE 9/27/95
SURFACE CONDITIONS Gravel embankment NW corner I-705 & "A" street			INSPECTOR T. Mathis	
METHOD OF EXCAVATION CAT 255 Trackhoe				
CHECKED BY S. Martin		APPROVED BY A. Markos		



SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		1	2	3	4	5	6	7	8	9	
	1	GRAVEL; dark yellowish brown; medium dense; well graded; fine to coarse grained; subrounded; moist; w/ some rubble and debris (bricks, wood, plastic) (fill).									
Grab 1	3	GRAVEL; dark gray, medium dense; well graded; fine to coarse grained; some sand, silt; moist; some rubble and debris (bricks, wood, plastic) (fill).									
Grab 2	5	GRAVEL; dark gray; black oily staining; medium dense; poorly graded; fine grained; subrounded; moist; some sand and silt; trace clay (fill).									
	7	Silty GRAVEL; dark gray; black oily staining and black tar-like material; medium dense; well graded; fine to coarse grained; moist; some clay, brick & wood; trace sand (fill).									
Grab 3	10	Bottom of excavation @10ft, test pit backfilled with excavated soil.									

REMARKS: WATER ENCOUNTERED @ 9.5'



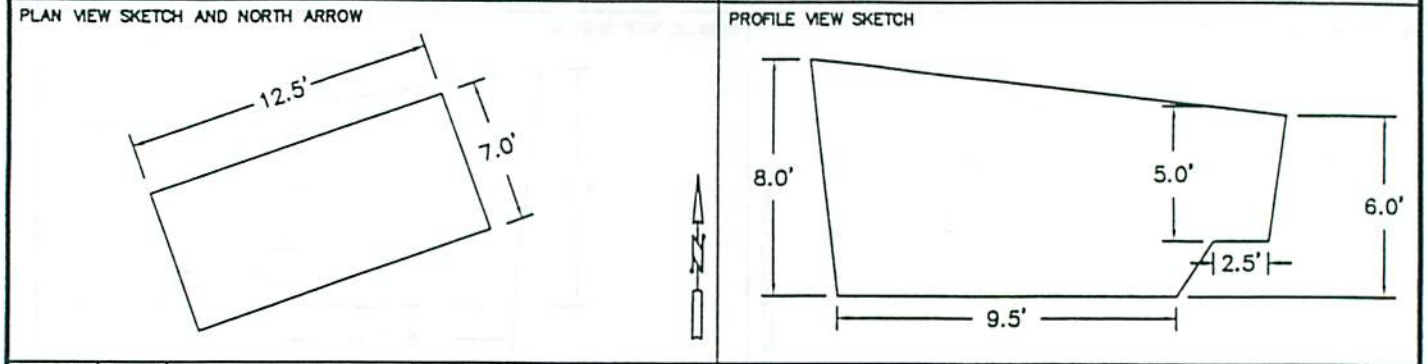
CLIENT City of Tacoma	PROJECT Gas Plant RI	PROJECT NO. 40406.530
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PROJECT LOCATION Tacoma, WA	COORDINATES N 702051 E 1160137	ELEVATION (DATUM) 20.0 (msl)	TOTAL DEPTH 8.0 ft	DATE 9/27/95
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SURFACE CONDITIONS Gravel embankment NW corner I-705 & "A" street	INSPECTOR T. Mathis
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METHOD OF EXCAVATION CAT 225 Trackhoe
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CHECKED BY S. Martin	APPROVED BY A. Markos
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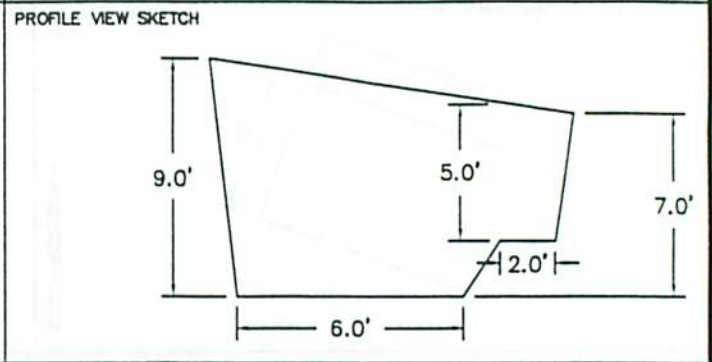
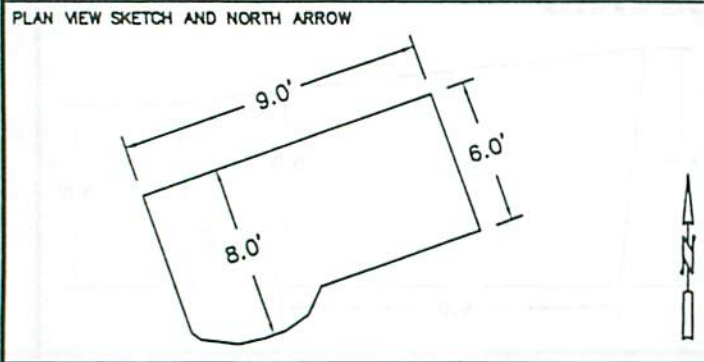


SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		1.5	3	4.5	6	7.5	9	10.5	12.0	13.5	
Grab 1	1	GRAVEL; moderate yellowish brown; medium dense; well graded; fine to coarse grained; subrounded; moist; some sand, silt and bricks; trace wood (fill).									
	2	-----									
Grab 2	3	grading gray.									
	4	GRAVEL; dark gray; black oily staining and black tar-like material; medium dense; fine to coarse grained; subrounded; moist; some sand and silt (fill).									
	5	-----									
Grab 3	6	Silty GRAVEL; dark gray; black oily staining; medium dense; fine grained subrounded; moist; some sand and wood fragments (fill).									
	7	-----									
	8	Bottom of excavation @8ft, test pit backfilled with excavated soil.									
	9										
	10										
	11										
	12										

REMARKS: WATER NOT ENCOUNTERED



CLIENT City of Tacoma		PROJECT Gas Plant Ri		PROJECT NO. 40406.530
PROJECT LOCATION Tacoma, WA	COORDINATES N 701993 E 1160113	ELEVATION (DATUM) 18.0 (msl)	TOTAL DEPTH 9.0 ft	DATE 9/27/95
SURFACE CONDITIONS Gravel embankment NW corner I-705 & "A" street			INSPECTOR T. Mathis	
METHOD OF EXCAVATION CAT 225 Trackhoe				
CHECKED BY S. Martin		APPROVED BY A. Markos		



SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		1	2	3	4	5	6	7	8	9	
Grab 1	1-3	GRAVEL; moderate yellowish brown; medium dense; well graded; fine to coarse grained; subrounded; moist; some sand and silt; trace bricks, wood and concrete (fill).									
Grab 2	3-5	GRAVEL; dark gray; black oily staining & black tar-like material; medium dense; fine to coarse grained; subrounded; moist; some sand and silt; trace bricks & concrete (fill).									
Grab 3	5-8	Silty GRAVEL; dark gray; black oily staining; medium dense; poorly graded; fine grained; subrounded; moist; some clay; trace medium sand (fill).									
	8-9	Bottom of excavation @ 9ft, test pit backfilled with excavated soil.									

REMARKS: WATER ENCOUNTERED @ 8.5'

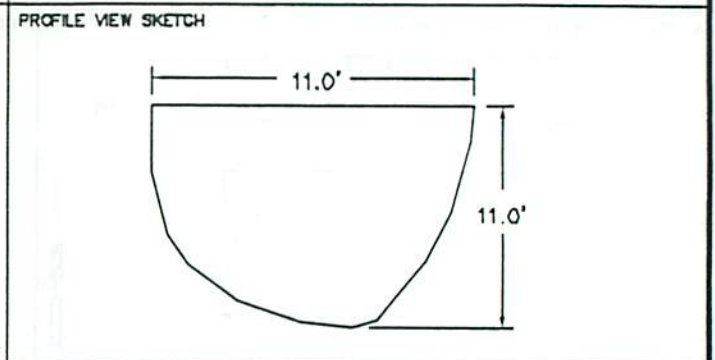
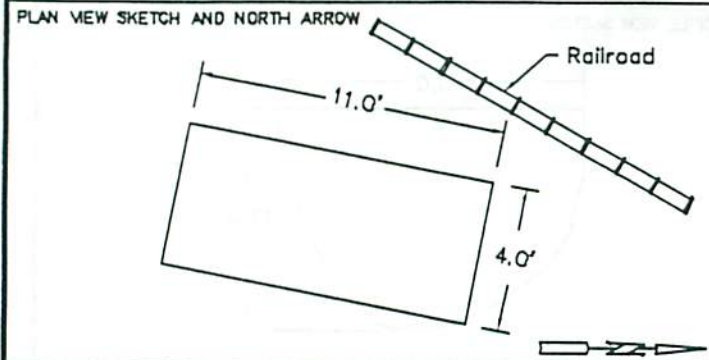


CLIENT City of Tacoma		PROJECT Gas Plant RI		PROJECT NO. 40406.530
PROJECT LOCATION Tacoma, WA	COORDINATES N 701829 E 1160325	ELEVATION (DATUM) 22.0 (msl)	TOTAL DEPTH 11.0 ft	DATE 9/29/95
SURFACE CONDITIONS Grassy			INSPECTOR S. Martin	

METHOD OF EXCAVATION
CAT 225 Trackhoe

CHECKED BY
T. Mathis

APPROVED BY
A. Markos



SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL				DEPTH
		STATION INTERVALS				
		1	2	3	4	
SB01 02-03	1	Silty GRAVEL; brown; well graded; rounded to subrounded; moist; w/ some metal debris, brick, and sand.				
	2					
	3					
	4	Increasing debris @4'- debris includes coal, asphalt, brick, bark, metal, and rock (granite).				
SB02 06-07	5					
	6					
	7					
	8					
	9	SAND; light brown to light gray; poorly graded; medium grained; moist; w/ some silt and trace rounded gravels.				
	10	Sandy SILT; light brown to light gray; nonplastic; moist.				
	11	Bottom of excavation @11ft, groundwater not encountered test pit backfilled with excavated soil.				
12						

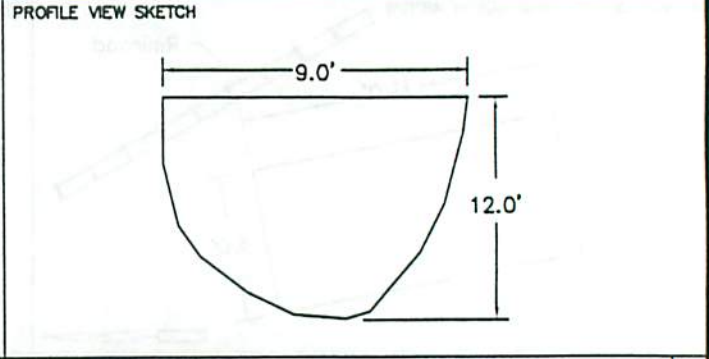
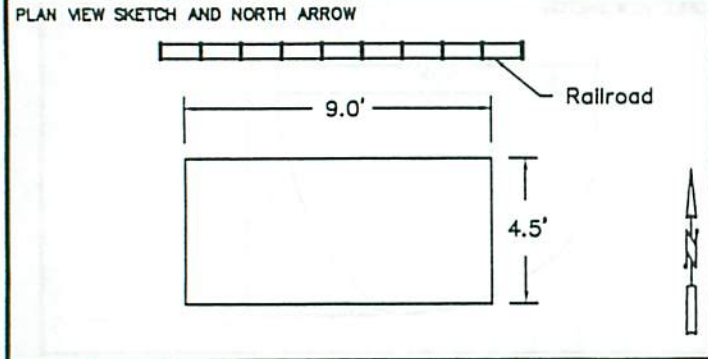
REMARKS:



CLIENT City of Tacoma		PROJECT Gas Plant R1		PROJECT NO. 40406.530
PROJECT LOCATION Tacoma, WA	COORDINATES N 701829 E 1160325	ELEVATION (DATUM) 22.0 (msl)	TOTAL DEPTH 12.0 ft	DATE 9/29/95
SURFACE CONDITIONS Grassy		INSPECTOR S. Martin		
METHOD OF EXCAVATION CAT 225 Trackhoe				

CHECKED BY
T. Mathis

APPROVED BY
A. Markos



SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		1	2	3	4	5	6	7	8	9	
TP15-02-03	1	RUBBLE/DEBRIS and sandy GRAVEL; brown; well graded; rounded to subrounded; 1/4" to boulder size; moist; w/ some silt (debris consisted of concrete, metal, and brick) (fill).									
	2										
	3	DEBRIS/RUBBLE and silty GRAVEL; gray to brown; well graded; rounded; with some cemented sand (fill).									
	4										
TP15-05-06	5										
	6										
	7										
	8										
	9	Silty SAND; dusky yellow; poorly graded; fine to medium grained; rounded; moist; interbedded w/ clayey silt to sandy silt; gray to orangish-brown; low plasticity; moist.									
TP15-10-11	10										
	11										
	12	Bottom of excavation @12ft, encountered groundwater @12.0' test pit backfilled with excavated soil.									

REMARKS: SOIL SAMPLE COMPOSITED FROM 2-4FT AND 9-11FT FROM TRACKHOE



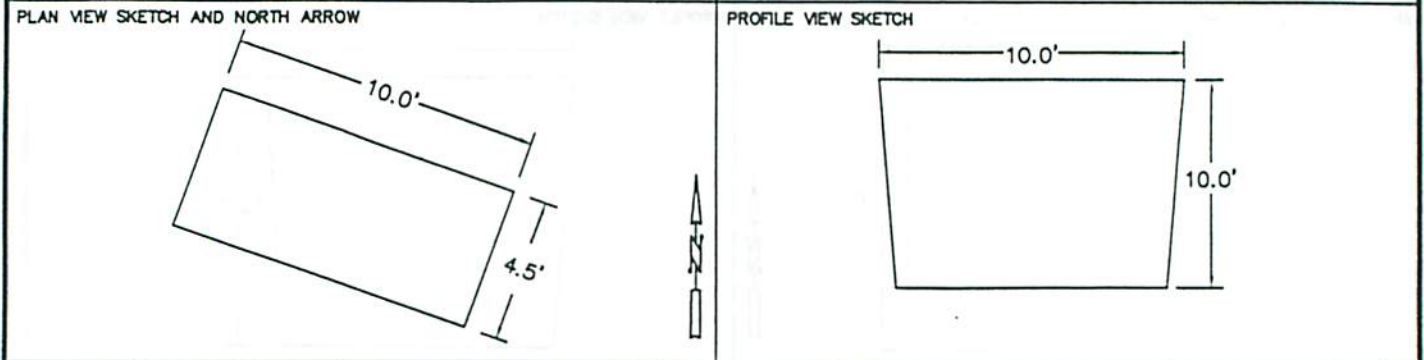
CLIENT City of Tacoma	PROJECT Gas Plant Ri	PROJECT NO. 40406.540
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PROJECT LOCATION Tacoma, WA	COORDINATES N 701898 E 1160021	ELEVATION (DATUM) 22.0 (msl)	TOTAL DEPTH 10.0 ft	DATE 12/20/95
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SURFACE CONDITIONS Barked & landscaped area under I-705 overpass.	INSPECTOR T. Mathis
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METHOD OF EXCAVATION CAT 205 LC Trackhoe

CHECKED BY S. Martin	APPROVED BY A. Markos
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SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		1	2	3	4	5	6	7	8	9	
Comp TP-16-02	1	Silty SAND; moderate yellowish brown; loose; well graded; fine to coarse grained; subrounded; moist; some bark & plant roots (fill).									
Comp TP-16-04	2	Silty CLAY; moderate bluish gray w/ rust colored mottling; hard; moist; some fine sand; oily staining on fractures in clay; strong mothball-like odor.									
	3										
	4	Sandy GRAVEL; bluish gray to dark gray; well graded; fine to coarse grained; rounded; moist; some silt; trace oily staining on gravel clasts; moderate mothball-like odor.									
	5										
	6										
Comp TP-16-10	7										
	8										
	9										
	10	Grading wet @10.0'; mothball-like odor increases									
		Bottom of excavation @10.0ft, test pit backfilled with excavated soil.									
	11										
	12										

REMARKS: OILY SHEEN/PRODUCT FLOATING ON GROUNDWATER IN PIT. STRONG MOTHBALL-LIKE ODOR FROM 2'-10'.



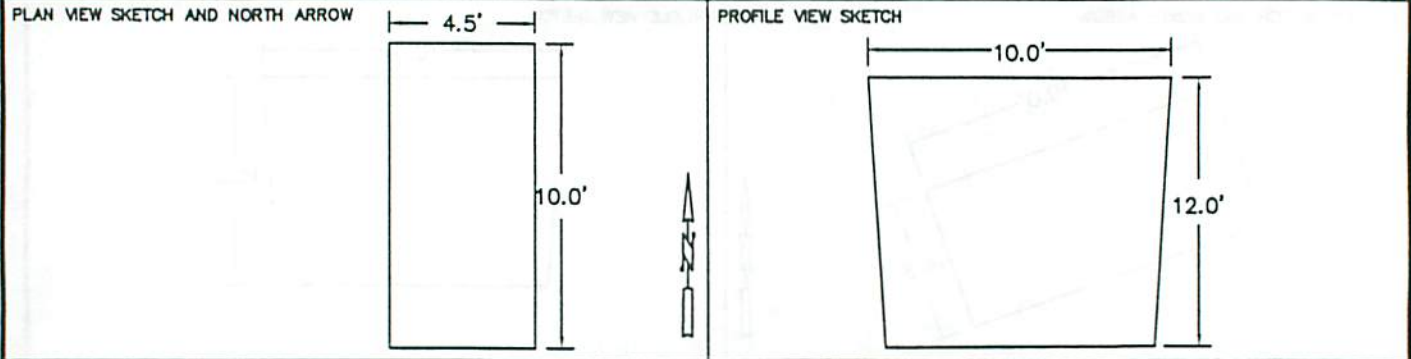
CLIENT City of Tacoma	PROJECT Gas Plant Ri	PROJECT NO. 40406.540
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PROJECT LOCATION Tacoma, WA	COORDINATES N 701940 E 1159960	ELEVATION (DATUM) 42.0 (msl)	TOTAL DEPTH 12.0 ft	DATE 12/20/95
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SURFACE CONDITIONS Barked & landscaped area @ NW corner of I-705 of S "a" st.	INSPECTOR T. Mathis
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METHOD OF EXCAVATION CAT 205 LC Trackhoe

CHECKED BY S. Martin	APPROVED BY A. Markos
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SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		1	2	3	4	5	6	7	8	9	
No analytical samples collected	1	Sandy CLAY; moderate brown; stiff; low plasticity; moist; some brick fragments and cobbles (fill).									
	2										
	3	Silty CLAY; mottled orange red & light gray; stiff; low plasticity; moist; some brick fragments & roots (fill).									
	4	4" electrical conduit									
	5										
	6										
	7										
	8										
	9										
	10										
	11										
	12	Bottom of excavation @12ft, test pit backfilled with excavated soil.									

REMARKS:



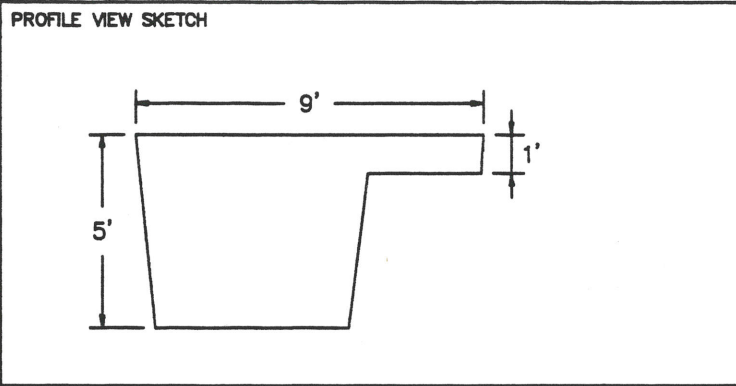
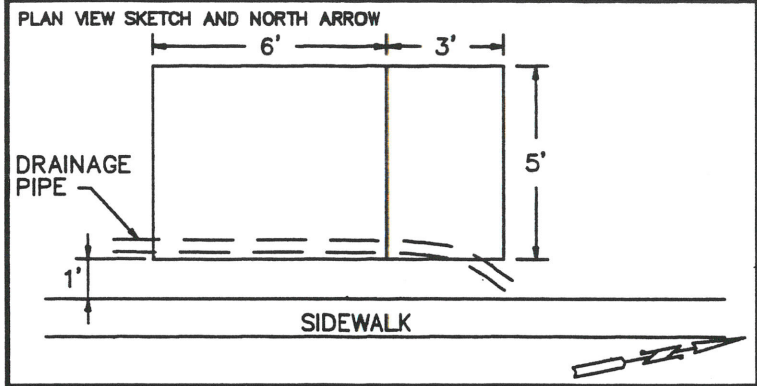
CLIENT City of Tacoma	PROJECT Tacoma Coal Gasification Site	PROJECT NO. 40406
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TEST LOCATION Tacoma, WA	COORDINATES N11701717 ; E1160065	ELEVATION (DATUM) 24.59 FT (Tacoma)	TOTAL DEPTH 5.0 FT	DATE 10/19/93
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SURFACE CONDITIONS Asphalt Pavement	INSPECTOR M. D'Andrea
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METHOD OF EXCAVATION Backhoe

CHECKED BY M. D'Andrea	APPROVED BY B. Bailey
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SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL								DEPTH
		STATION INTERVALS								
		0+01	0+02	0+03	0+04	0+05	0+06	0+07	0+08	
		ASPHALT PAVEMENT								
	1	UNIT 1								
	2	grades grey, with some cobbles, brick grades out.								
	3									
DA1-6	3	0.5'DIA. PLASTIC DRAIN PIPE, BACKFILLED WITH PEA GRAVEL, GEOTEXTILE WRAPPED.								
	4									
	5									
	6									
	7	UNIT 1: SAND; brown; poorly graded; medium to coarse grained; moist; with some gravels; trace silt, cobbles, and brick.								
	8									
	9									
	10									
	11									
	12									

REMARKS: Oil-like odors 1-3'. Excavation dry. Drainage pipe broken and clogged with soil material. Soil sample DA1-1 collected at base of drainage pipe at approximately 3 feet.



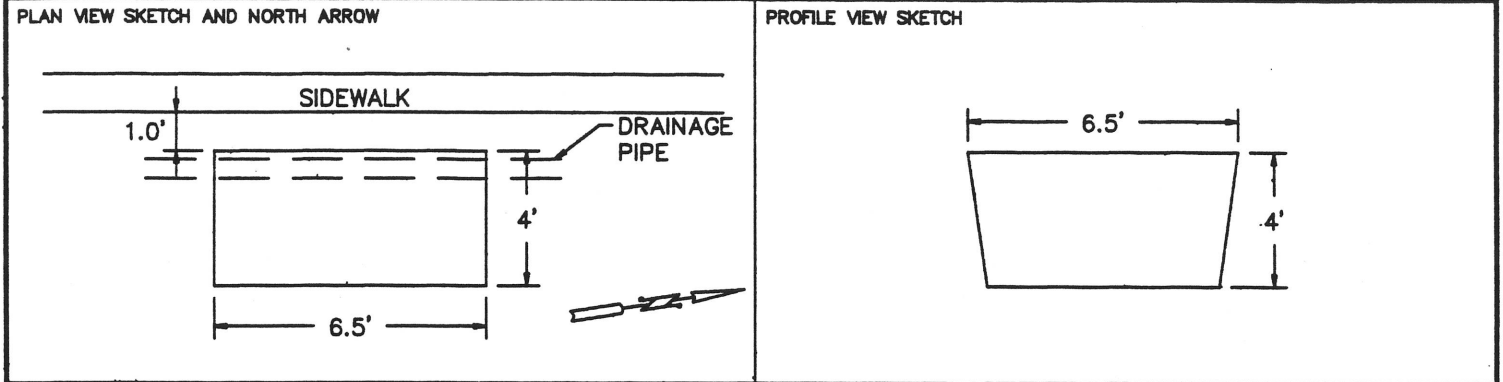
CLIENT City of Tacoma	PROJECT Tacoma Coal Gasification Site	PROJECT NO. 40406
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PROJECT LOCATION Tacoma, WA	COORDINATES N10701751 ; E1160040	ELEVATION (DATUM) 24.29 FT (Tacoma)	TOTAL DEPTH 4.0 FT	DATE 10/19/93
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SURFACE CONDITIONS Asphalt Pavement	INSPECTOR M. D'Andrea
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METHOD OF EXCAVATION Backhoe

CHECKED BY M. D'Andrea	APPROVED BY B. Bailey
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SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL								DEPTH	
		STATION INTERVALS									
		0+01	0+02	0+03	0+04	0+05	0+06	0+07	0+08	0+09	
DA1-2	1	ASPHALT PAVEMENT									
	2	SAND; brown; poorly graded; medium to coarse grained; moist; some gravels; trace silt and cobbles.									
	3	grades grey; some cobbles.								0.5'DIA. PLASTIC DRAINAGE PIPE, BACKFILLED WITH PEA GRAVEL, GEOTEXTILE WRAPPED.	
	4										
	5										
	6										
	7										
	8										
	9										
	10										
	11										
	12										

REMARKS: Oil-like odors 1.5-3 feet. Excavation dry. Soil sample DA1-2 collected from base of drainage pipe at approximately 3 feet.



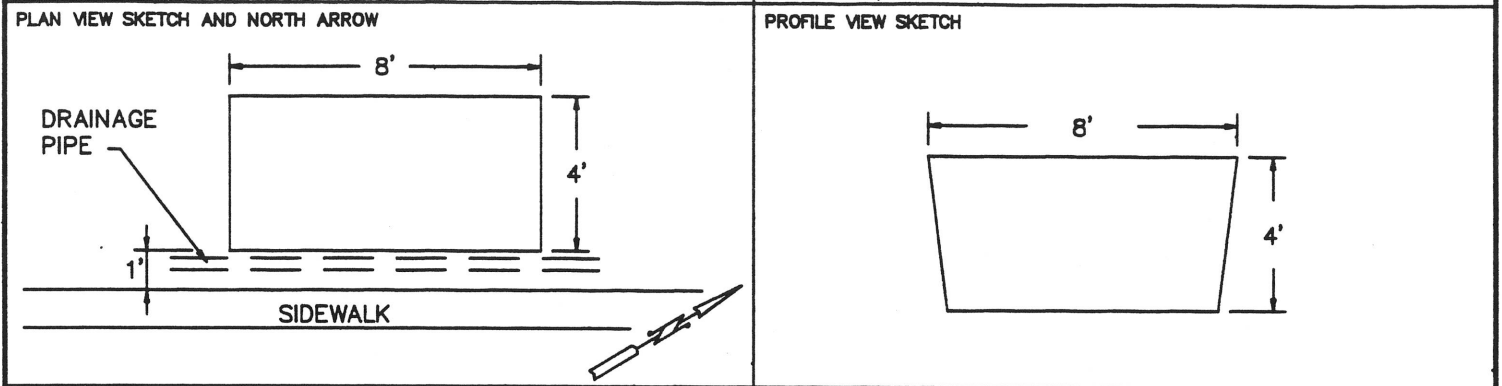
CLIENT City of Tacoma		PROJECT Tacoma Coal Gasification Site		PROJECT NO. 40406
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JECT LOCATION Tacoma, WA	COORDINATES N9701773 ; E1160074	ELEVATION (DATUM) 20.91 FT (Tacoma)	TOTAL DEPTH 4.0 FT	DATE 10/19/93
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SURFACE CONDITIONS Asphalt Pavement	INSPECTOR M. D'Andrea
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METHOD OF EXCAVATION Backhoe

CHECKED BY M. D'Andrea	APPROVED BY B. Bailey
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SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL								DEPTH
		STATION INTERVALS								
		0+01	0+02	0+03	0+04	0+05	0+06	0+07	0+08	
DA1-3	1	ASPHALT PAVEMENT								
	2	SAND; brown; poorly graded; medium to coarse grained; moist; with some gravels and cobbles; trace silt and brick.								
	3	Silty SAND; grey; poorly graded; fine to medium grained; dry; with some gravels and trace cobbles.								
	4	black stained cobbles.								
	5	Q (SEEP)								
	6									
	7									
	8									
	9									
	10									
	11									
	12									

REMARKS: Oil stained cobbles and odors 2.8-4.0 feet. Drainage pipe located along northwest edge of sidewalk. Soil sample DA1-3 collected at base of excavation northwest of drainage pipe.



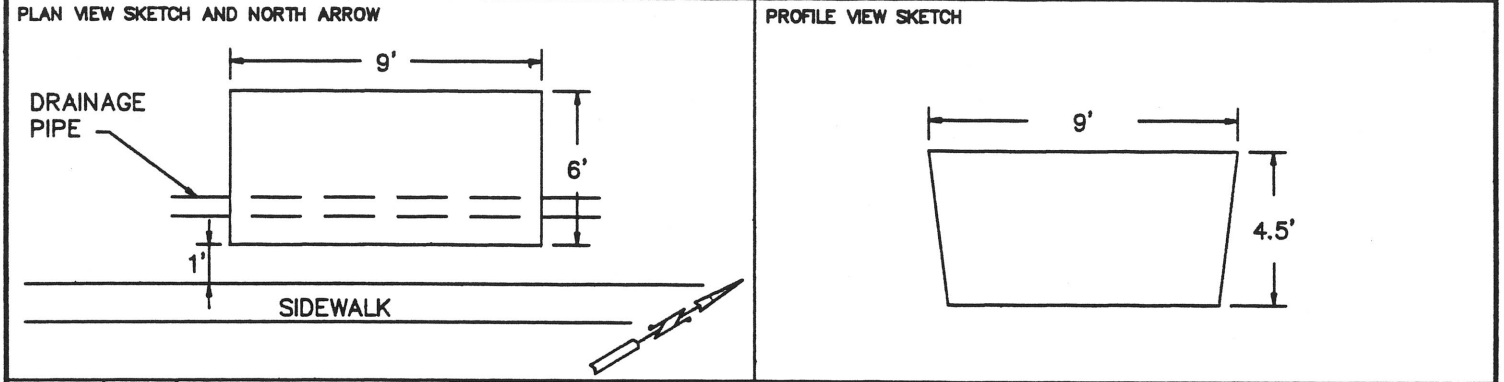
CLIENT City of Tacoma		PROJECT Tacoma Coal Gasification Site		PROJECT NO. 40406
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PROJECT LOCATION Tacoma, WA	COORDINATES N8701830 ; E1160091	ELEVATION (DATUM) 18.55 FT (Tacoma)	TOTAL DEPTH 4.5 FT	DATE 10/19/93
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SURFACE CONDITIONS Asphalt Pavement	INSPECTOR M. D'Andrea
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METHOD OF EXCAVATION Backhoe

CHECKED BY M. D'Andrea	APPROVED BY B. Bailey
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SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		0+01	0+02	0+03	0+04	0+05	0+06	0+07	0+08	0+09	
DA1-4	0	ASPHALT PAVEMENT									
	1	SAND; brown; poorly graded; fine grained; moist; with trace silt and gravel.									
	2	grades grey; with trace cobbles.									
	3	Cobbly SAND; brown; well graded; fine to coarse grained; moist; with some silt and gravels.									
	4	<div style="display: flex; justify-content: space-between;"> Q (SEEP) grades grey and wet. Q </div>									
	5										0.5'DIA. PLASTIC DRAIN PIPE, BACKFILLED WITH PEA GRAVEL GEOTEXTILE WRAPPED.
	6										
	7										
	8										
	9										
	10										
	11										
	12										

REMARKS: Odor similar to DA1-5 and DA1-6. Black seeps from northwest wall of excavation. Sheen on groundwater. Soil sample DA1-4 collected at 4.3 feet, one foot west of drainage pipe.



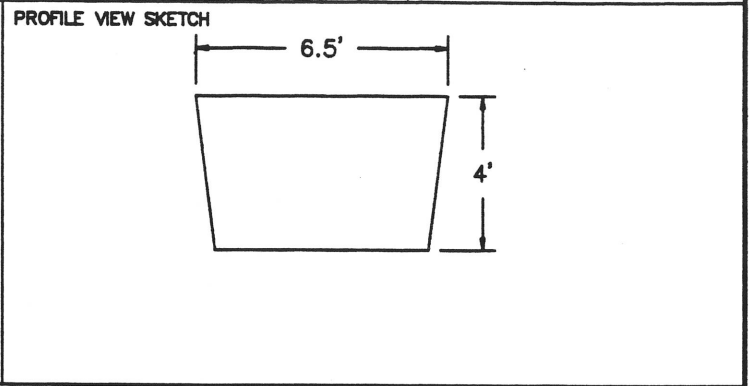
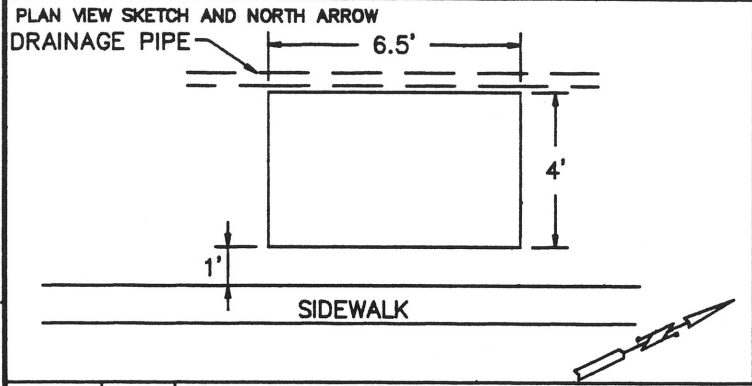
CLIENT City of Tacoma		PROJECT Tacoma Coal Gasification Site		PROJECT NO. 40406
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JECT LOCATION Tacoma, WA	COORDINATES N6701917 ; E1160122	ELEVATION (DATUM) 16.65 FT (Tacoma)	TOTAL DEPTH 4.0 FT	DATE 10/18/93
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SURFACE CONDITIONS Asphalt Pavement	INSPECTOR M. D'Andrea
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METHOD OF EXCAVATION Backhoe

CHECKED BY M. D'Andrea	APPROVED BY B. Bailey
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SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL								DEPTH
		STATION INTERVALS								
		0+01	0+02	0+03	0+04	0+05	0+06	0+07	0+08	
DA1-5	0	ASPHALT PAVEMENT								
	1	UNIT 1				UNIT 2				
	2	UNIT 1				UNIT 2				
	3	UNIT 2				UNIT 2				
	4	0.5'DIA.PLASTIC DRAINAGE PIPE, BACKFILLED W/PEA GRAVEL, GEOTEXTILE WRAPPED.								
	5									
	6									
	7									
	8									
	9									
	10									
	11									
12										

UNIT 1: Silty SAND; brown; poorly graded; fine and coarse grained; moist; with trace gravels.

UNIT 2: SAND; grey; poorly graded; fine and coarse grained; moist; with some cobbles, wood, and brick.

REMARKS: Coal tar seeps encountered at 3.8 feet below and adjacent to drainage pipe. Very strong odors. Iridescent silver sheen on groundwater. Soil sample DA1-5 collected from 3.8 feet in vicinity of tar and drainage pipe.



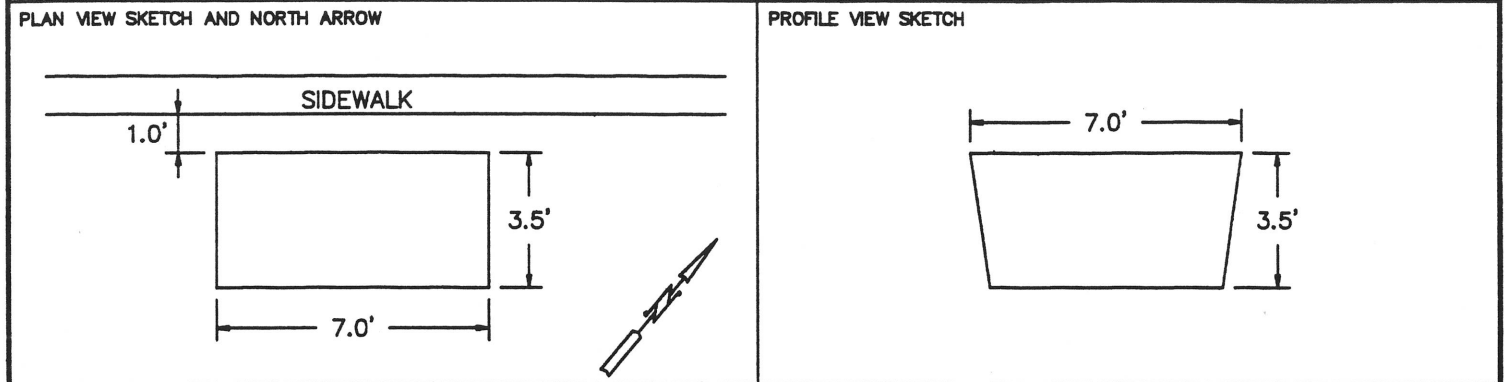
CLIENT City of Tacoma	PROJECT Tacoma Coal Gasification Site	PROJECT NO. 40406
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TEST LOCATION Tacoma, WA	COORDINATES N77701927 ; E1160094	ELEVATION (DATUM) 16.6 FT (Tacoma)	TOTAL DEPTH 3.5 FT	DATE 10/18/93
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SURFACE CONDITIONS Asphalt Pavement	INSPECTOR M. D'Andrea
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METHOD OF EXCAVATION Backhoe

CHECKED BY M. D'Andrea	APPROVED BY B. Bailey
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SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL								DEPTH
		STATION INTERVALS								
		0+01	0+02	0+03	0+04	0+05	0+06	0+07	0+08	
DA1-6	1	ASPHALT PAVEMENT								
	2	Gravelly SAND; light brown; well graded; fine-coarse grained; moist; with some silt.								
	3	grades black and wet with some cobbles.								
	4	Q (SEEP) Q Q								
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									

REMARKS: Coal tar seeps encountered on north wall beginning 1-foot below ground surface and continuing to depth. Iridescent silver sheen on groundwater. Soil sample DA1-6 composite from north and south wall, collected at base of excavation. Drainage pipe not encountered.



