PETROLEUM RELEASE FORM

TMB

Please Check All That Apply

INCIDENT INFORMATION

RECEIVED BY: (Dept. use only) TL

LOG NBR: (Dept. use only) 04-99-1193

DATE REPORTED: (today's date) 10/20/99

SITE NAME: Highway Service

SITE ADDRESS: 3108 Marine Dr.

☐ NON-REGULATED UST

SITE CITY: Astoria ZIP: 97103

☑ REGULATED UST & FAC NBR: 6897

SITE COUNTY: Tillamook PHONE:

☐ HEATING OIL TANK

MAIL CONTACTS

REPORTED BY (person reporting this release to the Dept.)

NAME: David Franklin

COMPANY: 3-Kings Environmental

ADDRESS:

CITY: ZIP:

STATE: PHONE: 360-887-5464

EMAIL:

RESPONSIBLE PARTY (person responsible for remedial action)

NAME: Cary Becktalt

COMPANY: Neimi Oil

ADDRESS: 490 Industrial St

CITY: Astoria ZIP: 97103

STATE: OR PHONE: 503-325-1972

EMAIL:

INVOICE CONTACT (required, may be same as responsible party)

NAME:

COMPANY:

ADDRESS:

CITY: ZIP:

STATE: PHONE:

OTHER CONTACT(S) (not required)

NAME:

COMPANY:

ADDRESS:

CITY: ZIP:

STATE: PHONE:

SITE ASSESSMENT

DATE DISCOVERED: 10/18/99 **DATE TANK IS EMPTY:** 10/18/99

CONFIRMATION:

- ☐ SI) STAFF: DEQ
- ☐ LD) LAB: DEQ
- ☐ LR) LAB: RP
- ☐ LO) LAB: OTHER
- ☐ RR) RP REPORT
- ☑ CN) CONTRACTOR
- ☐ OT) OTHER

DISCOVERY:

- ☐ RM) ROUTINE MONITORING
- ☑ DC) DECOMMISSIONING
- ☐ CP) COMPLAINT
- ☐ IC) INVENTORY CONTROL
- ☐ SA) SITE ASSESSMENT
- ☐ TT) TANK TEST
- ☐ OT) OTHER

CAUSE:

- ☐ TL) TANK LEAK
- ☐ PL) PIPE LEAK
- ☐ OF) OVERFILL
- ☐ SS) SURFACE SPILL
- ☐ PV) PUMP/VALVE LEAK
- ☐ OT) OTHER
- ☐ UN) UNKNOWN

CONTAMINANTS

- ☐ UG) UNLEADED GASOLINE
- ☐ LG) LEADED GASOLINE
- ☐ MG) MISC. GASOLINE
- ☐ DS) DIESEL (motor fuel)
- ☑ WO) WASTE OIL
- ☐ HO) HEATING OIL
- ☐ LB) LUBRICANT
- ☐ SV) SOLVENT
- ☐ OP) OTHER PET. DIST
- ☐ CH) CHEMICAL
- ☐ OT) OTHER
- ☐ UN) UNKNOWN

IMPACTS

- ☑ SL) SOIL
- ☐ GW) GROUNDWATER
- ☐ SW) SURFACE WATER
- ☐ DW) DRINKING WATER
- ☐ FV) FACILITY OR BUILDING (VAPOR)
- ☐ FP) FACILITY OR BUILDING (FREE PRODUCT.)

SITE-MANAGEMENT (THIS SECTION DEPT. USE ONLY)

RELEASE STOPPED: 10/18/99

FINAL REQUEST INVOICE DATE: 5/26/09 KD

CLEANUP STARTED: 10/18/99

NO FURTHER ACTION: 1/7/11 CK

NOTES/COMMENTS:

FILE NAME: (Niemi) Highway Service LOG NO. 04-99-1193

NWR'S NFA TRACKING CHECKLIST

ROUTE TO	ACTIVITY	RESPONSIBLE PERSON	DATE COMPLETED
RAH	UST database checked by Project Manager (PM) to make sure fees paid and tanks closed and verify w/ Greg UST compliance issues have been resolved	RAH	~~[illegible]~~
RAH	OTIS updated with soil disposal, public notice, site status in comments not file status field and other applicable information by PM	RAH / ~~RAH~~ Public comment due 4/10/09	1/21/09 ~~1/21/2009~~
RAH	Draft NFA prepared by PM and submitted to NRS-4 Hydro or Manager for review	RAH	1/21/2009
BR MK	Draft NFA approved by NRS-4 Hydro ~~Or~~ Manager, ~~if~~ necessary) and submitted for data entry where	Bill Robertson / MK	3/17/2009 / 3/6/09
~~LK~~ LB	To Administrative staff for proofreading letter and verify staff completed cost recovery entry	LB	5/22/09
~~SK~~ KD	SEQUENT and green sheet updated with final invoice request date	KD	5/26/09
—	**OPTIONAL STEP:** Expedited payment request by responsible party (RP) is handled by ==========>>	—	—
—	**OPTIONAL STEP:** Estimated Expedited Payment Amount given to RP by ==========>>	—	—
~~MMS or~~ LK	Final invoice paid notice received from Business Office; PM informed by ~~Julie~~ Lynne; ~~Julie~~ verify SITE TYPE/STATUS is updated and correct, PM end date	LK	1/3/11
RAH	Final NFA drafted and signed by PM (and Manager, if necessary) and send for data entry	RAH BHR	1/6/11 1/6/11
LK	SEQUENT updated with filed closed information and file closure activities complete	LK	1/10/11
~~DW~~	Copies made (including copy of NFA, EES, enclosures, attachments, if applicable, and release form for NFA binders) and mailed	LK / DW ↓	1/10/11

NFA PROCESS COMPLETE

? * check open files for additional files. File to closed

(6/14/06) * days Hydro Review Prior to Notice, + waiting on information

file

Oregon
John A. Kitzhaber, MD, Governor

Department of Environmental Quality
Nortwest Region Portland Office
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-4987
(503) 229-5263
Fax: (503) 229-6945
TTY: (800) 736-2900

7 January 2011

CARY BECHTOLT
ETU OIL/NIEMI OIL
PO BOX 989
ASTORIA OR 97103

Re: Highway Service
UST Cleanup File No. 04-99-1193
UST Facility ID. No. 6897

Dear Mr. Bechtolt:

The Department of Environmental Quality (DEQ) has completed its review of the information submitted to date, regarding the underground storage tank (UST) investigation and cleanup conducted at 3108 Marine Drive in Astoria, Oregon. DEQ has determined that the cleanup appears to have met the requirements of Oregon Administrative Rules (OAR) 340-122-0205 through 340-122-0360 and that no further action is required at this time. The site was evaluated for risk-based screening levels for urban residential, occupational, and excavation/construction worker exposure scenarios. Although the site was not evaluated for the residential scenario (determined not reasonably likely), concentrations are below residential screening levels.

This determination is a result of our evaluation and judgment based on the regulations and facts as we now understand them:

SITE HISTORY/BACKGROUND

The release was reported on 20 October 1999, by David Franklin with 3 Kings Environmental. The release was noted during decommissioning of the 550-gallon waste oil tank by 3 Kings, working for ETU/Niemi Oil. The current property owner is ETU, Inc.

The site is currently an active commercial fueling facility. Currently, two-four thousand gallon gasoline USTs and one 1,500 gallon gasoline UST are located on the central portion of the property. The site is currently zoned general commercial (C-3).

UST DECOMMISSIONING

In October 1999, the waste oil UST was decommissioned by removal. The tank was located off the northeast corner of the building. Two soil samples were collected from the base of the tank pit. Up to 78,000 parts per million (ppm) of heavy oil were detected at approximately 6 feet below ground surface (bgs). The tank was taken to Part Time Auto Wrecking in Ilwaco, Washington. Tank product/rinsate was transported to Harbor Oil in Portland, Oregon for recycling.

EXTENT OF CONTAMINATION DEFINED

The subject property is topographically divided near the center where a retaining wall exists. Subsurface investigations indicate geology generally consists of the following: upper area of site: silty, sandy gravels to between 12 and 15 feet bgs, fine to medium sands and clays to approximately 30 feet bgs, and bedrock was encountered at approximately 30 feet bgs. On the lower area of the property, sand was observed to the total depth of 15 feet bgs (MW-4).

In October 2003, an initial subsurface investigation was completed, which included a prior magnetometer/ground penetrating radar survey. The survey did not note any unusual anomalies. Six borings, GP-1 through GP-6 were installed on the subject property. In the vicinity of the waste oil tank, soil samples were collected and analyzed by hydrocarbon identification (HCID), quantifiable total petroleum hydrocarbons (TPH), and other required constituents as needed. Other samples collected from other portions of the property not relating to the waste oil tank were analyzed by HCID (and not quantifiable TPH), which is acceptable. Soil analytical results from all borings indicate that petroleum was not detected, with the exception of GP-3. At GP-3, up to 11 ppm of diesel and 85 ppm of heavy oil were detected at 17 feet bgs.

Groundwater was encountered at approximately 19 feet below ground surface (bgs). TPH as gasoline {86 parts per billion (ppb)} was detected in boring GP-1, which was installed on the southwest portion of the property and not believed to be related to the waste oil release. In the vicinity of the waste oil UST (boring GP-2), the following TPH were detected: gasoline-39 ppb, diesel-3,200 ppb, and heavy oil-110 ppb. Benzene was not detected with a detection limit of 0.5 ppb.

In October 2004, three additional borings were installed (borings B-7 through B-9) in the vicinity of the waste oil tank and in an assumed hydraulically downgradient direction. Soil samples were analyzed for TPH and constituents as necessary. Analytical results in the vicinity of the waste oil tank (boring B-7) indicate that up to 2,600 ppm of diesel and 12,000 ppm of heavy oil were detected at approximately 13 feet bgs. Other analytes were detected, but not at levels of significant concern.

In groundwater, TPH and constituents were detected in borings B-7 and B-8 (with the highest TPH detections at boring B-7, 2,400 ppb gasoline, 2,800 ppb diesel, and 5,100 ppb heavy oil). Results from boring B-9 indicate that select constituents were detected (with benzene at 38 ppb). Up to 53 ppb of benzene were detected at boring B-8. From these investigations, the magnitude and extent of contamination was not determined and the potential pathways considered were reported to be the following: direct contact by excavation workers, leaching to groundwater, vapor intrusion into buildings and volatilization to outdoor air.

In October 2007, four monitoring wells were installed to determine the extent of contamination and to determine groundwater quality conditions. Quarterly groundwater monitoring was initiated, which continued through September 2008. Also, three hand augers were installed one on the lower portion of the north Niemi property and two on the east adjacent property (Astoria Grooming. The monitoring wells were screened as follows: MW-1, 14-23 feet bgs, MW-2, 13-22 feet bgs, MW-3, 13.5-22.5 feet, and MW-4, 5.5-14.5 feet (note there is a significant change of topography at the north boundary of the subject site, which is why there is a disparity in the screened interval at MW-4). During monitoring, groundwater was measured between approximately 14 and 17 feet below top of casing (btc) at MW-1 through 3 and between approximately 4.5 and 7 feet btc at MW-4. Groundwater flow has been generally toward the north at the site.

Initial results indicated that petroleum and constituents were not detected at MW-1, MW-2 and MW-4. At MW-3, the following TPH and constituents, which were considered more significant, were detected: gasoline-1,350 ppb, diesel-522 ppb, benzene 31.9 ppb and ethylbenzene 19.6 ppb (note the highest benzene concentration was 100 ppb). The following quarters showed similar results. Petroleum was not detected in groundwater from the hand auger borings. With that, the magnitude and extent of contamination were considered defined.

REMEDIAL ACTIONS AND COMPLIANCE MONITORING/SAMPLING

No remedial actions occurred at the site.

CURRENT AND FUTURE GROUNDWATER BENEFICIAL USE DETERMINATION

Regarding groundwater use, the following were presented:

-The locality of the facility was determined to be within the subject property only (which includes the lower area of topography), but with the possibility of some low level petroleum-contaminated groundwater extending into the alley, which was detected in temporary well points on the subject property.
-Water is provided by the city of Astoria.
-The strata were noted to be low yielding (and by reported purging observations).
-The closest surface water is the Columbia River, which is located approximately 550 feet toward the north. The river is not in the locality of the facility (LOF) or area of contamination and residual contamination is not expected to migrate toward the river.

-A water well search was completed through the Oregon Water Resources Department (OWRD) database. The search indicates that four water supply wells were located in Sections 21 and 24, which are located greater than 1.5 miles from the LOF.

Based on the above and the explanations set forth, it appears there is no beneficial use of groundwater at the site and there is no intention to use groundwater.

CURRENT AND FUTURE LAND USE DETERMINATION

The current land use is general commercial (C-3). Single- and multi-family dwellings are allowed on the property above or below a first floor commercial. Based on information submitted by Niemi, the following reasons were identified to demonstrate that residential and urban residential uses are not viable:
-There are no plans to change property use.
-The property is an irregular shape that would not make for a cost effective redevelopment (also there is a retaining wall on the property and there is an abnormal elevation difference.
-The current costs of removing the fueling station infrastructure.
-The site is located in the vicinity of the Astoria landslide area (across Marine Drive).

Based on the above-submitted information, residential use does not appear feasible (which was not evaluated by representatives for Niemi).

CONTAMINANTS OF INTEREST (COIs)

The potential sources of contamination at the site are total petroleum hydrocarbons as gasoline, diesel, and heavy/waste oils. The contaminants of interest include benzene, toluene, ethylbenzene, total xylenes, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, isopropylbenzene, n-propylbenzene, naphthalene, methyl t-butyl ether, ethylene dibromide, ethylene dichloride, , polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls, cadmium, chromium, and lead. The petroleum constituents are volatile and semi volatile components of total petroleum hydrocarbons that DEQ evaluates to determine any potential risks to human or ecological receptors and to the environment in general.

CONTAMINANANTS OF POTENTIAL CONCERN (COPCs)

COPCs were not reported in the final closure request. However, the detected TPH and constituents were identified in reporting. As a result, all COIs detected (and identified by RSV) were considered COPCs by DEQ.

CONCEPTUAL SITE MODEL AND RISK-BASED DETERMINATION

Based on the evaluation and current site use, the following receptors were identified and evaluated for this cleanup: occupational and excavation and construction workers. The urban residential pathway was also evaluated. Note, while residential use was demonstrated to be unlikely, remaining soil and groundwater concentrations are within residential screening levels.

The following exposure pathways were considered for evaluation: for soil- vapor intrusion into buildings, volatilization to outdoor air, and direct contact, dermal absorption and inhalation of volatiles; for groundwater- vapor intrusion into buildings and volatilization to outdoor air.

All the pathways, with the exception of dermal contact, and the inhalation pathway for heavy oil, were screened out since concentrations were below risk-based screening levels. Regarding the direct contact, dermal absorption and inhalation pathway, while there is no current exposure with this pathway, any future work in the area of remaining contamination would require appropriate safety provisions to be taken. Contaminated soil is not known to be present off-property.

The leaching to groundwater and ingestion and inhalation from tap water exposure pathways were also screened out due to results from the beneficial water use determination (BWUD).

CONTAMINANTS OF CONCERN (COCs)

Based on the risk evaluation the TPH as heavy oil was identified as a COC in soil. A pre-approved site-specific calculation was completed using a DEQ spread sheet. Following adjustments to the calculation (which was to make the screening level more conservative), the concentration of heavy oil failed to meet the screening levels established for the soil ingestion, dermal contact and inhalation exposure pathway. For current use, there is no risk. However, for any future excavation work in the area, additional precautions must be taken to protect workers from unacceptable exposure and to properly manage contaminated soil and groundwater.

As a result, DEQ has determined there is currently no risk from this localized area of residual petroleum for the exposure pathways identified as complete.

RISK MANAGEMENT

For any excavation work that occurs in the area of remaining heavy oil contamination, safety provisions should be provided to any worker and excavated soil must be properly managed.

ECOLOGICAL RISK EVALUATION

Based on the location of the fueling facility, the limited extent of contamination, the distance to the nearest surface water source (Columbia River, approximately 550 feet toward the north) and the absence of ecological impacts due to the limited size and relatively low petroleum concentrations in the remaining contaminant plume, an ecological evaluation was not deemed necessary.

PUBLIC NOTICE

A letter dated 6 March 2009, was sent to the Clatsop County Education Service {NW Regional Education Service District (ESD)}. The Northwest Regional ESD had no comments.

NFA DETERMINATION

Limited contamination remains on the former Niemi Highway Service (see attached maps from RSV Engineering 2/26/09). DEQ approves leaving this contamination because it does not currently present an unacceptable risk to human health, safety, welfare or the environment with the controls described above. DEQ's approval to leave contamination on the site was based upon present conditions, as described in documents in DEQ's files.

Any future work in the contaminated areas of the property, including any sampling, management, and disposal of contaminated soil and groundwater must be performed in accordance with DEQ regulations and policies.

DEQ recommends that monitoring wells be properly decommissioned, since construction deficiencies can develop in monitoring wells, thereby creating a liability and a possible conduit for contaminant migration. Monitoring wells that are not maintained according to OWRD standards must either be repaired or decommissioned in accordance with OWRD regulations. Please coordinate with an OWRD Regional Well Inspector regarding proper abandonment procedures and submit a copy of any monitoring well decommissioning reports to DEQ.

This determination will not apply if new or undisclosed facts show that the cleanup does not comply with the referenced rules. Specifically, this letter only applies to the UST release discussed above (unless otherwise noted) and does not apply to contamination that may have originated from Underground Injection Control systems (UICs), i.e. motor vehicle drains, septic systems, drain fields, cesspools, seepage pits, drywells, seepage trenches, and abandoned wells. It also does not apply to former pump islands or UST locations, hydraulic hoists, or other sources of contamination not addressed by this letter. If this facility has unregistered UICs you must register them with the DEQ and obtain from DEQ either Rule Authorization or a permit to operate the UIC. Please visit DEQ's website at www.deq.state.or.us/wq/groundwa/uichome.htm or call (503) 229-5945 for more information.

DEQ recommends keeping a copy of all of the documentation associated with this remedial action with the permanent facility records.

Your efforts to comply with the regulations to ensure that your facility has been adequately cleaned up have been appreciated. If you have any questions, please contact me at (503) 229-5617 or the DEQ's Northwest Region office at (503) 229-5263.

Respectfully,

Robert A. Hood, Jr., UST Cleanup Specialist
UST Cleanup Section

Bruce Gilles, Manager
UST Cleanup Section

(rah:RAH)

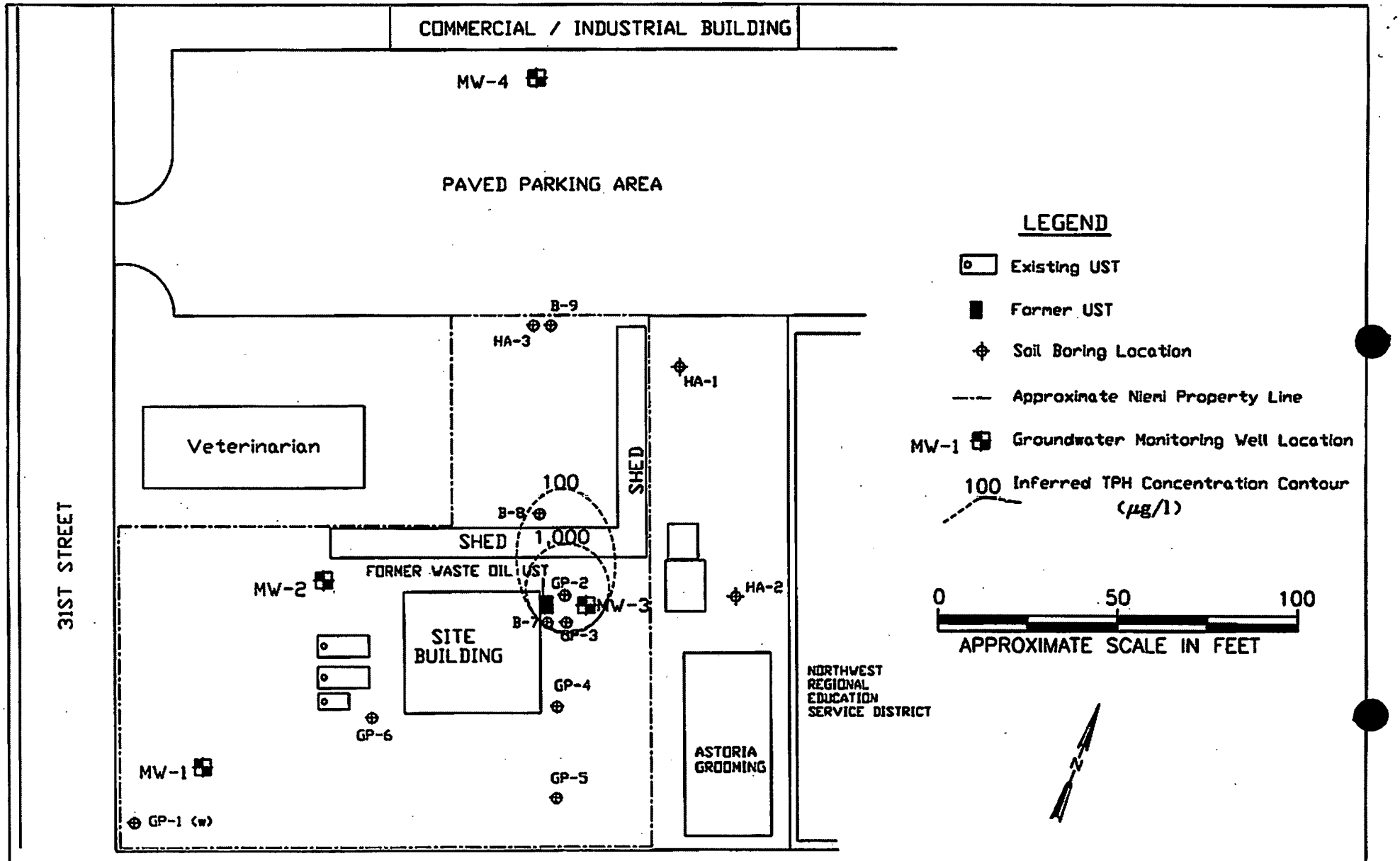
enclosures: RSV Engineering Figures 4 and 5 dated 24 January 2009

cc: NWR Monitoring Well Inspector
Oregon Water Resources Dept.
725 Summer St. NE, Ste. A
Salem, OR 97301-1270

Dan Becraft/ Brad Berrgren
RSV Engineering, Inc.
31960 SW Charbonneau Dr.
Ste. 101
Wilsonville, OR 97070

Dustin Till
Marten Law Group PLLC
1191 Second Ave., Ste. 2200
Seattle, WA 98101

NW Regional ESD
3194 Marine Dr.
Astoria, OR 97103

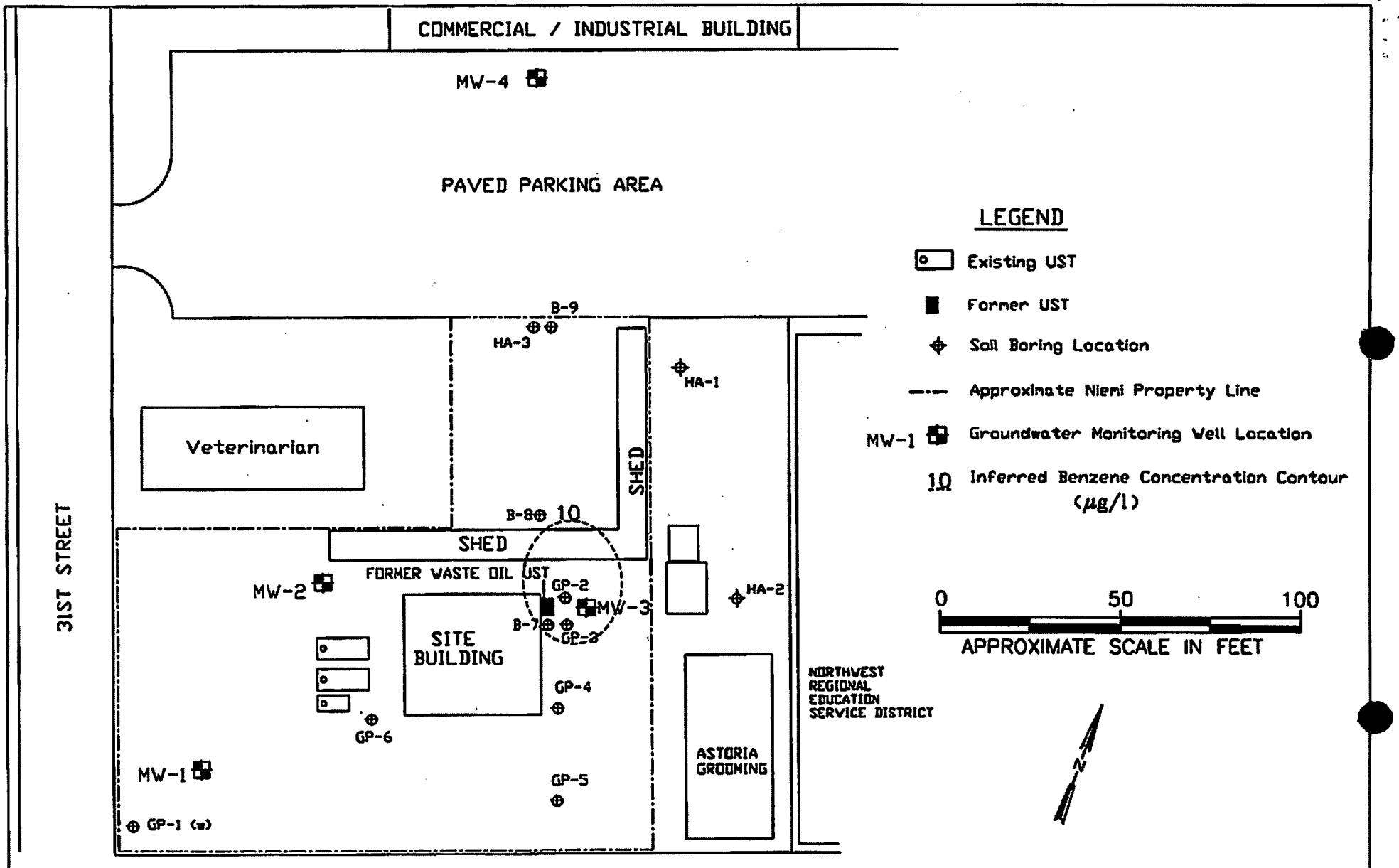


RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Cherbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

TPH-GASOLINE PLUME MAP
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 4

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		1/24/09	TPH-G



RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31980 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

BENZENE PLUME MAP
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 5

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		1/24/09	Benzene Plume Map

MARTEN
LAW GROUP
ATTORNEYS AT LAW

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED
JUL 30 2009
NORTHWEST REGION

Marten Law Group PLLC
1191 Second Avenue
Suite 2200
Seattle WA 98101
Phone: 206 292-2600
Fax: 206 292-2601
www.martenlaw.com

July 28, 2009

Via Certified Mail (7008 0150 0003 7897 8029)

Writer's Direct Line
206 292-2628
dtill@martenlaw.com

Robert Hood
Oregon Department of Environmental Quality
Northwest Region
2020 S.W. Fourth Avenue, Suite 400
Portland, OR 97201-4987

04 99 1193

RE: Ed Niemi Oil Co. / Etu, Inc.

Dear Mr. Hood:

We are writing to notify the Oregon Department of Environmental Quality ("DEQ") that, as of August 1, 2009, Marten Law Group PLLC ("MLG") will no longer represent the Ed Niemi Oil Company and Etu, Inc. (collectively "Niemi") with respect to the following two Leaking Underground Storage Tank ("LUST") sites:

- Hiway Service, 3108 Marine Drive, Astoria, Oregon (LUST No. 04-99-1193); and
- Jensen's BP, 238 SE Main Street, Warrenton, Oregon (LUST No. 04-99-0134).

Please direct all future communications relating to those two sites, including oversight invoices and any other notices, to Niemi's new counsel for those matters:

Allan Bakalian, Esq.
Zeno Drake Bakalian P.S.
4020 Lake Washington Blvd. NE, Suite 100
Kirkland, WA 98033
425.822.1511
abakalian@zdblaw.com

MLG will continue to represent Niemi with respect to the following three sites:

- Former Svensen Mobil, 40506 Old Highway 30, Svensen, Oregon (LUST No. 04-00-0856);
- Landwehr's, 34908 Highway 101-B, Astoria, Oregon (LUST No. 04-89-0238); and
- Midtown BP, 632 Marine Drive, Astoria, Oregon (LUST No. 04-98-1106).

Please continue to direct all communications for those three sites, including oversight invoices and all other notices, to MLG.

Sincerely,

Dustin T. Till

cc: A. Bakalian, Esq. – Zeno Drake Bakalian P.S.
B. Berggren, RSV Engineering, Inc.
D. Ismerio, Oregon Dep't of Environmental Quality

HOOD Robert

From: HOOD Robert
Sent: Tuesday, May 26, 2009 11:26 AM
To: 'Daniel Becraft'
Cc: 'Brad Berggren - RSV Jefferson'; 'Dustin Till'
Subject: RE: Niemi - Hiway Service

04 09 1193

They did not have any comments. I have moved forward with Final Invoice Request. I would guess the bill would go out in Mid-June (or whenever the next billing day is for the DEQ Business Office). Once payment is made and I am notified, the NFA can go out.

Rob

From: Daniel Becraft [mailto:dbecraft@bendbroadband.com]
Sent: Thursday, May 21, 2009 8:25 AM
To: HOOD Robert
Cc: 'Brad Berggren - RSV Jefferson'; 'Dustin Till'
Subject: RE: Niemi - Hiway Service

Rob - Thanks for the update. We are looking forward to well abandonments and stored file boxes on this project. Please continue to keep us posted regarding public comment. - Dan

---

From: HOOD Robert [mailto:HOOD.Robert@deq.state.or.us]
Sent: Wednesday, May 20, 2009 2:54 PM
To: HOOD Robert; Daniel Becraft
Cc: Brad Berggren - RSV Jefferson; Dustin Till
Subject: RE: Niemi - Hiway Service

Dan: I got the Educational District Service's phone number in Astoria today, called them and faxed the comment letter to them, they did not receive it supposedly. I hope to speak with the Administrator this week.

Rob

From: HOOD Robert
Sent: Tuesday, April 28, 2009 10:28 AM
To: 'Daniel Becraft'
Cc: Brad Berggren - RSV Jefferson; Dustin Till
Subject: RE: Niemi - Hiway Service

Dan: I didn't receive a response, but I also didn't get the certified mail receipt back. So, I will need to check on that and see where to go.

Rob

From: Daniel Becraft [mailto:dbecraft@bendbroadband.com]
Sent: Wednesday, April 22, 2009 11:15 AM
To: HOOD Robert
Cc: Brad Berggren - RSV Jefferson; Dustin Till
Subject: Niemi - Hiway Service

Rob – I forgot to ask you during our conversation last week, did you receive any comments in response to the public notice for Hiway Service? Thanks. - Dan

UST CLEANUP TELEPHONE USE REPORT

CALL FROM/TO: ~~Dorothy~~ Linda DATE: 5/22/09

WITH: NW Regional ESD TIME: PST

TELEPHONE NO: (503) 325-2662

REGARDING: Comment letter

FILE NO: 04-94-1193

SUMMARY OF CALL

The original letter was received, but no Green Card was with the letter. The public Notice letter was forwarded to the ~~DA~~ Facilities office in Hillsboro & they did not have any comments. I indicated to Linda that NW Regional ESD would receive a copy of the NFA when issued.

Ruth A Heard

Staff Signature

HOOD Robert

From: HOOD Robert
Sent: Wednesday, May 20, 2009 2:54 PM
To: HOOD Robert; 'Daniel Becraft'
Cc: 'Brad Berggren - RSV Jefferson'; 'Dustin Till'
Subject: RE: Niemi - Hiway Service

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State of Oregon
Department of Environmental Quality Memorandum

Date: March 10, 2009

To: **Rob Hood, NWR – Portland**

From: **Bill Robertson, NWR – Portland** BR **FINAL**

Subject: **No Further Action (NFA) Determination**
Niemi Highway Service
1308 Marine Drive
Astoria, Oregon 97103
DEQ File No. 04-99-1193

cc: **Mike Kortenhof, NWR – Portland**

I concur with issuance of an NFA for the site. I am providing you with the following comments:

- A petroleum release was discovered at the site in 1999 related to a 550-gallon waste oil underground storage tank (UST). The UST was decommissioned by removal and gasoline and heavy oil-range hydrocarbons were detected during the site characterization. Three new USTs were installed at the site, which continues to be used as a petroleum service station. No other releases were identified from the active UST fueling system.

- The magnitude and extent of contamination has been adequately determined by the installation of push probe borings and four monitoring wells. The groundwater flow direction has consistently been to the north-northwest. This direction is consistent with topography and relative to the Columbia River, which is the likely discharge point for groundwater in the vicinity of the site.

- The site is underlain mostly by fine-grained soils and clayey gravel that will minimize the spread of residual contamination.

- The site is zoned for commercial use and the current and reasonably likely future use is commercial.

- A beneficial water use determination found that drinking water to the area is supplied by the City of Astoria from a reservoir. No domestic wells are located within 1 mile of the site. Consequently, groundwater ingestion and inhalation from tapwater is not a complete exposure pathway.

- Available information indicates residual gasoline-range hydrocarbons are limited to greater than 6 feet below ground surface and occur primarily in the vicinity of the former used oil UST. A risk assessment was performed, which determined that the relatively low concentrations of residual petroleum hydrocarbons do not exceed risk-based concentrations applicable to the site.

- The Columbia River, located approximately 500 feet from the site, is the nearest surface water. No impacts to surface water or other ecological receptors are anticipated.

file

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
Northwest Region Portland Office
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-4987
(503) 229-5263
Fax: (503) 229-6945
TTY: (503) 229-5471

6 March 2009

CLATSOP COUNTY
EDUCATION SERVICE
3194 MARINE DR
ASTORIA OR 97103

Re: Niemi Oil, Hwy. Service
Public Notice
UST Cleanup File No.: 04-99-1193
Certified Mail 7099 3220 0000 9092 5944

Dear Sir or Madam:

The purpose of this letter is to inform you of the results of the environmental investigations performed by RSV Engineering, Inc. (RSV) and other environmental consultants on behalf of Niemi Oil/ETU, Inc. The Department of Environmental Quality (DEQ) wishes to solicit your input regarding further investigation and/or remediation on your property (alley way) that may have been impacted by a petroleum release from an underground storage tank (UST) located at 3108 Marine Drive in Astoria, Oregon. Currently, the site is an active retail fueling facility.

Documents were prepared by/or on behalf of Niemi Oil/ETU, Inc., which describes the site's history, the results of previous environmental investigations, and cleanup actions proposed or previously undertaken. The documents also provide an analysis of the human health risks associated with the cleanup actions and the health risks from exposure to any residual contamination left on the subject property or on other properties after completing the project.

In October 1999, the waste oil UST was decommissioned by removal. The tank was located off the northeast corner of the building (see attached map). Following subsequent subsurface investigations on the Niemi/ETU, Inc. property, it was determined that low levels of petroleum (benzene at 38 parts per billion) were detected at a temporary well point installed at the property boundary. Thus, a monitoring well was installed on your property and quarterly groundwater monitoring was initiated.

Analytical results from the four quarters of monitoring (between November 2007 and September 2008) indicate that no petroleum was detected. As a result, no evaluation was completed. Regarding the above-noted benzene concentration in groundwater at the property boundary, the result is within all risk-based concentrations that DEQ requires responsible parties to evaluate, with the exception of the ingestion and inhalation from tap water exposure pathway (drinking water from a water well). Based on a water use determination by Niemi/ETU, Inc., no known water well use was identified in the area. As a result, this pathway was not considered in the risk evaluation. Included are site maps and results from the above-mentioned data for your viewing.

As a result, DEQ does not intend to require further investigation or remediation. However, while disturbance of groundwater is unlikely, if any petroleum-contaminated groundwater were brought to the surface, it would have to be sampled, managed, and disposed of in accordance with DEQ regulations and policies. Niemi/ETU, Inc. and/or any subsequent owner of the property would retain responsibility for the petroleum contamination, indefinitely. This responsibility includes, but is not limited to the following: contaminated media characterization, chemical analyses, interim storage, transportation, and/or disposal. However, DEQ cannot assist you in securing compensation for expenses associated with devaluation of your property or future expenses associated with removal of the petroleum-contaminated groundwater, should that occur. This must be negotiated directly with Niemi Oil/ETU or through the civil court system.

DEQ requests any comments be submitted no later than **10 April 2009**. A copy of the file is available for review by appointment. To review this file, please call Lynne Kent at (503) 229-6170. Please reference the file using the DEQ file number 04-99-1193.

If you have any questions, please call me at (503) 229-5617.

Respectfully,

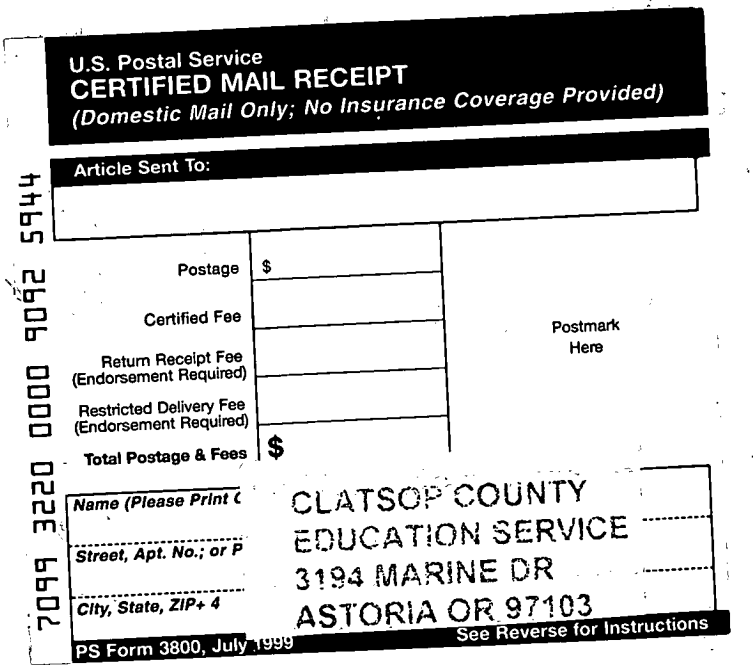
Robert A. Hood, Jr.
UST Cleanup Specialist

Enclosures for all parties: Map -Figure 2, Tables 2 and 6 through 9

Cary Bechtolt
Niemi Oil Co.
PO Box 989
Astoria, OR 97103

Dustin Till
Marten Law Group PLLC
1191 Second Avenue, Ste 2200
Seattle, WA 98101

Dan Becraft
RSV Engineering, Inc.
31960 SW Charbonneau Dr. Ste. 101
Wilsonville, OR 97070



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CLATSOP COUNTY
EDUCATION SERVICE
3194 MARINE DR
ASTORIA OR 97103

PS Form 3800, July 1999
See Reverse for Instructions

7099 3220 0000 9092 5944

Table 9
Groundwater Sampling Results-VOCs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Date	Benzene	Toulene	Ethylbenzene	Xylenes	Isopropylbenzene	N-propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Methyl-Tert-Buytl-Ether (MTBE)	1,2-dibromoethane (EDB)	1,2-dichloroethane (EDC)	Naphthalene
GP-1	10/10/2003	0.18J	0.26J	<0.50	0.45J	<2.0	<2.0	<2.0	<2.0	<0.50	<2.0	<0.50	NA
GP-2	10/10/2003	<0.50	0.12J	<0.50	<1.0	<2.0	<2.0	<2.0	<2.0	<0.50	<2.0	<0.50	NA
B-7	9/28/2004	12	2.4	7.5	3.08	68	96	0.98J	0.47J	<0.50	<2.0	<0.50	1.9J
B-8	10/13/2004	53	0.32J	0.42J	0.87	5.1	6.6	0.40J	0.13J	2.2	<2.0	<0.50	NA
B-9	10/13/2004	38	0.36J	0.27J	0.58J	2.3	4.4	0.39J	<2.0	2.7	<2.0	<0.50	NA
Appendix A Risk-Based Concentrations													
Volatilization to outdoor air	Occupational	13,000	>S	>S	>S	>S	>S	>S	>S	550,000	2,500	9,000	>S
Vapor Intrusion Into Buildings	Occupational	2,700	>S	>S	>S	>S	>S	51,000	38,000	280,000	1,800	3,600	>S
Groundwater in Excavation	Construction and Excavation Worker	1,700	78,000	110,000	22,000	51,000	18,000	1,300	1,400	31,000	20	600	680

Notes:

(1) Sampling results provided in ug/L
(2) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A: Table of Risk-Based Concentrations (RBCs), September 22, 2003
(3) RBCs provided in ug/L
(4) 30,000 Meets or exceeds one or more Appendix A RBC
(5) >S This groundwater RBC exceeds the solubility limit.

Table 8
Groundwater Sampling Results- PAHs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Date	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a) anthracene	Chrysene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Benzo(a)pyrene	Dibenzo(a,h) anthracene	Benzo(ghi) perylene	Indeno(1,2,3-cd) pyrene	2-Methyl napthalene	Dibenzofuran
GP-2	10/10/03	0.039	0.0051	0.021	0.010	0.015	0.0023	0.010	0.022	0.0031	0.0059	0.0030	0.0028	<0.020	<0.020	0.0056	<0.020	0.031	<0.020
B-7	09/28/04	1.3	<0.023	0.082	0.080	0.019J	0.015J	0.020J	0.13	0.014J	0.024	0.017J	0.0049J	0.012J	<0.023	0.054	0.014J	0.27	0.011J
B-8	10/13/04	0.12	0.0035J	0.014J	0.011J	0.013J	0.0056J	0.0075J	0.0091J	0.0084J	0.0064J	0.0071J	0.0076J	0.0079J	0.0095J	0.0098J	0.0092J	0.11	0.013J
B-9	10/13/04	0.088	<0.028	<0.028	0.0074J	0.0099J	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	0.083	<0.028
Appendix A Risk Based Concentrations																			
Volatilization to outdoor air	Occupational	>S	NS	>S	>S	NS	>S	>S	>S	>S	>S	>S	>S	>S	>S	NS	>S	NS	NS
Vapor Intrusion Into Buildings	Occupational	>S	NS	>S	>S	NS	>S	>S	>S	>S	>S	>S	>S	>S	>S	NS	>S	NS	NS
Groundwater in Excavation	Construction and Excavation	680	NS	>S	>S	NS	>S	>S	>S	9.1	>S	>S	>S	0.53	0.21	NS	2.9	NS	NS

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) NS = No Appendix A RBC provided by DEQ.
(3) >S = This groundwater RBC exceeds the solubility limit.
(4) Results and RBCs provided in µg/L.

Table 7
Groundwater Sampling Results -Metals
Highway Service 76 Station
Astoria, Oregon

		(µg/L)		
Sample ID	**Date**	**Cadmium**	**Chromium**	**Lead**
GP-1	10/10/03	0.18	4.15	58.6
GP-2	10/10/03	0.07	1.13	5.4
B-7	9/28/04	0.04	0.34	0.268
B-8	10/13/04	0.04	0.06	0.23
B-9	10/13/04	0.02	0.19	0.09
Appendix A Risk Based Concentrations (RBCs)				
Volatilization to outdoor air	Occupational	---	---	---
Vapor Intrusion to Buildings	Occupational	---	---	---
Groundwater in Excavation	Construction and Excavation Worker	---	---	---
*From United States Environmental Protection Agency, Region 9 Preliminary Remediation Goals, October 1, 2003				

Notes:

(1) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A:Table of Risk-Based Concentrations (RBCs), September 22, 2003.

(2) RBCs provided in ug/L.

(3) --- DEQ assumes that it is not physically possible to exceed an unacceptable risk level by this pathway.

Table 6
Groundwater Sampling Results - TPH
Highway Service 76 Station
Astoria, Oregon

		HCID			TPH µg/L		
Sample ID	Date	Gasoline	Diesel	Oil	Gx	Dx	Oil
GP-1	10/10/03	D	ND	ND	86	NA	NA
GP-2	10/10/03	D	D	ND	39	3,200	110
B-7	9/28/04	NA	NA	NA	2,400	2,800	5,100
B-8	10/13/04	NA	NA	NA	330	210J	190J
B-9	10/13/04	NA	NA	NA	120J	110J	86J
Appendix A Risk Based Concentrations							
Volatilization to outdoor air	Occupational	NS	NS	NS	>S	>S	>S*
Vapor Intrusion to Buildings	Occupational	NS	NS	NS	>S	>S	>S*
Groundwater in Excavation	Construction and Excavation Worker	NS	NS	NS	12,000	>S	>S*

Notes:

(1) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A: Table of Risk-Based Concentrations (RBCs), September 22, 2003.

(2) RBCs provided in ug/L

(3) NS = No Appendix A RBC provided by DEQ

(4) ND = Not Detected

(5) NA = not analyzed for

(6) 61,000 Meets or exceeds one or more Appendix A RBC

(7) >S This groundwater RBC exceeds the solubility limit.

(8) * = Site-Specific RBC calculated by DEQ.

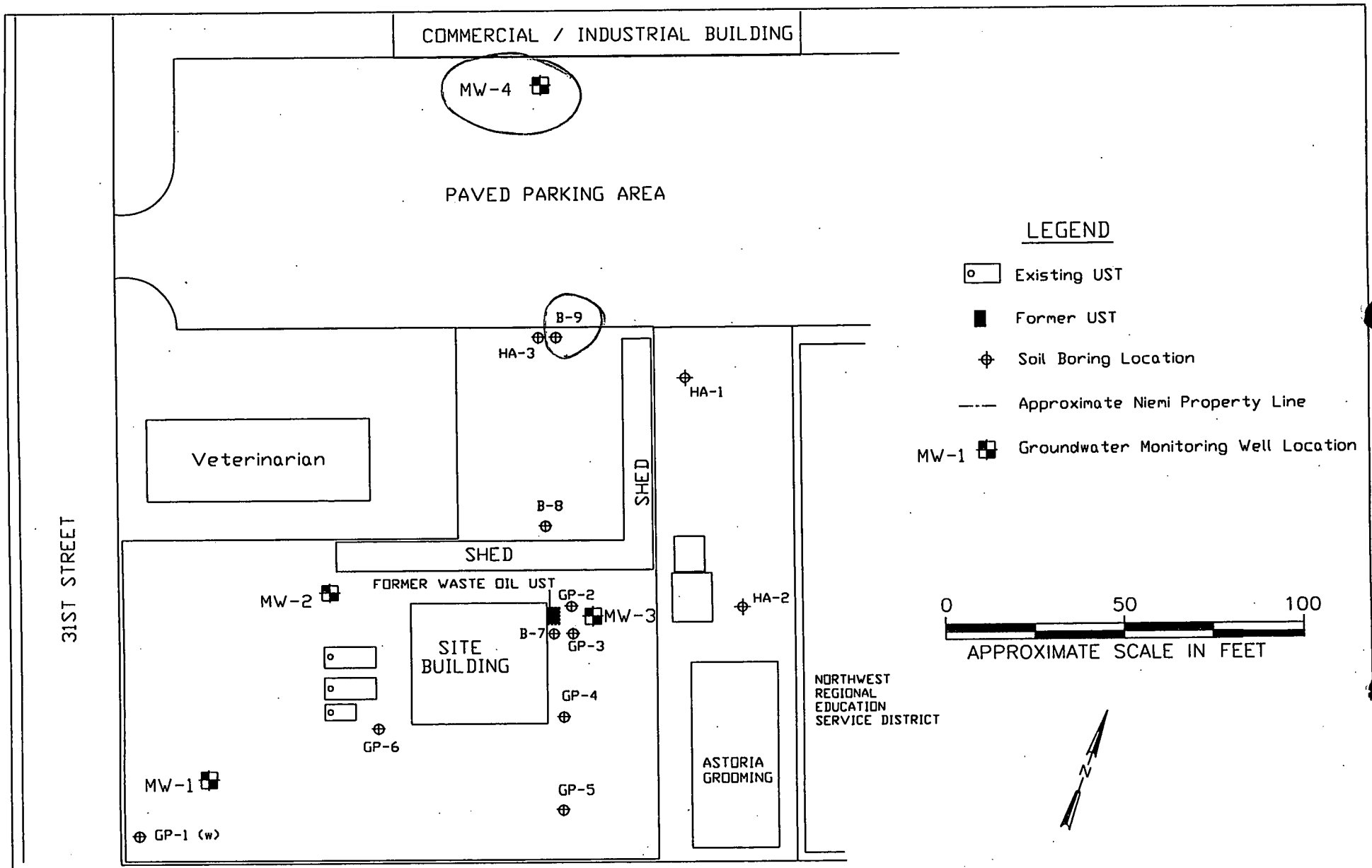
TABLE 2
SUMMARY of QUARTERLY GROUNDWATER MONITORING ANALYTICAL DATA for PETROLEUM HYDROCARBONS
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

Groundwater Sample ID	Sample Date	Gasoline-range Petroleum Hydrocarbons (Method NWTPH-Gx) (µg/l)	Diesel- and Heavy Oil-range Petroleum Hydrocarbons (Method NWTPH-Dx) (µg/l)		Volatile Organic Compounds (EPA Method 8260B) (µg/l)											Detected PAHs (EPA Method 8270) (µg/l)
			Diesel-range	Oil-range	Benzene	1,2, Dibromoethane	1,2, Dichloroethane	Ethylbenzene	Methyl tert-butyl ether	Toluene	Xylenes	1,2,4-Trimethylbenzen	1,3,5-Trimethylbenzen	Isopropylbenzene	n-propylbenzene	Naphthalene
MW-1	11/1/2007	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	—	—	—	—	—
	1/31/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	—
	5/29/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	—
	9/11/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	—
MW-2	11/1/2007	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	—	—	—	—	—
	1/31/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	—
	5/29/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	—
	9/11/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	—
MW-3	11/1/2007	**1,350**	**522**	ND<476	**31.9**	ND<1	ND<1	**19.6**	ND<1	**2.59**	**2.41**	—	—	—	—	—
	1/31/2008	**885**	**989**	**615**	**2.24**	ND<1	ND<1	**2.34**	ND<1	ND<1	ND<2	ND<2	ND<1	**30**	**48.9**	**0.211**
	5/29/2008	**1,350**	**487**	ND<476	**100**	ND<1	ND<1	**1.93**	ND<1	**0.58**	ND<2	ND<2	ND<1	**41.6**	**84**	**0.525**
	9/11/2008	**1,090**	**1,950**	ND<476	**78.3**	ND<1	ND<1	**4.19**	ND<1	**0.94**	ND<2	ND<2	ND<1	**36.3**	**72.4**	**0.809**
MW-4	11/1/2007	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	—	—	—	—	—
	1/31/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	—
	5/29/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	—
	9/11/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	—
Urban Residential RBCs for Vapor Intrusion into Buildings		>S	>S	>S	340	87	460	>S	70,000	>S	59,000	4,300	3,200	>Csat	11,000	29,000
Urban Residential RBCs for Volatilization to Outdoor Air		>S	>S	>S	5,100	360	3,400	>S	410,000	>S	>S	>S	>S	>S	>S	>S
Occupational RBCs for Volatilization to Outdoor Air		>S	>S	>S	13,000	960	9,000	>S	1,100,0000	>S	>S	>S	>S	>S	>S	>S
Occupational RBCs for Vapor Intrusion into Buildings		>S	>S	>S	2,700	690	3,600	>S	560,000	>S	>S	51,000	38,000	>S	>S	>S
RBCs for Groundwater in Excavation for Construction and Excavation Workers		12,000	6,700*	21,000*	1,700	28	600	110,000	59,000	200,000	22,000	1,300	1,400	51,000	4,500	680

Notes:

mg/l - Milligrams per liter
µg/l - Micrograms per liter
ND - Not detected above reporting limits.
NV - No RBC value for this constituent.

RBCs - Generic Risk-Based Concentrations per DEQ Risk-Based Decision Making for Petroleum Contaminated Sites, Appendix A.
>S Indicates that RBC exceeds solubility limit.
"----" Indicates sample not analyzed for this constituent.
"*" Indicates site-specific TPH RBC calcualted by DEQ.