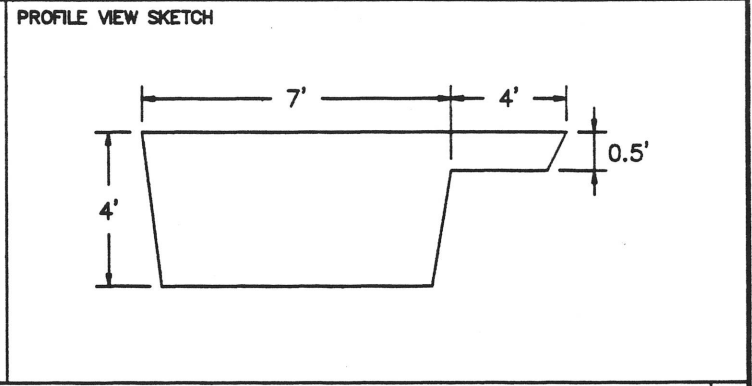
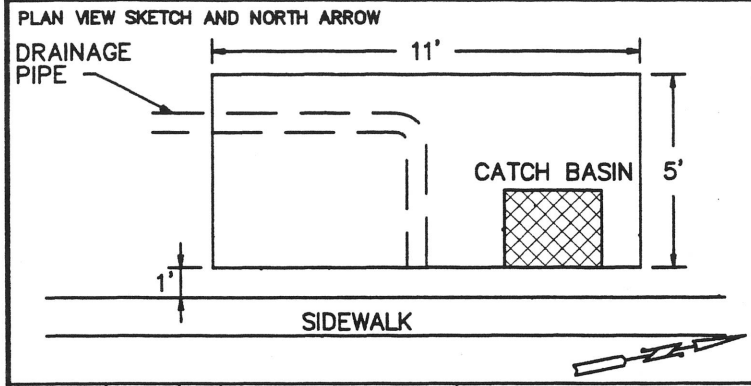
CLIENT City of Tacoma		PROJECT Tacoma Coal Gasification Site		PROJECT NO. 40406
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JECT LOCATION Tacoma, WA	COORDINATES N5701954 ; E1160134	ELEVATION (DATUM) 16.40 FT (Tacoma)	TOTAL DEPTH 4.0 FT	DATE 10/19/93
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SURFACE CONDITIONS Asphalt Pavement	INSPECTOR M. D'Andrea
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METHOD OF EXCAVATION Backhoe

CHECKED BY M. D'Andrea	APPROVED BY B. Bailey
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SAMPLE TYPE AND NUMBER	DEPTH IN FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL									DEPTH
		STATION INTERVALS									
		0+02	0+04	0+06	0+08	0+10	0+12	0+14	0+16	0+18	
DA1-7	0	ASPHALT PAVEMENT									
	1	SAND; brown; poorly graded; fine and coarse grained; moist; with trace gravels and brick.									
	2	Cobbly SAND; poorly graded; fine and coarse grained; wet; with some gravel, and trace brick, grey sheen.									
	3	Q (SEEP)									
	4	0.5'DIA. PLASTIC DRAINAGE PIPE, BACKFILLED WITH PEA GRAVEL, GEOTEXTILE WRAPPED.									
	5										
	6										
	7										
	8										
	9										
	10										
	11										
12											

REMARKS: Iridescent grey sheen on soil and groundwater beginning at 2 feet, continuing to depth. Strong odors. Drainage pipe broken. Sample DA1-7 collected from drainage pipe vicinity (approx. 3.5 feet)

**APPENDIX C
WATER LEVEL DEPTHS AND ELEVATIONS**

**REMEDIAL INVESTIGATION REPORT
TACOMA COAL GASIFICATION SITE
TACOMA, WASHINGTON**

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TABLE C-1 - Water Level Data

Tacoma Coal Gasification Site
Tacoma, Washington

Well Number	TOC Elev. (feet-NAVD88)	7/18/2016 (L.T. -1.1' MLLW @1049)					12/20/2016 (Tide approx. 11.5' MLLW @1200)				
		Depth to Water (ft. TOC)	Time	Elevation (feet NAVD88)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Depth to Water (ft. TOC)	Time	Elevation (ft. NAVD88)	LNAPL Thickness (feet)	DNAPL Thickness (feet)
DOT-MW-4	23.87	8.02	0952	15.85			7.15	1313	16.72		
HC-MW-2	31.48	17.42	1050	14.06			16.03	1235	15.45		
HC-MW-5	46.39	18.20	1110	28.19			15.81	1301	30.58		
HC-MW-6	47.16	19.10	1054	28.06			18.35	1248	28.81		
MW-9	19.77	14.40	1014	5.37		(a)	13.71	1214	6.06	Trace	0.20*
MW-16	19.88	14.79	1005	5.09			13.42	1151	6.46		
MW-19	31.97	4.50	1035	27.47			3.92	1231	28.05		
MW-20	48.32	19.70	1052	28.62			19.22	1245	29.10		
MW-21	41.89	12.38	1103	29.51			10.66	1251	31.23		
MW-22	32.04	4.54	1036	27.50			4.15	1232	27.89		
MW-23	41.71	13.46	1104	28.25			11.60	1252	30.11		
MW-24	17.68	11.01	1000	6.67			8.30	1146	9.38		
MW-25	20.20	14.25	1011	5.95		0.63*	13.41	1159	6.79	Trace	0.85*
MW-26	18.01	11.15	1003	6.86			10.12	1148	7.89		
MW-27	19.93	0.42	0950	19.51		1.40*(b)	nm (c)	nm(c)	-----	nm(c)	nm(c)
MW-28	16.77	11.39	0958	5.38			8.00	1145	8.77		
MW-29	17.92	12.10	1002	5.82			9.01	1147	8.91		
MW-30	18.39	9.56	1004	8.83			7.46	1150	10.93		

* - At bottom of casing

(a) -Present but no distinct layer (smear on tape)

(b) - Appears to be heavier material as compared to that in wells MW-9 and MW-25.

nm - not measured

(c) - Well monument under water

L.T. - Low Tide

MLLW - Mean Lower Low Water

TABLE C-1 - Water Level Data

Tacoma Coal Gasification Site
Tacoma, Washington

Well Number	TOC Elev. (feet-NAVD88)	4/27/2017 (Tide approx. 1.6' MLLW @1000)					8/29/2017 (Tide approx. 7.4' MLLW @ 1500)				
		Depth to Water (ft. TOC)	Time	Elevation (ft. NAVD88)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Depth to Water (ft. TOC)	Time	Elevation (ft. NAVD88)	LNAPL Thickness (feet)	DNAPL Thickness (feet)
DOT-MW-4	23.87	7.11	0927	16.76			9.00	1511	14.87		
HC-MW-2	31.48	15.91	0915	15.57			17.85	1555	13.63		
HC-MW-5	46.39	15.60	0845	30.79			18.87	1612	27.52		
HC-MW-6	47.16	18.29	0855	28.87			19.21	1602	27.95		
MW-9	19.77	13.35	-----	6.42	sheen	0.20*	14.41	1545	5.36	0.01(d)	0.20*(d)
MW-16	19.88	13.70	1028	6.18			14.56	1543	5.32		
MW-19	31.97	3.81	0906	28.16			4.55	1553	27.42		
MW-20	48.32	19.11	0859	29.21			19.69	1600	28.63		
MW-21	41.89	10.40	0850	31.49			12.88	1608	29.01		
MW-22	32.04	4.10	0907	27.94			4.51	1552	27.53		
MW-23	41.71	11.40	0851	30.31			14.08	1607	27.63		
MW-24	17.68	10.75	1020	6.93			11.03	1528	6.65		
MW-25	20.20	12.71	-----	7.49	0.01	0.5*	14.25	1539	5.95	sheen(d)	0.50*(d)
MW-26	18.01	10.24	1024	7.77			11.30	1532	6.71		
MW-27	19.93	nm (c)	nm(c)	-----	nm(c)	nm(c)	1.06	1509	18.87	sheen(d)	1.40*(d)
MW-28	16.77	10.25	1018	6.52			9.86	1526	6.91		
MW-29	17.92	10.87	1027	7.05			10.82	1530	7.10		
MW-30	18.39	8.74	1026	9.65			9.27	1541	9.12		

* - At bottom of casing
 nm - not measured
 (c) - Well monument under water
 (d) - On 10-29-17 @ 0935-1000
 L.T. - Low Tide
 MLLW - Mean Lower Low Water

TABLE C-1 - Water Level Data

Tacoma Coal Gasification Site
Tacoma, Washington

Well Number	TOC Elev. (feet-NAVD88)	12/5/2017 (Tide approx. 8.2' MLLW @1500)					4/17/2018 (L.T. -0.4' MLLW @1249)				
		Depth to Water (ft. TOC)	Time	Elevation (ft. NAVD88)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Depth to Water (ft. TOC)	Time	Elevation (feet NAVD88)	LNAPL Thickness (feet)	DNAPL Thickness (feet)
DOT-MW-4	23.87	7.11	1444	16.76			6.90	1241	16.97		
HC-MW-2	31.48	15.75	1442	15.73			15.69	1245	15.79		
HC-MW-5	46.39	15.38	1513	31.01			15.23	1307	31.16		
HC-MW-6	47.16	18.32	1504	28.84			18.21	1255	28.95		
MW-9	19.77	10.92	1345	8.85	sheen	0.20*	13.76	1325	6.01	0.02	0.15*
MW-16	19.88	13.66	1429	6.22			13.35	1227	6.53		
MW-19	31.97	3.85	1449	28.12			3.75	1247	28.22		
MW-20	48.32	19.15	1500	29.17			19.02	1257	29.30		
MW-21	41.89	10.45	1506	31.44			10.28	1302	31.61		
MW-22	32.04	4.08	1448	27.96			4.00	1248	28.04		
MW-23	41.71	11.42	1505	30.29			11.30	1300	30.41		
MW-24	17.68	10.68	1434	7.00			10.89	1234	6.79		
MW-25	20.20	12.93	1448	7.27	0.02	0.15*	12.80	-----	7.40	0.15	0.45*
MW-26	18.01	10.47	1431	7.54			10.72	1230	7.29		
MW-27	19.93	nm (c)	nm(c)	-----	nm(c)	nm(c)	nm (c)	nm(c)	-----	nm(c)	nm(c)
MW-28	16.77	9.85	1435	6.92			11.25	1236	5.52		
MW-29	17.92	10.50	1432	7.42			11.68	1232	6.24		
MW-30	18.39	8.32	1430	10.07			9.08	1228	9.31		

* - At bottom of casing
 nm - not measured
 (c) - Well monument under water
 L.T. - Low Tide
 MLLW - Mean Lower Low Water

TABLE C-1 - Water Level Data

Tacoma Coal Gasification Site
Tacoma, Washington

Well Number	TOC Elev. (feet-NAVD88)	7/25/2018 (L.T. -0.8' MLLW @1026)				
		Depth to Water (ft. TOC)	Time	Elevation (ft. NAVD88)	LNAPL Thickness (feet)	DNAPL Thickness (feet)
DOT-MW-4	23.87	8.97	1105	14.90		
HC-MW-2	31.48	17.87	1112	13.61		
HC-MW-5	46.39	18.71	1133	27.68		
HC-MW-6	47.16	19.20	1121	27.96		
MW-9	19.77	13.63	1305	6.14	Sheen	0.1*
MW-16	19.88	14.76	1049	5.12		
MW-19	31.97	4.54	1116	27.43		
MW-20	48.32	19.71	1122	28.61		
MW-21	41.89	12.72	1126	29.17		
MW-22	32.04	4.51	1114	27.53		
MW-23	41.71	13.90	1125	27.81		
MW-24	17.68	10.76	1058	6.92		
MW-25	20.20	14.28	1320	5.92	0.1	0.6*
MW-26	18.01	11.37	1054	6.64		
MW-27	19.93	0.93	1210	19.00	Sheen	1.4*
MW-28	16.77	11.99	1100	4.78		
MW-29	17.92	12.41	1056	5.51		
MW-30	18.39	10.31	1051	8.08		

* - At bottom of casing

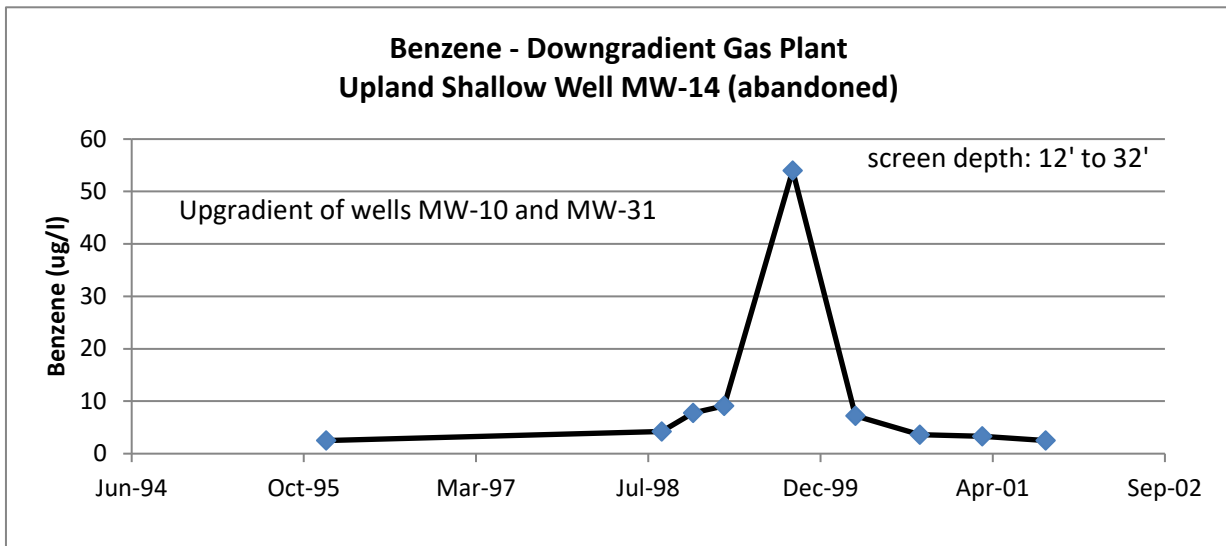
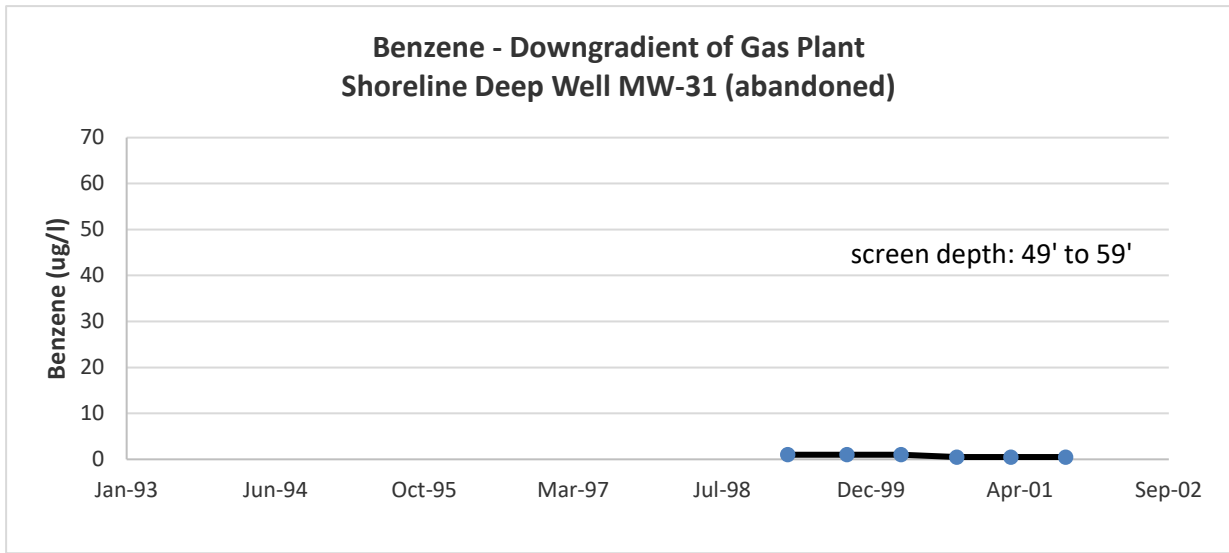
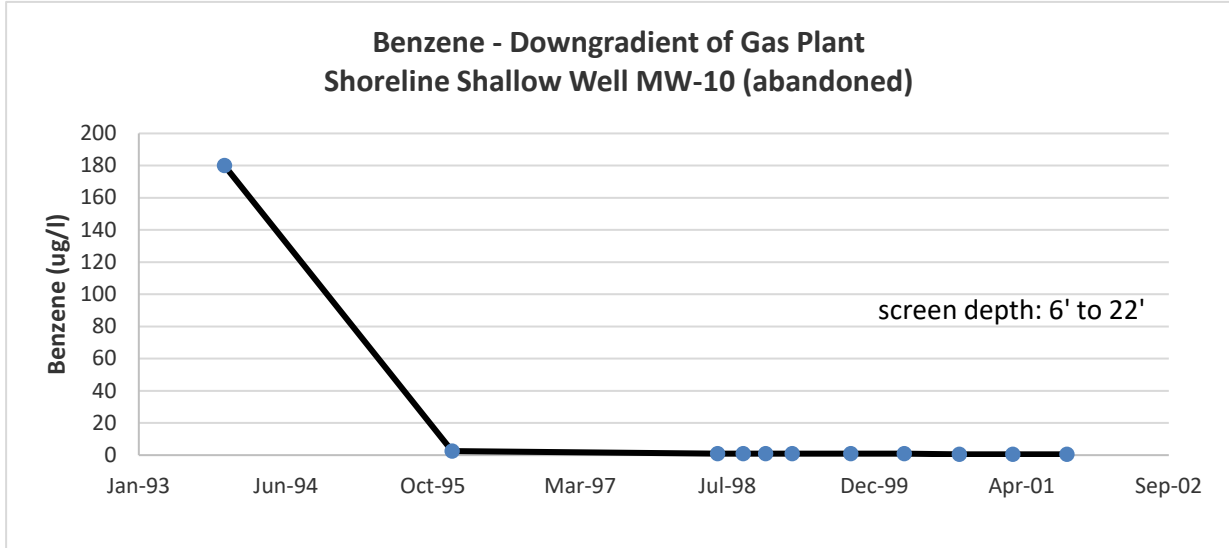
L.T. - Low Tide

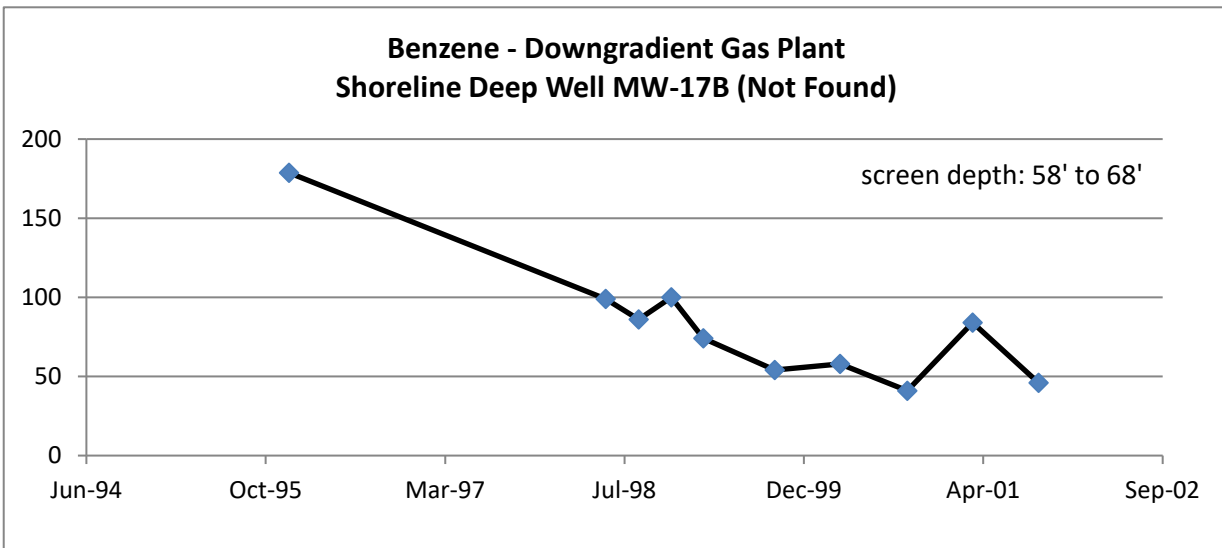
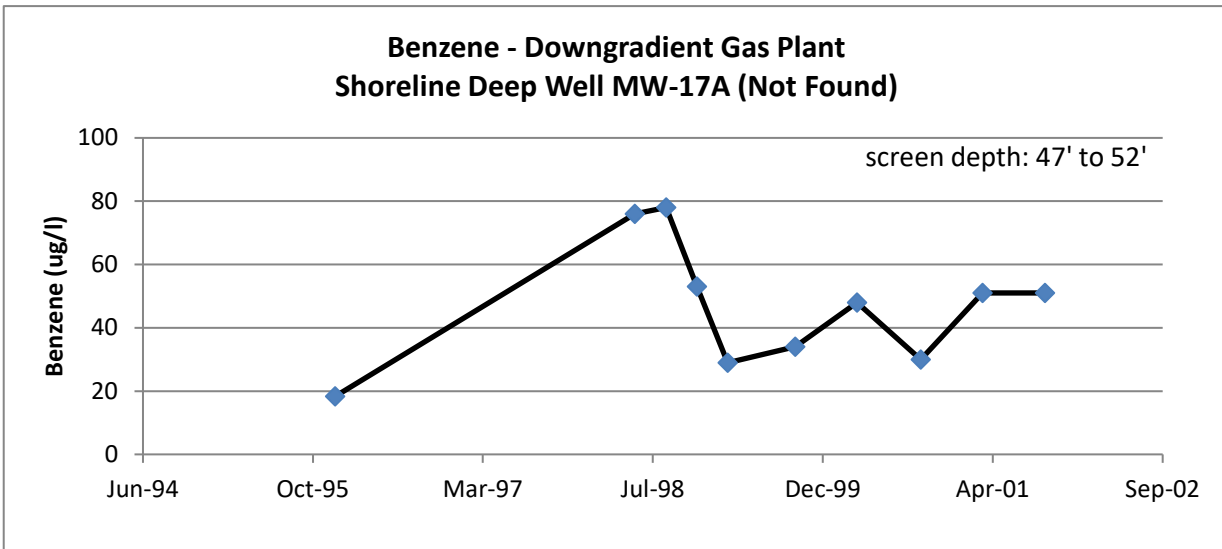
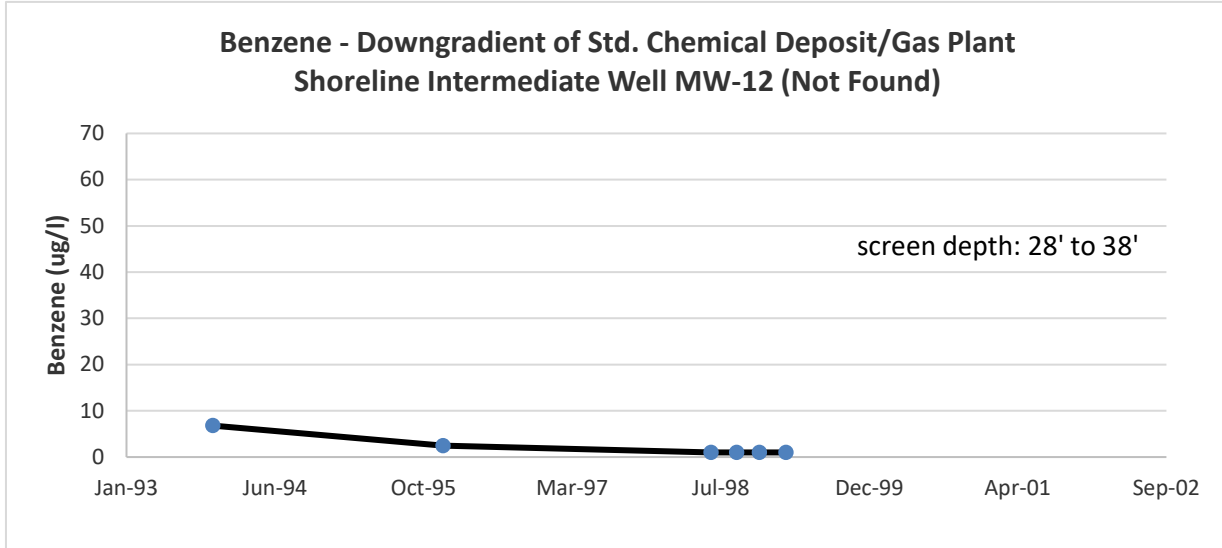
MLLW - Mean Lower Low Water

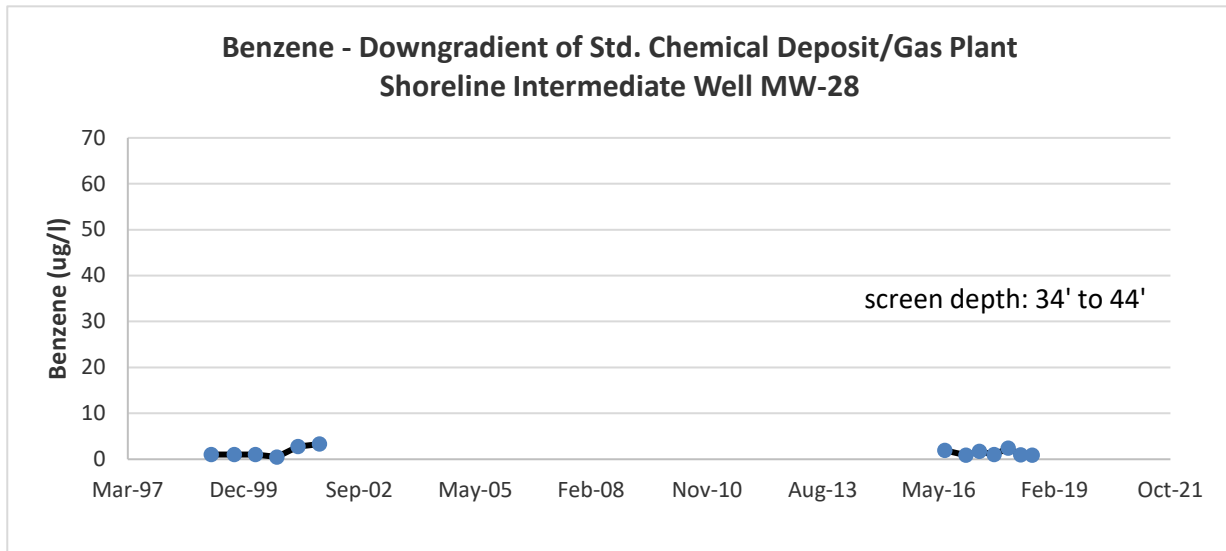
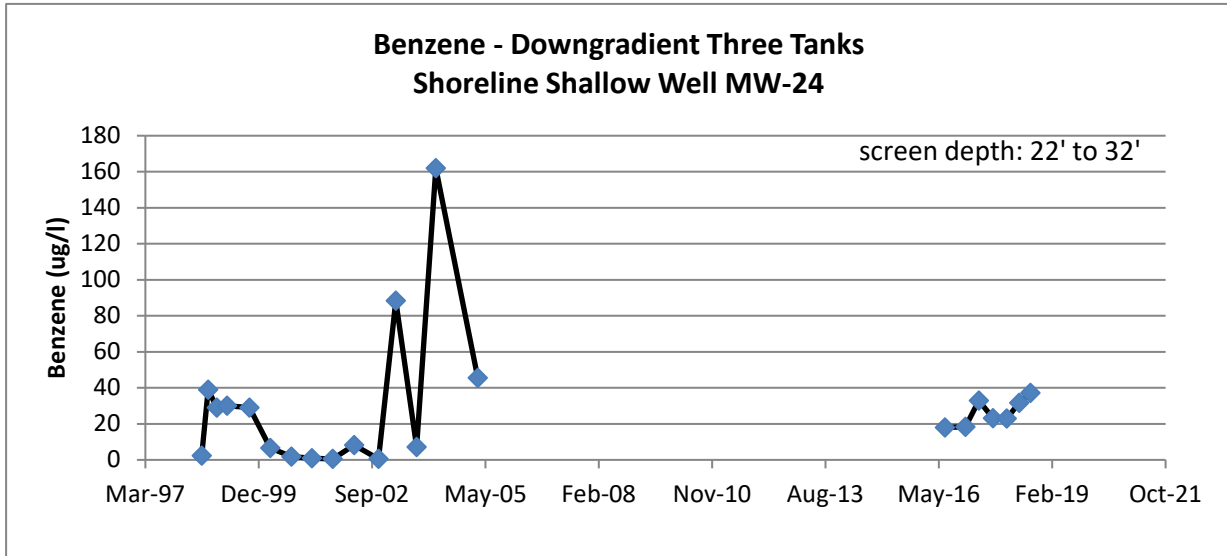
**APPENDIX D
TIME SERIES CONCENTRATION PLOTS FOR SELECTED
CONSTITUENTS AND WELLS**

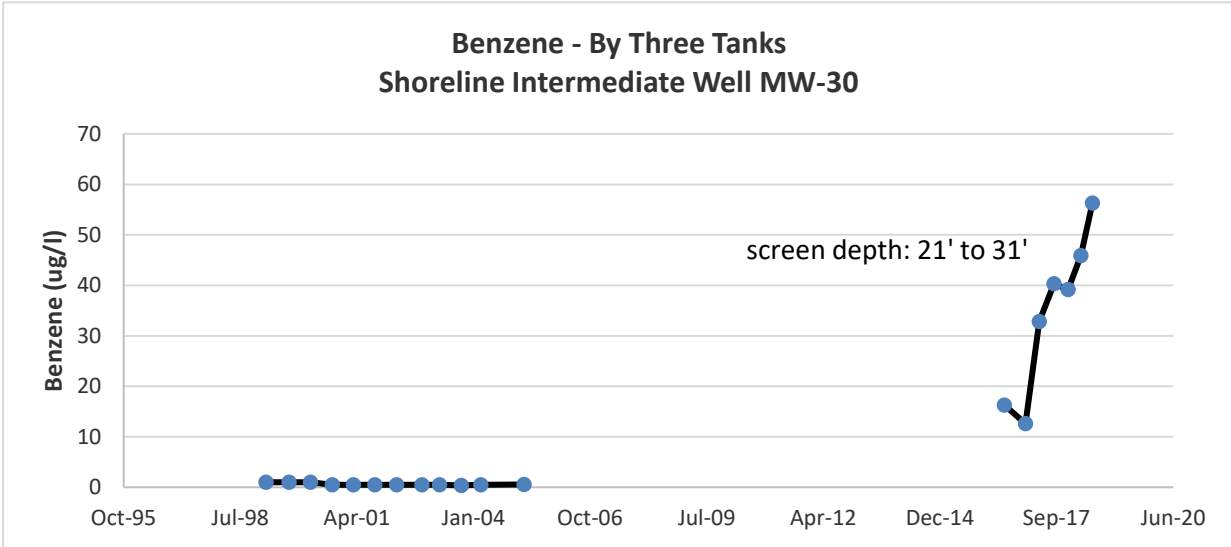
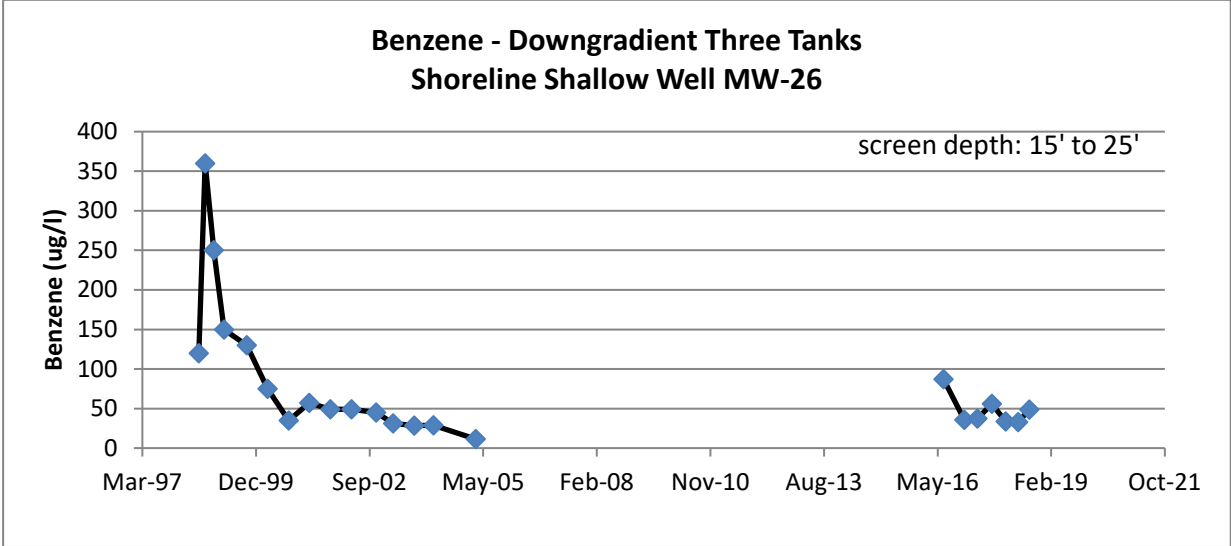
**REMEDIAL INVESTIGATION REPORT
TACOMA COAL GASIFICATION SITE
TACOMA, WASHINGTON**

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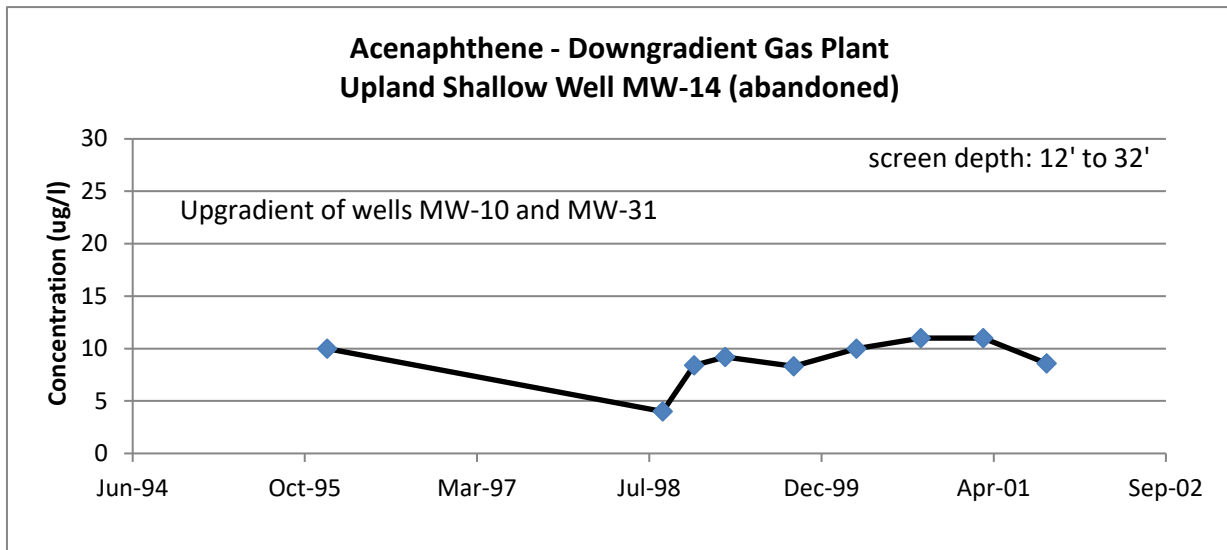
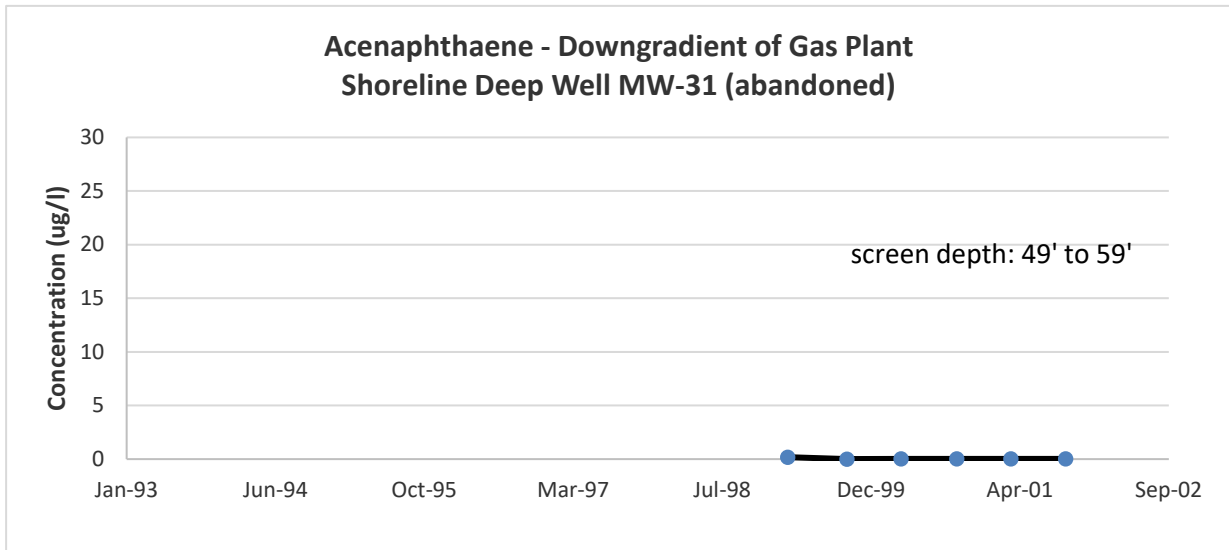
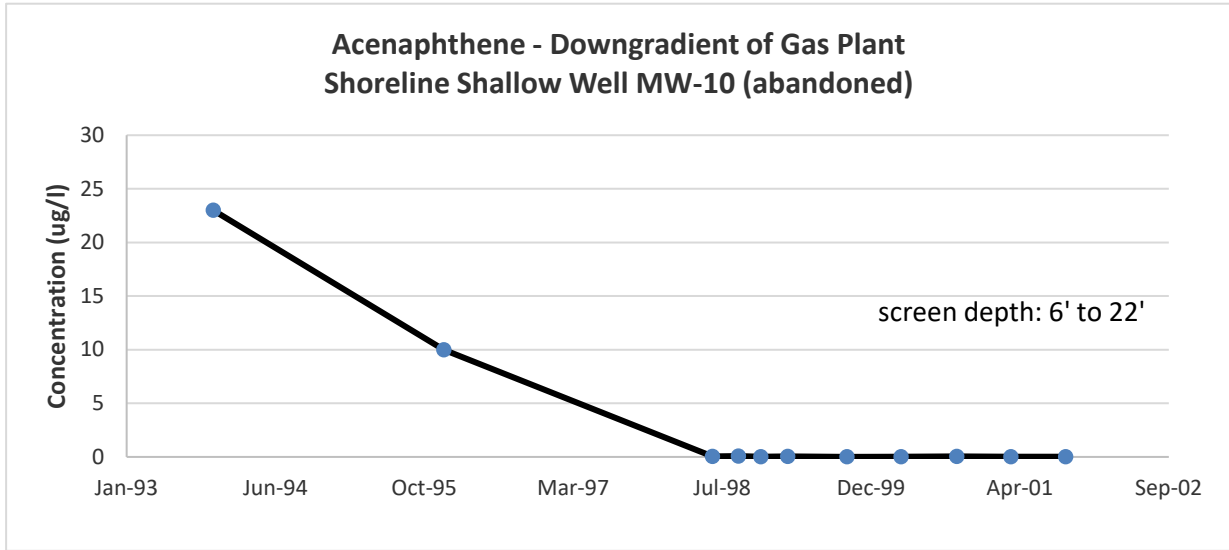


FIGURE D-2
Acenaphthene Trends
Selected Wells

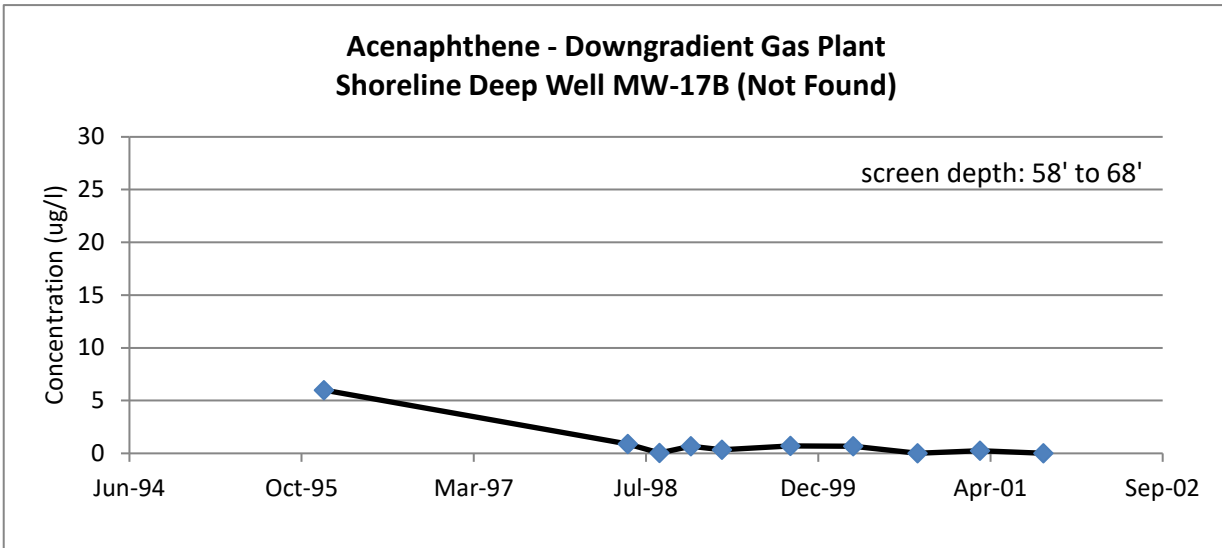
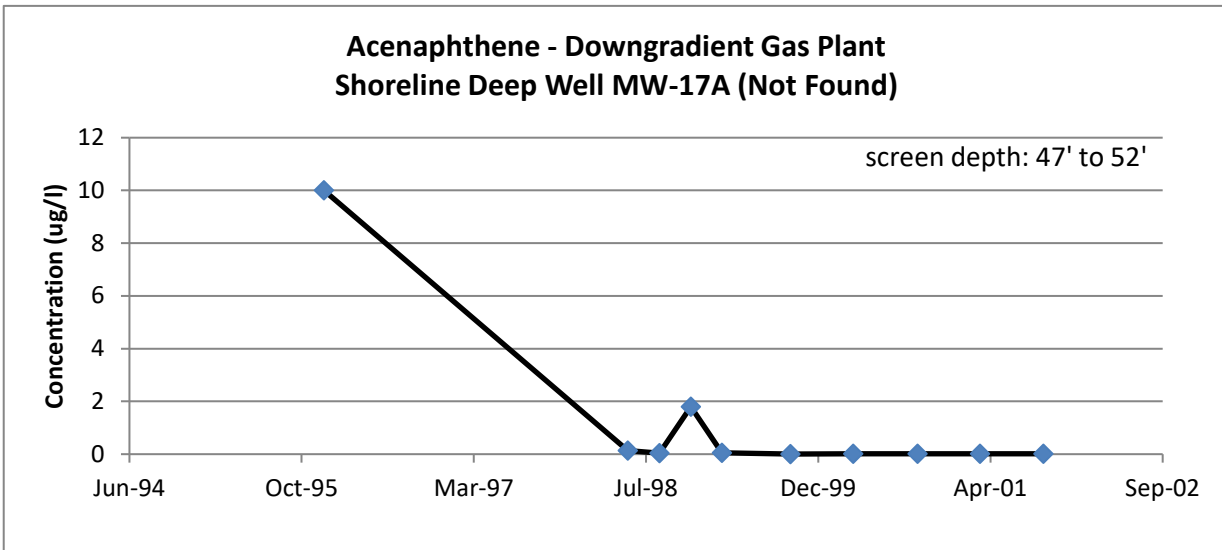
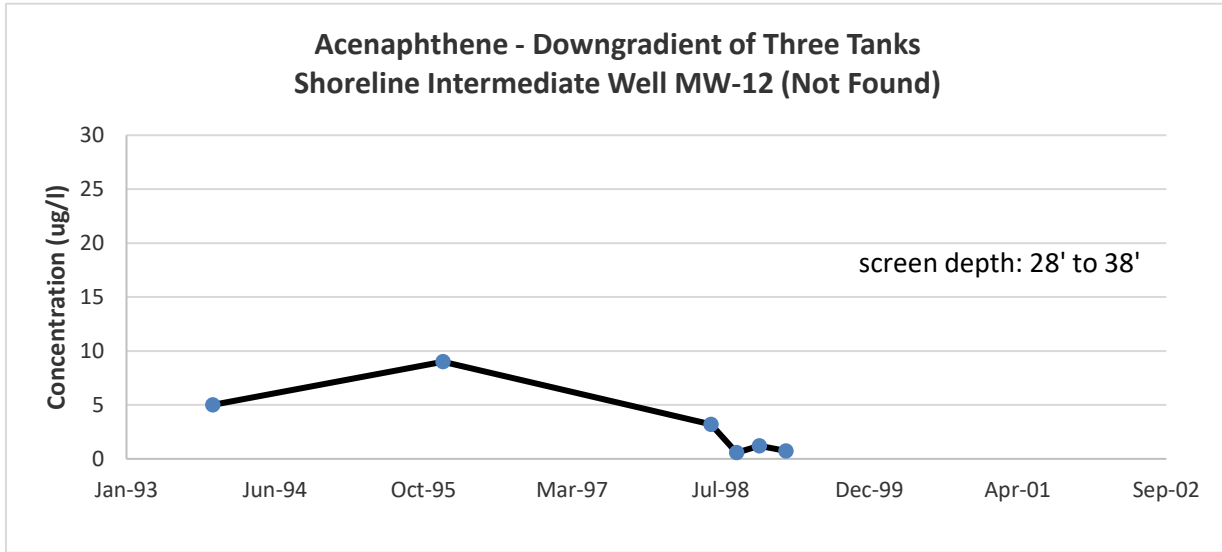