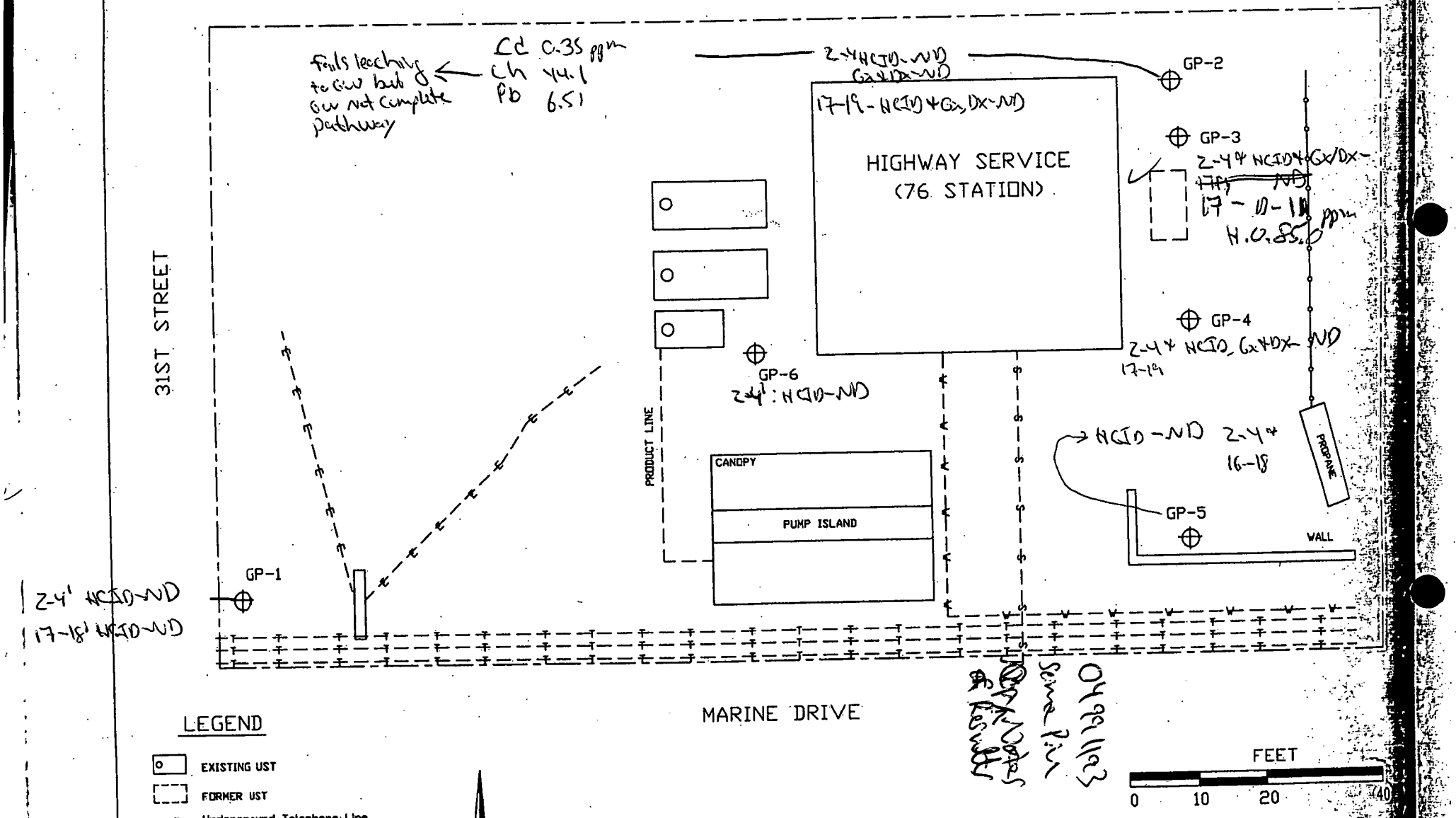
RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Chorbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

SITE PLAN
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 2

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		12/11/07	Wells & Grab 040406

SOIL



LEGEND

- EXISTING UST
- FORMER UST
- Underground Telephone Line
- Underground Electric Line
- Underground Water Line
- Underground Sewer Line
- Fence
- GP-2 Soil Boring Location

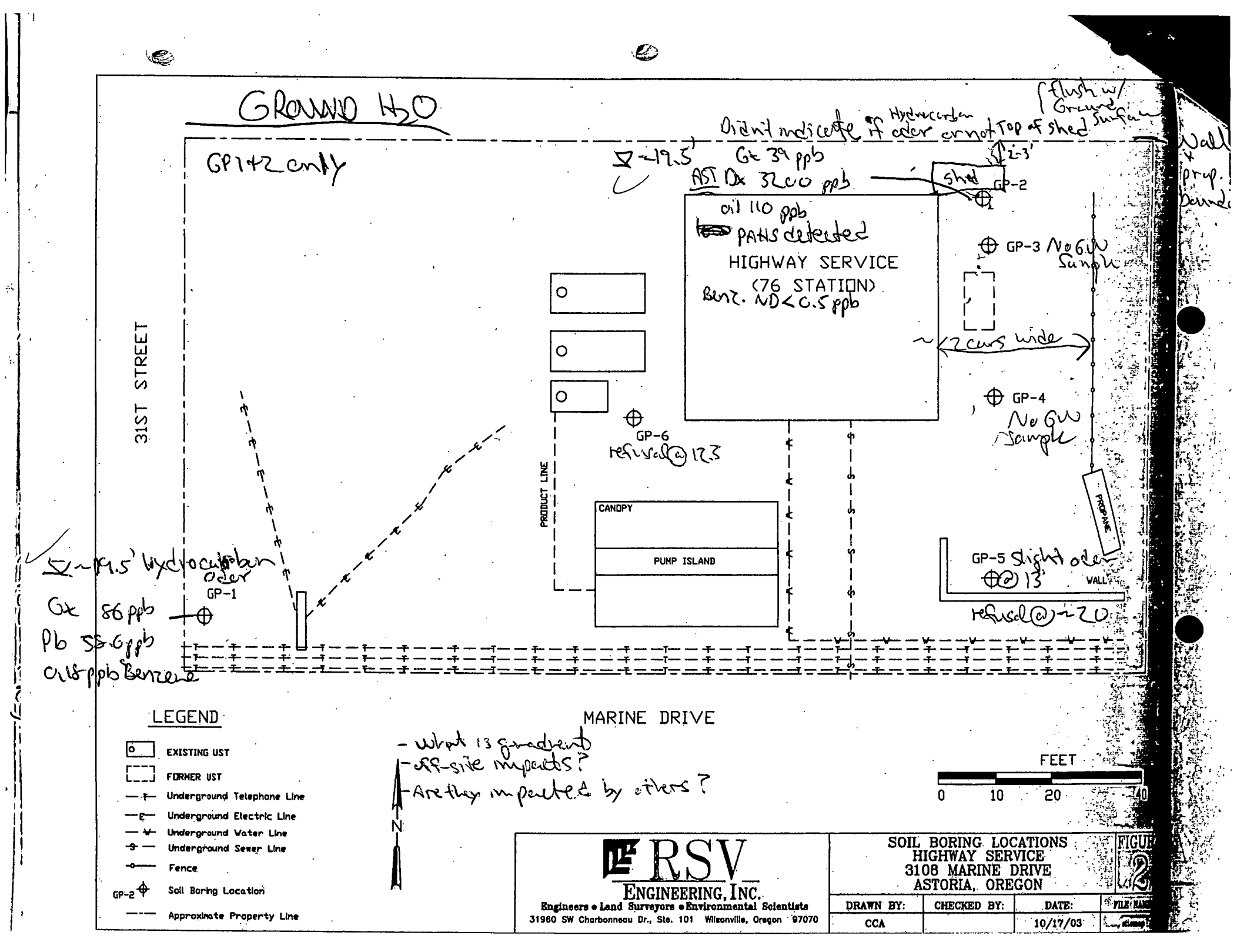
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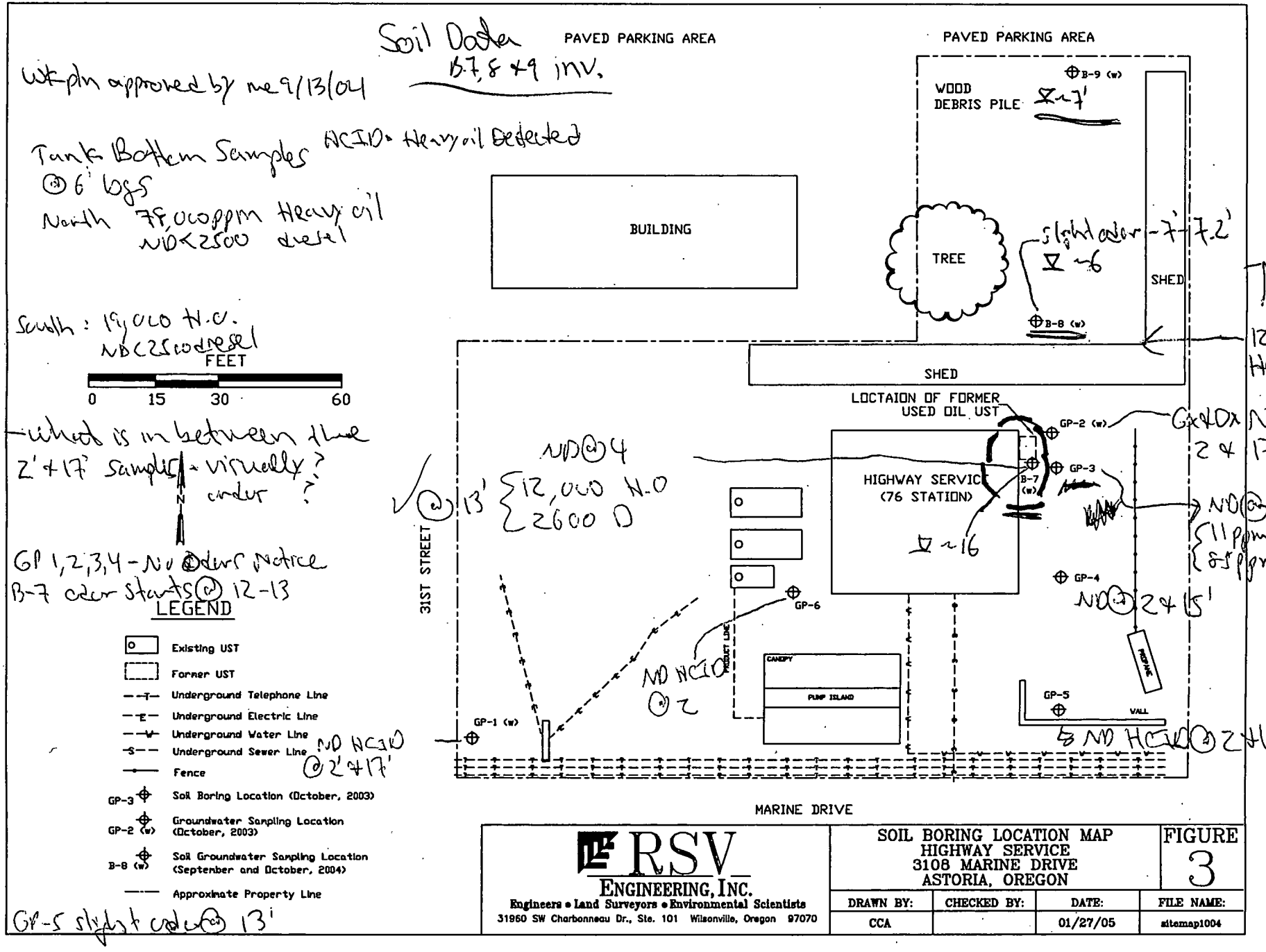
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SOIL BORING LOCATIONS
HIGHWAY SERVICE
3108 MARINE DRIVE
ASTORIA, OREGON

FIGURE 2

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
CGA		10/17/03	


GROUND H2O
GP1+2 only
Orient indicate if Hydrocarbon odor
Top of shed
flush w/ Ground Surface
Wall & prop. bound
∇ ~12.5'
Gx 39 ppb
AST Dx 3200 ppb
Shed
GP-2
2-3'
oil 110 ppb
PAHs detected
HIGHWAY SERVICE
(76 STATION)
Benz. ND<0.5 ppb
GP-3 No GW Sample
~2 cars wide
GP-4
No GW Sample
31ST STREET
GP-6
refusal @ 12.5
PRODUCT LINE
CANOPY
PUMP ISLAND
PROPANE
GP-5 Slight odor @ 13'
WALL
refusal @ ~20
∇ ~11.5' hydrocarbon odor
GP-1
Gx 86 ppb
Pb 58.6 ppb
0.18 ppb Benzene
MARINE DRIVE
- What is gradient
- off-site impacts?
- Are they impacted by others?
N
FEET
0
10
20
40
LEGEND
EXISTING UST
FORMER UST
Underground Telephone Line
Underground Electric Line
Underground Water Line
Underground Sewer Line
Fence
GP-2 Soil Boring Location
Approximate Property Line
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31980 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070
SOIL BORING LOCATIONS
HIGHWAY SERVICE
3108 MARINE DRIVE
ASTORIA, OREGON
FIGURE 2
DRAWN BY: CCA
CHECKED BY:
DATE: 10/17/03
FILE NAME:



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SOIL BORING LOCATION MAP
HIGHWAY SERVICE
3108 MARINE DRIVE
ASTORIA, OREGON

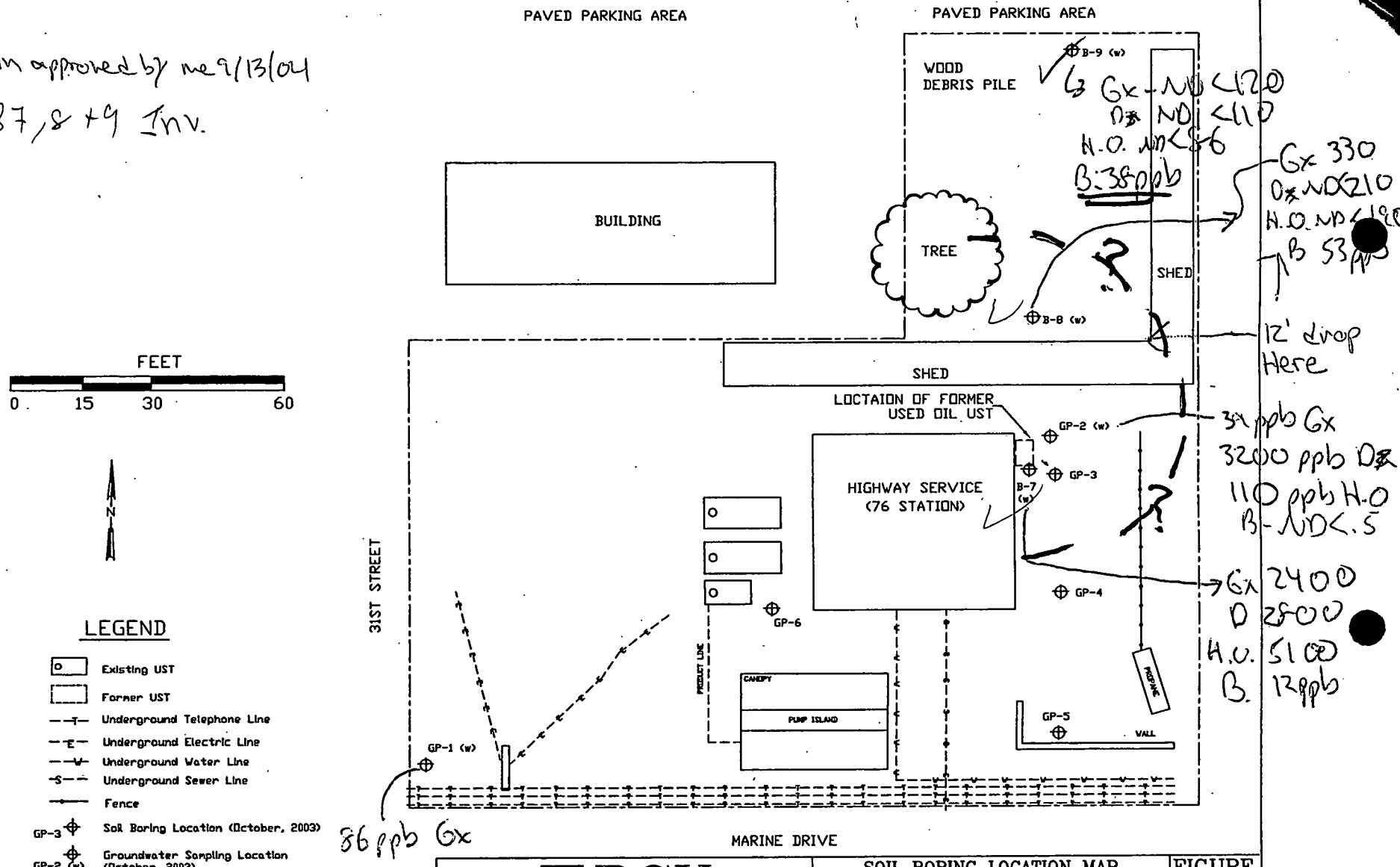
FIGURE 3

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
CCA		01/27/05	sitemap1004

GW Data

WL plan approved by me 9/13/04

B7, 8 + 9 Inv.



36 ppb Gx

39 ppb Gx
3200 ppb D
110 ppb H.O
B- ND<.5

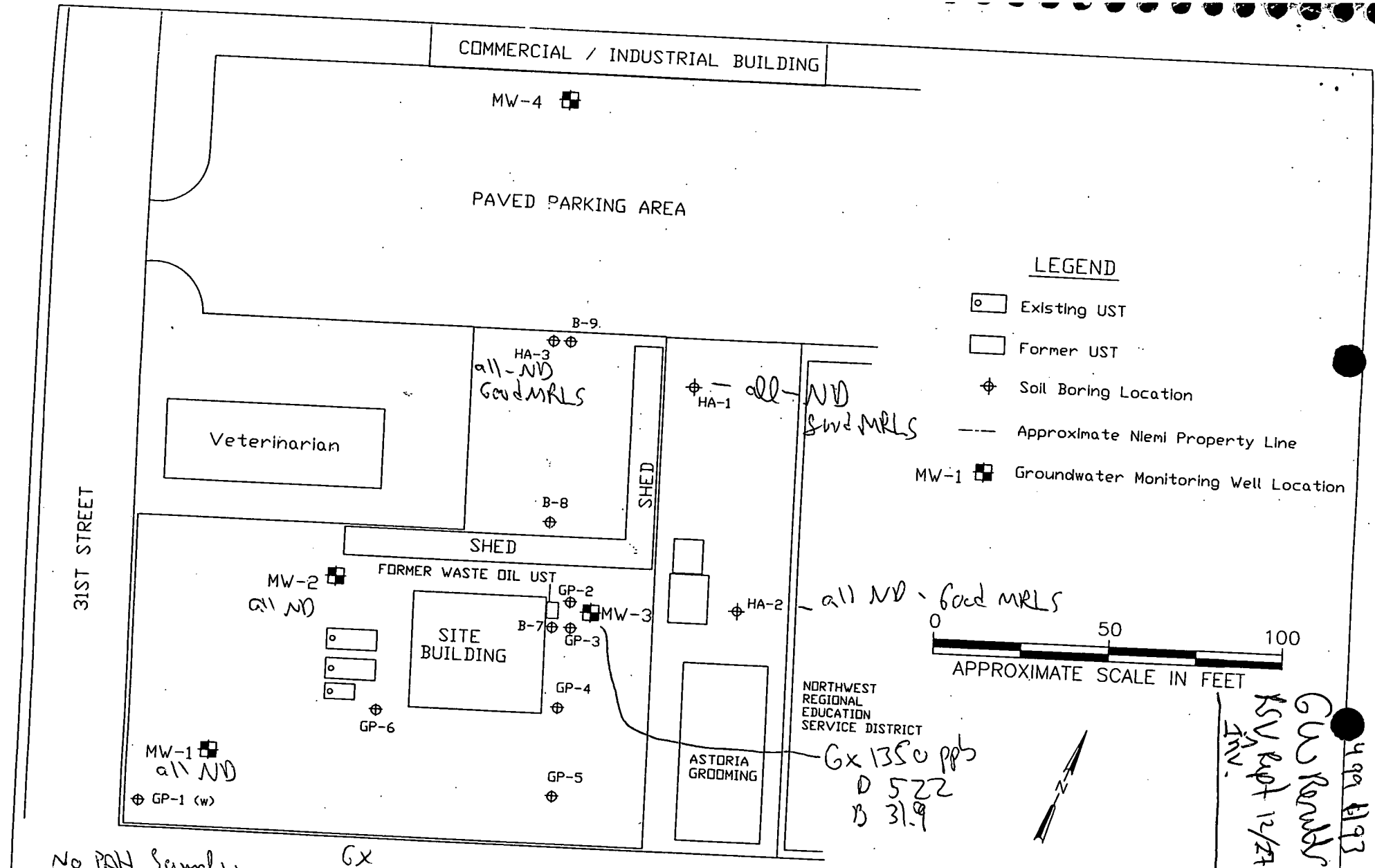
Gx 2400
D 2500
H.O. 5100
B. 12ppb

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SOIL BORING LOCATION MAP
HIGHWAY SERVICE
3108 MARINE DRIVE
ASTORIA, OREGON

FIGURE 3

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
CCA		01/27/05	sitemap1004

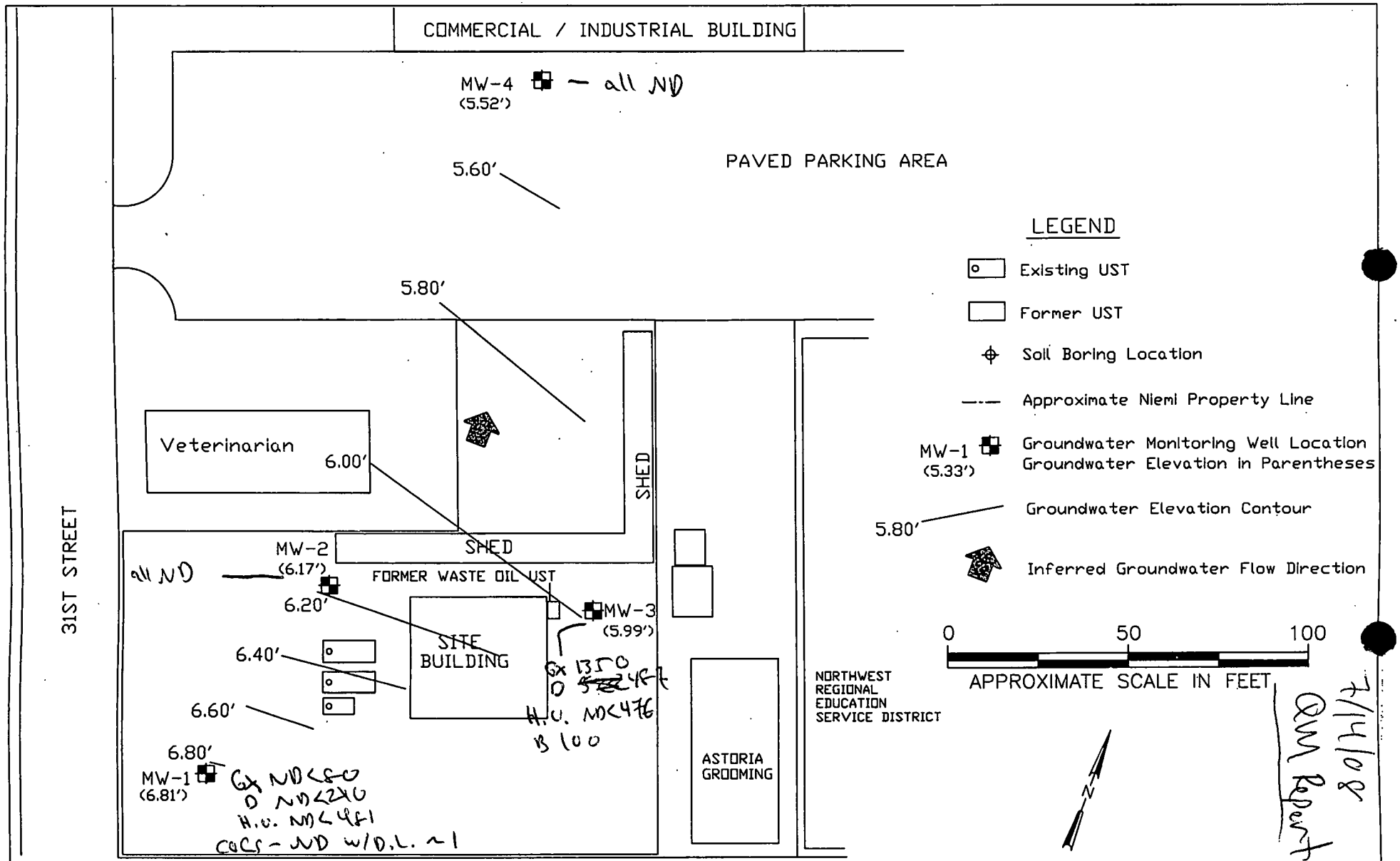


RSV ENGINEERING, INC.
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SITE PLAN
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 2

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		12/11/07	Wells & Grab 040408



RSV ENGINEERING, INC.
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31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

GROUNDWATER FLOW MAP
MAY 29, 2008
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 3

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		6/30/08	Figure 3 GW Flow

HOOD Robert

From: HOOD Robert
Sent: Wednesday, February 04, 2009 2:11 PM
To: 'Dustin Till'; dbecraft@bendbroadband.com
Subject: RE: Niemi Highway Service, DEQ Leaking UST Cleanup File No. 04-99-1193
Attachments: image002.jpg

Ok, now I see it better. So, Clatsop Co. Education Service will be contacted as part of public notice. Dan, I will get back to you on your other email.

Rob

From: Dustin Till [mailto:dtill@martenlaw.com]
Sent: Wednesday, January 21, 2009 1:44 PM
To: HOOD Robert; dbecraft@bendbroadband.com
Subject: RE: Niemi Highway Service, DEQ Leaking UST Cleanup File No. 04-99-1193

Rob,

The Clatsop County website provides the following ownership information on parcels adjacent to the Hiway Service site:

Tax Lot Number	Owner	Description
80909BD01100	Etu, Inc.	Service station parking lot area on Marine Drive.
80909BD01200	Etu, Inc.	Service station building and area where B-8, B-9, and HA-3 were advanced.
80909BD01101	Larry Goza	Veterinarian clinic.
80909BD01300	Mitch and Constance Ferry	Pet grooming business where HA-1 and HA-2 were advanced.
80909BD01001	NW Education Service	MW-4 was installed in the parking lot.

I've attached the site map (Figure 2) from RSV's Oct. 27, 2008 Corrective Action Closure Report and a parcel map I printed from the Clatsop County website today. I marked the approximate monitoring/sampling locations

on the Clatsop County map. When you look at these maps together, it's clear that HA-3, B-8, and B-9 were advanced on Etu's property rather than Lot 1101, which is owned by Mr. Goza.

There is no right-of-way identified on the County's tax parcel map, so it appears that the Service District owns the alley behind the Hiway Service site (i.e. within parcel 1001).

I hope this is helpful. We'll get you the rest of the information you requested shortly. In the meantime, we are available to answer any other questions you may have.

Regards,

-Dustin

Dustin T. Till | Marten Law Group PLLC
1191 Second Avenue | Suite 2200 | Seattle, Washington 98101
206.292.2628 (Direct) | 206.292.2600 (Main) | 206.292.2601 (Fax)
dtill@martenlaw.com | www.martenlaw.com

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From: HOOD Robert [mailto:HOOD.Robert@deq.state.or.us]
Sent: Wednesday, January 21, 2009 11:18 AM
To: HOOD Robert; Dustin Till; dbecraft@bendbroadband.com
Subject: fw: Niemi Highway Service, DEQ Leaking UST Cleanup File No. 04-99-1193

Also, please inform who owns property north of Niemi (tax lot 1101). It looks like the area where B-8 and HA-3 were installed are not Niemi/ETU-owned property. Thanks.

Rob

From: HOOD Robert
Sent: Wednesday, January 21, 2009 10:41 AM
To: 'Dustin Till'; Dan Becraft (dbecraft@bendbroadband.com)
Subject: Niemi Highway Service, DEQ Leaking UST Cleanup File No. 04-99-1193

Dustin and Dan:

I reviewed the Marten Law Group cover letter and the RSV closure request report, both dated 27 October 2008. I have drafted a NFA letter and had a few comments below, but over all this project is looking pretty complete. I will send to my Hydrogeologist for review. In the meantime, please provide any items requested below:

-Remaining plume maps (for this site, total petroleum hydrocarbons, benzene, and any other applicable constituents).

-Regarding residential, although RSV wrote off the scenario (in the land use determination), the concentrations appear to meet applicable residential screening levels. For this site, I'm not asking anything additional from you at this time, but will go over it in peer review.

-I remember we discussed the alley during our site visit. Is it public or private? Can you provide contact information for whoever owns it?

That is all for now. Thanks and please contact me if you have any questions.

Rob

Rob Hood

Natural Resource Specialist 4

Oregon Dept. of Environmental Quality

2020 SW 4th Ave., Ste. 400

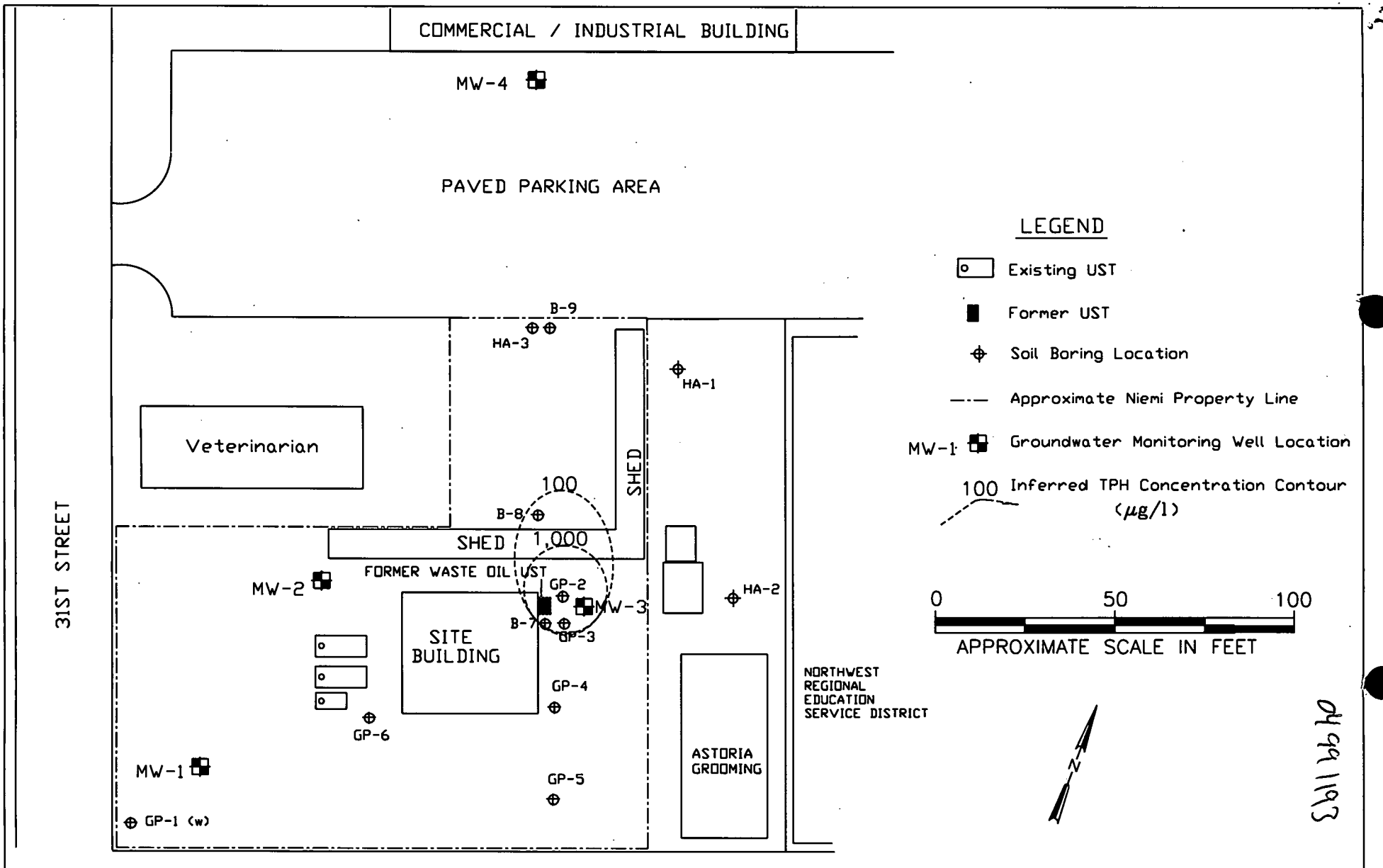
Portland, OR 97201-4987

Ph: (503) 229-5617

Fax: (503) 229-6945

email: hood.robert@deq.state.or.us

website: www.oregon.gov/deq



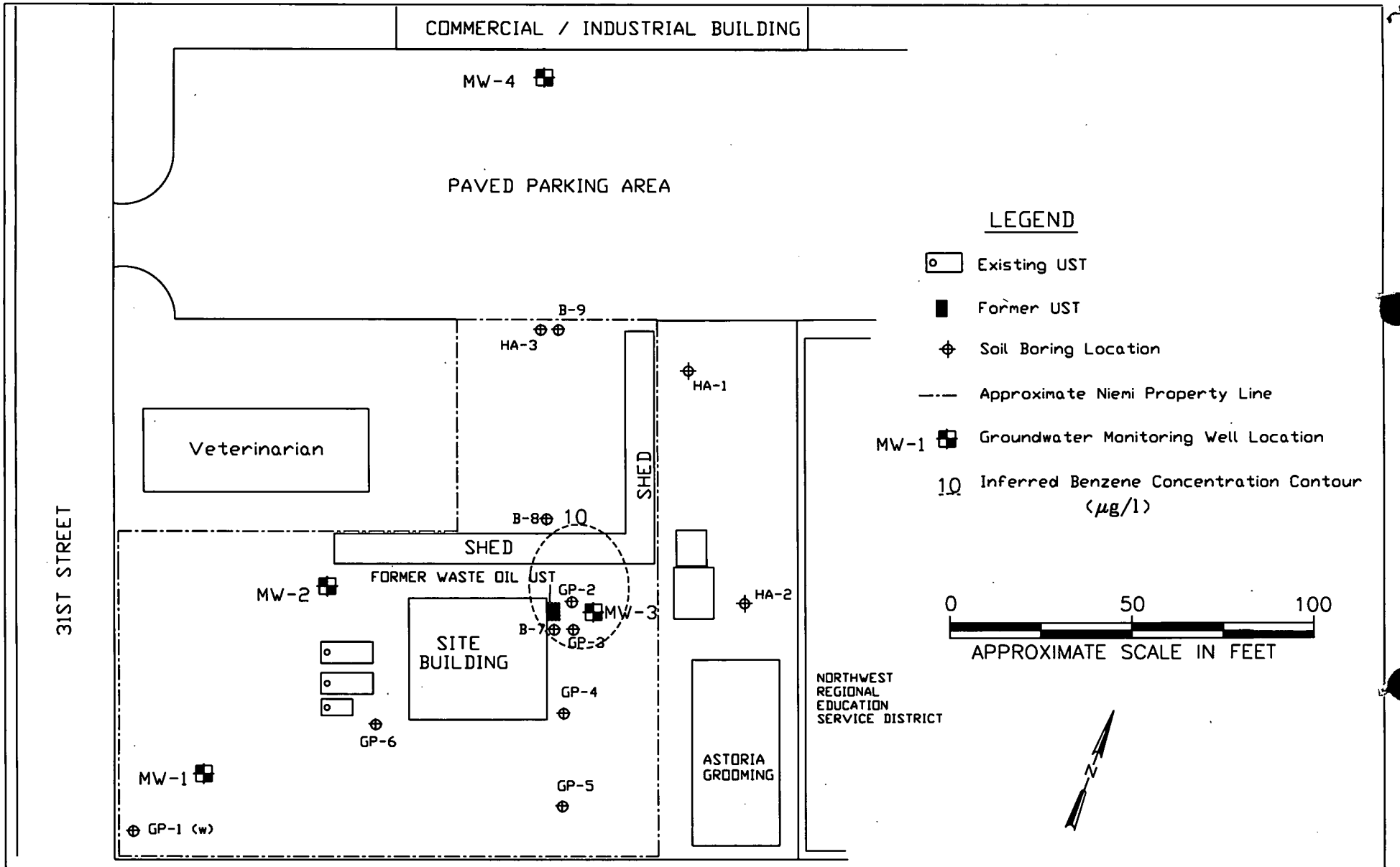
04 99 193

RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Chorbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

TPH-GASOLINE PLUME MAP
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 4

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		1/24/09	TPH-G



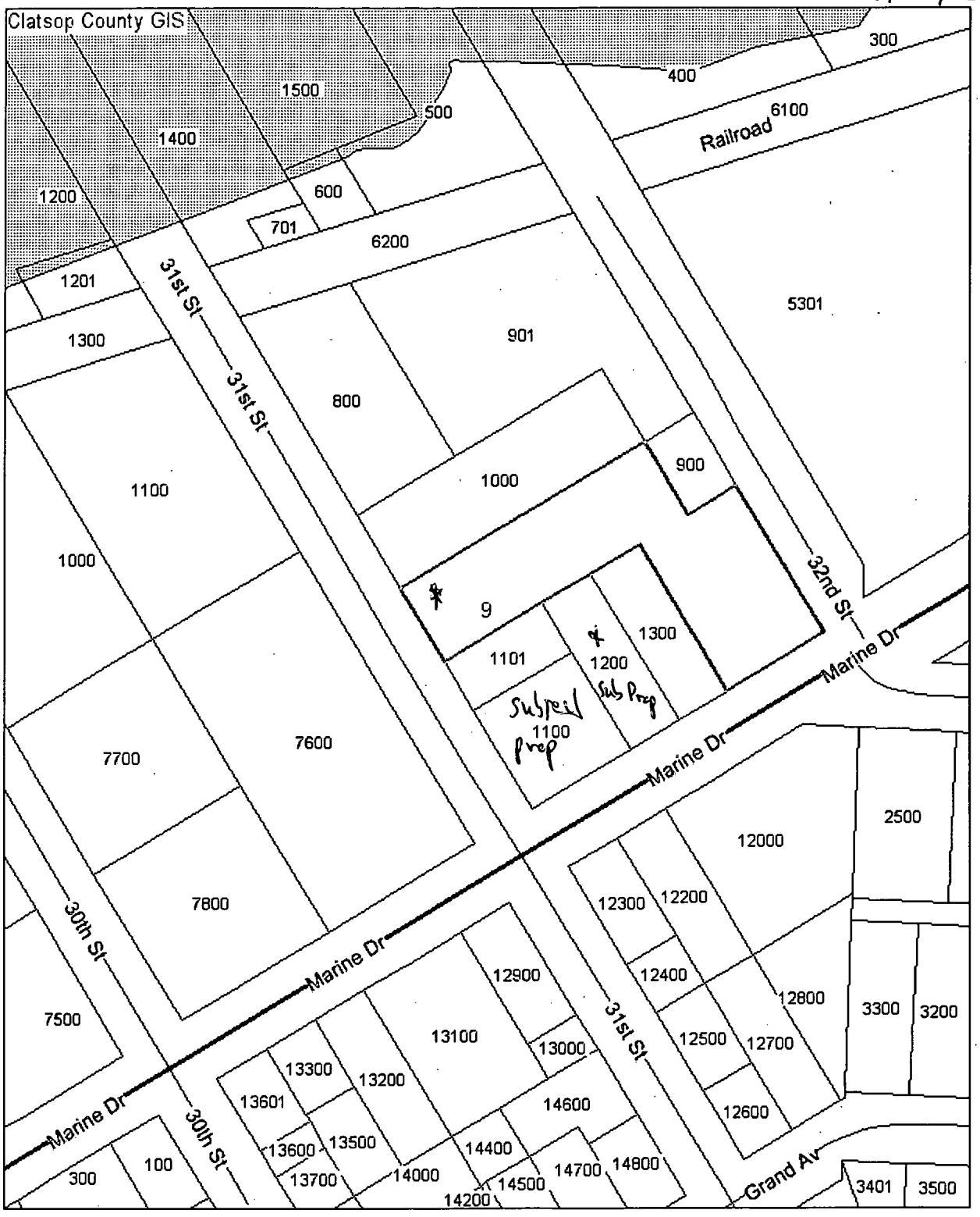
RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

BENZENE PLUME MAP
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 5

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		1/24/09	Benzene Plume Map

04 99 1193 1/21/2009



CLATSOP COUNTY WEBMAPS
Real Property Map Summary for the Current Tax Year

04 99 1193
1/24/2009

Reports:

Current Tax Statement for Account 23466
Appraisal Report for Account 23466
Payment and Appeal Instructions

Account Info:

Taxlot Key:	80909BD01001	Property Class:	921
Account Number:	23466	MA:	1
Real Market Value:	989381	NH:	U
Assessed Value:	450821	Unit:	
Primary Situs:	3196 Marine Dr		

Owner Info:

Owners:	Clatsop Co Education Service
Agents:	
Mailing Address:	3194 Marine Dr Astoria, OR 97103

Land Size Info:

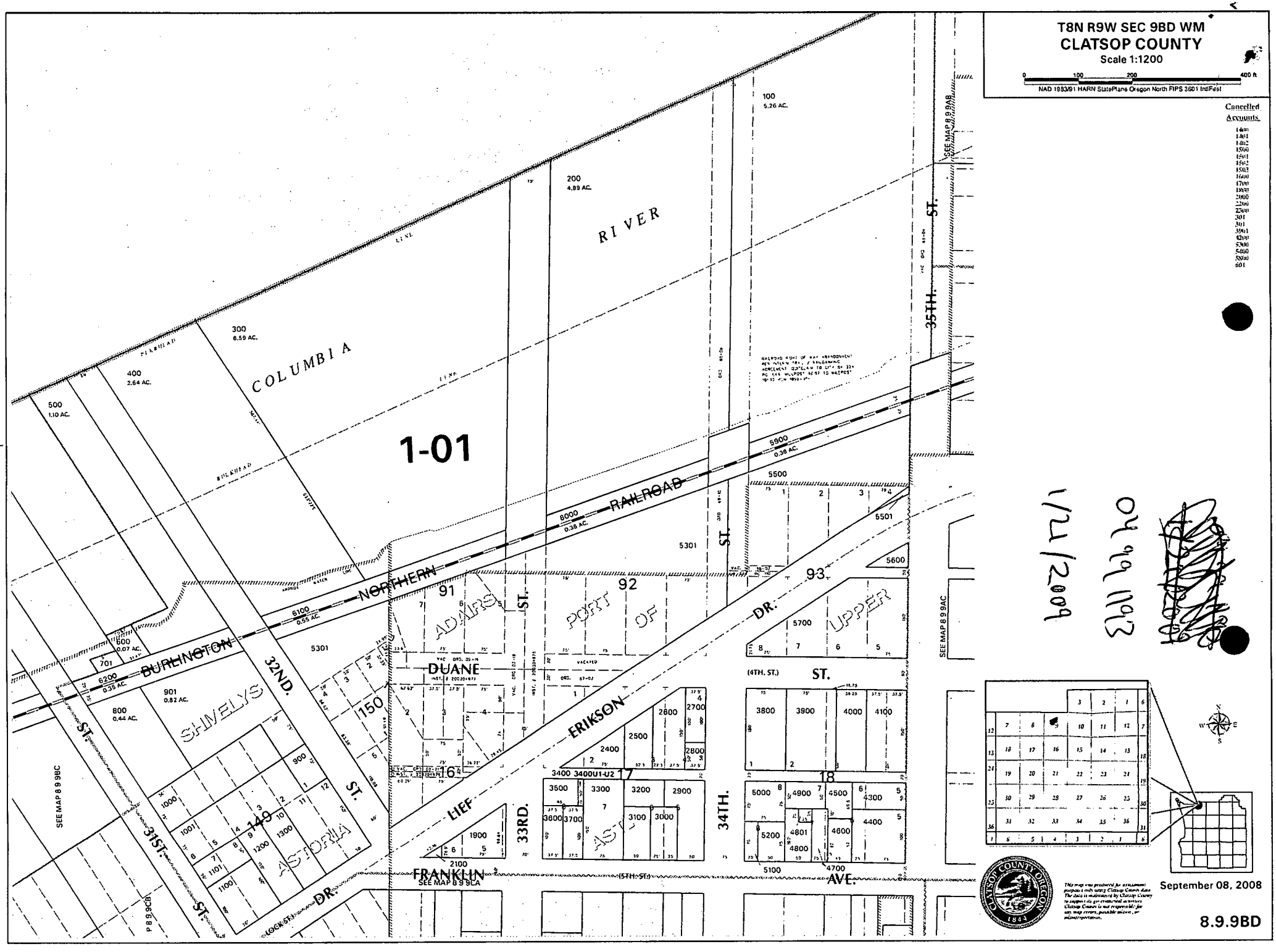
Account Num:	Taxcode:	Acres:
23466	0101	0.77

Special Interest Info:

Account Num:	Spec Int Type:	Spec Int Num:
23466		

Contact the Clatsop County Assessor's Department for more information or questions about this report.

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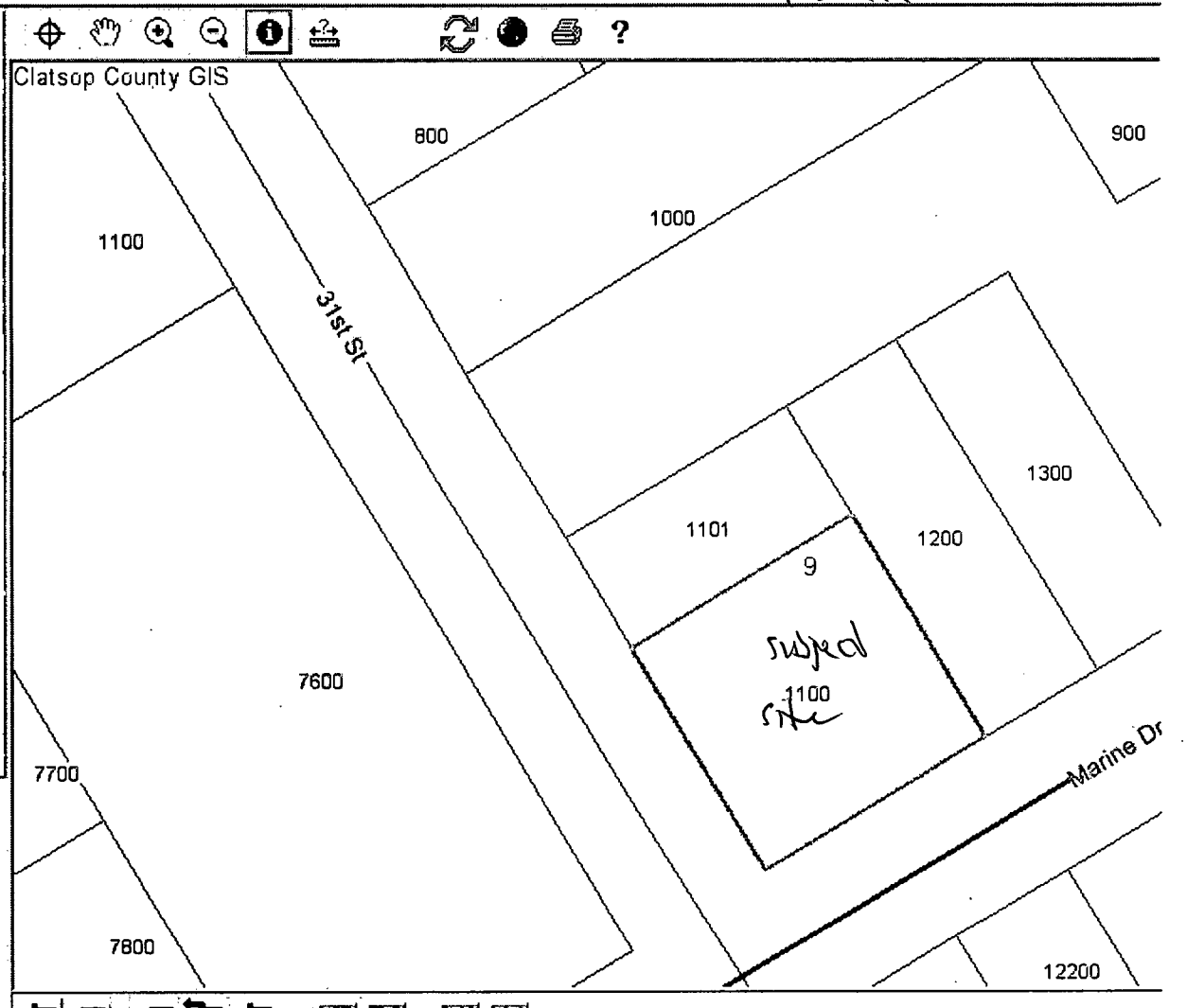

T8N R9W SEC 9BD WM
CLATSOP COUNTY
Scale 1:1200
0 100 200 400 ft
NAD 1983/91 HARN StatePlane Oregon North FIPS 3601 IntlFeet
Cancelled Accounts
1-01
COLUMBIA RIVER
100 5.26 AC.
200 4.89 AC.
300 6.59 AC.
400 2.64 AC.
500 1.10 AC.
5900 0.38 AC.
6000 0.38 AC.
6100 0.55 AC.
6200 0.35 AC.
500 0.07 AC.
701
901 0.82 AC.
800 0.44 AC.
5301
5500
5501
5600
5700
NORTHERN RAILROAD
BURLINGTON
ADAMS
PORT OF
UPPER
DUANE
SHIVELYS
ASTORIA
ERIKSON
FRANKLIN
32ND. ST.
33RD. ST.
34TH. ST.
35TH. ST.
31ST. ST.
LIEF DR.
93RD. DR.
LOCK ST.
(4TH. ST.) ST.
(5TH. ST.) AVE.
SEE MAP 8 9 9AB
SEE MAP 8 9 9AC
SEE MAP 8 9 9BC
SEE MAP 8 9 9CA
P 8 9 9CB
91
92
149
150
16
17
18
1900
2100
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400 3400U1-U2
3500
3600 3700
3800
3900
4000
4100
4300
4400
4500
4600
4700
4800
4801
4900
5000
5100
5200
1/12/2009
04 99 1193
September 08, 2008
8.9.9BD

dy 99 1193

Clatsop County GIS

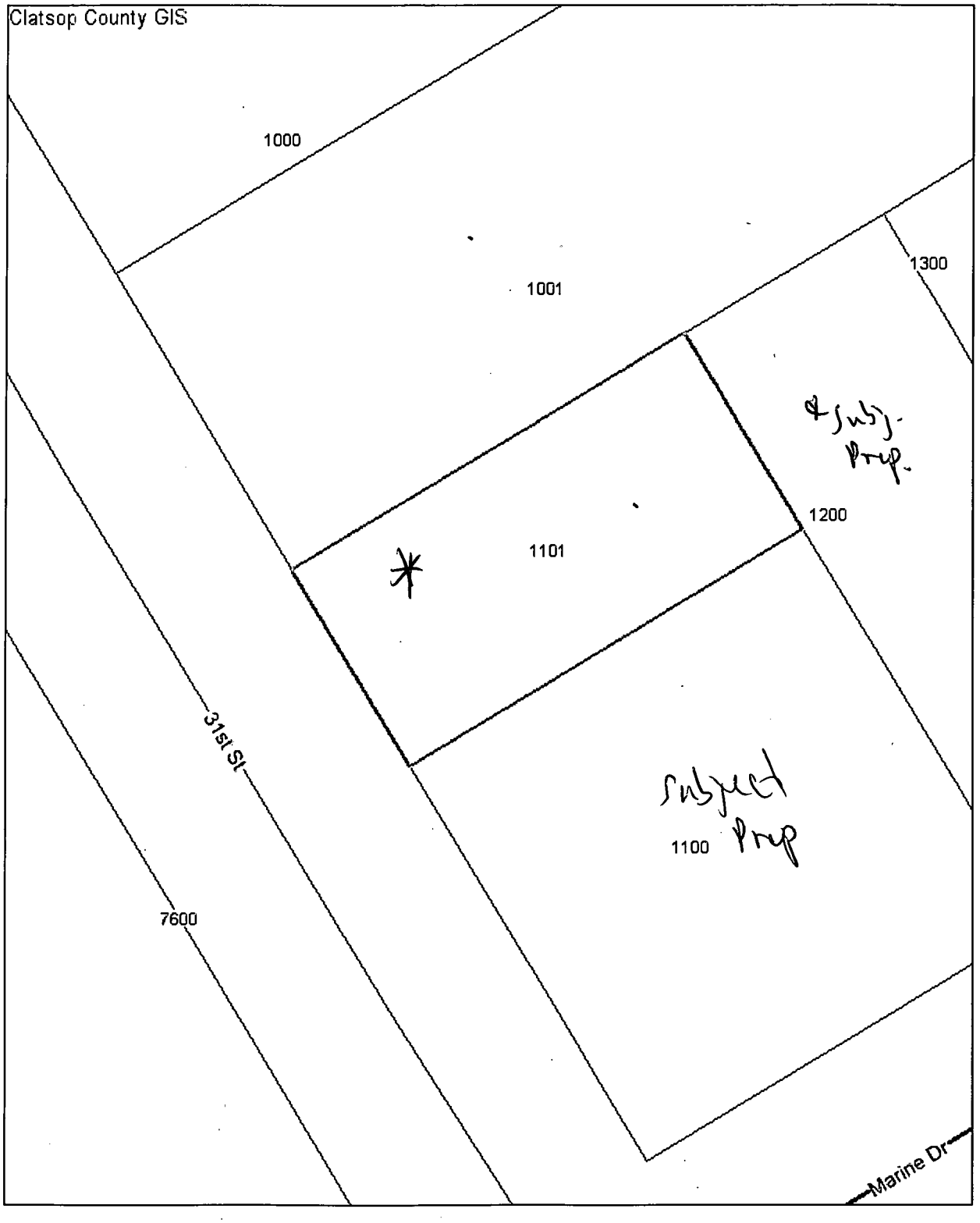
- Map Clatsop County
- Legend
- Scale 1" = 70 feet
- Identify Tax Accounts
- Search
- Search Results

TaxLotKey	80909BD01100
Tax Account	23467
Owner Name	ETU INC
Owner 1	
Owner 2	
In Care Of	Bechtolt Cary E
Situs Street Address	3108 MARINE DR
Situs City	Astoria
Mailing Address	
Mailing Optional Address	
Mailing PO Box	989
Mailing Unit Number	
Mailing City	Astoria
Mailing State	OR
Mailing Zip Code	97103
Year Built	56
Assessed Value	43810.00
AV Improvements	18810.00
AV Land	25000.00
Property Class	201
Real Market Value	43810.00
RMV Improvements	18810.00
RMV Land	25000.00
Stat Class	481
Maintenance Area	1
Neighborhood Code	UZ
TaxMapKey	80909BD01100



TaxLotKey	Tax Account	Owner Name	Owner 1	Owner 2	In Care Of	Situs Street Address	Situs City	Mailing
80909BD01100	23467	ETU INC			Bechtolt Cary E	3108 MARINE DR	Astoria	

0499 1193


Clatsop County GIS
1000
1001
1300
& Subj. Prop.
1200
1101
31st St
Subject Prop
1100
7600
Marine Dr

CLATSOP COUNTY WEBMAPS
Real Property Map Summary for the Current Tax Year

Reports:

Current Tax Statement for Account 23468

Appraisal Report for Account 23468

Payment and Appeal Instructions

Account Info:

Taxlot Key:	80909BD01101	Property Class:	201
Account Number:	23468	MA:	1
Real Market Value:	229966	NH:	U
Assessed Value:	85798	Unit:	
Primary Situs:	576 31st St		

Owner Info:

Owners:	Goza Larry Keith
Agents:	
Mailing Address:	576 31st St Astoria, OR 97103

Land Size Info:

Account Num:	Taxcode:	Acres:
34741	0101	
23468	0101	0.11

Special Interest Info:

Account Num:	Spec Int Type:	Spec Int Num:
34741		
23468		

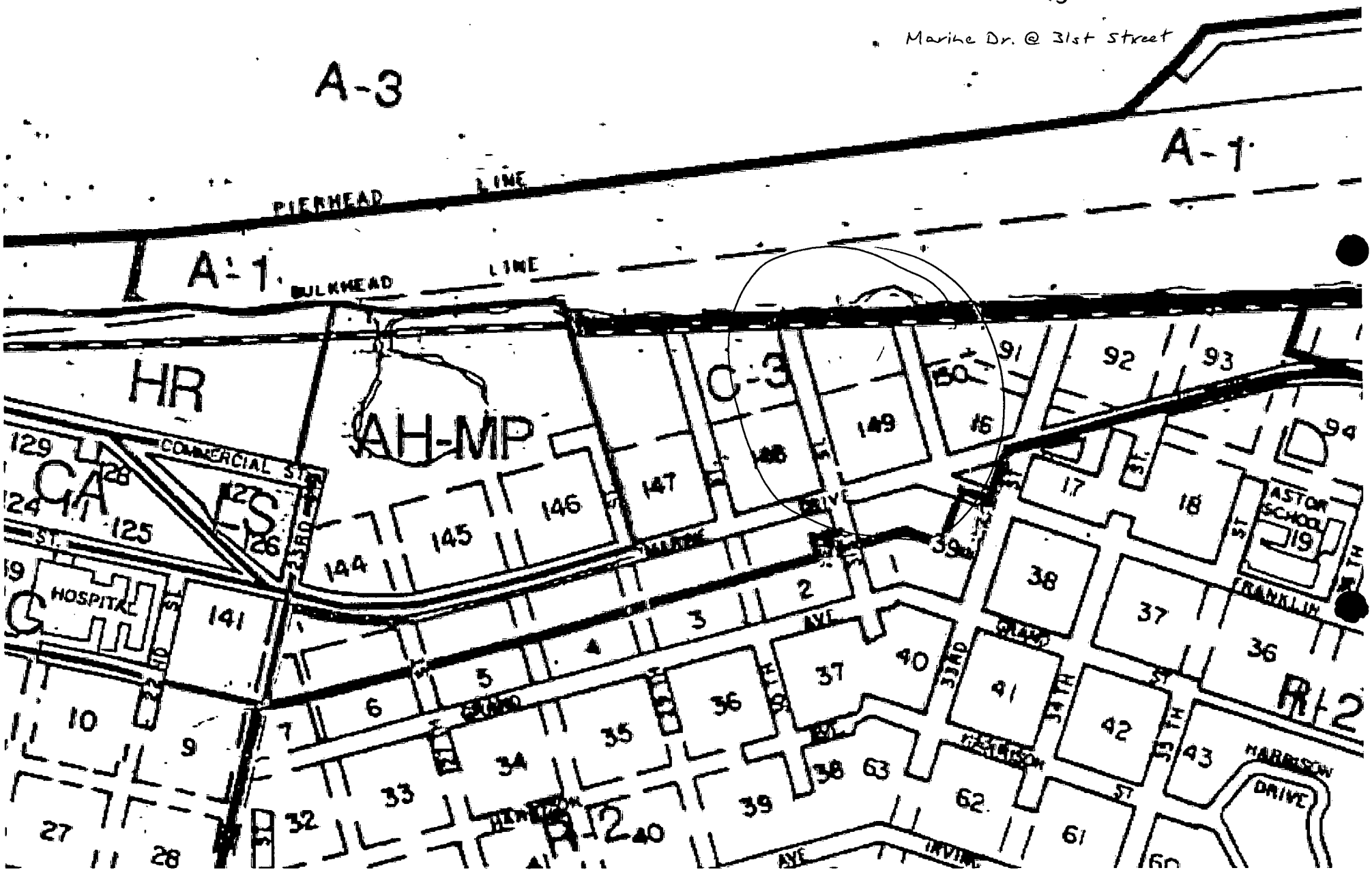
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04-99-1193 3108 Marine Drive

04 99 1193

Marine Dr. @ 31st Street



Clatsop County GIS

⊞ **Map** Clatsop County

⊞ **Legend**

⊞ **Scale** 1" = 33 feet

⊞ **Identify** Tax Accounts

⊟ **Search**

Search Tips

⊟ Tax Accounts Search Clear Search

TaxLotKey:

Tax Account:

Owner Name:

Situs Street Address: 3108 MARINE DR

⊟ **Search Results**

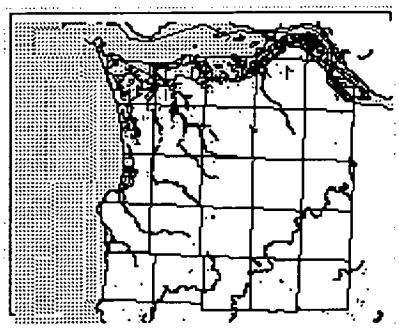
TaxLotKey	80909BD01101
Tax Account	23468
Owner Name	GOZA LARRY KEITH
Owner 1	
Owner 2	
In Care Of	
Situs Street Address	576 31ST ST
Situs City	Astoria
Mailing Address	576 31st St
Mailing Optional Address	
Mailing PO Box	
Mailing Unit Number	
Mailing City	Astoria
Mailing State	OR
Mailing Zip Code	97103
Year Built	39
Assessed Value	85798.00
AV Improvements	72525.00
AV Land	13273.00
Property Class	201
Real Market Value	229966.00
RMV Improvements	152366.00
RMV Land	77600.00
Stat Class	455
Maintenance Area	1
Neighborhood Code	U
TaxMapKey	80909BD01101

⊞ **Specs & Options**

⊞ **Places**

⊞ **Print**

⊟ **Reference Map**



Questions or Comments:
GIS Department

Help Documents

HOOD Robert

From: HOOD Robert
Sent: Wednesday, January 21, 2009 3:01 PM
To: TORAN Greg
Cc: MCCOY Bob
Subject: Niemi Hwy. Service, Facility 6897, Cleanup 04-99-1193

Greg: I am in the process of closing the cleanup for this site, regarding mainly the former waste oil tank removed in 1999. Monitoring wells were installed throughout the site and it appears there is nothing significant in terms of a release, (whether or not there is any issue from the fueling USTs). It is in for Hydro Review. I checked the database and with Bob McCoy on any compliance issues. There do not appear to be any. However, we see they haven't scheduled a time to meet with you for an inspection. Do you see any need to hold up the nfa or public comment following Hydro. review? Thanks.

Rob

Rob Hood
Natural Resource Specialist 4
Oregon Dept. of Environmental Quality
2020 SW 4th Ave., Ste. 400
Portland, OR 97201-4987
Ph: (503) 229-5617
Fax: (503) 229-6945
email: hood.robert@deq.state.or.us
website: www.oregon.gov/deq

HOOD Robert

From: HOOD Robert
Sent: Wednesday, January 21, 2009 11:18 AM
To: HOOD Robert; 'Dustin Till'; 'Dan Becraft (dbecraft@bendbroadband.com)'
Subject: fw: Niemi Highway Service, DEQ Leaking UST Cleanup File No. 04-99-1193

Also, please inform who owns property north of Niemi (tax lot 1101). It looks like the area where B-8 and HA-3 were installed are not Niemi/ETU-owned property. Thanks.

Rob

From: HOOD Robert
Sent: Wednesday, January 21, 2009 10:41 AM
To: 'Dustin Till'; Dan Becraft (dbecraft@bendbroadband.com)
Subject: Niemi Highway Service, DEQ Leaking UST Cleanup File No. 04-99-1193

Dustin and Dan:

I reviewed the Marten Law Group cover letter and the RSV closure request report, both dated 27 October 2008. I have drafted a NFA letter and had a few comments below, but over all this project is looking pretty complete. I will send to my Hydrogeologist for review. In the meantime, please provide any items requested below:

-Remaining plume maps (for this site, total petroleum hydrocarbons, benzene, and any other applicable constituents).

-Regarding residential, although RSV wrote off the scenario (in the land use determination), the concentrations appear to meet applicable residential screening levels. For this site, I'm not asking anything additional from you at this time, but will go over it in peer review.

-I remember we discussed the alley during our site visit. Is it public or private? Can you provide contact information for whoever owns it?

That is all for now. Thanks and please contact me if you have any questions.

Rob

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Fax: (503) 229-6945
email: hood.robert@deq.state.or.us
website: www.oregon.gov/deq

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Sent: Wednesday, January 21, 2009 10:41 AM
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Subject: Niemi Highway Service, DEQ Leaking UST Cleanup File No. 04-99-1193

Dustin and Dan:

I reviewed the Marten Law Group cover letter and the RSV closure request report, both dated 27 October 2008. I have drafted a NFA letter and had a few comments below, but over all this project is looking pretty complete. I will send to my Hydrogeologist for review. In the meantime, please provide any items requested below:

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Ph: (503) 229-5617
Fax: (503) 229-6945
email: hood.robert@deq.state.or.us
website: www.oregon.gov/deq

HOOD Robert

From: HOOD Robert
Sent: Monday, January 05, 2009 9:58 AM
To: 'Dustin Till'
Subject: RE: Niemi Hiway Service [04-99-1193] No Further Action Request
Attachments: image002.jpg; image001.jpg

04 99 1193

Dustin: I completed review of the text and some of the appendices last week. Although not complete, yet, this one looks promising from what I've seen so far. I'll update you as I get more into it. Unfortunately, I cannot provide a timeline to complete, but wanted to reply the status.

Happy New Year to you.

Rob

From: Dustin Till [mailto:dtill@martenlaw.com]
Sent: Monday, January 05, 2009 8:03 AM
To: HOOD Robert
Subject: RE: Niemi Hiway Service [04-99-1193] No Further Action Request

Rob:

Do you have an update on the status of Niemi's Oct. 27, 2008, NFA request for the Hiway Service site? Closing this site would be a great way to start off 2009.

Hope your Holidays went well. As always, we are available to answer any questions you may have.

Sincerely,
-Dustin

Dustin T. Till | Marten Law Group PLLC
1191 Second Avenue | Suite 2200 | Seattle, Washington 98101
206.292.2628 (Direct) | 206.292.2600 (Main) | 206.292.2601 (Fax)
dtill@martenlaw.com | www.martenlaw.com

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From: HOOD Robert [mailto:HOOD.Robert@deq.state.or.us]
Sent: Wednesday, November 12, 2008 6:17 PM
To: Dustin Till
Subject: RE: Niemi Hiway Service [04-99-1193] No Further Action Request

Dustin: I do not have a timeframe yet. The report near the end of my lined up reviews at this point.

Rob

From: Dustin Till [mailto:dtill@martenlaw.com]
Sent: Wednesday, November 12, 2008 9:24 AM
To: HOOD Robert
Cc: dbecraft@bendbroadband.com
Subject: FW: Niemi Hiway Service [04-99-1193] No Further Action Request

Rob,

Do you have an estimated timeframe for responding to Niemi's NFA request for the Hiway Service site? We look forward to working with DEQ to get this site closed as soon as possible. As always, please let us know if there is anything we can assist with.

Thanks,
-Dustin

Dustin T. Till | Marten Law Group PLLC
1191 Second Avenue | Suite 2200 | Seattle, Washington 98101
206.292.2628 (Direct) | 206.292.2600 (Main) | 206.292.2601 (Fax)
dtill@martenlaw.com | www.martenlaw.com

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From: Dustin Till
Sent: Monday, October 27, 2008 3:42 PM
To: 'HOOD Robert'
Cc: 'Daniel Becraft'
Subject: Niemi Hiway Service [04-99-1193] No Further Action Request

Rob,

Attached for DEQ's review is RSV Engineering's *Risk Based Corrective Action Closure Report* and Second Request for a No Further Action for the Niemi/Etu Hiway Service site (DEQ File No. 04-99-1193). We look forward to working with you to close this site in the near future.

You should receive a hard copy of RSV's report in the mail.

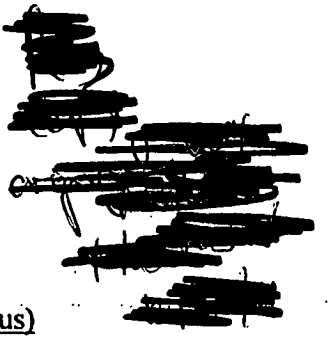
Please let me know if there are any questions I can answer.

Regards,
-Dustin

Dustin T. Till | Marten Law Group PLLC
1191 Second Avenue | Suite 2200 | Seattle, Washington 98101
206.292.2628 (Direct) | 206.292.2600 (Main) | 206.292.2601 (Fax)
dtill@martenlaw.com | www.martenlaw.com

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MARTEN
LAW GROUP
ATTORNEYS AT LAW



Marten Law Group PLLC
1191 Second Avenue
Suite 2200
Seattle WA 98101
Phone: 206 292-2600
Fax: 206 292-2601
www.martenlaw.com

October 27, 2008

Via Electronic Mail (hood.robert@deq.state.or.us)

Writer's Direct Line
206 292-2628
dtill@martenlaw.com

Robert Hood
Oregon Department of Environmental Quality
Northwest Region
2020 S.W. Fourth Avenue, Suite 400
Portland, OR 97201-4987

RE: ***Risk-Based Corrective Action Closure Report and Second Request for No Further Action Determination***
Niemi Oil/Etu Inc. Hiway Service Station
3108 Marine Drive
Astoria, OR
DEQ File No. 04-99-1193

Dear Rob:

Enclosed is RSV Engineering's *Risk-Based Corrective Action Closure Report* for the Niemi Oil Co./Etu Inc. Hiway Service site (DEQ File No. 04-99-1193) **(Exhibit A)**. As indicated in the enclosed report, the Hiway Service site is eligible for a No Further Action determination from the Oregon Department of Environmental Quality using OAR 340-122-0244.

Extensive soil and groundwater investigations performed over the past nine years indicate that the Hiway Service site is impacted by relatively low concentrations of petroleum contamination attributable to a waste-oil underground storage tank (UST) removed from the site in 1999. Soil and groundwater impacts do not exceed Risk-Based Concentrations (RBCs) for applicable exposure pathways, and are confined to the immediate vicinity of the former waste-oil UST.

In June 2005, Niemi submitted a NFA request to DEQ **(Exhibit B)**. In a September 23, 2005 letter, DEQ indicated that "soil and groundwater data collected does meet the proposed cleanup standards for the site." **(Exhibit C)**. DEQ nonetheless requested that Niemi collect additional groundwater data to determine whether low-level petroleum constituents (i.e., below applicable RBCs) detected on the northern portion of the site were indicative of a release from the existing gasoline USTs.

Consistent with a DEQ-approved scope of work, RSV installed and sampled four groundwater monitoring wells (three on-site and one off-site) and collected three groundwater grab samples from adjacent properties between October 29 and November 1, 2007. RSV collected three subsequent quarters of groundwater data from the monitoring wells.

This additional site characterization work did not detect petroleum impacts exceeding reporting limits on the northern portion of the property, and confirm that there is not a release from the current UST system. The investigation results further confirm that soil and groundwater impacts do not exceed applicable RBCs and are confined to the immediate vicinity of the former waste-oil UST. Finally, the investigations did not detect any off-site impacts on down-gradient and cross-gradient adjacent properties.

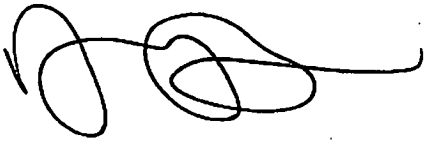
Accordingly, the Hiway Service site is eligible for closure and a NFA determination under OAR 340-122-0244 for the following reasons:

1. Contamination at the site is limited to petroleum-based constituents.
2. Petroleum-related hazardous constituents identified at the site are listed in the DEQ guidance Risk-Based Corrective Action for Petroleum Contaminated Sites, Appendix A Table of RBCs.
3. The site is zoned commercial and the current and future planned use of the site is as a gasoline and service station. The only RBC exceedances for applicable potential exposure pathways were ingestion, inhalation, and dermal contact for oils impacted with TPH as heavy oil (TPH-Oil), and migration to groundwater from soils impacted with TPH-Oil and metals in the vicinity of the former location of the waste-oil UST. However, the soil exceeding the ingestion, inhalation, and dermal contact exposure pathway is present 6 ft. or more below ground surface and deeper than the 3 ft. depth considered applicable for occupational workers per DEQ guidance. No site development at depths greater than 6 ft. is expected or planned in the future, so exposure to the impacted soils is unlikely.
4. Groundwater analytical results do not exceed DEQ Appendix A or site-specific TPH RBCs for applicable potential exposure pathways identified for the site (i.e., Volatilization to Outdoor Air, Vapor Intrusion into Buildings, or Groundwater in an Excavation for Occupational, Construction worker or Excavation worker pathways).

Niemi Oil Company and Etu, Inc. request that DEQ issue a formal determination in the form of a No Further Action letter that the Hiway Service Station (DEQ File No. 04-99-1193) is closed in accordance with a generic remedy for releases from petroleum USTs under OAR 340-122-0252, and DEQ's applicable risk-based guidance.

Thank you for your assistance and prompt attention to this request. If you have any questions concerning the enclosed report or Niemi's NFA request, please contact me.

Sincerely,



Dustin T. Till

Enclosures

cc: D. Becraft, RSV Engineering (dbecraft@bendbroadband.com)

Exhibit A

UST CLEANUP TELEPHONE USE REPORT

CALL FROM/(TO): Dan Becroft DATE: 9/23/08

WITH: RSV TIME: 1415

TELEPHONE NO: (541) 350-3610

REGARDING: Final Report

FILE NO: 04-91-1143

SUMMARY OF CALL

Discussed what a Final Report should look like. Essentially, it need to be the Corrective Action Plan (since one was completed) & the evaluation for Risk Based Closure. It will need to include Standard & Land & Water use evaluations, All data Tabulations & Results on figures w/ Plumes ~~Contoured~~ for TPH, Benzene & any other COCs.

Staff Signature

HOOD Robert

From: HOOD Robert
Sent: Tuesday, July 22, 2008 2:19 PM
To: 'Daniel Becraft'
Subject: Niemi Hiway Service, 04-99-1193

Dan: I reviewed the 2nd quarter groundwater monitoring report dated 14 July 2008. Had a few comments:

-In the report, it indicates that the groundwater ingestion pathway was excluded due to the beneficial water use determination later in the report. It was not included, but my notes indicate that you included it in the last report. I would guess that you would include it anyhow in a final report.

-When you complete your "final" risk evaluation, please be sure to include the zoning information. Also, whatever the outright zoning is, then the risk evaluation will need to be completed for that. For example, from your text, it looks like zoning allows apartments and row houses. If that is an outright use, then risk evaluation will need to be completed for the urban residential pathway.

-On Table 2, the inputted reporting limits do not match the lab report method reporting limits. While it may not make a difference for the risk evaluation, it should be noted at least in future reports or corrected and put into the next quarterly report.

For the next report, what will be the format? Since three quarters have been completed, I would guess you're probably going to submit a closure report along with the last round of data, barring any surprises. If so, let's discuss what that will need to look like. Thanks and let me know if you have any questions.

Rob

Rob Hood
Natural Resource Specialist 4
DEQ, Northwest Region
2020 SW 4th Ave, Ste. 400
Portland, OR 97201-4987
Phone: 503.229.5617
Fax: 503.229.6945

RSV
ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists

July 14, 2008

Robert Hood
Oregon Department of Environmental Quality
Northwest Region
2020 SE 4th Avenue, Suite 400
Portland, OR 97201-4987

Re: ***Second Quarter 2008 Groundwater Monitoring Report***
Hiway Service 76 Station
3108 Marine Drive
Astoria, Oregon
DEQ File No. 04-99-1193

Dear Mr. Hood:

On behalf of Niemi Oil Company, attached to this letter is the ***Second Quarter 2008*** groundwater monitoring report prepared by RSV Engineering, Inc. for the Niemi Oil Company, Hiway Service 76 Station in Astoria, Oregon.

If you have any questions concerning the report, please contact us.

Respectfully Submitted,

RSV Engineering, Inc.

Daniel E. Becraft, R.G.
Project Geologist

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED
JUL 14 2008
NORTHWEST REGION

cc: Cary Bechtolt – Niemi Oil Company
Mitch and Constance Fery – Astoria Grooming
Phil Sharp. – Northwest Educational Service District
Dustin Till, Esq. – Marten Law Group

RSV
ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists

March 14, 2008

Robert Hood
Oregon Department of Environmental Quality
Northwest Region
2020 SE 4th Avenue, Suite 400
Portland, OR 97201-4987

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED
MAR 17 2008
NORTHWEST REGION

Re: ***First Quarter 2008 Groundwater Monitoring Report***
Hiway Service 76 Station
3108 Marine Drive
Astoria, Oregon
DEQ File No. 04-99-1193

Dear Mr. Hood:

On behalf of Niemi Oil Company, attached to this letter is the ***First Quarter 2008*** groundwater monitoring report prepared by RSV Engineering, Inc. for the Niemi Oil Company, Hiway Service 76 Station in Astoria, Oregon.

If you have any questions concerning the report, please contact us.

Respectfully Submitted,

RSV Engineering, Inc.

Daniel E. Becraft, R.G.
Project Geologist

cc: Cary Bechtolt – Niemi Oil Company
Mitch and Constance Fery – Astoria Grooming
Phil Sharp. – Northwest Educational Service District
Dustin Till, Esq. – Marten Law Group

31960 SW Charbonneau Dr., Suite 101 • Wilsonville, OR 97070
phone: 503.694.6960 • fax: 503-694-6962

HOOD Robert

From: HOOD Robert
Sent: Thursday, January 31, 2008 3:37 PM
To: 'Dustin Till'; Dan Becraft (dbecraft@bendbroadband.com)
Subject: Niemi Hwy. Service, 04-99-1193

Dustin and Dan: I reviewed the Additional Site Characterization Report dated 27 December 2007.

-Figure 2 and the well log maps show locations for HA-1 and HA-2, but in reversed locations. Please describe which map is correct.

-For groundwater monitoring, please add the following analyses: At MW-3 add PAHs; at all monitoring wells, the samples should include all RBDM VOCs. From analytical results in the report and in the original work plan, the propyl benzenes and trimethylbenzenes were not included.

-Please complete a beneficial water use determination.

Thanks and let me know if you have any questions/comments.

Rob

Robert A. Hood, Jr.
Natural Resource Specialist 4
DEQ, Northwest Region
2020 SW 4th Ave, Ste. 400
Portland, OR 97201-4987
Phone: 503.229.5617
Fax: 503.229.6945

RSV
ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists

December 27, 2007

Robert Hood
Oregon Department of Environmental Quality
Northwest Region
2020 SE 4th Avenue, Suite 400
Portland, OR 97201-4987

RECEIVED
DEC 2 8 2007
DEPT OF ENVIRONMENTAL QUALITY
NORTHWEST REGION

Re: ***Additional Site Characterization Report***
Hiway Service 76 Station
3108 Marine Drive, Astoria, Oregon
DEQ File No. 04-99-1193

Dear Mr. Hood:

On behalf of Niemi Oil Company, attached to this letter is the ***Additional Site Characterization Report*** prepared by RSV Engineering, Inc. for the Niemi Oil Company, Hiway Service 76 Station in Astoria, Oregon. The report summarizes well installation and groundwater sampling activities performed during October and November 2007.

If you have any questions concerning the report, please contact us.

Respectfully Submitted,

RSV Engineering, Inc.

Daniel E. Becraft, R.G.
Project Geologist

cc: Cary Bechtolt – Niemi Oil Company
Mitch and Constance Fery – Astoria Grooming
Phil Sharp. – Northwest Educational Service District
Dustin Till, Esq. – Marten Law Group

HOOD Robert

From: Dan Becraft [dbecraft@bendbroadband.com]
Sent: Wednesday, April 05, 2006 4:50 PM
To: HOOD Robert
Cc: Brad Berggren; Jeff Kray; Dustin Till
Subject: Niemi Hiway Service - Revised SOW

04 94 1193

HS SOW Figure 1.PDF (78 KB) | Hiway Revised SOW 040406.PDF (..tification_.txt (209 I | _AVG

Rob - Attached you'll find the revised Hiway Service SOW for your review. I will be on the road tomorrow and obviously Friday, but available by cell (541) 350-3610 except when crossing the Cascades or Coast Range. See you on Friday morning. - Dan

- 4/26/2006

Call with Dan Becraft

Discussed a second boring on the Astoria property and one adding Grooming

boring near B-9 (to have some more data in lieu of a monitoring well). MW-4 location is Approved. Not sure of Access to the industrial property to the North. Supposedly USTs were on site in past. Now, there is a lot of old industrial Equipment on that property + Environmental concerns may exceed those from the Niemi UST Cleanup. They will get back with me regarding Access.

RSV
ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists

April 4, 2006

Mr. Robert Hood
Oregon Department of Environmental Quality
Northwest Region
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-4987

Re: Revised Scope of Work for Additional Site Characterization
Hiway Service 76 Station
3108 Marine Drive
Astoria, Oregon
DEQ File No. 04-99-1193

Dear Mr. Hood:

As the Oregon Department of Environmental Quality (DEQ) requested in a September 23, 2005 letter, RSV Engineering, Inc. prepared a Scope of Work dated October 11, 2005, for additional characterization activities at the Hiway Service 76 Station site. The October 11, 2005 scope of work included installation and sampling of four (4) groundwater-monitoring wells. During subsequent discussion regarding the proposed scope of work, DEQ requested that the scope of work be revised to further define the full lateral extent of petroleum constituents in groundwater. Consequently, this revised scope of work includes the collection of groundwater grab samples from properties to the north and east of the site.

Site Background

The Hiway Service site is an active 76 Service Station. Reportedly, there are three (3) active fuel product USTs located at the site: two (2) 4,000-gallon gasoline USTs and one (1) 1,500-gallon gasoline UST. On October 18, 1999, a 550-gallon used-oil UST was removed from the site. At that time, petroleum product odor and staining were noted in the soils from the used-oil UST excavation pit. Two (2) soil samples were collected from the bottom of the excavation and laboratory analyzed for Total Petroleum Hydrocarbon – Hydrocarbon Identification (TPH-HCID) and subsequently for TPH. TPH-HCID as diesel and heavy oil was detected in both samples. TPH as heavy oil was detected in both samples up to a maximum concentration of 78,000 mg/kg. TPH as diesel was not detected in either sample. The soil contamination was reported to the DEQ on October 21, 1999.

RSV conducted an initial soil and groundwater investigation at the site in October 2003. Results of laboratory analyses revealed relatively low concentrations of petroleum related compounds in soil and groundwater beneath the site. A ***Site Characterization Report*** was submitted to DEQ in February 2004. In April 2004, DEQ requested additional site

characterization work to better define the extent of petroleum related impacts. An ***Additional Site Characterization Report*** was submitted to DEQ in May 2005, summarizing the results of investigative work performed in October 2004 to further assess the potential impacts to soil and groundwater from the petroleum release from the former used-oil UST. The additional site characterization work consisted of the completion of three (3) soil borings. One (1) soil boring was completed adjacent to the former location of the used-oil UST, and two (2) soil borings were completed to the north of and hydraulically downgradient of the used-oil UST.

Analysis of samples collected from Soil Boring B-7, completed adjacent to the former used-oil UST, revealed detections of petroleum constituents in soil and groundwater consistent with a release from a used-oil tank. Groundwater samples collected from Soil Borings B-8 and B-9, completed to the north of and downgradient of the former used-oil UST, revealed relatively low detections of several petroleum related compounds more typically associated with gasoline. In a September 23, 2005 letter DEQ requested additional site characterization work consisting of the installation and sampling of at least four (4) groundwater-monitoring wells.

Hydrogeology

Unconsolidated sediments in the Astoria area, near the Columbia River, typically consist of silts, silty clays, and localized areas of peat. In borings advanced during the initial site characterization, soils/sediments encountered generally consisted of silty and sandy gravel and silt to depths of 12 to 15 ft below ground surface (bgs) underlain by fine- to medium-grained sand to depths of 20 ft bgs, the maximum depth explored at the site. Bedrock comprising of siltstone underlies the unconsolidated sediments in the area.

During the 2003 investigation, groundwater was encountered at a depth of 19.5 ft bgs at the site. The direction of shallow groundwater flow beneath the site is inferred to be generally toward the Columbia River, located approximately 250 feet north of the site. Soil boring logs from a property (Hauke site) south of the site, advanced for slope stability analysis by the City of Astoria, indicate that the depth to bedrock is approximately 30 ft bgs. The City of Astoria encountered groundwater above the elevation where groundwater was encountered at the Hiway Service site, indicating groundwater flow beneath the site is north toward the Columbia River. During 2004, depth to groundwater measurements at the site and the adjacent Hauke property confirmed the northerly groundwater flow direction.

Monitoring Well Installation and Soil And Groundwater Sampling And Analysis

RSV proposes to install four (4) groundwater-monitoring wells, three on site and a fourth off site to the north at the approximate locations shown on Figure 1. Also shown on Figure 1 are areas to the north and east of the site where groundwater grab samples will be collected for the purpose of attempting to fully define the extent of groundwater containing petroleum constituents, as requested by DEQ.

As previously reported to DEQ, the locations of current and former USTs and the groundwater flow direction support that the relatively low concentrations of petroleum constituents detected in a grab groundwater sample collected from Boring GP-1 (located in the southwest corner of the site) are from an off-site source. As such, no groundwater grab samples are proposed to the west, other than groundwater samples from the proposed wells (MW-1 & MW-2) in that area of the site.

It should be noted that, although DEQ has requested grab samples be collected from the areas shown on Figure 1, no groundwater sample collected on site to date has contained petroleum constituents that exceed DEQ's risked-based concentrations for petroleum contaminated sites.

The additional data will be used to further evaluate the nature and extent of petroleum-related impacts to groundwater associated with the site. We anticipate that the on-site soil borings will be advanced to a maximum depth of approximately 20 ft below ground surface (bgs), while the off-site monitoring well and grab sample borings will be advanced to a depth of approximately 10 feet bgs. The borings will be completed using conventional percussion probe / direct push drilling techniques. Soil samples for the on-site borings will be collected continuously using 1.25-inch to 2-inch diameter by 4-ft length plastic sampling tubes. The sampling tubes will be driven into the borehole inside 1.25-inch to 2-inch diameter by 4-ft length steel sampling rods. New plastic sleeves will be used for each sample. Other equipment entering the borehole will be decontaminated prior to each use.

The on-site monitoring wells will be screened to intersect the inferred water table with 10-ft length 2-inch diameter factory sand pre-packed polyvinyl chloride (PVC) well screen, while the well screen for the off-site monitoring well will be a 5-ft length if groundwater is encountered at a depth of less than 10 feet bgs. The screen will be attached to a PVC riser, and protected by a steel flush mount cover. The wells will be installed according to applicable Oregon Rules and Regulations by a qualified driller.

Soil samples for on-site borings will be collected continuously from ground surface to the total depth explored and screened in the field for the presence of petroleum hydrocarbons and organic vapors using a photoionization detector (PID). The samples will be visually classified in the field by an RSV geologist in general accordance with ASTM Method D-2488-93. The soil samples will be described with respect to soil types, grain size distribution, color (or discoloration), odor, moisture content, consistency, and photoionizable constituent content, as appropriate.

Soil samples for laboratory analysis will be collected from each on-site soil boring, if warranted based on the visual field observations and PID screening. Groundwater samples will be collected from each of the monitoring wells. The groundwater monitoring wells will be developed by alternate surge and purge techniques, after

installation. Groundwater in the monitoring wells will be allowed to equilibrate for at least 24 hours after development, prior to sampling.

Soil and groundwater samples will be analyzed for: (1) total petroleum hydrocarbons (TPH) by Northwest Method NWTPH-Dx and Northwest Method NWTPH-Gx; (2) VOCs (including benzene, toluene, ethylbenzene and xylenes [BTEX], ethylene dibromide [EDB], ethylene dichloride [EDC], and methyl-tertiary-butyl-ether [MTBE]) per EPA Method 8260; and (3) total or dissolved metals (cadmium, chromium, and lead) by EPA Method 6010 or 200.8.

Soil and groundwater samples will be placed in containers provided by the project laboratory and shipped using appropriate preservative and chain-of-custody controls within allowable holding times, to the project laboratory. Water and soil generated during sampling of the probes, including equipment decontamination water, will be placed in a labeled 55-gallon drum(s) and stored on site. After receipt of laboratory analytical results, arrangements for transport and disposal of the drummed soil and groundwater will be made. RSV anticipates that the soil will be transported to Waste Management Hillsboro Landfill in Hillsboro, Oregon, and that the drummed groundwater will be transported to Oil Re-Recycling Company (ORRCO) in Portland, Oregon.

After receipt of the laboratory analytical reports, RSV will analyze the data and prepare and submit a report to DEQ summarizing site investigation activities, laboratory results, and conclusions. As required by DEQ, three additional quarters of groundwater sampling and monitoring will be performed on the newly installed monitoring wells, after which a case for site closure will be submitted, assuming that petroleum constituent concentrations continue to be below their respective risk-based concentrations, as expected.

The RSV project team will consist of Mr. Brad Berggren, P.E., R.G., a Vice President and Principal with RSV, Dan Becraft R.G., Project Geologist, and other RSV personnel and subcontractors as needed. Mr. Berggren will serve as RSV Project Manager.

If you have any questions regarding this Scope of Work for the additional site characterization activities at the Hiway Service site, please contact us.

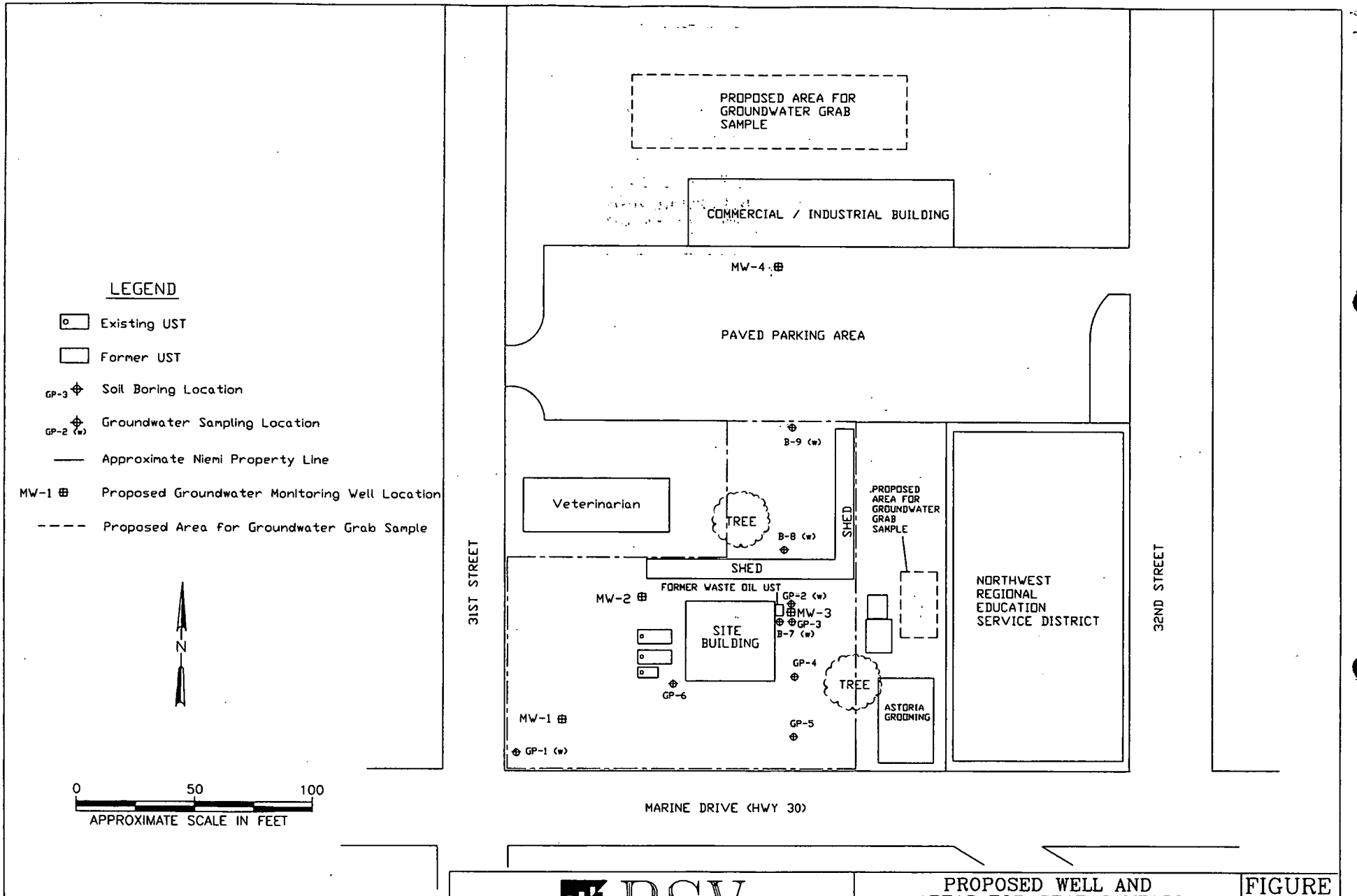
Respectfully Submitted,

RSV Engineering, Inc.

Daniel E. Becraft, R.G.
Project Geologist

for:
Brad J. Berggren, P.E., R.G.
Vice President

cc: Cary Bechtolt – Niemi Oil Company
Jeff Kray – Marten Law Group



RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

PROPOSED WELL AND AREAS FOR GRAB SAMPLES
HIWAY SERVICE
ASTORIA, OREGON

FIGURE 1

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		04/04/06	Wells & Grab 040406

NWR UST FIELD INSPECTION REPORT

Inspection Date: 7 April 2006

Site Name: (Nremi) Hwy Service

Total Time* ~~8~~ ~ 2 hrs

Site Address: 3108 Marine Dr.
Astoria, OR

*Include inspection, travel, paperwork

DEQ Inspector: Rob Haez

File/Facility No: 04 99 8 1193
(both UST & UST Cleanup file #'s as appropriate)

Others Onsite: Dustin Till - Maryten Law
Dan Becraft - RV
(include company name),
Cary Bechtolt - Nremi

Supervisor License No. : _____ Exp. date _____
(note the name of the license holder with **)

Inspection Type

Y---N---Decommissioning
Y---N---1998 Compliance (full)
Partial Compliance
Y---N---Leak Detection
Y---N---Financial Responsibility
Y---N---Corrosion Protection
Y---N---NA Spill & Overfill

Y---N---Install-New
Y---N---Upgrade-Retrofit
Y---N--- Service Provider Audit
(Y)---N---Cleanup
Y---N---SWLA/Soil Treatment
Y---N---Distributor Audit

Y---N---Complaint
Y---N---WQ-New Permit
Y---N---WQ-Exist Permit

Circle **Y** for.....Yes = inspected & in compliance (Y for data entry)
Circle **N** for.....No = inspected & **NOT** in compliance (N for data entry)
Leave Blank for.....Inspection not performed (no data entry necessary)

Photos Taken? Y-(N) (attach) Samples Taken? Y-(N) (attach results)

Notes (use back of form as necessary)

General site visit. Walked to back portion of property (toward river) & discussed reasonable Monitoring Well location based on ACCESS & due to concerns of property to the North (beyond Nremi's second property) which has had USTs or ASTs in the past, pretty industrialized & now has a lot of junk on it. Also inspected Properties toward the east & west for boring locations.

Site Sketch (Show North)

State of Oregon
Department of Environmental Quality Memorandum

To: **File 04-99-1193** **Date: 10 March 2006**
UST Cleanup Section

From: **Rob Hood** RAH
UST Cleanup Section

Subject: Phone Meeting with Dustin Till (Marten Law) and Dan Becraft (RSV Engineering). 3/9/2006

Phone meeting was held to discuss location of the proposed monitoring well in the paved area on the property due north of the Hwy. Service Station (also owned by Niemi). Also, previously I asked Craig Arola (former RSV project manager) to delineation the plume toward the east and northeast. It was agreed that two borings would be installed toward the east and northeast. Dan will look into location accessibility and will need to get access agreements together for signatures by the property owners.

Regarding monitoring well on the property north of Hwy. Service, a couple of options were discussed: 1) install the monitoring well as proposed, but also install a boring(s) further north to delineate the petroleum-contamination groundwater plume. 2) install boring(s) in the proposed monitoring well location and complete a monitoring well approximately 100 feet further north. The problem I noted with this scenario is that the monitoring well is already a good distance from the proposed monitoring wells at the Hwy. Service property. (meaning there would be a large area of data gap on a consecutive monitoring basis). Dustin will check with Jeff Kray, Lead Attorney for the Niemi sites and will get back with me for further discussion.

HOOD Robert

From: HOOD Robert
Sent: Monday, January 09, 2006 1:18 PM
To: 'Dustin Till'; Craig Arola
Subject: Niemi Highway Service, DEQ Leaking UST File 04-99-1193

Dustin and Craig:

I reviewed the scope-of-work. The monitoring well locations look appropriate to initially track contaminant levels in the source area and for some delineation. There are still some gaps in terms of delineation that will need to be addressed either with this investigation or at a later date. Let me know when you are going to that portion of the work and provide a work plan prior to that time.

Some other items:

-For soil samples, at the least, a soil sample should be collected from the soil groundwater interface.

-For analyses, all risk-based decision making gas constituents should be analyzed, not just the constituents that were proposed by RSV. For diesel, polynuclear aromatic hydrocarbons analyses should be completed if diesel in water is detected above 88 parts per billion (the ingestion and inhalation standard). For soil, if diesel is detected above the Level II Matrix standard, PAHs should be analyzed. Please ensure that all laboratory detection limits meet ingestion and inhalation standards for water and the most stringent soil cleanup standards.

-Please let me know when you schedule the work. I would like to make a site visit, if possible.

Rob

Robert A. Hood, Jr.
Natural Resource Specialist 4
DEQ, Northwest Region
2020 SW 4th Ave, Ste. 400
Portland, OR 97201-4987
Phone: 503.229.5617
Fax: 503.229.6945

HOOD Robert

From: Craig Arola [rsvcca@verizon.net]
Sent: Friday, October 14, 2005 3:26 PM
To: HOOD Robert
Cc: Jeff Kray; Dustin Till
Subject: Niemi Oil - Highway Service Scope of Work

Rob:

As requested in your September 23, 2005 letter to Niemi Oil, attached is a Scope of Work for additional site characterization at the site. The Scope of Work proposes installation of 4 groundwater monitoring wells. If you have any questions, please contact me. A hard copy will be mailed to you.

Thanks,

Craig

Craig C. Arola
RSV Engineering, Inc.
31960 SW Charbonneau Drive
Suite 101
Wilsonville, Oregon 97070

ph: 503-694-6960
fax: 503-694-6962
mobile: 503-332-7127

This e-mail may contain confidential and privileged information and is sent for the sole use of the intended recipient. If you are not the intended recipient, please contact the sender by reply e-mail and destroy all copies of the original message.

RECEIVED
OCT 17 2005
DEPT OF ENVIRONMENTAL QUALITY
NORTHWEST REGION

RSV
ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists

October 11, 2005

Mr. Robert Hood
Oregon Department of Environmental Quality
Northwest Region
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-4987

Re: Scope of Work for Additional Site Characterization
Highway Service 76 Station
3108 Marine Drive
Astoria, Oregon
DEQ File No. 04-99-1193

Dear Mr. Hood:

As the Oregon Department of Environmental Quality (DEQ) requested in a September 23, 2005 letter, RSV Engineering, Inc. prepared this Scope of Work for additional site characterization at the Highway Service 76 Station site. An ***Additional Site Characterization Report*** was submitted to DEQ in May 2005, summarizing the results of investigative work performed to further assess the potential impacts to soil and groundwater from a petroleum release from a former 550 gallon used-oil UST at the site. The additional site characterization work consisted of the completion of three (3) soil borings. One (1) soil boring was completed adjacent to the former 550-gallon oil UST, and two (2) soil borings were completed to the north of and hydraulically downgradient of the 550-gallon used oil UST. In a September 23, 2005 letter to Niemi Oil, DEQ requested additional site characterization consisting of installation and sampling of groundwater monitoring wells.

Site Background

The Highway Service site is an active 76 Service Station. Reportedly, there are three (3) active fuel product USTs located at the site: two (2) 4,000-gallon gasoline USTs and one (1) 1,500-gallon gasoline UST. On October 18, 1999, a 550-gallon used-oil UST was removed from the site. At that time, petroleum product odor and staining were noted in the soils from the UST excavation pit. Two (2) soil samples were collected from the bottom of the excavation and laboratory analyzed for Total Petroleum Hydrocarbon – Hydrocarbon Identification (TPH-HCID) and subsequently for TPH. TPH-HCID as diesel and heavy oil was detected in both samples. TPH as heavy oil was detected in both samples up to a maximum concentration of 78,000 mg/kg. TPH as diesel was not detected in either sample. The soil contamination was reported to the DEQ on October 21, 1999.

RSV conducted an initial soil and groundwater investigation at the site in October 2003. Results of laboratory analyses revealed relatively low concentrations of petroleum related compounds in soil and groundwater beneath the site. A ***Site Characterization Report*** was submitted to DEQ in February 2004. The three (3) soil borings requested by DEQ were completed in October 2004. Soil Boring B-7 completed on-site and adjacent to the former 550-gallon used oil UST, revealed detections of petroleum constituents in soil and groundwater consistent with a release from a used oil tank. Groundwater samples collected from Soil Borings B-8 and B-9, completed to the north of and downgradient of the former 550-gallon used oil UST, revealed relatively low detection of several petroleum related compounds more typically associated with gasoline. In a September 23, 2005 letter DEQ requested additional site characterization work consisting of the installation and sampling of at least four (4) groundwater monitoring wells.

Hydrogeology

Unconsolidated sediments in the Astoria area, near the Columbia River, typically consist of silts, silty clays, and localized areas of peat. In borings advanced during the initial site characterization, soils/sediments encountered generally consisted of silty and sandy gravel and silt to depths of 12 to 15 ft below ground surface (bgs) underlain by fine- to medium-grained sand to depths of 20 ft bgs, the maximum depth explored at the site. Bedrock comprising of siltstone underlies the unconsolidated sediments in the area.

During the 2003 investigation, groundwater was encountered at a depth of 19.5 ft bgs at the site. The direction of shallow groundwater flow beneath the site is inferred to be generally toward the Columbia River, located approximately 250 feet north of the site. Soil boring logs from a property (Hauke site) south of the site, advanced for slope stability analysis by the City of Astoria, indicate that the depth to bedrock is approximately 30 ft bgs. The City of Astoria encountered groundwater above the elevation where groundwater was encountered at the Highway Service site, indicating groundwater flow beneath the site is north toward the Columbia River. During 2004, depth to groundwater measurements at the site and the adjacent Hauke property confirmed the northerly groundwater flow direction.

Monitoring Well Installation

RSV proposes to install four (4) groundwater monitoring wells at the site to supplement existing investigative data. The proposed monitoring well locations are indicated on the attached Figure 1. The additional data will be used to further evaluate the nature and extent of petroleum-related impacts to groundwater at the site. We anticipate that the soil borings will be advanced to a maximum depth of approximately 20 ft bgs using conventional percussion probe / direct push drilling techniques. Soil samples will be collected continuously using 1.25-inch to 2-inch diameter by 4-ft length plastic sampling tubes. The sampling tubes will be driven into the borehole inside 1.25-inch to 2-inch diameter by 4-ft length steel sampling rods. New plastic sleeves will be used for each sample. Other equipment entering the borehole will be decontaminated prior to each use.

The monitoring wells will be screened to intersect the inferred water table with 10-ft length 2-inch diameter factory sand pre-packed polyvinyl chloride (PVC) well screen. The screen will be attached to a PVC riser, and protected by a steel flush mount cover. The wells will be installed according to applicable Oregon Rules and Regulations by a qualified driller.

Soil samples will be collected continuously from ground surface to the total depth explored in each probe and screened in the field for the presence of petroleum hydrocarbons and organic vapors using a photoionization detector (PID). The samples will be visually classified in the field by an RSV geologist in general accordance with ASTM Method D-2488-93. The soil samples will be described with respect to soil types, grain size distribution, color (or discoloration), odor, moisture content, consistency, and photoionizable constituent content, as appropriate. Soil samples will be collected from each sampling interval for in-field screening using a photoionization detector (PID). The collected samples will be placed in plastic reclosable bags prior to field screening.

Soil samples will be collected from each soil boring based on visual field observations and PID screening. Groundwater samples will be collected from each of the monitoring wells. The groundwater monitoring wells will be developed by alternate surge and purge techniques, after installation. Groundwater in the monitoring wells will be allowed to equilibrate for at least 24 hours after development, prior to sampling.

Soil and groundwater samples will be analyzed for: (1) total petroleum hydrocarbons (TPH) by Northwest Method NWTPH-Dx and Northwest Method NWTPH-Gx; (2) VOCs (including benzene, toluene, ethylbenzene and xylenes [BTEX], ethylene dibromide [EDB], ethylene dichloride [EDC], and methyl-tertiary-butyl-ether [MTBE]) per EPA Method 8260; and (3) total or dissolved metals (cadmium, chromium, and lead) by EPA Method 6010 or 200.8.

Soil and groundwater samples will be placed in containers provided by the project laboratory and shipped using appropriate preservative and chain-of-custody controls within allowable holding times, to the project laboratory. Water and soil generated during sampling of the probes, including equipment decontamination water, will be placed in a labeled 55-gallon drum(s) and stored on site. After receipt of laboratory analytical results, arrangements for transport and disposal of the drummed soil and groundwater will be made. RSV anticipates that the soil will be transported to Waste Management Hillsboro Landfill in Hillsboro, Oregon, and that the drummed groundwater will be transported to Oil Re-Recycling Company (ORRCO) in Portland, Oregon.

After receipt of sample laboratory results and data analysis, RSV will prepare and submit a report to DEQ summarizing site investigative activities, laboratory results, conclusions, and recommendation whether the site data support closure in accordance with DEQ's risk-based standards, or whether additional investigation activities are necessary.

The RSV project team will consist of Mr. Brad Berggren, P.E., R.G., a Vice President and Principal with RSV, Craig C. Arola R.G., Project Hydrogeologist, and other RSV personnel and subcontractors as needed. Mr. Berggren will serve as RSV Project Manager.

If you have any questions regarding this Scope of Work for the additional site characterization activities at the Highway Service site, please contact us.

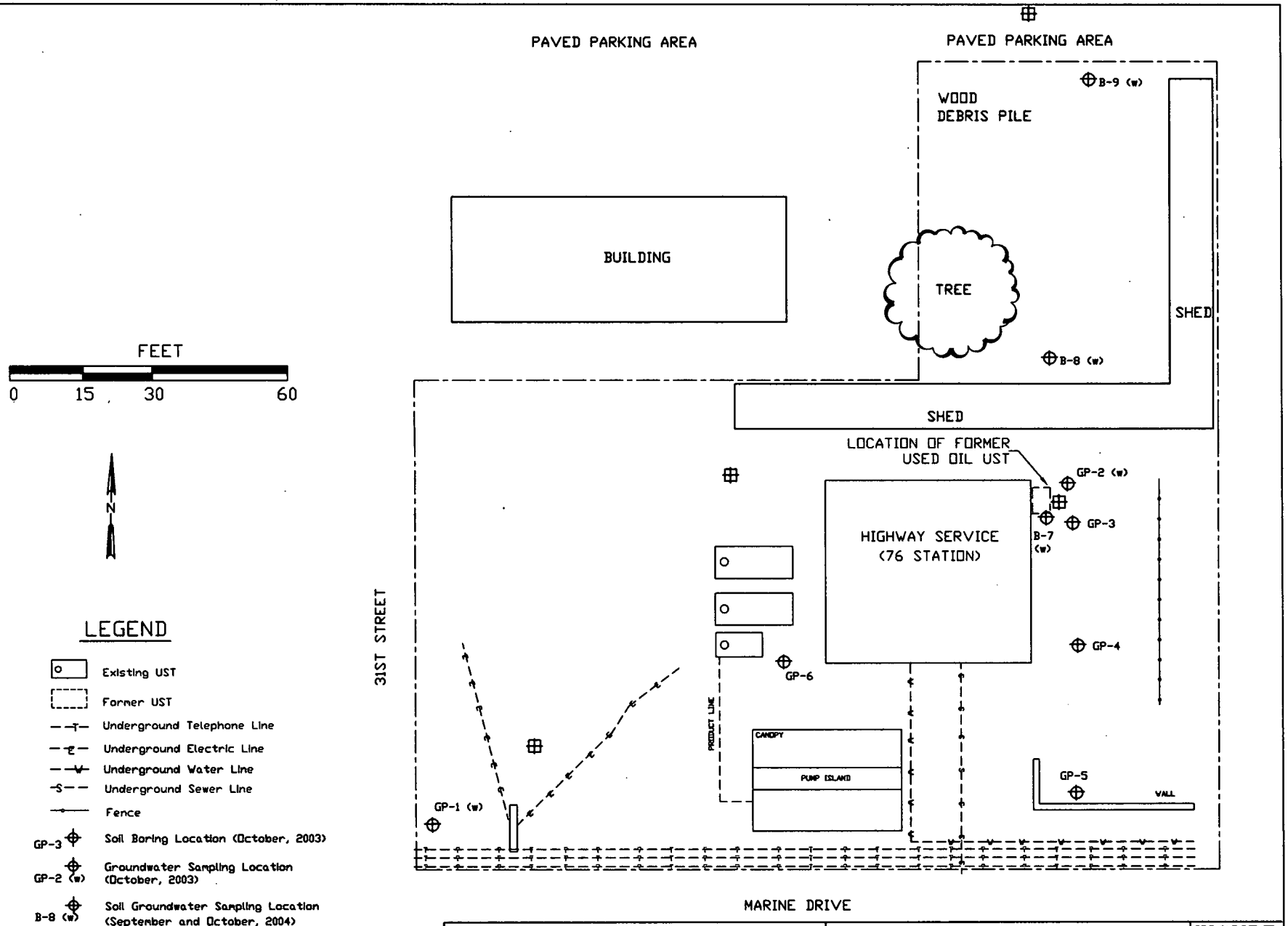
Respectfully Submitted,

RSV Engineering, Inc.

Craig C. Arola, R.G.
Project Geologist

Brad J. Berggren, P.E., R.G.
Vice President

cc: Cary Bechtolt – Niemi Oil Company
Jeff Kray – Marten Law Group



RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

PROPOSED MONITORING WELL LOCATIONS
HIGHWAY SERVICE
3108 MARINE DRIVE
ASTORIA, OREGON

FIGURE 1

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
CCA		09/29/05	proposed_wells

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
Northwest Region Portland Office
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-4987
(503) 229-5263
FAX (503) 229-6945
TTY (503) 229-5471

23 September 2005

MR CARY BECHTOLT
NIEMI OIL CO
PO BOX 989
ASTORIA OR 97103

Re: Highway Service
File No. 04-99-1193

Dear Mr. Bechtolt:
The Department of Environmental Quality (DEQ) has completed its review of the report entitled, *Additional Site Characterization Report*, dated May 2005, regarding the underground storage tank (UST) cleanup at 3108 Marine Drive in Astoria, Oregon. In the report, no further action (NFA) was again requested. At this time, DEQ again cannot issue a NFA letter for the following reasons:

- Additional groundwater investigation performed indicates that gasoline {330 parts per billion (ppb)}, diesel (3,200 ppb), and other constituents (benzene 53 ppb), in addition to the heavy oil from the waste oil tank, are present in groundwater at higher levels than previously detected. In addition, the contamination is a greater distance from the area of concern than was known or anticipated (approximately 80 feet from the former waste oil tank location and approximately 120 feet from the fueling UST system). While the soil and groundwater data collected does meet the proposed cleanup standards for the site, it appears that a release has occurred from the UST system at the center portion of the property in addition to the waste oil UST. As a result, Oregon Administrative Rule 340-122-0240 requires that monitoring wells be installed when contamination has migrated beyond the immediate vicinity of a UST pit. DEQ requests that at least four monitoring wells be installed and that the full extent of petroleum contamination be determined. Some of the wells and investigation will need to evaluate the existing fueling UST system.

- In review of the site-specific oil data, DEQ agrees with implementing a value into the most conservative carbon range of DEQ's total petroleum hydrocarbons (TPH) risk spreadsheet. However, since TPH and constituent data was collected, DEQ will require that the evaluation be performed by inserting the actual TPH (78,000 ppm from north BOT sample) and constituent values into the spreadsheet. DEQ has completed this, which is attached for you to evaluate and implement into the risk-based determination. In lieu of the lack of constituent data from the North BOT soil sample, constituent data was installed from the next highest TPH value with constituent data (B-7, 13- 15 feet below ground surface). The information was also installed with the 12,000 ppm of heavy oil detected from B-7. The calculation indicates that remaining heavy oil concentrations are within the applicable cleanup standards.

- Please provide the Clackamas County zoning documentation from which your land use

determination was derived.

Please submit a work plan by **14 October 2005**, which proposes the next phase of investigation, monitoring wells installations, and groundwater monitoring. If you have any questions, please call me at (503) 229-5617.

Respectfully,

Robert A. Hood, Jr.
UST Cleanup Specialist

enclosures
cc: Craig Arola
RSV Engineering, Inc.
31960 SW Charbonneau Dr. Ste. 101
Wilsonville, OR 97070

Jeff Kray
Marten Law Group PLLC
1191 Second Avenue, Ste 2200
Seattle, WA 98101

(rah:RAH)

TPH Fraction Composition (Weight Fraction)

	Site-Specific Data			Generic Weight Fraction Data		
Fuel Fractions	Raw Data mg/kg (ppm)	Adjusted Data mg/kg (ppm)	Weight Fraction	Gasoline	Diesel	Mineral Oil
Aliphatic C5-C6			0.00E+00	2.08E-01	0.00E+00	0.00E+00
Aliphatic >C6-C8			0.00E+00	2.20E-01	0.00E+00	0.00E+00
Aliphatic >C8-C10			0.00E+00	9.00E-02	2.00E-02	1.00E-03
Aliphatic >C10-C12			0.00E+00	3.00E-02	7.00E-02	3.00E-03
Aliphatic >C12-C16			0.00E+00	0.00E+00	3.50E-01	1.60E-01
Aliphatic >C16-C21			0.00E+00	0.00E+00	3.40E-01	7.00E-01
Aliphatic >C21-C34			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aromatic >C8-C10		0	0.00E+00	9.02E-02	2.52E-03	1.00E-03
Aromatic >C10-C12		0	0.00E+00	2.25E-02	7.40E-03	1.00E-03
Aromatic >C12-C16			0.00E+00	0.00E+00	8.00E-02	7.00E-03
Aromatic >C16-C21			0.00E+00	0.00E+00	1.20E-01	8.00E-02
Aromatic >C21-C34	78000	78000	1.00E+00	0.00E+00	0.00E+00	4.60E-02
n-Hexane	0.0	0.0	0.00E+00	2.40E-02	0.00E+00	0.00E+00
Benzene	0.0	0.0	6.41E-08	2.50E-02	2.90E-04	0.00E+00
Toluene	0.0	0.0	1.28E-08	1.20E-01	1.80E-03	0.00E+00
Ethylbenzene	0.0	0.0	1.79E-07	2.00E-02	6.80E-04	0.00E+00
Total Xylenes	0.1	0.1	7.56E-07	1.10E-01	5.00E-03	0.00E+00
1,2,4-trimethylbenzene	0.0	0.0	3.21E-07	3.00E-02	0.00E+00	0.00E+00
1,3,5-trimethylbenzene	0.0	0.0	3.59E-07	9.80E-03	1.80E-03	0.00E+00
Naphthalene	0.0	0.0	2.31E-08	2.50E-03	2.60E-03	0.00E+00
Total	78000	78000	1.00	1.00	1.00	1.00

Use one of the following two options for site-specific TPH RBC calculations:

OPTION 1:
Estimate TPH Fractions

(1) Enter TPH data (mg/kg or ppm) into the cell on the right
(2) Enter BTEX, TMB, and naphthalene data in the "Raw Data" column above
(3) Use one of the buttons at the right to identify the predominant product.

Gasoline Estimate
Diesel Estimate

OR

OPTION 2:
Use VPH and EPH Results

(1) Enter TPH fraction and constituent data in the "Raw Data" column above
(2) Use one of the buttons at the right to identify the predominant product.