FIGURE D-2
Acenaphthene Trends
Selected Wells

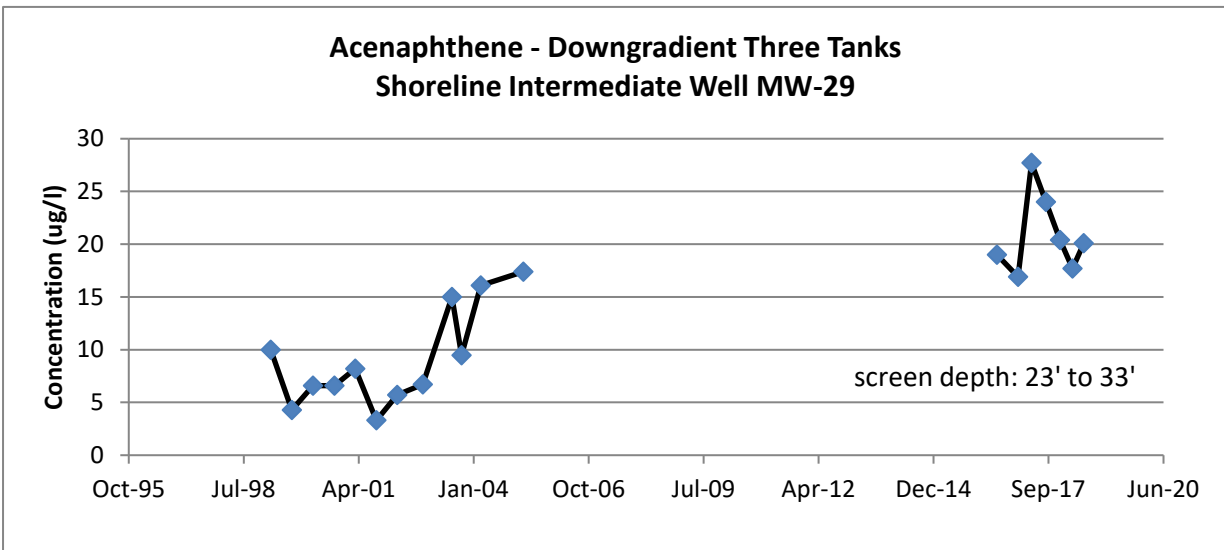
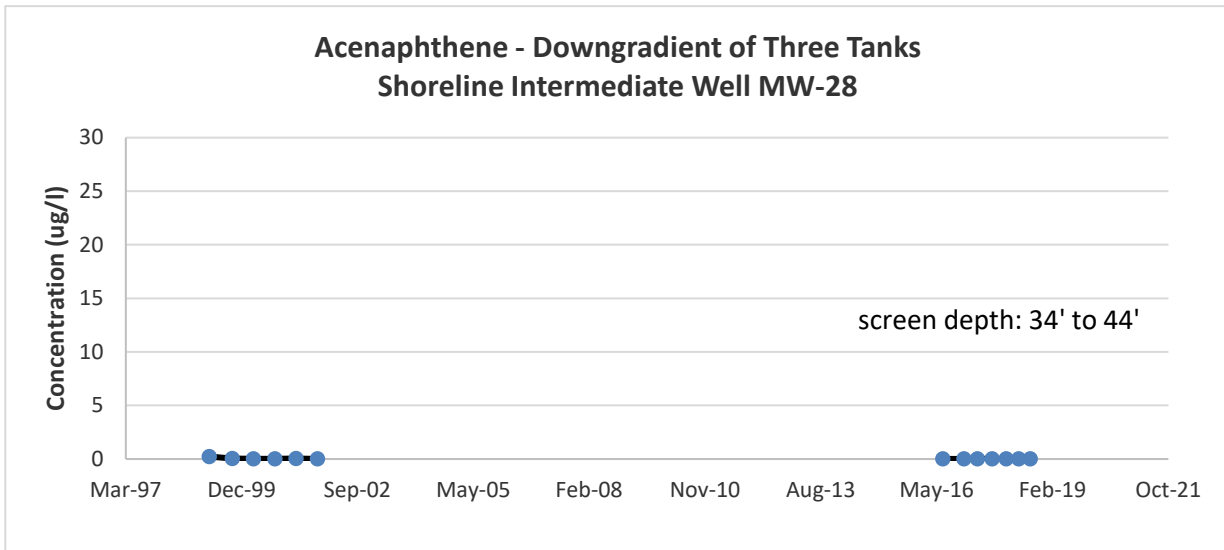
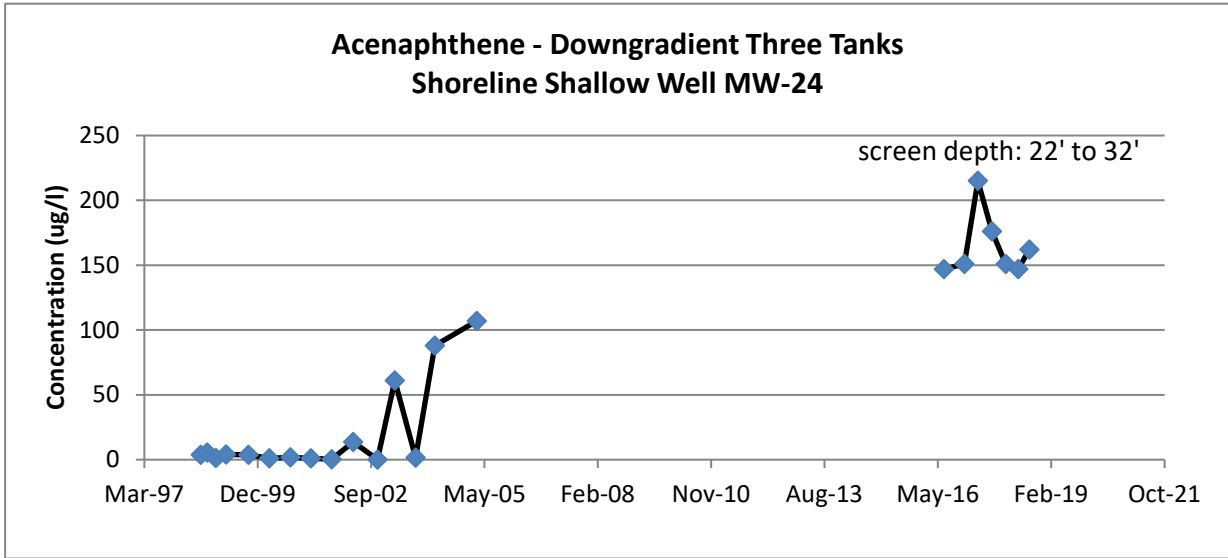


FIGURE D-2
Acenaphthene Trends
Selected Wells

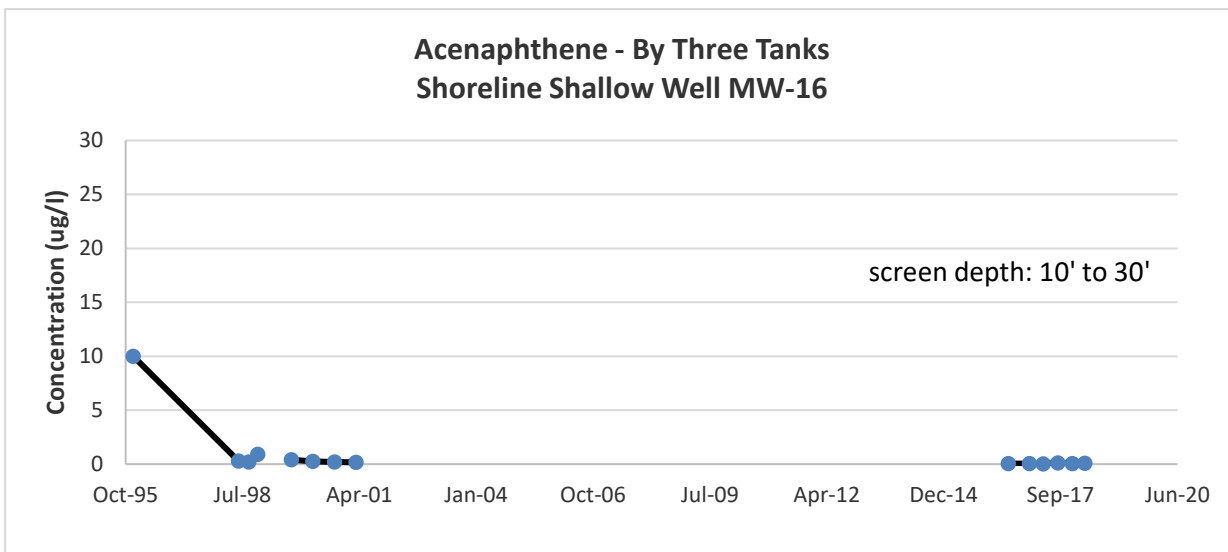
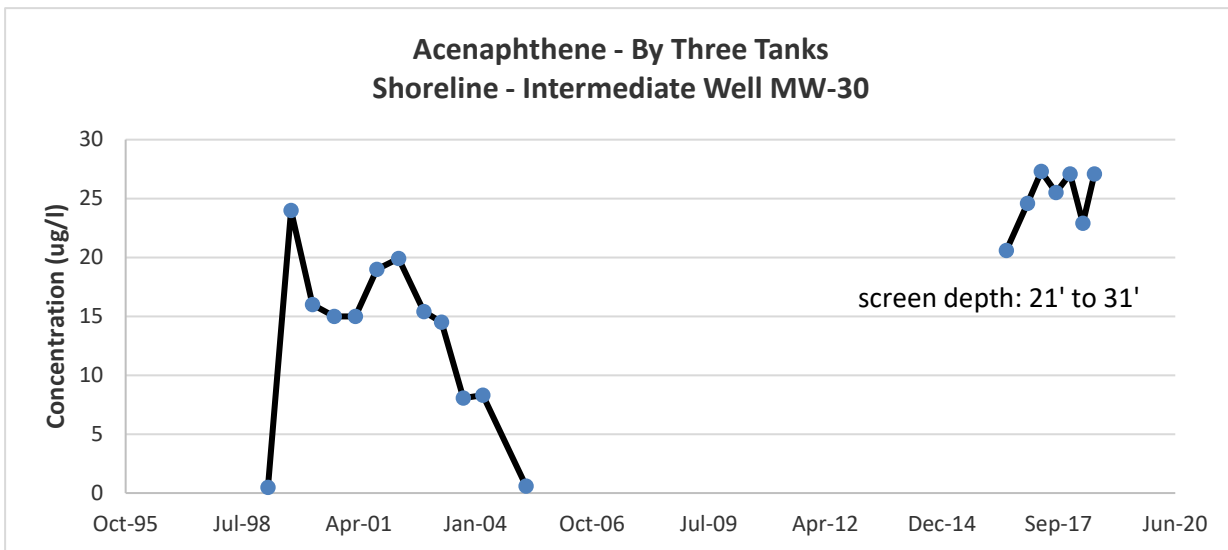
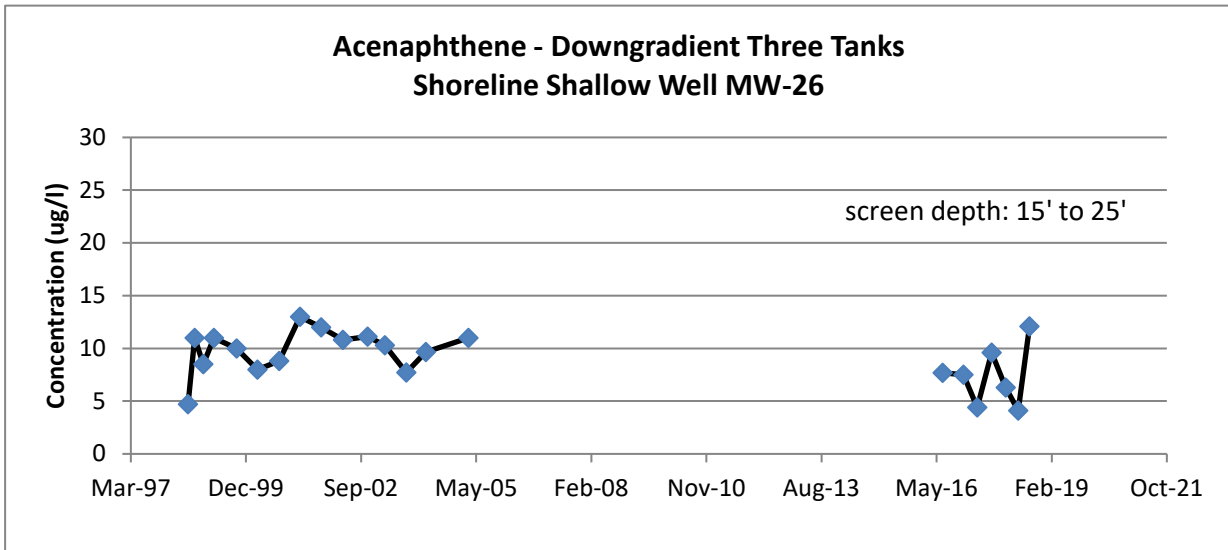


FIGURE D-2
Acenaphthene Trends
Selected Wells

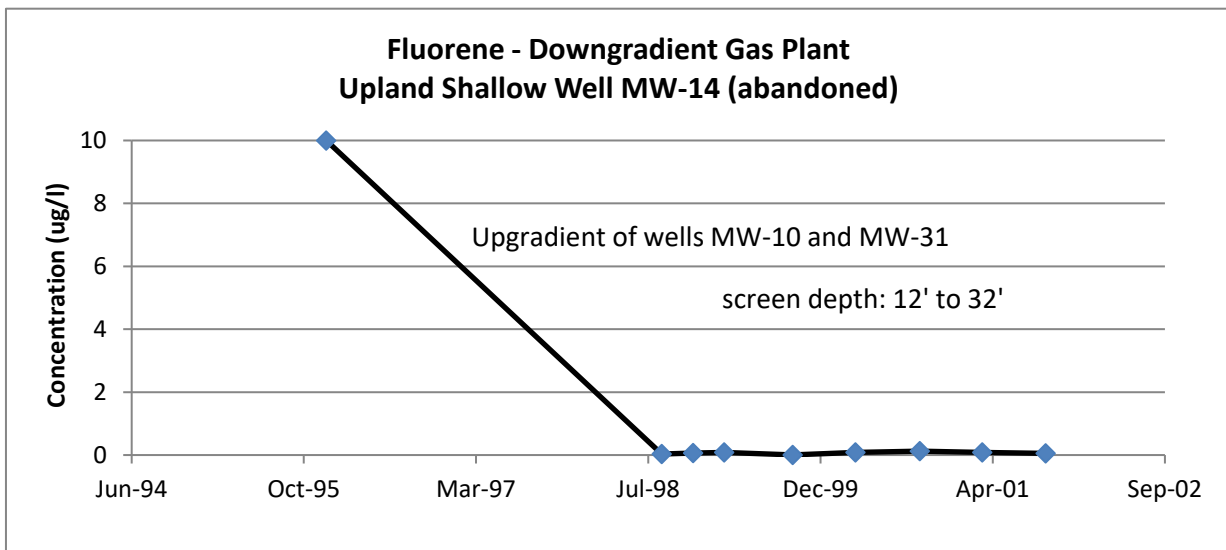
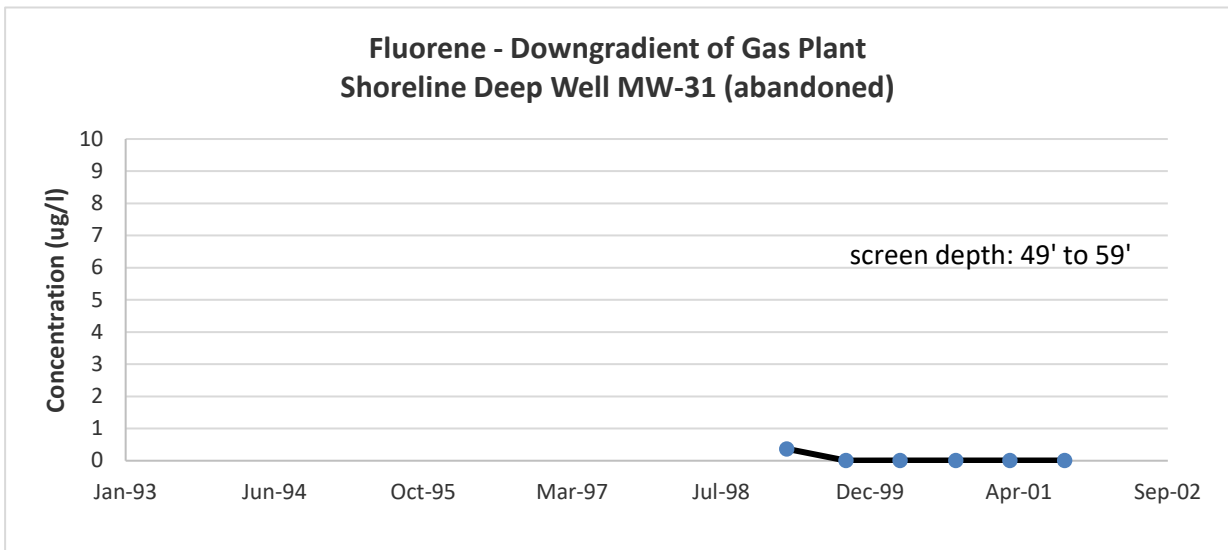
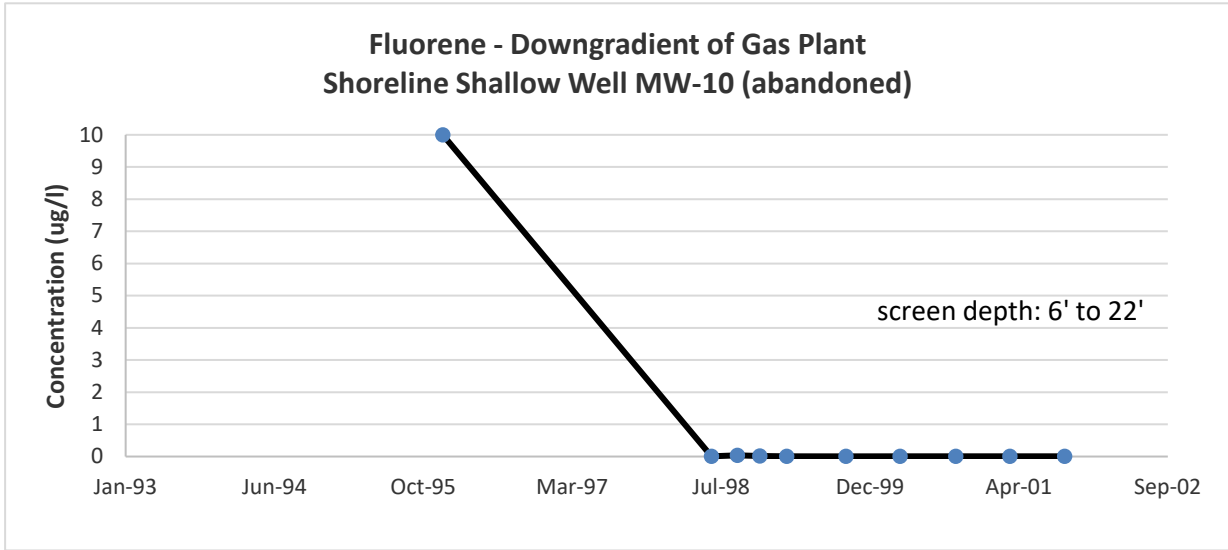
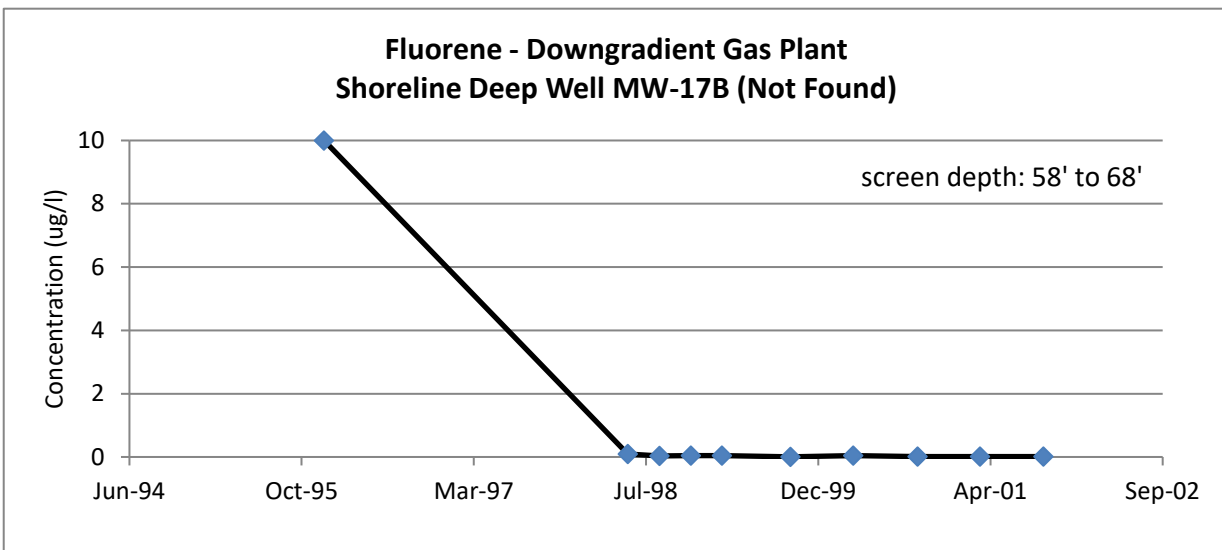
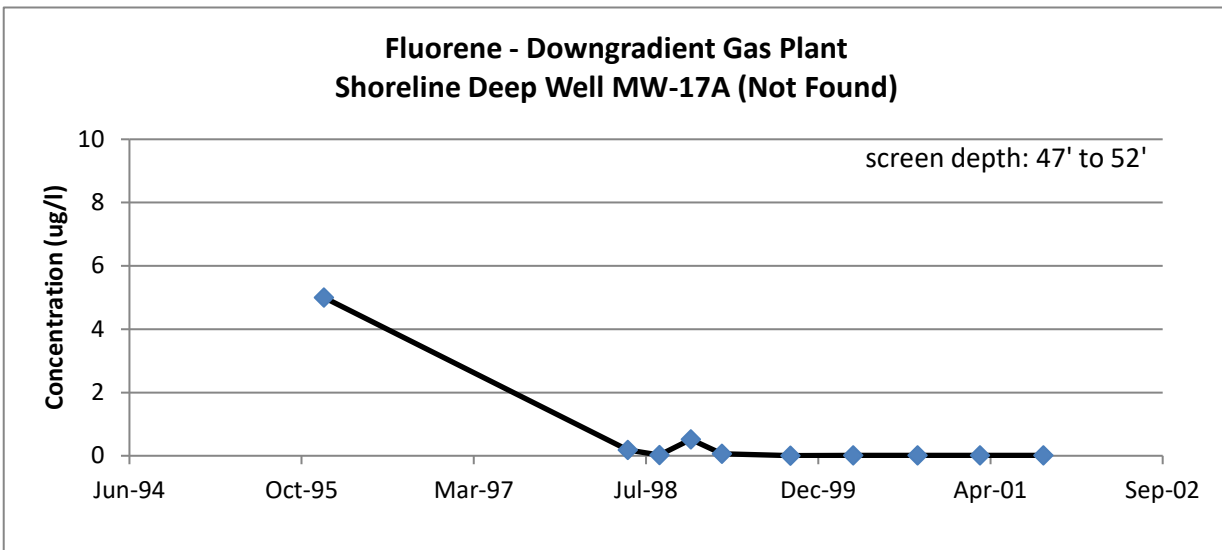
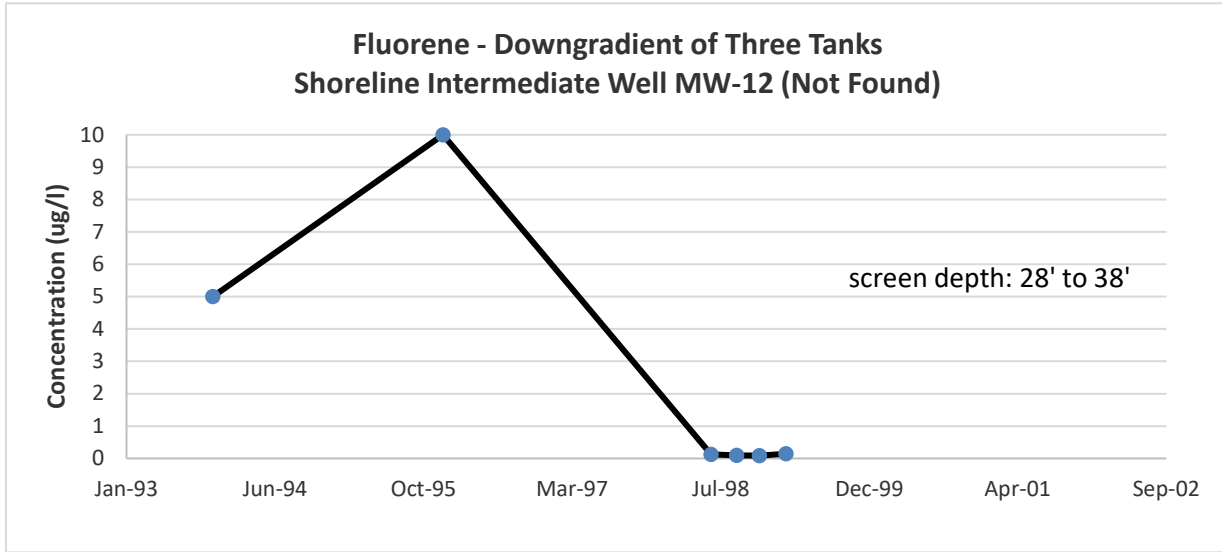
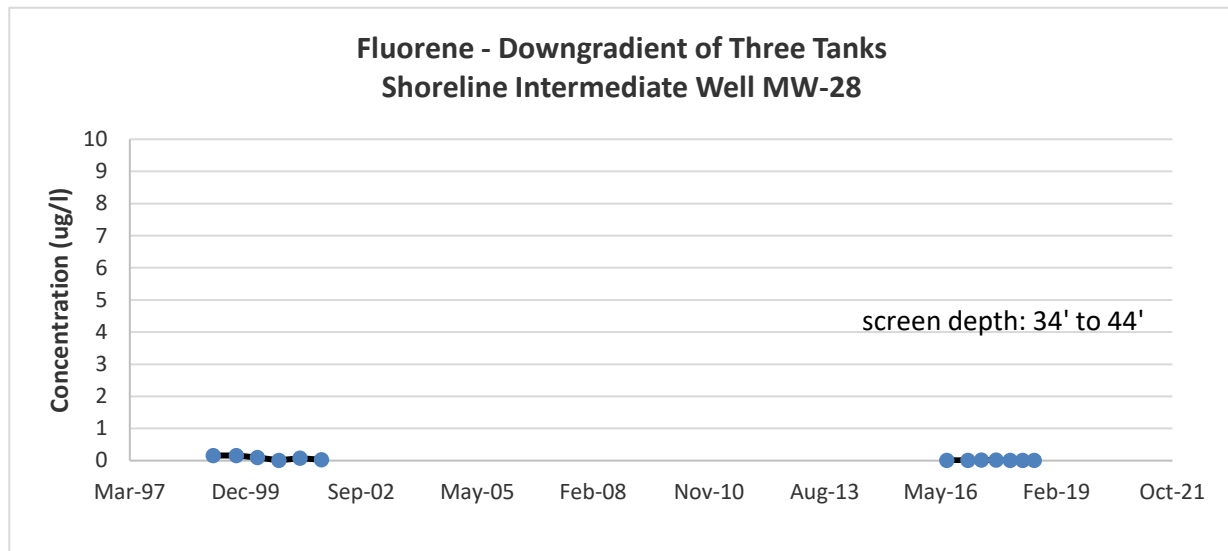
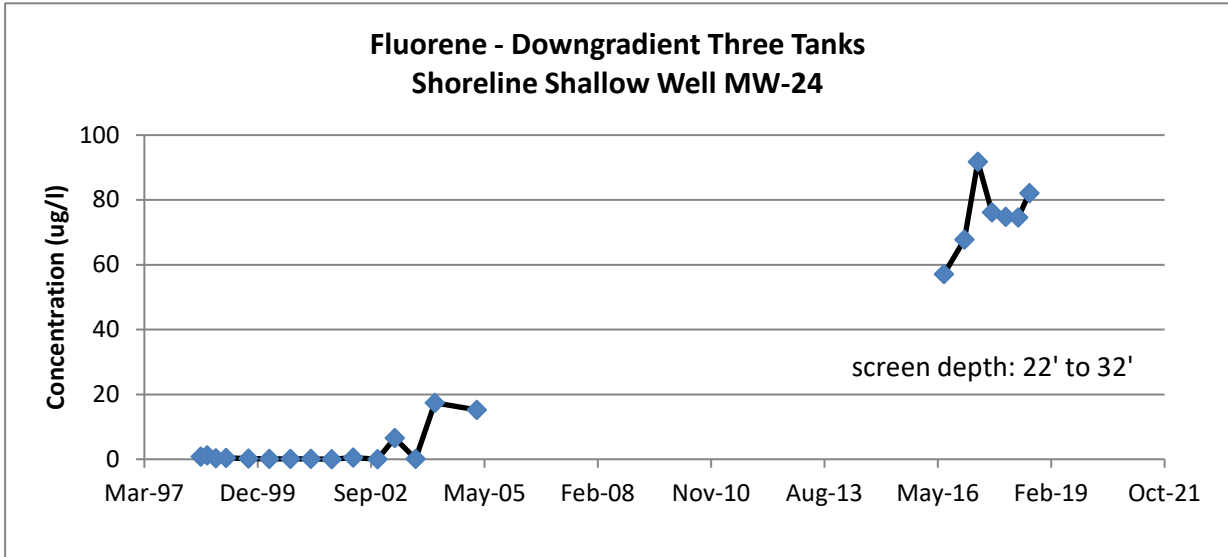
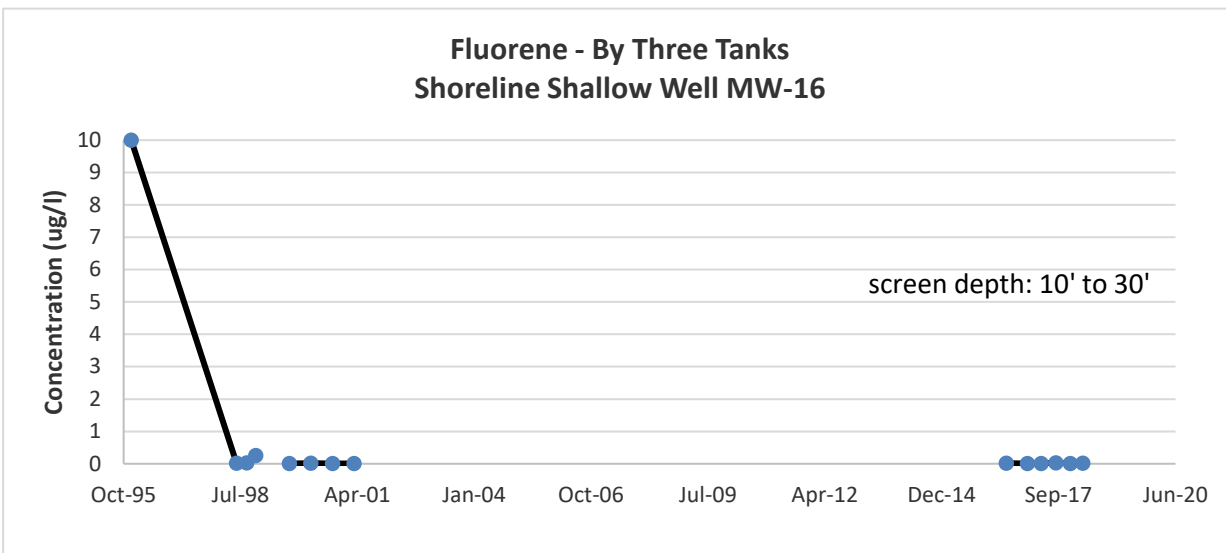
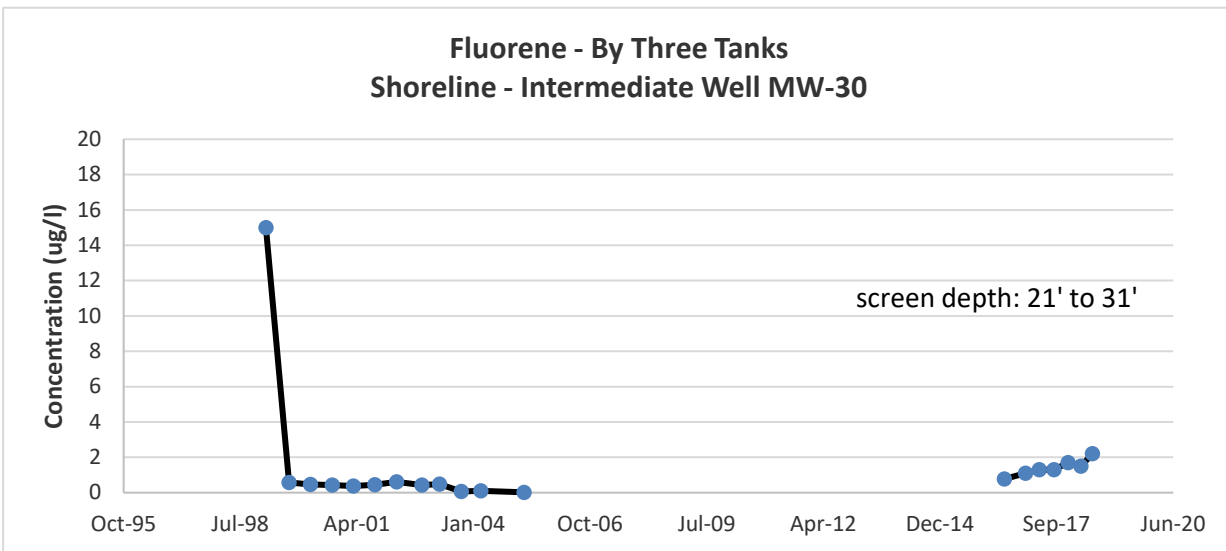
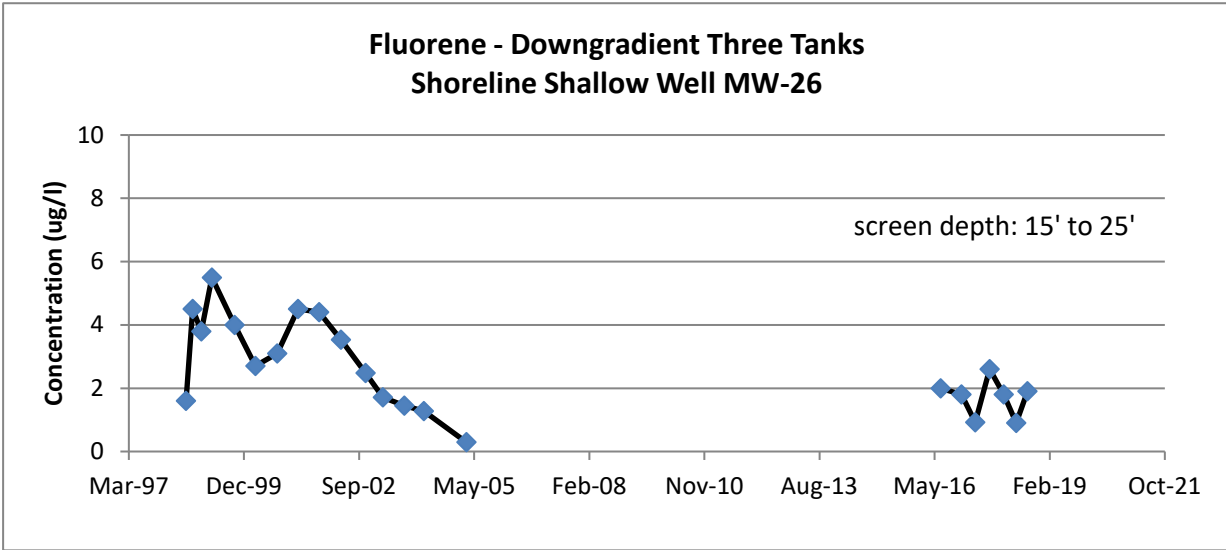


FIGURE D-3
Fluorene Trends
Selected Wells



**FIGURE D-3
Fluorene Trends
Selected Wells**





**FIGURE D-3
Fluorene Trends
Selected Wells**

**APPENDIX E
LABORATORY DATA SHEETS
JULY 2018 GROUNDWATER SAMPLING EVENT**

**REMEDIAL INVESTIGATION REPORT
TACOMA COAL GASIFICATION SITE
TACOMA, WASHINGTON**

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10 October 2018

Matt Dalton
Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale, WA 98248

RE: Tacoma Coal Gasification Site

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
18G0332

Associated SDG ID(s)
N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amanda Volgardsen, Project Manager



Chain of Custody Record & Laboratory Analysis Request



Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)
 www.arilabs.com

ARI Assigned Number: 18G0332 Turn-around Requested: MM/PTL

Page: 1 of 1

ARI Client Company: DOF Phone: 206-660-3466

Date: 7/26/18 Ice Present?

Client Contact: MATT DACTON / DAVID COOPER

No. of Coolers: 2 Cooler Temps: 4.4°C & 0.9°C

Client Project Name: TACOMA COAL GASIFICATION SITE

Analysis Requested										Notes/Comments
STEEL	LL PATHS	CYANIDE	TOTAL METALS As, Cu, Hg, Mo, Ni, Pb, Zn	DISS METALS As, Cu, Hg, Pb, Ni, Zn	WTPH-DX					

Client Project #: PAP-001-08ab Samplers: COOPER / E BEAVER

Sample ID	Date	Time	Matrix	No. Containers
MW-24	7/26/18	1030	WATER	11
MW-26		1230		11
MW-28		0930		11
MW-29		1130		11
MW-30		1315		11
HILLSIDE CREEK		1430		3
TRIP BLANK		-		2

Comments/Special Instructions <u>DISSOLVED METALS FIELD FILTERED 0.45um</u>	Relinquished by: (Signature) <u>[Signature]</u>	Received by: (Signature) <u>[Signature]</u>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: <u>EZRA BEAVER</u>	Printed Name: <u>Jasmine Bowman</u>	Printed Name:	Printed Name:
	Company: <u>DOF</u>	Company: <u>ARI</u>	Company:	Company:
	Date & Time: <u>7/27/18 13:00</u>	Date & Time: <u>7/27/18 1300</u>	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-24	18G0332-01	Water	26-Jul-2018 10:30	27-Jul-2018 13:00
MW-24	18G0332-02	Water	26-Jul-2018 10:30	27-Jul-2018 13:00
MW-26	18G0332-03	Water	26-Jul-2018 12:30	27-Jul-2018 13:00
MW-26	18G0332-04	Water	26-Jul-2018 12:30	27-Jul-2018 13:00
MW-28	18G0332-05	Water	26-Jul-2018 09:30	27-Jul-2018 13:00
MW-28	18G0332-06	Water	26-Jul-2018 09:30	27-Jul-2018 13:00
MW-29	18G0332-07	Water	26-Jul-2018 11:30	27-Jul-2018 13:00
MW-29	18G0332-08	Water	26-Jul-2018 11:30	27-Jul-2018 13:00
MW-30	18G0332-09	Water	26-Jul-2018 13:15	27-Jul-2018 13:00
MW-30	18G0332-10	Water	26-Jul-2018 13:15	27-Jul-2018 13:00
Hillside Seep	18G0332-11	Water	26-Jul-2018 14:30	27-Jul-2018 13:00
Trip Blank	18G0332-12	Water	26-Jul-2018 00:00	27-Jul-2018 13:00



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Case Narrative

Sample receipt

Samples as listed on the preceding page were received July 27, 2018 under ARI work order 18G0332. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limits.

The LCS/LCSD percent recoveries and RPD were within control limits.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270D-SIM

The samples were extracted and analyzed within the recommended holding times.

All of the samples were reanalyzed at dilutions due to various compounds exceeding the upper calibration limits. The low level method is not recommended for these samples. All of the initial runs have been flagged with "E" qualifiers. No further corrective action was taken.

Initial calibrations were within method requirements.

The initial calibration verification (ICV) for NT 11 on 8/7/18 is outside of control limits high for the surrogate Dibenzo(a,h)anthracene. Associated samples and QC have been flagged with a "Q" qualifier. All other continuing calibrations were within method requirements. No further corrective action was taken.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limits.

The LCS results were within control limits, with the exception of the five target compounds high of the limits. Results were reviewed and found to be correct. Investigation attributed to the outliers to contact with an EPH spike solution in the preparation lab. As the contact would not impact the samples or blanks, and sample results were higher than recommended for the low level method, the outliers have been flagged and no further corrective action was taken.



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The samples were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limits.

The LCS percent recoveries were within control limits.

Total and Dissolved Metals - EPA Method 6020A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The total method blank has Antimony detected below the reporting limit, but above the method detection limit. The Antimony was flagged with a "J" qualifier on the method blank. There were no target metals detected in the method blanks above the reporting limits. No further corrective action was taken.

The LCS percent recoveries were within control limits.

Total and Dissolved Hg - EPA Method 7470A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The LCS percent recoveries were within control limits.

A dissolved matrix spike and duplicate were prepared in conjunction with sample MW -24. The matrix spike percent recovery and duplicate RPD were within QC limits.

Wet Chemistry (Cyanide, TSS)

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

The method blanks were clean at the reporting limits.

The LCS percent recoveries were within control limits.

A TSS duplicate was prepared in conjunction with sample MW-24. The duplicate RPD was within QC limits.

Total and Dissolved Low Level Hg - EPA Method 7470A

The low level analysis was added October 3, 2018 outside of the 28 day recommended holding time. The LL Hg has been flagged with "H" qualifiers.

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The LCS percent recoveries were within control limits.

A dissolved matrix spike and duplicate were prepared in conjunction with sample MW-24. The matrix spike percent recovery and duplicate RPD were within QC limits.