Gasoline Fractions
Non-Gas Fractions

For references, please refer to *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* (DEQ, 2003).

for 78,000 ppm

Fuel Fraction	RBCss Residential (mg/kg)	RBCss Urban Residential (mg/kg)	RBCss Occupational (mg/kg)	RBCss Construction Worker (mg/kg)	RBCss Excavation Worker (mg/kg)	RBCse Residential (mg/kg)	RBCse Urban Residential (mg/kg)	RBCse Occupational (mg/kg)	RBCsi Residential (mg/kg)	RBCsi Urban Residential (mg/kg)	RBCsi Occupational (mg/kg)	RBCsw Residential (mg/kg)	RBCsw Urban Residential (mg/kg)	RBCsw Occupational (mg/kg)	RBCw Residential (ug/L)	RBCw Urban Residential (ug/L)	RBCw Occupational (ug/L)	RBCwe Residential (ug/L)	RBCwe Urban Residential (ug/L)	RBCwe Occupational (ug/L)	RBCwi Residential (ug/L)	RBCwi Urban Residential (ug/L)	RBCwi Occupational (ug/L)	RBCwe Construction & Excavation Worker (ug/L)	RBCwi Residential (ug/m³)	RBCwi Urban Residential (ug/m³)	RBCwi Occupational (ug/m³)
Aliphatic C5-C6	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E+04	3.5E+04	1.4E+05	1.9E+06	1.9E+06	7.4E+06	8.3E+04	8.3E+04	8.9E+05	3.1E+06	2.1E+04	2.1E+04	8.3E+04
Aliphatic >C6-C8	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E+04	3.5E+04	1.4E+05	1.1E+06	1E+06	4.9E+06	3.5E+04	3.5E+04	8.9E+04	1.8E+06	1.1E+04	1.1E+04	6.3E+04
Aliphatic >C8-C10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+03	1.4E+03	5.6E+03	4.9E+04	4.9E+04	1.6E+05	2.1E+03	2.1E+03	5.3E+03	2.6E+04	2.6E+03	2.6E+03	1.4E+03
Aliphatic >C10-C12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.7E+03	7.7E+03	3.1E+04	2.7E+04	2.7E+04	1.1E+05	1.2E+03	1.2E+03	3.1E+03	1.4E+04	1.4E+03	1.4E+03	7.7E+03
Aliphatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.1E+03	3.1E+03	1.3E+04	6.2E+03	6.2E+03	2.5E+04	2.8E+02	2.8E+02	7.3E+02	3.2E+03	2.8E+02	2.8E+02	1.7E+03
Aliphatic >C16-C21	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.7E+04	7.7E+04	3.1E+05	4.4E+03	4.4E+03	1.8E+04	2.1E+03	2.1E+03	5.3E+03	2.3E+04	2.1E+03	2.1E+03	1.2E+04
Aliphatic >C21-C34	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.3E+04	7.3E+04	2.9E+05	2.2E+02	2.2E+02	6.6E+03	7.3E+03	7.3E+03	2.9E+04	1.1E+05	0.0E+00	0.0E+00	0.0E+00
Aromatic >C8-C10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+03	3.4E+03	1.3E+04	1.1E+06	1.1E+06	4.7E+06	5.7E+04	5.7E+04	8.9E+05	2.7E+06	2.2E+02	2.2E+02	8.9E+02
Aromatic >C10-C12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+02	3.4E+02	1.3E+03	4.9E+06	4.9E+06	1.6E+07	1.1E+05	1.1E+05	2.2E+06	2.7E+06	2.2E+02	2.2E+02	8.9E+02
Aromatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+02	3.4E+02	1.3E+03	4.9E+06	4.9E+06	1.6E+07	9.4E+04	9.4E+04	1.1E+06	2.7E+06	1.1E+02	1.1E+02	4.4E+02
Aromatic >C16-C21	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E+03	1.1E+03	4.4E+03	4.4E+07	4.4E+07	1.8E+08	1.1E+07	1.1E+07	2.1E+08	2.7E+06	1.1E+02	1.1E+02	4.4E+02
Aromatic >C21-C34	1.0E+00	1.0E+00	1.0E+00	1.0E+00	9.4E-01	4.6E-07	4.6E-07	1.1E-07	3.6E-07	3.6E-07	1.7E-08	1.0E-04	1.0E-04	2.5E-05	1.1E+03	1.1E+03	4.4E+03	4.4E+07	4.4E+07	1.8E+08	1.1E+07	1.1E+07	2.1E+08	2.7E+06	1.1E+02	1.1E+02	4.4E+02
n-Hexane	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E+02	3.5E+02	1.4E+03	6.1E+04	6.1E+04	2.4E+05	2.7E+03	2.7E+03	3.3E+04	5.2E+04	3.2E+02	3.2E+02	8.3E+02
Benzene	4.0E-07	8.0E-07	5.1E-07	4.0E-07	2.5E-07	7.8E-06	7.8E-06	1.8E-06	7.8E-06	7.8E-06	1.7E-06	4.0E-07	4.0E-07	1.0E-07	7.7E+02	7.7E+02	2.9E+03	2.8E+03	2.8E+03	1.1E+04	1.2E+03	1.2E+03	2.3E+03	4.5E+03	1.1E+02	1.1E+02	4.2E+02
Toluene	8.4E-09	8.4E-09	4.0E-08	2.2E-09	1.4E-09	1.2E-07	1.2E-07	2.9E-08	9.7E-08	9.7E-08	8.1E-08	4.0E-07	4.0E-07	1.0E-07	1.3E+03	1.3E+03	5.4E+03	8.0E+04	8.0E+04	3.0E+05	3.2E+03	3.2E+03	4.2E+03	8.4E+04	1.1E+02	1.1E+02	4.2E+02
Ethylbenzene	7.6E-08	7.6E-08	3.7E-08	4.3E-08	2.7E-08	1.5E-07	1.5E-07	4.8E-07	1.5E-07	1.5E-07	1.7E-08	2.4E-05	2.4E-05	6.1E-06	2.1E+02	2.1E+02	6.2E+02	3.8E+03	3.8E+03	1.4E+04	1.1E+03	1.1E+03	1.1E+03	3.8E+03	1.1E+02	1.1E+02	4.2E+02
Total Xylenes	2.6E-08	2.6E-08	6.6E-07	2.7E-07	1.7E-07	1.2E-06	1.2E-06	2.8E-06	1.2E-06	1.2E-06	9.6E-07	4.9E-05	4.9E-05	1.2E-05	1.2E+01	1.2E+01	4.9E+01	9.4E+04	9.4E+04	3.8E+05	3.2E+04	3.2E+04	4.2E+04	9.4E+04	1.1E+02	1.1E+02	4.2E+02
1,2,4-trimethylbenzene	1.1E-05	1.1E-05	4.5E-06	1.5E-06	9.7E-07	1.5E-06	1.5E-06	1.9E-06	1.5E-06	1.5E-06	1.1E-06	4.9E-05	4.9E-05	1.2E-05	1.2E+01	1.2E+01	4.9E+01	2.7E+05	2.7E+05	1.1E+06	9.4E+04	9.4E+04	1.1E+05	2.7E+05	1.1E+02	1.1E+02	4.2E+02
1,3,5-trimethylbenzene	1.3E-05	1.3E-05	5.0E-06	1.7E-06	1.0E-07	1.7E-06	1.7E-06	2.1E-06	1.7E-06	1.7E-06	1.2E-06	5.4E-05	5.4E-05	1.3E-05	1.3E+01	1.3E+01	5.4E+01	1.4E+05	1.4E+05	5.5E+05	3.2E+04	3.2E+04	4.2E+04	1.4E+05	1.1E+02	1.1E+02	4.2E+02
Naphthalene	5.1E-07	4.7E-07	1.7E-07	1.3E-07	1.1E-07	5.7E-08	5.7E-08	1.4E-08	5.7E-08	5.7E-08	9E-09	3.6E-06	3.6E-06	9.0E-07	1.4E+00	1.4E+00	5.6E+00	3.6E+02	3.6E+02	1.4E+03	3.2E+02	3.2E+02	3.3E+02	3.6E+02	1.1E+02	1.1E+02	4.2E+02
TPH RBC* ⟶	1,700	3,400	21,000	6,700	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	340	340	1,400	>S	>S	>S	>S	>S	>S	>S	32	32	130
Generic Gasoline	720	1,500	22,000	13,000	>MAX	4,500	4,500	180,000	140	140	>MAX	29	29	110	100	100	400	>S	>S	>S	>S	>S	>S	>S	650	650	1,800
Generic Diesel / Heating Oil	3,900	8,300	70,000	23,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	2,800	2,800	>MAX	66	66	350	>S	>S	>S	>S	>S	>S	>S	120	170	490
Generic Mineral Insulating Oil	8,800	19,000	>MAX	40,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	290	290	1,100	>S	>S	>S	>S	>S	>S	>S	490	490	1,900

TPH Fraction Composition (Weight Fraction)

Fuel Fractions	Site-Specific Data			Generic Weight Fraction Data		
	Raw Data mg/kg (ppm)	Adjusted Data mg/kg (ppm)	Weight Fraction	Gasoline	Diesel	Mineral Oil
Aliphatic C5-C6			0.00E+00	2.06E-01	0.00E+00	0.00E+00
Aliphatic >C6-C8			0.00E+00	2.20E-01	0.00E+00	0.00E+00
Aliphatic >C8-C10			0.00E+00	9.00E-02	2.00E-02	1.00E-03
Aliphatic >C10-C12			0.00E+00	3.00E-02	7.00E-02	3.00E-03
Aliphatic >C12-C16			0.00E+00	0.00E+00	3.50E-01	1.60E-01
Aliphatic >C16-C21			0.00E+00	0.00E+00	3.40E-01	7.00E-01
Aliphatic >C21-C34			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aromatic >C8-C10		0	0.00E+00	9.02E-02	2.52E-03	1.00E-03
Aromatic >C10-C12		0	0.00E+00	2.25E-02	7.40E-03	1.00E-03
Aromatic >C12-C16			0.00E+00	0.00E+00	8.00E-02	7.00E-03
Aromatic >C16-C21			0.00E+00	0.00E+00	1.20E-01	8.00E-02
Aromatic >C21-C34	12000	12000	1.00E+00	0.00E+00	0.00E+00	4.60E-02
n-Hexane	0.0	0.0	0.00E+00	2.40E-02	0.00E+00	0.00E+00
Benzene	0.0	0.0	4.17E-07	2.50E-02	1.90E-04	0.00E+00
Toluene	0.0	0.0	8.33E-08	1.20E-01	1.80E-03	0.00E+00
Ethylbenzene	0.0	0.0	1.17E-06	2.00E-02	6.80E-04	0.00E+00
Total Xylenes	0.1	0.1	4.92E-06	1.10E-01	5.00E-03	0.00E+00
1,2,4-trimethylbenzene	0.0	0.0	2.08E-06	3.00E-02	0.00E+00	0.00E+00
1,3,5-trimethylbenzene	0.0	0.0	2.33E-06	9.80E-03	1.80E-03	0.00E+00
Naphthalene	0.0	0.0	1.50E-07	2.50E-03	2.80E-03	0.00E+00
Total	12000	12000	1.00	1.00	1.00	1.00

Use one of the following two options for site-specific TPH RBC calculations

OPTION 1: Estimate TPH Fractions
(1) Enter TPH data (mg/kg or ppm) into the cell on the right
(2) Enter BTEX, TMB, and naphthalene data in the "Raw Data" column above
(3) Use one of the buttons at the right to identify the predominant product

Gasoline Estimate | Diesel Estimate

OR

OPTION 2: Use VPH and EPH Results
(1) Enter TPH fraction and constituent data in the "Raw Data" column above
(2) Use one of the buttons at the right to identify the predominant product

Gasoline Fractions | Non-Gas Fractions

For references, please refer to *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* (DEQ, 2003).

for 12,000 ppm

Fuel Fraction	RBCss					RBCso			RBCsi			RBCsw			RBCwo			RBCwi			RBCwe			RBCwi		
	Residential	Urban Residential	Occupational	Construction Worker	Excavation Worker	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Construction & Excavation Worker	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/m³)	(ug/m³)	(ug/m³)	(ug/m³)	(ug/m³)	(ug/m³)
Aliphatic C5-C8	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E-04	3.5E-04	1.4E-03	9E-06	1.9E-06	7.4E-06	8.3E-04	8.3E-04	8.8E-05	3.1E-06	1.1E-04	2.1E-04	8.3E-04
Aliphatic >C8-C8	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E-04	3.5E-04	1.4E-03	1.2E-06	1.7E-06	4.8E-06	8.5E-04	8.5E-04	8.8E-05	7.2E-06	1.1E-03	2.1E-03	8.3E-04
Aliphatic >C8-C10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E-03	1.4E-03	5.5E-03	4.6E-04	4.6E-04	1.6E-06	1.8E-03	1.8E-03	2.1E-04	2.0E-04	2.9E-03	5.1E-03	4.4E-03
Aliphatic >C10-C12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E-03	1.4E-03	5.5E-03	1.7E-04	2.7E-04	1.1E-05	1.7E-03	1.7E-03	1.4E-04	6.7E-03	1.1E-02	1.7E-02	4.4E-03
Aliphatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.7E-03	3.7E-03	1.2E-02	6.2E-03	6.2E-03	2.5E-04	2.6E-02	2.6E-02	3.3E-03	1.2E-02	1.7E-02	2.6E-02	4.4E-03
Aliphatic >C16-C21	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.3E-04	7.3E-04	2.9E-05	4.4E-03	4.4E-03	1.8E-04	2.0E-02	2.0E-02	2.3E-03	1.6E-03	1.3E-03	1.7E-03	7.9E-04
Aliphatic >C21-C34	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.3E-04	7.3E-04	2.9E-05	2.2E-02	2.2E-02	8.6E-02	9.6E-02	9.6E-02	1.1E-02	6.0E-02	7.3E-03	7.3E-03	2.8E-04
Aromatic >C8-C10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E-02	3.4E-02	1.3E-03	1.1E-06	1.1E-06	4.2E-06	9.7E-04	9.7E-04	9.9E-05	2.7E-04	2.2E-02	2.2E-02	8.6E-03
Aromatic >C10-C12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E-02	3.4E-02	1.3E-03	7.4E-06	1.4E-06	9.7E-06	1.9E-03	1.9E-03	2.1E-04	2.4E-04	2.2E-02	2.2E-02	8.6E-03
Aromatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E-02	3.4E-02	1.3E-03	4.6E-06	4.6E-06	1.8E-07	4.8E-05	4.8E-05	4.7E-06	2.0E-04	2.2E-02	2.2E-02	8.6E-03
Aromatic >C16-C21	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E-02	1.8E-02	7.1E-03	4.0E-06	4.0E-06	1.6E-07	4.2E-05	4.2E-05	4.1E-06	9.6E-03	1.1E-02	1.1E-02	4.4E-03
Aromatic >C21-C34	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	4.6E-07	4.6E-07	1.7E-07	3.8E-07	3.8E-07	1.7E-08	1.0E+04	1.0E+04	2.5E-05	1.1E+03	1.1E+03	4.4E-03	4.4E+07	4.4E+07	1.8E+05	1.6E+07	1.6E+07	2.1E+06	5.5E-03	1.1E-02	1.1E-02	4.4E-03
n-Hexane	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E-02	3.5E-02	1.4E-03	6.1E-04	6.1E-04	2.4E-05	2.7E-03	2.7E-03	3.3E-04	3.3E-04	3.1E-01	3.1E-01	1.3E-02
Benzene	3.7E-06	3.7E-06	3.5E-06	7.8E-06	7.9E-06	8.1E-05	8.1E-05	2.0E-05	1.3E-04	1.3E-04	1.1E-04	8.5E-04	8.5E-04	3.7E-04	4.4E-01	4.4E-01	1.8E-02	2.8E-03	2.8E-03	1.1E-05	5.9E-04	5.9E-04	2.3E-05	5.5E-03	1.1E-01	1.1E-01	4.5E-03
Toluene	5.1E-05	5.1E-05	7.6E-05	1.4E-04	1.4E-04	7.7E-07	7.7E-07	1.9E-07	6.3E-07	6.3E-07	5.3E-08	2.0E-06	2.0E-06	8.6E-07	2.7E-01	2.7E-01	1.1E-02	7.1E-03	7.1E-03	2.9E-04	7.4E-04	7.4E-04	7.8E-05	7.8E-04	1.1E-01	1.1E-01	4.5E-03
Ethylbenzene	5.0E-01	5.0E-01	3.4E-01	2.6E-01	2.6E-01	1.2E-06	1.2E-06	1.9E-07	9.6E-07	9.6E-07	8.0E-08	1.6E-04	1.6E-04	6.9E-05	2.1E+02	2.1E+02	8.2E+02	9.0E-04	9.0E-04	3.8E-06	9.4E-03	9.4E-03	1.0E-03	4.0E-02	1.1E-01	1.1E-01	4.5E-03
Total Xylenes	1.1E-05	1.1E-05	4.4E-06	1.7E-06	1.7E-06	4.5E-06	4.5E-06	1.1E-05	3.7E-05	3.7E-05	3.1E-06	1.6E-04	1.6E-04	3.9E-05	2.1E+02	2.1E+02	8.2E+02	1.4E-03	1.4E-03	5.8E-06	1.4E-02	1.4E-02	1.5E-03	2.2E-04	1.1E-02	1.1E-02	4.5E-03
1,2,4-trimethylbenzene	7.4E-05	7.4E-05	1.0E-03	9.7E-06	9.8E-06	7.6E-03	7.6E-03	1.6E-03	6.5E-05	6.5E-05	5.2E-06	3.7E-04	3.7E-04	8.0E-05	1.2E+01	1.2E+01	4.9E+01	8.8E-04	8.8E-04	3.7E-06	4.3E-03	4.3E-03	5.1E-04	1.1E-02	1.1E-02	4.5E-03
1,3,5-trimethylbenzene	8.3E-05	8.3E-05	1.3E-03	1.1E-05	1.1E-05	1.0E-04	1.0E-04	2.0E-05	8.4E-05	8.4E-05	7.0E-06	2.7E-04	2.7E-04	1.2E-04	1.2E+01	1.2E+01	4.9E+01	2.5E-04	2.5E-04	1.1E-06	2.5E-03	2.5E-03	3.0E-04	1.1E-02	1.1E-02	4.5E-03
Naphthalene	3.9E-06	3.9E-06	1.1E-05	1.6E-07	2.7E-07	3.7E-07	3.7E-07	9.3E-08	3.1E-07	3.1E-07	2.5E-08	2.3E-03	2.3E-03	5.6E-06	2.7E+00	2.7E+00	1.1E+01	1.4E-05	1.4E-05	5.5E-05	3.7E-03	3.7E-03	3.9E-04	6.8E-07	3.1E-01	3.1E-01	1.3E-02
TPH RSC* ⟶	1,700	3,400	21,000	6,700	190,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	110	110	440	>S	>S	>S	>S	>S	>S	>S	32	32	130
Generic Gasoline	720	1,500	22,000	13,000	>MAX	4,500	4,500	80,000	140	140	>MAX	20	20	110	100	100	400	>S	>S	>S	>S	>S	>S	12,000	650	650	2,600
Generic Diesel / Heating Oil	3,900	5,500	70,000	73,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	2,800	2,800	>MAX	99	99	550	>S	>S	>S	>S	>S	>S	>S	120	120	490
Generic Mineral Insulating Oil	9,800	10,000	>MAX	40,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	290	290	1,100	>S	>S	>S	>S	>S	>S	>S	490	490	2,000

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September 14, 2005

VIA FACSIMILE

Mr. Robert Hood
Oregon Department of Environmental Quality
Northwest Region
2020 SE 4th Avenue, Suite 400
Portland, OR 97201-4987

Writer's Direct Line
206-292-2638
cacebedo@martenlaw.com

Re: ***No Further Action Determination***
Niemi Oil, Highway Service Station
3108 Marine Drive
Astoria, Oregon
DEQ File No. 04-99-1193

Restrictive Language
Niemi Oil, Midtown BP
632 Marine Drive
Astoria, OR
DEQ File No. 04-98-110

Dear Mr. Hood:

I am Cindy Johnson Acebedo, an attorney working with Jeff Kray at the Marten Law Group PLLC. Earlier this afternoon I left you a message regarding both the Niemi Highway Service Station and Niemi Midtown BP matters. I would like to discuss the following issues with you.

Highway Service Station

In June 2005, Niemi Oil Company requested that DEQ issue a formal determination in the form of a "No Further Action" letter. We are eager to conclude this matter with a "No Further Action" letter as soon as possible. There has been little communication between us regarding this issue since Niemi's request and I would like to discuss the status of that request.

Midtown BP

I understand that DEQ is requiring restrictive language in the deed pertaining to the Midtown BP. As I believe you know, Niemi has a potential buyer for the property and is negotiating the terms of the sale. In order to facilitate the sale of this property, it would

be very helpful if you could provide me with a sample of the restrictive language DEQ is requesting.

I look forward to hearing from you.

Sincerely,

Cindy Johnson Acebedo

Cc: Cary Bechtolt – Niemi Oil Company, Inc.
Brad J. Berggren – RSV Engineering, Inc.

MARTEN
LAW GROUP
ATTORNEYS AT LAW

FAX TRANSMITTAL

DATE:	September 14, 2005
TO:	Robert Hood Oregon Department of Environmental Quality Northwest Region 2020 S.W. Fourth Avenue, Suite 400 Portland, OR 97201-4987 FAX: (503) 229-6945 Phone: (503) 229-6585
FROM:	Cindy Johnson Acebedo Direct: (206) 292-2638
RE:	Niemi Oil - Highway Service Station / Midtown BP
MESSAGE:	Enclosed please see attached letter dated 09/14/05 to Robert Hood
PAGES:	3, including fax transmittal sheet

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HOOD Robert

From: HOOD Robert
Sent: Monday, September 13, 2004 11:25 AM
To: 'Craig Arola'
Cc: 'Allan Bakalian'
Subject: Niemi Highway Service, DEQ File 04-99-1193

Craig: I reviewed the work plan dated 19 August 2004. Boring locations look fine with me for this investigation. For constituent analyses, please add the trimethylbenzenes and propylbenzenes constituents for soil and groundwater samples.

The file is out for copying presently, so can you make sure that samples have been collected and analyzed for chlorinated solvents (or are covered under EPA 8260) and for soil- leachable metals analyses. Thanks and please let me know when you schedule the field work.

Rob

Robert A. Hood, Jr.
Natural Resource Specialist 4
DEQ, Northwest Region
2020 SW 4th Ave, Ste. 400
Portland, OR 97201-4987
Phone: 503.229.5617
Fax: 503.229.6945

RSV
ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists

AUG 2 3 2004
DE[illegible] [illegible]ALITY

August 19, 2004

Mr. Robert Hood
Oregon Department of Environmental Quality
Northwest Region
2020 SE 4th Avenue, Suite 400
Portland, OR 97201-4987

Re: Scope of Work for Additional Site Characterization
Highway Service 76 Station
3108 Marine Drive
Astoria, Oregon
DEQ File No. 04-99-1193

Dear Mr. Hood:

As requested by the Oregon Department of Environmental Quality (DEQ), RSV Engineering, Inc. has prepared this Scope of Work for an additional site characterization at the Highway Service 76 Station site. A ***Site Characterization Report*** was submitted to DEQ in February, 2004, summarizing the results of an initial site investigation to assess the potential impacts to soil and groundwater from a petroleum release from a former 500 gallon used oil UST at the site. In April 2004, DEQ requested additional site characterization work to better define the extent of the relatively low level petroleum related impacts from the former 500 gallon UST. During a May 18, 2004 meeting with DEQ, it was agreed that the additional site characterization would consist of one (1) to two (2) soil borings advanced to the north of the site to further evaluate potential downgradient impacts to groundwater. On June 2, 2004, DEQ also requested one (1) additional soil boring be advanced between Soil Borings GP-3 and GP-4 previously advanced at the site, to better characterize the former waste oil UST release.

Site Background

The Highway Service site is an active 76 Service Station. Reportedly, there are three (3) active fuel product USTs located at the site: Two (2) 4,000-gallon gasoline USTs and one (1) 1,500-gallon gasoline UST. On October 18, 1999, a 550-gallon used oil UST was removed from the site. At that time, petroleum product odor and staining were noted in the soils from the UST excavation pit. Two (2) soil samples were collected from the

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phone: 503.694.6960 • fax: 503.694.6962

bottom of the excavation and laboratory analyzed for Total Petroleum Hydrocarbon – Hydrocarbon Identification (TPH-HCID) and subsequently for TPH. TPH-HCID as diesel, and heavy oil were detected in both samples. TPH as heavy oil was detected in both samples up to a maximum concentration of 78,000 mg/kg. TPH as diesel was not detected in either sample. The soil contamination was reported to the DEQ on October 21, 1999.

RSV conducted an initial soil and groundwater investigation at the site in October, 2003. Results of laboratory analyses revealed relatively low concentration of petroleum related compounds in soil and groundwater beneath the site. A ***Site Characterization Report*** was submitted to DEQ in February, 2004. In April, 2004, DEQ requested additional site characterization work to better define the extent of petroleum related impacts. During a May 18, 2004 meeting with DEQ, it was agreed that the additional site characterization would consist of soil borings advanced to the north of the Highway Service property to further evaluate potential downgradient impacts to groundwater. On June 2, 2004, DEQ also requested one (1) additional boring be advanced between Borings GP-3 and GP-4 to better characterize the former waste oil UST release.

Hydrogeology

Unconsolidated sediments in the Astoria area, near the Columbia River, typically consist of silts, silty clays, and localized areas of peat. In borings advanced during the initial site characterization soils/sediments encountered generally consisted of silty and sandy gravel and silt to depths of 12 to 15 ft below ground surface (bgs) underlain by fine to medium grained sand to depths of 20 ft bgs, the maximum depth explored at the site. Bedrock comprising of siltstone underlies the unconsolidated sediments in the area.

During the 2003 investigation, groundwater was encountered at a depth of 19.5 ft bgs at the site. The direction of shallow groundwater flow beneath the site is inferred to be generally toward the Columbia River, located approximately 250 feet north of the site. Soil boring logs from a property south of the site, advanced for slope stability analysis by the City of Astoria indicate that the depth to bedrock is approximately 30 ft bgs. Groundwater was encountered by the City of Astoria above the elevation where groundwater was encountered at the Highway Service site, indicating groundwater flow beneath the site is north toward the Columbia River.

Additional Hydrogeology Data Collection

As noted above, the City of Astoria has installed one (1) groundwater monitoring well on the property located across Highway 30 (Marine Drive) immediately south of the Highway Service site (the Hauke property). As requested by DEQ, RSV proposes to obtain lithological information about the subsurface from well logs, as well as depth to water measurements from one well (LT-1P) located on the Hauke property. Permission was obtained from the City of Astoria Public Works Director, Mr. Mitch Mitchum on

May 25, 2004 to access Well LT-1P. The information will be used to supplement hydrogeology data collected from the Highway Service site.

Additional Soil and Groundwater Sampling

RSV proposes to collect one (1) additional soil and groundwater sample between former Soil Borings GP-3 and GP-4 (Figure 1) and two (2) groundwater samples on the property adjacent and to the north of the site to supplement existing investigation data. The additional data will be used to further evaluate the nature and extent of petroleum related impacts at and in the vicinity of the site. The borings will be advanced to a maximum depth of approximately 20 ft below ground surface (bgs). Due to overhead utility constraints, the boring advanced between former Soil Borings GP-3 and GP-4 will be advanced using conventional percussion probe/direct push drilling techniques. However, groundwater yield at the site is very low, and sufficient water may not be available to collect a groundwater sample between former Soil Borings GP-3 and GP-4. Soil samples will be collected continuously using 1.25-inch to 2-inch diameter by 4-ft length plastic sampling tubes. The sampling tubes will be driven into the borehole inside 1.25-inch to 2-inch diameter by 4-ft length steel sampling rods. New plastic sleeves will be used for each sample. Other equipment entering the borehole will be decontaminated prior to each use.

Considering the nature of the unconsolidated soils and possible siltstone bedrock to be encountered in the vicinity of the site and the lack of overhead obstructions or utilities, the two (2) soil borings north of the Highway Service property will be advanced using conventional hollow-stem auger drilling techniques. It is anticipated soil samples will be collected using a 2-inch diameter by 2-ft length steel split spoon sampler advanced using a 140-lb hammer with a standard 40-inch drop.

Soil samples will be collected continuously from ground surface to the total depth explored in each probe and screened in the field for the presence of petroleum hydrocarbons and organic vapors using a photoionization detector (PID). The samples will be visually classified in the field by an RSV geologist in general accordance with ASTM Method D-2488-93. The soil samples will be described with respect to soil types, grain size distribution, color (or discoloration), odor, moisture content, consistency, and photoionizable constituent content, as appropriate. Soil samples will be collected from each sampling interval for in-field screening using a photoionization detector (PID). The collected samples will be placed in plastic reclosable bags prior to field screening.

A soil sample from the boring advanced on the site will be collected for laboratory analyses based upon visual field screening and PID measurements. Groundwater samples will also be collected from each of the three boreholes, if sufficient water is available, using a bailer, peristaltic pump or other suitable sampling device. After completion of the soil borings, PVC screen and riser will be inserted into the borehole. The screen will be set such that is will intersect the inferred water table. Sand filter pack will be placed

around the screen and riser. The temporary groundwater monitoring points will be developed by alternate surge and purge techniques. Groundwater in the temporary sampling points will then be allowed to equilibrate for 24 hours prior to sampling. If no groundwater is measured in the sampling points during advancement, a PVC screen and riser will be placed in the borehole at the depth in which drilling refusal occurs. Sand filter pack will be place around the screen and riser to approximately three (3) ft below ground surface (bgs). A bentonite seal will be placed from 3 ft bgs to the ground surface. The temporary sampling points will then be sampled when sufficient water is available to obtain the samples. After collection of water samples, the temporary sampling points will be properly abandoned.

Soil and groundwater samples will be analyzed for total petroleum hydrocarbons (TPH) by Northwest Method NWTPH-Dx and Northwest Method NWTPH-Gx, VOCs (including benzene, toluene, ethylbenzene, and xylenes [BTEX]; ethylene dibromide [EDB], ethylene dichloride [EDC], and methyl-tertiary-butyl-ether [MTBE]) per EPA Method 8260, polycyclic aromatic hydrocarbons (PAHs) per EPA Method 8270, and total and dissolved metals (cadmium, chromium, and lead) by EPA Method 6010 or 200.8.

Soil and groundwater samples will be placed in containers provided by the project laboratory and shipped using appropriate preservative and chain-of-custody controls within allowable holding times, to the project laboratory. Water and soil generated during sampling of the probes, including equipment decontamination water, will be placed in a labeled 55-gallon drum(s) and stored on site. After receipt of laboratory analytical results, arrangements for transport and disposal of the drummed soil and groundwater will be made. It is anticipated that the soil will be transported to Waste Management Hillsboro Landfill in Hillsboro, Oregon, and that the drummed groundwater will be transported to Oil Re-Recycling Company (ORRCO) in Portland, Oregon.

After receipt of sample laboratory results and data analysis, a report will be prepared and submitted to DEQ summarizing site investigative activities, laboratory results, conclusions, and recommendation whether the site data support closure in accordance with DEQ's risk-based standards, or whether additional investigation activities are necessary.

The RSV project team will consist of Mr. Brad Berggren, a Vice President and Principal with RSV, Craig C. Arola, Project Hydrogeologist, and other RSV personnel and subcontractors as needed. Mr. Berggren will serve as RSV Project Manager.

If you have any questions regarding this Scope of Work for the additional site characterization activities at the Highway Service site, please contact us.

Sincerely,

RSV Engineering, Inc.

Craig C. Arola
Project Geologist

Brad J. Berggren, P.E., R.G.
Principal
Vice President

cc: Cary Bechtolt – Niemi Oil Corporation
Allan Bakalian – Marten Law Group

HOOD Robert

04 99 1193

From: Craig Arola [rsvcca@verizon.net]
Sent: Monday, August 30, 2004 2:26 PM
To: HOOD Robert
Cc: Allan Bakalian
Subject: Re: Hwy Service-Niemi

Rob:

Attached is a figure with proposed locations for the additional site characterization for the Highway Service site. The borings will be advanced in these approximate locations, assuming the locations are accessible with the drill rig. If you need a copy of the figure faxed, rather than e-mailed, let me know.

If you have any other questions, please let me know.

Thanks,

Craig

----- Original Message -----
From: HOOD Robert
To: Craig Arola
Sent: Thursday, August 26, 2004 2:02 PM
Subject: Hwy Service-Niemi

Hey Craig: I got the work plan, no map was attached, did you give me one earlier with proposed locations? Or could you fax me a map? 229-6945 is the fax #. Thanks.

Rob

Robert A. Hood, Jr.

Natural Resource Specialist 4

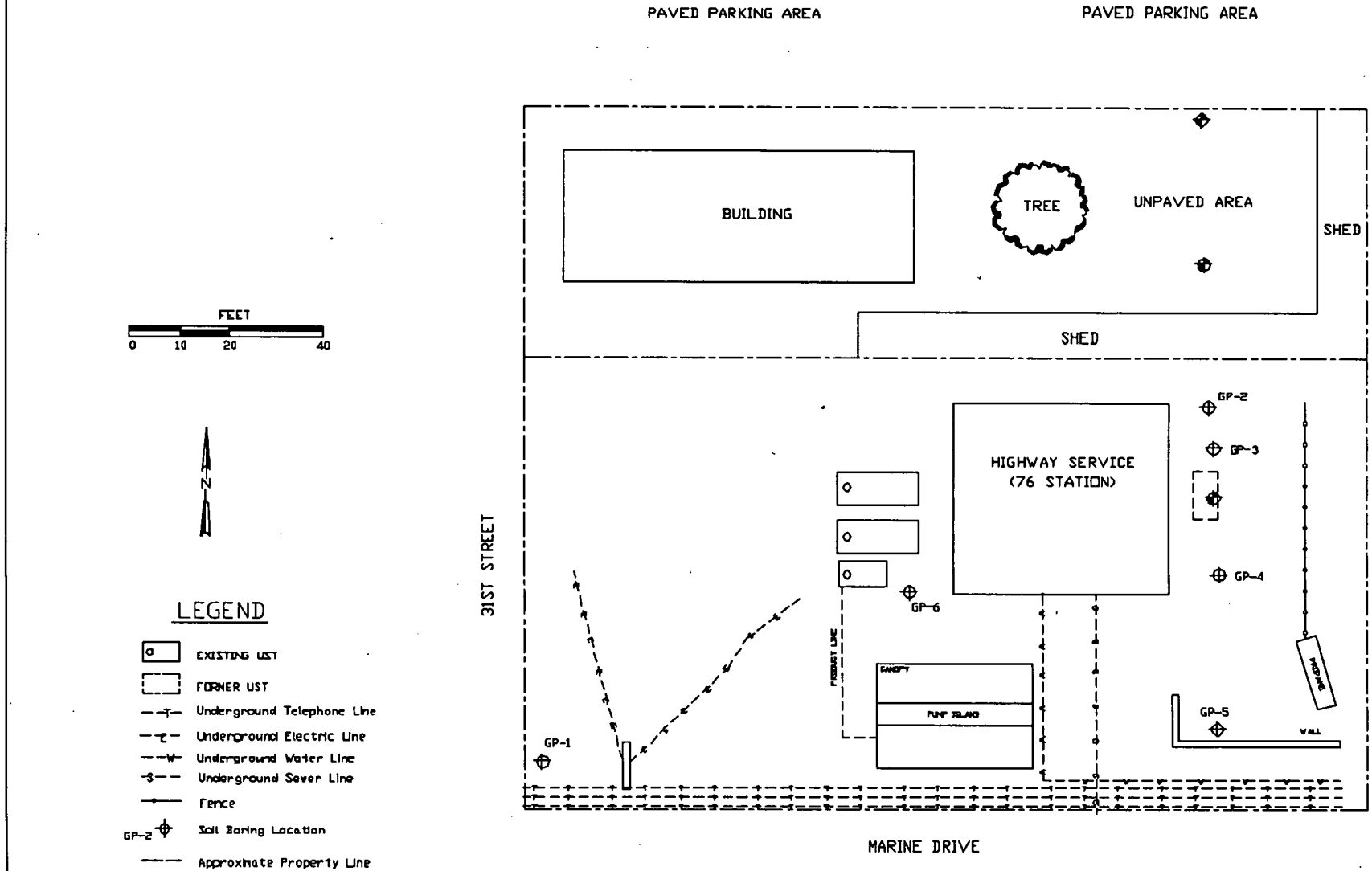
DEQ, Northwest Region

2020 SW 4th Ave, Ste. 400

Portland, OR 97201-4987

Phone: 503.229.5617

Fax: 503.229.6945



RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31950 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

PROPOSED SOIL BORING LOCATIONS
HIGHWAY SERVICE
3108 MARINE DRIVE
ASTORIA, OREGON

FIGURE 1

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
CCA		08/30/04	proposed_borings

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LAW GROUP
ATTORNEYS AT LAW

RECEIVED
JUN 17 2005
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Marten Law Group PLLC
1191 Second Avenue
Suite 2200
Seattle WA 98101
Phone: 206 292-2600
Fax: 206 292-2601
www.martenlaw.com

June 15, 2005

Mr. Robert A. Hood, Jr.
Oregon Department of Environmental Quality
Northwest Region
2020 SE 4th Avenue, Suite 400
Portland, OR 97201-4987

Writer's Direct Line
206-292-2608
jkray@martenlaw.com

Re: ***Additional Site Characterization Report and Request for No Further Action Determination***
Niemi Oil, Highway Service Station
3108 Marine Drive
Astoria, Oregon
DEQ File No. 04-99-1193

Dear Mr. Hood:

Attached to this letter is an Additional Site Characterization Report that RSV Engineering, Inc., prepared for the Niemi Oil Company, Highway Service Station Site in Astoria, Oregon. The report summarizes the additional soil and groundwater characterization work RSV Engineering, Inc. ("RSV"), performed at the site as requested and approved by the Oregon Department of Environmental Quality (DEQ).

As the Report indicates, RSV recommends that DEQ consider the Highway Service site for closure using Risk-Based Concentrations (OAR 340-122-0244) for the following reasons:

1) Contamination at the site is limited to petroleum-based constituents.

2) Petroleum related hazardous constituents identified at the site are listed in the Appendix A Table of RBCs.

3) The site is zoned commercial and the current and future planned use of the site is as a gasoline and service station. The only exceedances for petroleum-related compounds of applicable exposure pathways identified were ingestion, inhalation, and dermal contact of soils impacted with TPH-Oil and migration to groundwater from soils impacted with TPH-Oil and metals near the former UST tank pit. The soil exceeding the ingestion, inhalation, and dermal contact exposure pathway is at a depth of 6 feet or below; greater than the 3 foot recommended depth

to consider for occupational workers as described in the DEQ Risk-Based Decision Making for the Remediation of Petroleum Contaminated Sites guidance. No site development is expected or planned in the future, and exposure to the impacted soils is unlikely.

4) Groundwater samples did not reveal exceedances of DEQ Appendix A RBCs for any applicable exposure pathways identified for the site (i.e., Volatilization to Outdoor Air, Vapor Intrusion into Buildings, or Groundwater in an Excavation for Occupational, Construction worker or Excavation worker pathways).

Accordingly, Niemi Oil Company requests that DEQ issue a formal determination in the form of a "No Further Action" letter that the Niemi Oil Highway Service Station site is closed in accordance with a generic remedy for releases from petroleum USTs pursuant to OAR 340-122-0252, and DEQ's applicable risk-based guidance.

Thank you for your assistance and prompt consideration of this request. If you have any questions concerning the Additional Site Characterization Report or request for site closure, please contact me or Craig Arola at RSV Engineering.

Sincerely,

Jeff B. Kray

JBK:dah

Enclosure

Cc: Cary Bechtolt – Niemi Oil Company, Inc. (w/encl.)
Craig Arola – RSV Engineering, Inc. (w/o encl.)

HOOD Robert

From: Allan Bakalian [abakalian@martenlaw.com]
Sent: Wednesday, June 02, 2004 3:52 PM
To: HOOD Robert; Craig Arola; bjbrsv@teleport.com
Subject: RE: Niemi Highway Service, DEQ File 04-99-1193

Thanks for your prompt response Rob.
It turns out the property to the north is owned by Etu, Inc., for which Cary is an officer. Access is not an issue and we will be preparing the scope of work shortly. We will need to discuss your request regarding the UST boring, and will get back to on that too.

Thanks. By the way, did you discuss the Landwehr's NFA with Andree?

Allan B. Bakalian
Marten Law Group PLLC
1191 Second Ave. Suite 2200
Seattle, WA 98101
(206) 292-2619 (phone)
(206) 292-2601 (fax)
abakalian@martenlaw.com

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From: HOOD Robert [mailto:HOOD.Robert@deq.state.or.us]
Sent: Wednesday, June 02, 2004 3:10 PM
To: Allan Bakalian; Craig Arola; bjbrsv@teleport.com
Subject: Niemi Highway Service, DEQ File 04-99-1193

Allan, Craig, and Brad:

I spoke with my manager, Andree Pollock, today regarding the additional boring on the property north of Niemi. He agreed this was a good approach to the next step. I suggest the boring be installed just north of the shed doors on that property. Either you can contact the owner or I can send a letter indicating that work will need to be completed. Since you'll be out there, I would also like another attempt to be made in the assumed location of the former UST (between GP-3 and GP-4) for soil and an attempt at a groundwater sample again. Thanks and let's discuss some timelines.

Rob

Robert A. Hood, Jr.

Natural Resource Specialist 4

DEQ, Northwest Region

2020 SW 4th Ave, Ste. 400

Portland, OR 97201-4987

Phone: 503.229.5617

Fax: 503.229.6945

HOOD Robert

From: HOOD Robert
Sent: Wednesday, June 02, 2004 3:10 PM
To: Allan Bakalian (abakalian@martenlaw.com); Craig Arola; bjbrsv@teleport.com
Subject: Niemi Highway Service, DEQ File 04-99-1193

Allan, Craig, and Brad:

I spoke with my manager, Andree Pollock, today regarding the additional boring on the property north of Niemi. He agreed this was a good approach to the next step. I suggest the boring be installed just north of the shed doors on that property. Either you can contact the owner or I can send a letter indicating that work will need to be completed. Since you'll be out there, I would also like another attempt to be made in the assumed location of the former UST (between GP-3 and GP-4) for soil and an attempt at a groundwater sample again. Thanks and let's discuss some timelines.

Rob

Robert A. Hood, Jr.
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Phone: 503.229.5617
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MAY 3 2004
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NORTHWEST REGION

April 29, 2003

Mr. Robert Hood
UST Cleanup Specialist
Oregon Department of Environmental Quality
Northwest Region Portland Office
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-4987

Re: Niemi Oil Company
Highway Service Station
3108 Marine Drive
Astoria, Oregon
DEQ File No. 04-99-1193

Dear Mr. Hood:

RSV Engineering, Inc. (RSV) has received your April 7, 2004 letter indicating the Department of Environmental Quality (DEQ) has completed its review of the report entitled, ***Site Characterization Report***, dated February 2004, regarding the Niemi Oil Company's underground storage tank (UST) investigation and cleanup at 3108 Marine Drive in Astoria, Oregon. As you are aware, based on the site sampling data, on February 20, 2004, Niemi Oil Company submitted a request to DEQ for issuance of a "No Further Action" letter pursuant to the Generic Remedy for simple risk based sites under OAR 340-122-0252 and DEQ's applicable risk based guidance.

Thank you for your prompt response to our request. As we discussed during our telephone conversation today, we will need an extension of your request for submission of a work plan by May 3, 2004, for additional soil and groundwater sampling at this site. The purpose of the extension is to allow scheduling of a meeting with you to review the site data and clarify the need for and scope of the additional site investigation activities you requested.

Based on our conversation, this letter will confirm your agreement to extend the May 3, 2004 work plan submittal date, pending our meeting to discuss such the scope of any such additional work. We would like to schedule this meeting as soon as possible, and based on your schedule, have tentatively planned it for the week of May 10, 2004. Please let us know what day and time is best for you.

31960 S.W. Charbonneau Dr., Suite 101 • Wilsonville, OR 97070
phone: 503.694.6960 • fax: 503.694.6962

Thank you for your assistance. If you have any questions, or my understanding is incorrect, please contact me.

Respectfully Submitted,

RSV Engineering, Inc.

Brad J. Berggren, P.E, P.G.
Vice President

cc: Cary Bechtolt – Niemi Oil Company
Allan Bakalian – Marten Law Group

HOOD Robert

04 99 1193

From: Craig Arola [rsvcca@verizon.net]
Sent: Friday, April 30, 2004 12:26 PM
To: HOOD Robert
Cc: bjbrsv@teleport.com
Subject: Highway Service Meeting

Hi Rob,

As a follow-up to your discussion with Brad regarding a meeting on Highway Service, my understanding is that the week of May 10th works best for your current schedule.

The following are our preferred dates and times for a meeting the week of May 10 (in order of preference):

April 12 A.M.
April 12 P.M.
April 11 P.M

Please let us know if any of these time periods would work for you. We are also available for other dates and times, if these do not work well for you. In addition, Allan Bakalian (counsel for Niemi) indicated he was going do be down for another meeting on May 11th and thought it might be a good opportunity for him to sit in and for us to run through a status of the various sites (since this was last done in about May of last year). Please let me know if this is OK with you.

In regard to the Highway Service site, the topics we would like to discuss include: (1) the low yield and possible seasonal availability of groundwater at the site which may not allow the collection of quarterly groundwater samples, (2) topography of site vicinity and its impact of groundwater flow, areas accessible for investigation, and location of potential sources, and (3) the location of the previous borings with respect to the former UST tank pit. In particular,the location of the former tank pit is not precisely known, and the borings that were installed were intended to be within the immediate vicinity of the former tank pit (the location of the UST on the report figure is conceptual).

Thanks for your assistance and we look forward to meeting with you.

Craig

Craig C. Arola
RSV Engineering, Inc.
31960 SW Charbonneau Drive
Suite 101
Wilsonville, Oregon 97070

ph: 503-694-6960
fax: 503-694-6962
mobile: 503-332-7127

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04 99 1193

FACSIMILE TRANSMITTAL SHEET

TO:	FROM:
Rob Hood	Craig Arola
COMPANY:	DATE:
Oregon DEQ	April 30, 2004
FAX NUMBER:	TOTAL NO. OF PAGES INCLUDING COVER:
503-229-6945	3
PHONE NUMBER:	SENDER'S REFERENCE NUMBER:
503-229-5617	
RE:	YOUR REFERENCE NUMBER:
Niemi Oil – Highway Service	

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

NOTES/COMMENTS:

A hard copy will be mailed.

This message is intended only for the use of the individual or entity to which it is addressed and may contain information that is privileged, confidential, and exempt from disclosure under applicable law. If the reader of this message is not the intended recipient, or the employee or agent responsible for delivering the message to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify us immediately by telephone and destroy the received message. Thank you.

31960 SW Charbonneau Drive, Suite 101 • Wilsonville, Oregon 97070
(503) 694-6960 • (503) 694-6962 Fax

04/30/2004 08:20 5036946962 RSV ENGINEERING INC PAGE 01/03

RSV
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April 29, 2003

Mr. Robert Hood
UST Cleanup Specialist
Oregon Department of Environmental Quality
Northwest Region Portland Office
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-4987

Re: Niemi Oil Company
Highway Service Station
3108 Marine Drive
Astoria, Oregon
DEQ File No. 04-99-1193

Dear Mr. Hood:

RSV Engineering, Inc. (RSV) has received your April 7, 2004 letter indicating the Department of Environmental Quality (DEQ) has completed its review of the report entitled, ***Site Characterization Report***, dated February 2004, regarding the Niemi Oil Company's underground storage tank (UST) investigation and cleanup at 3108 Marine Drive in Astoria, Oregon. As you are aware, based on the site sampling data, on February 20, 2004, Niemi Oil Company submitted a request to DEQ for issuance of a "No Further Action" letter pursuant to the Generic Remedy for simple risk based sites under OAR 340-122-0252 and DEQ's applicable risk based guidance.

Thank you for your prompt response to our request. As we discussed during our telephone conversation today, we will need an extension of your request for submission of a work plan by May 3, 2004, for additional soil and groundwater sampling at this site. The purpose of the extension is to allow scheduling of a meeting with you to review the site data and clarify the need for and scope of the additional site investigation activities you requested.

Based on our conversation, this letter will confirm your agreement to extend the May 3, 2004 work plan submittal date, pending our meeting to discuss such the scope of any such additional work. We would like to schedule this meeting as soon as possible, and based on your schedule, have tentatively planned it for the week of May 10, 2004. Please let us know what day and time is best for you.

31960 S.W. Charbonneau Dr., Suite 101 • Wilsonville, OR 97070
phone: 503.694.6960 • fax: 503.694.6962

04/30/2004 08:20 5036946962 RSV ENGINEERING INC PAGE 02/03

Thank you for your assistance. If you have any questions, or my understanding is incorrect, please contact me.

Respectfully Submitted,

RSV Engineering, Inc.

Brad J. Berggren, P.E, P.G.
Vice President

cc: Cary Bechtolt – Niemi Oil Company
Allan Bakalian – Marten Law Group

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
Northwest Region Portland Office
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-4987
(503) 229-5263
FAX (503) 229-6945
TTY (503) 229-5471

7 April 2004

MR CARY BECHTOLT
NIEMI OIL CO
PO BOX 989
ASTORIA OR 97103

Re: Highway Service
File No. 04-99-1193
Facility ID No. 6897

Dear Mr. Bechtolt:

The Department of Environmental Quality (DEQ) has completed its review of the report entitled, *Site Characterization Report*, dated February 2004, regarding the underground storage tank (UST) cleanup at 3108 Marine Drive in Astoria, Oregon. In the report and in your cover letter, no further action was requested. At this time, DEQ cannot issue a No Further Action letter for the following reasons:

- Oregon Administrative Rule 340-122-0240 requires that monitoring wells be installed when contamination has migrated beyond the immediate vicinity of a UST pit. Analytical results from a groundwater sample collected from boring GP-2 indicate this is the case (up to 3.2 parts per million of diesel were detected). Additional petroleum impacts to groundwater were identified at boring GP-1. As a result, at least three monitoring wells will need to be installed and at least four quarterly groundwater sampling events are necessary.

- The magnitude and extent of contamination has not been determined. In particular, this has not occurred in the vicinity of boring GP-2 and GP-1. Also, the source of contamination at boring GP-1 has not been determined.

Please submit a work plan by **3 May 2004**, which proposes the next phase of investigation, monitoring well installations, and groundwater monitoring. If you have any questions, please call me at (503) 229-5617.

Respectfully,

Robert A. Hood, Jr.
UST Cleanup Specialist

cc: Craig Arola
RSV Engineering, Inc.
31960 SW Charbonneau Dr. Ste. 101
Wilsonville, OR 97070

Allan Bakalian
Marten Law Group PLLC
1191 Second Avenue, Ste 2200
Seattle, WA 98101

(rah:RAH)

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September 9, 2003

Rick Silverman
Oregon Department of Environmental Quality
Northwest Region
2020 SE 4th Avenue, Suite 400
Portland, OR 97201-4987

Re: Niemi Oil Company
Initial Site Assessment Scope of Work
Highway Service
3108 Marine Drive
Astoria, Oregon
DEQ File No. 04-99-1193

Dear Mr. Silverman:

This letter is to confirm your verbal approval in our August 27, 2003 telephone conversation to proceed with our Scope of Work for the Niemi Oil Highway Service site referenced above. The Scope of Work was presented to DEQ in an RSV Engineering, Inc. (RSV) letter dated August 19, 2003, and involves environmental records review, a magnetometer survey, and soil and groundwater sampling.

Thank you for your approval to proceed. If you have any questions concerning this letter or the Scope of Work, please contact us.

Sincerely,

RSV Engineering, Inc.

Craig C. Arola
Project Geologist

cc: Cary Bechtolt – Niemi Oil Corporation
Allan Bakalian – Marten Law Group
Veronica Warner – Fireman's Fund Insurance Company

31960 S.W. Charbonneau Dr., Suite 101 • Wilsonville, OR 97070
phone: 503.694.6960 • fax: 503.694.6962

UST CLEANUP TELEPHONE USE REPORT

CALL FROM/TO: Craig Arola DATE: 8/27/03

WITH: RSV TIME:

TELEPHONE NO: (503) 694-6960

REGARDING: Highway Service

FILE NO: 04-99-1193

SUMMARY OF CALL

I reviewed the proposed work plan & told Craig that they need to take a water sample @ the waste oil tank excavation due to 78,000 ppm TPH remaining after the tank removal in October 1999. Craig said they may take water sample this round or at a later date depending on depth of water during this sampling episode.

R. Silverman

Staff Signature

Rick Silverman

RSV
ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists

DEPT OF ENVIRONMENTAL QUALITY
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AUG 21 2003
NORTHWEST REGION

August 19, 2003

Rick Silverman
Oregon Department of Environmental Quality
Northwest Region
2020 SE 4th Avenue, Suite 400
Portland, OR 97201-4987

Re: Initial Site Assessment Scope of Work
Highway Service
3108 Marine Drive
Astoria, Oregon
DEQ File No. 04-99-1193

Dear Mr. Silverman:

This letter presents the Scope of Work for an initial site investigation at the above referenced site. Based on your April 3, 2003 meeting with Niemi Oil Company/ETU Inc. (Niemi Oil) representatives, and as confirmed in Allan Bakalian's April 7, 2003 letter, it was agreed that Niemi Oil would conduct additional soil and groundwater sampling in the vicinity of the former 550-gallon used oil underground storage tank (UST) at the site.

Site Background

The Highway Service site is an active 76 Service Station. Four (4) underground storage tanks (USTs) were previously located at the site: Two (2) 4,000-gallon gasoline USTs, one (1) 1,500-gallon gasoline UST, and one (1) 550-gallon used oil UST.

On October 18, 1999, one 550-gallon used oil UST was removed from the site. Product odor and staining were noted in the soils from the excavation tank pit. Two (2) soil samples were collected from the bottom of the excavation and laboratory analyzed for Total Petroleum Hydrocarbon – Hydrocarbon Identification (TPH-HCID) and subsequently for TPH. TPH-HCID as diesel, and heavy oil were detected in both samples. TPH as heavy oil was detected in both samples up to a maximum concentration of 78,000 mg/kg. TPH as diesel was not detected in either sample. The current contents and conditions of the other USTs on the site are uncertain.

The contamination was reported to the Oregon Department of Environmental Quality (DEQ) on October 21, 1999. In an April, 2003 meeting with Niemi Oil representatives,

DEQ requested additional soil and groundwater sampling associated with the former used oil UST.

Hydrogeology

Unconsolidated sediments in the Astoria area typically consist of silts, silty clays, and localized areas of peat. The direction of shallow groundwater flow beneath the site is inferred to be generally toward the Columbia River, located approximately 250 feet north of the site.

Proposed Assessment Work

RSV Engineering, Inc. (RSV) proposes initial site assessment activities consisting of environmental records review, magnetometer survey, and collection of shallow soil and groundwater samples. The Scope of Work has been developed to collect initial site data.

In order to further investigate the soil contamination at the site, RSV will review environmental records for the site and surrounding properties. These records will include known or potential hazardous waste sites or landfills, sites currently under investigation for environmental violations, hazardous materials spills, and registered aboveground and/or underground storage tanks on or near the property.

Prior to initiating subsurface investigation activities, a magnetometer survey may be conducted at the site to identify the locations and orientations of suspected USTs identified at the site. If possible, each identified UST will be accessed to obtain a sample of tank contents and to record the volume of tank contents (if present).

Soil and Groundwater Sampling

RSV Engineering, Inc. (RSV) proposes site investigation activities consisting of the collection of shallow soil and groundwater samples. The Scope of Work has been developed to collect initial site data.

RSV anticipates the collection of a total of ten (10) shallow soil samples at the site to supplement existing soil data. Five (5) shallow soil samples will be collected in the vicinity of the former waste oil UST on the eastern part of the property, and five (5) samples will be collected in the vicinity of contamination near the other on-site USTs. The borings will be advanced using conventional percussion probe/direct push drilling techniques. Actual locations and depths of the borings will be determined in the field based on depth to groundwater, soil conditions, and surface and overhead obstructions.

The borings will be advanced to a depth of 8 to 12 ft below ground surface (bgs), the estimated depth to groundwater at the site. Soil samples will be collected continuously using 1.25-inch diameter by 4-ft length plastic sampling tubes. The sampling tubes will be driven into the borehole inside 1.25-inch diameter by 4-ft length steel sampling rods.

New plastic sleeves will be used for each sample. Other equipment entering the borehole will be decontaminated prior to each use.

The samples will be visually classified in the field by an RSV geologist in general accordance with ASTM Method D-2488-93. The soil samples will be described with respect to soil types, grain size distribution, color (or discoloration), odor, moisture content, consistency, and photoionizable constituent content, as appropriate. Soil samples will be collected from each sampling interval for in-field screening using a photoionization detector (PID). The collected samples will be placed in plastic reclosable bags prior to field screening. Based upon observations in the field and results from the field-screening, one to two soil samples from each soil boring will be selected for submittal to the project laboratory for chemical analysis. The samples will be submitted for chemical analysis of TPH-HCID, and subsequently TPH-Gasoline, TPH-Diesel, and TPH-Heavy Oil as appropriate. In addition, selected soil samples in the vicinity of each UST area will be analyzed using one or more of the following methods: VOCs [including benzene, toluene, ethylbenzene, and xylenes (BTEX), 1,2-dibromoethane (EDB), 1,2-dichloroethane (EDC), volatile chlorinated hydrocarbons (VCH), n-propylbenzene, iso-propylbenzene and methyl-tertiary-butyl-ether (MTBE)] by U.S. Environmental Protection Agency (EPA) Method 8260, polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270, total leachable metals (cadmium, chromium, and lead) by EPA Method 1311/6010, polychlorinated biphenyls (PCBs) by EPA Method 8081.

If groundwater is encountered during drilling, groundwater samples will be collected from each direct-push probe using a peristaltic pump or other suitable pump. If necessary, PVC screen and riser will be installed in the borehole to reduce the amount of sediment in the groundwater samples. If soil conditions allow (i.e. sufficient yield of water is available), the boreholes will be purged prior to sample collection. Selected samples will be analyzed for hydrocarbon identification by Northwest Method NWTPH-HCID, and subsequently by Northwest Method NWTPH-Dx and Northwest Method NWTPH-Gx as appropriate, based on location and field screening results. Selected groundwater samples in which diesel-range hydrocarbons are detected will be analyzed for BTEX and VCH per EPA Method 8260, PAHs per EPA Method 8270, total leachable metals (cadmium, chromium, and lead) by EPA Method 1311/6010, and PCBs by EPA Method 8081. Selected groundwater samples in which gasoline-range hydrocarbons are detected will also be analyzed for VOCs by EPA Method 8260B and dissolved metals (cadmium, chromium and lead) by EPA Methods 6000/7000 Series.

Soil and groundwater samples will be placed in containers provided by the project laboratory and shipped using appropriate preservative and chain-of-custody controls within allowable holding times, to the project laboratory.

After receipt of sample laboratory results and data analysis, a report will be prepared and submitted to DEQ summarizing site investigative activities, laboratory results, conclusions, and recommendations for additional work, if necessary.

If you have any questions regarding this Scope of Work for the site investigation activities at the Highway Service site, please contact us.

Sincerely,

RSV Engineering, Inc.

Craig C. Arola
Project Geologist

Brad J. Berggren, P.E., P.G.
Principal
Vice President

cc: Cary Bechtolt – Niemi Oil Corporation
Allan Bakalian – Marten Law Group
Veronica Warner – Fireman's Fund Insurance Company

MARTEN
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ATTORNEYS AT LAW

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1191 Second Avenue
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Seattle WA 98101
Phone: 206 292-2600
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June 27, 2003

Via Facsimile

Rick Silverman
Oregon Department Of Environmental Quality
Northwest Region
2020 SE 4th Avenue, Suite 400
Portland, OR 97201-4987

Writer's Direct Line
206-292-2619
abakalian@martenlaw.com

RE: *Niemi Oil Company/ETU, Inc.*
Warrenton - 238 SE Main Street, Warrenton, Oregon
Highway Service – 3108 Marine Drive, Astoria, Oregon

Dear Mr. Silverman:

As I informed you in my telephone message today, Niemi Oil Company requires an additional thirty (30) days to submit the scopes of work for the Highway Service and Warrenton Service Station sites. Accordingly, Niemi Oil's consultant, RSV Engineering, will be submitting these scopes of work on August 1, 2003.

I appreciate your cooperation with regard to this matter. Please do not hesitate to contact me if you have any questions or need additional information.

Sincerely,

Allan B. Bakalian

ABB:ml

Copy: Cary Bechtolt
Brad Berggren
Brian Chenoweth

RYCEWICZ & CHENOWETH, LLP
ATTORNEYS AT LAW

601 SW SECOND AVENUE, SUITE 1940 ~ PORTLAND, OREGON 97204-3154
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CHRISTOPHER A. RYCEWICZ
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CHRISTOPHER W. RICHt
WILLIAM L. BARBER
CARRIE A. DEAVOURS
*ADMITTED IN OR AND WA
†ADMITTED IN CO

March 6, 2003

~~0489 0238~~
~~0490 0496~~
0499 1193

Rob Hood
UST Cleanup Specialist
DEQ Northwest Region
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-4987

Rick Silverman
UST Cleanup Specialist
DEQ Northwest Region
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-4987

Re: ETU/Niemi Oil Company UST Investigation and Cleanup in Astoria, Oregon

Dear Mr. Hood and Mr. Silverman:

We are in receipt of your February 21, 2003 letter to Mr. Bechtolt. You had mentioned in your letter that Rycewicz and Chenoweth, LLP is representing ETU/Niemi Oil Company regarding three sites, commonly known as Lanwehr's Country Grocery, Niemi Burns/Johanson Bulk Plant and Highway Service. As of yet, Rycewicz and Chemoweth, LLP has not been retained to represent ETU/Niemi Oil Company for any of these sites. Thus, we are not authorized to respond to your requests regarding investigation and cleanup. However, we will be discussing with Mr. Bechtolt our possible representation of ETU/Niemi Oil regarding these sites.

We would appreciate your consideration in allowing ETU/Niemi Oil Company additional time to secure representation. We will notify you immediately if and when we are retained to represent ETU/Niemi Oil Company on any of these sites.

Very truly yours,

RYCEWICZ & CHENOWETH, LLP

Brian D. Chenoweth

cc: Cary Bechtolt
Allan B. Bakalian
M:\CLIENTS\BRIAN\NIEMI\DEQ letter 3.5.03.wpd

RECEIVED
MAR 10 2003
DEPT OF ENVIRONMENTAL QUALITY
NORTHWEST REGION

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
Northwest Region Portland Office
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-4987
(503) 229-5263
FAX (503) 229-6945
TTY (503) 229-5471

21 February 2003

MR CARY BECHTOLT
ETU /NIEMI OIL COMPANY
PO BOX 989
ASTORIA OR 97103

Re: ETU/Niemi Oil Company UST Cleanups
Files: Multiple Niemi Oil Sites

Dear Mr. Bechtolt:

The Department of Environmental Quality (DEQ) is providing you with a status report for six underground storage tank (UST) cleanups assigned to Robert Hood, for which ETU/Niemi Oil Company is responsible for cleanup. Please note that Mr. Rick Silverman will become project manager for these sites upon Mr. Hood's departure from the tanks program in June 2003. The DEQ understands that Mr. Brian Chenoweth (Rycewicz and Chenoweth) is representing ETU/Niemi Oil Company (ETU/Niemi) for three sites and Mr. Allan Bakalian (Marten Law Group) is representing ETU/Niemi for the other three sites. Although the DEQ has, for the past several years, made requests that ETU/Niemi complete investigations and cleanups at each of these properties, the required work has not been completed.

Releases were reported to the DEQ as early as 1989. Contaminated groundwater is present at most of these properties, yet ETU/Niemi has failed to complete subsurface investigations, conduct groundwater monitoring, or perform remediation at many of the properties for a number of years.

Below are outlines of information that were required in various letters sent to Niemi/ETU in spring 2002. This is a last chance effort for Niemi/ETU to avoid enforcement activities at some of your sites. **Failure to submit information or work plans within 14 business days from receipt of this certified letter will result in notices of noncompliance with referrals to the DEQ's Enforcement Section.**

Sites represented by Rycewicz & Chenoweth

DEQ file No: 04-89-0238, Lanwehr's Country Grocery: In a letter dated 28 May 2002, the DEQ requested that you submit quarterly monitoring reports since February 1998, by 14 June 2002. You have not submitted any reports so the DEQ is assuming that monitoring has not been completed. Also, the DEQ requested that you submit a corrective action plan (CAP) by 01 July 2002. DEQ has not received a CAP.

DEQ file No: 04-90-0496, Niemi Burns/Johanson Bulk Plant: No actions will be taken for this site since it is part of the Astoria Area-Wide project which is being managed by Anna Coates of the DEQ.

DEQ file No: 04-99-1193, Highway Service: A decommissioning/cleanup report (not the checklist and change-in-service reports) was due on 14 June 2002. Please submit this report.

Sites represented by Marten Law Group PLLC

DEQ file No: 04-98-1106, Midtown BP: The following information was due on 01 July 2002: a decommissioning/cleanup report from 3 Kings Environmental and groundwater monitoring reports from 1999 (all four quarters), January and October 2000, October 2001, and January 2002. Also, quarterly reports are due from May, August, and November 2002.

Based on the report submitted by Clearwater Group, Inc., additional contaminated groundwater delineation is necessary. A work plan was requested. Please submit all documents.

DEQ file No: 04-99-0134, Warrenton BP: In September 2002, DEQ issued a Notice of Assessment of Civil Penalty and Order. The Order became final and enforceable on October 11th and 15th, 2002. At this time, ETU/Niemi is in violation of the Order for failure to meet the compliance dates. Recently DEQ offered to mitigate the civil penalty amount if ETU/Niemi completed the investigation and decommissioned the USTs. If you agree to accept the mitigated civil penalties, the DEQ will establish new compliance dates for completion of the necessary investigation/remedial actions. If you do not accept the mitigated civil penalties, you will be referred to enforcement for a civil penalty for failure to comply with an EQC Order.

DEQ file No: 04-00-0856, Svenson Mobil: Free floating product was observed near a utility along the boundary of this site and to date no free product removal has been completed. Also, in a letter dated 8 August 2000, the DEQ granted you until 18 August 2000, to determine other responsible parties. No information was provided.

On 30 October 2000, the DEQ issued a notice of noncompliance to ETU/Niemi for failing to decommission out-of-service USTs and requested that ETU/Niemi submit service provider and signed access agreement documentation within 14 days and that the USTs be decommissioned within 30 days of the notice-of-noncompliance. The violations have not been corrected.

On 22 April 2002, the DEQ issued another notice of noncompliance to ETU/Niemi for failing to decommission the out-of-service USTs. During phone conversation with Mr. Allan Bakalian, he indicated receipt of the notice and that the necessary paperwork to begin decommissioning and investigation activities was going to be submitted to DEQ.

On 30 May 2002, Mr. John Foxwell, ETU/Niemi's consultant, stated that he would submit a work plan for the decommissioning by 17 June 2002. By 15 July 2002, a 30-day notice to decommission the USTs was to be submitted with site work to commence by 30 August 2002. No information was submitted.

On 23 July 2002, Mr. Bakalian notified Mr. Hood that UST removal for abandoned tanks is not

covered by insurance, but the soil and groundwater investigations will be covered. Neither decommissioning nor investigation work has been completed.

Other

DEQ file No: 04-97-0057, Seaside BP: A letter of "No Further Action" was drafted in 1998. Payment of all outstanding cost recovery money is due before the letter can be issued. In a letter to Niemi/ETU Oil, a final payment of $5,398.14 was due to finalize cleanup. Please contact the DEQ business office to verify the correct final payment.

DEQ File No: 04-02-0988, Former Mobil/Niemi Oil Bulk Plant: A release was reported on 23 September 2002. Please submit a report for work completed.

If you have any questions, please contact Mr. Silverman at (503) 229-5477.

Respectfully,

Rob Hood
UST Cleanup Specialist

Rick Silverman
UST Cleanup Specialist

cc: Allan Bakalian
Marten Law Group
1191 Second Ave., Ste. 2200
Seattle, WA 98101

Kyle Sattler
GeoEngineers
7504 SW Bridgeport Road
Portland, OR 97224

Brian Chenoweth
Rycewicz & Chenoweth
601 SW 2nd Ave, Ste. 1940
Portland, OR 9720

Alice Codd
PO Box 317
Maunaloa, HI 96770

6th Street Limited
c/o Sue Avies Collins
10 6th Street #101
Astoria, OR 97103

Susan Greco-DEQ Headquarters-Enforcement

DEQ UST Cleanup File Nos: 04-89-0238, 04-90-0496, 04-97-0057, 04-98-1106, 04-99-1193, 04-99-0134, 04-00-0856, 04-02-0988

(rah:RJS)

Oregon
John A. Kitzhaber, M.D., Governor

Department of Environmental Quality
Northwest Region
2020 SW Fourth Avenue
Suite 400
Portland, OR 97201-4987
(503) 229-5263 Voice
TTY (503) 229-5471

28 May 2002

BRIAN CHENOWETH
RYCEWICZ & CHENOWETH
1001 SW FIFTH AVENUE, STE 1300
PORTLAND OR 97204-1151

Re: Niemi Oil UST Cleanup Sites

Dear Mr. Chenoweth:

Per your conversation with Mr. Andree Pollock, Manager of the Department of Environmental Quality's (DEQ) Underground Storage Tank (UST) Cleanup Program, the DEQ is providing you an update of Niemi Oil's current cleanup projects status and oversight costs (through approximately April 2002).

Based on conversation with Mr. Alan Bakalian of the Marten Law Group PLLC (insurance attorney), the following Niemi sites are being handled through insurance:

04-98-1106 (Midtown BP): The DEQ sent a letter dated 23 May 2002, requesting additional information and investigation. Oversight costs owed: $2,000.45.

04-99-0134 (Warrenton BP): Site received a notice of noncompliance and a referral has been submitted to DEQ enforcement. Oversight costs owed: $1,299.91

04-00-0856 (Svenson Mobil): Decommissioning activities are being planned. Oversight costs owed: $1,313.54.

At this point, the following sites are not being handled by insurance:

04-89-0238 (Lanwehr's Country Grocery): Eight notices on noncompliance have been issued for various UST and cleanup issues. The DEQ does expect that ETU/Niemi Oil will re-initiate proactive measures to ensure the cleanup gets back on track. Failure to re-start the project will result in a referral to the DEQ's enforcement section in which a civil penalty could be assessed. Oversight costs owed: $13,785.44.

04-90-0496 (Niemi Burns/Johanson Bulk Plant): Site has been incorporated into the DEQ's Astoria Areawide Project. Oversight costs owed: $4,837.86.

04-99-1193 (Highway Service): The DEQ sent a letter dated 23 May 2002, requesting the decommissioning/cleanup report for 1998 decommissioning activities. Oversight costs owed: $78.97.

04-97-0057 (Seaside BP): The letter of "No Further Action" was drafted in 1998. A final invoice of $5,398.14 is due to finalize the cleanup.

If you have any questions or if I can be of help in any way, please call me at (503) 229-5617.

Respectfully,

Robert A. Hood, Jr.
UST Cleanup Specialist

cc: Alan Bakalian
Marten Law Group PLLC
1191 Second Ave., Ste. 2200
Seattle, WA 98101

Mr. Cary Bechtolt
ETU Oil/Niemi Oil Company
PO Box 989
Astoria, OR 97103

File Nos: 04-98-1106, 04-99-0134, 04-00-0856, 04-89-0238, 04-90-0496, 04-99-1193, 04-97-0057

(rah:RAH)

Oregon
John A. Kitzhaber, M.D., Governor

Department of Environmental Quality
Northwest Region
2020 SW Fourth Avenue
Suite 400
Portland, OR 97201-4987
(503) 229-5263 Voice
TTY (503) 229-5471

23 May 2002

MR CARY BECHTOLT
ETU OIL/NIEMI OIL COMPANY
PO BOX 989
ASTORIA OR 97103

Re: Highway Service
File No. 04-99-1193

Dear Mr. Bechtolt:

The Department of Environmental Quality (DEQ) has completed its review of information submitted to date, regarding the underground storage tank (UST) cleanup at the Highway Service station, 3108 Marine Drive in Astoria, Oregon. It appears the 550-gallon waste oil UST was decommissioned in 1999 by 3 Kings Environmental. However, the DEQ has not received a decommissioning/cleanup report. Please submit the report by **14 June 2002**. If you have any questions or if I can be of help in any way, please call me at (503) 229-5617.

Respectfully,

Robert A. Hood, Jr.
UST Cleanup Specialist

cc: Alan Bakalian
Marten Law Group PLLC
1191 Second Ave., Ste. 2200
Seattle, WA 98101
(rah:RAH)

F

Oregon

John A. Kitzhaber, M.D., Governor

Department of Environmental Quality
Northwest Region
2020 SW Fourth Avenue
Suite 400
Portland, OR 97201-4987
(503) 229-5263 Voice
TTY (503) 229-5471

June 9, 2000

CARY BECKTALT
NEIMI OIL
490 INDUSTRIAL ST
ASTORIA OR 97103

Re: HIWAY SERVICE
File No. 04-99-1193

A recent review of the file on the underground storage tank (UST) cleanup project conducted at 3108 MARINE DR in ASTORIA, Oregon indicates that reports on the investigation and cleanup have not been submitted to date.

Oregon law requires that initial reports on abatement measures and site evaluation be submitted within 20 days of the release discovery. Reports on initial site assessment are required within 45 days of the release. Where free product is present, the Department requires monthly free product recovery reports. Soil matrix cleanup reports are due within 60 days of completing the cleanup. For longer term cleanups, quarterly reports are due.

The Department requests your cooperation by submitting all reports due on your site within 15 days of receipt of this letter. Please keep in mind that this review and this letter are for the purpose of updating the Department's records. A Department project manager has not been assigned to this project to provide ongoing project management or final review.

If you are interested in having a project manager assigned, please call me at 503-229-5472, for details on how to accomplish this.

Sincerely,

Tina Leppaluoto

Tina Leppaluoto, UST Cleanup Specialist
UST Compliance and Cleanup Section

Oregon
John A. Kitzhaber, M.D., Governor

Department of Environmental Quality
Northwest Region
2020 SW Fourth Avenue
Suite 400
Portland, OR 97201-4987
(503) 229-5263 Voice
TTY (503) 229-5471

April 20, 2000

CARY BECKTALT
NEIMI OIL
490 INDUSTRIAL ST
ASTORIA OR 97103

Re: HIWAY SERVICE
File No.: 04-99-1193

The purpose of this letter is to provide an update on your underground storage tank (UST) cleanup project, located at 3108 MARINE DR in ASTORIA, Oregon, and to inform you of some changes to the DEQ's program. You are receiving this letter because you or your contractor reported a release from the UST system at this property and because the DEQ has not assigned your project to a project manager or closed out your file. File closure occurs when cleanup has met the appropriate requirements and the DEQ has reviewed the reports and issued a "no further action" (nfa) letter.

BACKLOGGED PROJECTS

The DEQ's first priority is to work on projects that pose the highest threat to human health or the environment. Due to staffing limitations, not all projects are assigned to project managers for review and are placed on DEQ's backlog of work needing to be completed.

To accommodate people who do not want to (or cannot) wait years for the DEQ to work down its list of priorities, the DEQ has set up a program by which responsible parties can request oversight. Filling out and signing a "cost recovery agreement" does this. By signing this document, the responsible party agrees to work with the DEQ in resolving the cleanup issues and agrees to pay the oversight costs which DEQ is required by law to collect.

Once a "cost recovery agreement" has been received for a project, DEQ places the project on a waiting list for assignment to the next available project manager. How long this takes depends on a lot of factors including current DEQ staffing and the number of high priority projects that need to be dealt with. In the past, it has taken up to two years for DEQ project managers to be assigned to a project. Currently the wait is about six months for more complicated projects. If there is an immediate need (i.e. a property transaction pending) for DEQ review, projects are usually assigned within two to four weeks.

NEW PROGRAM INFORMATION

In November 1998, revised rules went into effect for UST Cleanups. These rules included housekeeping items as well as rules governing low impact sites (LIP) and for developing generic remedies. These rules are available at the DEQ's website (http://www.deq.state.or.us/wmc/tank/200rules.htm) or can be obtained from the Northwest Region office.

Guidance for LIP sites was prepared in December 1998. Copies of this guidance are available at the DEQ's website (http://www.deq.state.or.us/wmc/tank/lisguid.htm) or from the Northwest Region office.

During 1999, DEQ developed a generic remedy for risk based assessments. The generic remedy and guidance document was finalized on September 29, 1999. Copies of this guidance are available at the DEQ's website (http://www.deq.state.or.us/wmc/tank/rbdm_notice.htm) or from the Northwest Region office. This document replaces the DEQ's "Interim Guidance On Incorporating Risk Based Corrective Action For Petroleum Release Sites" (April 1996).

Another significant change is that the cleanup levels in Oregon Administrative Rules (OAR) 340-122-242 (4) have been replaced by the risk based screening levels in the risk based generic remedy.

The new rules and guidance apply to new releases and to cleanups that were not completed by the adoption date of the rules and guidance. If your cleanup was completed prior to these dates, or if you were operating under a DEQ *approved* corrective action plan, DEQ will apply the rules in place at the time of the cleanup when conducting our review.

If you have any questions or would like copies of the above referenced documents, please call Tina Leppaluoto at (503) 229-5472.

Sincerely,

Andree Pollock, Manager
UST Cleanup and Compliance Section

Enclosures: Cost Recovery Agreement

(avp:AVP)

UST CLEANUP TELEPHONE USE REPORT

CALL FROM (TO): Dave Franklin DATE: 6/12/01

WITH: Three Kings TIME: 12.11p

TELEPHONE NO: (360) 666-8202

REGARDING: Hiway Service

FILE NO: 04-99-6766

SUMMARY OF CALL

Talked w/Dave regarding final cleanup report never submitted to the Dept. He said he did not perform any cleanup activities for this site. The only work was done was the decom & sampling & reported the release to the Dept. No report was prepared only the decom paperwork was received along w/ lab data & receipts for disposal of contents of the tank & the tank. ~~dis~~ Cary Bectolt needs to be contacted to see if cleanup was ever done & for the final report submitted.

J. Leppliette

Staff Signature

UST FACILITY WORKSHEET

34-99-1193

FACILITY ID# 6897 DATE 1/4/00

ACCESS ENTRY ☐ LETTER TO MAIL ☐ PERMIT TO MAIL ☐ REPORTS RECEIVED ☐

- ☐ Request Fees
- ☐ Request D/report
- ☐ Request D/checklist
- ☐ Request I/checklist
- ☐ Request Other
- ☐ 30 Day Notice

- ☐ Copy region office
- ☐ Enclosures
  - ☐ Action requested (list below)
- ☐ Copy HQ facility file

- ☐ 30 Day
- ☐ D/report
  - ☐ D/checklist
- ☐ I/checklist
- ☐ Notice to upgrade
- ☐ Oracle updated
- ☐ Reports sent to region
- ☐ Access updated

UST's of Concern ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐other_____

Response duedate:_____ Initial get

No Further Action At This Time ☐

Action: Review UST Closure records

UST PERMIT INFORMATION

Date received_____ Region_____ County_____

Fees due: _____

Permit Type: ☐ New ☐ Mod ☐ Existing ☐ Replacement

Comments: Close out UST(s) on Sequent & Access
Copy 1st+2pageSof reports to UST-HQ group

file in LUST cleanup file at NWR.
Complete or verify cross reference sheet in NWR facility file. Log into OTIS AS Received.
Forward report to Project manager if Assigned.

UST FACILITY NO. 6897 DATE 11/23/99 INITIAL VCB

LUST NO. 34-99-1193 LUST FILE CHECKED ☐ FAC FILE CHECKED ☐

FEES DUE ☐ AMOUNT _____ MAIL FEE REQUEST ☐ FEES OK ☑

FEE RECORDS CONTACT HQ ☐ DONE ☐

UPDATE AS PAID ☐

UPDATE TO CANCEL ☐

COMMENT _____ DONE ☑

INSTALL CHECKLIST ☐ OK FORWARD TO UST COMP STAFF ☐

INCOMPLETE ☐ PHONE REQUEST ☐

SIGNATURES ☐ REJECTION LTR ☐

COMMENT _____ CHECKLIST RETURNED ☐

---

30 DAY NOTICE RETRO ☐ DECOM ☑ OK FORWARD TO UST DO ☐

SIGNATURES ☐ PHONE REQUEST ☐

CONTRACTOR ☐ REJECTION LTR ☐

OWNER CHANGE ☐ NOTICE RETURNED ☐

WRONG FORM ☐

MISSING DATA ☐

TANK NOT PERMITTED ☐ MAIL PERMIT APP FOR EXT TANKS ☐

REQUEST SAMPLING PLAN ☐ MAIL MOD APP ☐

COMMENT _____ DONE ☑

DECOM CHECKLIST ☑ SERVICE CHANGE RPT ☑ RPTS OK FORWARD TO UST DO ☐

SIGNATURES ☐ PHONE REQUEST ☐

WRONG FORM ☐ REJECTION LTR ☐

MISSING DATA ☐ RPTS RETURNED ☐

COMMENT _____ DONE ☑

RECEIPTS

WASTE/SLUDGE REQUESTED ☐ PHONE REQUEST ☐

TANK REQUESTED ☐ REJECTION LTR ☐

SOIL REQUESTED ☐ DONE ☐

---

72 HR NOTICE

NOT NOTIFIED ☐ OK ☑

POTENTIAL VIOLATION ☐

TRACK FOR POSSIBLE NOTICE OF NONCOMPLIANCE LIST ON ACCESS ☐ OK ☐

PROBLEMS ☐ OK ☐

Oregon Department of Environmental Quality

UNDERGROUND STORAGE TANK DECOMMISSIONING/CHANGE-IN-SERVICE REPORT

DEQ DECOMMISSIONING CERTIFICATE NUMBER: 1931 FAC 6897

FACILITY NAME: HIWAY SERVICE

FACILITY ADDRESS: 3108 MARINE DR ASTORIA OR 97103

PERMITTEE PHONE: 503 325 1972 DATE: 10/21

The following information MUST be submitted by the underground storage tank permittee or licensed DEQ Supervisor within 30 days following completion of the tank decommissioning or change-in-service. (OAR 340-150-0166 (5)(a)).

The attached supplemental checklist should be prepared by the person performing the decommissioning or change-in-service. The checklist should be provided to DEQ and the permittee to demonstrate that all required practices were followed.

Ordinarily the checklist is filled out by the DEQ licensed Service Provider or Supervisor. Permittees, tank owners or property owners who wish to personally decommission a tank or complete a change-in-service must follow all the conditions and requirements of OAR 340-150-0166 and other applicable standards. The permittee should contact the DEQ Regional Office prior to starting the work to receive current copies of the General Permit to Decommission USTs and underground storage tank regulations.

A. DATES:

Decommissioning/Change-in-Service Notice - Date Submitted: 9/99 (30 days before work starts).

Work Start Telephone Notice - Date Submitted: 10/99 (3 working days before work starts).

DEQ Person Notified: TINA

Date Work Started: 10/18 Date Work Completed: 10/18

Note: Provide the following information if any soil or water contamination is found during the decommissioning or change-in- service. Contamination must be reported by the UST permittee within 24 hours. The licensed service provider must report contamination within 72 hours after discovery unless previously reported.

Date Contamination Reported: 10/21 By: DAVE Kruglik

DEQ Person Notified: TINA

Backfill Telephone Notice - Date Called: N/A (before backfilling).

DEQ Person Notified: N/A

B. PERMITS: **Note:** DEQ permits may be needed where soil or water cleanup is required.

DEQ Water Discharge Permit #: _____ Date: _____

Water Disposed to (Location): _____

DEQ Solid Waste Disposal Permit #: _____ Date: _____

Soil Disposal or Treatment Location: _____

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED
NOV 17 1999
NORTHWEST REGION

C. TANK INFORMATION:

TANK ID #	DEQ-UST PERMIT #	TANK SIZE IN GALLONS	PRODUCT: GASOLINE, DIESEL, USED OIL, OTHER? PRESENT	PRODUCT: GASOLINE, DIESEL, USED OIL, OTHER? NEW	CLOSURE OR CHANGE-IN- SERVICE? TANK REMOVAL	CLOSURE OR CHANGE-IN- SERVICE? CLOSURE IN PLACE♦	CLOSURE OR CHANGE-IN- SERVICE? CHANGE IN SERVICE♦	TANK TO BE REPLACED? YES*	TANK TO BE REPLACED? NO
4	AJHAB	550	USED OIL		✓				✓

* Where decommissioned tank(s) are replaced by new underground storage tanks the UST permittee must submit a *General Permit Registration Form to Install and Operate USTs* containing information on the new tanks 30 days before installing them.

♦ Submit a soil sampling plan to the DEQ regional office and receive plan approval prior to starting work if 1) tank is to be decommissioned in-place, 2) tank contents are changed to a non-regulated substance, 3) tank contains a regulated substance other than petroleum, or 4) tank changed to non-regulated use.

D. DISPOSAL INFORMATION:

TANK ID #	TANK AND PIPING DISPOSAL METHOD: SCRAP	LAND-FILL	OTHER	IDENTIFY LOCATION & PROPERTY OWNER	DISPOSAL LOCATION OF TANK CONTENTS: LIQUIDS *	SLUDGES *
4	✓			Part Time, Auto Wrecking 2803 Sandridge	X	X
				Ilwaco WA 98624		oil Re-Refining Port of

* Note: The tank contents, the tank and the piping may be subject to the requirements of Hazardous Waste regulations. If you have questions, contact the DEQ regional office for your area.

E. CONTAMINATION INFORMATION: * Note: Sampling is required if groundwater is encountered. See cleanup rules.

TANK ID #	GROUND * WATER IN PIT ?	PRODUCT ODOR IN SOIL ?	PRODUCT STAINS IN SOIL ?	NUMBER OF SAMPLES	LABORATORY (NAME, CITY, STATE, PHONE)
4		✓	✓	2	Columbia TNSP Port of 503 986 5464

F. SITE SKETCH: (Show location of adjacent roads, property lines, structures, dispensers, & all USTs. Show North, general direction of ground slope and soil sample locations. Sketch does not need to be drawn to scale. You may attach a separate drawing.)

SEE MAP

DAILY FIELD ACTIVITY LOG

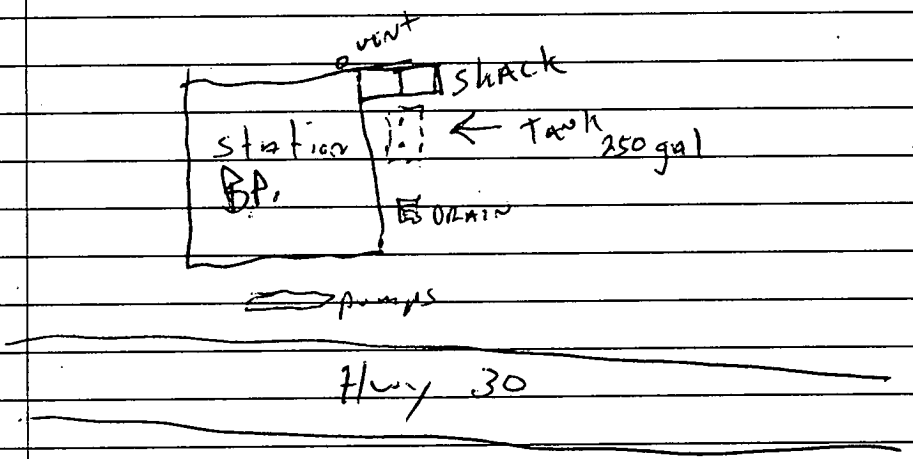
3 Kings Environmental, Inc.

Specializing in Commercial/Residential Underground Storage Tanks

PROJECT NAME: _____

LOCATION: 2105 MARINE DR ASTORIA

PROJECT NUMBER: _____ DATE: 10/18 PAGE 1 OF _____

TIME	DESCRIPTION OF ACTIVITIES
	

BP. North Bot - 01
BP. South Bot - 02

VISITORS ON SITE:	ADDITIONAL COMMENTS:
WEATHER CONDITIONS:	SIGNED

"There's no gamble with 3 Kings!"

21605-B NE 10th Avenue • Ridgefield, WA 98642-9580 • Salem (503) 580-2312 • Portland (503) 286-7780 • Vancouver (360) 887-5464

G. WORK PERFORMED BY:

DEQ Service Provider's License #: 14312 Construction Contractors License #: 126423

Name: 3 Kings Enviro

Telephone: 360 887 5464

DEQ Decommissioning Supervisor's License #: 1931

Name: Dave Franklin

Telephone: 360 887 5464

DEQ Soil Matrix Service Provider's License #: 14311 (If applicable)

Name: 3 Kings Environmental

Telephone: 360-887-5464

DEQ Soil Matrix Supervisor's License #: 14132 (If applicable)

Name: Dave Franklin

Telephone: 360-887-5464

H. ATTACHMENTS TO THIS REPORT:

1. Attach a copy of the laboratory report showing the results of all tests on all soil and water samples. The laboratory report must identify sample collection methods, sample location, sample depth, sample type (soil or water), type of sample container, sample temperature during transportation, types of tests, and copies of analytical laboratory reports, including QA/QC information. Include laboratory name, address and copies of chain-of-custody forms.

2. If contamination is detected and a Level 2 or Level 3 soil matrix cleanup standard is selected attach a copy of the soil matrix analysis for the site including methods of determining soil type, depth to groundwater, and sensitivity of uppermost aquifer.

I. REPORT FILING:

This report, signed by the permittee, complete with all applicable attachments must be filed with the DEQ regional office within 30 days after the excavation is backfilled or change-in-service is complete. Contact the DEQ regional office prior to filing this report where special circumstances exist at the site (such as water in pit, remaining pockets of contamination, etc.).

EASTERN REGION / BEND Phone: Bend (541) 388-6146	EASTERN REGION / THE DALLES Phone: The Dalles (541) 298-7255	EASTERN REGION / PENDLETON Phone: Pendleton (541) 276-4063
WESTERN REGION / SALEM Phone: Salem (503) 378-8240	WESTERN REGION / EUGENE Phone: Eugene (541) 686-7838	WESTERN REGION / MEDFORD Phone: Medford (541) 776-6136, Ext. 233
	NORTHWEST REGION Phone: Portland (503) 229-5263	

I have personally reviewed this report and the attachments and find them to be true and complete.

Permittee: CARY BECHOLT (Please Print)

Permittee: Cary Bechholt (Signature) Date: 11/10/99

For information: (503) 229-6652 or Toll Free in Oregon UST HELPLINE 1-800-742-7878

CLIENT: THREE KINGS ENVIRONMENTAL
21605 B NE 10TH AVE
RIDGEFIELD WA 98642

PHONE: (360) 887-5464
FAX: (360) 887-1492

DATE SUBMITTED: 10/21/99

PROJECT NAME: MARINE OIL NIEMI OIL 99245

CI SAMPLE #	CLIENTS ID#	DATE	TIME	DESCRIPTION
992100-001	BP-01	10/18/99	1100	BP NORTH BOT 01-6' BGS
992100-002	BP-02	10/18/99	1115	BP SOUTH BOT 02-6' BGS

REPORT DATE: 10/26/99 REPORT NUMBER: 992100 PAGE: 1 OF 2

SAMPLE	TEST	PARAMETER	RESULT	UNIT	DETECTION LIMIT	ANALYST
BP NORTH BOT 01-6' BGS SAMPLE ID: BP-01						
992100-001	NWTPH-Dx	DIESEL	ND	mg/Kg	2500	Abigail K.
	NWTPH-Dx	HEAVY OILS	78000	mg/Kg	10000	
		SURROGATE RECOVERY	105	%RECOVERY	50%-150%	
BP NORTH BOT 01-6' BGS SAMPLE ID: BP-01						
992100-001	NWTPH-HCID SOIL	GASOLINE	ND	mg/Kg	20	Abigail K.
	NWTPH-HCID	DIESEL	DETECTED	mg/Kg	50	
		OIL/GREASE	DETECTED	mg/Kg	100	
		SURROGATE	109	%RECOVERY	50-150%	
BP SOUTH BOT 02-6' BGS SAMPLE ID: BP-02						
992100-002	NWTPH-Dx	DIESEL	ND	mg/Kg	2500	Abigail K.
	NWTPH-Dx	HEAVY OILS	19000	mg/Kg	10000	
		SURROGATE RECOVERY	96	%RECOVERY	50%-150%	
BP SOUTH BOT 02-6' BGS SAMPLE ID: BP-02						
992100-002	NWTPH-HCID SOIL	GASOLINE	ND	mg/Kg	20	Abigail K.
	NWTPH-HCID	DIESEL	DETECTED	mg/Kg	50	
		OIL/GREASE	DETECTED	mg/Kg	100	

REPORT DATE: 10/26/99 REPORT NUMBER: 992100 PAGE: 2 OF 2

SAMPLE	TEST	PARAMETER	RESULT	UNIT	DETECTION LIMIT	ANALYST
BP SOUTH BOT 02-6' BGS SAMPLE ID: BP-02						
992100-002	NWTPH-HCID SOIL NWTPH-HCID	SURROGATE	124	%RECOVERY	50-150%	Abigail K.

COLUMBIA INSPECTION, INC.

CHAIN OF CUSTODY RECORD

Laboratory • Inspection • Tank Calibration

Environmental • Petroleum • OR Certified Water Analysis

☑ 7133 N. Lombard, Portland, OR 97203 Ph: (503) 286-9464 Fax: (503) 285-7831

☐ 4901 E. 20th Street, Fife, WA 98424 Ph: (253) 922-8781 Fax: (253) 922-8957

☐ 613 Escobar Street, Martinez, CA 94553 Ph: (510) 229-0360 Fax: (510) 229-2821

☐ 790 Basin Street, Unit #2, San Pedro, CA 90731 Ph: (310) 833-1557 Fax: (310) 833-1585

Customer Name: B King

Attention: Dave Franklin

Address: _____

_____

Phone: (_____) _____

FAX: (360) 887 1492

Sampler: Dave Franklin ☑ Submitted

Project Name: MARINE OIL Nilmi oil

Project Number: 99245

P.O. Number: 444

Testing Priority: ☑ Standard ☐ Rush

Due Date _____

Notification Method(s): ☐ Telephone ☐ FAX ☐ Mail

Sample id#	Sample Description	Sample Matrix	Sample Date	Sample Time	Analyses To Be Performed: NW TPH HCID
	B.P.-North-Bot-01-6'BGS	Soil	10/18	1100	X
	B.P.-South-Bot-02-6'BGS	Soil	10/18	1115	X

Relinquished By: Signature: _____ Printed Name: Dave Franklin

Received By: Signature: _____ Printed Name: _____ Date/Time 10/21/95 1120

Relinquished By: Signature: _____ Printed Name: _____

Received By: Signature: _____ Printed Name: _____ Date/Time _____

FOR LABORATORY USE ONLY

Inspection Job Number: _____ ☐ Visa _____

Laboratory Project Number: _____ ☐ Cash/Check # _____

Overtime authorized ☐ Yes ☐ No Amount Paid: $_____

White Copy - Laboratory Yellow Copy - Client Copy

PART TIME AUTO WRECKING

2803 SANDRIDGE ROAD
ILWACO, WA 98624
642-4852 • YARD #2652

CUSTOMER'S ORDER NO. DATE Oct 19 99

NAME 3 Kings

ADDRESS Richfield Wa PHONE NO. ( )

SOLD BY	CASH	CHECK	CHARGE	C.O.D.	ON ACCT.	PAID OUT	MDSE RTD.

QUAN.	DESCRIPTION	PRICE	AMOUNT
	Received 2 ea 500 gal		
	and 2 ea 280 gallon		
	Cut & cleaned		
	fuel tanks		
	Jeff Anderson	TAX	
		TOTAL	

Received by

All claims and returned goods must be accompanied by this bill.

Thank You

PRINTED IN U.S.A.

Harbor Oil, Inc.

No. 02744

11535 N. Force Avenue • Portland, OR 97217
Phone: (503) 285-4648 • Fax: (503) 285-9521

MATERIALS RECEIPT

Generator 3 Kings

Date 10/21/99

Address

Transporter 3 Kings Environmental

Purchase Order No.

Truck No.

Trailer No.

Product			Gals Loaded	OFFICE USE ONLY
	Grease trap			Unit Price
				Product / Sub Total
API	Weight	HAL	Gross Gals	
TEMP	GROSS	DIST	Net Gals	Freight / Sub Total
CORR FACTOR	TARE	SW		
WT GAL	NET	SS		Tax / Sub Total

REMARKS:

x Drum pick up

Hours / Sub Total

TOTAL

DRIVER

RECEIVED BY

White Customer Canary Office Pink Billing Goldenrod Yard

Oregon Department of Environmental Quality

UNDERGROUND STORAGE TANK DECOMMISSIONING/CHANGE-IN-SERVICE CHECKLIST

DEQ DECOMMISSIONING CERTIFICATE NUMBER: 1931 FAC 6897

FACILITY NAME: HIWAY SERVICE

FACILITY ADDRESS: 3108 MARINE DR ASTORIA OR 97103

PERMITTEE PHONE: 503 325-1972 DATE: 10/21

A. SAFETY EQUIPMENT ON JOB SITE:

Fire Extinguisher: Type/Size: ABC Recharge Date: 10/99

Combustible Gas Detector: Model: GT 202 Calibration Date: 10/99

Oxygen Analyzer: Model: GT 202 Calibration Date: 10/99

B. DECOMMISSIONING:

All Tanks: N/A = Not Applicable (Check (√) Appropriate Box)	YES	NO	UNKNOWN	N/A
1. All electrical equipment grounded and explosion proof?				✓
2. Safety equipment on job site?	✓			
3. Overhead electrical lines located?	✓			
4. Subsurface electrical lines off or disconnected?	✓			
5. Natural gas lines off or disconnected?				✓
6. No open fires or smoking material in area?	✓			
7. Vehicle and pedestrian traffic controlled?	✓			
8. Excavation material area cleared?	✓			
9. Rainwater runoff directed to treatment area?				✓
10. Drained and collected product from lines?	✓			
11. Removed product and residual from tank?	✓			
12. Cleaned tank?	✓			
13. Excavated to top of tank?	✓			
14. Removed tank fixtures? (pumps, leak detection equipment)	✓			
15. Removed product, fill and vent lines?	✓			

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED
NOV 17 1999
NORTHWEST REGION

C. TANK ABANDONMENT IN-PLA

All Tanks: N/A = Not Applicable (Check (√) Appropriate Box)	YES	NO	UNKNOWN	N/A
16. Sampling plan approved by DEQ? Date: DEQ Staff:				
17. Contamination concerns fully resolved?				
18. Fill Material? Type: _____				

D. TANK REMOVAL:

19. Tank placement area cleared, chocks placed?	✓			
20. Purged or ventilated tank to prevent explosion? Method used: CO2 Meter reading: 2%	✓			
21. Were chains or steel cables wrapped around tank for removal?		✓		
22. Tank removed, set on ground, blocked to prevent movement?	✓			
23. Tank set on truck and secured with straps(s)?	✓			
24. Tank labeled before leaving site?	✓			

E. SITE ASSESSMENT:

25. Site assessed for contamination? See OAR 340-122-0340	✓			
26. Soil samples taken and analyzed?	✓			
27. Decommissioning/Change-in-Service report sent to DEQ?	✓			
28. Was contamination found? Date/Time: 10/18 1600	✓			
29. Was contamination reported to DEQ? By: DAVE Franklin Date Time: 10/21 DEQ Staff: TINA	✓			
30. Was hazardous waste determination made for tank contents (Liquids sludges)?		✓		

31. Disposal location of tank(s) contents.

Name: OIL RE REFINING

Address: 11535 N FORCE AVE PORT OR

Date: 10/21

Attach disposal receipt.

32. Disposal or recycling location of removed tank(s) and associated piping.

Name: PART TIME AUTO WRECKING

Address: 2803 SANDRIDGE RD ILWACO WA

Date: 10/20

Attach disposal receipt.

33. If tank(s) are intended to be reused, identify new tank site.

Name: _____

Address: N/A

Date: _____

Purpose of Reuse: _____

"There's no gamble with 3 Kings!"
21605B N.E. 10th Avenue Ridgefield, WA 98642
Vancouver (360) 887-KING (5464) Portland (503) 286-7780 Salem (503) 560-2312 FAX (360) 887-1492

F. WORK PERFORMED BY:

DEQ Service Provider's License #: 14312

Name: 3 Kings Enviro
(Please Print)

Telephone: 360 887 5464

DEQ Decommissioning Supervisor's License #: 1931

Name: Dave Franklin
(Please Print)

Telephone: 360 887 5464

G. CHECKLIST FILING:

1. Provide copy of checklist to the UST permittee.

2. Send completed checklist to the DEQ regional office for your area (see below) within 30 days after the excavation is backfilled.

RETURN COMPLETED AND SIGNED FORM TO THE DEQ REGIONAL OFFICE FOR YOUR AREA.

EASTERN REGION / BEND
2146 NE 4th, #104
Bend, OR 97701
Phone: (541) 388-6146
Fax: (541) 388-8283

EASTERN REGION / THE DALLES
400 E. Scenic Drive, #307
The Dalles, OR 97058
Phone: (541) 298-7255
Fax: (541) 298-7330

EASTERN REGION / PENDLETON
700 SE Emigrant, Suite 330
Pendleton, OR 97801
Phone: (541) 276-4063
Fax: (541) 278-0168

WESTERN REGION / SALEM
750 Front Street NE, Suite 120
Salem, OR 97301-1039
Phone: (503) 378-8240
Fax: (503) 373-7944

WESTERN REGION / EUGENE
1102 Lincoln Street, Suite 210
Eugene, OR 97401
Phone: (541) 686-7838
Fax: (541) 686-7551

WESTERN REGION / MEDFORD
201 Main Street, Suite 2-D
Medford, OR 97501
Phone: (541) 776-6136, Ext. 233
Fax: (541) 776-6262

NORTHWEST REGION
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-5884
Phone: (503) 229-5263
Fax: (503) 229-6945

I have personally reviewed this decommissioning/change-in-service checklist and find it to be true and complete.

Licensed Supervisor: Dave Franklin
(Please Print)

Licensed Supervisor: _____ Date: 11/1
(Signature)

Permittee: CARY BECHTOLT
(Please Print)

Permittee: Cary Bechtolt Date: 11/10/99
(Signature)

For Information: (503) 229-6652 or Toll Free in Oregon UST HELPLINE 1-800-742-7878

...registration forms, administrative rules and other publications

Oregon
John A. Kitzhaber, M.D., Governor

Department of Environmental Quality
Northwest Region
2020 SW Fourth Avenue
Suite 400
Portland, OR 97201-4987
(503) 229-5263 Voice
TTY (503) 229-5471

October 25, 1999

Cary Becktalt
Neimi Oil
490 Industrial St
Astoria OR 97103

RE: HIWAY SERVICE
File No.: 04-99-1193

On 10/20/1999, a release was reported from an underground storage tank (UST) system at your facility located at 3108 MARINE DR in ASTORIA, Oregon. As the responsible party for the facility, you are required to clean up the release according to OAR 340-122-201 through 340-122-360.

An Initial Report Form for UST Cleanup Projects is enclosed. This form needs to be completed and returned to this office within twenty (20) days from the date the release was reported. An outline of additional reporting requirements and due dates is also enclosed. A copy of the UST Cleanup regulations or an application for a letter of authorization for soil treatment will be provided upon request. As the responsible party, you should be aware of the requirements for cleanup, even if you have hired a qualified contractor or consultant to assist you.

Please reference the DEQ File Number listed above in all future correspondence and reports.

By law, DEQ is required to recover project oversight costs. DEQ oversight begins with the initial site characterization and continues through site closure. Oversight includes activities such as reviewing reports, preparing correspondence, answering technical questions, site inspections, and enforcement actions. **You will be receiving an invoice each month for all oversight activities performed to date.**

DEQ's highest priority for oversight are those sites which pose the greatest hazard to human health, safety and the environment. As a result, many lower environmental priority sites will not be reviewed in detail or receive a final "No further action" or "closure" letter from DEQ until the higher priority sites are addressed. However, all projects - simple or complex - require at least some oversight. At a minimum, sufficient review of reports and data submitted is conducted to determine the environmental priority of the cleanup project.

For those responsible parties who desire DEQ oversight, regardless of environmental priority, we have developed a Responsible Party Priority Site Program. To receive oversight and more effectively schedule your project, you will be asked to sign an agreement requesting priority review and confirming your agreement to pay DEQ oversight costs in a timely manner.

Not entering into the Agreement does not release you from responsibility for investigation and/or cleanup of the contamination; nor does it mean that you are exempt from paying for DEQ oversight costs. Please be aware that there may be a waiting list for assignment to the next available project manager, and that these projects are assigned on a first come, first served basis.

Please read the attached information on the cost recovery and invoice process. We have also included information about the Responsible Party Priority Site Program and an agreement, if you are interested in expediting review of your project. You may contact the Waste Management and Cleanup Program at (503) 229-6635 if you have questions about cost recovery.

Thank you for your cooperation and continued efforts to comply with the regulations. **If you have any questions about the regulations and/or your cleanup project, please call (503) 229-5263 and ask to speak to the Underground Storage Tank Duty Officer.**

Sincerely,

Greg Foran, Duty Officer
Underground Storage Tanks
Cleanup and Compliance Section

Enclosures

Oregon
John A. Kitzhaber, M.D., Governor

Department of Environmental Quality
Northwest Region
2020 SW Fourth Avenue
Suite 400
Portland, OR 97201-4987
(503) 229-5263 Voice
TTY (503) 229-5471

October 1, 1999

ETU Inc
490 Industry St
Astoria, OR 97103

Facility ID 6897

Dear Tank Owner/Permittee:

We received a 30 day decommissioning notice for removal of underground storage tank(s) located at:

HIWAY SERVICE
3108 MARINE DR
ASTORIA, OR 97103

Checking our records, it appears the tanks are registered, permit fees are current, and the contractor is licensed. You are required to confirm the date of upgrade at least 72 hours prior to start of work, by calling (503) 229-5263 and asking for the UST Duty Officer. If you have any further questions about your permit fees, facility information or DEQ Licensed Contractors please call Victor Beard at (503) 229-5159.

An assessment must be conducted at all tank sites and contamination must be reported within 24 hours of discovery. OAR 340-122-205 through 340-122-360 contains the sampling requirements necessary when decommissioning underground storage tanks. As soon as contamination is identified in any manner, including observations of visible staining or odors, it must be reported. If obvious signs of contamination are present in the excavation, **DO NOT** wait until you receive the sample results to report the contamination.

If you need to report contamination or have any general questions regarding site cleanup or UST compliance issues, please call (503) 229-5263 and ask to speak with the UST Duty Officer.

REMINDER: The UST Decommissioning/Change-In-Service Report form and the UST Decommissioning Checklist form must be submitted within 30 days after completion of work.

Sincerely,

Victor Beard
UST Cleanup and Compliance

cc: Stephanie Holmes, WMC
NWR facility file # 6897
Service Provider if known

UST FACILITY NO. 6897 DATE 10-1-99 INITIAL JCB

LUST NO. _____ LUST FILE CHECKED ☐ FAC FILE CHECKED ☐

FEES DUE ☐ AMOUNT _____ MAIL FEE REQUEST ☐ FEES OK ☑

FEE RECORDS CONTACT HQ ☐ DONE ☐

UPDATE AS PAID ☐

UPDATE TO CANCEL ☐

COMMENT _____ DONE ☑

INSTALL CHECKLIST ☐ OK FORWARD TO UST COMP STAFF ☐

INCOMPLETE ☐ PHONE REQUEST ☐

SIGNATURES ☐ REJECTION LTR ☐

COMMENT _____ CHECKLIST RETURNED ☐

---

30 DAY NOTICE RETRO ☐ DECOM ☑ OK FORWARD TO UST DO ☐

SIGNATURES ☐ PHONE REQUEST ☐

CONTRACTOR ☐ REJECTION LTR ☐

OWNER CHANGE ☐ NOTICE RETURNED ☐

WRONG FORM ☐

MISSING DATA ☐

TANK NOT PERMITTED ☐ MAIL PERMIT APP FOR EXT TANKS ☐

REQUEST SAMPLING PLAN ☐ MAIL MOD APP ☐

COMMENT OK LTR DONE ☐

DECOM CHECKLIST ☐ SERVICE CHANGE RPT ☐ RPTS OK FORWARD TO UST DO ☐

SIGNATURES ☐ PHONE REQUEST ☐

WRONG FORM ☐ REJECTION LTR ☐

MISSING DATA ☐ RPTS RETURNED ☐

COMMENT _____ DONE ☐

RECEIPTS

WASTE/SLUDGE REQUESTED ☐ PHONE REQUEST ☐

TANK REQUESTED ☐ REJECTION LTR ☐

SOIL REQUESTED ☐ DONE ☐

---

72 HR NOTICE

NOT NOTIFIED ☐ OK ☐

POTENTIAL VIOLATION ☐

TRACK FOR POSSIBLE NOTICE OF NONCOMPLIANCE LIST ON ACCESS ☐ OK ☐

PROBLEMS ☐

TRACK FOR PROBLEMS LISTED ABOVE LIST ON ACCESS ☐ OK ☐

Oregon Department of Environmental Quality

GENERAL PERMIT REGISTRATION FORM AND 30-DAY NOTICE OF INTENT TO DECOMMISSION USTS OR COMPLETE A CHANGE-IN-SERVICE

1. FACILITY (Location of Tanks) *(Please Print)*

Name: Highway BP

Address: 3108 Marine Drive
Astoria, OR 97103

Phone: 503-325-4050

2. PERMITTEE *(Please Print)*

Name: ETM, Inc

Address: PO Box 989
Astoria, OR 97103

Phone: 503-325-1972

DEQ General Permit Operating Certificate Number: 6897

Work To Be Performed By: 3 Kings Environmental Inc. License # 14312
(Permittee, Tank Owner, Property Owner or Licensed Service Provider) (Service Provider)

Phone: 360-887-5564 Mobile Phone: 503-781-0728

THIS FORM MUST BE SUBMITTED BY UST PERMITTEE 30 DAYS BEFORE START OF WORK

YOU MUST CONTACT YOUR LOCAL DEQ REGIONAL OFFICE 3-DAYS BEFORE STARTING ANY DECOMMISSIONING WORK. (Phone numbers are listed on Page 2)

Will tank removal or potential cleanup affect adjacent property or Right-of-Way property? Yes _____ No X

Date decommissioning is scheduled to begin: 10/99

			PRODUCT: GASOLINE, DIESEL, USED OIL, OTHER?		CLOSURE OR CHANGE-IN-SERVICE?			TANK TO BE REPLACED?	
TANK ID#	DEQ-UST PERMIT #	TANK SIZE IN GALLONS	PRESENT	NEW	TANK REMOVAL	CLOSURE IN PLACE•	CHANGE IN SERVICE•	YES*	NO
4	AJAAB	550	used oil		X				X

- If decommissioned tank(s) are to be replaced by new underground storage tanks you must submit a *General Permit Registration Form to Install and Operate USTs* for the new tanks 30 days before installing them.
- Submit a soil sampling plan to the DEQ regional office and receive plan approval prior to starting work if (1) tank is to be decommissioned in-place, (2) tank contents are changed to an unregulated substance, (3) tank contains a regulated substance other than petroleum, or (4) tank is changed to an unregulated use.

X Permittee: GARY E. BECHTOLT PRES
(Please Print)

X Permittee: Gary E Bechtolt Date: 9.29.99
(Signature)

3 Kings
Environmental, Inc.

Specializing in Commercial/Residential Underground Storage Tanks

FAX COVER SHEET

TO THE ATTENTION OF: UST Duty office

COMPANY: DEQ
Phone #: 503-229-5263
Fax #: 503-229-6945

DATE: 9/30/99

NUMBER OF PAGES (including the fax cover sheet): 3

FROM THE DESK OF: David

COMMENTS:

30 day Decommissioning Notices
for Facility # 7325 & 6897

NIEMI OIL CO.

HEATING OIL & SERVICE

BP gasoline

FAX #(503) 325-1973

PHONE#(503)325-1972

FACSIMILE TRANSMITTAL

COVER LETTER

TO: RICHARD ROSE

DEQ

503-229-6945

DATE: 2-11-99

PAGES TO FOLLOW COVER 1

811 SW Sixth Avenue
Portland, OR 97204-1390
(503) 229 -6652

UNDERGROUND STORAGE TANK PROGRAM

GENERAL PERMIT OPERATING CERTIFICATE

ISSUED TO:

ETU Inc.
490 Industry Street
P.O. Box 989
Astoria, OR 97103

OPERATING CERTIFICATE NUMBER: 04 - 6897 - 1999 - OPER

FACILITY NAME AND LOCATION:

Hiway Service
3108 Marine Drive
Astoria, OR 97103

TANK OWNER:
ETU Inc.

PERMITTEE:
ETU Inc.

REGISTRATION TYPE: Operate
Regulated Substance Delivery Authorized

TANK PERMIT NO:	TANK ID NO:	TANK SIZE:	TANK CONTENTS:
AJAKJ	1	4,000 gallons	Gasoline
AJAAK	2	4,000 gallons	Gasoline
AJAAA	3	1,500 gallons	Gasoline

Issued in accordance with the provisions of ORS Chapter 466.706 to 466.835, 466.994 and 466.995 and OAR 340-150-0001 to -0166 and ORS 465.200 to 465.455 and 465.990 and OAR 340-122-0205 to -0360.

The Oregon Department of Environmental Quality issues this operating certificate with the understanding that the permittee will operate in accordance with the conditions and requirements of the general permit to operate an underground storage tank pursuant to OAR 340-150-0163. This operating certificate remains valid until such time as a modified registration form is received by the department or the department suspends or revokes the operating certificate for failure by the permittee to comply with the conditions and requirements of the general permit to operate or applicable statutes or rules.

ISSUE DATE: 02/11/1999

Michael H. Kortenhof, Manager
UST Compliance and Cleanup Program
Waste Management and Cleanup Division

Regulated Substance Delivery Authorized

POLICY UST # TNK8001456

PLEASE DO NOT ADD ANY NEW INFORMATION TO THIS FOLDER

PLEASE GO TO THE NEXT FOLDER

PHONE 325 1915

NIEMI OIL CO

"BE WARM & THANKFUL"

P.O. BOX 989 - ASTORIA, OREGON 97103

RECEIVED
FEB 2 4 2004
DEPT OF ENVIRONMENTAL QUALITY
NORTHWEST REGION

February 20, 2004

Robert Hood
Oregon Department of Environmental Quality
Northwest Region
2020 SE 4th Avenue, Suite 400
Portland, OR 97201-4987

Re: ***Site Characterization Report and***
Request for No Further Action Determination
Niemi Oil, Highway Service Station
3108 Marine Drive
Astoria, Oregon
DEQ File No. 04-99-1193

Dear Mr. Hood:

Attached to this letter is a ***Site Characterization Report*** prepared by RSV Engineering, Inc. for the Niemi Oil Company, Highway Service Station Site in Astoria, Oregon. The report summarizes the soil sampling and groundwater sampling performed at the site as requested by the Oregon Department of Environmental Quality (DEQ) and described in the DEQ approved Scope of Work. The Scope of Work for the site characterization was submitted to DEQ on August 19, 2003, and verbally approved by Rick Silverman of DEQ on August 27, 2003.

The site characterization work performed by RSV involved collecting soil and groundwater data to assess potential exposure pathways in the vicinity of a former 500-gallon used oil underground storage tank (UST) that was removed from the site in 1999. Based on the characterization data collected, the site is eligible for closure with no further action, consistent with Oregon's Generic Remedy for simple risk-based cleanup rules at OAR 340-122-0047 and OAR 340-122-0252.

To summarize, the site investigation results demonstrate that the relatively low concentrations of petroleum constituents detected in soil samples do not exceed DEQ's Risk Based Concentrations levels for soil ingestion, dermal contact, and inhalation volatilization to outdoor air, or vapor intrusion to buildings for occupational, construction, or excavation workers, as specified in DEQ's September 22, 2003 Risk Based Decision Making For the Remediation of Petroleum-Contaminated Sites guidance. Similarly, groundwater sampling results do not exceed DEQ's Risk Based Concentration levels relevant to the current and expected future commercial use of the site.

Accordingly, Niemi Oil Company requests that DEQ issue a formal determination in the form of a "No Further Action" letter that the Niemi Oil Highway Service Station site is closed in accordance with a generic remedy for releases from petroleum USTs pursuant to OAR 340-122-0252, and DEQ's applicable risk based guidance.

Thank you for your assistance and prompt consideration of this request. If you have any questions concerning the ***Site Characterization Report*** or request for site closure, please contact me or Brad Berggren at RSV Engineering.

Respectfully Submitted,

Niemi Oil Company

Cary Bechtolt

Cary Bechtolt
President

cc: Allan Bakalian – Marten Law Group PLLC
Brad J. Berggren – RSV Engineering, Inc.

84-99-1193

SITE CHARACTERIZATION REPORT
HIGHWAY SERVICE 76 STATION
3108 MARINE DRIVE
ASTORIA, OREGON

FEBRUARY, 2004

Prepared For:

Niemi Oil Company
P.O. Box 989
Astoria, Oregon 97103

Prepared By:

RSV Engineering, Inc.
31960 SW Charbonneau Drive, Suite 101
Wilsonville, Oregon 97070
(503) 694.6960

RSV Project No. 03-135

RSV
ENGINEERING, INC.

NIEMI OIL COMPANY
SITE CHRACTERIZATION REPORT
HIGHWAY SERVICE 76 STATION
3108 MARINE DRIVE
ASTORIA, OREGON

RSV Engineering, Inc. is submitting this Site Characterization Report to the Niemi Oil Company and Marten Law Group, PLLC to document work performed regarding the Highway Service 76 Service Station site located at 3108 Marine Drive in Astoria, Oregon. The report was prepared in conformance with RSV Engineering's quality assurance/quality control procedures to ensure that the report meets industry standards in terms of the methods used and the information presented. If you have any questions or comments concerning this report, please contact one of the individuals listed below.