WORK ORDER

18G0332

Client: Dalton, Olmsted & Fuglevand, Inc

Project Manager: Amanda Volgardsen

Project: Tacoma Coal Gasification Site

Project Number: PAP-001-08ab

Preservation Confirmation

Container ID	Container Type	pH
18G0332-01 A	Large OJ, 1000 mL	
18G0332-01 B	HDPE NM, 500 mL, 1:1 HNO3	< 2 pass
18G0332-01 C	Small OJ, 500 mL, NaOH	> 12 pass
18G0332-01 D	Glass NM, Amber, 500 mL	
18G0332-01 E	Glass NM, Amber, 500 mL	
18G0332-01 F	Glass NM, Amber, 500 mL	
18G0332-01 G	Glass NM, Amber, 500 mL	
18G0332-01 H	VOA Vial, Clear, 40 mL, HCL	Bubble
18G0332-01 I	VOA Vial, Clear, 40 mL, HCL	
18G0332-01 J	VOA Vial, Clear, 40 mL, HCL	Bubble
18G0332-02 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	< 2 pass
18G0332-03 A	Large OJ, 1000 mL	
18G0332-03 B	HDPE NM, 500 mL, 1:1 HNO3	< 2 pass
18G0332-03 C	Small OJ, 500 mL, NaOH	> 12 pass
18G0332-03 D	Glass NM, Amber, 500 mL	
18G0332-03 E	Glass NM, Amber, 500 mL	
18G0332-03 F	Glass NM, Amber, 500 mL	
18G0332-03 G	Glass NM, Amber, 500 mL	
18G0332-03 H	VOA Vial, Clear, 40 mL, HCL	
18G0332-03 I	VOA Vial, Clear, 40 mL, HCL	Bubble
18G0332-03 J	VOA Vial, Clear, 40 mL, HCL	
18G0332-04 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	< 2 pass
18G0332-05 A	Large OJ, 1000 mL	
18G0332-05 B	HDPE NM, 500 mL, 1:1 HNO3	< 2 pass
18G0332-05 C	Small OJ, 500 mL, NaOH	> 12 pass
18G0332-05 D	Glass NM, Amber, 500 mL	
18G0332-05 E	Glass NM, Amber, 500 mL	
18G0332-05 F	Glass NM, Amber, 500 mL	
18G0332-05 G	Glass NM, Amber, 500 mL	
18G0332-05 H	VOA Vial, Clear, 40 mL, HCL	
18G0332-05 I	VOA Vial, Clear, 40 mL, HCL	
18G0332-05 J	VOA Vial, Clear, 40 mL, HCL	
18G0332-06 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	< 2 pass
18G0332-07 A	Large OJ, 1000 mL	
18G0332-07 B	HDPE NM, 500 mL, 1:1 HNO3	< 2 pass



WORK ORDER

18G0332

Client: Dalton, Olmsted & Fuglevand, Inc	Project Manager: Amanda Volgardsen
Project: Tacoma Coal Gasification Site	Project Number: PAP-001-08ab

18G0332-07 C	Small OJ, 500 mL, NaOH	> 12 pass
18G0332-07 D	Glass NM, Amber, 500 mL	
18G0332-07 E	Glass NM, Amber, 500 mL	
18G0332-07 F	Glass NM, Amber, 500 mL	
18G0332-07 G	Glass NM, Amber, 500 mL	
18G0332-07 H	VOA Vial, Clear, 40 mL, HCL	Bubble
18G0332-07 I	VOA Vial, Clear, 40 mL, HCL	
18G0332-07 J	VOA Vial, Clear, 40 mL, HCL	
18G0332-08 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	< 2 pass
18G0332-09 A	Large OJ, 1000 mL	
18G0332-09 B	HDPE NM, 500 mL, 1:1 HNO3	< 2 pass
18G0332-09 C	Small OJ, 500 mL, NaOH	> 12 pass
18G0332-09 D	Glass NM, Amber, 500 mL	
18G0332-09 E	Glass NM, Amber, 500 mL	
18G0332-09 F	Glass NM, Amber, 500 mL	
18G0332-09 G	Glass NM, Amber, 500 mL	
18G0332-09 H	VOA Vial, Clear, 40 mL, HCL	
18G0332-09 I	VOA Vial, Clear, 40 mL, HCL	
18G0332-09 J	VOA Vial, Clear, 40 mL, HCL	
18G0332-10 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	< 2 pass
18G0332-11 A	VOA Vial, Clear, 40 mL, HCL	
18G0332-11 B	VOA Vial, Clear, 40 mL, HCL	
18G0332-11 C	VOA Vial, Clear, 40 mL, HCL	
18G0332-12 A	VOA Vial, Clear, 40 mL, HCL	
18G0332-12 B	VOA Vial, Clear, 40 mL, HCL	

Preservation Confirmed By _____

Date _____

Reviewed By _____

Date _____



Cooler Receipt Form

ARI Client: PDF

Project Name: _____

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 19G0332

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES NO

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 4.4°C 0.9°C

Time: 1300

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D005206

Cooler Accepted by: JTB Date: 7/27/18 Time: 1300

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA YES NO

Were all bottles sealed in individual plastic bags? YES NO

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES NO

Were all VOC vials free of air bubbles? NA YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI: NA 7/25/18

Was Sample Split by ARI : NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: JTB Date: 7/27/18 Time: 1520

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

Voa vials have bbbbles, will list which vials have bubbles on pres sheet.

By: JTB Date: 7/27/18

			Small → "sm" (< 2 mm) Peabubbles → "pb" (2 to < 4 mm) Large → "lg" (4 to < 6 mm) Headspace → "hs" (> 6 mm)
--	--	--	---



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-24
18G0332-01 (Water)

Metals and Metallic Compounds

Method: EPA 6020A

Sampled: 07/26/2018 10:30

Instrument: ICPMS2

Analyzed: 01-Aug-2018 15:32

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGG0723 Sample Size: 25 mL
Prepared: 30-Jul-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	1	0.0180	0.200	0.0560	ug/L	J
Lead	7439-92-1	1	0.0680	0.100	ND	ug/L	U
Silver	7440-22-4	1	0.0170	0.200	ND	ug/L	U



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Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-24
18G0332-01 (Water)

Metals and Metallic Compounds

Method: EPA 6020A UCT-KED

Sampled: 07/26/2018 10:30

Instrument: ICPMS2

Analyzed: 30-Jul-2018 19:40

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGG0723 Sample Size: 25 mL
Prepared: 30-Jul-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0220	0.200	0.330	ug/L	
Copper	7440-50-8	1	0.340	0.500	ND	ug/L	U
Nickel	7440-02-0	1	0.0500	0.500	0.284	ug/L	J
Zinc	7440-66-6	1	0.820	4.00	1.84	ug/L	J



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-24
18G0332-01 (Water)

Metals and Metallic Compounds

Method: EPA 7470A Sampled: 07/26/2018 10:30
Instrument: CVAA Analyzed: 30-Jul-2018 09:21

Sample Preparation: Preparation Method: TWM EPA 7470A
Preparation Batch: BGG0726 Sample Size: 20 mL
Prepared: 30-Jul-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000100	ND	mg/L	U

Sample Preparation: Preparation Method: TLM EPA 7470A low level
Preparation Batch: BGJ0338 Sample Size: 20 mL
Prepared: 10-Oct-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000020	ND	mg/L	H, U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-24
18G0332-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 07/26/2018 10:30

Instrument: NT3

Analyzed: 30-Jul-2018 14:41

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGG0743 Sample Size: 10 mL
Prepared: 30-Jul-2018 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.20	37.2	ug/L	
Toluene	108-88-3	1	0.20	0.28	ug/L	
Ethylbenzene	100-41-4	1	0.20	1.07	ug/L	
m,p-Xylene	179601-23-1	1	0.40	1.91	ug/L	
o-Xylene	95-47-6	1	0.20	2.82	ug/L	
<i>Surrogate: Toluene-d8</i>			80-120 %	101	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	104	%	



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Reported:
10-Oct-2018 15:25

MW-24
18G0332-01 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM

Sampled: 07/26/2018 10:30

Instrument: NT11

Analyzed: 07-Aug-2018 14:07

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0753 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel
Cleanup Batch: CGG0222 Initial Volume: 0.5 mL
Cleaned: 31-Jul-2018 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	50	0.500	1.18	ug/L	D
2-Methylnaphthalene	91-57-6	50	0.500	11.2	ug/L	D
1-Methylnaphthalene	90-12-0	50	0.500	82.8	ug/L	D, E
Acenaphthylene	208-96-8	50	0.500	0.552	ug/L	D
Acenaphthene	83-32-9	50	0.500	140	ug/L	D, E
Dibenzofuran	132-64-9	50	0.500	4.69	ug/L	D
Fluorene	86-73-7	50	0.500	81.3	ug/L	D, E
Phenanthrene	85-01-8	50	0.500	34.3	ug/L	D
Anthracene	120-12-7	50	0.500	2.43	ug/L	D
Fluoranthene	206-44-0	50	0.500	0.693	ug/L	D
Pyrene	129-00-0	50	0.500	ND	ug/L	U
Benzo(a)anthracene	56-55-3	50	0.500	ND	ug/L	U
Chrysene	218-01-9	50	0.500	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	50	0.500	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	50	0.500	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	50	0.500	ND	ug/L	U
Benzofluoranthenes, Total		50	0.500	ND	ug/L	U
Benzo(a)pyrene	50-32-8	50	0.500	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	50	0.500	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	50	0.500	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	50	0.500	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10			42-120 %	71.4	%	
Surrogate: Dibenzo[a,h]anthracene-d14			29-120 %	77.0	%	Q
Surrogate: Fluoranthene-d10			57-120 %	80.7	%	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-24
18G0332-01 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 07/26/2018 10:30

Instrument: FID3

Analyzed: 01-Aug-2018 16:11

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0764 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.100	1.54	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)		1	0.200	ND	mg/L	U
Surrogate: <i>o</i> -Terphenyl			50-150 %	81.6	%	

Data File: \\target\share\chem2\fid3b,1\20180801_b\318H0124.D

Date: 01-AUG-2018 16:11

Client ID:

Sample Info: 18G0332-01

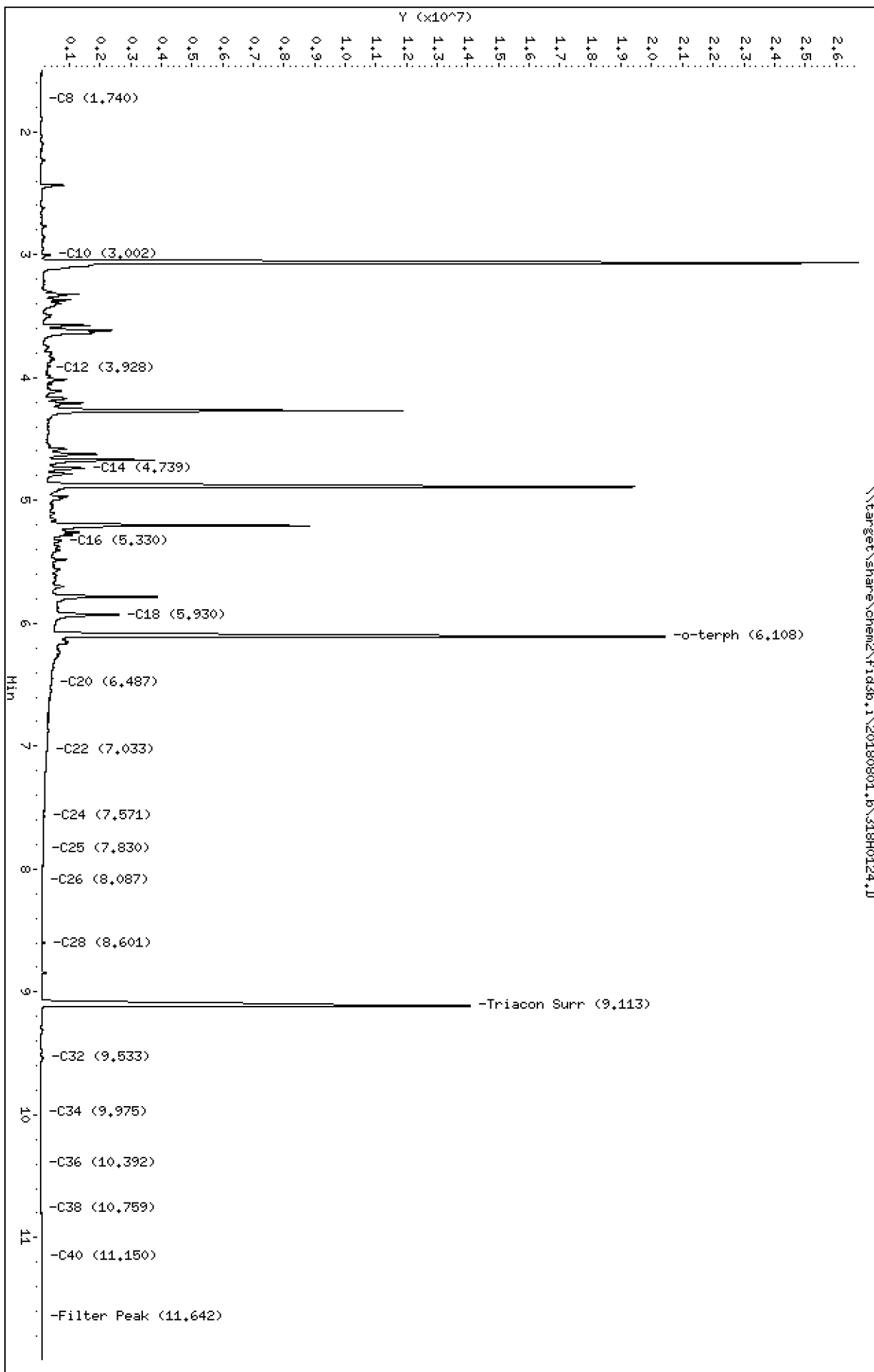
Instrument: fid3b,1

Operator: JGR

Column diameter: 0.25

Column phase: RTX-1

\\target\share\chem2\fid3b,1\20180801_b\318H0124.D



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20180801.b/318H0124.D
Method: 20180801.b\FID3TPH.m
Instrument: fid3b.i
Operator: JGR
Report Date: 08/02/2018
Macro: FID3_072018

ARI ID: 18G0332-01
Client ID:
Injection: 01-AUG-2018 16:11
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc(mg per L)
Toluene	1.542	0.017	25286	51396	WATPHG	(Tol-C12)	51945342	289.5
C8	1.740	-0.018	9879	12654	WATPHD	(C12-C24)	132574775	771.5
C10	3.002	0.022	316881	374672	WATPHM	(C24-C38)	5038455	34.4
C12	3.928	-0.007	239548	437772	AK102	(C10-C25)	182475291	898.9 M
C14	4.739	0.027	1441655	2280761	AK103	(C25-C36)	3880667	36.8
C16	5.330	-0.022	686348	1455549	OR.DIES	(C10-C28)	184806727	906.4 M
C18	5.930	-0.009	2566350	5919185				
C20	6.487	-0.004	368460	1052571				
C22	7.033	-0.005	203612	312178				
C24	7.571	-0.008	112750	289457				
C25	7.830	-0.014	80252	121382	KEROSEN	(Tol-C18)	157024733	668.8
C26	8.087	-0.017	59402	95993				
C28	8.601	-0.005	115959	162091	IT.DIES	(C10-C24)	181544896	896.3
C32	9.533	-0.003	83616	234129				
C34	9.975	0.011	17754	37699				
Filter Peak	11.642	-0.059	34027	249001				
C36	10.392	0.017	21606	105689	BUNKERC	(C10-C38)	186583351	3017.1
o-terph	6.108	0.002	19722213	21438983				
Triacon Surr	9.113	-0.001	14022056	20145107				

Range Times: NW Diesel(3.985 - 7.628) NW Gas(1.476 - 3.985) NW M.Oil(7.628 - 10.821)
AK102(2.929 - 7.794) AK103(7.794 - 10.424) Jet A(2.929 - 5.989)

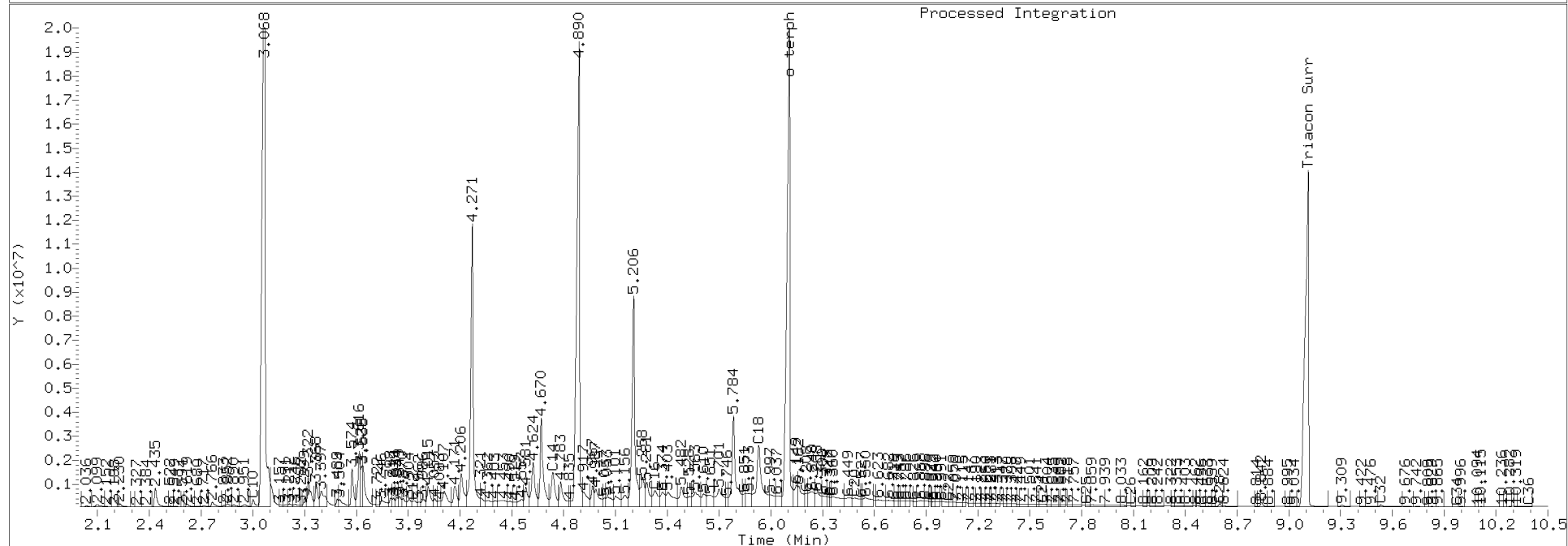
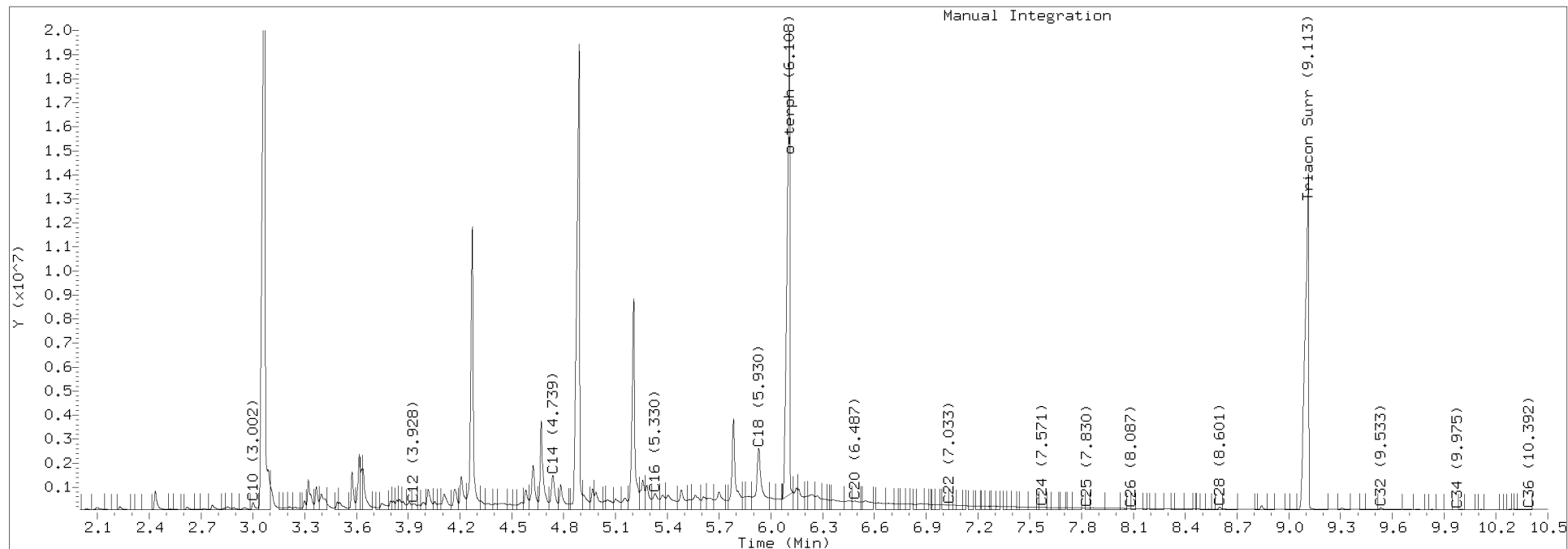
Surrogate	Area	Amount
o-Terphenyl	21438983	91.8
Triacontane	20145107	102.9

Analyte	RF	Curve Date
o-Terph Surr	233493.9	25-MAY-2018
Triacon Surr	195771.2	25-MAY-2018
Gas	179445.5	xx-xx-xxxx
Diesel	171841.0	25-MAY-2018
Motor Oil	146298.0	25-MAY-2018
AK102	203004.0	25-MAY-2018
AK103	105393.0	05-JUN-2018
Kerosene	234790.8	07-JUN-2018
OR Diesel	203892.0	25-MAY-2018
IT Diesel	202556.0	25-MAY-2018
Bunker C	61842.2	20-JUL-2018

TPH Manual Integrations Report

Datafile: FID3B, 20180801.b/318H0124.D Injection: 01-AUG-2018 16:11

Lab ID:18G0332-01





Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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MW-24
18G0332-01 (Water)

Wet Chemistry

Method: SM 2540 D-97 Sampled: 07/26/2018 10:30
Instrument: BAL2 Analyzed: 30-Jul-2018 06:44

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGG0728 Sample Size: 440 mL
Prepared: 30-Jul-2018 Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	2	2	23	mg/L	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-24
18G0332-01 (Water)

Wet Chemistry

Method: SM 4500-CN⁻ E-99

Sampled: 07/26/2018 10:30

Instrument: UV1800-2

Analyzed: 30-Jul-2018 15:05

Sample Preparation:

Preparation Method: No Prep - Volatiles

Preparation Batch: BGG0737

Prepared: 30-Jul-2018

Sample Size: 50 mL

Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Cyanide, Total	57-12-5	1	0.0050	0.0050	0.0250	mg/L	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-24
18G0332-01RE1 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM

Sampled: 07/26/2018 10:30

Instrument: NT11

Analyzed: 07-Aug-2018 14:57

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0753 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel
Cleanup Batch: CGG0222 Initial Volume: 0.5 mL
Cleaned: 31-Jul-2018 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	250	2.50	ND	ug/L	U
2-Methylnaphthalene	91-57-6	250	2.50	10.2	ug/L	D
1-Methylnaphthalene	90-12-0	250	2.50	87.7	ug/L	D
Acenaphthylene	208-96-8	250	2.50	ND	ug/L	U
Acenaphthene	83-32-9	250	2.50	162	ug/L	D
Dibenzofuran	132-64-9	250	2.50	4.34	ug/L	D
Fluorene	86-73-7	250	2.50	82.1	ug/L	D
Phenanthrene	85-01-8	250	2.50	33.3	ug/L	D
Anthracene	120-12-7	250	2.50	2.88	ug/L	D
Fluoranthene	206-44-0	250	2.50	ND	ug/L	U
Pyrene	129-00-0	250	2.50	ND	ug/L	U
Benzo(a)anthracene	56-55-3	250	2.50	ND	ug/L	U
Chrysene	218-01-9	250	2.50	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	250	2.50	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	250	2.50	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	250	2.50	ND	ug/L	U
Benzofluoranthenes, Total		250	2.50	ND	ug/L	U
Benzo(a)pyrene	50-32-8	250	2.50	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	250	2.50	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	250	2.50	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	250	2.50	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10			42-120 %		D1	D1
Surrogate: Dibenz[a,h]anthracene-d14			29-120 %		D1	D1
Surrogate: Fluoranthene-d10			57-120 %		D1	D1



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-24
18G0332-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A Sampled: 07/26/2018 10:30
Instrument: ICPMS1 Analyzed: 03-Aug-2018 14:34

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony, Dissolved	7440-36-0	1	0.0180	0.200	ND	ug/L	U

Instrument: ICPMS2 Analyzed: 02-Aug-2018 19:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead, Dissolved	7439-92-1	1	0.0680	0.100	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0170	0.200	ND	ug/L	U



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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MW-24
18G0332-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED Sampled: 07/26/2018 10:30
Instrument: ICPMS2 Analyzed: 02-Aug-2018 19:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0220	0.200	0.276	ug/L	
Copper, Dissolved	7440-50-8	1	0.340	0.500	0.544	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0500	0.500	0.206	ug/L	J
Zinc, Dissolved	7440-66-6	1	0.820	4.00	1.16	ug/L	J



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-24
18G0332-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A Sampled: 07/26/2018 10:30
Instrument: CVAA Analyzed: 30-Jul-2018 09:46

Sample Preparation: Preparation Method: TWM EPA 7470A
Preparation Batch: BGG0727 Sample Size: 20 mL
Prepared: 30-Jul-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000100	ND	mg/L	U

Sample Preparation: Preparation Method: TLM EPA 7470A low level
Preparation Batch: BGJ0340 Sample Size: 20 mL
Prepared: 10-Oct-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000020	ND	mg/L	H, U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-26
18G0332-03 (Water)

Metals and Metallic Compounds

Method: EPA 6020A

Sampled: 07/26/2018 12:30

Instrument: ICPMS2

Analyzed: 01-Aug-2018 15:38

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGG0723 Sample Size: 25 mL
Prepared: 30-Jul-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	1	0.0180	0.200	0.0510	ug/L	J
Lead	7439-92-1	1	0.0680	0.100	0.0730	ug/L	J
Silver	7440-22-4	1	0.0170	0.200	ND	ug/L	U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-26
18G0332-03 (Water)

Metals and Metallic Compounds

Method: EPA 6020A UCT-KED

Sampled: 07/26/2018 12:30

Instrument: ICPMS2

Analyzed: 30-Jul-2018 19:44

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGG0723 Sample Size: 25 mL
Prepared: 30-Jul-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0220	0.200	0.259	ug/L	
Copper	7440-50-8	1	0.340	0.500	ND	ug/L	U
Nickel	7440-02-0	1	0.0500	0.500	0.293	ug/L	J
Zinc	7440-66-6	1	0.820	4.00	2.75	ug/L	J



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-26
18G0332-03 (Water)

Metals and Metallic Compounds

Method: EPA 7470A Sampled: 07/26/2018 12:30
Instrument: CVAA Analyzed: 30-Jul-2018 09:23

Sample Preparation: Preparation Method: TWM EPA 7470A
Preparation Batch: BGG0726 Sample Size: 20 mL
Prepared: 30-Jul-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000100	ND	mg/L	U

Sample Preparation: Preparation Method: TLM EPA 7470A low level
Preparation Batch: BGJ0338 Sample Size: 20 mL
Prepared: 10-Oct-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000020	ND	mg/L	H, U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-26
18G0332-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 07/26/2018 12:30

Instrument: NT3

Analyzed: 30-Jul-2018 15:07

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGG0743 Sample Size: 10 mL
Prepared: 30-Jul-2018 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.20	48.8	ug/L	
Toluene	108-88-3	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	0.29	ug/L	
m,p-Xylene	179601-23-1	1	0.40	4.12	ug/L	
o-Xylene	95-47-6	1	0.20	1.27	ug/L	
<i>Surrogate: Toluene-d8</i>			80-120 %	100	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	97.9	%	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-26
18G0332-03 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM

Sampled: 07/26/2018 12:30

Instrument: NT11

Analyzed: 08-Aug-2018 16:22

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0753 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel
Cleanup Batch: CGG0222 Initial Volume: 0.5 mL
Cleaned: 31-Jul-2018 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	5	0.050	3.71	ug/L	D
2-Methylnaphthalene	91-57-6	5	0.050	0.592	ug/L	D
1-Methylnaphthalene	90-12-0	5	0.050	5.73	ug/L	D, E
Acenaphthylene	208-96-8	5	0.050	0.076	ug/L	D
Acenaphthene	83-32-9	5	0.050	5.99	ug/L	D, E
Dibenzofuran	132-64-9	5	0.050	1.26	ug/L	D
Fluorene	86-73-7	5	0.050	1.93	ug/L	D
Phenanthrene	85-01-8	5	0.050	1.97	ug/L	D
Anthracene	120-12-7	5	0.050	0.229	ug/L	D
Fluoranthene	206-44-0	5	0.050	0.221	ug/L	D
Pyrene	129-00-0	5	0.050	0.157	ug/L	D
Benzo(a)anthracene	56-55-3	5	0.050	ND	ug/L	U
Chrysene	218-01-9	5	0.050	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	5	0.050	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	5	0.050	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	5	0.050	ND	ug/L	U
Benzofluoranthenes, Total		5	0.050	ND	ug/L	U
Benzo(a)pyrene	50-32-8	5	0.050	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	5	0.050	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	5	0.050	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	5	0.050	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10			42-120 %	72.5	%	
Surrogate: Dibenzo[a,h]anthracene-d14			29-120 %	78.5	%	
Surrogate: Fluoranthene-d10			57-120 %	83.2	%	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-26
18G0332-03 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 07/26/2018 12:30

Instrument: FID3

Analyzed: 01-Aug-2018 16:31

Sample Preparation:

Preparation Method: EPA 3510C SepF

Preparation Batch: BGG0764

Sample Size: 500 mL

Prepared: 31-Jul-2018

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.100	0.684	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)		1	0.200	ND	mg/L	U
Surrogate: <i>o</i> -Terphenyl			50-150 %	81.0	%	

Data File: \\target\share\chem2\fid3b,1\20180801_b\318H0125.D

Date: 01-AUG-2018 16:31

Client ID:

Sample Info: 18G0332-03

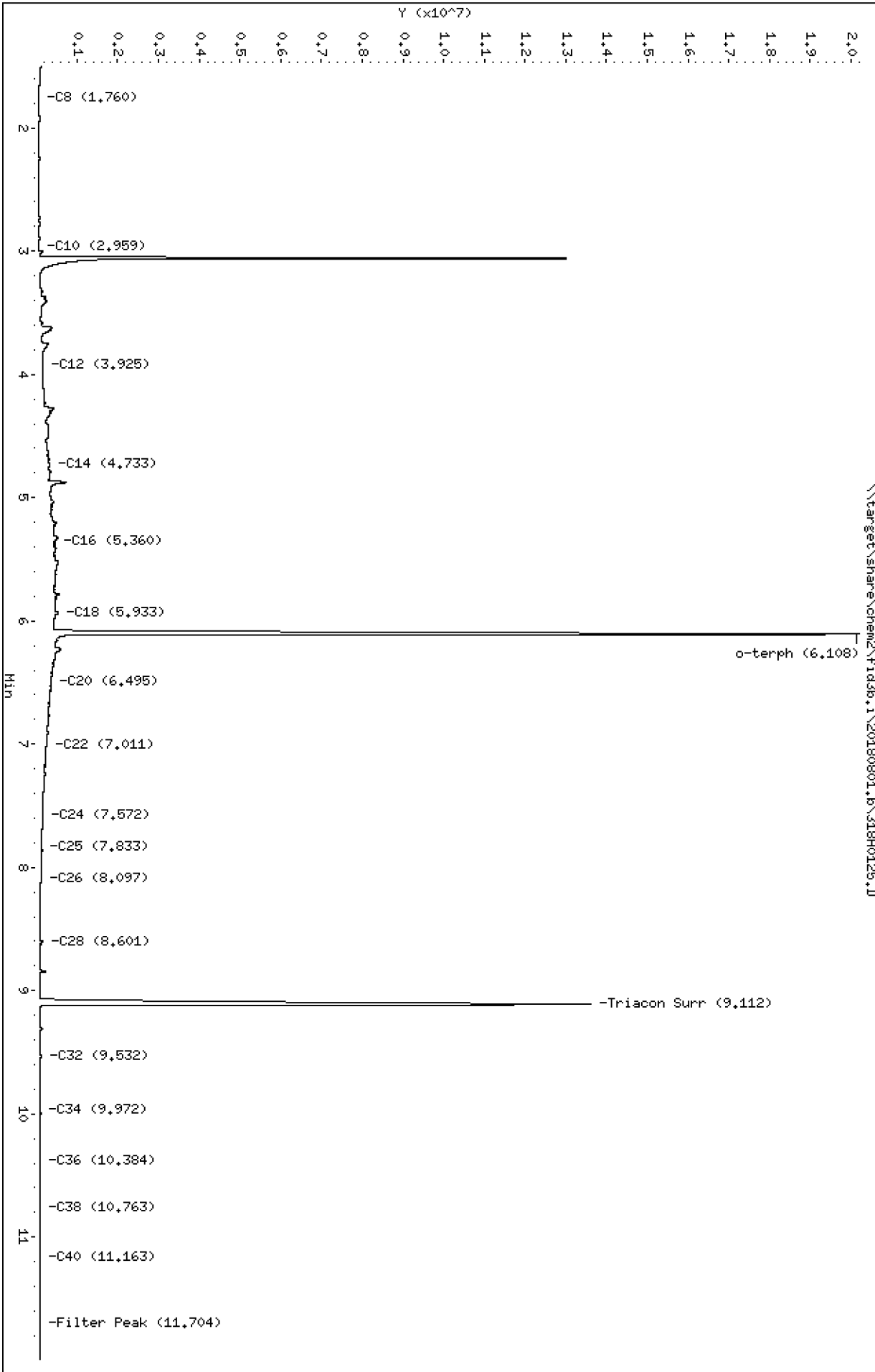
Column phase: RTX-1

Instrument: fid3b,1

Operator: JGR

Column diameter: 0.25

Page 1



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20180801.b/318H0125.D
Method: 20180801.b\FID3TPH.m
Instrument: fid3b.i
Operator: JGR
Report Date: 08/02/2018
Macro: FID3_072018

ARI ID: 18G0332-03
Client ID:
Injection: 01-AUG-2018 16:31
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc(mg per L)
Toluene	1.558	0.032	32219	71027	WATPHG	(Tol-C12)	17891036	99.7
C8	1.760	0.003	7977	9622	WATPHD	(C12-C24)	58746754	341.9
C10	2.959	-0.021	11126	27862	WATPHM	(C24-C38)	4865322	33.3
C12	3.925	-0.011	94581	288703	AK102	(C10-C25)	76585089	377.3 M
C14	4.733	0.022	280204	826798	AK103	(C25-C36)	3774761	35.8
C16	5.360	0.009	392656	272338	OR.DIES	(C10-C28)	78509122	385.1 M
C18	5.933	-0.006	483523	1541532				
C20	6.495	0.003	307296	563862				
C22	7.011	-0.027	186983	562414				
C24	7.572	-0.006	102207	365631				
C25	7.833	-0.011	74158	96761	KEROSEN	(Tol-C18)	54097119	230.4
C26	8.097	-0.007	53265	169355				
C28	8.601	-0.005	104456	147488	IT.DIES	(C10-C24)	75881741	374.6
C32	9.532	-0.004	83870	212137				
C34	9.972	0.008	19726	10577				
Filter Peak	11.704	0.004	31342	208065				
C36	10.384	0.010	21340	62991	BUNKERC	(C10-C38)	80747063	1305.7
o-terph	6.108	0.002	19764712	21270924				
Triacon Surr	9.112	-0.002	13557039	19077553				

Range Times: NW Diesel(3.985 - 7.628) NW Gas(1.476 - 3.985) NW M.Oil(7.628 - 10.821)
AK102(2.929 - 7.794) AK103(7.794 - 10.424) Jet A(2.929 - 5.989)

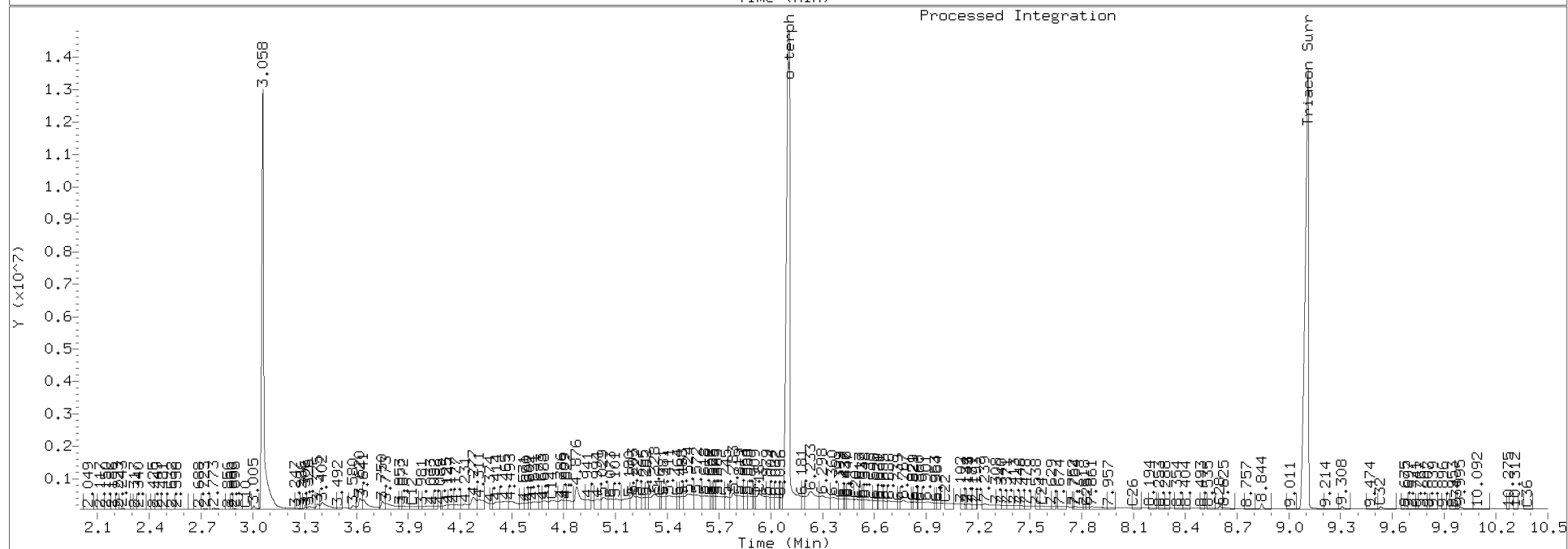
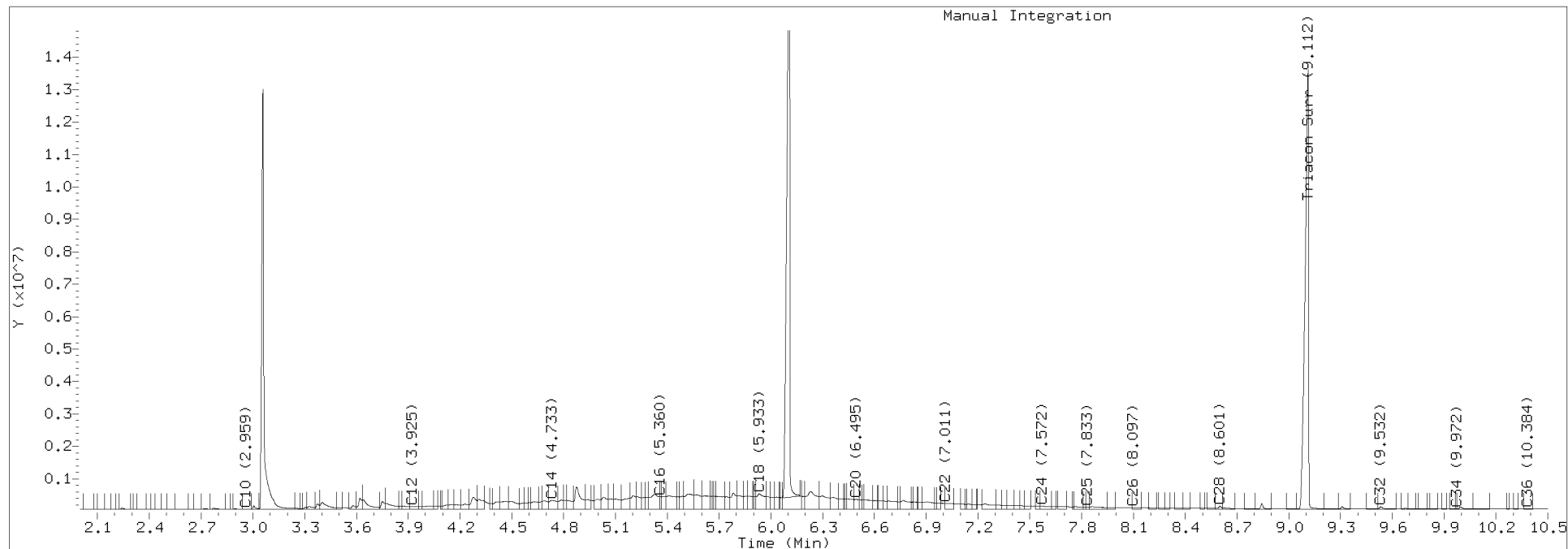
Surrogate	Area	Amount
o-Terphenyl	21270924	91.1
Triacontane	19077553	97.4

Analyte	RF	Curve Date
o-Terph Surr	233493.9	25-MAY-2018
Triacon Surr	195771.2	25-MAY-2018
Gas	179445.5	xx-xx-xxxx
Diesel	171841.0	25-MAY-2018
Motor Oil	146298.0	25-MAY-2018
AK102	203004.0	25-MAY-2018
AK103	105393.0	05-JUN-2018
Kerosene	234790.8	07-JUN-2018
OR Diesel	203892.0	25-MAY-2018
IT Diesel	202556.0	25-MAY-2018
Bunker C	61842.2	20-JUL-2018

TPH Manual Integrations Report

Datafile: FID3B, 20180801.b/318H0125.D Injection: 01-AUG-2018 16:31

Lab ID:18G0332-03





Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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MW-26
18G0332-03 (Water)

Wet Chemistry

Method: SM 2540 D-97 Sampled: 07/26/2018 12:30
Instrument: BAL2 Analyzed: 30-Jul-2018 06:44

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGG0728 Sample Size: 550 mL
Prepared: 30-Jul-2018 Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	2	2	36	mg/L	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-26
18G0332-03 (Water)

Wet Chemistry

Method: SM 4500-CN⁻ E-99

Sampled: 07/26/2018 12:30

Instrument: UV1800-2

Analyzed: 30-Jul-2018 15:06

Sample Preparation: Preparation Method: No Prep - Volatiles
Preparation Batch: BGG0737 Sample Size: 50 mL
Prepared: 30-Jul-2018 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Cyanide, Total	57-12-5	1	0.0050	0.0050	0.0970	mg/L	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-26
18G0332-03RE1 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM

Sampled: 07/26/2018 12:30

Instrument: NT11

Analyzed: 07-Aug-2018 15:35

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0753 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel
Cleanup Batch: CGG0222 Initial Volume: 0.5 mL
Cleaned: 31-Jul-2018 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	50	0.500	3.33	ug/L	D
2-Methylnaphthalene	91-57-6	50	0.500	0.869	ug/L	D
1-Methylnaphthalene	90-12-0	50	0.500	8.70	ug/L	D
Acenaphthylene	208-96-8	50	0.500	ND	ug/L	U
Acenaphthene	83-32-9	50	0.500	12.1	ug/L	D
Dibenzofuran	132-64-9	50	0.500	1.19	ug/L	D
Fluorene	86-73-7	50	0.500	4.89	ug/L	D
Phenanthrene	85-01-8	50	0.500	2.96	ug/L	D
Anthracene	120-12-7	50	0.500	ND	ug/L	U
Fluoranthene	206-44-0	50	0.500	ND	ug/L	U
Pyrene	129-00-0	50	0.500	ND	ug/L	U
Benzo(a)anthracene	56-55-3	50	0.500	ND	ug/L	U
Chrysene	218-01-9	50	0.500	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	50	0.500	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	50	0.500	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	50	0.500	ND	ug/L	U
Benzofluoranthenes, Total		50	0.500	ND	ug/L	U
Benzo(a)pyrene	50-32-8	50	0.500	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	50	0.500	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	50	0.500	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	50	0.500	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10			42-120 %	60.2	%	
Surrogate: Dibenzo[a,h]anthracene-d14			29-120 %	65.5	%	Q
Surrogate: Fluoranthene-d10			57-120 %	63.5	%	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-26
18G0332-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A Sampled: 07/26/2018 12:30
Instrument: ICPMS1 Analyzed: 03-Aug-2018 14:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony, Dissolved	7440-36-0	1	0.0180	0.200	0.0420	ug/L	J

Instrument: ICPMS2 Analyzed: 02-Aug-2018 19:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead, Dissolved	7439-92-1	1	0.0680	0.100	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0170	0.200	ND	ug/L	U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-26
18G0332-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED

Sampled: 07/26/2018 12:30

Instrument: ICPMS2

Analyzed: 02-Aug-2018 19:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0220	0.200	0.194	ug/L	J
Copper, Dissolved	7440-50-8	1	0.340	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0500	0.500	0.130	ug/L	J
Zinc, Dissolved	7440-66-6	1	0.820	4.00	ND	ug/L	U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-26
18G0332-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A Sampled: 07/26/2018 12:30
Instrument: CVAA Analyzed: 30-Jul-2018 09:53

Sample Preparation: Preparation Method: TWM EPA 7470A
Preparation Batch: BGG0727 Sample Size: 20 mL
Prepared: 30-Jul-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000100	ND	mg/L	U

Sample Preparation: Preparation Method: TLM EPA 7470A low level
Preparation Batch: BGJ0340 Sample Size: 20 mL
Prepared: 10-Oct-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000020	ND	mg/L	H, U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-28
18G0332-05 (Water)

Metals and Metallic Compounds

Method: EPA 6020A

Sampled: 07/26/2018 09:30

Instrument: ICPMS2

Analyzed: 01-Aug-2018 15:42

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGG0723 Sample Size: 25 mL
Prepared: 30-Jul-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	1	0.0180	0.200	ND	ug/L	U
Lead	7439-92-1	1	0.0680	0.100	ND	ug/L	U
Silver	7440-22-4	1	0.0170	0.200	ND	ug/L	U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-28
18G0332-05 (Water)

Metals and Metallic Compounds

Method: EPA 6020A UCT-KED

Sampled: 07/26/2018 09:30

Instrument: ICPMS2

Analyzed: 30-Jul-2018 19:48

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGG0723 Sample Size: 25 mL
Prepared: 30-Jul-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0220	0.200	11.5	ug/L	
Copper	7440-50-8	1	0.340	0.500	ND	ug/L	U
Nickel	7440-02-0	1	0.0500	0.500	0.0620	ug/L	J
Zinc	7440-66-6	1	0.820	4.00	1.87	ug/L	J



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-28
18G0332-05 (Water)

Metals and Metallic Compounds

Method: EPA 7470A Sampled: 07/26/2018 09:30
Instrument: CVAA Analyzed: 30-Jul-2018 09:25

Sample Preparation: Preparation Method: TWM EPA 7470A
Preparation Batch: BGG0726 Sample Size: 20 mL
Prepared: 30-Jul-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000100	ND	mg/L	U

Sample Preparation: Preparation Method: TLM EPA 7470A low level
Preparation Batch: BGJ0338 Sample Size: 20 mL
Prepared: 10-Oct-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000020	ND	mg/L	H, U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-28
18G0332-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 07/26/2018 09:30

Instrument: NT3

Analyzed: 30-Jul-2018 15:33

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGG0743 Sample Size: 10 mL
Prepared: 30-Jul-2018 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.20	0.86	ug/L	
Toluene	108-88-3	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	2.99	ug/L	
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	0.50	ug/L	
<i>Surrogate: Toluene-d8</i>			80-120 %	98.6	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	98.0	%	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-28
18G0332-05 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM

Sampled: 07/26/2018 09:30

Instrument: NT11

Analyzed: 08-Aug-2018 17:00

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0753 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel
Cleanup Batch: CGG0222 Initial Volume: 0.5 mL
Cleaned: 31-Jul-2018 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.010	1.13	ug/L	E
2-Methylnaphthalene	91-57-6	1	0.010	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.010	0.021	ug/L	
Acenaphthylene	208-96-8	1	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.010	0.013	ug/L	
Dibenzofuran	132-64-9	1	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.010	ND	ug/L	U
Anthracene	120-12-7	1	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.010	0.013	ug/L	
Pyrene	129-00-0	1	0.010	0.015	ug/L	
Benzo(a)anthracene	56-55-3	1	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10			42-120 %	72.8	%	
Surrogate: Dibenzo[a,h]anthracene-d14			29-120 %	99.2	%	
Surrogate: Fluoranthene-d10			57-120 %	91.6	%	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-28
18G0332-05 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 07/26/2018 09:30

Instrument: FID3

Analyzed: 01-Aug-2018 16:50

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0764 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)		1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			50-150 %	67.0	%	

Data File: \\target\share\chem2\fid3b.1\20180801_b\318H0126.D

Date: 01-AUG-2018 16:50

Client ID:

Sample Info: 18G0332-05

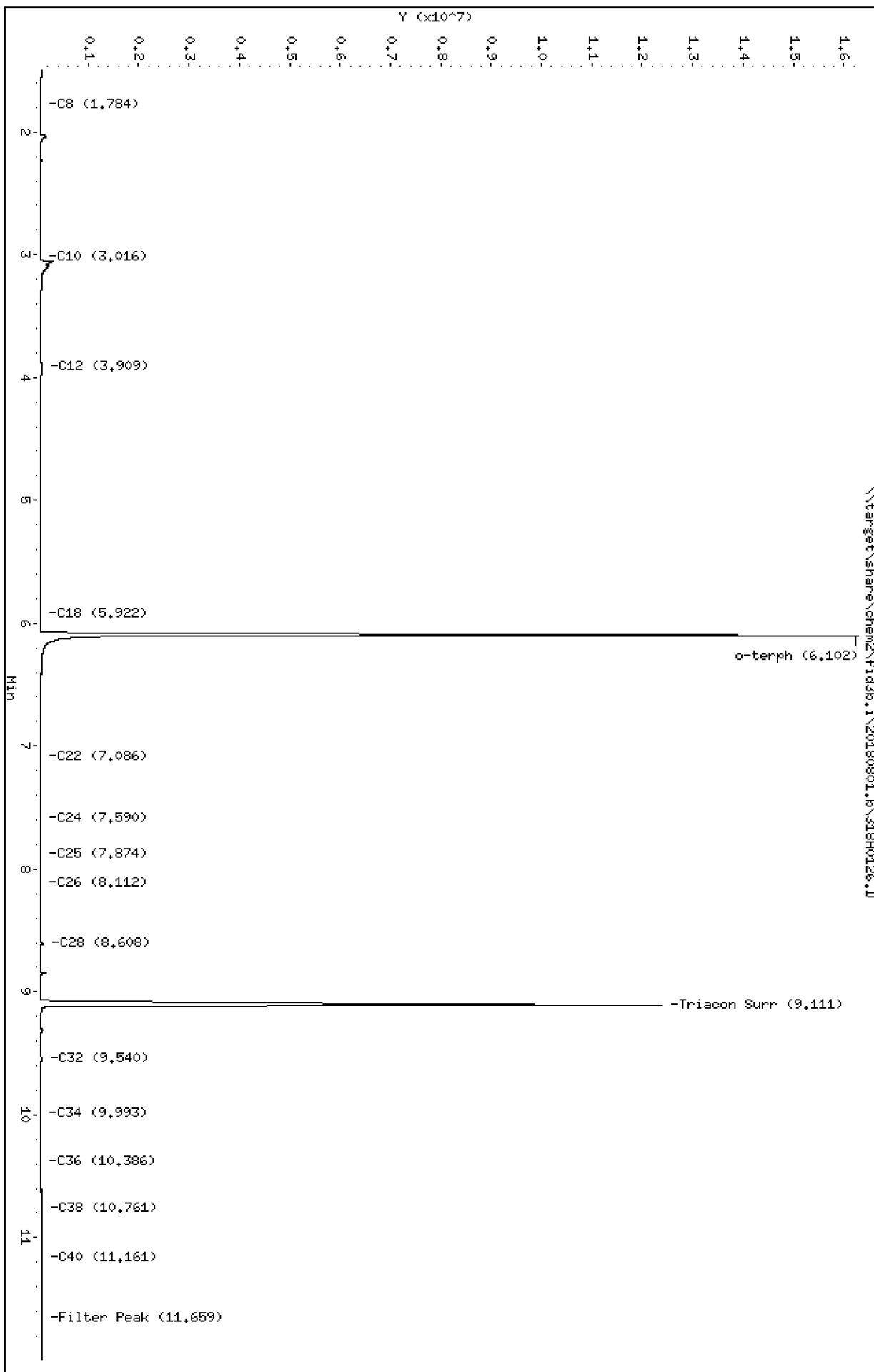
Column phase: RTX-1

Instrument: fid3b.1

Operator: JGR

Column diameter: 0.25

Page 1



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20180801.b/318H0126.D
Method: 20180801.b\FID3TPH.m
Instrument: fid3b.i
Operator: JGR
Report Date: 08/02/2018
Macro: FID3_072018

ARI ID: 18G0332-05
Client ID:
Injection: 01-AUG-2018 16:50
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc(mg per L)
Toluene	----				WATPHG	(Tol-C12)	1466316	8.2
C8	1.784	0.026	4721	11475	WATPHD	(C12-C24)	71248	0.4
C10	3.016	0.036	3167	7232	WATPHM	(C24-C38)	724272	5.0
C12	3.909	-0.026	16028	67906	AK102	(C10-C25)	1214585	6.0
C14	----				AK103	(C25-C36)	560097	5.3
C16	----				OR.DIES	(C10-C28)	1330411	6.5
C18	5.922	-0.017	1499	1445				
C20	----							
C22	7.086	0.048	1645	1326				
C24	7.590	0.012	2338	3167				
C25	7.874	0.030	4781	17397	KEROSEN	(Tol-C18)	1481165	6.3
C26	8.112	0.008	1560	1590				
C28	8.608	0.002	52326	72319	IT.DIES	(C10-C24)	1212345	6.0
C32	9.540	0.004	38002	93998				
C34	9.993	0.029	6542	6089				
Filter Peak	11.659	-0.041	30940	178323				
C36	10.386	0.012	11763	25431	BUNKERC	(C10-C38)	1936617	31.3
o-terph	6.102	-0.004	16241028	17614350				
Triacon Surr	9.111	-0.003	12353684	16147314				

Range Times: NW Diesel(3.985 - 7.628) NW Gas(1.476 - 3.985) NW M.Oil(7.628 - 10.821)
AK102(2.929 - 7.794) AK103(7.794 - 10.424) Jet A(2.929 - 5.989)

Surrogate	Area	Amount
o-Terphenyl	17614350	75.4
Triacontane	16147314	82.5

Analyte	RF	Curve Date
o-Terph Surr	233493.9	25-MAY-2018
Triacon Surr	195771.2	25-MAY-2018
Gas	179445.5	xx-xx-xxxx
Diesel	171841.0	25-MAY-2018
Motor Oil	146298.0	25-MAY-2018
AK102	203004.0	25-MAY-2018
AK103	105393.0	05-JUN-2018
Kerosene	234790.8	07-JUN-2018
OR Diesel	203892.0	25-MAY-2018
IT Diesel	202556.0	25-MAY-2018
Bunker C	61842.2	20-JUL-2018



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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MW-28
18G0332-05 (Water)

Wet Chemistry

Method: SM 2540 D-97 Sampled: 07/26/2018 09:30
Instrument: BAL2 Analyzed: 30-Jul-2018 06:44

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGG0728 Sample Size: 910 mL
Prepared: 30-Jul-2018 Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	1	1	ND	mg/L	U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-28
18G0332-05 (Water)

Wet Chemistry

Method: SM 4500-CN⁻ E-99

Sampled: 07/26/2018 09:30

Instrument: UV1800-2

Analyzed: 30-Jul-2018 15:06

Sample Preparation:

Preparation Method: No Prep - Volatiles

Preparation Batch: BGG0737

Prepared: 30-Jul-2018

Sample Size: 50 mL

Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Cyanide, Total	57-12-5	1	0.0050	0.0050	ND	mg/L	U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-28
18G0332-05RE1 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM

Sampled: 07/26/2018 09:30

Instrument: NT11

Analyzed: 08-Aug-2018 17:38

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0753 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel
Cleanup Batch: CGG0222 Initial Volume: 0.5 mL
Cleaned: 31-Jul-2018 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	5	0.050	1.23	ug/L	D
2-Methylnaphthalene	91-57-6	5	0.050	ND	ug/L	U
1-Methylnaphthalene	90-12-0	5	0.050	ND	ug/L	U
Acenaphthylene	208-96-8	5	0.050	ND	ug/L	U
Acenaphthene	83-32-9	5	0.050	ND	ug/L	U
Dibenzofuran	132-64-9	5	0.050	ND	ug/L	U
Fluorene	86-73-7	5	0.050	ND	ug/L	U
Phenanthrene	85-01-8	5	0.050	ND	ug/L	U
Anthracene	120-12-7	5	0.050	ND	ug/L	U
Fluoranthene	206-44-0	5	0.050	ND	ug/L	U
Pyrene	129-00-0	5	0.050	ND	ug/L	U
Benzo(a)anthracene	56-55-3	5	0.050	ND	ug/L	U
Chrysene	218-01-9	5	0.050	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	5	0.050	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	5	0.050	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	5	0.050	ND	ug/L	U
Benzofluoranthenes, Total		5	0.050	ND	ug/L	U
Benzo(a)pyrene	50-32-8	5	0.050	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	5	0.050	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	5	0.050	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	5	0.050	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10			42-120 %	71.0	%	
Surrogate: Dibenzo[a,h]anthracene-d14			29-120 %	75.9	%	
Surrogate: Fluoranthene-d10			57-120 %	78.7	%	



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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MW-28
18G0332-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A Sampled: 07/26/2018 09:30
Instrument: ICPMS1 Analyzed: 03-Aug-2018 14:57

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony, Dissolved	7440-36-0	1	0.0180	0.200	ND	ug/L	U

Instrument: ICPMS2 Analyzed: 02-Aug-2018 19:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead, Dissolved	7439-92-1	1	0.0680	0.100	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0170	0.200	ND	ug/L	U



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MW-28
18G0332-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED Sampled: 07/26/2018 09:30
Instrument: ICPMS2 Analyzed: 02-Aug-2018 19:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0220	0.200	11.5	ug/L	
Copper, Dissolved	7440-50-8	1	0.340	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0500	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	0.820	4.00	0.976	ug/L	J



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
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MW-28
18G0332-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 07/26/2018 09:30

Instrument: CVAA

Analyzed: 30-Jul-2018 09:55

Sample Preparation: Preparation Method: TWM EPA 7470A
Preparation Batch: BGG0727 Sample Size: 20 mL
Prepared: 30-Jul-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000100	ND	mg/L	U

Sample Preparation: Preparation Method: TLM EPA 7470A low level
Preparation Batch: BGJ0340 Sample Size: 20 mL
Prepared: 10-Oct-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000020	ND	mg/L	H, U



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MW-29
18G0332-07 (Water)

Metals and Metallic Compounds

Method: EPA 6020A

Sampled: 07/26/2018 11:30

Instrument: ICPMS2

Analyzed: 01-Aug-2018 15:47

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGG0723 Sample Size: 25 mL
Prepared: 30-Jul-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	1	0.0180	0.200	0.0280	ug/L	J
Lead	7439-92-1	1	0.0680	0.100	ND	ug/L	U
Silver	7440-22-4	1	0.0170	0.200	ND	ug/L	U



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Reported:
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MW-29
18G0332-07 (Water)

Metals and Metallic Compounds

Method: EPA 6020A UCT-KED

Sampled: 07/26/2018 11:30

Instrument: ICPMS2

Analyzed: 30-Jul-2018 19:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGG0723 Sample Size: 25 mL
Prepared: 30-Jul-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0220	0.200	4.06	ug/L	
Copper	7440-50-8	1	0.340	0.500	ND	ug/L	U
Nickel	7440-02-0	1	0.0500	0.500	0.131	ug/L	J
Zinc	7440-66-6	1	0.820	4.00	ND	ug/L	U



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MW-29
18G0332-07 (Water)

Metals and Metallic Compounds

Method: EPA 7470A Sampled: 07/26/2018 11:30
Instrument: CVAA Analyzed: 30-Jul-2018 09:27

Sample Preparation: Preparation Method: TWM EPA 7470A
Preparation Batch: BGG0726 Sample Size: 20 mL
Prepared: 30-Jul-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000100	ND	mg/L	U

Sample Preparation: Preparation Method: TLM EPA 7470A low level
Preparation Batch: BGJ0338 Sample Size: 20 mL
Prepared: 10-Oct-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000020	ND	mg/L	H, U



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Reported:
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MW-29
18G0332-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 07/26/2018 11:30

Instrument: NT3

Analyzed: 30-Jul-2018 15:59

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGG0743 Sample Size: 10 mL
Prepared: 30-Jul-2018 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.20	7.66	ug/L	
Toluene	108-88-3	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	0.51	ug/L	
<i>Surrogate: Toluene-d8</i>			80-120 %	100	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	100	%	



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Reported:
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MW-29
18G0332-07 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM

Sampled: 07/26/2018 11:30

Instrument: NT11

Analyzed: 08-Aug-2018 18:16

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0753 Sample Size: 430 mL
Prepared: 31-Jul-2018 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel
Cleanup Batch: CGG0222 Initial Volume: 0.5 mL
Cleaned: 31-Jul-2018 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	5	0.058	0.178	ug/L	D
2-Methylnaphthalene	91-57-6	5	0.058	0.433	ug/L	D
1-Methylnaphthalene	90-12-0	5	0.058	14.7	ug/L	D, E
Acenaphthylene	208-96-8	5	0.058	ND	ug/L	U
Acenaphthene	83-32-9	5	0.058	17.1	ug/L	D, E
Dibenzofuran	132-64-9	5	0.058	ND	ug/L	U
Fluorene	86-73-7	5	0.058	4.25	ug/L	D
Phenanthrene	85-01-8	5	0.058	0.985	ug/L	D
Anthracene	120-12-7	5	0.058	0.060	ug/L	D
Fluoranthene	206-44-0	5	0.058	ND	ug/L	U
Pyrene	129-00-0	5	0.058	ND	ug/L	U
Benzo(a)anthracene	56-55-3	5	0.058	ND	ug/L	U
Chrysene	218-01-9	5	0.058	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	5	0.058	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	5	0.058	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	5	0.058	ND	ug/L	U
Benzofluoranthenes, Total		5	0.058	ND	ug/L	U
Benzo(a)pyrene	50-32-8	5	0.058	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	5	0.058	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	5	0.058	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	5	0.058	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10			42-120 %	72.7	%	
Surrogate: Dibenzo[a,h]anthracene-d14			29-120 %	82.7	%	
Surrogate: Fluoranthene-d10			57-120 %	84.9	%	



Dalton, Olmsted & Fuglevand, Inc
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Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
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MW-29
18G0332-07 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 07/26/2018 11:30

Instrument: FID3

Analyzed: 01-Aug-2018 17:09

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0764 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.100	0.348	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)		1	0.200	ND	mg/L	U
Surrogate: <i>o</i> -Terphenyl			50-150 %	74.1	%	

Data File: \\target\share\chem2\fid3b,1\20180801_b\318H0127.D

Date: 01-AUG-2018 17:09

Client ID:

Sample Info: 18G0332-07

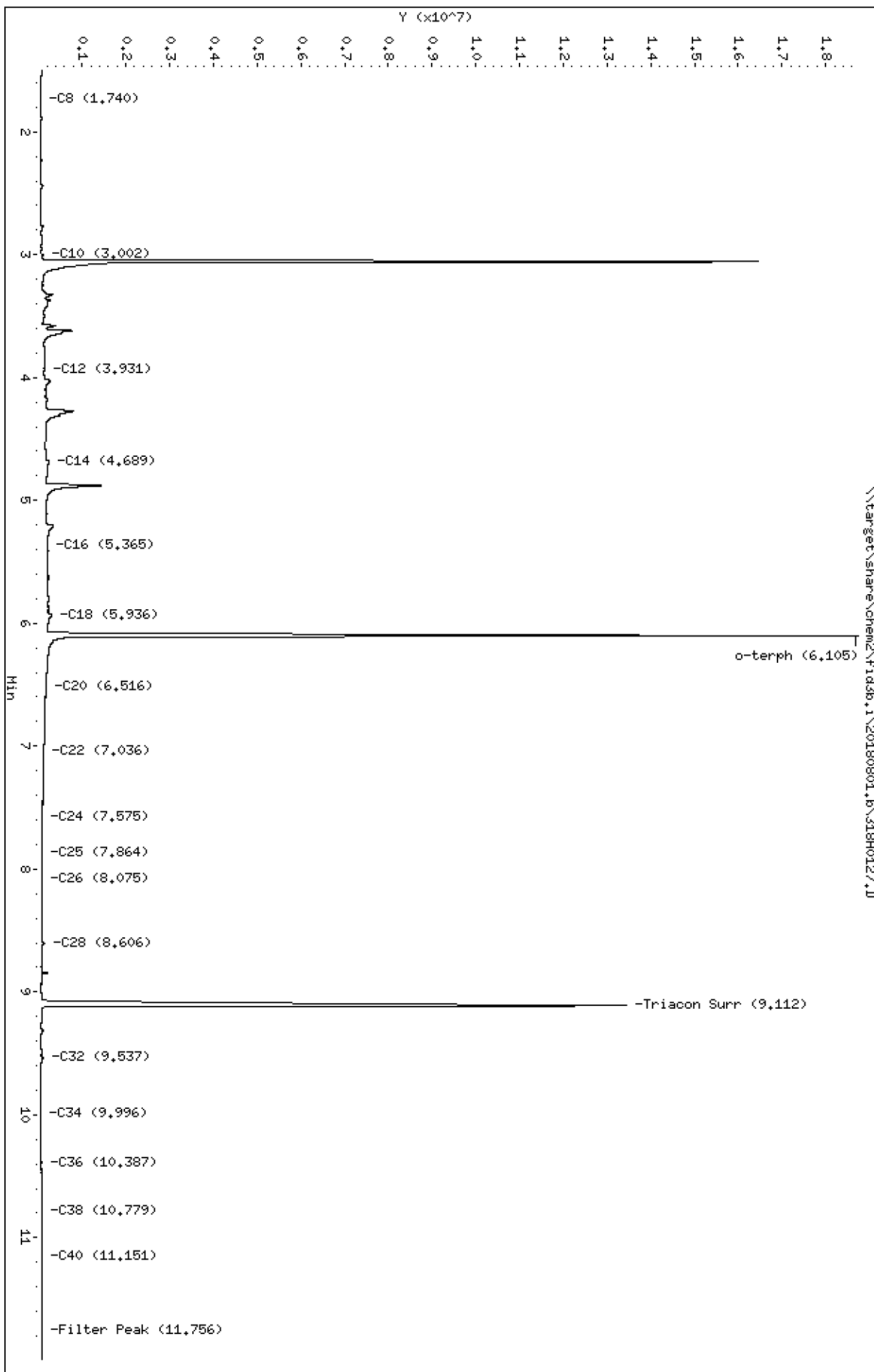
Column phase: RTX-1

Instrument: fid3b,1

Operator: JGR

Column diameter: 0.25

Page 1



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20180801.b/318H0127.D
Method: 20180801.b\FID3TPH.m
Instrument: fid3b.i
Operator: JGR
Report Date: 08/02/2018
Macro: FID3_072018

ARI ID: 18G0332-07
Client ID:
Injection: 01-AUG-2018 17:09
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc(mg per L)
Toluene	1.540	0.015	17743	43780	WATPHG	(Tol-C12)	22417601	124.9
C8	1.740	-0.018	2932	4438	WATPHD	(C12-C24)	29864366	173.8
C10	3.002	0.023	73730	98068	WATPHM	(C24-C38)	2014418	13.8
C12	3.931	-0.004	78826	47093	AK102	(C10-C25)	51834371	255.3 M
C14	4.689	-0.023	196980	643663	AK103	(C25-C36)	1657065	15.7
C16	5.365	0.014	162793	103788	OR.DIES	(C10-C28)	52570633	257.8 M
C18	5.936	-0.003	260588	1284647				
C20	6.516	0.024	122433	177543				
C22	7.036	-0.002	75340	173566				
C24	7.575	-0.004	45166	163485				
C25	7.864	0.020	46169	223923	KEROSEN	(Tol-C18)	43556343	185.5
C26	8.075	-0.029	25961	38400				
C28	8.606	-0.000	81476	102010	IT.DIES	(C10-C24)	51594646	254.7
C32	9.537	0.001	58388	168942				
C34	9.996	0.032	15081	36606				
Filter Peak	11.756	0.055	25383	33187				
C36	10.387	0.013	16190	36275	BUNKERC	(C10-C38)	53609063	866.9
o-terph	6.105	-0.000	18504153	19477261				
Triacon Surr	9.112	-0.002	13401681	17673071				

Range Times: NW Diesel(3.985 - 7.628) NW Gas(1.476 - 3.985) NW M.Oil(7.628 - 10.821)
AK102(2.929 - 7.794) AK103(7.794 - 10.424) Jet A(2.929 - 5.989)

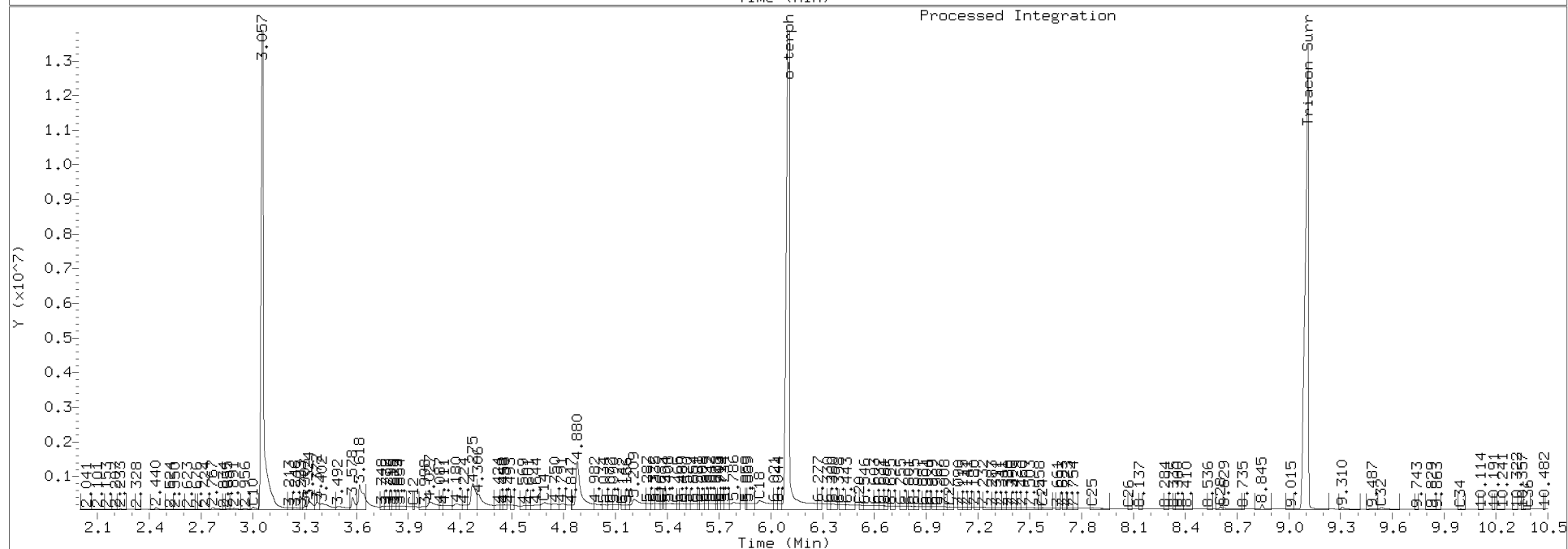
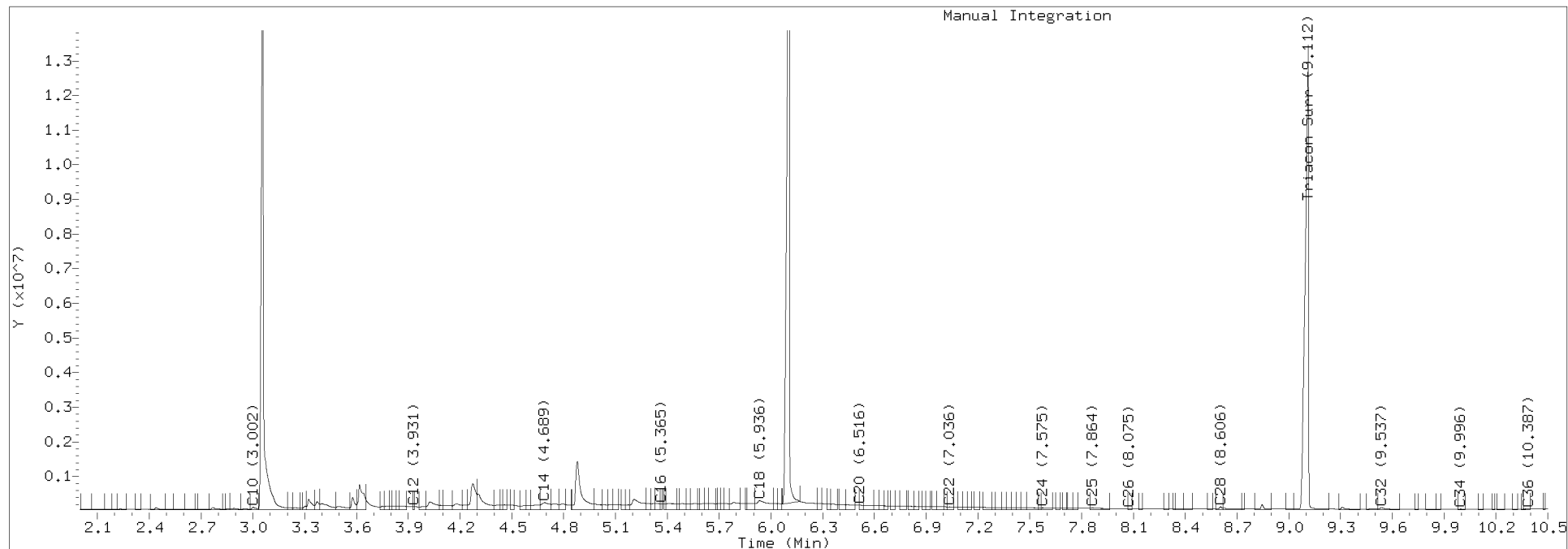
Surrogate	Area	Amount
o-Terphenyl	19477261	83.4
Triacontane	17673071	90.3

Analyte	RF	Curve Date
o-Terph Surr	233493.9	25-MAY-2018
Triacon Surr	195771.2	25-MAY-2018
Gas	179445.5	xx-xx-xxxx
Diesel	171841.0	25-MAY-2018
Motor Oil	146298.0	25-MAY-2018
AK102	203004.0	25-MAY-2018
AK103	105393.0	05-JUN-2018
Kerosene	234790.8	07-JUN-2018
OR Diesel	203892.0	25-MAY-2018
IT Diesel	202556.0	25-MAY-2018
Bunker C	61842.2	20-JUL-2018

TPH Manual Integrations Report

Datafile: FID3B, 20180801.b/318H0127.D Injection: 01-AUG-2018 17:09

Lab ID:18G0332-07





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MW-29
18G0332-07 (Water)

Wet Chemistry

Method: SM 2540 D-97 Sampled: 07/26/2018 11:30
Instrument: BAL2 Analyzed: 30-Jul-2018 06:44

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGG0728 Sample Size: 895 mL
Prepared: 30-Jul-2018 Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	1	1	12	mg/L	



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MW-29
18G0332-07 (Water)

Wet Chemistry

Method: SM 4500-CN⁻ E-99

Sampled: 07/26/2018 11:30

Instrument: UV1800-2

Analyzed: 30-Jul-2018 15:06

Sample Preparation:

Preparation Method: No Prep - Volatiles

Preparation Batch: BGG0737

Prepared: 30-Jul-2018

Sample Size: 50 mL

Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Cyanide, Total	57-12-5	1	0.0050	0.0050	0.0220	mg/L	



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MW-29
18G0332-07RE1 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM

Sampled: 07/26/2018 11:30

Instrument: NT11

Analyzed: 07-Aug-2018 16:51

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0753 Sample Size: 430 mL
Prepared: 31-Jul-2018 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel
Cleanup Batch: CGG0222 Initial Volume: 0.5 mL
Cleaned: 31-Jul-2018 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	50	0.581	ND	ug/L	U
2-Methylnaphthalene	91-57-6	50	0.581	ND	ug/L	U
1-Methylnaphthalene	90-12-0	50	0.581	17.2	ug/L	D
Acenaphthylene	208-96-8	50	0.581	ND	ug/L	U
Acenaphthene	83-32-9	50	0.581	20.1	ug/L	D
Dibenzofuran	132-64-9	50	0.581	ND	ug/L	U
Fluorene	86-73-7	50	0.581	3.98	ug/L	D
Phenanthrene	85-01-8	50	0.581	0.981	ug/L	D
Anthracene	120-12-7	50	0.581	ND	ug/L	U
Fluoranthene	206-44-0	50	0.581	ND	ug/L	U
Pyrene	129-00-0	50	0.581	ND	ug/L	U
Benzo(a)anthracene	56-55-3	50	0.581	ND	ug/L	U
Chrysene	218-01-9	50	0.581	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	50	0.581	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	50	0.581	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	50	0.581	ND	ug/L	U
Benzofluoranthenes, Total		50	0.581	ND	ug/L	U
Benzo(a)pyrene	50-32-8	50	0.581	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	50	0.581	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	50	0.581	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	50	0.581	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10			42-120 %	59.0	%	
Surrogate: Dibenzo[a,h]anthracene-d14			29-120 %	56.9	%	Q
Surrogate: Fluoranthene-d10			57-120 %	69.1	%	



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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MW-29
18G0332-08 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A Sampled: 07/26/2018 11:30
Instrument: ICPMS1 Analyzed: 03-Aug-2018 15:01

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony, Dissolved	7440-36-0	1	0.0180	0.200	ND	ug/L	U

Instrument: ICPMS2 Analyzed: 02-Aug-2018 19:17

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead, Dissolved	7439-92-1	1	0.0680	0.100	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0170	0.200	ND	ug/L	U



Dalton, Olmsted & Fuglevand, Inc
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Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
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MW-29
18G0332-08 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED

Sampled: 07/26/2018 11:30

Instrument: ICPMS2

Analyzed: 02-Aug-2018 19:17

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0220	0.200	3.98	ug/L	
Copper, Dissolved	7440-50-8	1	0.340	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0500	0.500	0.118	ug/L	J
Zinc, Dissolved	7440-66-6	1	0.820	4.00	0.918	ug/L	J



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-29
18G0332-08 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A Sampled: 07/26/2018 11:30
Instrument: CVAA Analyzed: 30-Jul-2018 09:57

Sample Preparation: Preparation Method: TWM EPA 7470A
Preparation Batch: BGG0727 Sample Size: 20 mL
Prepared: 30-Jul-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000100	ND	mg/L	U

Sample Preparation: Preparation Method: TLM EPA 7470A low level
Preparation Batch: BGJ0340 Sample Size: 20 mL
Prepared: 10-Oct-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000020	ND	mg/L	H, U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
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Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-30
18G0332-09 (Water)

Metals and Metallic Compounds

Method: EPA 6020A

Sampled: 07/26/2018 13:15

Instrument: ICPMS2

Analyzed: 01-Aug-2018 15:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGG0723 Sample Size: 25 mL
Prepared: 30-Jul-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	1	0.0180	0.200	ND	ug/L	U
Lead	7439-92-1	1	0.0680	0.100	ND	ug/L	U
Silver	7440-22-4	1	0.0170	0.200	ND	ug/L	U



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Ferndale WA, 98248

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Reported:
10-Oct-2018 15:25

MW-30
18G0332-09 (Water)

Metals and Metallic Compounds

Method: EPA 6020A UCT-KED

Sampled: 07/26/2018 13:15

Instrument: ICPMS2

Analyzed: 01-Aug-2018 15:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGG0723 Sample Size: 25 mL
Prepared: 30-Jul-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0220	0.200	19.9	ug/L	
Copper	7440-50-8	1	0.340	0.500	ND	ug/L	U
Nickel	7440-02-0	1	0.0500	0.500	0.283	ug/L	J
Zinc	7440-66-6	1	0.820	4.00	1.32	ug/L	J



Dalton, Olmsted & Fuglevand, Inc
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Ferndale WA, 98248

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Reported:
10-Oct-2018 15:25

MW-30
18G0332-09 (Water)

Metals and Metallic Compounds

Method: EPA 7470A Sampled: 07/26/2018 13:15
Instrument: CVAA Analyzed: 30-Jul-2018 09:30

Sample Preparation: Preparation Method: TWM EPA 7470A
Preparation Batch: BGG0726 Sample Size: 20 mL
Prepared: 30-Jul-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000100	ND	mg/L	U

Sample Preparation: Preparation Method: TLM EPA 7470A low level
Preparation Batch: BGJ0338 Sample Size: 20 mL
Prepared: 10-Oct-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000020	ND	mg/L	H, U



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Project: Tacoma Coal Gasification Site
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Reported:
10-Oct-2018 15:25

MW-30
18G0332-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 07/26/2018 13:15

Instrument: NT3

Analyzed: 30-Jul-2018 16:25

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGG0743 Sample Size: 10 mL
Prepared: 30-Jul-2018 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.20	56.3	ug/L	
Toluene	108-88-3	1	0.20	0.25	ug/L	
Ethylbenzene	100-41-4	1	0.20	0.72	ug/L	
m,p-Xylene	179601-23-1	1	0.40	1.01	ug/L	
o-Xylene	95-47-6	1	0.20	2.28	ug/L	
<i>Surrogate: Toluene-d8</i>			80-120 %	98.2	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	102	%	



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6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
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Reported:
10-Oct-2018 15:25

MW-30
18G0332-09 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM

Sampled: 07/26/2018 13:15

Instrument: NT11

Analyzed: 08-Aug-2018 18:54

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0753 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel
Cleanup Batch: CGG0222 Initial Volume: 0.5 mL
Cleaned: 31-Jul-2018 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	10	0.100	11.1	ug/L	D, E
2-Methylnaphthalene	91-57-6	10	0.100	1.08	ug/L	D
1-Methylnaphthalene	90-12-0	10	0.100	12.1	ug/L	D, E
Acenaphthylene	208-96-8	10	0.100	0.200	ug/L	D
Acenaphthene	83-32-9	10	0.100	24.8	ug/L	D, E
Dibenzofuran	132-64-9	10	0.100	ND	ug/L	U
Fluorene	86-73-7	10	0.100	2.21	ug/L	D
Phenanthrene	85-01-8	10	0.100	1.21	ug/L	D
Anthracene	120-12-7	10	0.100	0.181	ug/L	D
Fluoranthene	206-44-0	10	0.100	ND	ug/L	U
Pyrene	129-00-0	10	0.100	ND	ug/L	U
Benzo(a)anthracene	56-55-3	10	0.100	ND	ug/L	U
Chrysene	218-01-9	10	0.100	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	10	0.100	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	10	0.100	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	10	0.100	ND	ug/L	U
Benzofluoranthenes, Total		10	0.100	ND	ug/L	U
Benzo(a)pyrene	50-32-8	10	0.100	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	10	0.100	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	10	0.100	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	10	0.100	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10			42-120 %	73.9	%	
Surrogate: Dibenzo[a,h]anthracene-d14			29-120 %	73.1	%	
Surrogate: Fluoranthene-d10			57-120 %	92.6	%	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

MW-30
18G0332-09 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 07/26/2018 13:15

Instrument: FID3

Analyzed: 01-Aug-2018 17:29

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0764 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.100	0.256	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)		1	0.200	ND	mg/L	U
Surrogate: <i>o</i> -Terphenyl			50-150 %	79.2	%	

Data File: \\target\share\chem2\fid3b.1\20180801_b\318H0128.D

Date: 01-AUG-2018 17:29

Client ID:

Sample Info: 18G0332-09

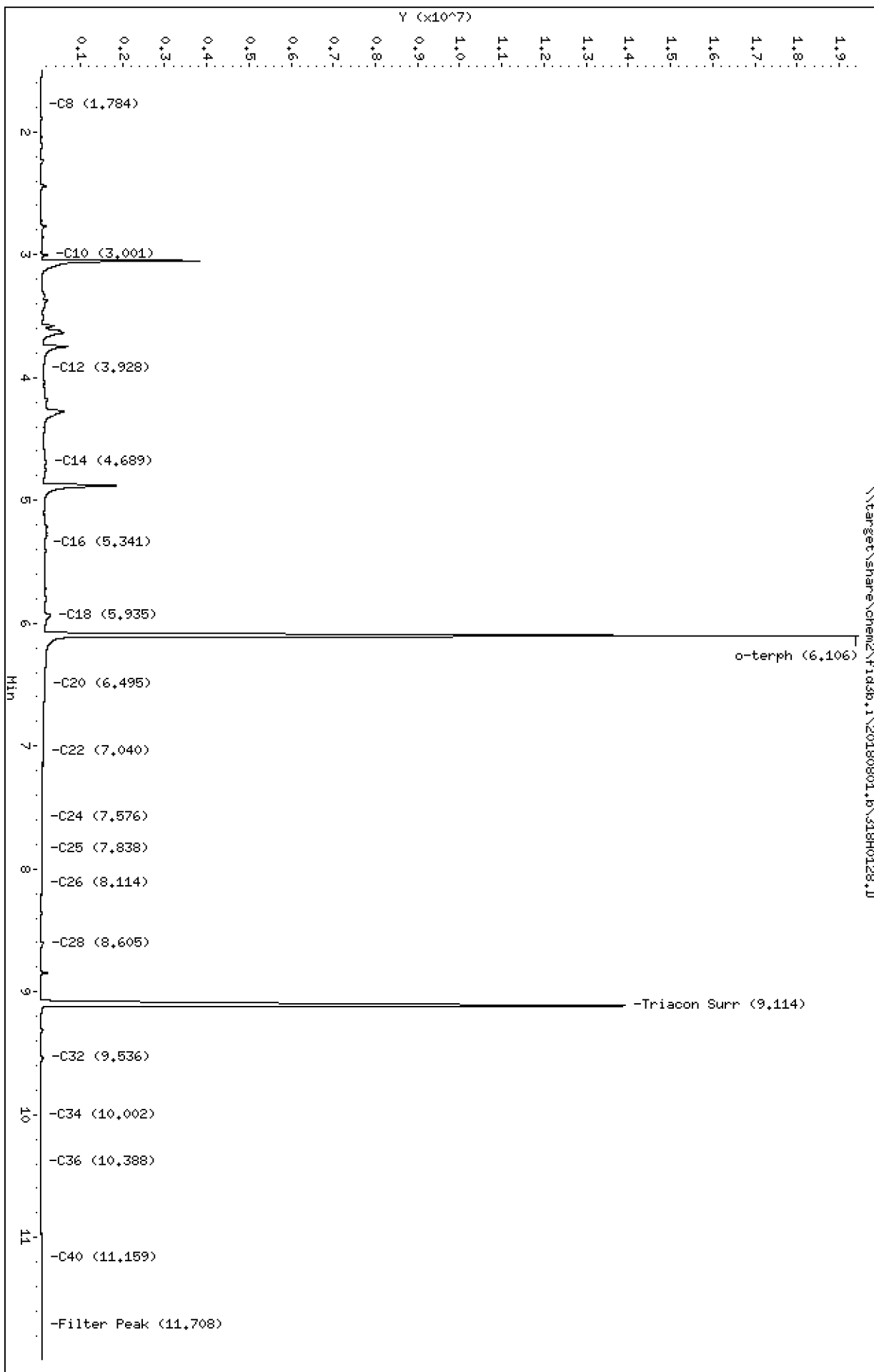
Column phase: RTX-1

Instrument: fid3b.1

Operator: JGR

Column diameter: 0.25

Page 1



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20180801.b/318H0128.D
Method: 20180801.b\FID3TPH.m
Instrument: fid3b.i
Operator: JGR
Report Date: 08/02/2018
Macro: FID3_072018

ARI ID: 18G0332-09
Client ID:
Injection: 01-AUG-2018 17:29
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc(mg per L)
Toluene	1.506	-0.019	39772	86376	WATPHG	(Tol-C12)	11672105	65.0
C8	1.784	0.027	5129	7263	WATPHD	(C12-C24)	22031518	128.2
C10	3.001	0.022	160067	202821	WATPHM	(C24-C38)	1520269	10.4
C12	3.928	-0.007	69017	214794	AK102	(C10-C25)	32561992	160.4 M
C14	4.689	-0.022	139164	452331	AK103	(C25-C36)	1224505	11.6
C16	5.341	-0.010	113774	386288	OR.DIES	(C10-C28)	33148362	162.6 M
C18	5.935	-0.004	229846	1131492				
C20	6.495	0.004	101079	580153				
C22	7.040	0.002	56454	133501				
C24	7.576	-0.002	34612	116071				
C25	7.838	-0.005	24632	11679	KEROSEN	(Tol-C18)	27908627	118.9
C26	8.114	0.011	18590	28760				
C28	8.605	-0.001	77495	134476	IT.DIES	(C10-C24)	32379866	159.9
C32	9.536	0.000	57298	122713				
C34	10.002	0.039	6870	9844				
Filter Peak	11.708	0.008	24696	67766				
C36	10.388	0.014	10498	20757	BUNKERC	(C10-C38)	33900135	548.2
o-terph	6.106	0.001	19287642	20810674				
Triacon Surr	9.114	0.000	13880869	18880872				

Range Times: NW Diesel(3.985 - 7.628) NW Gas(1.476 - 3.985) NW M.Oil(7.628 - 10.821)
AK102(2.929 - 7.794) AK103(7.794 - 10.424) Jet A(2.929 - 5.989)

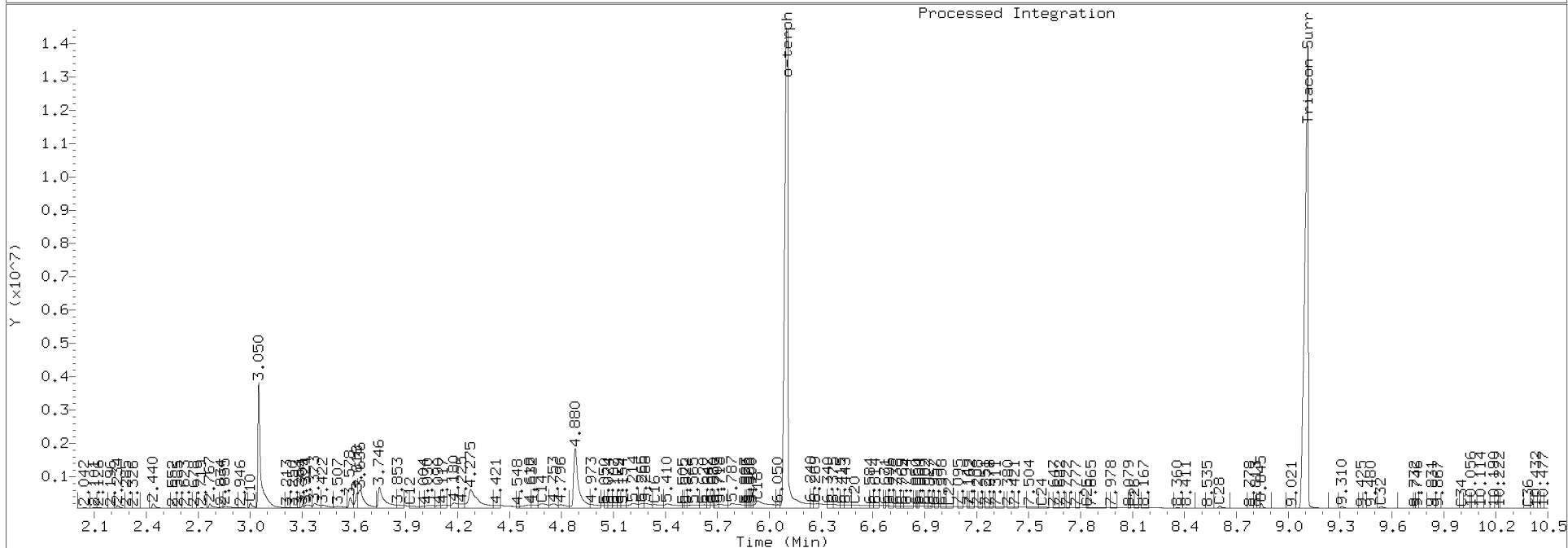
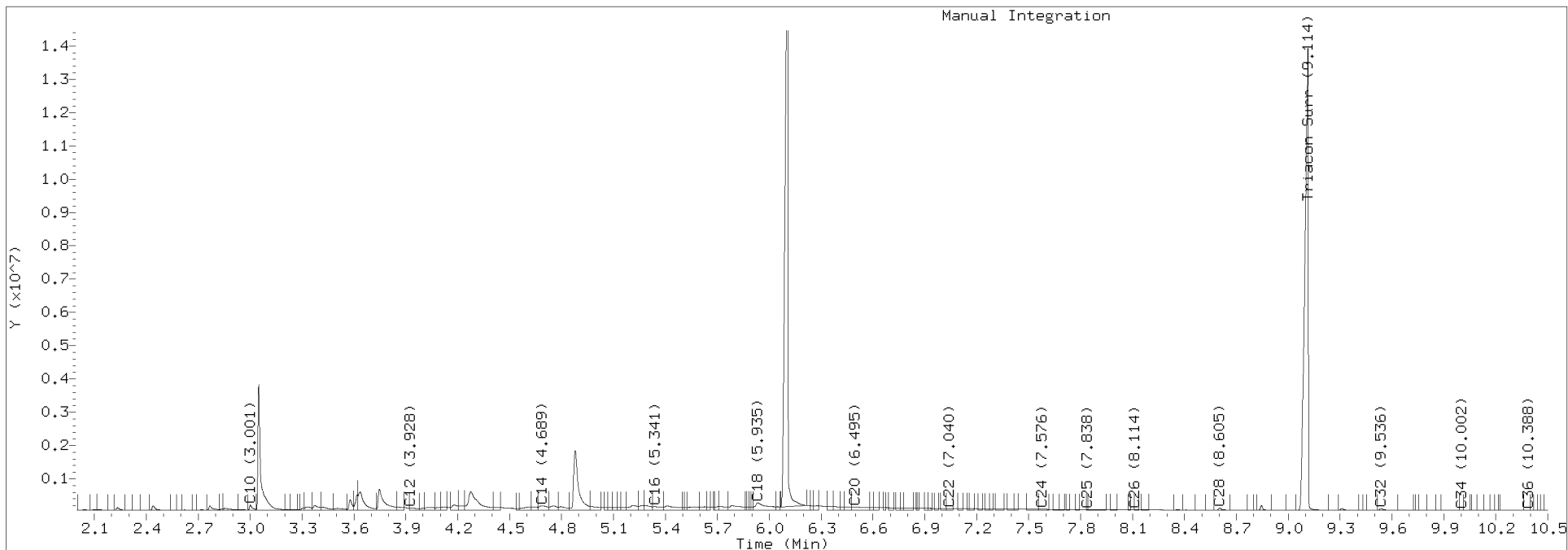
Surrogate	Area	Amount
o-Terphenyl	20810674	89.1
Triacontane	18880872	96.4

Analyte	RF	Curve Date
o-Terph Surr	233493.9	25-MAY-2018
Triacon Surr	195771.2	25-MAY-2018
Gas	179445.5	xx-xx-xxxx
Diesel	171841.0	25-MAY-2018
Motor Oil	146298.0	25-MAY-2018
AK102	203004.0	25-MAY-2018
AK103	105393.0	05-JUN-2018
Kerosene	234790.8	07-JUN-2018
OR Diesel	203892.0	25-MAY-2018
IT Diesel	202556.0	25-MAY-2018
Bunker C	61842.2	20-JUL-2018

TPH Manual Integrations Report

Datafile: FID3B, 20180801.b/318H0128.D Injection: 01-AUG-2018 17:29

Lab ID:18G0332-09





Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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MW-30
18G0332-09 (Water)

Wet Chemistry

Method: SM 2540 D-97 Sampled: 07/26/2018 13:15
Instrument: BAL2 Analyzed: 30-Jul-2018 06:44

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGG0728 Sample Size: 900 mL
Prepared: 30-Jul-2018 Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	1	1	22	mg/L	



Dalton, Olmsted & Fuglevand, Inc
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MW-30
18G0332-09 (Water)

Wet Chemistry

Method: SM 4500-CN⁻ E-99

Sampled: 07/26/2018 13:15

Instrument: UV1800-2

Analyzed: 30-Jul-2018 15:07

Sample Preparation: Preparation Method: No Prep - Volatiles
Preparation Batch: BGG0737 Sample Size: 50 mL
Prepared: 30-Jul-2018 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Cyanide, Total	57-12-5	1	0.0050	0.0050	0.0070	mg/L	



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Reported:
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MW-30
18G0332-09RE1 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM

Sampled: 07/26/2018 13:15

Instrument: NT11

Analyzed: 07-Aug-2018 17:29

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0753 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel
Cleanup Batch: CGG0222 Initial Volume: 0.5 mL
Cleaned: 31-Jul-2018 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	50	0.500	10.6	ug/L	D
2-Methylnaphthalene	91-57-6	50	0.500	0.929	ug/L	D
1-Methylnaphthalene	90-12-0	50	0.500	11.7	ug/L	D
Acenaphthylene	208-96-8	50	0.500	ND	ug/L	U
Acenaphthene	83-32-9	50	0.500	27.1	ug/L	D
Dibenzofuran	132-64-9	50	0.500	ND	ug/L	U
Fluorene	86-73-7	50	0.500	1.98	ug/L	D
Phenanthrene	85-01-8	50	0.500	1.04	ug/L	D
Anthracene	120-12-7	50	0.500	ND	ug/L	U
Fluoranthene	206-44-0	50	0.500	ND	ug/L	U
Pyrene	129-00-0	50	0.500	ND	ug/L	U
Benzo(a)anthracene	56-55-3	50	0.500	ND	ug/L	U
Chrysene	218-01-9	50	0.500	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	50	0.500	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	50	0.500	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	50	0.500	ND	ug/L	U
Benzofluoranthenes, Total		50	0.500	ND	ug/L	U
Benzo(a)pyrene	50-32-8	50	0.500	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	50	0.500	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	50	0.500	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	50	0.500	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10			42-120 %	63.7 %	%	
Surrogate: Dibenzo[a,h]anthracene-d14			29-120 %	60.7 %	%	Q
Surrogate: Fluoranthene-d10			57-120 %	74.6 %	%	



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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MW-30
18G0332-10 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A Sampled: 07/26/2018 13:15
Instrument: ICPMS1 Analyzed: 03-Aug-2018 15:05

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony, Dissolved	7440-36-0	1	0.0180	0.200	ND	ug/L	U

Instrument: ICPMS2 Analyzed: 02-Aug-2018 19:22

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead, Dissolved	7439-92-1	1	0.0680	0.100	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0170	0.200	ND	ug/L	U



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MW-30
18G0332-10 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED

Sampled: 07/26/2018 13:15

Instrument: ICPMS2

Analyzed: 02-Aug-2018 19:22

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0220	0.200	19.0	ug/L	
Copper, Dissolved	7440-50-8	1	0.340	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0500	0.500	0.248	ug/L	J
Zinc, Dissolved	7440-66-6	1	0.820	4.00	ND	ug/L	U



Dalton, Olmsted & Fuglevand, Inc
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Ferndale WA, 98248

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Project Number: PAP-001-08ab
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Reported:
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MW-30
18G0332-10 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A Sampled: 07/26/2018 13:15
Instrument: CVAA Analyzed: 30-Jul-2018 10:00

Sample Preparation: Preparation Method: TWM EPA 7470A
Preparation Batch: BGG0727 Sample Size: 20 mL
Prepared: 30-Jul-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000100	ND	mg/L	U

Sample Preparation: Preparation Method: TLM EPA 7470A low level
Preparation Batch: BGJ0340 Sample Size: 20 mL
Prepared: 10-Oct-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000020	ND	mg/L	H, U



Dalton, Olmsted & Fuglevand, Inc
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Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Hillside Seep
18G0332-11 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 07/26/2018 14:30

Instrument: NT3

Analyzed: 30-Jul-2018 16:51

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGG0743 Sample Size: 10 mL
Prepared: 30-Jul-2018 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	1.17	ug/L	
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	99.3	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	97.3	%	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Trip Blank
18G0332-12 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 07/26/2018 00:00

Instrument: NT3

Analyzed: 30-Jul-2018 13:48

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGG0743 Sample Size: 10 mL
Prepared: 30-Jul-2018 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	97.6	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	96.0	%	



Dalton, Olmsted & Fuglevand, Inc
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Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Volatile Organic Compounds - Quality Control

Batch BGG0743 - EPA 5030 (Purge and Trap)

Instrument: NT3

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0743-BLK1)				Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 10:31						
Benzene	ND	0.20	ug/L							U
Toluene	ND	0.20	ug/L							U
Ethylbenzene	ND	0.20	ug/L							U
m,p-Xylene	ND	0.40	ug/L							U
o-Xylene	ND	0.20	ug/L							U
Surrogate: Toluene-d8	4.90		ug/L	5.00		98.0	80-120			
Surrogate: 4-Bromofluorobenzene	4.91		ug/L	5.00		98.2	80-120			



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Volatile Organic Compounds - Quality Control

Batch BGG0743 - EPA 5030 (Purge and Trap)

Instrument: NT3

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 08:47										
LCS (BGG0743-BS1)										
Benzene	11.0	0.20	ug/L	10.0		110	80-120			
Toluene	10.7	0.20	ug/L	10.0		107	80-120			
Ethylbenzene	11.3	0.20	ug/L	10.0		113	80-120			
m,p-Xylene	22.7	0.40	ug/L	20.0		113	80-121			
o-Xylene	11.4	0.20	ug/L	10.0		114	80-121			
<i>Surrogate: Toluene-d8</i>	5.08		ug/L	5.00		102	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	4.94		ug/L	5.00		98.9	80-120			



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Volatile Organic Compounds - Quality Control

Batch BGG0743 - EPA 5030 (Purge and Trap)

Instrument: NT3

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 09:13										
LCS Dup (BGG0743-BSD1)										
Benzene	11.1	0.20	ug/L	10.0		111	80-120	0.81	30	
Toluene	10.8	0.20	ug/L	10.0		108	80-120	1.24	30	
Ethylbenzene	11.1	0.20	ug/L	10.0		111	80-120	1.43	30	
m,p-Xylene	22.2	0.40	ug/L	20.0		111	80-121	2.30	30	
o-Xylene	11.2	0.20	ug/L	10.0		112	80-121	1.50	30	
Surrogate: Toluene-d8	5.01		ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	5.07		ug/L	5.00		101	80-120			



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Semivolatile Organic Compounds - SIM - Quality Control

Batch BGG0753 - EPA 3510C SepF

Instrument: NT11

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0753-BLK1)										
Prepared: 31-Jul-2018 Analyzed: 07-Aug-2018 11:00										
Naphthalene	ND	0.010	ug/L							U
2-Methylnaphthalene	ND	0.010	ug/L							U
1-Methylnaphthalene	ND	0.010	ug/L							U
Acenaphthylene	ND	0.010	ug/L							U
Acenaphthene	ND	0.010	ug/L							U
Dibenzofuran	ND	0.010	ug/L							U
Fluorene	ND	0.010	ug/L							U
Phenanthrene	ND	0.010	ug/L							U
Anthracene	ND	0.010	ug/L							U
Fluoranthene	ND	0.010	ug/L							U
Pyrene	ND	0.010	ug/L							U
Benzo(a)anthracene	ND	0.010	ug/L							U
Chrysene	ND	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.010	ug/L							U
Benzofluoranthenes, Total	ND	0.010	ug/L							U
Benzo(a)pyrene	ND	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.010	ug/L							U
Surrogate: 2-Methylnaphthalene-d10	0.204		ug/L	0.300		68.2	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.316		ug/L	0.300		105	29-120			Q
Surrogate: Fluoranthene-d10	0.266		ug/L	0.300		88.6	57-120			



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
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Reported:
10-Oct-2018 15:25

Semivolatile Organic Compounds - SIM - Quality Control

Batch BGG0753 - EPA 3510C SepF

Instrument: NT11

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0753-BS1)		Prepared: 31-Jul-2018 Analyzed: 07-Aug-2018 11:37								
Naphthalene	0.410	0.010	ug/L	0.300		137	37-120			*
2-Methylnaphthalene	0.258	0.010	ug/L	0.300		86.1	37-120			
1-Methylnaphthalene	0.274	0.010	ug/L	0.300		91.4	29-120			
Acenaphthylene	0.260	0.010	ug/L	0.300		86.7	41-120			
Acenaphthene	0.436	0.010	ug/L	0.300		145	41-120			*
Dibenzofuran	0.265	0.010	ug/L	0.300		88.2	38-120			
Fluorene	0.287	0.010	ug/L	0.300		95.7	43-120			
Phenanthrene	0.296	0.010	ug/L	0.300		98.5	41-120			
Anthracene	0.474	0.010	ug/L	0.300		158	40-120			*
Fluoranthene	0.304	0.010	ug/L	0.300		101	45-120			
Pyrene	0.525	0.010	ug/L	0.300		175	41-120			*
Benzo(a)anthracene	0.324	0.010	ug/L	0.300		108	42-120			
Chrysene	0.302	0.010	ug/L	0.300		101	44-120			
Benzo(b)fluoranthene	0.311	0.010	ug/L	0.300		104	44-120			
Benzo(k)fluoranthene	0.304	0.010	ug/L	0.300		101	50-120			
Benzo(j)fluoranthene	0.288	0.010	ug/L	0.300		95.8	39-160			
Benzofluoranthenes, Total	0.902	0.010	ug/L	0.900		100	46-120			
Benzo(a)pyrene	0.269	0.010	ug/L	0.300		89.6	35-120			
Indeno(1,2,3-cd)pyrene	0.293	0.010	ug/L	0.300		97.8	37-120			
Dibenzo(a,h)anthracene	0.277	0.010	ug/L	0.300		92.3	34-120			
Benzo(g,h,i)perylene	0.506	0.010	ug/L	0.300		169	38-120			*
Surrogate: 2-Methylnaphthalene-d10	0.221		ug/L	0.300		73.6	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.314		ug/L	0.300		105	29-120			Q
Surrogate: Fluoranthene-d10	0.283		ug/L	0.300		94.4	57-120			



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Semivolatile Organic Compounds - SIM - Quality Control

Batch BGG0753 - EPA 3510C SepF

Instrument: NT11

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BGG0753-MS1)										
		Source: 18G0332-01		Prepared: 31-Jul-2018		Analyzed: 08-Aug-2018 15:05				
Naphthalene	1.64	1.00	ug/L	0.600	1.18	77.4	37-120			D
2-Methylnaphthalene	11.0	1.00	ug/L	0.600	11.2	NR	37-120			*, D
1-Methylnaphthalene	84.4	1.00	ug/L	0.600	82.8	254	29-120			*, D
Acenaphthylene	1.29	1.00	ug/L	0.600	0.552	123	41-120			*, D
Acenaphthene	153	1.00	ug/L	0.600	140	NR	41-120			*, D, E
Dibenzofuran	5.02	1.00	ug/L	0.600	4.69	55.1	38-120			D
Fluorene	84.4	1.00	ug/L	0.600	81.3	524	43-120			*, D
Phenanthrene	35.4	1.00	ug/L	0.600	34.3	184	41-120			*, D
Anthracene	3.44	1.00	ug/L	0.600	2.43	168	40-120			*, D
Fluoranthene	1.18	1.00	ug/L	0.600	0.693	81.8	45-120			D
Pyrene	ND	1.00	ug/L	0.600	ND	103	41-120			U, D
Benzo(a)anthracene	ND	1.00	ug/L	0.600	ND	94.0	42-120			U, D
Chrysene	ND	1.00	ug/L	0.600	ND	92.9	44-120			U, D
Benzo(b)fluoranthene	ND	1.00	ug/L	0.600	ND	71.1	44-120			U, D
Benzo(k)fluoranthene	ND	1.00	ug/L	0.600	ND	78.7	50-120			U, D
Benzo(j)fluoranthene	ND	1.00	ug/L	0.600	ND	76.7	39-160			U, D
Benzofluoranthenes, Total	1.36	1.00	ug/L	1.80	ND	75.5	46-120			D
Benzo(a)pyrene	ND	1.00	ug/L	0.600	ND	82.1	35-120			U, D
Indeno(1,2,3-cd)pyrene	ND	1.00	ug/L	0.600	ND	57.6	37-120			U, D
Dibenzo(a,h)anthracene	ND	1.00	ug/L	0.600	ND	62.9	34-120			U, D
Benzo(g,h,i)perylene	ND	1.00	ug/L	0.600	ND	79.9	38-120			U, D
Surrogate: 2-Methylnaphthalene-d10	0.406		ug/L	0.600	0.214	67.6	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.348		ug/L	0.600	0.231	57.9	29-120			
Surrogate: Fluoranthene-d10	0.452		ug/L	0.600	0.242	75.3	57-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Semivolatile Organic Compounds - SIM - Quality Control

Batch BGG0753 - EPA 3510C SepF

Instrument: NT11

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BGG0753-MSD1)		Source: 18G0332-01		Prepared: 31-Jul-2018		Analyzed: 08-Aug-2018 15:43				
Naphthalene	1.75	1.00	ug/L	0.600	1.18	95.9	37-120	6.54	30	D
2-Methylnaphthalene	12.0	1.00	ug/L	0.600	11.2	139	37-120	9.05	30	*, D
1-Methylnaphthalene	92.0	1.00	ug/L	0.600	82.8	NR	29-120	8.68	30	*, D
Acenaphthylene	1.36	1.00	ug/L	0.600	0.552	134	41-120	5.11	30	*, D
Acenaphthene	167	1.00	ug/L	0.600	140	NR	41-120	8.64	30	*, D, E
Dibenzofuran	5.53	1.00	ug/L	0.600	4.69	140	38-120	9.60	30	*, D
Fluorene	91.9	1.00	ug/L	0.600	81.3	NR	43-120	8.44	30	*, D
Phenanthrene	38.5	1.00	ug/L	0.600	34.3	716	41-120	8.63	30	*, D
Anthracene	3.50	1.00	ug/L	0.600	2.43	179	40-120	1.85	30	*, D
Fluoranthene	1.26	1.00	ug/L	0.600	0.693	93.9	45-120	5.94	30	D
Pyrene	ND	1.00	ug/L	0.600	ND	106	41-120			U, D
Benzo(a)anthracene	ND	1.00	ug/L	0.600	ND	90.7	42-120			U, D
Chrysene	ND	1.00	ug/L	0.600	ND	91.1	44-120			U, D
Benzo(b)fluoranthene	ND	1.00	ug/L	0.600	ND	76.8	44-120			U, D
Benzo(k)fluoranthene	ND	1.00	ug/L	0.600	ND	72.0	50-120			U, D
Benzo(j)fluoranthene	ND	1.00	ug/L	0.600	ND	81.9	39-160			U, D
Benzofluoranthenes, Total	1.38	1.00	ug/L	1.80	ND	76.9	46-120	1.83	30	D
Benzo(a)pyrene	ND	1.00	ug/L	0.600	ND	78.9	35-120			U, D
Indeno(1,2,3-cd)pyrene	ND	1.00	ug/L	0.600	ND	52.3	37-120			U, D
Dibenzo(a,h)anthracene	ND	1.00	ug/L	0.600	ND	57.8	34-120			U, D
Benzo(g,h,i)perylene	ND	1.00	ug/L	0.600	ND	67.2	38-120			U, D
Surrogate: 2-Methylnaphthalene-d10	0.418		ug/L	0.600	0.214	69.6	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.337		ug/L	0.600	0.231	56.2	29-120			
Surrogate: Fluoranthene-d10	0.460		ug/L	0.600	0.242	76.6	57-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Petroleum Hydrocarbons - Quality Control

Batch BGG0764 - EPA 3510C SepF

Instrument: FID3

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0764-BLK1)				Prepared: 31-Jul-2018 Analyzed: 01-Aug-2018 15:32						
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
<i>Surrogate: o-Terphenyl</i>	0.178		mg/L	0.225		79.3	50-150			

Data File: \\target\share\chem2\fid3b,1\20180801_b\318H0122.D

Date: 01-AUG-2018 15:32

Client ID:

Sample Info: BCC0764-BLK1

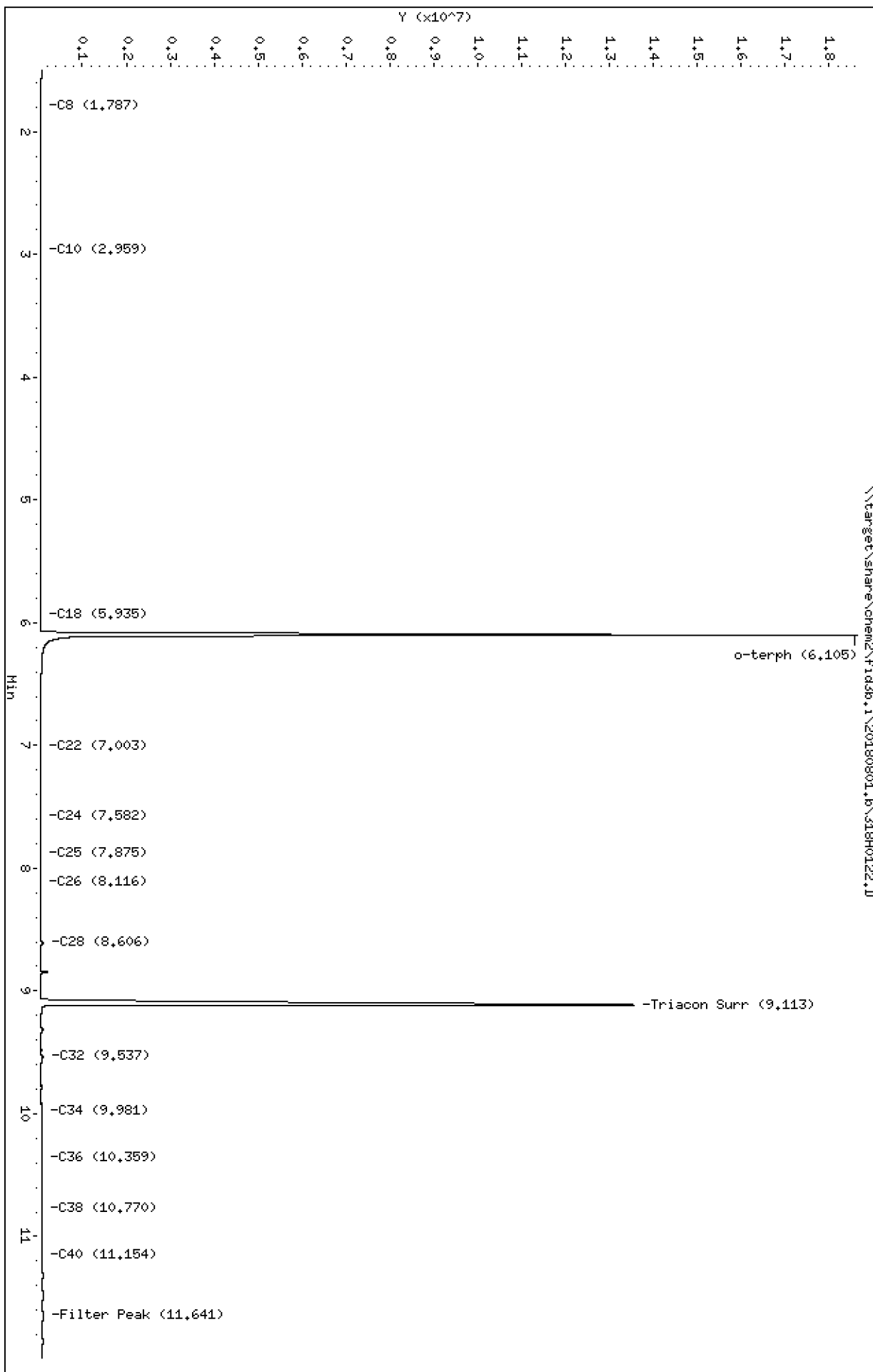
Column phase: RTX-1

Instrument: fid3b,1

Operator: JGR

Column diameter: 0.25

Page 1



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20180801.b/318H0122.D
Method: 20180801.b\FID3TPH.m
Instrument: fid3b.i
Operator: JGR
Report Date: 08/02/2018
Macro: FID3_072018

ARI ID: BGG0764-BLK1
Client ID:
Injection: 01-AUG-2018 15:32
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc(mg per L)
Toluene	----				WATPHG	(Tol-C12)	107399	0.6
C8	1.787	0.030	7474	19345	WATPHD	(C12-C24)	122464	0.7
C10	2.959	-0.020	4033	16903	WATPHM	(C24-C38)	2000467	13.7
C12	----				AK102	(C10-C25)	139367	0.7
C14	----				AK103	(C25-C36)	1312865	12.5
C16	----				OR.DIES	(C10-C28)	353062	1.7
C18	5.935	-0.004	2677	5155				
C20	----							
C22	7.003	-0.035	3211	2976				
C24	7.582	0.004	4862	4154				
C25	7.875	0.031	6710	27457	KEROSEN	(Tol-C18)	132267	0.6
C26	8.116	0.012	4982	9045				
C28	8.606	0.000	65878	117525	IT.DIES	(C10-C24)	139367	0.7
C32	9.537	0.001	53302	143507				
C34	9.981	0.017	17491	88013				
Filter Peak	11.641	-0.059	49903	251850				
C36	10.359	-0.015	21395	15308	BUNKERC	(C10-C38)	2139834	34.6
o-terph	6.105	-0.001	18598420	20838859				
Triacon Surr	9.113	-0.001	13514071	18666823				

Range Times: NW Diesel(3.985 - 7.628) NW Gas(1.476 - 3.985) NW M.Oil(7.628 - 10.821)
AK102(2.929 - 7.794) AK103(7.794 - 10.424) Jet A(2.929 - 5.989)

Surrogate	Area	Amount
o-Terphenyl	20838859	89.2
Triacontane	18666823	95.4

Analyte	RF	Curve Date
o-Terph Surr	233493.9	25-MAY-2018
Triacon Surr	195771.2	25-MAY-2018
Gas	179445.5	xx-xx-xxxx
Diesel	171841.0	25-MAY-2018
Motor Oil	146298.0	25-MAY-2018
AK102	203004.0	25-MAY-2018
AK103	105393.0	05-JUN-2018
Kerosene	234790.8	07-JUN-2018
OR Diesel	203892.0	25-MAY-2018
IT Diesel	202556.0	25-MAY-2018
Bunker C	61842.2	20-JUL-2018



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Petroleum Hydrocarbons - Quality Control

Batch BGG0764 - EPA 3510C SepF

Instrument: FID3

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0764-BS1)				Prepared: 31-Jul-2018 Analyzed: 01-Aug-2018 15:52						
Diesel Range Organics (C12-C24)	2.50	0.100	mg/L	3.00		83.2	56-120			
Surrogate: <i>o</i> -Terphenyl	0.192		mg/L	0.225		85.4	50-150			

Data File: \\target\share\chem2\fid3b.1\20180801.b\318H0123.D

Date: 01-AUG-2018 15:52

Client ID:

Sample Info: BCC0764-BS1

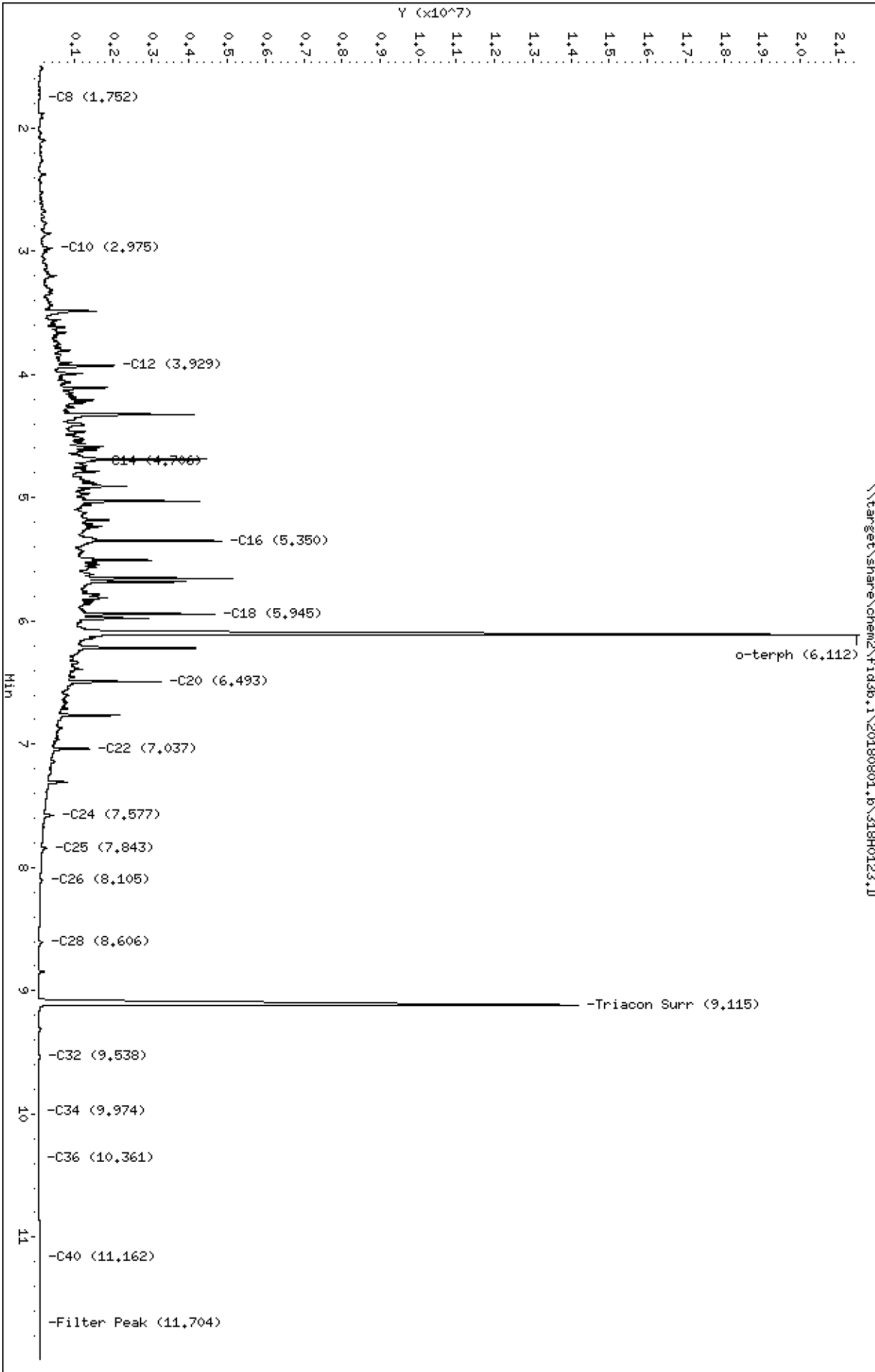
Column phase: RTX-1

Instrument: fid3b.1

Operator: JGR

Column diameter: 0.25

Page 1



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20180801.b/318H0123.D
Method: 20180801.b\FID3TPH.m
Instrument: fid3b.i
Operator: JGR
Report Date: 08/02/2018
Macro: FID3_072018

ARI ID: BGG0764-BS1
Client ID:
Injection: 01-AUG-2018 15:52
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc(mg per L)
Toluene	1.520	-0.006	112033	170001	WATPHG	(Tol-C12)	27877925	155.4
C8	1.752	-0.006	53964	82904	WATPHD	(C12-C24)	214564132	1248.6
C10	2.975	-0.004	350213	422758	WATPHM	(C24-C38)	3860708	26.4
C12	3.929	-0.006	1974021	2502177	AK102	(C10-C25)	238568594	1175.2 M
C14	4.706	-0.005	1481459	1488841	AK103	(C25-C36)	2617405	24.8
C16	5.350	-0.001	4793027	5869833	OR.DIES	(C10-C28)	240577590	1179.9 M
C18	5.945	0.006	4620148	4864606				
C20	6.493	0.001	3193203	3384701				
C22	7.037	-0.002	1347690	2345338				
C24	7.577	-0.001	400836	909092				
C25	7.843	-0.001	198729	594755	KEROSEN	(Tol-C18)	179127151	762.9
C26	8.105	0.001	93620	227874				
C28	8.606	0.000	94671	163859	IT.DIES	(C10-C24)	237440143	1172.2
C32	9.538	0.002	49255	106506				
C34	9.974	0.010	8404	26388				
Filter Peak	11.704	0.004	26152	32742				
C36	10.361	-0.013	9969	15067	BUNKERC	(C10-C38)	241300851	3901.9
o-terph	6.112	0.006	20175700	22435960				
Triacon Surr	9.115	0.001	14132242	19973155				

Range Times: NW Diesel(3.985 - 7.628) NW Gas(1.476 - 3.985) NW M.Oil(7.628 - 10.821)
AK102(2.929 - 7.794) AK103(7.794 - 10.424) Jet A(2.929 - 5.989)