Respectfully submitted,
RSV ENGINEERING INC.

Craig C. Arola,
Staff Hydrogeologist

Brad J. Berggren, P.E., P.G.
Vice President

RECEIVED
FEB 24 2004
DEPT OF ENVIRONMENTAL QUALITY
NORTHWEST REGION

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Appendix A UST Facility Worksheet

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NIEMI OIL COMPANY
SITE CHARACTERIZATION REPORT
HIGHWAY SERVICE 76 SERVICE STATION
3108 MARINE DRIVE
ASTORIA, OREGON

INTRODUCTION

This report summarizes the results of the site characterization activities conducted in September and October 2003 by RSV Engineering, Inc. (RSV) at the Niemi Oil Company Highway Service 76 Station. Based on a review of the previous site investigation and cleanup actions involving several former underground storage tanks (USTs), and the recent site characterization investigations, the site is a candidate for closure using Oregon's Generic Remedy for simple risk-based cleanup approach developed in accordance with Oregon Administrative Rule (OAR) 340-122-0047 and OAR 340-122-0257.

The Highway Service 76 Station is located at 3108 Marine Drive in Astoria, Clatsop County, Oregon, in the southwest quarter of the northwest quarter of Section 9, Township 8 North, Range 9 West. The location of the site is shown in Figure 1. The property is owned by Etu, Inc., and operated as a 76 gasoline station and convenience store by Niemi Oil Company.

Contamination was first discovered at the site in October 1999, when one 550-gallon used oil underground storage tank (UST) was removed from the site. Two soil samples were collected from the bottom of the excavation at a depth of 6 ft, and laboratory analyzed for Total Petroleum Hydrocarbon-Hydrocarbon Identification (TPH-HCID), and subsequently for TPH as diesel and heavy oil. TPH as heavy oil was detected in both samples at concentrations of 19,000 mg/kg and 78,000 mg/kg, respectively. A release of used oil from the UST was reported to the Oregon Department of Environmental Quality

(DEQ) on October 21, 1999. The Oregon Department of Environmental Quality (DEQ) has listed the site as a Leaking Underground Storage Tank (LUST) site, File Number is 04-99-1193.

In an April, 2003 meeting with Niemi Oil representatives, DEQ requested additional soil and groundwater sampling associated with the former used oil tank. The additional site characterization activities were conducted in response to the April, 2003 DEQ request. A Scope of Work for the initial site characterization activities was submitted to the DEQ on August 19, 2003. The Scope of Work was verbally approved by Rick Silverman of DEQ on August 27, 2003.

BACKGROUND

Site History

The Highway Service site is an active 76 Service Station. The site is located on the northeast intersection of Marine Drive (Hwy 30) and 31st Street in a commercial area of Astoria, near the Columbia River. The elevation of the site is approximately 25 ft above mean sea level (MSL).

The site is currently zoned commercial (C3). Properties to the south across Marine Drive, to the east, west, and north of the site are also zoned C3. Property zoned Single Family Residential (R2) is located further to the south of the site along a bluff at an approximate elevation of 100 to 250 ft MSL. According to the City of Astoria City Planner, no changes to current zoning in the area are planned.

Three (3) underground storage tanks (USTs) are currently located at the site, including two (2) 4,000-gallon gasoline USTs, and one (1) 1,500-gallon gasoline UST. Tank tightness testing of the current USTs located at the site has not detected any leaks or releases.

Physical Setting and Geology

The Highway Service site is located approximately 550 ft south of the Columbia River. A bedrock high is located approximately one-half mile to the south of the site. Floodplain sediments in the vicinity of the Columbia River in this part of Astoria generally consist of primarily sands and gravels with minor amounts of clay. Underlying unconsolidated sediments in the area is the Astoria Formation, which is characterized by an upper sandstone unit of Miocene age, a middle shale unit, and a lower sandstone unit. According to the Highway Service station manager, depth to bedrock encountered during geotechnical borings completed at an adjacent site south and across Marine Drive from the Highway Service site indicated bedrock occurs approximately 28 ft bgs.

Shallow soils in the vicinity of the site have been mapped as Walluski Silt Loam. The Walluski Silt Loam is typically moderately well drained and has a slow permeability. A typical profile consists of 14 inches of very dark grayish brown silt loam, 7 inches of dark brown silt loam, and 39 inches of dark yellowish brown, yellowish brown, and light brownish gray, mottled silty clay loam.

Shallow soils encountered at nearby sites consisted of primarily silty sands and coarse gray and black sand, to depths of up to 15 ft. A sandy clay layer was occasionally encountered at a depth of approximately 2 to 7 ft bgs.

Hydrogeology

Depth to groundwater in the vicinity of the site has been reported at depths of approximately 2 to 7 ft bgs, with flow to the north and northwest, toward the Columbia River (PRC Environmental Management, Inc, 1996; Kennedy/Jenks Consultants, 1995). During removal of the 500-gallon used oil UST at the site, groundwater was not encountered to a depth of 6 ft below ground surface (bgs).

Previous Work

In October 18, 1999, one 550-gallon used oil underground storage tank (UST) was removed from the site. Product odor and staining were noted in soils in the excavation tank pit. Two soil samples were collected from the bottom of the excavation at a depth of 6 ft, and laboratory analyzed for Total Petroleum Hydrocarbon-Hydrocarbon Identification (TPH-HCID), and subsequently for TPH as diesel and heavy oil. TPH as heavy oil was detected in both samples at concentrations of 19,000 mg/kg and 78,000 mg/kg, respectively. TPH as diesel was not detected in either sample.

The release from the 500-gallon used oil UST was reported to the Oregon Department of Environmental Quality (DEQ) on October 21, 1999. In an April, 2003 meeting with Niemi Oil representatives, DEQ requested additional soil and groundwater sampling associated with the former used oil tank. A UST Facility Worksheet submitted to DEQ is included as Appendix A.

CURRENT SITE CONDITIONS

The Highway Service 76 Station site is located on the northeast corner of Marine Drive and 31st Street in a commercial area of Astoria. Commercial properties are located along both sides of Marine Drive, with residential properties adjacent to the rear (i.e., southeast) of commercial properties on the opposing side of Marine Drive from the site.

Site features are shown on Figure 2. The terrain of the site is gently sloping toward the northwest and is paved with asphalt. A strip between the USTs and the northwestern property boundary is unpaved. Overhead utilities servicing the site include electric and telephone. Underground utilities servicing the site include natural gas, water, and sanitary sewer. No drinking water wells are located at the site. In addition, a review of available well logs from the Oregon Department of Water Resources from within approximately one mile of the site did not reveal any drinking water wells. A copy of the well log information is included as Appendix E.

GEOPHYSICAL SURVEY

On September 29, 2003 a magnetometer/ground penetrating radar (GPR) survey was performed by GeoPotential, Inc. of Gresham, Oregon to locate in-use and previously abandoned underground storage tanks (USTs) beneath the site. Three (3) USTs, all of which are in use, were located in the northwest central part of the site. The number of the detected tanks is consistent with the number of tanks currently registered for the site, and no other USTs were detected during the geophysical survey. A copy of the GeoPotential report is included as Appendix B.

SITE INVESTIGATION SCOPE OF WORK AND METHODS

The site investigation activities involved the advancement of six (6) soil borings (GP-1 through GP-6) at the approximate locations shown on Figure 2. The borings were advanced using conventional percussion probe/direct push drilling techniques. Soil samples were collected continuously using 1.25-inch diameter by 4-ft length plastic sampling tubes. The sampling tubes were driven into the borehole inside 1.25-inch diameter by 4-ft length steel sampling rods. New plastic sleeves were used for each sample. Other equipment entering the borehole was decontaminated prior to each use.

Soil samples were collected continuously to the bottom of each boring. The samples were visually classified in the field by an RSV geologist in general accordance with ASTM Method D-2488-93. The soil samples were described with respect to soil types, grain size distribution, color (or discoloration), odor, moisture content, consistency, and photoionizable constituent content, as appropriate. Soil boring log forms are included as Appendix C.

Soil samples were collected from each sampling interval for in-field screening using a photoionization detector (PID). The collected samples were placed in plastic reclosable bags prior to field screening. The PID yields a semi-quantitative headspace analysis of

the concentration of volatile organic compounds (VOCs) in the samples that have ionization potentials equal to or less than 10.6 electron volts (eV). The PID was calibrated prior to field activities according to manufacturer's instructions, using a 101 parts per million (ppm) isobutylene span gas and air (zero gas), and checked periodically for proper response. It is useful to note that the PID does not allow for a differentiation of individual VOCs, and has a useful detection limit of approximately 0.1 ppm for select VOC constituents.

Based on the results of field screening and depth with respect to the inferred water table, a shallow and deeper soil sample were collected from each soil boring (with the exception of GP-6 which encountered refusal at 12 feet below ground surface) and submitted for laboratory analysis of total petroleum hydrocarbons (TPH) by the Northwest Hydrocarbon Identification Method (NWTPH-HCID). Samples for which TPH as gasoline were detected were also analyzed for gasoline-range TPH by Northwest Method TPH-Gx and VOCs (including benzene, toluene, ethylbenzene, xylenes, ethylene dibromide, ethylene dichloride, methyl-tertiary-butyl-ether, 1,2,4-trimethlybenzene, 1,3,5-trimethylbenzene, n-propylbenzene, isopropylbenzene, and chlorinated VOCs) by U.S. Environmental Protection Agency (EPA) Method 8260.

Soil samples yielding detection of TPH as diesel or heavy oil were also analyzed for diesel- and oil-range TPH by Northwest Method NWTPH-Dx, polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270, total leachable metals (cadmium, chromium, and lead) by EPA Method 1311/6010, and polychlorinated biphenyls (PCBs) by EPA Method 8081.

Groundwater samples were collected from two of the soil borings (GP-1 and GP-2) and submitted for laboratory analysis for hydrocarbon identification by Northwest Method NWTPH-HCID. Samples in which TPH as gasoline were detected were also analyzed for NWTHPH-Gx, VOCs, and dissolved metals (cadmium, chromium, and lead).

Groundwater samples in which TPH as diesel or heavy oil were detected were also analyzed for PAHs and PCBs.

Soil and groundwater samples intended for laboratory analyses were labeled, placed in a cooler with ice, and delivered to the project laboratory within allowable holding times. Sample labels identified the date and location of the sample, and the analyses to be conducted. Samples were placed in containers provided by the project laboratory. The chain-of custody forms which accompanied the samples to the laboratory are included in Appendix C.

Quantitative chemical analyses of the collected soil and groundwater samples were performed by Columbia Analytical Services of Kelso, Washington. Water generated during sampling of the probes, including equipment decontamination water, was placed in a labeled 55-gallon drum(s) and stored on site, pending proper disposal.

OREGON RULES AND REGULATIONS

The following table summarizes Oregon Rules and Regulations pertaining to releases from underground storage tanks (USTs), and referenced for the investigation performed at the Highway Service Site:

Oregon Administrative Rule	Title	Met	Report(s)
340-122-0220	Initial Response	YES	UST Facility Worksheet, January 4, 2000
340-122-0225	Initial Abatement Measures and Site Check	YES	UST Facility Worksheet, January 4, 2000
340-122-0230	Initial Site Characterization	YES	RSV Engineering, Inc., ***Site Characterization Report.*** Highway Service 76 Station, 3108 Marine Drive, Astoria, Oregon. February, 2004.

340-122-0235	Free Product Removal	N/A	UST Facility Worksheet, January 4, 2000
340-122-0240	Investigation for Magnitude and Extent of Contamination	YES	RSV Engineering, Inc., ***Site Characterization Report.*** Highway Service 76 Station, 3108 Marine Drive, Astoria, Oregon. February, 2004.
340-122-0244	Risk Based Concentrations	YES	RSV Engineering, Inc., ***Site Characterization Report.*** Highway Service 76 Station, 3108 Marine Drive, Astoria, Oregon. February, 2004.
340-122-0252	Generic Remedies	YES	RSV Engineering, Inc., ***Site Characterization Report.*** Highway Service 76 Station, 3108 Marine Drive, Astoria, Oregon. February, 2004.

RISK BASED PATHWAYS

The Highway Service site is currently an operating retail gasoline filling and service station, and convenience store. A site conceptual model, based on DEQ's revised September 22, 2003 Risk-Based Decision Making For the Remediation of Petroleum-Contaminated Sites guidance, is shown in Table 1. The pathways summarized for the site were selected based on the current and expected future commercial use of the site and surrounding properties. The following potential exposure routes were considered for employees and workers at the site: direct contact with soil, dermal absorption and inhalation of volatiles, inhalation of chemicals volatilized into on-site buildings, inhalation of chemicals volatilized into buildings, and leaching to groundwater.

Ingestion of groundwater is not a current or reasonably likely exposure pathway and therefore was excluded as a potential pathway at the site since. The conclusion is supported by the following observations. The site receives its water supply from the City of Astoria, no drinking water wells are present at the site, and the relatively low yield of groundwater observed during collection of groundwater samples at the site. In addition, a review of well records available from the Oregon Department of Water Resources

(ODWR) in the vicinity of the site indicated that no drinking water wells are located within approximately one mile of the site (Sections 8, 9, 10, 15, 16, or 17, Township 8 North, Range 9 West). The site is located in Section 9. A list of wells located within Sections 8, 9, 10, 15, 16, and 17 is provided in Appendix E. An additional search of well records available from ODWR for Township 8 North, Range 9 West indicated that the nearest drinking water well is located approximately 1.5 miles south (an expected upgradient groundwater flow direction) of the site. This well and other wells identified within Township 8 North, Range 9 West were completed within bedrock beneath the silty clay unconsolidated sediments similar to those observed at the Highway Service site.

Considering the current and expected future commercial zoning of the Highway Service site and surrounding properties, and the nature and magnitude of petroleum constituents detected in soil and groundwater samples, the site will be evaluated for closure using Oregon's Generic Remedy for simple Risk-Based Cleanup approach developed in accordance with Oregon Administrative Rule (OAR) 340-122-0047 and OAR 340-122-0257.

ECOLOGICAL RISK

Based on the data collected from the site and surrounding land use information, the site does not pose an ecological risk based on the following factors. Shallow contaminated soils at the site cover a relatively small area that is covered by asphaltic concrete. The nearest surface water body (Columbia River) is located approximately 550 ft north of the site. No surface water impacts near the site have been reported. Although groundwater containing relatively low concentrations of certain petroleum constituents has been detected in shallow groundwater beneath the site, only lead, detected in groundwater at the assumed most upgradient groundwater sampling location exceeded the DEQ Level II Screening Level Guidance Value for Ecological Risk Assessments. Considering the distance (>500 ft) of the site from the Columbia River, and the relatively low mobility of lead in the subsurface, it is unlikely that groundwater containing significant levels of lead from the site would reach aquatic sediments or surface water in the vicinity of the site.

RESULTS

Site Geology and Hydrogeology

In general, silty and sandy gravels or silt were encountered to depths of approximately 12 to 15 feet below ground surface (bgs). Underlying the silt and gravel soil in Borings GP-1, GP-2, GP-3, and GP-4 was fine-medium grained sand. In Boring GP-5, clay was encountered below the silty soils and in Boring GP-6, refusal was encountered at a depth of 12.5 feet bgs.

In Boring GP-1 (the apparent most upgradient location), below the sand at a depth of 19.5' bgs, a wet gravelly clay was encountered, with refusal encountered at 20 feet bgs. Groundwater was also encountered in Borings GP-2, GP-3, and GP-4 at approximately 19.5' bgs. Groundwater was not encountered in Borings GP-5 and GP-6.

Groundwater samples were collected from Borings GP-1 and GP-2. Groundwater recharge was very slow to Borings GP-1 and GP-2 and yield was very low. Although collection of a groundwater sample was attempted from Boring GP-4, the pump tubing clogged with fine sand and no sample could be obtained. Boring GP-3 did not yield enough groundwater to obtain a sample. A hydrocarbon odor was only observed from the groundwater sample collected from Boring GP-1 (the apparent most upgradient location). Petroleum odors were not observed in soil or groundwater samples collected from any of the other borings at the site.

Refusal was encountered in Boring GP-5 at a depth 20.5' bgs. According to the Station manager, during geotechnical investigations for a construction project on the opposite side of Marine Drive from the site, bedrock was encountered at a depth of approximately 28 feet bgs. The manager also stated that all the soils encountered beneath the site are fill material, and that the base of the fill consists of boulders that were originally used as ship ballast and were placed at the base when infilling occurred.

Soil Sampling Results

The results of field screening using the PID indicated the presence of relatively low concentrations of volatile organic vapors in samples collected from Borings GP-2 (0.4 ppm at a depth of 17 ft) and GP-5 (0.5 to 3.4 ppm between 13 ft and 17 ft). Other samples collected for PID screening yielded no response (0 ppm).

Hydrocarbon Identification and TPH

Samples from all six (6) soil borings were laboratory analyzed for TPH-HCID. HCID and TPH results are summarized in Table 2. Based on the locations of the advanced soil borings relative to the former used oil UST, the following samples were selected for analyses of TPH-Gx, TPH-Dx, and TPH-Oil: GP-2, 2 to 4 ft; GP-2, 17 to 19 ft; GP-3, 2 to 4 ft; GP-3, 17 to 19 ft; GP-4, 2 to 4 ft; and GP-4, 15 to 17 ft. TPH-Gx was not detected in any of the analyzed samples. TPH-Dx was detected in Boring GP-3, 17 to 19 ft at a concentration of 11 mg/ kg. TPH-Oil was detected in Borings GP-3, 2 to 4 ft; GP-3, 17 to 19 ft, and GP-4, 2 to 4 ft at concentrations up to 85 mg/kg. The TPH-Dx and TPH-Oil soil concentrations are below DEQ's Generic Risk-Based Concentrations (RBCA) for the applicable potential exposure pathways identified for the site (i.e., Soil Ingestion, Dermal Contact, and Inhalation for occupational, construction, and excavation workers; Volatilization to Outdoor Air for occupational workers; Vapor Intrusion to Buildings for occupational workers, and Leaching to Groundwater for occupational settings).

Metals

Due to their proximity to the former used oil UST, soil samples from Soil Borings GP-2 (2 to 4 ft, 17 to 19 ft), GP-3 (2 to 4 ft, 17 to 19 ft), and GP-4 (2 to 4 ft, 15 to 17 ft) were collected and laboratory analyzed for cadmium, chromium, and lead. A summary of metals sampling results are provided in Table 3. Cadmium was detected in the all of the samples at concentrations ranging from 0.030 mg/kg (Boring GP-2, 17 to 19 ft) to 0.417 mg/kg (Boring GP-4, 2 to 4 ft). Chromium was detected in all the samples at concentrations ranging from 7.23 mg/kg (Boring GP-4, 17 to 19 ft) to 44.1 mg/kg

(Boring GP-2, 2 to 4 ft). Lead was detected in the samples at concentrations ranging from 2.07 mg/kg (GP-4, 15 to 17 ft) to 9.44 mg/kg (Boring GP-3, 2 to 4 ft). These metals are naturally occurring in soil and the concentrations detected are not unusual relative to typically ranges for soil (DEQ, 1994; EPA, 2002). In addition, concentrations of lead were not detected above the applicable potential exposure pathways identified for the site (i.e., occupational, construction worker, or excavation worker Appendix A RBCs for Soil Ingestion, Dermal Contact, and Inhalation; Volatilization to Outdoor Air; Vapor Intrusion to Buildings; or Leaching to Groundwater pathways).

Since no Appendix A RBCs have been promulgated in Oregon for cadmium or chromium, the concentrations of these constituents in soil were compared to the EPA Region 9 Preliminary Remediation Goals (PRGs). The concentration of chromium detected in Boring GP-2, 2 to 4 ft (44.1 mg/kg) and Boring GP-3, 2 to 4 ft (40.6 mg/kg) slightly exceeded the PRG for Leaching to Groundwater (Dilution Attenuation Factor of 20). However, deeper soil samples collected from Borings GP-2 (17 to 19 ft) and GP-3 (17 to 19 ft), just above groundwater at the site did not exceed the Leaching to Groundwater PRG concentration. Concentrations of chromium detected in the samples were not above the Region 9 PRGs for the Direct Contact with soils pathway. Concentrations of cadmium detected in the soil samples did not exceed the PRG for Leaching to Groundwater or Direct Contact with soils pathway.

Polychlorinated Biphenyls (PCBs)

Soil samples for analysis of PCBs were collected from Borings GP-2 (2 to 4 ft and 17 to 19 ft), GP-3 (2 to 4 ft and 17 to 19 ft), and GP-4 (2 to 4 ft and 17 to 19 ft). No PCBs were detected in the samples. PCB results are summarized in Table 4.

Polycyclic Aromatic Hydrocarbons (PAHs)

Soil samples were collected for analysis of PAHs from Borings GP-2 (2 to 4 ft and 17 to 19 ft), GP-3 (2 to 4 ft and 17 to 19 ft), GP-4 (2 to 4 ft and 15 to 17 ft), and GP-5 (2 to 4 ft and 17 to 19 ft). PAH sampling results are included as the attached Table 5. The following PAHs were detected in the samples: naphthalene, acenaphtylene,

acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenzo(a,h)anthracene, benzo(ghi)perylene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, and dibenzofuran at relatively low concentrations ranging from 0.29 µg/kg (fluorene in Boring GP-3 17 to 19 ft) to 19 µg/kg (naphthalene in Boring GP-5 16 to 18 ft). None of these petroleum constituents were detected above the RBCs for applicable potential exposure pathways identified for the site (i.e., occupational, construction worker, or excavation worker Appendix A RBCs for Soil Ingestion, Dermal Contact, and Inhalation; Volatilization to Outdoor Air; Vapor Intrusion to Buildings; or Leaching to Groundwater).

Volatile Organic Compounds (VOCs)

Soil samples were collected for analysis of VOCs from Borings GP-2 (2 to 4 ft and 17 to 19 ft), GP-3 (2 to 4 ft and 17 to 19 ft), GP-4 (2 to 4 ft and 15 to 17 ft), and GP-5 (2 to 4 ft and 16 to 18 ft). VOC sampling results are provided in Table 6. The following VOCs were detected in the samples: ethylbenzene, xylenes, isopropylbenzene, n-propylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, methyl-tert-butyl-ether (MTBE), and methylene chloride (a common laboratory contaminant, and not a compound typical of petroleum contamination). Since no Appendix A RBCs have been promulgated in Oregon for methylene chloride, the concentrations of methylene chloride in soil were compared to United States Environmental Protection Agency Region 9 Preliminary Remediation Goals (PRGs). None of the concentrations of methylene chloride detected in the soil samples exceeded the PRG for leaching to groundwater except Boring GP-5, 16 to 18 ft (22 µg/kg). No other VOCs were detected above for the applicable potential exposure pathways identified for the site (i.e., occupational, construction worker, or excavation worker Appendix A RBCs for Soil Ingestion, Dermal Contact, and Inhalation; Volatilization to Outdoor Air; Vapor Intrusion to Buildings; or Leaching to Groundwater).

Groundwater Sampling Results

Hydrocarbon Identification and TPH

Groundwater samples from Borings GP-1 (the apparent most upgradient location at the site) and GP-2 (adjacent to the location of the former used oil UST) were laboratory analyzed for TPH-HCID. Groundwater TPH results are summarized in Table 7. TPH-HCID as gasoline was detected in Borings GP-1 and GP-2. TPH-HCID as diesel and heavy oil were detected in Boring B-2. Based on the results of the TPH-HCID analysis, Boring B-1 was analyzed for TPH-Gx, and Boring B-2 was analyzed for TPH-Gx, TPH-Dx, and TPH-Heavy Oil. TPH-Gx was detected at a concentration of 86 µg/L in Boring B-1 and at a concentration of 39 µg/L in Boring B-2. TPH-Dx and TPH-Heavy Oil were detected at concentrations of 3,200 and 110 µg/L respectively in Boring B-2. The detected constituents did not exceed the Appendix A RBCs for the applicable potential exposure pathways identified for the site (i.e., Volatilization to Outdoor Air, Vapor Intrusion to buildings, or Groundwater in an Excavation for occupational, construction worker, or excavation worker scenarios).

Metals

Groundwater samples were collected from Borings GP-1 and GP-2 for analysis of dissolved metals (cadmium, chromium, and lead). A summary of groundwater metals sampling results is provided in Table 8. Cadmium was detected at a concentration of 0.18 µg/L in Boring GP-2 and at a concentration of 0.07 µg/L in Boring GP-2. Chromium was detected at concentration of 4.15 µg/L in Boring GP-1 and at a concentration of 1.13 µg/L in Boring GP-2. Lead was detected at a concentration of 58.6 µg/L in Boring GP-1 (the apparent most upgradient location at the site) and at a concentration of 5.4 µg/L in Boring B-2, located near the former used oil UST. The only potential groundwater pathway for lead that a RBC has been listed is for Ingestion and Inhalation of Tap Water, which is not considered an applicable pathway for the site. According to Appendix A notes, Volatilization to Outdoor Air, Vapor Intrusion to Buildings, and Groundwater in an Excavation are not applicable pathways for lead. Similarly, no Appendix A RBCs have been promulgated for cadmium or chromium for

Volatilization to Outdoor Air, Vapor Intrusion to Buildings, or Groundwater in an Excavation.

Volatile Organic Compounds (VOCs)

Groundwater samples were collected from Borings GP-1 and GP-2 for analysis of VOCs. A summary of VOC analytical results is shown in Table 11. Benzene and toluene were detected in the samples. Concentrations of these VOCs ranged from 0.12 µg/L to 0.26 µg/L. The detected concentrations did not exceed the Appendix A RBCs for the applicable potential exposure pathways identified for the site (i.e., Volatilization to Outdoor Air, Vapor Intrusion to Buildings, or Groundwater in an Excavation for occupational, construction worker, or excavation worker pathways).

PCBs and PAHs

Groundwater samples were collected from Boring GP-2 (adjacent to the former used oil UST) for analysis of PCBs and PAHs. A summary of PCB sampling results is provided in Table 9, and a summary of PAH sampling results is provided in Table 10. No PCBs were detected in the groundwater sample from Boring GP-2. The following PAHs were detected in the sample: naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthracene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene, and 2-methylnaphthalene at concentrations ranging from 0.0023 µg/L (anthracene) to 0.039 µg/L (naphthalene). The detected concentrations did not exceed the Appendix A RBCs for the applicable potential exposure pathways identified for the site (i.e., Volatilization to Outdoor Air, Vapor Intrusion to Buildings, or Groundwater in an Excavation for occupational, construction worker, or excavation worker pathways).

SUMMARY AND RECOMMENDATIONS

Summary

The October 2003 site soil and groundwater characterization work was undertaken to assess the nature and scope of a petroleum product release reported in October, 1999 from a 550-gallon used oil UST, which was removed from the site at that time. Based upon the detection of product odors and staining in soil exposed during the UST removal, two soil samples were collected from the bottom of the excavation at a depth of 6 ft. TPH as heavy oil was detected in both samples at concentrations of 19,000 mg/kg and 78,000 mg/kg, respectively. No spills or leaks from the remaining three (3) USTs at the site have been reported or detected during recent tightness testing by Niemi Oil.

In August 2003, DEQ approved RSV's scope of work for additional site investigations of soil and groundwater in the vicinity of the former used oil tank. The site characterization sampling work was performed in September and October, 2003. The soil and groundwater data from this investigation is included in Tables 2 through 11 of this report.

A site conceptual model, based on DEQ Risk Based Guidance, as summarized in Table 1, was also developed. The following potential exposure routes were considered for employees and workers at the site, based on the current and expected future commercial use of the site and surrounding properties: direct contact with soil, dermal absorption and inhalation of volatiles, inhalation of chemicals volatilized into on-site buildings, inhalation of chemicals volatilized into buildings, and leaching to groundwater.

Ingestion of groundwater was excluded as a potential pathway at the site since the site receives its water supply from the City of Astoria, no drinking water wells are present at the site, and the relatively low yield of groundwater observed during collection of groundwater samples at the site. In addition, a review of well records available from the Oregon Department of Water Resources in the vicinity of the site indicated that no drinking water wells are located within approximately one mile of the site.

The site was evaluated for closure using Oregon's Generic Remedy for simple Risk-Based Cleanup in accordance with Oregon Administrative Rule (OAR) 340-122-0047 and OAR 340-122-0257, after consideration of the current and expected future commercial zoning of the site and surrounding properties, and the nature and magnitude of petroleum constituents detected in soil and groundwater samples,

Field screening and laboratory chemical analyses indicate that soil and groundwater at the Highway Service site have been impacted by relatively low concentrations of petroleum related constituents. The relatively low concentrations of petroleum constituents in soil do not exceed the DEQ RBCs for soil ingestion, dermal contact, and inhalation; volatilization to outdoor air, or vapor intrusion to buildings for occupational, construction, or excavation workers.

Groundwater sampling did not reveal exceedances of the Appendix A RBCs for the applicable potential exposure pathways identified for the site (i.e., volatilization to outdoor air, vapor intrusion to buildings, or groundwater in an excavation for occupational, construction worker, or excavation worker pathways), for VOCs, PCBs, PAHs, or metals.

Accordingly, based on the data collected at the site, and a comparison of the applicable risk-based criteria as required by the Oregon UST rules discussed in Section 4 above, the site is eligible for closure in accordance with the procedures for a risk-based generic remedy.

Recommendations

RSV recommends that DEQ consider the Highway Service site for closure using a Generic Remedy for simple risk based sites. Based on soil and groundwater data collected from the site, the site meets the following applicability criteria set forth in OAR 340-122-0252 for use of a generic remedy:

1) Contamination at the site is limited to petroleum based constituents.

2) Hazardous constituents identified at the site are listed in the Appendix A Table of RBCs, except methylene chloride, a common laboratory contaminant, which was detected at relatively low concentrations in soil, and was not detected in groundwater samples.
3) No potentially unacceptable ecological risks exist at the site.
4) No odors or nuisance conditions have been reported at the site that cannot be adequately addressed by the application of risk-based concentrations.

No further action is therefore warranted at the Highway Service site, using a Generic Remedy for simple risk based sites under OAR 340-122-0252. Accordingly, DEQ should consider granting closure of the Highway Service site and issue Niemi Oil Company and Etu, Inc. a "No Further Action" letter.

REFERENCES

Final Report Astoria Plywood Removal Assessment, Astoria, Oregon. PRC Environmental Management, Inc., April 25, 1996.

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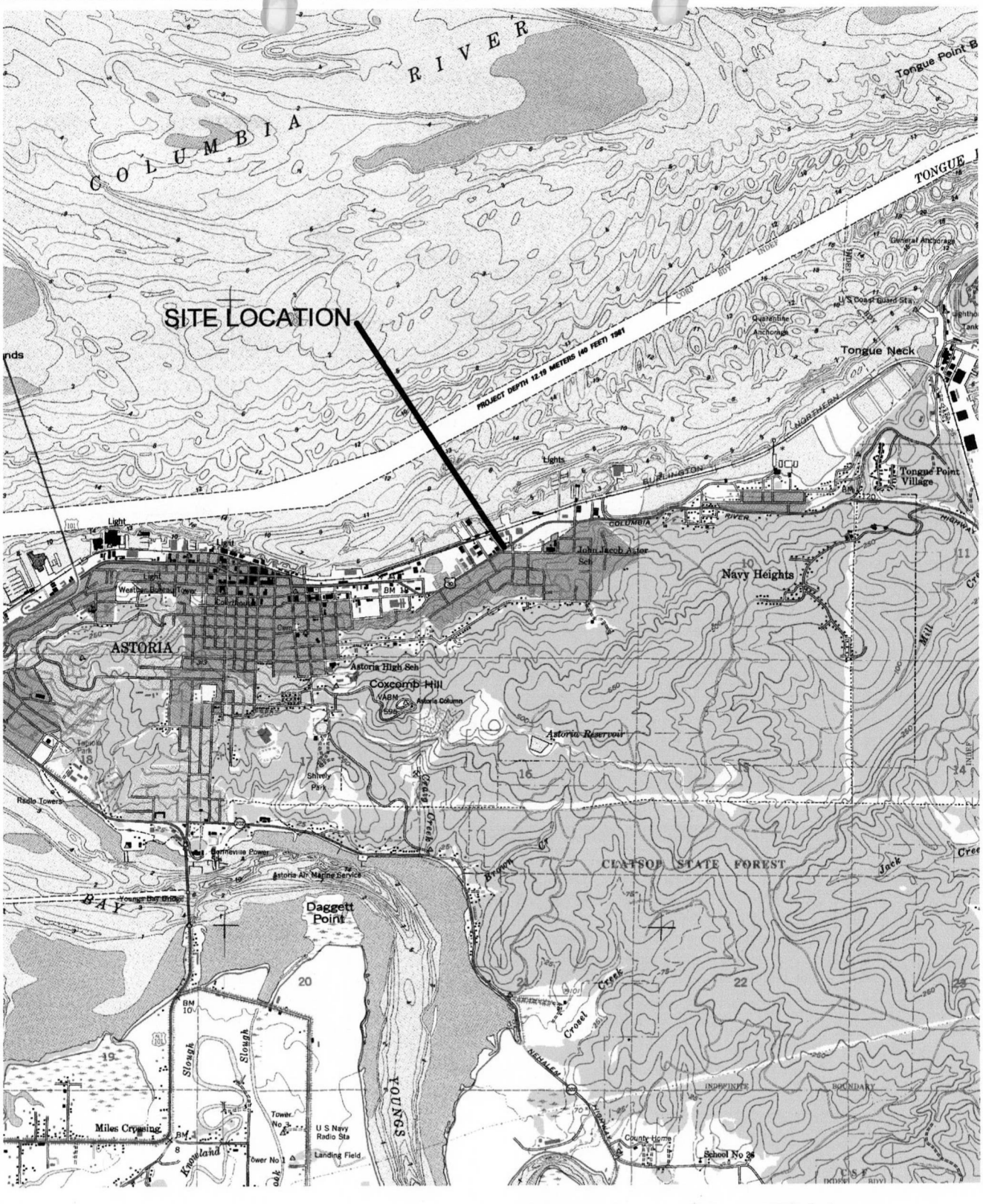
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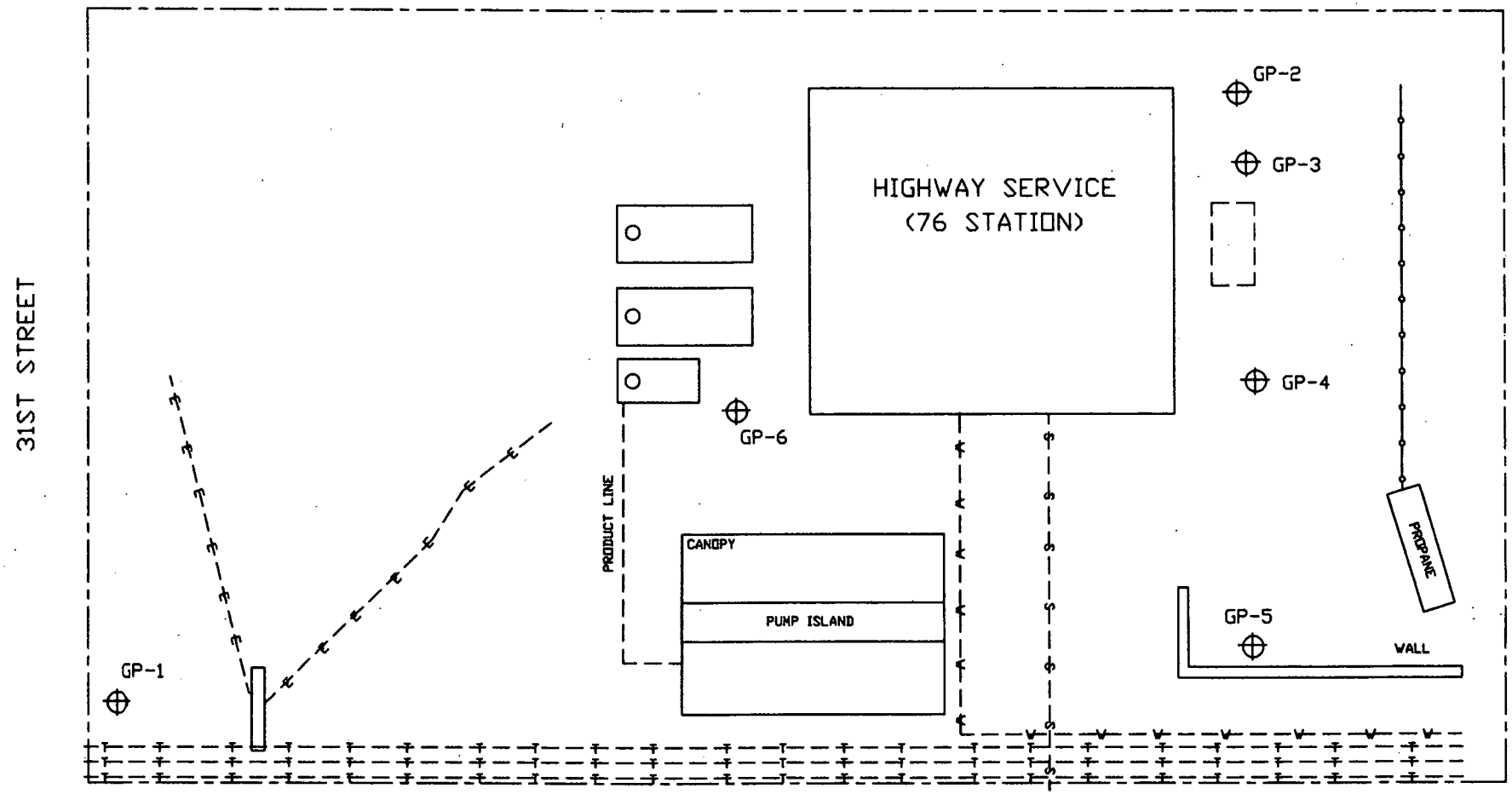
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Adapted from the USGS Astoria, Oregon-Washington 1:24,000 topographic map, 1949, Photorevised 1984

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SITE LOCATION MAP				FIGURE
NIEMI OIL - HIGHWAY SERVICE ASTORIA, OREGON				1
DRAWN	CHECKED	APPROVED	DATE	DRAWING NO.
CCA			11/6/03	03-135-01



LEGEND

- EXISTING UST
- FORMER UST
- Underground Telephone Line
- Underground Electric Line
- Underground Water Line
- Underground Sewer Line
- Fence
- GP-2 Soil Boring Location
- Approximate Property Line

N

FEET

0 10 20 40

RSV ENGINEERING, INC.

Engineers • Land Surveyors • Environmental Scientists

31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

SOIL BORING LOCATIONS
HIGHWAY SERVICE
3108 MARINE DRIVE
ASTORIA, OREGON

FIGURE 2

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
CCA		10/17/03	sitemap

Table 1
Summary of Conceptual Site Model
Highway Service 76 Station
Astoria, Oregon

Potentially Exposed Population	Exposure Route, Medium and Exposure Point	Was this Pathway Selected?	Reason for Selection or Exclusion
CURRENT LAND USE: INDUSTRIAL			
Excavation Workers Construction Workers	Direct Contact with chemicals in on-site soil	Yes	Contaminated soil is in area accessible to workers
Excavation Workers Construction Workers	Dermal absorption and inhalation of volatiles	Yes	Depth of seasonal groundwater relatively shallow. Exposure by excavation and construction workers possible.
Employees	Inhalation of chemicals volatilized into buildings	Yes	Vadose zone soils and groundwater near on-site building potentially contaminated with volatiles
Employees	Inhalation of chemicals volatilized to outdoor air	Yes	Vadose zone soils and groundwater likely contaminated with VOCs
Employees	Leaching to GW followed by ingestion from nearby downgradient wells	No	Shallow water table beneath site, not used for drinking water source.

Table 2
Soil Sampling Results-Hydrocarbon Identification and TPH
Highway Service 76 Station
Astoria, Oregon

			HCID			TPH mg/kg		
Sample ID	Depth(ft)	Date	Gasoline	Diesel	Oil	TPH-Gx	TPH-Dx	TPH-Oil
GP-1	2-4	10/10/03	ND	ND	ND	NA	NA	NA
GP-1	17-18	10/10/03	ND	ND	ND	NA	NA	NA
GP-2	2-4	10/10/03	ND	ND	ND	<6.2	<31	<130
GP-2	17-19	10/10/03	ND	ND	ND	<5.5	<28	<110
GP-3	2-4	10/10/03	ND	ND	ND	<6.2	<32	7.2
GP-3	17-19	10/10/03	ND	ND	ND	<5.6	11	85
GP-4	2-4	10/10/03	ND	ND	ND	<6.3	<31	9.6
GP-4	15-17	10/10/03	ND	ND	ND	<5.2	<26	<110
GP-5	2-4	10/10/03	ND	ND	ND	NA	NA	NA
GP-5	16-18	10/10/03	ND	ND	ND	NA	NA	NA
GP-6	2-4	10/10/03	ND	ND	ND	NA	NA	NA
Appendix A Risk Based Concentrations								
Soil Ingestion Dermal Contact and Inhalation		Occupational	NS	NS	NS	22,000	70,000	NS
		Construction Worker	NS	NS	NS	13,000	23,000	NS
		Excavation Worker	NS	NS	NS	---	---	NS
Volitilization to Outdoor Air		Occupational	NS	NS	NS	80,000	---	NS
Vapor Intrusion to Buildings		Occupational	NS	NS	NS	---	---	NS
Leaching to Groundwater		Occupational	NS	NS	NS	110	---	NS

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum -Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) RBCs provided in mg/kg
(3) NS = No Appendix A RBC provided by DEQ
(4) ND = Not Detected
(5) NA = not analyzed for
(6) 26 Meets or exceeds one or more Appendix A RBC.
(7) --- The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)

Table 3 : Soil Sampling Results -Metals
Highway Service 76 Station
Astoria, Oregon

			(mg/kg)		
Sample ID	**Depth (ft)**	**Date**	**Cadmium**	**Chromium**	**Lead**
GP-2	2-4	10/10/03	0.352	**44.1**	6.51
GP-2	17-19	10/10/03	0.030	7.23	2.26
GP-3	2-4	10/10/03	0.291	**40.6**	9.44
GP-3	17-19	10/10/03	0.39	9.81	2.49
GP-4	2-4	10/10/03	0.417	30.8	7.78
GP-4	15-17	10/10/03	0.031	7.58	2.07
Appendix A Risk Based Concentrations (RBCs)[1]					
Soil Ingestion, Dermal Contact and Inhalation		Occupational	NS	NS	750
		Construction Worker	450*	450*	750
		Excavation Worker	NS	NS	750
Volatilization to Outdoor Air		Occupational	NS	NS	NA
Vapor Intrusion to Buildings		Occupational	NS	NS	NA
Leaching to Groundwater		Occupational	8*	38*	30

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) RBCs provided in mg/kg
(3) NS = No Appendix A RBC provided by DEQ.
(4) NA = Pathway not applicable to the chemical of interest according to Appendix A.
(5) 450* From United States Environmental Protection Agency Region 9 Preliminary Remediation Goals, October 1, 2003. Leaching to Groundwater Pathway represents a DAF of 20.
(6) **44.1** Meets or exceeds one of more Appendix A RBC

Table 4
Soil Sampling Results - PCBs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Depth (ft)	Date	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
GP-2	2-4	10/10/03	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10
GP-2	17-19	10/10/03	<0.098	<0.20	<0.098	<0.098	<0.098	<0.098	<0.098
GP-3	2-4	10/10/03	<0.099	<0.20	<0.099	<0.099	<0.099	<0.099	<0.099
GP-3	17-19	10/10/03	<0.099	<0.20	<0.099	<0.099	<0.099	<0.099	<0.099
GP-4	2-4	10/10/03	<0.099	<0.20	<0.099	<0.099	<0.099	<0.099	<0.099
GP-4	15-17	10/10/03	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10

Notes:

(1) Results reported in mg/kg
(2) The Generic Protective PCB concentration in Soil for the Industrial Land-Use Scenario is 7.5 mg/kg (DEQ Generic Remedies for Soils Contaminated with PCBs, December, 1997).

Table 5
Soil Sampling Results - PAHs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Depth (ft)	Date	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo (a) anthracene	Chrysene	Benzo (b) fluoranthene	Benzo (k) fluoranthene	Benzo (a) pyrene	Dibenzo (a,h) anthracene	Benzo (ghi) perylene	Indeno (1,2,3-cd) pyrene	2-Methylnaphatene	Dibenzofuran
GP-2	2-4	10/10/03	0.36	<5.0	<5.0	<5.0	0.54	<5.0	<5.0	<5.0	<5.0	0.29	<5.0	<5.0	<5.0	<5.0	0.15	<5.0	0.35	<5.0
GP-2	17-19	10/10/03	0.47	<5.0	<5.0	<5.0	0.22	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0.26	<5.0
GP-3	2-4	10/10/03	0.68	<5.1	<5.1	<5.1	0.40	<5.1	0.30	0.31	<5.1	0.26	<5.1	<5.1	<5.1	<5.1	0.22	<5.1	0.84	<5.1
GP-3	17-19	10/10/03	0.67	<5.0	<5.0	0.29	6.9	0.31	1.7	4.2	1.7	8.9	3.0	<5.0	1.6	2.1	4.6	0.67	1.7	0.28
GP-4	2-4	10/10/03	0.30	<5.0	<5.0	<5.0	0.56	<5.0	0.37	0.42	<5.0	0.26	<5.0	<5.0	<5.0	<5.0	0.22	0.23	<5.0	<5.0
GP-4	15-17	10/10/03	0.38	<4.9	<4.9	<4.9	0.21	<4.9	<4.9	0.15	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	0.18	<4.9	0.33	<4.9
GP-5	2-4	10/10/03	0.45	0.38	<5.0	<5.0	3.5	0.47	6.2	10	2.3	4.1	2.6	2.0	3.1	0.49	4.9	3.1	0.33	<5.0
GP-5	16-18	10/10/03	19	<5.1	1.3	1.3	6.7	0.30	3.3	11	1.1	2.4	<5.1	<5.1	<5.1	<5.1	2.2	0.91	2.8	0.91
Appendix A Risk Based Concentrations																				
Soil Ingestion, Dermal Contact Inhalation	Occupational		770,000	NS	41,000,000	35,000,000	NS	—	29,000,000	21,000,000	2,700	270,000	2,700	27,000	270	270	NS	2,700	NS	NS
	Construction Worker		710,000	NS	16,000,000	12,000,000	NS	90,000,000	8,900,000	6,700,000	21,000	2,100,000	21,000	210,000	2,100	2,100	NS	21,000	NS	NS
	Excavation Worker		20,000,000	NS	—	—	NS	—	—	—	590,000	59,000,000	590,000	5,900,000	59,000	59,000	NS	590,000	NS	NS
Volitilization to Outdoor Air	Occupational		—	NS	—	—	NS	—	—	—	—	—	—	—	—	—	NS	—	NS	NS
Vapor Intrusion to Buildings	Occupational		—	NS	—	—	NS	—	—	—	—	—	—	—	—	—	NS	—	NS	NS
Leaching to Groundwater	Occupational		15,000	NS	—	—	NS	—	—	—	—	—	—	—	—	—	NS	—	NS	NS

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) NS = No Appendix A RBC provided by DEQ
(3) — The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)
(4) Results and RBCs provided in µg/kg

Table 6
Soil Sampling Results-VOCs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Depth (ft)	Date	Benzene	Toulene	Ethylbenzene	Xylenes	Isopropylbenzene	N-propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Methyl-Tert-Buytl-Ether (MTBE)	1,2-dibromoethane (EDB)	1,2-dichloroethane (EDC)	Naphthalene	Methylene Chloride
GP-2	2-4	10/10/03	<6.3	<6.3	<6.3	<12.6	<26	<26	<26	<26	<6.3	<26	<6.3	<26	3.5
GP-2	17-19	10/10/03	<5.5	<5.5	<5.5	<11.0	<22	<22	<22	<22	<5.5	<22	<5.5	<22	2.5
GP-3	2-4	10/10/03	<6.2	<6.2	<6.2	<12.4	<25	<25	<25	<25	1.0	<25	<6.2	<25	4.1
GP-3	17-19	10/10/03	<5.6	<5.6	<5.6	<11.2	<23	<23	<23	<23	<5.6	<23	<5.6	<23	2.4
GP-4	2-4	10/10/03	<6.2	<6.2	<6.2	<12.4	<25	<25	<25	<25	<6.2	<25	<6.2	<25	3.0
GP-4	15-17	10/10/03	<5.2	<5.2	<5.2	<10.4	<21	<21	<21	<21	<5.2	<21	<5.2	<21	1.4
GP-5	2-4	10/10/03	<6.1	<6.1	<6.1	<12.2	<25	<25	<25	<25	<6.1	<25	<6.1	<25	1.6
GP-5	16-18	10/10/03	<6.8	<6.8	7.3	43.4	3.6	9.0	61	7.0	<6.8	<27	<6.8	1.6	22
Appendix A Risk Based Concentrations															
Soil Ingestion, Dermal Contact and Inhalation		Occupational	34,000	68,000,000	74,000,000	24,000,000	51,000,000	19,000,000	1,500,000	1,500,000	760,000	33	15,000	770,000	21,000*
		Construction Worker	340,000	39,000,000	28,000,000	19,000,000	24,000,000	9,300,000	1,400,000	1,400,000	9,000,000	250	180,000	710,000	
		Excavation Worker	9,400,000	—	—	—	—	—	40,000,000	40,000,000	—	7,100	5,000,000	20,000,000	
Volatilization to outdoor air		Occupational	48,000	—	—	—	—	—	790,000	—	720,000	1,700	14,000	—	
Vapor Intrusion to Buildings		Occupational	1,200	—	—	—	—	—	840,000	140,000	35,000	370	560	—	
Leaching to Groundwater		Occupational	52	180,000	—	100,000	—	—	55,000	12,000	300	0.59	7.4	15,000	

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) NS = No Appendix A RBC provided by DEQ
(3) ND = Not Detected
(4) NA = Not analyzed for
(5) 130 Meets or exceeds one or more Appendix A RBC
(6) — The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)
(7) Results and RBCs provided in µg/kg
(8) 21,000* From United States Environmental Protection Agency Region 9 Preliminary Remediation Goals, October 1, 2003.

Table 7
Groundwater Sampling Results - Hydrocarbon Identification an TPH
Highway Service 76 Station
Astoria, Oregon

		HCID			TPH µg/L		
Sample ID	**Date**	**Gasoline**	**Diesel**	**Oil**	**Gx**	**Dx**	**Oil**
GP-1	10/10/03	D	ND	ND	86	NA	NA
GP-2	10/10/03	D	D	ND	39	3,200	110
Appendix A Risk Based Concentrations							
Volatilization to outdoor air	Occupational	NS	NS	NS	---	---	NS
Vapor Intrusion to Buildings	Occupational	NS	NS	NS	---	---	NS
Groundwater in Excavation	Construction and Excavation Worker	NS	NS	NS	12,000	---	NS

Notes:

(1) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A: Table of Risk-Based Concentrations (RBCs), September 22, 2003.

(2) RBCs provided in ug/L

(3) NS = No Appendix A RBC provided by DEQ

(4) ND = Not Detected

(5) NA = not analyzed for

(6) **61,000** Meets or exceeds one or more Appendix A RBC

(7) — The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)

Table 8: Groundwater Sampling Results -Metals
Highway Service 76 Station
Astoria, Oregon

		(µg/L)		
Sample ID	**Date**	**Cadmium**	**Chromium**	**Lead**
GP-1	10/10/03	0.18	4.15	58.6
GP-2	10/10/03	0.07	1.13	5.4
Appendix A Risk Based Concentrations (RBCs)				
Volatilization to outdoor air	Occupational	NS	NS	N/A
Vapor Intrusion to Buildings	Occupational	NS	NS	N/A
Groundwater in Excavation	Construction and Excavation Worker	NS	NS	N/A
*From United States Environmental Protection Agency, Region 9 Preliminary Remediation Goals, October 1, 2003				

Notes

(1) (1) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A: Table of Risk-Based Concentrations (RBCs), September 22, 2003.
(2) RBCs provided in ug/L
(3) NS = No Appendix A RBC provided by DEQ
(4) ND = Not Detected
(5) **60** Meets or exceeds one of more Appendix A RBC
(6) N/A = Pathway not applicable to the chemical of interest according to Appendix A

Table 9
Groundwater Sampling Results - PCBs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Date	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
GP-2	10/10/03	<0.20	<0.39	<0.20	<0.20	<0.20	<0.20	<0.20

Notes:

(1) Results reported in µg/L

Table 10
Groundwater Sampling Results - PAHs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Date	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo (a) anthracene	Chrysene	Benzo (b) fluoranthene	Benzo (k) fluoranthene	Benzo (a) pyrene	Dibenzo (a,h) anthracene	Benzo (ghi) perylene	Indeno (1,2,3-cd) pyrene	2-Methylnapthalene	Dibenzofuran
GP-2	10/10/03	0.039	0.0051	0.021	0.010	0.015	0.0023	0.010	0.022	0.0031	0.0059	0.0030	0.0028	<0.020	<0.020	0.0056	<0.020	0.031	<0.020
Appendix A Risk Based Concentrations																			
Volatilization to outdoor air	Occupational	---	NS	---	---	NS	---	---	---	---	---	---	---	---	---	NS	---	NS	NS
Vapor Intrusion Into Buildings	Occupational	---	NS	---	---	NS	---	---	---	---	---	---	---	---	---	NS	---	NS	NS
Groundwater in Excavation	Construction and Excavation	680	NS	---	---	NS	---	---	---	9.1	---	---	---	0.53	0.21	NS	2.9	NS	NS

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) NS = No Appendix A RBC provided by DEQ
(3) --- The Groundwater RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)
(4) Results and RBCs provided in µg/L

Table 11
Groundwater Sampling Results-VOCs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Date	Benzene	Toulene	Ethylbenzene	Xylenes	Isopropylbenzene	N-propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Methyl-Tert-Buytl-Ether (MTBE)	1,2-dibromoethane (EDB)	1,2-dichloroethane (EDC)
GP-1	10/10/03	0.18	0.26	<0.50	0.45	<2.0	<2.0	<2.0	<2.0	<0.50	<2.0	<0.50
GP-2	10/10/03	<0.50	0.12	<0.50	<1.0	<2.0	<2.0	<2.0	<2.0	<0.50	<2.0	<0.50
Appendix A Risk-Based Concentrations												
Volatilization to outdoor air	Occupational	13,000	---	---	---	---	---	---	---	550,000	2,500	9,000
Vapor Intrusion Into Buildings	Occupational	2,700	---	---	---	---	---	51,000	38,000	280,000	1,800	3,600
Groundwater in Excavation	Construction and Excavation Worker	1,700	78,000	110,000	22,000	51,000	18,000	1,300	1,400	31,000	20	600

Notes:

(1) Sampling results provided in ug/L
(2) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A: Table of Risk-Based Concentrations (RBCs), September 22, 2003
(3) RBCs provided in ug/L
(4) **30,000** Meets or exceeds one or more Appendix A RBC
(5) --- The Groundwater RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)

APPENDIX A

UST FACILITY WORKSHEET

UST FACILITY WORKSHEET

34-99-1193

FACILITY ID# 6897 DATE 1/4/00

ACCESS ENTRY ☐ LETTER TO MAIL ☐ PERMIT TO MAIL ☐ REPORTS RECEIVED ☐

- ☐ Request Fees
- ☐ Request D/report
- ☐ Request D/checklist
- ☐ Request I/checklist
- ☐ Request Other
- ☐ 30 Day Notice

- ☐ Copy region office
- ☐ Enclosures
  - ☐ Action requested (list below)
- ☐ Copy HQ facility file

- ☐ 30 Day
- ☐ D/report
  - ☐ D/checklist
- ☐ I/checklist
- ☐ Notice to upgrade
- ☐ Oracle updated
- ☐ Reports sent to region
- ☐ Access updated

UST's of Concern ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐other_____

Response duedate:_____

Initial get

No Further Action At This Time ☐

Action: Review UST Closure records

UST PERMIT INFORMATION

Date received_____ Region_____ County_____

Fees due: _____

Permit Type: ☐ New ☐ Mod ☐ Existing ☐ Replacement

Comments: Close out UST(s) on Sequent & Access
Copy 1st+2pages of reports to UST-HQ group

file in LUST cleanup file at NWR.
complete or verify cross reference sheet in NWR
facility file. Log into OTIS AS Received.
Forward report to Project manager if Assigned.