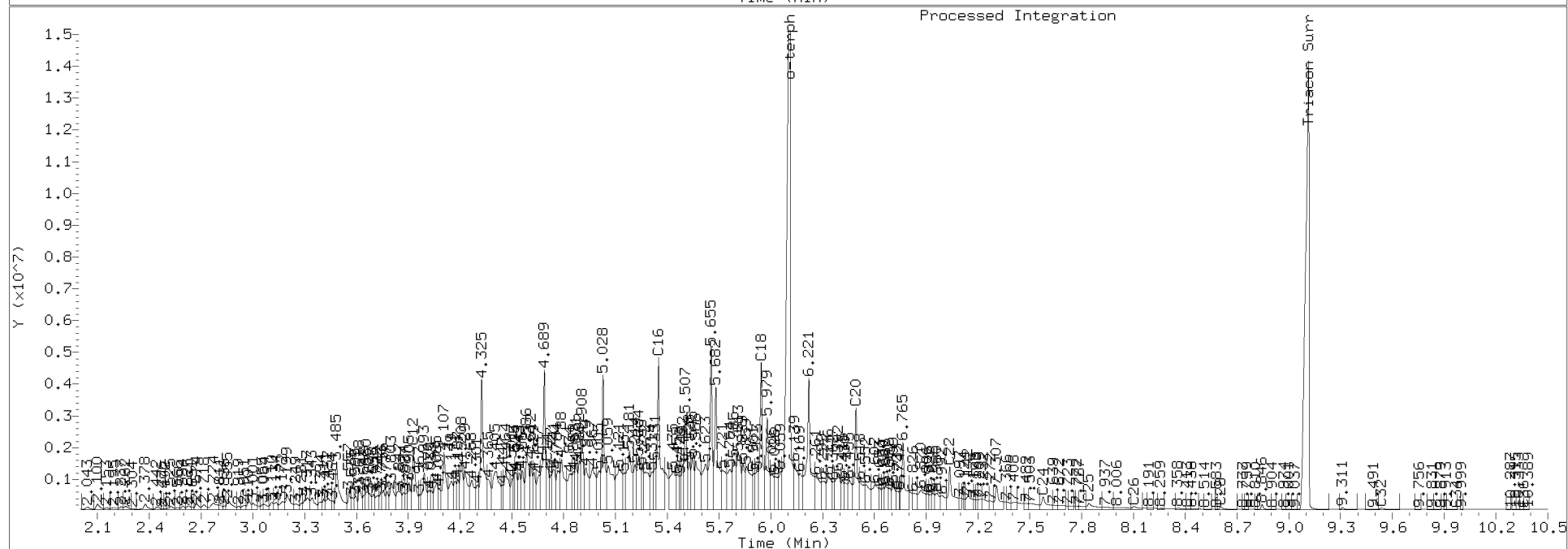
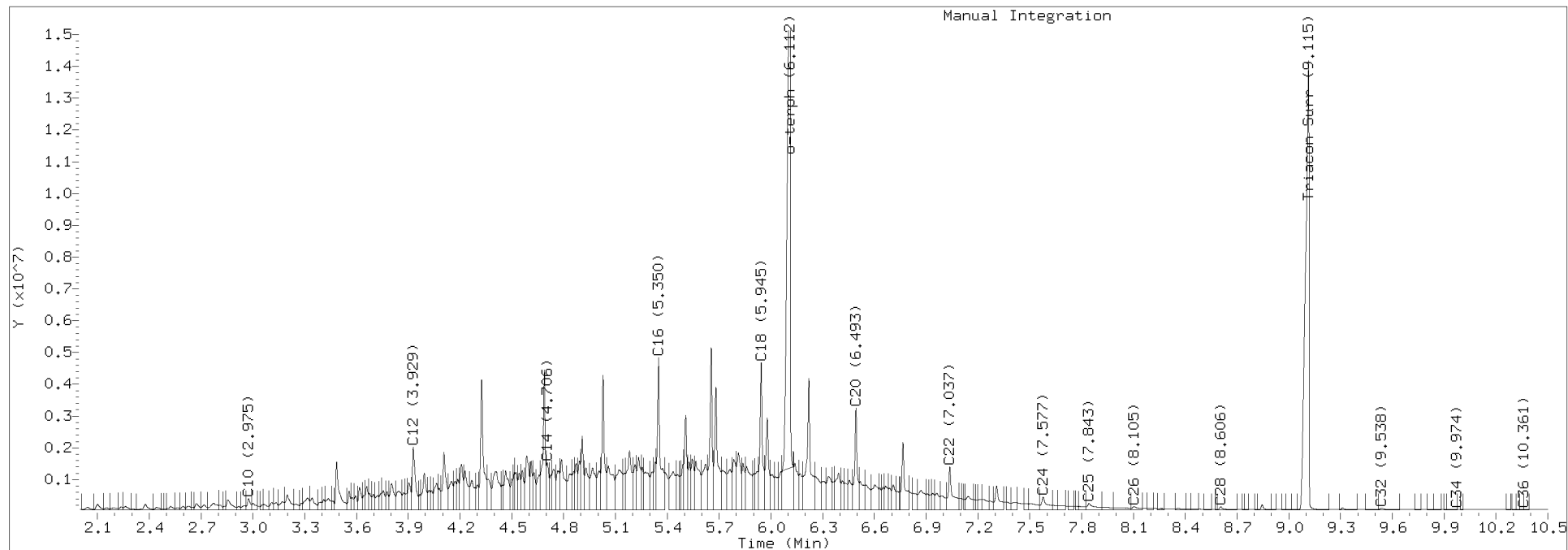
Surrogate	Area	Amount
o-Terphenyl	22435960	96.1
Triacontane	19973155	102.0

Analyte	RF	Curve Date
o-Terph Surr	233493.9	25-MAY-2018
Triacon Surr	195771.2	25-MAY-2018
Gas	179445.5	xx-xx-xxxx
Diesel	171841.0	25-MAY-2018
Motor Oil	146298.0	25-MAY-2018
AK102	203004.0	25-MAY-2018
AK103	105393.0	05-JUN-2018
Kerosene	234790.8	07-JUN-2018
OR Diesel	203892.0	25-MAY-2018
IT Diesel	202556.0	25-MAY-2018
Bunker C	61842.2	20-JUL-2018

TPH Manual Integrations Report

Datafile: FID3B, 20180801.b/318H0123.D Injection: 01-AUG-2018 15:52

Lab ID: BGG0764-BS1





Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Metals and Metallic Compounds - Quality Control

Batch BGG0723 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0723-BLK1)						Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 14:11						
Lead	208	ND	0.0680	0.100	ug/L							U
Silver	107	ND	0.0170	0.200	ug/L							U
Arsenic	75a	ND	0.0220	0.200	ug/L							U
Copper	63	ND	0.340	0.500	ug/L							U
Copper	65	ND	0.350	0.500	ug/L							U
Nickel	60	ND	0.0500	0.500	ug/L							U
Nickel	62	ND	0.220	0.500	ug/L							U
Zinc	66	ND	0.820	4.00	ug/L							U
Zinc	67	ND	0.940	4.00	ug/L							U



Dalton, Olmsted & Fuglevand, Inc
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Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Metals and Metallic Compounds - Quality Control

Batch BGG0723 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0723-BLK2)						Prepared: 30-Jul-2018 Analyzed: 01-Aug-2018 14:37						
Antimony	121	0.0200	0.0180	0.200	ug/L							J
Antimony	123	ND	0.0280	0.200	ug/L							U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
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10-Oct-2018 15:25

Metals and Metallic Compounds - Quality Control

Batch BGG0723 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0723-BS1)						Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 14:15						
Lead	208	28.9	0.0680	0.100	ug/L	25.0		116	80-120			
Silver	107	27.3	0.0170	0.200	ug/L	25.0		109	80-120			
Arsenic	75a	26.9	0.0220	0.200	ug/L	25.0		108	80-120			
Copper	63	28.0	0.340	0.500	ug/L	25.0		112	80-120			
Copper	65	27.3	0.350	0.500	ug/L	25.0		109	80-120			
Nickel	60	26.9	0.0500	0.500	ug/L	25.0		108	80-120			
Nickel	62	27.2	0.220	0.500	ug/L	25.0		109	80-120			
Zinc	66	92.8	0.820	4.00	ug/L	80.0		116	80-120			
Zinc	67	86.9	0.940	4.00	ug/L	80.0		109	80-120			



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Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Metals and Metallic Compounds - Quality Control

Batch BGG0723 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0723-BS2)						Prepared: 30-Jul-2018 Analyzed: 01-Aug-2018 14:42						
Antimony	121	26.6	0.0180	0.200	ug/L	25.0		107	80-120			
Antimony	123	26.7	0.0280	0.200	ug/L	25.0		107	80-120			



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Metals and Metallic Compounds - Quality Control

Batch BGG0726 - TWM EPA 7470A

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0726-BLK1)					Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 08:55					
Mercury	ND	0.000100	mg/L							U



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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Metals and Metallic Compounds - Quality Control

Batch BGG0726 - TWM EPA 7470A

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0726-BS1)					Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 08:57					
Mercury	0.00199	0.000100	mg/L	0.00200		99.4	80-120			



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Metals and Metallic Compounds - Quality Control

Batch BGJ0338 - TLM EPA 7470A low level

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGJ0338-BLK1)					Prepared: 10-Oct-2018 Analyzed: 10-Oct-2018 09:46					
Mercury	ND	0.000020	mg/L							U



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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Metals and Metallic Compounds - Quality Control

Batch BGJ0338 - TLM EPA 7470A low level

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGJ0338-BS1)					Prepared: 10-Oct-2018 Analyzed: 10-Oct-2018 09:48					
Mercury	0.000212	0.000020	mg/L	0.000200		106	80-120			



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGG0727 - TWM EPA 7470A

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0727-BLK1)										
				Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 09:37						
Mercury, Dissolved	ND	0.000100	mg/L							U



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGG0727 - TWM EPA 7470A

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0727-BS1)					Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 09:39					
Mercury, Dissolved	0.00211	0.000100	mg/L	0.00200		106	80-120			



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGG0727 - TWM EPA 7470A

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BGG0727-DUP1)										
		Source: 18G0332-02		Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 09:48						
Mercury, Dissolved	ND	0.000100	mg/L		ND					U



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGG0727 - TWM EPA 7470A

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BGG0727-MS1)										
		Source: 18G0332-02		Prepared: 30-Jul-2018		Analyzed: 30-Jul-2018 09:50				
Mercury, Dissolved	0.00110	0.000100	mg/L	0.00100	ND	110	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGH0044 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGH0044-BLK2)						Prepared: 02-Aug-2018 Analyzed: 03-Aug-2018 14:09						
Antimony, Dissolved	121	ND	0.0180	0.200	ug/L							U
Antimony, Dissolved	123	ND	0.0280	0.200	ug/L							U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGH0044 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGH0044-BS2)						Prepared: 02-Aug-2018		Analyzed: 03-Aug-2018 14:13				
Antimony, Dissolved	121	26.9	0.0180	0.200	ug/L	25.0		108	80-120			
Antimony, Dissolved	123	26.7	0.0280	0.200	ug/L	25.0		107	80-120			



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Reported:
10-Oct-2018 15:25

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGH0044 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGH0044-BLK1)						Prepared: 02-Aug-2018 Analyzed: 02-Aug-2018 17:45						
Lead, Dissolved	208	ND	0.0680	0.100	ug/L							U
Silver, Dissolved	107	ND	0.0170	0.200	ug/L							U
Arsenic, Dissolved	75a	ND	0.0220	0.200	ug/L							U
Copper, Dissolved	63	ND	0.340	0.500	ug/L							U
Copper, Dissolved	65	ND	0.350	0.500	ug/L							U
Nickel, Dissolved	60	ND	0.0500	0.500	ug/L							U
Nickel, Dissolved	62	ND	0.220	0.500	ug/L							U
Zinc, Dissolved	66	ND	0.820	4.00	ug/L							U
Zinc, Dissolved	67	ND	0.940	4.00	ug/L							U



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Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGH0044 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGH0044-BS1)						Prepared: 02-Aug-2018 Analyzed: 02-Aug-2018 17:49						
Lead, Dissolved	208	26.9	0.0680	0.100	ug/L	25.0		108	80-120			
Silver, Dissolved	107	27.5	0.0170	0.200	ug/L	25.0		110	80-120			
Arsenic, Dissolved	75a	26.5	0.0220	0.200	ug/L	25.0		106	80-120			
Copper, Dissolved	63	28.4	0.340	0.500	ug/L	25.0		114	80-120			
Copper, Dissolved	65	27.9	0.350	0.500	ug/L	25.0		112	80-120			
Nickel, Dissolved	60	27.7	0.0500	0.500	ug/L	25.0		111	80-120			
Nickel, Dissolved	62	26.7	0.220	0.500	ug/L	25.0		107	80-120			
Zinc, Dissolved	66	93.7	0.820	4.00	ug/L	80.0		117	80-120			
Zinc, Dissolved	67	87.8	0.940	4.00	ug/L	80.0		110	80-120			



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGJ0340 - TLM EPA 7470A low level

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGJ0340-BLK1)					Prepared: 10-Oct-2018 Analyzed: 10-Oct-2018 12:28					
Mercury, Dissolved	ND	0.000020	mg/L							U



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGJ0340 - TLM EPA 7470A low level

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGJ0340-BS1)					Prepared: 10-Oct-2018 Analyzed: 10-Oct-2018 12:31					
Mercury, Dissolved	0.000217	0.000020	mg/L	0.000200		108	80-120			



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGJ0340 - TLM EPA 7470A low level

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BGJ0340-DUP1)										
		Source: 18G0332-02		Prepared: 10-Oct-2018		Analyzed: 10-Oct-2018 12:36				
Mercury, Dissolved	ND	0.000020	mg/L		ND					U



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Reported:
10-Oct-2018 15:25

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGJ0340 - TLM EPA 7470A low level

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BGJ0340-MS1)										
		Source: 18G0332-02		Prepared: 10-Oct-2018		Analyzed: 10-Oct-2018 12:39				
Mercury, Dissolved	0.000125	0.000020	mg/L	0.000100	ND	125	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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Wet Chemistry - Quality Control

Batch BGG0728 - No Prep Wet Chem

Instrument: BAL2

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0728-BLK1)						Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 06:44					
Suspended Solids	ND	1	1	mg/L							U



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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Wet Chemistry - Quality Control

Batch BGG0728 - No Prep Wet Chem

Instrument: BAL2

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0728-BS1)						Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 06:44					
Suspended Solids	50	1	1	mg/L	50.00		99.4	90-110			



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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Wet Chemistry - Quality Control

Batch BGG0728 - No Prep Wet Chem

Instrument: BAL2

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BGG0728-DUP1)											
		Source: 18G0332-01				Prepared: 30-Jul-2018		Analyzed: 30-Jul-2018 06:44			
Suspended Solids	19	2	2	mg/L		23			19.40	20	



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:25
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Wet Chemistry - Quality Control

Batch BGG0737 - No Prep - Volatiles

Instrument: UV1800-2

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0737-BLK1)						Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 15:03					
Cyanide, Total	ND	0.0050	0.0050	mg/L							U



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Wet Chemistry - Quality Control

Batch BGG0737 - No Prep - Volatiles

Instrument: UV1800-2

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0737-BS1)						Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 15:04					
Cyanide, Total	0.143	0.0050	0.0050	mg/L	0.151		94.5	75-125			



Dalton, Olmsted & Fuglevand, Inc
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Project: Tacoma Coal Gasification Site
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Reported:
10-Oct-2018 15:25

Certified Analyses included in this Report

Analyte	Certifications
EPA 6020A in Water	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Antimony-121	NELAP,WADOE,DoD-ELAP
Antimony-123	NELAP
Silver-107	WA-DW,DoD-ELAP,NELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Antimony-121	NELAP,WADOE,DoD-ELAP
Antimony-123	NELAP,WADOE,DoD-ELAP
EPA 6020A UCT-KED in Water	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Zinc-66	WADOE,WA-DW,DoD-ELAP
Zinc-67	WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP
EPA 7470A in Water	
Mercury	WADOE,NELAP,DoD-ELAP,CALAP
Mercury	WADOE,NELAP,DoD-ELAP,CALAP
Mercury	WADOE,NELAP,DoD-ELAP,CALAP
Mercury	WADOE,NELAP,DoD-ELAP,CALAP
EPA 8260C in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE



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Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:25

Acrolein	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,CALAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Butanone	DoD-ELAP,NELAP,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
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1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8270D-SIM in Water

Naphthalene	ADEC,DoD-ELAP,NELAP,CALAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,CALAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,CALAP,WADOE
Biphenyl	NELAP
Acenaphthylene	ADEC,DoD-ELAP,NELAP,CALAP,WADOE
Acenaphthene	ADEC,DoD-ELAP,NELAP,CALAP,WADOE
Dibenzofuran	ADEC,DoD-ELAP,NELAP,CALAP



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Fluorene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Phenanthrene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Anthracene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Carbazole	NELAP
Fluoranthene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Pyrene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Benzo(a)anthracene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Chrysene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Benzo(b)fluoranthene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Benzo(k)fluoranthene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Benzo(j)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(e)pyrene	NELAP
Benzo(a)pyrene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Perylene	ADEC, NELAP, CALAP
Indeno(1,2,3-cd)pyrene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Dibenzo(a,h)anthracene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Benzo(g,h,i)perylene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C24-C38)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP, NELAP, WADOE
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP, NELAP, WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP, NELAP, WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP, NELAP, WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP, NELAP, WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP, NELAP, WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP, NELAP, WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP, NELAP, WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP, NELAP, WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP, NELAP, WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP, NELAP, WADOE

SM 2540 D-97 in Water



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Suspended Solids DoD-ELAP,WADOE,NELAP

SM 4500-CN⁻ E-99 in Water

Cyanide, Total WADOE,WA-DW,NELAP,DoD-ELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	02/07/2019
CALAP	California Department of Public Health CAELAP	2748	06/30/2019
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-011	05/12/2019
WADOE	WA Dept of Ecology	C558	06/30/2019
WA-DW	Ecology - Drinking Water	C558	06/30/2019



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Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
- J Estimated concentration value detected below the reporting limit.
- H Hold time violation - Hold time was exceeded.
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D1 Surrogate was not detected due to sample extract dilution
- D The reported value is from a dilution
- * Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



10 October 2018

Matt Dalton
Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale, WA 98248

RE: Tacoma Coal Gasification Site

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
18G0339

Associated SDG ID(s)
N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amanda Volgardsen, Project Manager





Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Seep 1	18G0339-01	Water	27-Jul-2018 11:00	27-Jul-2018 14:57
Seep 1	18G0339-02	Water	27-Jul-2018 11:00	27-Jul-2018 14:57
Seep 2	18G0339-03	Water	27-Jul-2018 12:30	27-Jul-2018 14:57
Seep 2	18G0339-04	Water	27-Jul-2018 12:30	27-Jul-2018 14:57
Trip Blank	18G0339-05	Water	27-Jul-2018 00:00	27-Jul-2018 14:57



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10-Oct-2018 15:44

Case Narrative

Sample receipt

Samples as listed on the preceding page were received July 27, 2018 under ARI work order 18G0339. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limits.

The LCS/LCSD percent recoveries and RPD were within control limits.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270D-SIM

The samples were extracted and analyzed within the recommended holding times.

Initial calibrations were within method requirements.

The initial calibration verification (ICV) for NT 11 on 8/7/18 is outside of control limits high for the surrogate Dibenzo(a,h)anthracene. Associated samples and QC have been flagged with a "Q" qualifier. All other continuing calibrations were within method requirements. No further corrective action was taken.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limits.

The LCS results were within control limits, with the exception of the five target compounds high of the limits. Results were reviewed and found to be correct. Investigation attributed to the outliers to contact with an EPH spike solution in the preparation lab. As the contact would not impact the samples or blanks, and sample results were higher than recommended for the low level method, the outliers have been flagged and no further corrective action was taken.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The samples were extracted and analyzed within the recommended holding times.



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Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limits.

The LCS percent recoveries were within control limits.

Total and Dissolved Metals - EPA Method 6020A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The total method blank has Antimony detected below the reporting limit, but above the method detection limit. The Antimony was flagged with a "J" qualifier on the method blank. There were no target metals detected in the method blanks above the reporting limits. No further corrective action was taken.

The LCS percent recoveries were within control limits.

Total and Dissolved Hg - EPA Method 7470A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The LCS percent recoveries were within control limits.

Wet Chemistry (Cyanide, TSS)

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The LCS percent recoveries were within control limits.

Total and Dissolved Low Level Hg - EPA Method 7470A

The low level analysis was added October 3, 2018 outside of the 28 day recommended holding time. The LL Hg has been flagged with "H" qualifiers.



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Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The LCS percent recoveries were within control limits.



WORK ORDER

18G0339

Client: Dalton, Olmsted & Fuglevand, Inc

Project Manager: Amanda Volgardsen

Project: Tacoma Coal Gasification Site

Project Number: PAP-001-08ab

Preservation Confirmation

Container ID	Container Type	pH
18G0339-01 A	VOA Vial, Clear, 40 mL, HCL	
18G0339-01 B	VOA Vial, Clear, 40 mL, HCL	
18G0339-01 C	VOA Vial, Clear, 40 mL, HCL	
18G0339-01 D	Glass NM, Amber, 500 mL	
18G0339-01 E	Glass NM, Amber, 500 mL	
18G0339-01 F	Glass NM, Amber, 500 mL	
18G0339-01 G	Glass NM, Amber, 500 mL	
18G0339-01 H	Large OJ, 1000 mL	
18G0339-01 I	Small OJ, 500 mL, NaOH	
18G0339-01 J	HDPE NM, 500 mL, 1:1 HNO3	L12 Fail
18G0339-02 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	L2 PASS
18G0339-03 A	VOA Vial, Clear, 40 mL, HCL	L2 PASS
18G0339-03 B	VOA Vial, Clear, 40 mL, HCL	
18G0339-03 C	VOA Vial, Clear, 40 mL, HCL	
18G0339-03 D	Glass NM, Amber, 500 mL	
18G0339-03 E	Glass NM, Amber, 500 mL	
18G0339-03 F	Glass NM, Amber, 500 mL	
18G0339-03 G	Glass NM, Amber, 500 mL	
18G0339-03 H	Large OJ, 1000 mL	
18G0339-03 I	Small OJ, 500 mL, NaOH	
18G0339-03 J	HDPE NM, 500 mL, 1:1 HNO3	L12 Fail
18G0339-04 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	L2 PASS
18G0339-05 A	VOA Vial, Clear, 40 mL, HCL	L2 PASS
18G0339-05 B	VOA Vial, Clear, 40 mL, HCL	

Preservation Confirmed By sef

Date 7-28-18



Cooler Receipt Form

ARI Client: DOF
 COC No(s): _____ (NA)
 Assigned ARI Job No: 1860339

Project Name: TALOMA Coal gasification
 Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____
 Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES NO
 Were custody papers included with the cooler? YES NO
 Were custody papers properly filled out (ink, signed, etc.) YES NO
 Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 16.6
 Time: 1457
 If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: DO02865

Cooler Accepted by: Seif Date: 7-27-18 Time: 1457

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO
 What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____
 Was sufficient ice used (if appropriate)? NA YES NO
 Were all bottles sealed in individual plastic bags? YES NO
 Did all bottles arrive in good condition (unbroken)? YES NO
 Were all bottle labels complete and legible? YES NO
 Did the number of containers listed on COC match with the number of containers received? YES NO
 Did all bottle labels and tags agree with custody papers? YES NO
 Were all bottles used correct for the requested analyses? YES NO
 Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES NO
 Were all VOC vials free of air bubbles? NA YES NO
 Was sufficient amount of sample sent in each bottle? YES NO
 Date VOC Trip Blank was made at ARI... NA 7-25-18
 Was Sample Split by ARI : NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: Seif Date: 7-25-18 Time: 1025

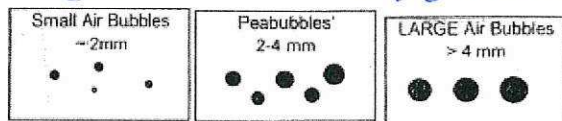
**** Notify Project Manager of discrepancies or concerns ****

7-28-18

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC
<u>MW-110</u>	<u>Seep 2</u>		

Additional Notes, Discrepancies, & Resolutions:

NO sample time on label for Seep-1 Cyanide. Air bubbles marked on pres sheet. MW-110 written for all LL PAH & DX samples for Seep 2 and crossed out except
 By: Seif Date: 7-28-18 for 1 LL PAH.



Small → "sm" (< 2 mm)
 Peabubbles → "pb" (2 to < 4 mm)
 Large → "lg" (4 to < 6 mm)
 Headspace → "hs" (> 6 mm)



Dalton, Olmsted & Fuglevand, Inc
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Project: Tacoma Coal Gasification Site
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Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Seep 1
18G0339-01 (Water)

Metals and Metallic Compounds

Method: EPA 6020A

Sampled: 07/27/2018 11:00

Instrument: ICPMS2

Analyzed: 01-Aug-2018 16:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGG0723 Sample Size: 25 mL
Prepared: 30-Jul-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	10	0.180	2.00	0.510	ug/L	J, D
Lead	7439-92-1	10	0.680	1.00	9.48	ug/L	D
Silver	7440-22-4	10	0.170	2.00	ND	ug/L	U



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Seep 1
18G0339-01 (Water)

Metals and Metallic Compounds

Method: EPA 6020A UCT-KED

Sampled: 07/27/2018 11:00

Instrument: ICPMS2

Analyzed: 01-Aug-2018 16:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGG0723 Sample Size: 25 mL
Prepared: 30-Jul-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	10	0.220	2.00	2.52	ug/L	D
Copper	7440-50-8	10	3.40	5.00	3.75	ug/L	J, D
Nickel	7440-02-0	10	0.500	5.00	2.39	ug/L	J, D
Zinc	7440-66-6	10	8.20	40.0	18.4	ug/L	J, D



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Reported:
10-Oct-2018 15:44

Seep 1
18G0339-01 (Water)

Metals and Metallic Compounds

Method: EPA 7470A Sampled: 07/27/2018 11:00
Instrument: CVAA Analyzed: 30-Jul-2018 09:32

Sample Preparation: Preparation Method: TWM EPA 7470A
Preparation Batch: BGG0726 Sample Size: 20 mL
Prepared: 30-Jul-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000100	0.000107	mg/L	

Sample Preparation: Preparation Method: TLM EPA 7470A low level
Preparation Batch: BGJ0338 Sample Size: 20 mL
Prepared: 10-Oct-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000020	0.000145	mg/L	H



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Reported:
10-Oct-2018 15:44

Seep 1
18G0339-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 07/27/2018 11:00

Instrument: NT3

Analyzed: 30-Jul-2018 17:17

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGG0743 Sample Size: 10 mL
Prepared: 30-Jul-2018 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	99.2	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	99.4	%	



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Reported:
10-Oct-2018 15:44

Seep 1
18G0339-01 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM

Sampled: 07/27/2018 11:00

Instrument: NT11

Analyzed: 08-Aug-2018 13:11

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0753 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel
Cleanup Batch: CGG0222 Initial Volume: 0.5 mL
Cleaned: 31-Jul-2018 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.010	0.014	ug/L	
2-Methylnaphthalene	91-57-6	1	0.010	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.010	0.011	ug/L	
Acenaphthylene	208-96-8	1	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.010	0.023	ug/L	
Dibenzofuran	132-64-9	1	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.010	ND	ug/L	U
Anthracene	120-12-7	1	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.010	0.012	ug/L	
Pyrene	129-00-0	1	0.010	0.013	ug/L	
Benzo(a)anthracene	56-55-3	1	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.010	0.013	ug/L	
Benzo(a)pyrene	50-32-8	1	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10			42-120 %	75.2	%	
Surrogate: Dibenzo[a,h]anthracene-d14			29-120 %	110	%	
Surrogate: Fluoranthene-d10			57-120 %	92.7	%	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Seep 1
18G0339-01 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 07/27/2018 11:00

Instrument: FID3

Analyzed: 01-Aug-2018 17:48

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0764 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)		1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			50-150 %	84.0	%	

Data File: \\target\share\chem2\fid3b.1\20180801_b\318H0129.D

Date: 01-AUG-2018 17:48

Client ID:

Sample Info: 18G0339-01

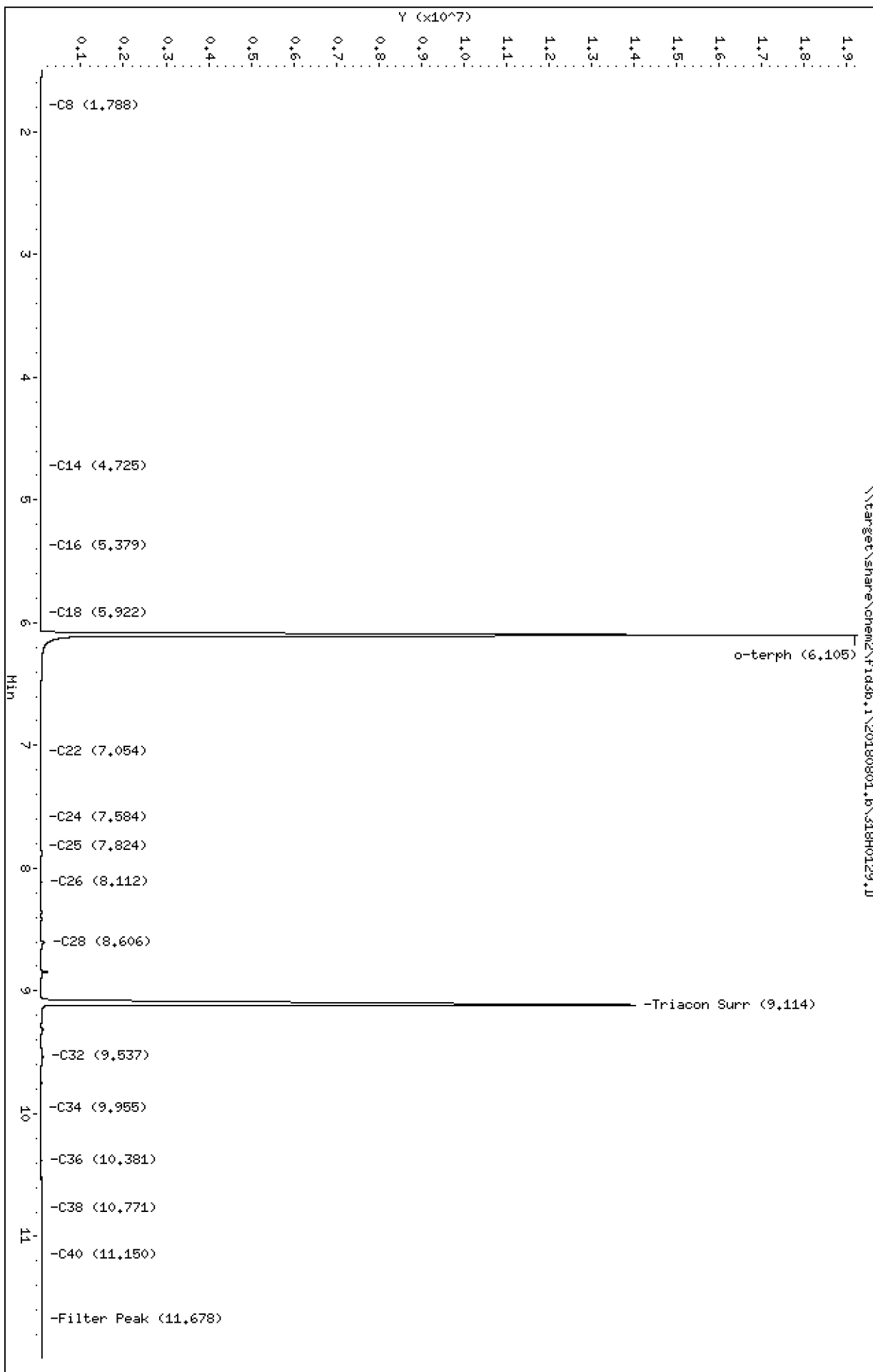
Column phase: RTX-1

Instrument: fid3b.1

Operator: JGR

Column diameter: 0.25

Page 1



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20180801.b/318H0129.D
Method: 20180801.b\FID3TPH.m
Instrument: fid3b.i
Operator: JGR
Report Date: 08/02/2018
Macro: FID3_072018

ARI ID: 18G0339-01
Client ID:
Injection: 01-AUG-2018 17:48
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc(mg per L)
Toluene	----				WATPHG	(Tol-C12)	164803	0.9
C8	1.788	0.030	6163	14757	WATPHD	(C12-C24)	723041	4.2
C10	----				WATPHM	(C24-C38)	2213437	15.1
C12	----				AK102	(C10-C25)	805167	4.0
C14	4.725	0.014	5337	13795	AK103	(C25-C36)	1957793	18.6
C16	5.379	0.028	6284	7614	OR.DIES	(C10-C28)	1533354	7.5
C18	5.922	-0.017	7775	22551				
C20	----							
C22	7.054	0.016	12107	20168				
C24	7.584	0.006	14926	60059				
C25	7.824	-0.020	14109	18884	KEROSEN	(Tol-C18)	380187	1.6
C26	8.112	0.008	16305	66514				
C28	8.606	-0.000	82371	113345	IT.DIES	(C10-C24)	756197	3.7
C32	9.537	0.001	66564	191980				
C34	9.955	-0.008	14491	12892				
Filter Peak	11.678	-0.023	24873	27539				
C36	10.381	0.007	16223	38441	BUNKERC	(C10-C38)	2969634	48.0
o-terph	6.105	-0.001	19211467	22063421				
Triacon Surr	9.114	0.000	13985291	19567789				

Range Times: NW Diesel(3.985 - 7.628) NW Gas(1.476 - 3.985) NW M.Oil(7.628 - 10.821)
AK102(2.929 - 7.794) AK103(7.794 - 10.424) Jet A(2.929 - 5.989)

Surrogate	Area	Amount
o-Terphenyl	22063421	94.5
Triacontane	19567789	100.0

Analyte	RF	Curve Date
o-Terph Surr	233493.9	25-MAY-2018
Triacon Surr	195771.2	25-MAY-2018
Gas	179445.5	xx-xx-xxxx
Diesel	171841.0	25-MAY-2018
Motor Oil	146298.0	25-MAY-2018
AK102	203004.0	25-MAY-2018
AK103	105393.0	05-JUN-2018
Kerosene	234790.8	07-JUN-2018
OR Diesel	203892.0	25-MAY-2018
IT Diesel	202556.0	25-MAY-2018
Bunker C	61842.2	20-JUL-2018



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:44
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Seep 1
18G0339-01 (Water)

Wet Chemistry

Method: SM 2540 D-97 Sampled: 07/27/2018 11:00
Instrument: BAL2 Analyzed: 30-Jul-2018 06:44

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGG0728 Sample Size: 920 mL
Prepared: 30-Jul-2018 Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	1	1	6	mg/L	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Seep 1
18G0339-01 (Water)

Wet Chemistry

Method: SM 4500-CN⁻ E-99

Sampled: 07/27/2018 11:00

Instrument: UV1800-2

Analyzed: 30-Jul-2018 15:07

Sample Preparation: Preparation Method: No Prep - Volatiles
Preparation Batch: BGG0737 Sample Size: 50 mL
Prepared: 30-Jul-2018 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Cyanide, Total	57-12-5	1	0.0050	0.0050	ND	mg/L	U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Seep 1
18G0339-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A Sampled: 07/27/2018 11:00
Instrument: ICPMS1 Analyzed: 03-Aug-2018 15:10

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony, Dissolved	7440-36-0	5	0.0900	1.00	0.275	ug/L	J, D

Instrument: ICPMS2 Analyzed: 02-Aug-2018 19:49

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead, Dissolved	7439-92-1	5	0.340	0.500	ND	ug/L	U
Silver, Dissolved	7440-22-4	5	0.0850	1.00	ND	ug/L	U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Seep 1
18G0339-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED

Sampled: 07/27/2018 11:00

Instrument: ICPMS2

Analyzed: 02-Aug-2018 19:49

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	5	0.110	1.00	2.29	ug/L	D
Copper, Dissolved	7440-50-8	5	1.70	2.50	3.23	ug/L	D
Nickel, Dissolved	7440-02-0	5	0.250	2.50	1.86	ug/L	J, D
Zinc, Dissolved	7440-66-6	5	4.10	20.0	10.7	ug/L	J, D



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:44
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Seep 1
18G0339-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A Sampled: 07/27/2018 11:00
Instrument: CVAA Analyzed: 30-Jul-2018 10:02

Sample Preparation: Preparation Method: TWM EPA 7470A
Preparation Batch: BGG0727 Sample Size: 20 mL
Prepared: 30-Jul-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000100	ND	mg/L	U

Sample Preparation: Preparation Method: TLM EPA 7470A low level
Preparation Batch: BGJ0340 Sample Size: 20 mL
Prepared: 10-Oct-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000020	0.000039	mg/L	H



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Seep 2
18G0339-03 (Water)

Metals and Metallic Compounds

Method: EPA 6020A

Sampled: 07/27/2018 12:30

Instrument: ICPMS2

Analyzed: 01-Aug-2018 16:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGG0723 Sample Size: 25 mL
Prepared: 30-Jul-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	10	0.180	2.00	0.290	ug/L	J, D
Lead	7439-92-1	10	0.680	1.00	ND	ug/L	U
Silver	7440-22-4	10	0.170	2.00	ND	ug/L	U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Seep 2
18G0339-03 (Water)

Metals and Metallic Compounds

Method: EPA 6020A UCT-KED

Sampled: 07/27/2018 12:30

Instrument: ICPMS2

Analyzed: 01-Aug-2018 16:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGG0723 Sample Size: 25 mL
Prepared: 30-Jul-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	10	0.220	2.00	2.12	ug/L	D
Copper	7440-50-8	10	3.40	5.00	ND	ug/L	U
Nickel	7440-02-0	10	0.500	5.00	1.88	ug/L	J, D
Zinc	7440-66-6	10	8.20	40.0	14.8	ug/L	J, D



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Seep 2
18G0339-03 (Water)

Metals and Metallic Compounds

Method: EPA 7470A Sampled: 07/27/2018 12:30
Instrument: CVAA Analyzed: 30-Jul-2018 09:34

Sample Preparation: Preparation Method: TWM EPA 7470A
Preparation Batch: BGG0726 Sample Size: 20 mL
Prepared: 30-Jul-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000100	ND	mg/L	U

Sample Preparation: Preparation Method: TLM EPA 7470A low level
Preparation Batch: BGJ0338 Sample Size: 20 mL
Prepared: 10-Oct-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000020	0.000024	mg/L	H



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Seep 2
18G0339-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 07/27/2018 12:30

Instrument: NT3

Analyzed: 30-Jul-2018 17:43

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGG0743 Sample Size: 10 mL
Prepared: 30-Jul-2018 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	96.2	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	97.9	%	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Seep 2
18G0339-03 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM

Sampled: 07/27/2018 12:30

Instrument: NT11

Analyzed: 08-Aug-2018 13:49

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0753 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel
Cleanup Batch: CGG0222 Initial Volume: 0.5 mL
Cleaned: 31-Jul-2018 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.010	ND	ug/L	U
2-Methylnaphthalene	91-57-6	1	0.010	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.010	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.010	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.010	ND	ug/L	U
Anthracene	120-12-7	1	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10			42-120 %	75.6	%	
Surrogate: Dibenzo[a,h]anthracene-d14			29-120 %	109	%	
Surrogate: Fluoranthene-d10			57-120 %	93.9	%	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Seep 2
18G0339-03 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 07/27/2018 12:30

Instrument: FID3

Analyzed: 01-Aug-2018 18:08

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BGG0764 Sample Size: 500 mL
Prepared: 31-Jul-2018 Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)		1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			50-150 %	83.1	%	

Data File: \\target\share\chem2\FID3b,1\20180801_b\318H0130.D

Date: 01-AUG-2018 18:08

Client ID:

Sample Info: 18G0339-03

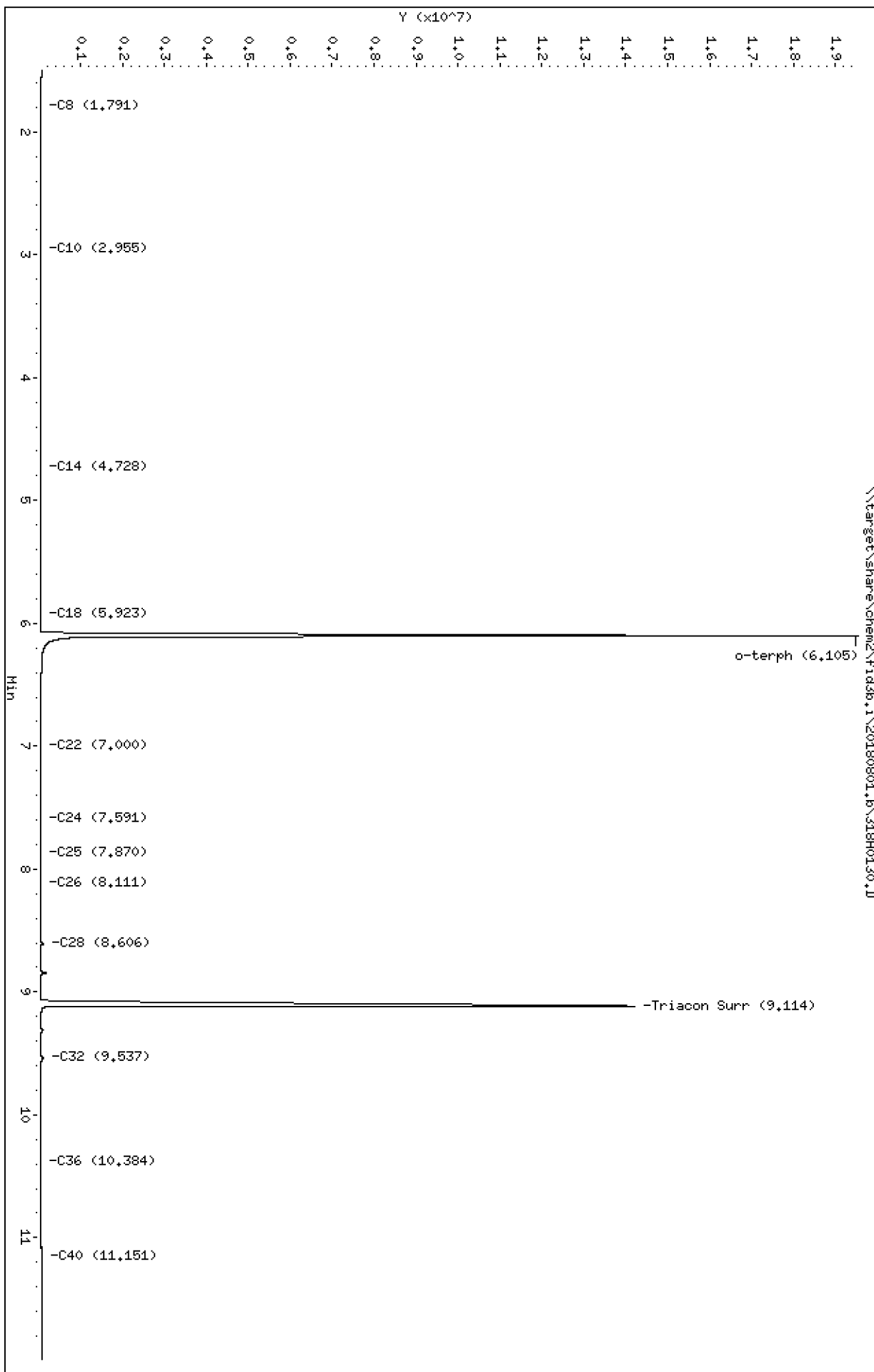
Column phase: RTX-1

Instrument: FID3b,1

Operator: JGR

Column diameter: 0.25

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Analytical Resources Inc.
TPH Quantitation Report

Data file: 20180801.b/318H0130.D
Method: 20180801.b\FID3TPH.m
Instrument: fid3b.i
Operator: JGR
Report Date: 08/02/2018
Macro: FID3_072018

ARI ID: 18G0339-03
Client ID:
Injection: 01-AUG-2018 18:08
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc(mg per L)
Toluene	1.512	-0.014	35070	147815	WATPHG	(Tol-C12)	340675	1.9
C8	1.791	0.033	6469	13082	WATPHD	(C12-C24)	210607	1.2
C10	2.955	-0.024	7697	35200	WATPHM	(C24-C38)	777837	5.3
C12	----				AK102	(C10-C25)	281362	1.4
C14	4.728	0.017	4051	9694	AK103	(C25-C36)	704849	6.7
C16	----				OR.DIES	(C10-C28)	447728	2.2
C18	5.923	-0.016	2687	6443				
C20	----							
C22	7.000	-0.038	3201	3087				
C24	7.591	0.012	4836	18981				
C25	7.870	0.027	8421	33276	KEROSEN	(Tol-C18)	438159	1.9
C26	8.111	0.007	3400	5783				
C28	8.606	-0.000	67488	87786	IT.DIES	(C10-C24)	281362	1.4
C32	9.537	0.001	52339	116928				
C34	----							
Filter Peak	----							
C36	10.384	0.010	8195	17517	BUNKERC	(C10-C38)	1059199	17.1
o-terph	6.105	-0.000	19496472	21834884				
Triacon Surr	9.114	0.000	14160081	19730576				

Range Times: NW Diesel(3.985 - 7.628) NW Gas(1.476 - 3.985) NW M.Oil(7.628 - 10.821)
AK102(2.929 - 7.794) AK103(7.794 - 10.424) Jet A(2.929 - 5.989)

Surrogate	Area	Amount
o-Terphenyl	21834884	93.5
Triacontane	19730576	100.8

Analyte	RF	Curve Date
o-Terph Surr	233493.9	25-MAY-2018
Triacon Surr	195771.2	25-MAY-2018
Gas	179445.5	xx-xx-xxxx
Diesel	171841.0	25-MAY-2018
Motor Oil	146298.0	25-MAY-2018
AK102	203004.0	25-MAY-2018
AK103	105393.0	05-JUN-2018
Kerosene	234790.8	07-JUN-2018
OR Diesel	203892.0	25-MAY-2018
IT Diesel	202556.0	25-MAY-2018
Bunker C	61842.2	20-JUL-2018



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:44
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Seep 2
18G0339-03 (Water)

Wet Chemistry

Method: SM 2540 D-97 Sampled: 07/27/2018 12:30
Instrument: BAL2 Analyzed: 30-Jul-2018 06:44

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BGG0728 Sample Size: 920 mL
Prepared: 30-Jul-2018 Final Volume: 1000 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Suspended Solids		1	1	1	2	mg/L	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Seep 2
18G0339-03 (Water)

Wet Chemistry

Method: SM 4500-CN⁻ E-99

Sampled: 07/27/2018 12:30

Instrument: UV1800-2

Analyzed: 30-Jul-2018 15:08

Sample Preparation:

Preparation Method: No Prep - Volatiles

Preparation Batch: BGG0737

Sample Size: 50 mL

Prepared: 30-Jul-2018

Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Cyanide, Total	57-12-5	1	0.0050	0.0050	0.0110	mg/L	



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Seep 2
18G0339-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A Sampled: 07/27/2018 12:30
Instrument: ICPMS1 Analyzed: 03-Aug-2018 15:14

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony, Dissolved	7440-36-0	5	0.0900	1.00	0.235	ug/L	J, D

Instrument: ICPMS2 Analyzed: 02-Aug-2018 19:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead, Dissolved	7439-92-1	5	0.340	0.500	ND	ug/L	U
Silver, Dissolved	7440-22-4	5	0.0850	1.00	ND	ug/L	U



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Project: Tacoma Coal Gasification Site
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Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Seep 2
18G0339-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020A UCT-KED

Sampled: 07/27/2018 12:30

Instrument: ICPMS2

Analyzed: 02-Aug-2018 19:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BGH0044 Sample Size: 25 mL
Prepared: 02-Aug-2018 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	5	0.110	1.00	2.23	ug/L	D
Copper, Dissolved	7440-50-8	5	1.70	2.50	2.36	ug/L	J, D
Nickel, Dissolved	7440-02-0	5	0.250	2.50	1.55	ug/L	J, D
Zinc, Dissolved	7440-66-6	5	4.10	20.0	13.6	ug/L	J, D



Dalton, Olmsted & Fuglevand, Inc
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Reported:
10-Oct-2018 15:44

Seep 2
18G0339-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A Sampled: 07/27/2018 12:30
Instrument: CVAA Analyzed: 30-Jul-2018 10:04

Sample Preparation: Preparation Method: TWM EPA 7470A
Preparation Batch: BGG0727 Sample Size: 20 mL
Prepared: 30-Jul-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000100	ND	mg/L	U

Sample Preparation: Preparation Method: TLM EPA 7470A low level
Preparation Batch: BGJ0340 Sample Size: 20 mL
Prepared: 10-Oct-2018 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000020	0.000026	mg/L	H



Dalton, Olmsted & Fuglevand, Inc
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Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Trip Blank
18G0339-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 07/27/2018 00:00

Instrument: NT3

Analyzed: 30-Jul-2018 14:14

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGG0743 Sample Size: 10 mL
Prepared: 30-Jul-2018 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	98.8	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	98.9	%	



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6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Volatile Organic Compounds - Quality Control

Batch BGG0743 - EPA 5030 (Purge and Trap)

Instrument: NT3

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0743-BLK1)				Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 10:31						
Benzene	ND	0.20	ug/L							U
Toluene	ND	0.20	ug/L							U
Ethylbenzene	ND	0.20	ug/L							U
m,p-Xylene	ND	0.40	ug/L							U
o-Xylene	ND	0.20	ug/L							U
<i>Surrogate: Toluene-d8</i>	4.90		ug/L	5.00		98.0	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	4.91		ug/L	5.00		98.2	80-120			



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Volatile Organic Compounds - Quality Control

Batch BGG0743 - EPA 5030 (Purge and Trap)

Instrument: NT3

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0743-BS1)		Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 08:47								
Benzene	11.0	0.20	ug/L	10.0		110	80-120			
Toluene	10.7	0.20	ug/L	10.0		107	80-120			
Ethylbenzene	11.3	0.20	ug/L	10.0		113	80-120			
m,p-Xylene	22.7	0.40	ug/L	20.0		113	80-121			
o-Xylene	11.4	0.20	ug/L	10.0		114	80-121			
Surrogate: Toluene-d8	5.08		ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	4.94		ug/L	5.00		98.9	80-120			



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Reported:
10-Oct-2018 15:44

Volatile Organic Compounds - Quality Control

Batch BGG0743 - EPA 5030 (Purge and Trap)

Instrument: NT3

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BGG0743-BSD1)		Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 09:13								
Benzene	11.1	0.20	ug/L	10.0		111	80-120	0.81	30	
Toluene	10.8	0.20	ug/L	10.0		108	80-120	1.24	30	
Ethylbenzene	11.1	0.20	ug/L	10.0		111	80-120	1.43	30	
m,p-Xylene	22.2	0.40	ug/L	20.0		111	80-121	2.30	30	
o-Xylene	11.2	0.20	ug/L	10.0		112	80-121	1.50	30	
Surrogate: Toluene-d8	5.01		ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	5.07		ug/L	5.00		101	80-120			



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Semivolatile Organic Compounds - SIM - Quality Control

Batch BGG0753 - EPA 3510C SepF

Instrument: NT11

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0753-BLK1)										
				Prepared: 31-Jul-2018 Analyzed: 07-Aug-2018 11:00						
Naphthalene	ND	0.010	ug/L							U
2-Methylnaphthalene	ND	0.010	ug/L							U
1-Methylnaphthalene	ND	0.010	ug/L							U
Acenaphthylene	ND	0.010	ug/L							U
Acenaphthene	ND	0.010	ug/L							U
Dibenzofuran	ND	0.010	ug/L							U
Fluorene	ND	0.010	ug/L							U
Phenanthrene	ND	0.010	ug/L							U
Anthracene	ND	0.010	ug/L							U
Fluoranthene	ND	0.010	ug/L							U
Pyrene	ND	0.010	ug/L							U
Benzo(a)anthracene	ND	0.010	ug/L							U
Chrysene	ND	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.010	ug/L							U
Benzofluoranthenes, Total	ND	0.010	ug/L							U
Benzo(a)pyrene	ND	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.010	ug/L							U
Surrogate: 2-Methylnaphthalene-d10	0.204		ug/L	0.300		68.2	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.316		ug/L	0.300		105	29-120			Q
Surrogate: Fluoranthene-d10	0.266		ug/L	0.300		88.6	57-120			



Dalton, Olmsted & Fuglevand, Inc
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Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Semivolatile Organic Compounds - SIM - Quality Control

Batch BGG0753 - EPA 3510C SepF

Instrument: NT11

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0753-BS1)		Prepared: 31-Jul-2018 Analyzed: 07-Aug-2018 11:37								
Naphthalene	0.410	0.010	ug/L	0.300		137	37-120			*
2-Methylnaphthalene	0.258	0.010	ug/L	0.300		86.1	37-120			
1-Methylnaphthalene	0.274	0.010	ug/L	0.300		91.4	29-120			
Acenaphthylene	0.260	0.010	ug/L	0.300		86.7	41-120			
Acenaphthene	0.436	0.010	ug/L	0.300		145	41-120			*
Dibenzofuran	0.265	0.010	ug/L	0.300		88.2	38-120			
Fluorene	0.287	0.010	ug/L	0.300		95.7	43-120			
Phenanthrene	0.296	0.010	ug/L	0.300		98.5	41-120			
Anthracene	0.474	0.010	ug/L	0.300		158	40-120			*
Fluoranthene	0.304	0.010	ug/L	0.300		101	45-120			
Pyrene	0.525	0.010	ug/L	0.300		175	41-120			*
Benzo(a)anthracene	0.324	0.010	ug/L	0.300		108	42-120			
Chrysene	0.302	0.010	ug/L	0.300		101	44-120			
Benzo(b)fluoranthene	0.311	0.010	ug/L	0.300		104	44-120			
Benzo(k)fluoranthene	0.304	0.010	ug/L	0.300		101	50-120			
Benzo(j)fluoranthene	0.288	0.010	ug/L	0.300		95.8	39-160			
Benzofluoranthenes, Total	0.902	0.010	ug/L	0.900		100	46-120			
Benzo(a)pyrene	0.269	0.010	ug/L	0.300		89.6	35-120			
Indeno(1,2,3-cd)pyrene	0.293	0.010	ug/L	0.300		97.8	37-120			
Dibenzo(a,h)anthracene	0.277	0.010	ug/L	0.300		92.3	34-120			
Benzo(g,h,i)perylene	0.506	0.010	ug/L	0.300		169	38-120			*
Surrogate: 2-Methylnaphthalene-d10	0.221		ug/L	0.300		73.6	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.314		ug/L	0.300		105	29-120			Q
Surrogate: Fluoranthene-d10	0.283		ug/L	0.300		94.4	57-120			



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:44
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Petroleum Hydrocarbons - Quality Control

Batch BGG0764 - EPA 3510C SepF

Instrument: FID3

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0764-BLK1)				Prepared: 31-Jul-2018 Analyzed: 01-Aug-2018 15:32						
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
<i>Surrogate: o-Terphenyl</i>	0.178		mg/L	0.225		79.3	50-150			

Data File: \\target\share\chem2\fid3b,1\20180801_b\318H0122.D

Date: 01-AUG-2018 15:32

Client ID:

Sample Info: BCC0764-BLK1

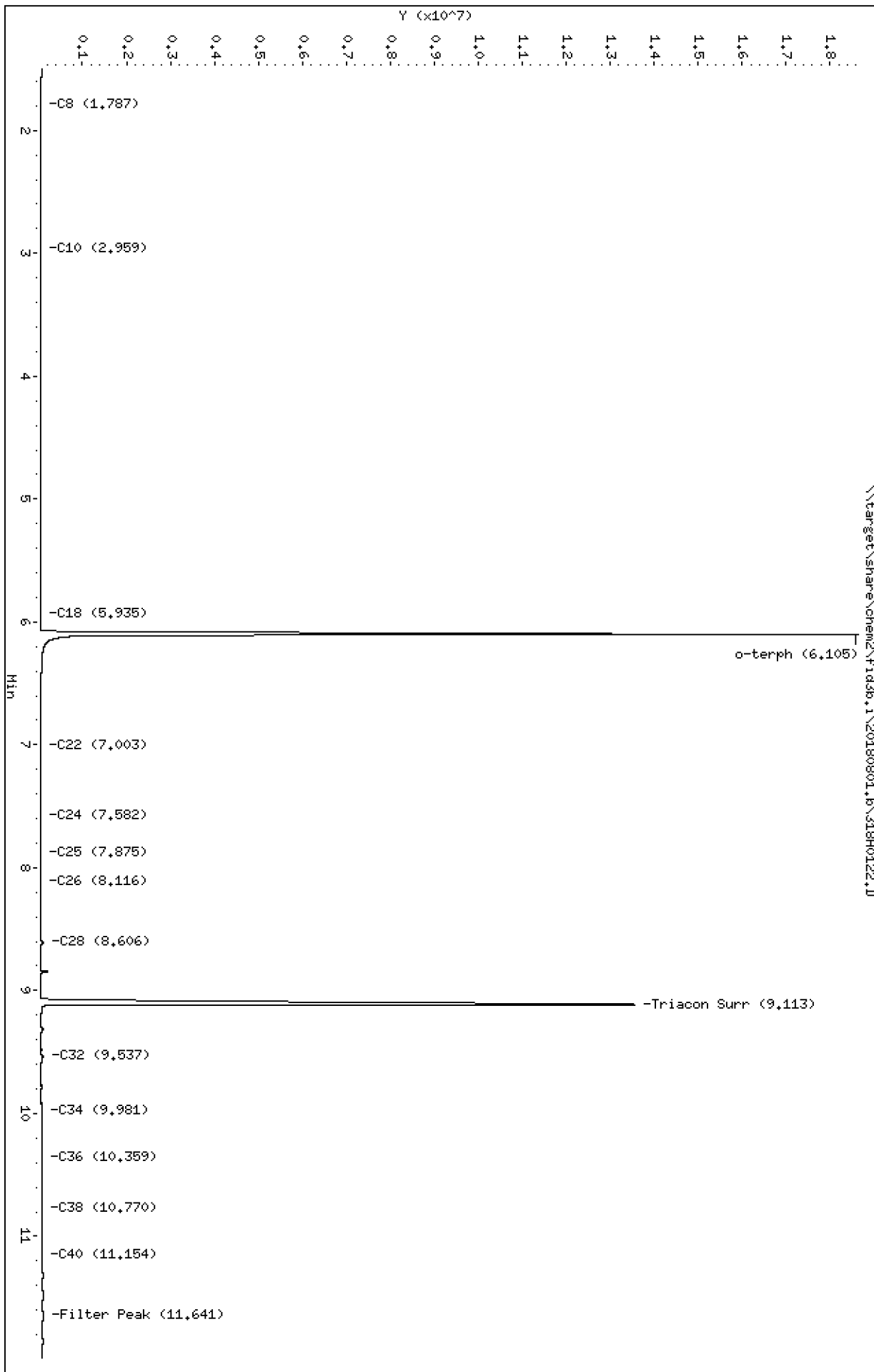
Column phase: RTX-1

Instrument: fid3b,1

Operator: JGR

Column diameter: 0.25

Page 1



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20180801.b/318H0122.D
Method: 20180801.b\FID3TPH.m
Instrument: fid3b.i
Operator: JGR
Report Date: 08/02/2018
Macro: FID3_072018

ARI ID: BGG0764-BLK1
Client ID:
Injection: 01-AUG-2018 15:32
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc(mg per L)
Toluene	----				WATPHG	(Tol-C12)	107399	0.6
C8	1.787	0.030	7474	19345	WATPHD	(C12-C24)	122464	0.7
C10	2.959	-0.020	4033	16903	WATPHM	(C24-C38)	2000467	13.7
C12	----				AK102	(C10-C25)	139367	0.7
C14	----				AK103	(C25-C36)	1312865	12.5
C16	----				OR.DIES	(C10-C28)	353062	1.7
C18	5.935	-0.004	2677	5155				
C20	----							
C22	7.003	-0.035	3211	2976				
C24	7.582	0.004	4862	4154				
C25	7.875	0.031	6710	27457	KEROSEN	(Tol-C18)	132267	0.6
C26	8.116	0.012	4982	9045				
C28	8.606	0.000	65878	117525	IT.DIES	(C10-C24)	139367	0.7
C32	9.537	0.001	53302	143507				
C34	9.981	0.017	17491	88013				
Filter Peak	11.641	-0.059	49903	251850				
C36	10.359	-0.015	21395	15308	BUNKERC	(C10-C38)	2139834	34.6
o-terph	6.105	-0.001	18598420	20838859				
Triacon Surr	9.113	-0.001	13514071	18666823				

Range Times: NW Diesel(3.985 - 7.628) NW Gas(1.476 - 3.985) NW M.Oil(7.628 - 10.821)
AK102(2.929 - 7.794) AK103(7.794 - 10.424) Jet A(2.929 - 5.989)

Surrogate	Area	Amount
o-Terphenyl	20838859	89.2
Triacontane	18666823	95.4

Analyte	RF	Curve Date
o-Terph Surr	233493.9	25-MAY-2018
Triacon Surr	195771.2	25-MAY-2018
Gas	179445.5	xx-xx-xxxx
Diesel	171841.0	25-MAY-2018
Motor Oil	146298.0	25-MAY-2018
AK102	203004.0	25-MAY-2018
AK103	105393.0	05-JUN-2018
Kerosene	234790.8	07-JUN-2018
OR Diesel	203892.0	25-MAY-2018
IT Diesel	202556.0	25-MAY-2018
Bunker C	61842.2	20-JUL-2018



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Petroleum Hydrocarbons - Quality Control

Batch BGG0764 - EPA 3510C SepF

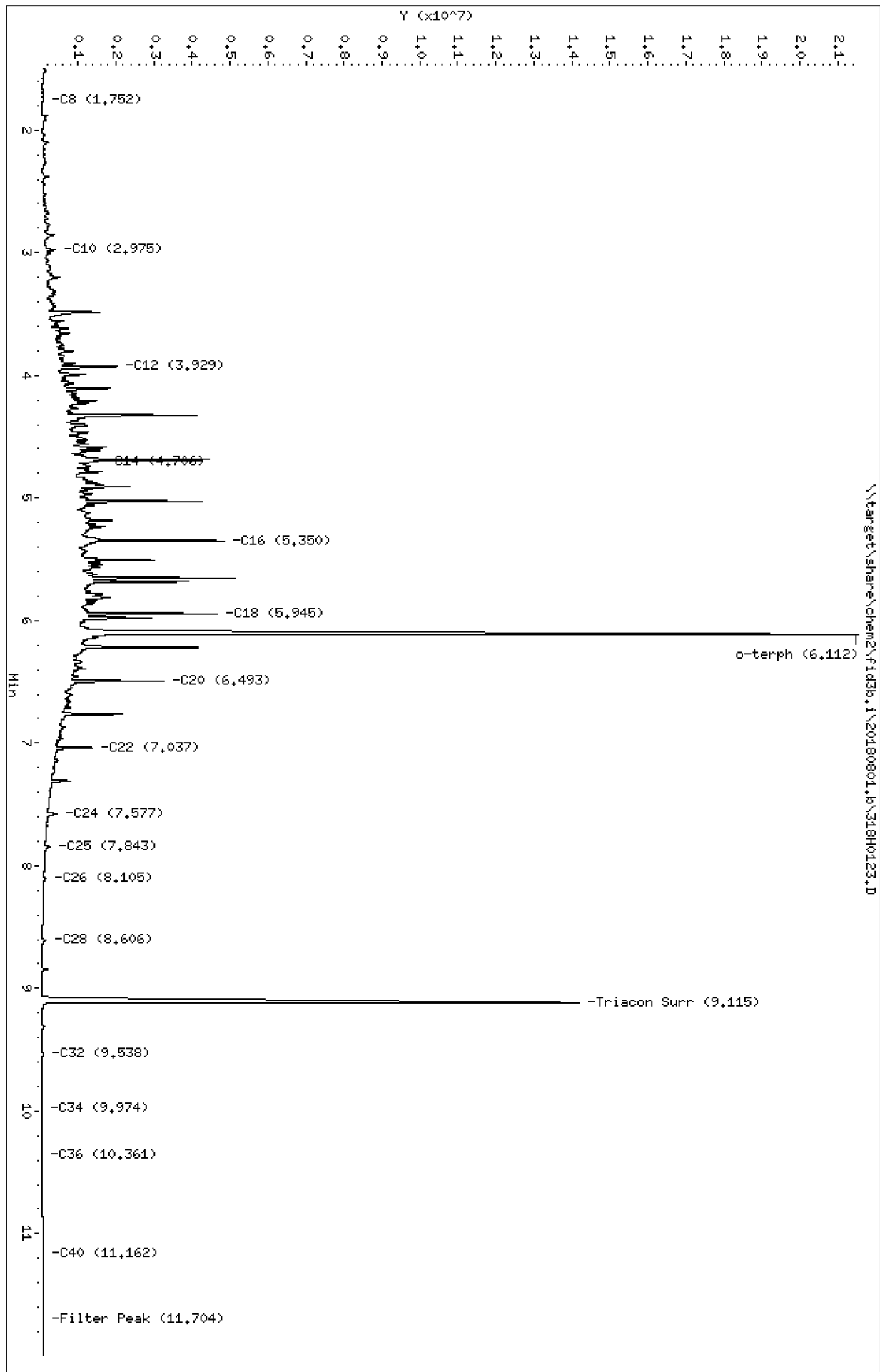
Instrument: FID3

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0764-BS1)				Prepared: 31-Jul-2018 Analyzed: 01-Aug-2018 15:52						
Diesel Range Organics (C12-C24)	2.50	0.100	mg/L	3.00		83.2	56-120			
Surrogate: <i>o</i> -Terphenyl	0.192		mg/L	0.225		85.4	50-150			

Data File: \\target\share\chem2\fid3b,1\20180801_b\318H0123.D
Date: 01-AUG-2018 15:52
Client ID:
Sample Info: BGC0764-BS1

Column phase: RTX-1

Instrument: fid3b,1
Operator: JGR
Column diameter: 0.25



Analytical Resources Inc.
TPH Quantitation Report

Data file: 20180801.b/318H0123.D
Method: 20180801.b\FID3TPH.m
Instrument: fid3b.i
Operator: JGR
Report Date: 08/02/2018
Macro: FID3_072018

ARI ID: BGG0764-BS1
Client ID:
Injection: 01-AUG-2018 15:52
Dilution Factor: 1

FID:3B RESULTS

Compound	RT	Shift	Height	Area	Method	Range	Total Area	Conc(mg per L)
Toluene	1.520	-0.006	112033	170001	WATPHG	(Tol-C12)	27877925	155.4
C8	1.752	-0.006	53964	82904	WATPHD	(C12-C24)	214564132	1248.6
C10	2.975	-0.004	350213	422758	WATPHM	(C24-C38)	3860708	26.4
C12	3.929	-0.006	1974021	2502177	AK102	(C10-C25)	238568594	1175.2 M
C14	4.706	-0.005	1481459	1488841	AK103	(C25-C36)	2617405	24.8
C16	5.350	-0.001	4793027	5869833	OR.DIES	(C10-C28)	240577590	1179.9 M
C18	5.945	0.006	4620148	4864606				
C20	6.493	0.001	3193203	3384701				
C22	7.037	-0.002	1347690	2345338				
C24	7.577	-0.001	400836	909092				
C25	7.843	-0.001	198729	594755	KEROSEN	(Tol-C18)	179127151	762.9
C26	8.105	0.001	93620	227874				
C28	8.606	0.000	94671	163859	IT.DIES	(C10-C24)	237440143	1172.2
C32	9.538	0.002	49255	106506				
C34	9.974	0.010	8404	26388				
Filter Peak	11.704	0.004	26152	32742				
C36	10.361	-0.013	9969	15067	BUNKERC	(C10-C38)	241300851	3901.9
o-terph	6.112	0.006	20175700	22435960				
Triacon Surr	9.115	0.001	14132242	19973155				

Range Times: NW Diesel(3.985 - 7.628) NW Gas(1.476 - 3.985) NW M.Oil(7.628 - 10.821)
AK102(2.929 - 7.794) AK103(7.794 - 10.424) Jet A(2.929 - 5.989)

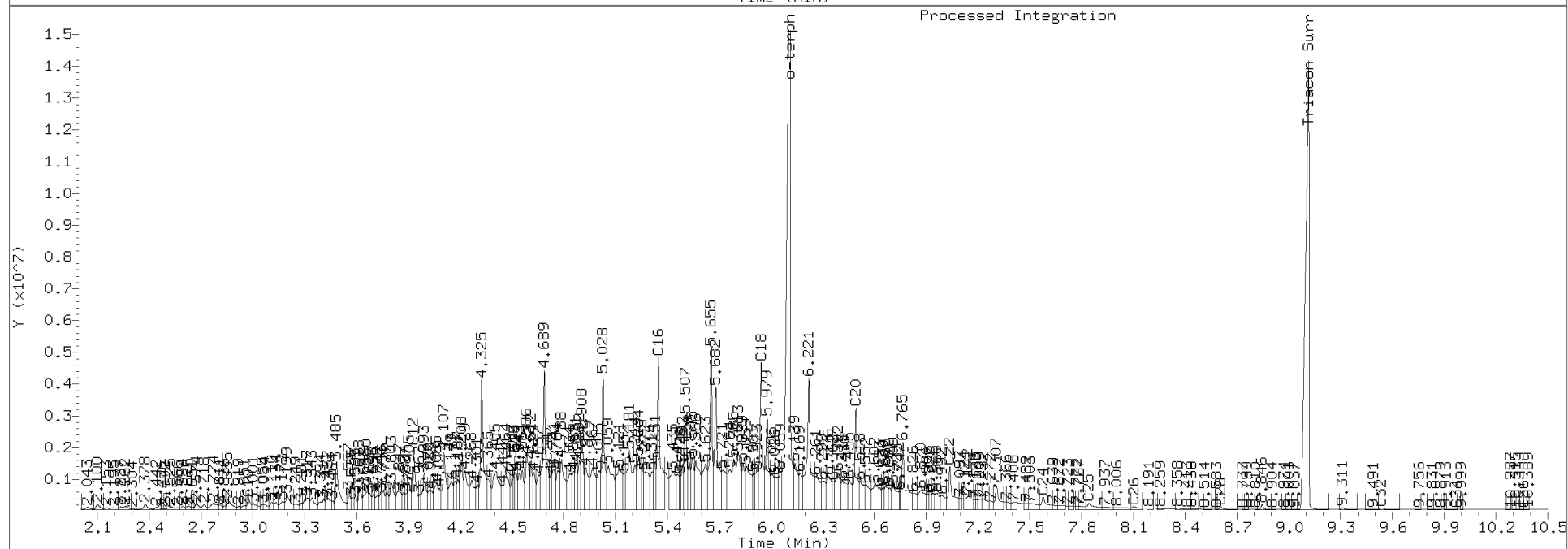
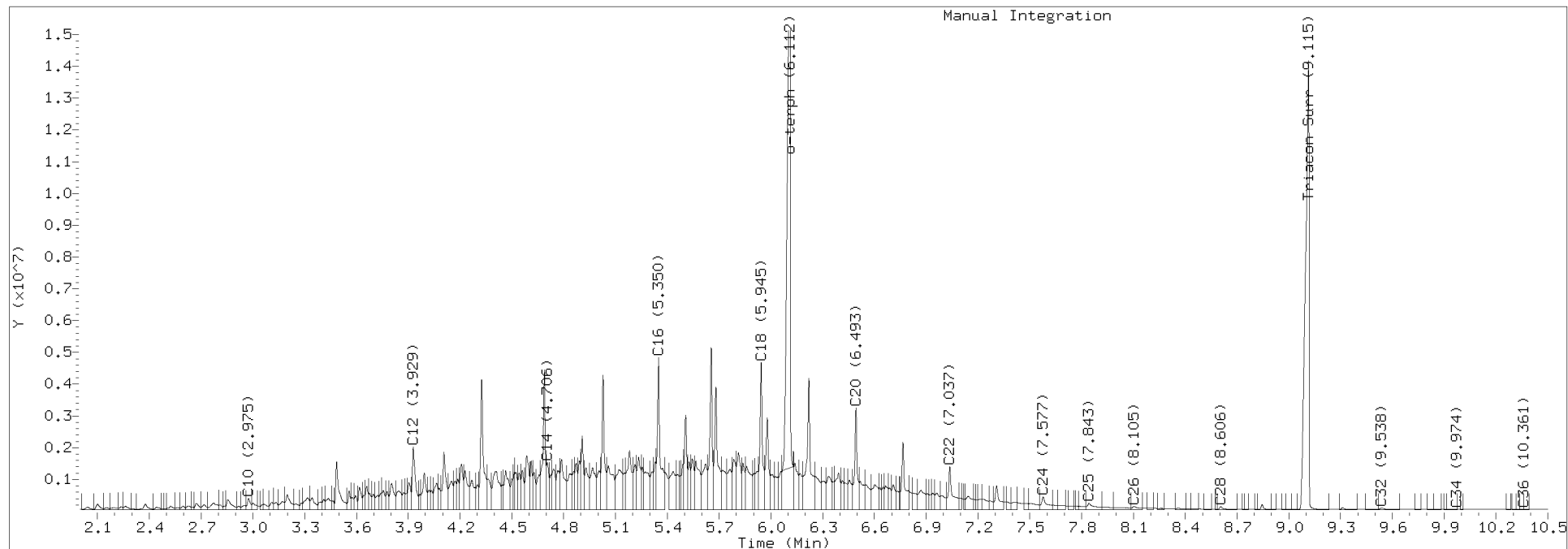
Surrogate	Area	Amount
o-Terphenyl	22435960	96.1
Triacontane	19973155	102.0

Analyte	RF	Curve Date
o-Terph Surr	233493.9	25-MAY-2018
Triacon Surr	195771.2	25-MAY-2018
Gas	179445.5	xx-xx-xxxx
Diesel	171841.0	25-MAY-2018
Motor Oil	146298.0	25-MAY-2018
AK102	203004.0	25-MAY-2018
AK103	105393.0	05-JUN-2018
Kerosene	234790.8	07-JUN-2018
OR Diesel	203892.0	25-MAY-2018
IT Diesel	202556.0	25-MAY-2018
Bunker C	61842.2	20-JUL-2018

TPH Manual Integrations Report

Datafile: FID3B, 20180801.b/318H0123.D Injection: 01-AUG-2018 15:52

Lab ID: BGG0764-BS1





Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Metals and Metallic Compounds - Quality Control

Batch BGG0723 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0723-BLK1)						Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 14:11						
Lead	208	ND	0.0680	0.100	ug/L							U
Silver	107	ND	0.0170	0.200	ug/L							U
Arsenic	75a	ND	0.0220	0.200	ug/L							U
Copper	63	ND	0.340	0.500	ug/L							U
Copper	65	ND	0.350	0.500	ug/L							U
Nickel	60	ND	0.0500	0.500	ug/L							U
Nickel	62	ND	0.220	0.500	ug/L							U
Zinc	66	ND	0.820	4.00	ug/L							U
Zinc	67	ND	0.940	4.00	ug/L							U



Dalton, Olmsted & Fuglevand, Inc
6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Metals and Metallic Compounds - Quality Control

Batch BGG0723 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0723-BLK2)						Prepared: 30-Jul-2018 Analyzed: 01-Aug-2018 14:37						
Antimony	121	0.0200	0.0180	0.200	ug/L							J
Antimony	123	ND	0.0280	0.200	ug/L							U



Dalton, Olmsted & Fuglevand, Inc
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Metals and Metallic Compounds - Quality Control

Batch BGG0723 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0723-BS1)						Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 14:15						
Lead	208	28.9	0.0680	0.100	ug/L	25.0		116	80-120			
Silver	107	27.3	0.0170	0.200	ug/L	25.0		109	80-120			
Arsenic	75a	26.9	0.0220	0.200	ug/L	25.0		108	80-120			
Copper	63	28.0	0.340	0.500	ug/L	25.0		112	80-120			
Copper	65	27.3	0.350	0.500	ug/L	25.0		109	80-120			
Nickel	60	26.9	0.0500	0.500	ug/L	25.0		108	80-120			
Nickel	62	27.2	0.220	0.500	ug/L	25.0		109	80-120			
Zinc	66	92.8	0.820	4.00	ug/L	80.0		116	80-120			
Zinc	67	86.9	0.940	4.00	ug/L	80.0		109	80-120			



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Project Number: PAP-001-08ab
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Reported:
10-Oct-2018 15:44

Metals and Metallic Compounds - Quality Control

Batch BGG0723 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0723-BS2)						Prepared: 30-Jul-2018 Analyzed: 01-Aug-2018 14:42						
Antimony	121	26.6	0.0180	0.200	ug/L	25.0		107	80-120			
Antimony	123	26.7	0.0280	0.200	ug/L	25.0		107	80-120			



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:44
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Metals and Metallic Compounds - Quality Control

Batch BGG0726 - TWM EPA 7470A

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0726-BLK1)					Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 08:55					
Mercury	ND	0.000100	mg/L							U



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6034 N Star Rd
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Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Metals and Metallic Compounds - Quality Control

Batch BGG0726 - TWM EPA 7470A

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0726-BS1)					Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 08:57					
Mercury	0.00199	0.000100	mg/L	0.00200		99.4	80-120			



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6034 N Star Rd
Ferndale WA, 98248

Project: Tacoma Coal Gasification Site
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Reported:
10-Oct-2018 15:44

Metals and Metallic Compounds - Quality Control

Batch BGJ0338 - TLM EPA 7470A low level

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGJ0338-BLK1)					Prepared: 10-Oct-2018 Analyzed: 10-Oct-2018 09:46					
Mercury	ND	0.000020	mg/L							U



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:44
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Metals and Metallic Compounds - Quality Control

Batch BGJ0338 - TLM EPA 7470A low level

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGJ0338-BS1)					Prepared: 10-Oct-2018 Analyzed: 10-Oct-2018 09:48					
Mercury	0.000212	0.000020	mg/L	0.000200		106	80-120			



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:44
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGG0727 - TWM EPA 7470A

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0727-BLK1)										
				Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 09:37						
Mercury, Dissolved	ND	0.000100	mg/L							U



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:44
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGG0727 - TWM EPA 7470A

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0727-BS1)					Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 09:39					
Mercury, Dissolved	0.00211	0.000100	mg/L	0.00200		106	80-120			



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Reported:
10-Oct-2018 15:44

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGH0044 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGH0044-BLK2)						Prepared: 02-Aug-2018 Analyzed: 03-Aug-2018 14:09						
Antimony, Dissolved	121	ND	0.0180	0.200	ug/L							U
Antimony, Dissolved	123	ND	0.0280	0.200	ug/L							U



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Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGH0044 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGH0044-BS2)						Prepared: 02-Aug-2018		Analyzed: 03-Aug-2018 14:13				
Antimony, Dissolved	121	26.9	0.0180	0.200	ug/L	25.0		108	80-120			
Antimony, Dissolved	123	26.7	0.0280	0.200	ug/L	25.0		107	80-120			



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Project: Tacoma Coal Gasification Site
Project Number: PAP-001-08ab
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Reported:
10-Oct-2018 15:44

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGH0044 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGH0044-BLK1)						Prepared: 02-Aug-2018 Analyzed: 02-Aug-2018 17:45						
Lead, Dissolved	208	ND	0.0680	0.100	ug/L							U
Silver, Dissolved	107	ND	0.0170	0.200	ug/L							U
Arsenic, Dissolved	75a	ND	0.0220	0.200	ug/L							U
Copper, Dissolved	63	ND	0.340	0.500	ug/L							U
Copper, Dissolved	65	ND	0.350	0.500	ug/L							U
Nickel, Dissolved	60	ND	0.0500	0.500	ug/L							U
Nickel, Dissolved	62	ND	0.220	0.500	ug/L							U
Zinc, Dissolved	66	ND	0.820	4.00	ug/L							U
Zinc, Dissolved	67	ND	0.940	4.00	ug/L							U



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Project Manager: Matt Dalton

Reported:
10-Oct-2018 15:44

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGH0044 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGH0044-BS1)						Prepared: 02-Aug-2018 Analyzed: 02-Aug-2018 17:49						
Lead, Dissolved	208	26.9	0.0680	0.100	ug/L	25.0		108	80-120			
Silver, Dissolved	107	27.5	0.0170	0.200	ug/L	25.0		110	80-120			
Arsenic, Dissolved	75a	26.5	0.0220	0.200	ug/L	25.0		106	80-120			
Copper, Dissolved	63	28.4	0.340	0.500	ug/L	25.0		114	80-120			
Copper, Dissolved	65	27.9	0.350	0.500	ug/L	25.0		112	80-120			
Nickel, Dissolved	60	27.7	0.0500	0.500	ug/L	25.0		111	80-120			
Nickel, Dissolved	62	26.7	0.220	0.500	ug/L	25.0		107	80-120			
Zinc, Dissolved	66	93.7	0.820	4.00	ug/L	80.0		117	80-120			
Zinc, Dissolved	67	87.8	0.940	4.00	ug/L	80.0		110	80-120			



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Project Number: PAP-001-08ab
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Reported:
10-Oct-2018 15:44

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGJ0340 - TLM EPA 7470A low level

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGJ0340-BLK1)					Prepared: 10-Oct-2018 Analyzed: 10-Oct-2018 12:28					
Mercury, Dissolved	ND	0.000020	mg/L							U



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:44
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BGJ0340 - TLM EPA 7470A low level

Instrument: CVAA

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGJ0340-BS1)					Prepared: 10-Oct-2018 Analyzed: 10-Oct-2018 12:31					
Mercury, Dissolved	0.000217	0.000020	mg/L	0.000200		108	80-120			



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:44
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Wet Chemistry - Quality Control

Batch BGG0728 - No Prep Wet Chem

Instrument: BAL2

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0728-BLK1)						Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 06:44					
Suspended Solids	ND	1	1	mg/L							U



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:44
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Wet Chemistry - Quality Control

Batch BGG0728 - No Prep Wet Chem

Instrument: BAL2

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0728-BS1)						Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 06:44					
Suspended Solids	50	1	1	mg/L	50.00		99.4	90-110			



Dalton, Olmsted & Fuglevand, Inc 6034 N Star Rd Ferndale WA, 98248	Project: Tacoma Coal Gasification Site Project Number: PAP-001-08ab Project Manager: Matt Dalton	Reported: 10-Oct-2018 15:44
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Wet Chemistry - Quality Control

Batch BGG0737 - No Prep - Volatiles

Instrument: UV1800-2

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGG0737-BLK1)						Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 15:03					
Cyanide, Total	ND	0.0050	0.0050	mg/L							U



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6034 N Star Rd
Ferndale WA, 98248

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10-Oct-2018 15:44

Wet Chemistry - Quality Control

Batch BGG0737 - No Prep - Volatiles

Instrument: UV1800-2

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGG0737-BS1)						Prepared: 30-Jul-2018 Analyzed: 30-Jul-2018 15:04					
Cyanide, Total	0.143	0.0050	0.0050	mg/L	0.151		94.5	75-125			



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Certified Analyses included in this Report

Analyte	Certifications
EPA 6020A in Water	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Antimony-121	NELAP,WADOE,DoD-ELAP
Antimony-123	NELAP
Silver-107	WA-DW,DoD-ELAP,NELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Antimony-121	NELAP,WADOE,DoD-ELAP
Antimony-123	NELAP,WADOE,DoD-ELAP
EPA 6020A UCT-KED in Water	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Zinc-66	WADOE,WA-DW,DoD-ELAP
Zinc-67	WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP
EPA 7470A in Water	
Mercury	WADOE,NELAP,DoD-ELAP,CALAP
Mercury	WADOE,NELAP,DoD-ELAP,CALAP
Mercury	WADOE,NELAP,DoD-ELAP,CALAP
Mercury	WADOE,NELAP,DoD-ELAP,CALAP
EPA 8260C in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE



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Acrolein	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,CALAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Butanone	DoD-ELAP,NELAP,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE



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1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8270D-SIM in Water

Naphthalene	ADEC,DoD-ELAP,NELAP,CALAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,CALAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,CALAP,WADOE
Biphenyl	NELAP
Acenaphthylene	ADEC,DoD-ELAP,NELAP,CALAP,WADOE
Acenaphthene	ADEC,DoD-ELAP,NELAP,CALAP,WADOE
Dibenzofuran	ADEC,DoD-ELAP,NELAP,CALAP



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Fluorene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Phenanthrene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Anthracene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Carbazole	NELAP
Fluoranthene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Pyrene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Benzo(a)anthracene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Chrysene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Benzo(b)fluoranthene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Benzo(k)fluoranthene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Benzo(j)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(e)pyrene	NELAP
Benzo(a)pyrene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Perylene	ADEC, NELAP, CALAP
Indeno(1,2,3-cd)pyrene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Dibenzo(a,h)anthracene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE
Benzo(g,h,i)perylene	ADEC, DoD-ELAP, NELAP, CALAP, WADOE

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C24-C38)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP, NELAP, WADOE
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP, NELAP, WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP, NELAP, WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP, NELAP, WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP, NELAP, WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP, NELAP, WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP, NELAP, WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP, NELAP, WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP, NELAP, WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP, NELAP, WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP, NELAP, WADOE

SM 2540 D-97 in Water



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Suspended Solids DoD-ELAP,WADOE,NELAP

SM 4500-CN⁻ E-99 in Water

Cyanide, Total WADOE,WA-DW,NELAP,DoD-ELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	02/07/2019
CALAP	California Department of Public Health CAELAP	2748	06/30/2019
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-011	05/12/2019
WADOE	WA Dept of Ecology	C558	06/30/2019
WA-DW	Ecology - Drinking Water	C558	06/30/2019



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Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
- J Estimated concentration value detected below the reporting limit.
- H Hold time violation - Hold time was exceeded.
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D1 Surrogate was not detected due to sample extract dilution
- D The reported value is from a dilution
- * Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.