UST FACILITY NO. 6897 DATE 11/23/99 INITIAL VCB

LUST NO. 34-99-1193 LUST FILE CHECKED ☐ FAC FILE CHECKED ☐

FEES DUE ☐ AMOUNT _____ MAIL FEE REQUEST ☐ FEES OK ☑

FEE RECORDS CONTACT HQ ☐ DONE ☐

UPDATE AS PAID ☐

UPDATE TO CANCEL ☐

COMMENT _____ DONE ☑

INSTALL CHECKLIST ☐ OK FORWARD TO UST COMP STAFF ☐

INCOMPLETE ☐ PHONE REQUEST ☐

SIGNATURES ☐ REJECTION LTR ☐

COMMENT _____ CHECKLIST RETURNED ☐

---

30 DAY NOTICE RETRO ☐ DECOM ☑ OK FORWARD TO UST DO ☐

SIGNATURES ☐ PHONE REQUEST ☐

CONTRACTOR ☐ REJECTION LTR ☐

OWNER CHANGE ☐ NOTICE RETURNED ☐

WRONG FORM ☐

MISSING DATA ☐

TANK NOT PERMITTED ☐ MAIL PERMIT APP FOR EXT TANKS ☐

REQUEST SAMPLING PLAN ☐ MAIL MOD APP ☐

COMMENT _____ DONE ☑

DECOM CHECKLIST ☑ SERVICE CHANGE RPT ☑ RPTS OK FORWARD TO UST DO ☐

SIGNATURES ☐ PHONE REQUEST ☐

WRONG FORM ☐ REJECTION LTR ☐

MISSING DATA ☐ RPTS RETURNED ☐

COMMENT _____ DONE ☑

RECEIPTS

WASTE/SLUDGE REQUESTED ☐ PHONE REQUEST ☐

TANK REQUESTED ☐ REJECTION LTR ☐

SOIL REQUESTED ☐ DONE ☐

---

72 HR NOTICE

NOT NOTIFIED ☐ OK ☑

POTENTIAL VIOLATION ☐

TRACK FOR POSSIBLE NOTICE OF NONCOMPLIANCE LIST ON ACCESS ☐ OK ☐

PROBLEMS ☐ OK ☐

Oregon Department of Environmental Quality

UNDERGROUND STORAGE TANK DECOMMISSIONING/CHANGE-IN-SERVICE REPORT

DEQ DECOMMISSIONING CERTIFICATE NUMBER: 1931 FAC 6897

FACILITY NAME: HIWAY SERVICE

FACILITY ADDRESS: 3108 MARINE DR ASTORIA OR 97103

PERMITTEE PHONE: 503 325 1972 DATE: 10/21

The following information MUST be submitted by the underground storage tank permittee or licensed DEQ Supervisor within 30 days following completion of the tank decommissioning or change-in-service. (OAR 340-150-0166 (5)(a)).

The attached supplemental checklist should be prepared by the person performing the decommissioning or change-in-service. The checklist should be provided to DEQ and the permittee to demonstrate that all required practices were followed.

Ordinarily the checklist is filled out by the DEQ licensed Service Provider or Supervisor. Permittees, tank owners or property owners who wish to personally decommission a tank or complete a change-in-service must follow all the conditions and requirements of OAR 340-150-0166 and other applicable standards. The permittee should contact the DEQ Regional Office prior to starting the work to receive current copies of the General Permit to Decommission USTs and underground storage tank regulations.

A. DATES:

Decommissioning/Change-in-Service Notice - Date Submitted: 9/99 (30 days before work starts).

Work Start Telephone Notice - Date Submitted: 10/99 (3 working days before work starts).

DEQ Person Notified: TINA

Date Work Started: 10/18 Date Work Completed: 10/18

Note: Provide the following information if any soil or water contamination is found during the decommissioning or change-in-service. Contamination must be reported by the UST permittee within 24 hours. The licensed service provider must report contamination within 72 hours after discovery unless previously reported.

Date Contamination Reported: 10/21 By: DAVE Kruzynski

DEQ Person Notified: TINA

Backfill Telephone Notice - Date Called: N/A (before backfilling).

DEQ Person Notified: N/A

B. PERMITS: Note: DEQ permits may be needed where soil or water cleanup is required.

DEQ Water Discharge Permit #: _____ Date: _____

Water Disposed to (Location): _____

DEQ Solid Waste Disposal Permit #: _____ Date: _____

Soil Disposal or Treatment Location: _____

DEPT OF ENVIRONMENTAL QUALITY
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NOV 17 1999
NORTHWEST REGION

C. TANK INFORMATION:

TANK ID #	DEQ-UST PERMIT #	TANK SIZE IN GALLONS	PRODUCT: GASOLINE, DIESEL, USED OIL, OTHER? PRESENT	PRODUCT: GASOLINE, DIESEL, USED OIL, OTHER? NEW	CLOSURE OR CHANGE-IN-SERVICE? TANK REMOVAL	CLOSURE OR CHANGE-IN-SERVICE? CLOSURE IN PLACE ♦	CLOSURE OR CHANGE-IN-SERVICE? CHANGE IN SERVICE ♦	TANK TO BE REPLACED? YES*	TANK TO BE REPLACED? NO
4	AJHAB	550	USED OIL		✓				✓

* Where decommissioned tank(s) are replaced by new underground storage tanks the UST permittee must submit a *General Permit Registration Form to Install and Operate USTs* containing information on the new tanks 30 days before installing them.

♦ Submit a soil sampling plan to the DEQ regional office and receive plan approval prior to starting work if 1) tank is to be decommissioned in-place, 2) tank contents are changed to a non-regulated substance. 3) tank contains a regulated substance other than petroleum, or 4) tank changed to non-regulated use.

D. DISPOSAL INFORMATION:

TANK ID #	TANK AND PIPING DISPOSAL METHOD: SCRAP	LAND-FILL	OTHER	IDENTIFY LOCATION & PROPERTY OWNER	DISPOSAL LOCATION OF TANK CONTENTS: LIQUIDS *	SLUDGES *
4	✓			Part Time, Auto Wrecking 2803 Sandridge	X	X
				Ilwaco WA 98624		oil Re-Refining Port on

* Note: The tank contents, the tank and the piping may be subject to the requirements of Hazardous Waste regulations. If you have questions, contact the DEQ regional office for your area.

E. CONTAMINATION INFORMATION: * Note: Sampling is required if groundwater is encountered. See cleanup rules.

TANK ID #	GROUND * WATER IN PIT ?	PRODUCT ODOR IN SOIL ?	PRODUCT STAINS IN SOIL ?	NUMBER OF SAMPLES	LABORATORY (NAME, CITY, STATE, PHONE)
4		✓	✓	2	Columbia Anal Port Or 503 986 5464

F. SITE SKETCH: (Show location of adjacent roads, property lines, structures, dispensers, & all USTs. Show North, general direction of ground slope and soil sample locations. Sketch does not need to be drawn to scale. You may attach a separate drawing.)

SEE MAP

3 Kings Environmental, Inc.

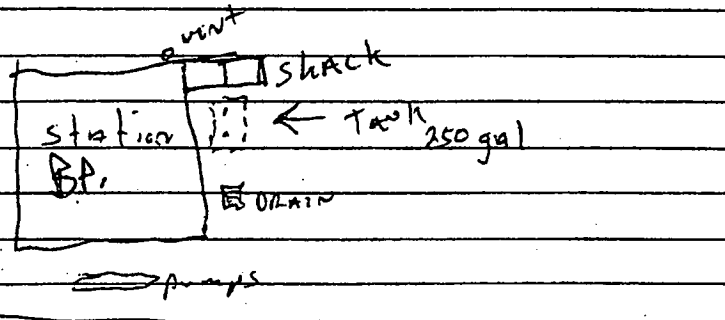
DAILY FIELD ACTIVITY LOG

Specializing in Commercial/Residential Underground Storage Tanks

PROJECT NAME: _____

LOCATION: 2105 MARINE DR ASTORIA

PROJECT NUMBER: _____ DATE: 10/18 PAGE 1 OF _____

TIME	DESCRIPTION OF ACTIVITIES
	
	Hwy 30
	BP. North Bot - 01
	BP. South Bot - 02

VISITORS ON SITE:	ADDITIONAL COMMENTS:
WEATHER CONDITIONS:	SIGNED

"There's no gamble with 3 Kings!"

21605-B NE 10th Avenue • Ridgefield, WA 98642-9580 • Salem (503) 580-2312 • Portland (503) 286-7780 • Vancouver (360) 887-546

G. WORK PERFORMED BY:

DEQ Service Provider's License #: 14312 Construction Contractors License #: 126423

Name: 3 Kings Enviro

Telephone: 360 887 5464

DEQ Decommissioning Supervisor's License #: 1931

Name: Dave Franklin

Telephone: 360 887 5464

DEQ Soil Matrix Service Provider's License #: 14311 (If applicable)

Name: 3 Kings Environmental

Telephone: 360-887-5464

DEQ Soil Matrix Supervisor's License #: 14132 (If applicable)

Name: Dave Franklin

Telephone: 360-887-5464

H. ATTACHMENTS TO THIS REPORT:

1. Attach a copy of the laboratory report showing the results of all tests on all soil and water samples. The laboratory report must identify sample collection methods, sample location, sample depth, sample type (soil or water), type of sample container, sample temperature during transportation, types of tests, and copies of analytical laboratory reports, including QA/QC information. Include laboratory name, address and copies of chain-of-custody forms.

2. If contamination is detected and a Level 2 or Level 3 soil matrix cleanup standard is selected attach a copy of the soil matrix analysis for the site including methods of determining soil type, depth to groundwater, and sensitivity of uppermost aquifer.

I. REPORT FILING:

This report, signed by the permittee, complete with all applicable attachments must be filed with the DEQ regional office within 30 days after the excavation is backfilled or change-in-service is complete. Contact the DEQ regional office prior to filing this report where special circumstances exist at the site (such as water in pit, remaining pockets of contamination, etc.).

EASTERN REGION / BEND
Phone: Bend (541) 388-6146

WESTERN REGION / SALEM
Phone: Salem (503) 378-8240

EASTERN REGION / THE DALLES
Phone: The Dalles (541) 298-7255

WESTERN REGION / EUGENE
Phone: Eugene (541) 686-7838

NORTHWEST REGION
Phone: Portland (503) 229-5263

EASTERN REGION / PENDLETON
Phone: Pendleton (541) 276-4063

WESTERN REGION / MEDFORD
Phone: Medford (541) 776-6136, Ext. 233

I have personally reviewed this report and the attachments and find them to be true and complete.

Permittee: CARY BECHDOLT (Please Print)

Permittee: Cary Bechdolt (Signature) Date: 11/10/99

For Information: (503) 229-6652 or Toll Free in Oregon UST HELPLINE 1-800-742-7878

CLIENT: THREE KINGS ENVIRONMENTAL
21605 B NE 10TH AVE
RIDGEFIELD WA 98642

PHONE: (360) 887-5464
FAX: (360) 887-1492

DATE SUBMITTED: 10/21/99

PROJECT NAME: MARINE OIL NIEMI OIL 99245

CI SAMPLE #	CLIENTS ID#	DATE	TIME	DESCRIPTION
992100-001	BP-01	10/18/99	1100	BP NORTH BOT 01-6' BGS
992100-002	BP-02	10/18/99	1115	BP SOUTH BOT 02-6' BGS

REPORT DATE: 10/26/99 REPORT NUMBER: 992100 PAGE: 1 OF 2

SAMPLE	TEST	PARAMETER	RESULT	UNIT	DETECTION LIMIT	ANALYST
BP NORTH BOT 01-6' BGS SAMPLE ID: BP-01						
992100-001	NWTPH-Dx	DIESEL	ND	mg/Kg	2500	Abigail K.
	NWTPH-Dx	HEAVY OILS	78000	mg/Kg	10000	
		SURROGATE RECOVERY	105	%RECOVERY	50%-150%	
BP NORTH BOT 01-6' BGS SAMPLE ID: BP-01						
992100-001	NWTPH-HCID SOIL	GASOLINE	ND	mg/Kg	20	Abigail K.
	NWTPH-HCID	DIESEL	DETECTED	mg/Kg	50	
		OIL/GREASE	DETECTED	mg/Kg	100	
		SURROGATE	109	%RECOVERY	50-150%	
BP SOUTH BOT 02-6' BGS SAMPLE ID: BP-02						
992100-002	NWTPH-Dx	DIESEL	ND	mg/Kg	2500	Abigail K.
	NWTPH-Dx	HEAVY OILS	19000	mg/Kg	10000	
		SURROGATE RECOVERY	96	%RECOVERY	50%-150%	
BP SOUTH BOT 02-6' BGS SAMPLE ID: BP-02						
992100-002	NWTPH-HCID SOIL	GASOLINE	ND	mg/Kg	20	Abigail K.
	NWTPH-HCID	DIESEL	DETECTED	mg/Kg	50	
		OIL/GREASE	DETECTED	mg/Kg	100	

REPORT DATE: 10/26/99 REPORT NUMBER: 992100 PAGE: 2 OF 2

SAMPLE	TEST	PARAMETER	RESULT	UNIT	DETECTION LIMIT	ANALYST
BP SOUTH BOT 02-6' BGS SAMPLE ID: BP-02						
992100-002	NWTPH-HCID SOIL NWTPH-HCID	SURROGATE	124	%RECOVERY	50-150%	Abigail K.

COLUMBIA INSPECTION, INC.

CHAIN OF CUSTODY RECORD

Laboratory • Inspection • Tank Calibration

Environmental • Petroleum • OR Certified Water Analysis

☑ 7133 N. Lombard, Portland, OR 97203 Ph: (503) 286-9464 Fax: (503) 285-7831

☐ 4901 E. 20th Street, Fife, WA 98424 Ph: (253) 922-8781 Fax: (253) 922-8957

☐ 613 Escobar Street, Martinez, CA 94553 Ph: (510) 229-0360 Fax: (510) 229-2821

☐ 790 Basin Street, Unit #2, San Pedro, CA 90731 Ph: (310) 833-1557 Fax: (310) 833-1585

Customer Name: 3 Kings

Attention: Dave Franklin

Address:

Phone: ( )

FAX: (360) 887 1492

Sampler: Dave Franklin ☑ Submitted

Project Name: MARINE DR Nimitz Oil

Project Number: 99245

P.O. Number: 444

Testing Priority: ☑ Standard ☐ Rush

Due Date

Notification Method(s): ☐ Telephone ☐ FAX ☐ Mail

Sample id#	Sample Description	Sample Matrix	Sample Date	Sample Time	Analyses To Be Performed: NW TPH HCID
	B.P. North-Bot-01-6'BGS	Soil	10/18	1100	X
	B.P. South-Bot-02-6'BGS	Soil	10/18	1115	X

Relinquished By: Signature: Printed Name: Dave Franklin

Received By: Signature: Printed Name:

Date/Time: 10/21/95 1120

Relinquished By: Signature: Printed Name:

Received By: Signature: Printed Name:

Date/Time:

FOR LABORATORY USE ONLY

Inspection Job Number: ☐ Visa

Laboratory Project Number: ☐ Cash/Check #

Overtime authorized ☐ Yes ☐ No Amount Paid: $

White Copy - Laboratory Yellow Copy - Client Copy

CI Form 100 (COC) Rev B

PART TIME AUTO WRECKING
2803 SANDRIDGE ROAD
ILWACO, WA 98624
642-4852 • YARD #2652
[illegible]-438-3[illegible]

CUSTOMER'S ORDER NO. DATE Oct 19 99

NAME 3 Kings PHONE NO. ( )

ADDRESS Pittsfield Wa

SOLD BY	CASH	CHECK	CHARGE	C.O.D.	ON ACCT.	PAID OUT	MDSE RTD

QUAN.	DESCRIPTION	PRICE	AMOUNT
	Removed 2 ea 500 gal		
	and 2 ea 280 gallon		
	Cut & cleaned		
	fuel tanks		
	Jeff Anderson	TAX	
		TOTAL	

Received by

All claims and returned goods must be accompanied by this bill.

Thank You

PRINTED IN U.S.A.

1993
Toxicological
Response

Harbor Oil, Inc.

No. 02744

11535 N. Force Avenue • Portland, OR 97217
Phone: (503) 285-4648 • Fax: (503) 285-9521

MATERIALS RECEIPT

Generator 3 Kings

Date 10/21/99

Address

Transporter 3 Kings Environmental

Purchase Order No.

Truck No.

Trailer No.

Product	Gals Loaded	OFFICE USE ONLY
Grease water		Unit Price

API	Weight	HAL	Gross Gals	Product	Sub Total
TEMP	GROSS	DIST	Net Gals	Freight	Sub Total
CORR FACTOR	TARE	SW			
WT GAL	NET	SS		Tax	Sub Total
				Hours	Sub Total
				TOTAL	

REMARKS:

x Hauling Fee

DRIVER

RECEIVED BY

White: Customer Canary: Office Pink: Billing Goldenrod: Yard

Oregon Department of Environmental Quality

UNDERGROUND STORAGE TANK DECOMMISSIONING/CHANGE-IN-SERVICE CHECKLIST

DEQ DECOMMISSIONING CERTIFICATE NUMBER: 1931 FAC 6897

FACILITY NAME: HIWAY SERVICE

FACILITY ADDRESS: 3108 MARINE DR ASTORIA OR 97103

PERMITTEE PHONE: 503 325-1972 DATE: 10/21

A. SAFETY EQUIPMENT ON JOB SITE:

Fire Extinguisher: Type/Size: ABC Recharge Date: 10/99

Combustible Gas Detector: Model: GT 202 Calibration Date: 10/99

Oxygen Analyzer: Model: GT 202 Calibration Date: 10/99

B. DECOMMISSIONING:

All Tanks: N/A = Not Applicable (Check (√) Appropriate Box)	YES	NO	UNKNOWN	N/A
1. All electrical equipment grounded and explosion proof?				✓
2. Safety equipment on job site?	✓			
3. Overhead electrical lines located?	✓			
4. Subsurface electrical lines off or disconnected?	✓			
5. Natural gas lines off or disconnected?				✓
6. No open fires or smoking material in area?	✓			
7. Vehicle and pedestrian traffic controlled?	✓			
8. Excavation material area cleared?	✓			
9. Rainwater runoff directed to treatment area?				✓
10. Drained and collected product from lines?	✓			
11. Removed product and residual from tank?	✓			
12. Cleaned tank?	✓			
13. Excavated to top of tank?	✓			
14. Removed tank fixtures? (pumps, leak detection equipment)	✓			
15. Removed product, fill and vent lines?	✓			

DEPT OF ENVIRONMENTAL QUALITY
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NOV 17 1999
NORTHWEST REGION

C. TANK ABANDONMENT IN-PLACE

All Tanks: N/A = Not Applicable (Check (√) Appropriate Box)	YES	NO	UNKNOWN	N/A
16. Sampling plan approved by DEQ? Date: DEQ Staff:				
17. Contamination concerns fully resolved?		N/A		
18. Fill Material? Type: _____				

D. TANK REMOVAL:

19. Tank placement area cleared, chocks placed?	✓			
20. Purged or ventilated tank to prevent explosion? Method used: CO2 Meter reading: 2%	✓			
21. Were chains or steel cables wrapped around tank for removal?		✓		
22. Tank removed, set on ground, blocked to prevent movement?	✓			
23. Tank set on truck and secured with straps(s)?	✓			
24. Tank labeled before leaving site?	✓			

E. SITE ASSESSMENT:

25. Site assessed for contamination? See OAR 340-122-0340	✓			
26. Soil samples taken and analyzed?	✓			
27. Decommissioning/Change-in-Service report sent to DEQ?	✓			
28. Was contamination found? Date/Time: 10/18 1600	✓			
29. Was contamination reported to DEQ? By: DAVE Franklin Date Time: 10/21 DEQ Staff: TINA	✓			
30. Was hazardous waste determination made for tank contents (Liquids sludges)?		✓		

31. Disposal location of tank(s) contents.

Name: OIL RE REFINING

Address: 11535 N FORCE AVE

PORT OR

Date: 10/21

Attach disposal receipt.

32. Disposal or recycling location of removed tank(s) and associated piping.

Name: PORT TIME AUTO WRECKING

Address: 2503 SANDRIDGE RD

ILWACO WA

Date: 10/20

Attach disposal receipt.

33. If tank(s) are intended to be reused, identify new tank site.

Name: _____

Address: N/A

Date: _____

Purpose of Reuse: _____

"There's no gamble with 3 Kings!"
21605B N.E. 10th Avenue Ridgefield, WA 98642
Vancouver (360) 887-KING (5464) Portland (503) 286-7780 Salem (503) 580-2312 FAX (360) 887-1492

F. WORK PERFORMED BY:

DEQ Service Provider's License #: 14312

Name: 3 Kings Environ (Please Print)

Telephone: 360 887 5464

DEQ Decommissioning Supervisor's License #: 1931

Name: Dave Franklin (Please Print)

Telephone: 360 887 5464

G. CHECKLIST FILING:

1. Provide copy of checklist to the UST permittee.

2. Send completed checklist to the DEQ regional office for your area (see below) within 30 days after the excavation is backfilled.

RETURN COMPLETED AND SIGNED FORM TO THE DEQ REGIONAL OFFICE FOR YOUR AREA.

EASTERN REGION / BEND
2146 NE 4th, #104
Bend, OR 97701
Phone: (541) 388-6146
Fax: (541) 388-8283

EASTERN REGION / THE DALLES
400 E. Scenic Drive, #307
The Dalles, OR 97058
Phone: (541) 298-7255
Fax: (541) 298-7330

EASTERN REGION / PENDLETON
700 SE Emigrant, Suite 330
Pendleton, OR 97801
Phone: (541) 276-4063
Fax: (541) 278-0168

WESTERN REGION / SALEM
750 Front Street NE, Suite 120
Salem, OR 97301-1039
Phone: (503) 378-8240
Fax: (503) 373-7944

WESTERN REGION / EUGENE
1102 Lincoln Street, Suite 210
Eugene, OR 97401
Phone: (541) 686-7838
Fax: (541) 686-7551

WESTERN REGION / MEDFORD
201 Main Street, Suite 2-D
Medford, OR 97501
Phone: (541) 776-6136, Ext. 233
Fax: (541) 776-6262

NORTHWEST REGION
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-5884
Phone: (503) 229-5263
Fax: (503) 229-6945

I have personally reviewed this decommissioning/change-in-service checklist and find it to be true and complete.

Licensed Supervisor: Dave Franklin (Please Print)

Licensed Supervisor: [signature] (Signature) Date: 11/1

Permittee: CARY BECHTOLT (Please Print)

Permittee: Cary Bechtolt (Signature) Date: 11/10/99

For information: (503) 229-6652 or Toll Free in Oregon UST HELPLINE 1-800-742-7878

... registration forms, administrative rules and other publications

APPENDIX B

GEOPOTENTIAL ENVIRONMENTAL & EXPLORATION GEOPHYSICS GEOPHYSICAL SURVEY REPORT

GeoPotential

ENVIRONMENTAL & EXPLORATION GEOPHYSICS

437 N.E. LIBERTY AVE. GRESHAM, OR 97030 • PH (503) 665-7520 • FAX (503) 492-4404
E-MAIL GeoPotential@aol.com

SUMMARY REPORT

SUBSURFACE MAPPING SURVEY FOR UNDERGROUND STORAGE TANKS

HIGHWAY SERVICE (76 STATION)
3108MARINE DRIVE (HWY 30)
ASTORIA, OREGON

CLIENT:

RSV Engineering, Inc.
31960 SW Charbonneau Drive, Suite 101
Wilsonville, Oregon 97070

October 1, 2003

GeoPotential Project Number 4691

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PROCEDURE ..... PAGE 4
RESULTS ..... PAGE 4
LIMITATIONS ..... PAGE 5

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SUMMARY

A geophysical survey was conducted at the Highway Service 76 Gas Station, located at 3108 Marine Drive in Astoria, Oregon (Figure 1) for the purpose of detecting possible underground storage tanks (USTs) at the site. A Magnetometer survey and a follow-up Ground Penetrating RADAR (GPR) survey were conducted to achieve the objectives of this project.

No USTs were detected with this survey, except for the active USTs, which were outlined.

INTRODUCTION

Subsurface mapping surveys are geophysical surveys utilizing geophysical data and methods to detect and locate natural and manmade subsurface features. The Geometrics G-858 Cesium magnetometer, used to obtain the magnetic data, is a geophysical tool specifically designed to detect buried ferriferous (iron-bearing) objects, including utilities, drums and USTs. Follow-up surveys using GPR are often used to help determine the source of the disturbances and the depth of burial of the objects causing them.

SURVEY OBJECTIVES

The first survey objective at this site was to locate and map the positions of possible USTs in the parking and dispensing areas of the Highway Service 76 Gas Station, located at 3108 Marine Drive in Astoria, Oregon. The second objective was to outline the active USTs.

SURVEY SITE

The survey site consisted of the asphalt-covered parking lot and dispensing bay of the gas station. The survey area was approximately 0.2 acres and not entirely accessible, because of several parked vehicles that could not be moved. The anomaly produced by a large metallic surface object like a vehicle can mask the anomaly produced by a small, buried metallic object. At this site, it is possible that a small buried object located within about 10 feet of the parked cars might be missed due to the significant anomaly produced by them. Surface features included a sign, the pump island and canopy, a propane tank, tires and car parts. Three fill ports and vents indicated the existence of USTs.

TIMING

Jeff Mann and Nikos Tzetos of GeoPotential conducted fieldwork on September 29, 2003. The report was written by Nikos Tzetos and emailed to RSV Engineering on October 1, 2003.

SURVEY EQUIPMENT

The following geophysical instruments were used to conduct the survey:

- GEOMETRICS G-858 CESIUM MAGNETOMETER (MAGNETIC SURVEY)
- MALA RAMAC GROUND PENETRATING RADAR SYSTEM with a 500 MHz ANTENNA (GPR SURVEY)
- AQUA -TRONICS A6 ELECTROMAGNETIC TRACER (EMA6 SURVEY)
- SCHONSTEDT GA52 MAGNETIC GRADIOMETER (GA52 SURVEY)

This equipment and the procedures used to meet the survey objectives of this project have been proven effective in detecting buried objects such as utilities and USTs.

The success of a GPR survey is greatly controlled by site conditions. Clayey soil and wet-soil conditions severely attenuate signal penetration even at different locations on the same site. USTs and utilities may be missed if they are deeper than the signal penetration, or if they are located under metallic debris or disturbed soils. Like all geophysical data, GPR data is ambiguous. Stones and cobbles produce reflections similar to USTs and utilities. Not all USTs produce the classic hyperbolic shaped reflections.

PROCEDURE

An orthogonal survey grid was established on the site using measuring wheels and tapes. The southwest corner of the survey area was used as the origin (0,0) for the survey grid.

Magnetic data were collected automatically at approximately 6-inch intervals along traverses orthogonal to the baselines. Traverses were 5 feet apart. Data were downloaded to a laptop computer and processed in the field. Contour maps were printed and used to locate suspect anomalies for further investigation with GPR, EMA6 and GA52 surveys.

Anomalies not appearing to be related to surface objects were located on the site using a measuring wheel. A follow up GPR survey was conducted across anomalies that could be caused by 3D objects like USTs, in an attempt to determine the shape and dimensions of the metallic objects causing them.

RESULTS

Figure 2 is a magnetic contour map produced by the magnetic survey, contoured at an interval of 500 nanoTesla (nT), an interval sufficient to detect underground utilities and USTs. The contour map is colored to visually enhance the anomalies in the magnetic field. Magnetic highs caused by ferriferous objects below the sensor are shown in red. Blues indicate magnetic lows, usually caused by surface objects located above the sensor.

Five Magnetic Anomalies, not attributed to surface features, were detected with this survey. They are marked MA A to E in Figure 2. Results were marked with paint. Figure 3 is an interpretation map of the survey.

MA A is interpreted to be caused by an electrical line related to the sign at the southwest corner of the property.

MA B is interpreted to be caused by an electrical line powering the same sign.

MA C is caused by the active UST fill ports and their product lines.

MA D is caused by a metallic sewer line.

MA E is interpreted to be caused by remnants of an old building that existed at that location, according to a gas station employee.

The three active USTs were outlined using GPR. The southernmost UST was not detected with radar, because it was located beneath a reinforced slab. Its edges were inferred by its reported size, an EMA6 survey that detected a possible south edge and a GPR profile that showed a possible east edge.

LIMITATIONS

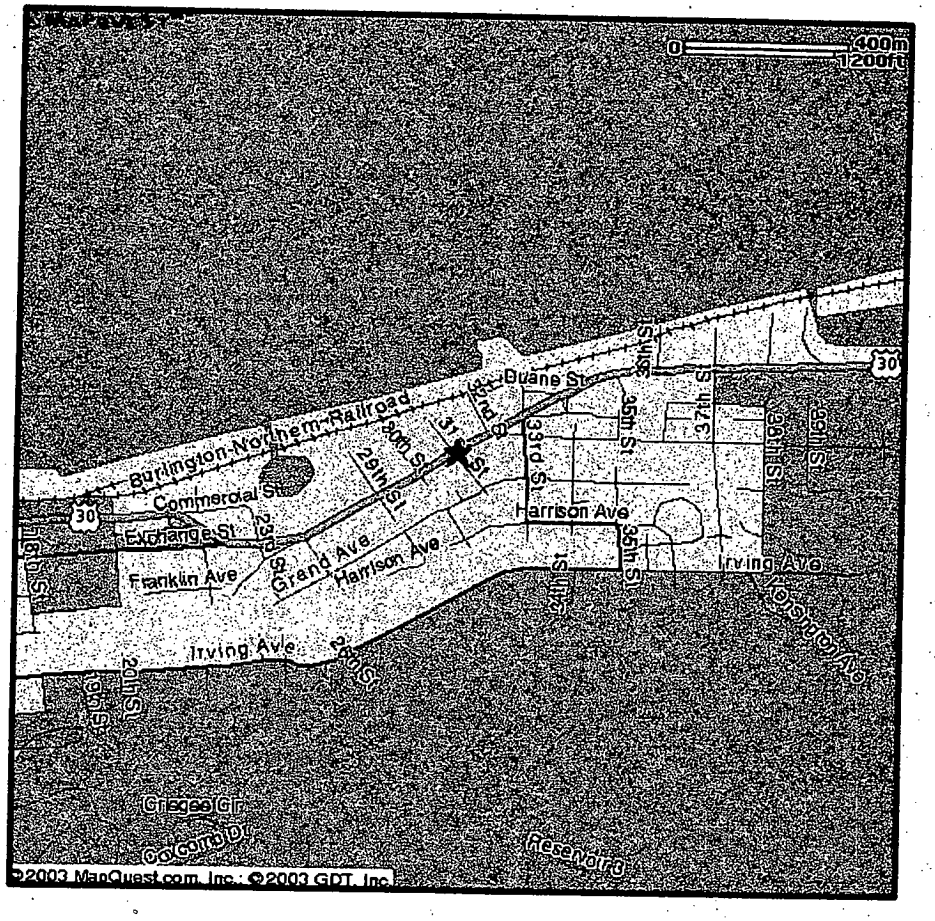
Geophysical surveys consist of interpreting geophysical responses from subsurface features. Since a variety of subsurface features can produce identical geophysical responses it is necessary to confirm the geophysical interpretation with intrusive investigations such as excavating or drilling. In addition, many subsurface features may produce no geophysical response. The use of this subsurface mapping survey is the sole responsibility of the client.

Ralph Soule
GeoPotential



Nikos Tzetos
GeoPotential

October 1, 2003



GeoPotential

ENVIRONMENTAL & EXPLORATION GEOPHYSICS

437 N.E. LIBERTY AVE. GRESHAM, OR 97030 - PH (503) 666-7530 - FAX (503) 492-4404

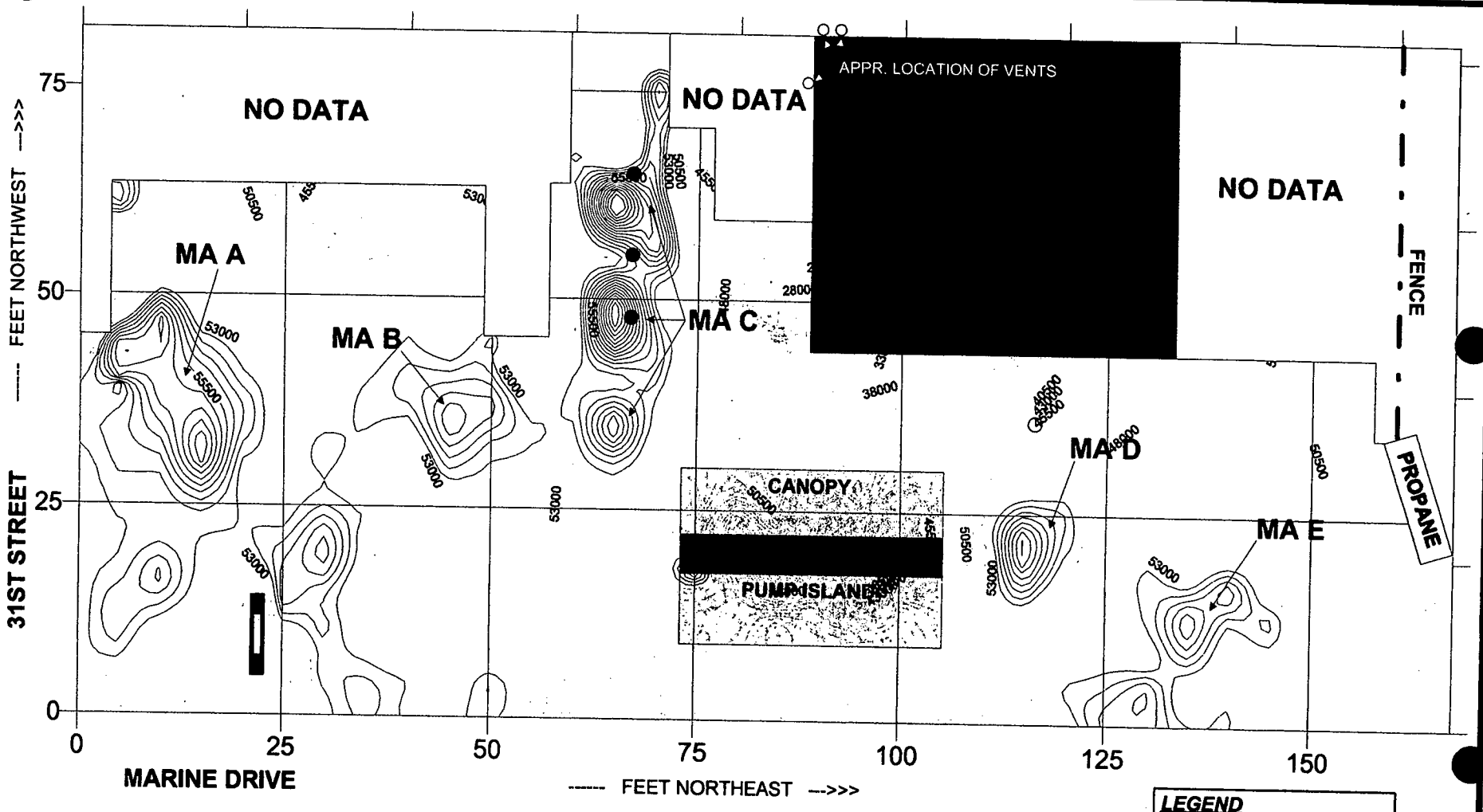
E-MAIL GeoPotential@aol.com

DATE: September 29, 2003 SUBSURFACE MAPPING SURVEY PROJECT NO. 69137

LOCATION: HIGHWAY SERVICE (76 STATION) 3109 Marine Drive Astoria, Oregon

CLIENT: RSV Engineering

FIGURE 1 LOCATION MAP



GeoPotential

ENVIRONMENTAL & EXPLORATION GEOPHYSICS

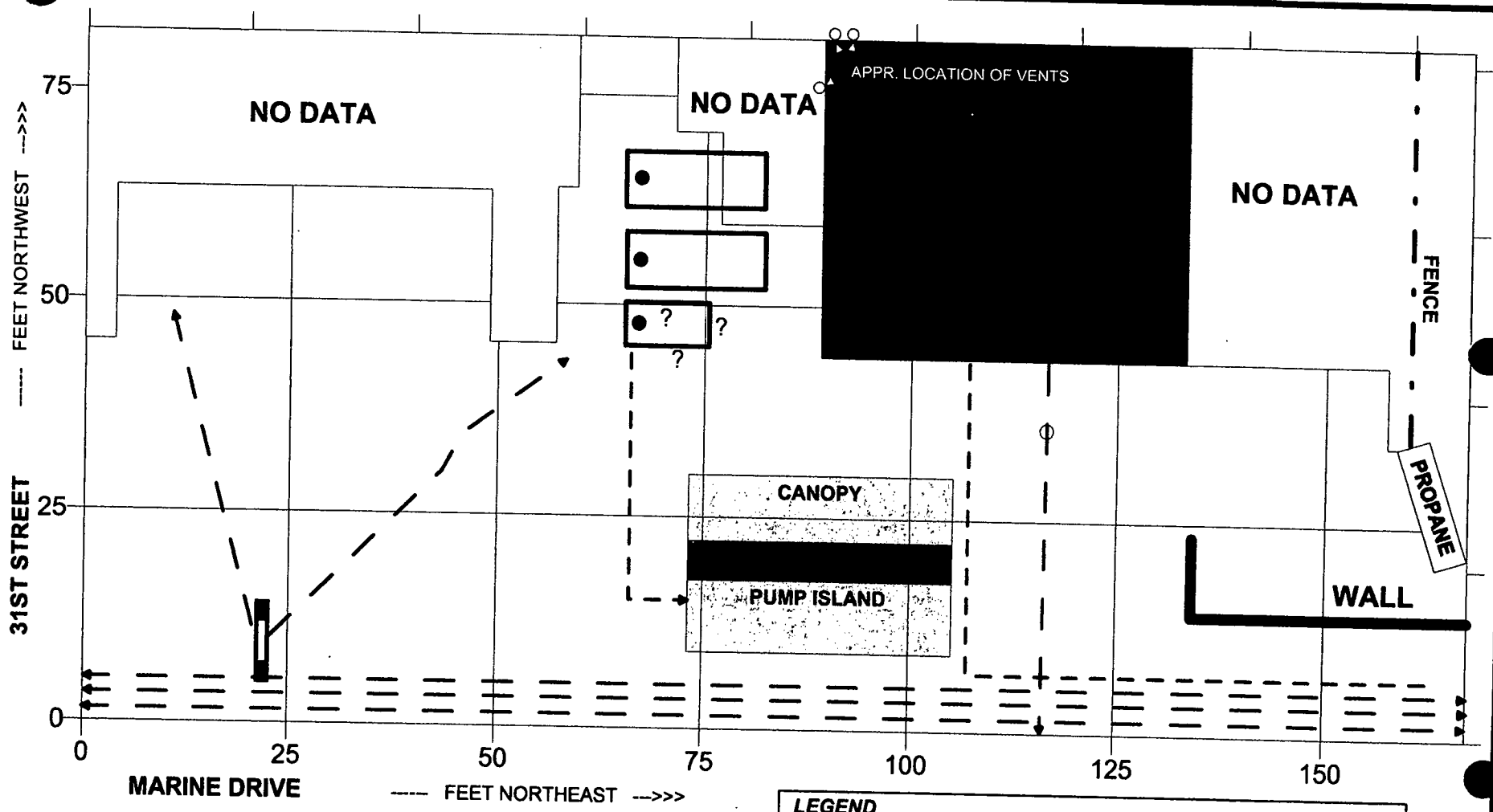
E-MAIL GeoPotential@aol.com

DATE: September 29, 2003 SUBSURFACE MAPPING SURVEY PROJECT NO: 469137

LOCATION: HIGHWAY SERVICE (76 STATION) 3108 Marine Drive Astoria, Oregon

CLIENT: RSV Engineering

FIGURE 2. MAGNETIC MAP (C.I. = 500 nT)



LEGEND

SIGN ○ CLEANOUT — — COMMUNICATIONS
— — ELECTRIC
- - - WATER
— — SEWER
UST ● FILL
- - - PRODUCT LINES

GeoPotential

ENVIRONMENTAL & EXPLORATION GEOPHYSICS

E-MAIL GeoPotential@aol.com

DATE: September 29, 2003 SUBSURFACE MAPPING SURVEY PROJECT No. 691373

LOCATION: HIGHWAY SERVICE (76 STATION) 3108 Marine Drive Astoria, Oregon

CLIENT: RSV Engineering

FIGURE 3. INTERPRETATION MAP

APPENDIX A
MAGNETIC SURVEYS

The earth's magnetic field, measured in "nanoTeslas" (nT), behaves like a bar magnet, with the strongest magnetic field located at the poles, and the weakest field located near the equator. In the United States, the average field intensity varies widely, however, the average value is about 50,000 nT. Also, like the magnetic field around the bar magnet, the earth's magnetic field is inclined. This inclination varies between 60 and 75 degrees, generally depending upon the latitude of the measuring location. The earth's magnetic field varies constantly and, during sunspot activity, quite dramatically. A magnetometer is an electronic device that measures the intensity of the earth's magnetic field.

Naturally occurring geologic features and buried ferrous metal objects such as underground storage tanks, drums, ordnance, pipes and debris filled trenches produce both horizontal and vertical disturbances to the earth's local magnetic field. The objects causing these "anomalies" can be detected quickly and reliably using portable magnetometers.

The intensity of an anomaly is a function of the mass, size and depth of burial of the object. As a rule of thumb, single drums buried several feet below the surface produce anomalies of about 200 nT relative to the normal undisturbed background and can be detected at a horizontal distance of about 15 feet, while large caches of drums can produce anomalies of many thousands of nT and may be detectable 50 feet away.

Magnetometers generally measure horizontal variations in the local magnetic field. A magnetic gradiometer is a variant of the magnetometer that measures both the horizontal and the vertical magnetic field at each survey point. It consists of two identical sensors located vertically on a staff and having a fixed separation. The intensity of the magnetic field caused by a buried metal object varies inversely with the distance between the object and the sensor. The relative intensities measured simultaneously at each sensor are used to determine the relative depth of burial of an object.

Relative depth estimates of buried metal objects can be made using a single sensor. In general, for a given mass object, the deeper the object is buried, the lower the amplitude and the wider the anomaly. Shallowly buried objects produce higher amplitude anomalies with closely spaced contour lines.

Magnetic surveys can only detect **ferrous metal** objects and cannot be used to identify the buried object. Estimates of the total mass of a buried object are difficult due to the physical properties of the object and other factors. Interference caused by observed surface metal objects limits the accuracy of the survey. The anomalies produced by fences, power lines, cars and buildings can easily mask the anomaly caused by an underground target.

Magnetic surveys are cost effective. Using the standard "step and wait" magnetometer, data from approximately 1000 points can be obtained in one field day corresponding to between 1 acre and about 5 acres depending on site conditions and survey goals. More modern cesium magnetometers collect up to 10 readings per second continuously, thus the operator can proceed without stopping. Many modern magnetometers use an audible signal to call attention to anomalous data as it is obtained. At some sites metallic objects can be detected and marked in the field at the time of the survey.

The use of a second, automatically recording "base station" magnetometer is highly recommended due to temporal variations in the earth's magnetic field. These changes must be removed from the field data before an accurate interpretation can be made, particularly when searching for small-buried objects.

Magnetic data are most commonly presented in two contour maps. The TOTAL MAGNETIC FIELD CONTOUR MAP shows the horizontal magnetic field and, therefore, the areal extent of anomalies. The GRADIOMETER CONTOUR MAPS show the vertical magnetic field and indicate the relative depth of burial of the objects causing those anomalies. Color versions of these maps may be produced showing only the magnetic highs and lows.

APPENDIX - B
GROUND PENETRATING RADAR SURVEYS

Ground Penetrating Radar (GPR) uses high frequency radio waves directed into the ground to acquire information about the subsurface. The energy radiated into the ground is reflected back to the antenna by features having significantly different electrical properties to that of the surrounding material. The greater the contrast, the stronger the reflection. Typical reflectors include water table, bedrock, bedding, fractures, voids, contaminant plumes and man-made objects such as UST's and utilities. Data are digitally recorded or downloaded to a laptop computer for filtering and processing.

GPR can be a valuable tool to accurately locate both metallic and non-metallic UST's and utilities, buried drums and hazardous material even below reinforced concrete floors and slabs. GPR can delineate trenches and excavations and, under some conditions, it can be used to locate contaminant plumes. It has been used as an archaeological tool to look for buried artifacts. It can accurately profile fresh water lake bottoms either from a boat or from a frozen lake surface. GPR can locate voids below roads and runways. GPR has numerous engineering applications. It can be used in non-destructive testing of engineering material, for example, locating rebar in concrete structures and determining the thickness of concrete and other structural material.

GPR is often used in conjunction with magnetometer surveys. Magnetometer Surveys are very fast and large areas can be covered cost effectively. Often, magnetic anomalies can be marked in the field, then can be further investigated using ground penetrating radar.

Under some conditions, although a UST itself may not be clearly visible in a GPR record, the excavation or trench in which the UST is buried is evident. When combined with other complimentary data, such as magnetometer data, it is safe to assume that a GPR "trench" with no clear GPR UST reflection, combined with a large "tank-shaped" magnetic anomaly indicates the presence of a UST.

ADVANTAGES

GPR provides continuous records along traverses which, depending on the goal of the survey, may be interpreted in the field.

In clean, dry, sandy soil, reflections from targets as deep as 100 feet are possible.

At flat, open sites, for reconnaissance purposes, the antenna can be towed behind a vehicle at several mph.

Many GPR antennas are shielded and are unaffected by surface and overhead objects and power lines.

The resolution of data is very high particularly for high frequency antennas.

GPR can be used in conjunction with magnetic or EM surveys to accurately locate buried objects.

Even under adverse site conditions, shallow, man-made objects generally can be detected.

Fiberglass UST's can be detected using GPR.

LIMITATIONS

Subsurface objects can be detected but, in general, they cannot be identified. USTs and utilities have a characteristic reflection, however, large rocks and boulders have a similar reflection.

The reflection visible in a GPR record is very complex and may be caused by small changes in the electrical properties of the soil. The target in mind may not produce it.

Other methods may be necessary to aid in the interpretation of the data (use a magnetometer to detect a large metallic mass, then GPR to determine if the object is tank-like, or a utility locator to determine if there are feed lines and fill pipes leading to the object).

Penetration of the GPR signal is "site specific" and its depth of penetration at a particular site cannot be predicted ahead of time. Near surface conductive material, such as salty or contaminated ground water and wet, clay-rich soil, may attenuate the radar signal, limiting the effective depth of the survey to several feet.

Adequate contrast between the ground and the target is required to obtain reflections. UST's may be missed if they are badly corroded.

To determine the depth to an object without "ground truth", assumptions must be made regarding soil properties.

GPR may not be cost-effective for some projects. For a detailed survey mapping underground storage tanks and utilities, it may be necessary to collect data in orthogonal directions at 5-foot line spacing.

To acquire the highest quality data, proper coupling between the antenna and the ground surface is necessary. Poor data may be obtained at sites covered with tall grass and brush.

APPENDIX C

SOIL BORING LOGS

RSV ENGINEERING, INC
31960 SW Charbonneau Drive, #101
Wilsonville, Oregon 97070
TEL (503) 694-6960
FAX (503) 694-6962

LOCATION MAP

SEE SITE PLAN

WELL/BORING NUMBER **GP-1**

PROJECT NAME:Highway Service 76 Station
PROJECT NUMBER: 03-135
LOCATION: 3108 Marine Drive, Astoria, Oregon
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 9/10/03

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)	BOREHOLE/WELL CONSTRUCTION DETAIL
											Asphalt	
		0								ML	Sandy Silt (ML) light brown, fine sand, dense, dry	
GS				GP-1@ 2'-4'							@ 3': gray, with clay	
		0			5							
					10					SP	Sand (SM) brown, fine- medium grained, dry	
		0										
		0										
					15							
		0										
GS				GP-1@ 17'-18'							@ 18': gray, fine grained	
			▽		20					CL	Clay with gravel (CL-GC) dark gray, wet, hydrocarbon odor	
											@ 20': hard rock refusal	
					25							
					30							

DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe
SAMPLING METHOD: Geoprobe
DRILLING START TIME:9:35
DRILLING END TIME:10:10

WELL ID TAG: NA
WELL START CARD NO.: NA
RIM ELEVATION: NA
CASING ELEVATION: NA
DATUM: NA

TIME	DATE	DTW

SV ENGINEERING, INC
31960 SW Charbonneau Drive, #101
Wilsonville, Oregon 97070
TEL (503) 694-6960
FAX (503) 694-6962

LOCATION MAP

SEE SITE PLAN

WELL/BORING NUMBER GP-2

PROJECT NAME:Highway Service 76 Station
PROJECT NUMBER: 03-135
LOCATION: 3108 Marine Drive, Astoria, Oregon
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 9/10/03

SAMPLE INFORMATION									STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)	BOREHOLE/WELL CONSTRUCTION DETAIL
SAMPLE TYPE	BLOW COUNTS	PID (ppm)		First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %			
											Asphalt	
GS		0			GP-2@ 2'-4'					GM	Silty Sandy Gravel (GM) light brown, angular, dry	
		0				5						
		0										
		0				10						
		0								SP	Sand (SM) light gray, fine-medium grained, dry	
						15						
GS		0.4		▽	GP-2@ 17'-18'						@ 19': gray, fine grained, wet	
						20					Geoprobe water sampler screen pushed to 23'	
						25						
						30						

DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe
SAMPLING METHOD: Geoprobe
DRILLING START TIME:1:15
DRILLING END TIME:1:45

WELL ID TAG: NA
WELL START CARD NO.: NA
RIM ELEVATION: NA
CASING ELEVATION: NA
DATUM: NA

TIME	DATE	DTW

RSV ENGINEERING, INC
1960 SW Charbonneau Drive, #101
Wilsonville, Oregon 97070
TEL (503) 694-6960
FAX (503) 694-6962

LOCATION MAP

SEE SITE PLAN

WELL/BORING NUMBER GP-3

PROJECT NAME:Highway Service 76 Station
PROJECT NUMBER: 03-135
LOCATION: 3108 Marine Drive, Astoria, Oregon
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 9/10/03

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)	BOREHOLE/WELL CONSTRUCTION DETAIL
											Asphalt	
GS		0		GP-3@ 2'-4'						GM	Silty Sandy Gravel (GM) brown, angular, dry	
		0			5							
		0										
		0			10							
		0										
		0										
		0			15					SP	Sand (SM) light brown, fine-medium grained, dry	
GS		0	▽	GP-3@ 17'-18'							@ 19': gray, fine grained @ 19.5': wet	
					20							
					25							
					30							

DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe
SAMPLING METHOD: Geoprobe
DRILLING START TIME:2:10
DRILLING END TIME:2:35

WELL ID TAG: NA
WELL START CARD NO.: NA
RIM ELEVATION: NA
CASING ELEVATION: NA
DATUM: NA

TIME	DATE	DTW

SV ENGINEERING, INC
31960 SW Charbonneau Drive, #101
Wilsonville, Oregon 97070
TEL (503) 694-6960
FAX (503) 694-6962

LOCATION MAP

SEE SITE PLAN

WELL/BORING NUMBER GP-4

PROJECT NAME:Highway Service 76 Station
PROJECT NUMBER: 03-135
LOCATION: 3108 Marine Drive, Astoria, Oregon
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 9/10/03

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %
GS		0		GP-4@ 2'-4'	5			
		0						
		0			10			
		0						
GS		0		GP-4@ 15'-17'	15			
		0	▽					
					20			
					25			
					30			

STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
		Asphalt
	GM	Silty Sandy Gravel (GM) brown, angular, dry
	SP	Sand (SM) light brown, fine-medium grained, dry
		@ 19': gray, fine grained @ 19.5': wet Geoprobe sampler screen pushed to 23'. Pump tubing clogged with fine sand, no water sample

BOREHOLE/WELL CONSTRUCTION DETAIL



DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe
SAMPLING METHOD: Geoprobe
DRILLING START TIME:2:40
DRILLING END TIME:3:05

WELL ID TAG: NA
WELL START CARD NO.: NA
RIM ELEVATION: NA
CASING ELEVATION: NA
DATUM: NA

TIME	DATE	DTW

RSV ENGINEERING, INC
[illegible]960 SW Charbonneau Drive, #101
[illegible]ilsonville, Oregon 97070
TEL (503) 694-6960
FAX (503) 694-6962

LOCATION MAP

SEE SITE PLAN

WELL/BORING NUMBER GP-5

PROJECT NAME:Highway Service 76 Station
PROJECT NUMBER: 03-135
LOCATION: 3108 Marine Drive, Astoria, Oregon
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 9/10/03

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH (ft) bgs	SAMPLE LOCATION	SAMPLE INTERVAL	REC %
GS		0		GP-5@ 2'-4'	5			
		0						
		0			10			
		0.5						
		1.1			15			
GS		3.4		GP-5@ 16'-18'				
					20			
					25			
					30			

STRATA

SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
	Asphalt
GM	Silty Sandy Gravel (GM) brown, angular, dry
	poor recovery, large gravels blocking tube
CL	Silty Clay (CL) brown, moist, slight odor
	Refusal encountered @ 20.5'

BOREHOLE/WELL CONSTRUCTION DETAIL

DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe
SAMPLING METHOD: Geoprobe
DRILLING START TIME:3:20
DRILLING END TIME:3:45

WELL ID TAG: NA
WELL START CARD NO.: NA
RIM ELEVATION: NA
CASING ELEVATION: NA
DATUM: NA

TIME	DATE	DTW

SV ENGINEERING, INC
31960 SW Charbonneau Drive, #101
Wilsonville, Oregon 97070
TEL (503) 694-6960
FAX (503) 694-6962

LOCATION MAP

SEE SITE PLAN

WELL/BORING NUMBER GP-6

PROJECT NAME:Highway Service 76 Station
PROJECT NUMBER: 03-135
LOCATION: 3108 Marine Drive, Astoria, Oregon
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 9/10/03

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH (ft) bgs	SAMPLE LOCATION & INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)	BOREHOLE/WELL CONSTRUCTION DETAIL
										Asphalt	
GS		0		GP-6@ 2'-4'	5				GM	Silty Sandy Gravel (GM) brown, fine-medium sand, dry	
		0									
		0									
		0			10					driller report refusal @12.5'	
					15						
					20						
					25						
					30						

DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe
SAMPLING METHOD: Geoprobe
DRILLING START TIME:4:25
DRILLING END TIME:4:35

WELL ID TAG: NA
WELL START CARD NO.: NA
RIM ELEVATION: NA
CASING ELEVATION: NA
DATUM: NA

TIME	DATE	DTW

APPENDIX D

LABORATORY DATA SHEETS

AND

CHAIN OF CUSTODY DOCUMENTATION

1317 South 13th Avenue P.O. Box 479 Kelso, Washington 98626 (360) 577-7222 ph (360) 636-1068 fax

Columbia Analytical Services INC
An Employee - Owned Company

November 12, 2003

Service Request No: K2308015

Craig Arola
RSV Engineering Inc.
31960 SW Charbonneau Drive
Suite 201
Wilsonville, OR 97070

RE: Niemi Highway Service

Dear Craig:

Enclosed are the results of the rush sample(s) submitted to our laboratory on October 13, 2003. For your reference, these analyses have been assigned our service request number K2308015.

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAC standards except as noted in the case narrative report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3280.

Respectfully submitted,

Columbia Analytical Services, Inc.

Les Kennedy
Project Chemist

LK/jeb

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
[redacted]	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
B	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.
*	The duplicate analysis not within control limits. See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

[redacted]	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a chromatographic interference.
X	See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
[redacted]	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

Case Narrative

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	RSV Engineering	**Service Request No.:**	K2308015
Project:	Niemi Highway Service	**Date Received:**	10/13/03
Sample Matrix:	Soil & Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Matrix/Duplicate Matrix Spike (MS/DMS), and Laboratory Control Sample (LCS).

Sample Receipt

Thirteen samples were received for analysis at Columbia Analytical Services on 10/13/03 in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Total and Dissolved Metals

No anomalies associated with the analysis of this batch were observed.

Diesel Range Organics by Method NWTPH-Dx

No anomalies associated with the analysis of this batch were observed.

Gasoline Range Organics by Method NWTPH-G

No anomalies associated with the analysis of this batch were observed.

PCB Aroclors by EPA Method 8082

Continuing Calibration Verification (CCV) Exceptions
The primary evaluation criterion was exceeded for Aroclor 1260in CCV 1026R033. In accordance with CAS standard operating procedures, the alternative evaluation specified in the EPA method was performed using the average percent recovery of all analytes in the verification standard. The standard meets the alternative evaluation criteria.

Volatile Organic Compounds by EPA Method 8260B

Laboratory Control Sample (LCS) Exceptions
The advisory criterion was exceeded for the following analytes in LCS KWG0317002-3: Isopropylbenzene, n-Propylbenzene, 1,3,5-Trimethylbenzene, and 1,2,4-Trimethylbenzene. As per the CAS/Kelso Standard Operating Procedure (SOP) for this method, these compounds are not included in the subset of analytes used to control the analysis. The recovery information reported for these analytes is for advisory purposes only (i.e. to provide additional detail related to the performance of each individual compound). No further corrective action was required.

Approved by _____ Date 11/12/03

Polynuclear Aromatic Hydrocarbons by EPA Method 8270C

Sample Notes and Discussion

Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD). A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD for these samples.

Approved by ll **Date** 11/12/03

Chain of Custody Documentation

CHAIN OF CUSTODY

Columbia Analytical Services, Inc.
An Employee - Owned Company

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222x07 • FAX (360) 636-1068

SR#: K2308015

PAGE 1 OF 2 COC #

PROJECT NAME: Miami Highway Service
PROJECT NUMBER:
PROJECT MANAGER:
COMPANY/ADDRESS: RSI Engineering Inc.
31960 SW Chachanneau Drive #101
CITY/STATE/ZIP: Wilsonville, OR 97070
E-MAIL ADDRESS:
PHONE #: (503) 694-6960 FAX: (503) 694-6962
SAMPLER'S SIGNATURE:

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐	Volatile Organics 624☐ 8260☐	Hydrocarbons Gas☐	BTEX☐ Diesel☐ (*see below) Oil☐	Fuel Fingerprint (FIQ) NW-HCID Screen	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCB's Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081A☐ 8141A☐ 8151A☐	Chloropheno lics - 8151M Tri☐ Tetra☐ PCP☐	PAHS 8310☐ SIM☐	Metals, Total or Dissolved (See list below)	Cyanide☐	Hex-Chrom☐	pH, Cond., Cl, SO4, PO4, F, NO2, NO3, BOD, TSS, TDS (circle) NH3-N, COD, Total-P, TKN, TOC, DOC (circle) NO2+NO3	TOX 9020☐ AOX 1650☐ 506☐	REMARKS
GP-1 @ 2'-4'	10/10/03	9:40	1	S	2				X												
GP-1 @ 17'-18'	"	10:00	2	S	2				X												
GP-1	"	10:10	3	W	8				X												
GP-2 @ 2'-4'	"	1:20	4	S	2				X												
GP-2 @ 17'-19'	"	1:40	5	S	2				X												
GP-2	"	1:45	6	W	8				X												
GP-3 @ 2'-4'	"	2:15	7	S	2				X												
GP-3 @ 17'-19'	"	2:50	8	S	2				X												
GP-4 @ 2'-4'	"	2:45	9	S	2				X												
GP-4 @ 15'-17'	"	3:00	10	S	2				X												

000008

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required
___ II. Report Dup., MS, MSD as required
___ III. Data Validation Report (includes all raw data)
___ IV. CLP Deliverable Report
___ V. EDD

INVOICE INFORMATION

P.O. #
Bill To:

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard (10-15 working days)
___ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

See Attached instructions

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature	Signature	Signature	Signature
Printed Name	Printed Name	Printed Name	Printed Name
Firm	Firm	Firm	Firm
Date/Time 10/13/03 9:00 AM	Date/Time 10/13/03 10:40 CAS	Date/Time 10/13/03 1:25 CAS	Date/Time 10/13/03 1335 CAS

CHAIN OF CUSTODY

SR#: K2308015

Columbia Analytical Services, Inc.
An Employee - Owned Company

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222x07 • FAX (360) 636-1068

PAGE 2 OF 2 COC #

PROJECT NAME: Niemi Highway Service
PROJECT NUMBER:
PROJECT MANAGER:
COMPANY/ADDRESS: RSV Engineering, Inc. 31960 SW Charbonneau Dr. #101 Wilsonville, OR 97070
CITY/STATE/ZIP:
E-MAIL ADDRESS:
PHONE: (503) 694-6960 FAX: (503) 694-6962
SAMPLER'S SIGNATURE:

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐	Volatile Organics 624☐ 8260☐	Hydrocarbons Gas☐ Diesel☐ (*see below) Oil☐	BTEX☐ 8021☐	Fuel Fingerprint (FIQ) ☐ NW-HCID Screen	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCB's Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081A☐ 8141A☐ 8151A☐	Chlorophenolics Tri☐ Tetra☐ 8151M PCP☐	PAHS 8310☐ SIM☐	Metals, Total or Dissolved (See list below)	Cyanide☐	Hex-Chrom☐	pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020☐ AOX 1650☐ 506☐	REMARKS
GP-5 @ 2'-4'	10/10/03	3:20	11		2					X												
GP-5 @ 16'-18'	11	3:45	12		2					X												
GP-6 @ 2'-4'	11	4:30	13		2					X												
Trip Blank			14		1					~~X~~												

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required
___ II. Report Dup., MS, MSD as required
___ III. Data Validation Report (includes all raw data)
___ IV. CLP Deliverable Report
___ V. EDD

INVOICE INFORMATION

P.O. #:
Bill To:

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard (10-15 working days)
___ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

See attached instructions

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature	Signature	Signature	Signature
Printed Name	Printed Name	Printed Name	Printed Name
Date/Time 10/8/03 9:00AM	Date/Time 10/3/03 10:40	Date/Time 10/3/03	Date/Time 1335 10/13/03
Firm	Firm CAS	Firm CAS	Firm

Columbia Analytical Services Inc.
Cooler Receipt And Preservation Form

Project/Client RSV Engineering Work Order K23 8015

Cooler received on 10/13/03. and opened on 10/13/03. by KM.

1. Were custody seals on outside of cooler? Y N
   If yes, how many and where? _____
2. Were seals intact and signature & date correct? Y N
3. Is the shipper's airbill available and filed? If no, record airbill number: CAS Y N
4. COC #

Temperature of cooler(s) upon receipt:	2.5	1.8		
Temperature Blank:	5.1	NA 8.4		

5. Were custody papers properly filled out (ink, signed, etc.)? Y N
6. Type of packing material present ice
7. Did all bottles arrive in good condition (unbroken)? Y N
8. Were all bottle labels complete (*i.e.* analysis, preservation, etc.)? Y N
9. Did all bottle labels and tags agree with custody papers? Y N
10. Were the correct types of bottles used for the tests indicated? Y N
11. Were all of the preserved bottles received at the lab with the appropriate pH? Y N
12. Were VOA vials checked for absence of air bubbles, and if present, noted below? Y N
13. Did the bottles originate from CAS/K or a branch laboratory? Y N
14. Are CWA Microbiology samples received with > ½ the 24 hr. hold time remaining from collection? Y N
15. Was Cl2/Res negative? Y N

Explain any discrepancies: _____

RESOLUTION: _____

Samples that required preservation or received out of temperature:

Sample ID	Reagent	Volume	Lot Number	Bottle Type	Rec'd out of Temperature	Initials
					000010	

Total Solids

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Servic
Sample Matrix: Soil

Service Request: K2308015

Total Solids

Prep Method: NONE
Analysis Method: 160.3M
Test Notes:

Units: PERCENT
Basis: WET

Sample Name	Lab Code	Date Collected	Date Received	Date Analyzed	Result	Result Notes
GP-1@2'-4'	K2308015-001	10/10/2003	10/13/2003	10/14/2003	72.9	
GP-1@17'-18'	K2308015-002	10/10/2003	10/13/2003	10/14/2003	88.9	
GP-2@2'-4'	K2308015-004	10/10/2003	10/13/2003	10/14/2003	77.8	
GP-2@17'-19'	K2308015-005	10/10/2003	10/13/2003	10/14/2003	90.2	
GP-3@2'-4'	K2308015-007	10/10/2003	10/13/2003	10/14/2003	79.3	
GP-3@17'-19'	K2308015-008	10/10/2003	10/13/2003	10/14/2003	88.8	
GP-4@2'-4'	K2308015-009	10/10/2003	10/13/2003	10/14/2003	79.8	
GP-4@15'-17'	K2308015-010	10/10/2003	10/13/2003	10/14/2003	94.3	
GP-5@2'-4'	K2308015-011	10/10/2003	10/13/2003	10/14/2003	81.2	
GP-5@16'-18'	K2308015-012	10/10/2003	10/13/2003	10/14/2003	71.8	
GP-6@2'-4'	K2308015-013	10/10/2003	10/13/2003	10/14/2003	91.0	

QA/QC Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Servic	**Date Collected:**	10/10/2003
Sample Matrix:	Soil	**Date Received:**	10/13/2003
		Date Analyzed:	10/14/2003

Duplicate Sample Summary
Total Solids

Prep Method: NONE
Analysis Method: 160.3M
Test Notes:

Units: PERCENT
Basis: WET

Sample Name	Lab Code	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
GP-1@2'-4'	K2308015-001	72.9	75.7	74.3	4	

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Servic
Sample Matrix: Soil

Service Request: K2308015
Date Collected: 10/10/2003
Date Received: 10/13/2003
Date Analyzed: 10/14/2003

Duplicate Sample Summary
Total Solids

Prep Method: NONE
Analysis Method: 160.3M
Test Notes:

Units: PERCENT
Basis: WET

Sample Name	Lab Code	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
GP-4@15'-17'	K2308015-010	94.3	94.6	94.5	<1	

Printed: 10/15/2003 09:37
U:\Stealth\Crystal.rpt\Solids.rpt

SuperSet Reference: W0316241

Metals

DISSOLVED METALS

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: RSV Engineering, Inc. Service Request: K2308015

Project No.:

Project Name: Niemi Highway Service

Sample No.	Lab Sample ID.
GP-1	K2308015-003 DISS
GP-1D	K2308015-003D DISS
GP-1S	K2308015-003S DISS
GP-2	K2308015-006 DISS
Method Blank	K2308015-MB

re ICP interelement corrections applied? Yes/No YES

re ICP background corrections applied? Yes/No YES

If yes-were raw data generated before application of background corrections? Yes/No NO

mments:

certify that this data package is in compliance with the terms and conditions of the ntract, both technically and for completeness, for other than the conditions detailed ve. Release of the data contained in this hardcopy data package and in the mputer-readable data submitted on diskette has been authorized by the Laboratory Manager or e Manager's designee, as verified by the following signature.

gnature: Date: 11/12/03

000016

DISSOLVED METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: NA
Project Name: Niemi Highway Service
Matrix: WATER

Service Request: K2308015
Date Collected: 10/10/03
Date Received: 10/13/03
Units: µG/L
Basis: NA

Sample Name: GP-1

Lab Code: K2308015-003 DISS

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	200.8	0.04	0.02	2	10/23/03	11/10/03	0.18		
Chromium	200.8	0.40	0.12	2	10/23/03	11/10/03	4.15		
Lead	200.8	0.04	0.02	2	10/23/03	11/10/03	58.6		

% Solids: 0.0

Comments:

000017

DISSOLVED METALS
-1-
INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: NA
Project Name: Niemi Highway Service
Matrix: WATER

Service Request: K2308015
Date Collected: 10/10/03
Date Received: 10/13/03
Units: µG/L
Basis: NA

Sample Name: GP-2
Lab Code: K2308015-006 DISS

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	200.8	0.04	0.02	2	10/23/03	11/10/03	0.07		
Chromium	200.8	0.40	0.12	2	10/23/03	11/10/03	1.13		
Lead	200.8	0.04	0.02	2	10/23/03	11/10/03	5.40		

% Solids: 0.0

Comments:

DISSOLVED METALS
-1-
INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: NA
Project Name: Niemi Highway Service
Matrix: WATER

Service Request: K2308015
Date Collected:
Date Received:
Units: µG/L
Basis: NA

Sample Name: Method Blank
Lab Code: K2308015-MB

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	200.8	0.02	0.01	1	10/23/03	11/10/03	0.01	U	
Chromium	200.8	0.20	0.06	1	10/23/03	11/10/03	0.06	B	
Lead	200.8	0.02	0.01	1	10/23/03	11/10/03	0.01	U	

% Solids: 0.0

Comments:

000019

DISSOLVED METALS
- 5a -
SPIKE SAMPLE RECOVERY

Client: RSV Engineering, Inc.
Project No.:
Project Name: Niemi Highway Service
Matrix: WATER

Service Request: K2308015
Units: µg/L
Basis: NA
% Solids: 0.0

Sample Name: GP-1S
Lab Code: K2308015-003S DISS

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Cadmium	70 - 130	18.8		0.18		20.0	93		200.8
Chromium	70 - 130	20.7		4.15		20.0	83		200.8
Lead	70 - 130	76.6		58.6		20.0	90		200.8

An empty field in the Control Limit column indicates the control limit is not applicable.

DISSOLVED METALS

-6-

SPIKE DUPLICATES

Client: RSV Engineering, Inc.
Service Request: K2308015

Project No.:
Units: µg/L

Project Name: Niemi Highway Service
Basis: NA

Matrix: WATER
% Solids: 0.0

Sample Name: GP-1D
Lab Code: K2308015-003D DISS

Analyte	Control Limit(%)	Spike(S)	C	Spike Dup.(SD)	C	RPD	Q	Method
Cadmium		0.18		0.16		14		200.8
Chromium	20	4.15		4.18		1		200.8
Lead	20	58.6		58.7		0		200.8

An empty field in the Control Limit column indicates the control limit is not applicable.

Diesel and Residual Range Organics

080022

Analytical Results

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	10/10/2003
Sample Matrix:	Water	**Date Received:**	10/13/2003

Diesel and Residual Range Organics

Sample Name:	GP-2	**Units:**	ug/L
Lab Code:	K2308015-006	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	NWTPH-Dx		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	**3200**	Y	280	40	1	10/14/03	10/14/03	KWG0316213	
Residual Range Organics (RRO)	**110**	J	560	60	1	10/14/03	10/14/03	KWG0316213	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	79	50-150	10/14/03	Acceptable
n-Triacontane	89	50-150	10/14/03	Acceptable

Comments:

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Collected: NA
Date Received: NA

Diesel and Residual Range Organics

Sample Name: Method Blank
Lab Code: KWG0316213-3

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	49	J	250	36	1	10/14/03	10/14/03	KWG0316213	
Residual Range Organics (RRO)	ND	U	500	54	1	10/14/03	10/14/03	KWG0316213	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	88	50-150	10/14/03	Acceptable
n-Triacontane	97	50-150	10/14/03	Acceptable

Comments:

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015

Surrogate Recovery Summary
Diesel and Residual Range Organics

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2
GP-2	K2308015-006	79	89
Method Blank	KWG0316213-3	88	97
Lab Control Sample	KWG0316213-1	81	91
Duplicate Lab Control Sample	KWG0316213-2	84	95

Surrogate Recovery Control Limits (%)

Sur1 = o-Terphenyl	50-150
Sur2 = n-Triacontane	50-150

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

000025

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Extracted: 10/14/2003
Date Analyzed: 10/14/2003

Lab Control Spike/Duplicate Lab Control Spike Summary
Diesel and Residual Range Organics

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0316213

	Lab Control Sample KWG0316213-1 Lab Control Spike			Duplicate Lab Control Sample KWG0316213-2 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Expected**	**%Rec**	**Result**	**Expected**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Diesel Range Organics (DRO)	1730	1600	108	1800	1600	112	51-143	4	30
Residual Range Organics (RRO)	1770	1600	111	1820	1600	114	60-131	3	30

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000026

Gasoline Range Organics

Analytical Results

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	10/10/2003
Sample Matrix:	Water	**Date Received:**	10/13/2003

Gasoline Range Organics

Sample Name:	GP-1	**Units:**	ug/L
Lab Code:	K2308015-003	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	NWTPH-Gx		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics (GRO)	86	Y	50	12	1	10/21/03	10/21/03	KWG0316785	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Difluorobenzene	102	50-150	10/21/03	Acceptable

Comments:

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Collected: 10/10/2003
Date Received: 10/13/2003

Gasoline Range Organics

Sample Name: GP-2
Lab Code: K2308015-006

Extraction Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics (GRO)	39	J	50	12	1	10/22/03	10/22/03	KWG0316785	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Difluorobenzene	101	50-150	10/22/03	Acceptable

Comments:

Analytical Results

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Gasoline Range Organics

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG0316785-4	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	NWTPH-Gx		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics (GRO)	ND	U	50	12	1	10/21/03	10/21/03	KWG0316785	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Difluorobenzene	104	50-150	10/21/03	Acceptable

Comments:

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015

Surrogate Recovery Summary
Gasoline Range Organics

Extraction Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1
GP-1	K2308015-003	102
GP-2	K2308015-006	101
Method Blank	KWG0316785-4	104
Batch QC	K2308187-002	104
Batch QCMS	KWG0316785-1	106
Batch QCDMS	KWG0316785-2	105
Lab Control Sample	KWG0316785-3	106

Surrogate Recovery Control Limits (%)

Sur1 = 1,4-Difluorobenzene	50-150

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

000031

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Extracted: 10/21/2003
Date Analyzed: 10/21/2003

Matrix Spike/Duplicate Matrix Spike Summary
Gasoline Range Organics

Sample Name: Batch QC
Lab Code: K2308187-002

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: NWTPH-Gx

Level: Low
Extraction Lot: KWG0316785

Analyte Name	Sample Result	Batch QCMS KWG0316785-1 Matrix Spike			Batch QCDMS KWG0316785-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Expected	%Rec	Result	Expected	%Rec			
Gasoline Range Organics (GRO)	ND	559	500	112	505	500	101	64-131	10	30

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000032

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Extracted: 10/21/2003
Date Analyzed: 10/21/2003

Lab Control Spike Summary
Gasoline Range Organics

Extraction Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0316785

	Lab Control Sample KWG0316785-3 Lab Control Spike			
Analyte Name	**Result**	**Expected**	**%Rec**	**%Rec Limits**
Gasoline Range Organics (GRO)	514	500	103	73-124

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000033

Hydrocarbon Identification

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	10/10/03
Sample Matrix:	Soil	**Date Received:**	10/13/03

Hydrocarbon Identification Screen

Sample Name:	GP-1@2'-4'	Units:	mg/Kg (ppm)
Lab Code:	K2308015-001	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline Range Organics	EPA 3550B	NWTPH-HCID	20	1	10/14/03	10/15/03	ND	
Diesel Range Organics	EPA 3550B	NWTPH-HCID	50	1	10/14/03	10/15/03	ND	
Residual Range Organics	EPA 3550B	NWTPH-HCID	100	1	10/14/03	10/15/03	ND	

Approved By: M Cullen Date: 10/15/03

000035

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	10/10/03
Sample Matrix:	Soil	**Date Received:**	10/13/03

Hydrocarbon Identification Screen

Sample Name:	GP-1@17'-18'	Units:	mg/Kg (ppm)
Lab Code:	K2308015-002	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline Range Organics	EPA 3550B	NWTPH-HCID	20	1	10/14/03	10/15/03	ND	
Diesel Range Organics	EPA 3550B	NWTPH-HCID	50	1	10/14/03	10/15/03	ND	
Residual Range Organics	EPA 3550B	NWTPH-HCID	100	1	10/14/03	10/15/03	ND	

Approved By: _____ Date: 10/15/03

000036

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	10/10/03
Sample Matrix:	Water	**Date Received:**	10/13/03

Hydrocarbon Identification Screen

Sample Name:	GP-1	Units:	ug/L (ppb)
Lab Code:	K2308015-003	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline Range Organics	EPA 3550B	NWTPH-HCID	250	1	10/14/03	10/14/03	D	
Diesel Range Organics	EPA 3550B	NWTPH-HCID	630	1	10/14/03	10/14/03	ND	
Residual Range Organics	EPA 3550B	NWTPH-HCID	630	1	10/14/03	10/14/03	ND	

D — Detected at or above the method reporting limit. Follow-up analyses are required for quantitative results.

Approved By: _____ Date: 10/15/03

1S22/020597p

000037

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	RSV Engineering, Inc.	Service Request:	K2308015
Project:	Niemi Highway Service	Date Collected:	10/10/03
Sample Matrix:	Soil	Date Received:	10/13/03

Hydrocarbon Identification Screen

Sample Name: GP-2@2'-4'
Lab Code: K2308015-004
Test Notes:

Units: mg/Kg (ppm)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline Range Organics	EPA 3550B	NWTPH-HCID	20	1	10/14/03	10/15/03	ND	
Diesel Range Organics	EPA 3550B	NWTPH-HCID	50	1	10/14/03	10/15/03	ND	
Residual Range Organics	EPA 3550B	NWTPH-HCID	100	1	10/14/03	10/15/03	ND	

Approved By: MM Linda Date: 10/15/03

1S22/020597p

000038

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	10/10/03
Sample Matrix:	Soil	**Date Received:**	10/13/03

Hydrocarbon Identification Screen

Sample Name:	GP-2@17'-19'	Units:	mg/Kg (ppm)
Lab Code:	K2308015-005	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline Range Organics	EPA 3550B	NWTPH-HCID	20	1	10/14/03	10/15/03	ND	
Diesel Range Organics	EPA 3550B	NWTPH-HCID	50	1	10/14/03	10/15/03	ND	
Residual Range Organics	EPA 3550B	NWTPH-HCID	100	1	10/14/03	10/15/03	ND	

Approved By: _____ Date: 10/15/03

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1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	10/10/03
Sample Matrix:	Water	**Date Received:**	10/13/03

Hydrocarbon Identification Screen

Sample Name:	GP-2	Units:	ug/L (ppb)
Lab Code:	K2308015-006	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline Range Organics	EPA 3550B	NWTPH-HCID	250	1	10/14/03	10/14/03	D	
Diesel Range Organics	EPA 3550B	NWTPH-HCID	630	1	10/14/03	10/14/03	D	
Residual Range Organics	EPA 3550B	NWTPH-HCID	630	1	10/14/03	10/14/03	ND	

D — Detected at or above the method reporting limit. Follow-up analyses are required for quantitative results.

Approved By: _____ Date: 10/15/03

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1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	10/10/03
Sample Matrix:	Soil	**Date Received:**	10/13/03

Hydrocarbon Identification Screen

Sample Name:	GP-3@2'-4'	**Units:**	mg/Kg (ppm)
Lab Code:	K2308015-007	**Basis:**	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline Range Organics	EPA 3550B	NWTPH-HCID	20	1	10/14/03	10/15/03	ND	
Diesel Range Organics	EPA 3550B	NWTPH-HCID	50	1	10/14/03	10/15/03	ND	
Residual Range Organics	EPA 3550B	NWTPH-HCID	100	1	10/14/03	10/15/03	ND	

Approved By: _____ Date: 10/15/03

1S22/020597p

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	10/10/03
Sample Matrix:	Soil	**Date Received:**	10/13/03

Hydrocarbon Identification Screen

Sample Name:	GP-3@17'-19'	**Units:**	mg/Kg (ppm)
Lab Code:	K2308015-008	**Basis:**	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline Range Organics	EPA 3550B	NWTPH-HCID	20	1	10/14/03	10/15/03	ND	
Diesel Range Organics	EPA 3550B	NWTPH-HCID	50	1	10/14/03	10/15/03	ND	
Residual Range Organics	EPA 3550B	NWTPH-HCID	100	1	10/14/03	10/15/03	ND	

Approved By: M Ulder Date: 10/15/03

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1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	10/10/03
Sample Matrix:	Soil	**Date Received:**	10/13/03

Hydrocarbon Identification Screen

Sample Name:	GP-4@2'-4'	**Units:**	mg/Kg (ppm)
Lab Code:	K2308015-009	**Basis:**	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline Range Organics	EPA 3550B	NWTPH-HCID	20	1	10/14/03	10/15/03	ND	
Diesel Range Organics	EPA 3550B	NWTPH-HCID	50	1	10/14/03	10/15/03	ND	
Residual Range Organics	EPA 3550B	NWTPH-HCID	100	1	10/14/03	10/15/03	ND	

Approved By: M Gurley Date: 10/15/03

000042A

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	10/10/03
Sample Matrix:	Soil	**Date Received:**	10/13/03

Hydrocarbon Identification Screen

Sample Name:	GP-4@15'-17'	Units:	mg/Kg (ppm)
Lab Code:	K2308015-010	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline Range Organics	EPA 3550B	NWTPH-HCID	20	1	10/14/03	10/15/03	ND	
Diesel Range Organics	EPA 3550B	NWTPH-HCID	50	1	10/14/03	10/15/03	ND	
Residual Range Organics	EPA 3550B	NWTPH-HCID	100	1	10/14/03	10/15/03	ND	

Approved By: _____ Date: 10/15/03

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	10/10/03
Sample Matrix:	Soil	**Date Received:**	10/13/03

Hydrocarbon Identification Screen

Sample Name:	GP-5@2'-4'	**Units:**	mg/Kg (ppm)
Lab Code:	K2308015-011	**Basis:**	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline Range Organics	EPA 3550B	NWTPH-HCID	20	1	10/14/03	10/15/03	ND	
Diesel Range Organics	EPA 3550B	NWTPH-HCID	50	1	10/14/03	10/15/03	ND	
Residual Range Organics	EPA 3550B	NWTPH-HCID	100	1	10/14/03	10/15/03	ND	

Approved By: _____ Date: 10/15/03

1S22/020597p

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	10/10/03
Sample Matrix:	Soil	**Date Received:**	10/13/03

Hydrocarbon Identification Screen

Sample Name:	GP-5@16'-18'	Units:	mg/Kg (ppm)
Lab Code:	K2308015-012	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline Range Organics	EPA 3550B	NWTPH-HCID	20	1	10/14/03	10/15/03	ND	
Diesel Range Organics	EPA 3550B	NWTPH-HCID	50	1	10/14/03	10/15/03	ND	
Residual Range Organics	EPA 3550B	NWTPH-HCID	100	1	10/14/03	10/15/03	ND	

Approved By: MM Gurley Date: 10/15/03

1S22/020597p

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	RSV Engineering, Inc.	Service Request:	K2308015
Project:	Niemi Highway Service	Date Collected:	10/10/03
Sample Matrix:	Soil	Date Received:	10/13/03

Hydrocarbon Identification Screen

Sample Name: GP-6@2'-4'
Lab Code: K2308015-013
Test Notes:

Units: mg/Kg (ppm)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline Range Organics	EPA 3550B	NWTPH-HCID	20	1	10/14/03	10/15/03	ND	
Diesel Range Organics	EPA 3550B	NWTPH-HCID	50	1	10/14/03	10/15/03	ND	
Residual Range Organics	EPA 3550B	NWTPH-HCID	100	1	10/14/03	10/15/03	ND	

Approved By: _____ Date: 10/15/03

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Hydrocarbon Identification Screen

Sample Name:	Method Blank	**Units:**	ug/L (ppb)
Lab Code:	KWG0316213-3	**Basis:**	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline Range Organics	EPA 3550B	NWTPH-HCID	250	1	10/14/03	10/14/03	ND	
Diesel Range Organics	EPA 3550B	NWTPH-HCID	630	1	10/14/03	10/14/03	ND	
Residual Range Organics	EPA 3550B	NWTPH-HCID	630	1	10/14/03	10/14/03	ND	

Approved By: _____ Date: 10/15/03

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1S22/020597p

Analytical Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA

Hydrocarbon Identification Screen

Sample Name:	Method Blank	Units:	mg/Kg (ppm)
Lab Code:	KWG0316214-4	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline Range Organics	EPA 3550B	NWTPH-HCID	20	1	10/14/03	10/15/03	ND	
Diesel Range Organics	EPA 3550B	NWTPH-HCID	50	1	10/14/03	10/15/03	ND	
Residual Range Organics	EPA 3550B	NWTPH-HCID	100	1	10/14/03	10/15/03	ND	

Approved By: _____ Date: 10/15/03

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1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Collected: 10/10/03
Date Received: 10/13/03
Date Extracted: 10/14/03
Date Analyzed: 10/14/03

Surrogate Recovery Summary
Hydrocarbon Identification Screen

Prep Method: EPA 3550B
Analysis Method: NWTPH-HCID

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery o-Terphenyl	Percent Recovery 4-Bromofluorobenzene	Percent Recovery n-Triacontane
GP-1	K2308015-003		81	76	91
GP-2	K2308015-006		79	77	89
Method Blank	KWG0316213-3		88	87	97
CAS Acceptance Limits:			50-150	20-150	50-150

Approved By: _____ Date: 10/15/03

000049

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2308015
Date Collected: 10/10/03
Date Received: 10/13/03
Date Extracted: 10/14/03
Date Analyzed: 10/15/03

Surrogate Recovery Summary
Hydrocarbon Identification Screen

Prep Method: EPA 3550B
Analysis Method: NWTPH-HCID

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery o-Terphenyl	Percent Recovery 4-Bromofluorobenzene	Percent Recovery n-Triacontane
GP-1@2'-4'	K2308015-001		79	70	88
GP-1@17'-18'	K2308015-002		80	71	91
GP-2@2'-4'	K2308015-004		79	71	90
GP-2@17'-19'	K2308015-005		84	79	95
GP-3@2'-4'	K2308015-007		75	70	82
GP-3@17'-19'	K2308015-008		93	87	107
GP-4@2'-4'	K2308015-009		73	63	83
GP-4@15'-17'	K2308015-010		82	71	95
GP-5@2'-4'	K2308015-011		83	81	94
GP-5@16'-18'	K2308015-012		86	77	98
GP-6@2'-4'	K2308015-013		86	80	99
Method Blank	KWG0316214-4		79	73	91
CAS Acceptance Limits:			50-150	20-150	50-150

Approved By: _____ Date: 10/15/03

000050

Polychlorinated Biphenyls (PCB's) Method 8082

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Collected: 10/10/2003
Date Received: 10/13/2003

Polychlorinated Biphenyls (PCBs)

Sample Name: GP-2
Lab Code: K2308015-006

Extraction Method: EPA 3520C
Analysis Method: 8082

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.20	0.10	1	10/17/03	11/04/03	KWG0316537	
Aroclor 1221	ND	U	0.39	0.050	1	10/17/03	11/04/03	KWG0316537	
Aroclor 1232	ND	U	0.20	0.086	1	10/17/03	11/04/03	KWG0316537	
Aroclor 1242	ND	U	0.20	0.051	1	10/17/03	11/04/03	KWG0316537	
Aroclor 1248	ND	U	0.20	0.031	1	10/17/03	11/04/03	KWG0316537	
Aroclor 1254	ND	U	0.20	0.030	1	10/17/03	11/04/03	KWG0316537	
Aroclor 1260	ND	U	0.20	0.048	1	10/17/03	11/04/03	KWG0316537	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
D[redacted]hlorobiphenyl	20	10-147	11/04/03	Acceptable

Cos[redacted]ts:

000052

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Collected: NA
Date Received: NA

Polychlorinated Biphenyls (PCBs)

Sample Name: Method Blank
Lab Code: KWG0316537-3

Extraction Method: EPA 3520C
Analysis Method: 8082

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.20	0.10	1	10/17/03	10/27/03	KWG0316537	
Aroclor 1221	ND	U	0.40	0.050	1	10/17/03	10/27/03	KWG0316537	
Aroclor 1232	ND	U	0.20	0.086	1	10/17/03	10/27/03	KWG0316537	
Aroclor 1242	ND	U	0.20	0.051	1	10/17/03	10/27/03	KWG0316537	
Aroclor 1248	ND	U	0.20	0.031	1	10/17/03	10/27/03	KWG0316537	
Aroclor 1254	ND	U	0.20	0.030	1	10/17/03	10/27/03	KWG0316537	
Aroclor 1260	ND	U	0.20	0.048	1	10/17/03	10/27/03	KWG0316537	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
D[redacted]hlorobiphenyl	100	10-147	10/27/03	Acceptable

om[redacted]:

000053

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015

Surrogate Recovery Summary
Polychlorinated Biphenyls (PCBs)

Extraction Method: EPA 3520C
Analysis Method: 8082

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1
GP-2	K2308015-006	20
Method Blank	KWG0316537-3	100
Lab Control Sample	KWG0316537-1	71
Duplicate Lab Control Sample	KWG0316537-2	67

Surrogate Recovery Control Limits (%)

Sur1 = Decachlorobiphenyl 10-147

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

000054

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Extracted: 10/17/2003
Date Analyzed: 10/27/2003

Lab Control Spike/Duplicate Lab Control Spike Summary
Polychlorinated Biphenyls (PCBs)

Extraction Method: EPA 3520C
Analysis Method: 8082

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0316537

Analyte Name	Lab Control Sample KWG0316537-1 Lab Control Spike Result	Expected	%Rec	Duplicate Lab Control Sample KWG0316537-2 Duplicate Lab Control Spike Result	Expected	%Rec	%Rec Limits	RPD	RPD Limit
Aroclor 1016	2.03	2.00	102	1.92	2.00	96	46-143	6	30
Aroclor 1260	2.12	2.00	106	2.09	2.00	105	50-139	1	30

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000055

Volatile Organic Compounds
Method 8260

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

lient: RSV Engineering, Inc.
:oject: Niemi Highway Service
ımple Matrix: Water

Service Request: K2308015
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

ımple Name: GP-1
ab Code: K2308015-003

Units: ug/L
Basis: NA

ktraction Method: EPA 5030B
nalysis Method: 8260B

Level: Low

nalyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
ethyl tert-Butyl Ether	ND	U	0.50	0.074	1	10/22/03	10/22/03	KWG0317002	
2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
enzene	**0.18**	J	0.50	0.11	1	10/22/03	10/22/03	KWG0317002	
oluene	**0.26**	J	0.50	0.098	1	10/22/03	10/22/03	KWG0317002	
2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/22/03	10/22/03	KWG0317002	
hylbenzene	ND	U	0.50	0.13	1	10/22/03	10/22/03	KWG0317002	
,p-Xylenes	**0.29**	J	0.50	0.22	1	10/22/03	10/22/03	KWG0317002	
Xylene	**0.16**	J	0.50	0.079	1	10/22/03	10/22/03	KWG0317002	
opropylbenzene	ND	U	2.0	0.068	1	10/22/03	10/22/03	KWG0317002	*
Propylbenzene	ND	U	2.0	0.098	1	10/22/03	10/22/03	KWG0317002	*
3,5-Trimethylbenzene	ND	U	2.0	0.13	1	10/22/03	10/22/03	KWG0317002	*
2,4-Trimethylbenzene	ND	U	2.0	0.15	1	10/22/03	10/22/03	KWG0317002	*
ap[redacted]lene	ND	U	2.0	0.29	1	10/22/03	10/22/03	KWG0317002	

See Case Narrative

rrogate Name	%Rec	Control Limits	Date Analyzed	Note
ibromofluoromethane	97	78-124	10/22/03	Acceptable
oluene-d8	98	87-118	10/22/03	Acceptable
Bromofluorobenzene	89	81-113	10/22/03	Acceptable

omments:

000057

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-2
Lab Code: K2308015-006

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Methyl tert-Butyl Ether	ND	U	0.50	0.074	1	10/22/03	10/22/03	KWG0317002	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
Benzene	ND	U	0.50	0.11	1	10/22/03	10/22/03	KWG0317002	
Toluene	**0.12**	J	0.50	0.098	1	10/22/03	10/22/03	KWG0317002	
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/22/03	10/22/03	KWG0317002	
Ethylbenzene	ND	U	0.50	0.13	1	10/22/03	10/22/03	KWG0317002	
m,p-Xylenes	ND	U	0.50	0.22	1	10/22/03	10/22/03	KWG0317002	
o-Xylene	ND	U	0.50	0.079	1	10/22/03	10/22/03	KWG0317002	
Isopropylbenzene	ND	U	2.0	0.068	1	10/22/03	10/22/03	KWG0317002	*
n-Propylbenzene	ND	U	2.0	0.098	1	10/22/03	10/22/03	KWG0317002	*
1,3,5-Trimethylbenzene	ND	U	2.0	0.13	1	10/22/03	10/22/03	KWG0317002	*
1,2,4-Trimethylbenzene	ND	U	2.0	0.15	1	10/22/03	10/22/03	KWG0317002	*
Naphthalene	ND	U	2.0	0.29	1	10/22/03	10/22/03	KWG0317002	

See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	96	78-124	10/22/03	Acceptable
Toluene-d8	96	87-118	10/22/03	Acceptable
4-Bromofluorobenzene	89	81-113	10/22/03	Acceptable

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

lient:	RSV Engineering, Inc.	**Service Request:**	K2308015
roject:	Niemi Highway Service	**Date Collected:**	NA
ample Matrix:	Water	**Date Received:**	NA

Volatile Organic Compounds

ample Name:	Method Blank	**Units:**	ug/L
ab Code:	KWG0317002-4	**Basis:**	NA
xtraction Method:	EPA 5030B	**Level:**	Low
nalysis Method:	8260B		

nalyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
lethyl tert-Butyl Ether	ND	U	0.50	0.074	1	10/22/03	10/22/03	KWG0317002	
,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
enzene	ND	U	0.50	0.11	1	10/22/03	10/22/03	KWG0317002	
oluene	ND	U	0.50	0.098	1	10/22/03	10/22/03	KWG0317002	
,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/22/03	10/22/03	KWG0317002	
thylbenzene	ND	U	0.50	0.13	1	10/22/03	10/22/03	KWG0317002	
ı,p-Xylenes	ND	U	0.50	0.22	1	10/22/03	10/22/03	KWG0317002	
-Xylene	ND	U	0.50	0.079	1	10/22/03	10/22/03	KWG0317002	
sopropylbenzene	ND	U	2.0	0.068	1	10/22/03	10/22/03	KWG0317002	*
-Propylbenzene	ND	U	2.0	0.098	1	10/22/03	10/22/03	KWG0317002	*
,3,5-Trimethylbenzene	ND	U	2.0	0.13	1	10/22/03	10/22/03	KWG0317002	*
,2,4-Trimethylbenzene	ND	U	2.0	0.15	1	10/22/03	10/22/03	KWG0317002	*
fa[redacted]alene	ND	U	2.0	0.29	1	10/22/03	10/22/03	KWG0317002	

See Case Narrative

urrogate Name	%Rec	Control Limits	Date Analyzed	Note
ibromofluoromethane	95	78-124	10/22/03	Acceptable
oluene-d8	100	87-118	10/22/03	Acceptable
-Bromofluorobenzene	90	81-113	10/22/03	Acceptable

omments:

000059

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015

Surrogate Recovery Summary
Volatile Organic Compounds

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
GP-1	K2308015-003	97	98	89
GP-2	K2308015-006	96	96	89
Method Blank	KWG0317002-4	95	100	90
GP-2MS	KWG0317002-1	95	100	91
GP-2DMS	KWG0317002-2	95	100	91
Lab Control Sample	KWG0317002-3	94	98	91

rrogate Recovery Control Limits (%)

1 =	Dibromofluoromethane	78-124
2 =	Toluene-d8	87-118
3 =	4-Bromofluorobenzene	81-113

lts flagged with an asterisk (*) indicate values outside control criteria.
lts flagged with a pound (#) indicate the control criteria is not applicable.

000060

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

'lient: RSV Engineering, Inc.
'roject: Niemi Highway Service
ample Matrix: Water

Service Request: K2308015
Date Extracted: 10/22/2003
Date Analyzed: 10/22/2003

Matrix Spike/Duplicate Matrix Spike Summary
Volatile Organic Compounds

ample Name: GP-2
ab Code: K2308015-006

xtraction Method: EPA 5030B
nalysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low
Extraction Lot: KWG0317002

nalyte Name	Sample Result	GP-2MS KWG0317002-1 Matrix Spike			GP-2DMS KWG0317002-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Expected	%Rec	Result	Expected	%Rec			
lethyl tert-Butyl Ether	ND	11.0	10.0	110	12.1	10.0	121	66-135	10	30
2-Dichloroethane (EDC)	ND	10.2	10.0	102	9.89	10.0	99	74-135	3	30
enzene	ND	10.9	10.0	109	10.7	10.0	107	76-138	2	30
oluene	0.12	10.6	10.0	105	10.4	10.0	103	82-131	2	30
2-Dibromoethane (EDB)	ND	9.60	10.0	96	9.58	10.0	96	68-135	0	30
hylbenzene	ND	10.4	10.0	104	10.1	10.0	101	76-139	3	30
,p-Xylenes	ND	20.5	20.0	103	19.9	20.0	100	86-130	3	30
Xylene	ND	9.84	10.0	98	9.62	10.0	96	82-134	2	30
opropylbenzene	ND	8.95	10.0	90	8.80	10.0	88	72-136	2	30
P[redacted]benzene	ND	9.57	10.0	96	9.33	10.0	93	72-139	3	30
3,5-Trimethylbenzene	ND	9.29	10.0	93	9.17	10.0	92	81-132	1	30
2,4-Trimethylbenzene	ND	9.80	10.0	98	9.62	10.0	96	82-135	2	30
aphthalene	ND	9.84	10.0	98	9.77	10.0	98	50-149	1	30

ults [redacted]d with an asterisk (*) indicate values outside control criteria.
ults flagged with a pound (#) indicate the control criteria is not applicable.
:ent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000061

QA/QC Report

lient: RSV Engineering, Inc.
roject: Niemi Highway Service
ımple Matrix: Water

Service Request: K2308015
Date Extracted: 10/22/2003
Date Analyzed: 10/22/2003

Lab Control Spike Summary
Volatile Organic Compounds

ıtraction Method: EPA 5030B
nalysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0317002

	Lab Control Sample KWG0317002-3 Lab Control Spike				%Rec
nalyte Name	**Result**	**Expected**	**%Rec**		**Limits**
ethyl tert-Butyl Ether	10.2	10.0	102		78-128
2-Dichloroethane (EDC)	9.70	10.0	97		73-130
;nzene	9.61	10.0	96		90-120
)luene	9.14	10.0	91		89-119
2-Dibromoethane (EDB)	9.24	10.0	92		74-130
hylbenzene	9.13	10.0	91		89-124
p-Xylenes	18.2	20.0	91		90-122
Xylene	8.93	10.0	89		88-126
)propylbenzene	7.73	10.0	77	*	82-123
Propylbenzene	8.11	10.0	81	*	83-128
3,5-Trimethylbenzene	8.24	10.0	82	*	85-128
2,4-Trimethylbenzene	8.69	10.0	87	*	88-129
ıphthalene	8.61	10.0	86		71-137

ılts flagged with an asterisk (*) indicate values outside control criteria.
cent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000062

Polynuclear Aromatic Hydrocarbons
Method 8270

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Collected: 10/10/2003
Date Received: 10/13/2003

Polynuclear Aromatic Hydrocarbons

Sample Name: GP-2
Lab Code: K2308015-006

Extraction Method: EPA 3520C
Analysis Method: 8270C SIM

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**0.039**		0.020	0.0032	1	10/17/03	10/24/03	KWG0316637	
2-Methylnaphthalene	**0.031**		0.020	0.0027	1	10/17/03	10/24/03	KWG0316637	
Acenaphthylene	**0.0051**	J	0.020	0.0018	1	10/17/03	10/24/03	KWG0316637	
Acenaphthene	**0.021**		0.020	0.0020	1	10/17/03	10/24/03	KWG0316637	
Dibenzofuran	ND	U	0.020	0.0071	1	10/17/03	10/24/03	KWG0316637	
Fluorene	**0.010**	J	0.020	0.0026	1	10/17/03	10/24/03	KWG0316637	
Phenanthrene	**0.015**	J	0.020	0.0032	1	10/17/03	10/24/03	KWG0316637	
Anthracene	**0.0023**	J	0.020	0.0011	1	10/17/03	10/24/03	KWG0316637	
Fluoranthene	**0.013**	J	0.020	0.0024	1	10/17/03	10/24/03	KWG0316637	
Pyrene	**0.022**		0.020	0.0023	1	10/17/03	10/24/03	KWG0316637	
Benz(a)anthracene	**0.0031**	J	0.020	0.0021	1	10/17/03	10/24/03	KWG0316637	
Chrysene	**0.0059**	J	0.020	0.0013	1	10/17/03	10/24/03	KWG0316637	
B[illegible](b)fluoranthene	**0.0030**	J	0.020	0.0020	1	10/17/03	10/24/03	KWG0316637	
Be[illegible]o(k)fluoranthene	**0.0028**	J	0.020	0.0014	1	10/17/03	10/24/03	KWG0316637	
Benzo(a)pyrene	ND	U	0.020	0.0016	1	10/17/03	10/24/03	KWG0316637	
Indeno(1,2,3-cd)pyrene	ND	U	0.020	0.0021	1	10/17/03	10/24/03	KWG0316637	
Dibenz(a,h)anthracene	ND	U	0.020	0.0017	1	10/17/03	10/24/03	KWG0316637	
Benzo(g,h,i)perylene	**0.0056**	J	0.020	0.0037	1	10/17/03	10/24/03	KWG0316637	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Biphenyl-d10	58	34-115	10/24/03	Acceptable
Fluorene-d10	49	43-96	10/24/03	Acceptable
Fluoranthene-d10	76	20-131	10/24/03	Acceptable
Terphenyl-d14	57	13-146	10/24/03	Acceptable

Comments:

000064

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Collected: NA
Date Received: NA

Polynuclear Aromatic Hydrocarbons

Sample Name: Method Blank
Lab Code: KWG0316637-3

Extraction Method: EPA 3520C
Analysis Method: 8270C SIM

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**0.0046**	J	0.020	0.0032	1	10/17/03	10/24/03	KWG0316637	
2-Methylnaphthalene	**0.0031**	J	0.020	0.0027	1	10/17/03	10/24/03	KWG0316637	
Acenaphthylene	ND	U	0.020	0.0018	1	10/17/03	10/24/03	KWG0316637	
Acenaphthene	ND	U	0.020	0.0020	1	10/17/03	10/24/03	KWG0316637	
Dibenzofuran	ND	U	0.020	0.0071	1	10/17/03	10/24/03	KWG0316637	
Fluorene	ND	U	0.020	0.0026	1	10/17/03	10/24/03	KWG0316637	
Phenanthrene	**0.013**	J	0.020	0.0032	1	10/17/03	10/24/03	KWG0316637	
Anthracene	ND	U	0.020	0.0011	1	10/17/03	10/24/03	KWG0316637	
Fluoranthene	**0.010**	J	0.020	0.0024	1	10/17/03	10/24/03	KWG0316637	
Pyrene	**0.0056**	J	0.020	0.0023	1	10/17/03	10/24/03	KWG0316637	
Benz(a)anthracene	ND	U	0.020	0.0021	1	10/17/03	10/24/03	KWG0316637	
Chrysene	**0.0026**	J	0.020	0.0013	1	10/17/03	10/24/03	KWG0316637	
Benzo(b)fluoranthene	**0.0020**	J	0.020	0.0020	1	10/17/03	10/24/03	KWG0316637	
Benzo(k)fluoranthene	ND	U	0.020	0.0014	1	10/17/03	10/24/03	KWG0316637	
Benzo(a)pyrene	ND	U	0.020	0.0016	1	10/17/03	10/24/03	KWG0316637	
Indeno(1,2,3-cd)pyrene	**0.0096**	J	0.020	0.0021	1	10/17/03	10/24/03	KWG0316637	
Dibenz(a,h)anthracene	**0.0097**	J	0.020	0.0017	1	10/17/03	10/24/03	KWG0316637	
Benzo(g,h,i)perylene	**0.011**	J	0.020	0.0037	1	10/17/03	10/24/03	KWG0316637	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Biphenyl-d10	68	34-115	10/24/03	Acceptable
Fluorene-d10	53	43-96	10/24/03	Acceptable
Fluoranthene-d10	93	20-131	10/24/03	Acceptable
Terphenyl-d14	109	13-146	10/24/03	Acceptable

Comments:

000065

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3520C
Analysis Method: 8270C SIM

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3	Sur4
GP-2	K2308015-006	58	49	76	57
Method Blank	KWG0316637-3	68	53	93	109
Lab Control Sample	KWG0316637-1	77	74	98	102
Duplicate Lab Control Sample	KWG0316637-2	78	73	95	102

urrogate Recovery Control Limits (%)

ur1	= Biphenyl-d10	34-115
ur2	= Fluorene-d10	43-96
ur3	= Fluoranthene-d10	20-131
ur4	= Terphenyl-d14	13-146

esults flagged with an asterisk (*) indicate values outside control criteria.
esults flagged with a pound (#) indicate the control criteria is not applicable.

000066

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Extracted: 10/17/2003
Date Analyzed: 10/24/2003

Lab Control Spike/Duplicate Lab Control Spike Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3520C
Analysis Method: 8270C SIM

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0316637

Analyte Name	Lab Control Sample KWG0316637-1 Lab Control Spike Result	Expected	%Rec	Duplicate Lab Control Sample KWG0316637-2 Duplicate Lab Control Spike Result	Expected	%Rec	%Rec Limits	RPD	RPD Limit
Naphthalene	3.73	5.00	75	3.17	5.00	63	37-95	16	30
2-Methylnaphthalene	3.80	5.00	76	3.12	5.00	62	26-110	20	30
Acenaphthylene	3.96	5.00	79	3.50	5.00	70	44-103	12	30
Acenaphthene	3.94	5.00	79	3.52	5.00	70	41-97	11	30
Dibenzofuran	3.86	5.00	77	3.43	5.00	69	17-130	12	30
Fluorene	4.02	5.00	80	3.59	5.00	72	46-102	11	30
Phenanthrene	4.31	5.00	86	3.86	5.00	77	47-101	11	30
Anthracene	4.23	5.00	85	3.59	5.00	72	45-104	16	30
Fluoranthene	5.02	5.00	100	4.31	5.00	86	51-112	15	30
Pyrene	4.44	5.00	89	3.98	5.00	80	45-111	11	30
Benz(a)anthracene	4.62	5.00	92	3.96	5.00	79	50-111	15	30
Chrysene	4.64	5.00	93	4.13	5.00	83	51-108	12	30
Benzo(b)fluoranthene	4.56	5.00	91	4.04	5.00	81	54-114	12	30
Benzo(k)fluoranthene	4.65	5.00	93	4.18	5.00	84	51-117	11	30
Benzo(a)pyrene	4.62	5.00	92	4.11	5.00	82	51-119	12	30
Indeno(1,2,3-cd)pyrene	5.19	5.00	104	4.74	5.00	95	43-127	9	30
Dibenz(a,h)anthracene	5.55	5.00	111	5.01	5.00	100	47-119	10	30
Benzo(g,h,i)perylene	4.74	5.00	95	4.32	5.00	86	44-115	9	30

sults flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000067

1317 South 13th Avenue P.O. Box 479 Kelso, Washington 98626 (360) 577-7222 ph (360) 636-1068 fax

Columbia Analytical Services INC.
An Employee - Owned Company

December 4, 2003

Service Request No: K2308015

Craig Arola
RSV Engineering Inc.
31960 SW Charbonneau Drive
Suite 201
Wilsonville, OR 97070

RE: Niemi Highway Service

Dear Craig:

Enclosed are the revised report pages for the rush sample(s) submitted to our laboratory on October 13, 2003. For your reference, these analyses have been assigned our service request number K2308015.

The halogenated compound list has been added to the initial list of compounds provided.

Please call if you have any questions. My extension is 3280.

Respectfully submitted,

Columbia Analytical Services, Inc.

Les Kennedy
Project Chemist

LK/jeb

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
[redacted]	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
B	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.
*	The duplicate analysis not within control limits. See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a chromatographic interference.
X	See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	[redacted] chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-1
Lab Code: K2308015-003

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	0.50	0.17	1	10/22/03	10/22/03	KWG0317002	
Chloromethane	ND	U	0.50	0.14	1	10/22/03	10/22/03	KWG0317002	
Vinyl Chloride	ND	U	0.50	0.22	1	10/22/03	10/22/03	KWG0317002	
Bromomethane	ND	U	0.50	0.22	1	10/22/03	10/22/03	KWG0317002	
Chloroethane	ND	U	0.50	0.23	1	10/22/03	10/22/03	KWG0317002	
Trichlorofluoromethane	ND	U	0.50	0.14	1	10/22/03	10/22/03	KWG0317002	
1,1-Dichloroethene	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
Trichlorotrifluoroethane	ND	U	0.50	0.14	1	10/22/03	10/22/03	KWG0317002	
Methylene Chloride	ND	U	2.0	0.20	1	10/22/03	10/22/03	KWG0317002	
trans-1,2-Dichloroethene	ND	U	0.50	0.14	1	10/22/03	10/22/03	KWG0317002	
1,1-Dichloroethane	ND	U	0.50	0.091	1	10/22/03	10/22/03	KWG0317002	
cis-1,2-Dichloroethene	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
Ch[redacted]form	ND	U	0.50	0.096	1	10/22/03	10/22/03	KWG0317002	
1,1[redacted]richloroethane (TCA)	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
Carbon Tetrachloride	ND	U	0.50	0.13	1	10/22/03	10/22/03	KWG0317002	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
Trichloroethene (TCE)	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
1,2-Dichloropropane	ND	U	0.50	0.13	1	10/22/03	10/22/03	KWG0317002	
Bromodichloromethane	ND	U	0.50	0.085	1	10/22/03	10/22/03	KWG0317002	
2-Chloroethyl Vinyl Ether	ND	U	5.0	0.24	1	10/22/03	10/22/03	KWG0317002	
cis-1,3-Dichloropropene	ND	U	0.50	0.085	1	10/22/03	10/22/03	KWG0317002	
trans-1,3-Dichloropropene	ND	U	0.50	0.087	1	10/22/03	10/22/03	KWG0317002	
1,1,2-Trichloroethane	ND	U	0.50	0.10	1	10/22/03	10/22/03	KWG0317002	
Tetrachloroethene (PCE)	ND	U	0.50	0.11	1	10/22/03	10/22/03	KWG0317002	
Dibromochloromethane	ND	U	0.50	0.082	1	10/22/03	10/22/03	KWG0317002	
Chlorobenzene	ND	U	0.50	0.094	1	10/22/03	10/22/03	KWG0317002	
Bromoform	ND	U	0.50	0.28	1	10/22/03	10/22/03	KWG0317002	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.14	1	10/22/03	10/22/03	KWG0317002	
1,3-Dichlorobenzene	ND	U	0.50	0.11	1	10/22/03	10/22/03	KWG0317002	
1,4-Dichlorobenzene	ND	U	0.50	0.098	1	10/22/03	10/22/03	KWG0317002	
1,2-Dichlorobenzene	ND	U	0.50	0.088	1	10/22/03	10/22/03	KWG0317002	

Com[redacted]:

000004

Analytical Results

Client:	RSV Engineering, Inc.	**Service Request:**	K2308015
Project:	Niemi Highway Service	**Date Collected:**	10/10/2003
Sample Matrix:	Water	**Date Received:**	10/13/2003

Volatile Organic Compounds

Sample Name:	GP-1	**Units:**	ug/L
Lab Code:	K2308015-003	**Basis:**	NA

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	97	78-124	10/22/03	Acceptable
Toluene-d8	98	87-118	10/22/03	Acceptable
4-Bromofluorobenzene	89	81-113	10/22/03	Acceptable

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Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-2
Lab Code: K2308015-006

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	0.50	0.17	1	10/22/03	10/22/03	KWG0317002	
Chloromethane	ND	U	0.50	0.14	1	10/22/03	10/22/03	KWG0317002	
Vinyl Chloride	ND	U	0.50	0.22	1	10/22/03	10/22/03	KWG0317002	
Bromomethane	ND	U	0.50	0.22	1	10/22/03	10/22/03	KWG0317002	
Chloroethane	ND	U	0.50	0.23	1	10/22/03	10/22/03	KWG0317002	
Trichlorofluoromethane	ND	U	0.50	0.14	1	10/22/03	10/22/03	KWG0317002	
1,1-Dichloroethene	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
Trichlorotrifluoroethane	ND	U	0.50	0.14	1	10/22/03	10/22/03	KWG0317002	
Methylene Chloride	ND	U	2.0	0.20	1	10/22/03	10/22/03	KWG0317002	
trans-1,2-Dichloroethene	ND	U	0.50	0.14	1	10/22/03	10/22/03	KWG0317002	
1,1-Dichloroethane	ND	U	0.50	0.091	1	10/22/03	10/22/03	KWG0317002	
cis-1,2-Dichloroethene	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
Ch[redacted]oform	ND	U	0.50	0.096	1	10/22/03	10/22/03	KWG0317002	
1,[redacted]richloroethane (TCA)	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
Carbon Tetrachloride	ND	U	0.50	0.13	1	10/22/03	10/22/03	KWG0317002	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
Trichloroethene (TCE)	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
1,2-Dichloropropane	ND	U	0.50	0.13	1	10/22/03	10/22/03	KWG0317002	
Bromodichloromethane	ND	U	0.50	0.085	1	10/22/03	10/22/03	KWG0317002	
2-Chloroethyl Vinyl Ether	ND	U	5.0	0.24	1	10/22/03	10/22/03	KWG0317002	
cis-1,3-Dichloropropene	ND	U	0.50	0.085	1	10/22/03	10/22/03	KWG0317002	
trans-1,3-Dichloropropene	ND	U	0.50	0.087	1	10/22/03	10/22/03	KWG0317002	
1,1,2-Trichloroethane	ND	U	0.50	0.10	1	10/22/03	10/22/03	KWG0317002	
Tetrachloroethene (PCE)	ND	U	0.50	0.11	1	10/22/03	10/22/03	KWG0317002	
Dibromochloromethane	ND	U	0.50	0.082	1	10/22/03	10/22/03	KWG0317002	
Chlorobenzene	ND	U	0.50	0.094	1	10/22/03	10/22/03	KWG0317002	
Bromoform	ND	U	0.50	0.28	1	10/22/03	10/22/03	KWG0317002	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.14	1	10/22/03	10/22/03	KWG0317002	
1,3-Dichlorobenzene	ND	U	0.50	0.11	1	10/22/03	10/22/03	KWG0317002	
1,4-Dichlorobenzene	ND	U	0.50	0.098	1	10/22/03	10/22/03	KWG0317002	
1,2-Dichlorobenzene	ND	U	0.50	0.088	1	10/22/03	10/22/03	KWG0317002	

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000006

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-2
Lab Code: K2308015-006

Units: ug/L
Basis: NA

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	96	78-124	10/22/03	Acceptable
Toluene-d8	96	87-118	10/22/03	Acceptable
4-Bromofluorobenzene	89	81-113	10/22/03	Acceptable

Comments:

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG0317002-4

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	0.50	0.17	1	10/22/03	10/22/03	KWG0317002	
Chloromethane	ND	U	0.50	0.14	1	10/22/03	10/22/03	KWG0317002	
Vinyl Chloride	ND	U	0.50	0.22	1	10/22/03	10/22/03	KWG0317002	
Bromomethane	ND	U	0.50	0.22	1	10/22/03	10/22/03	KWG0317002	
Chloroethane	ND	U	0.50	0.23	1	10/22/03	10/22/03	KWG0317002	
Trichlorofluoromethane	ND	U	0.50	0.14	1	10/22/03	10/22/03	KWG0317002	
1,1-Dichloroethene	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
Trichlorotrifluoroethane	ND	U	0.50	0.14	1	10/22/03	10/22/03	KWG0317002	
Methylene Chloride	ND	U	2.0	0.20	1	10/22/03	10/22/03	KWG0317002	
trans-1,2-Dichloroethene	ND	U	0.50	0.14	1	10/22/03	10/22/03	KWG0317002	
1,1-Dichloroethane	ND	U	0.50	0.091	1	10/22/03	10/22/03	KWG0317002	
cis-1,2-Dichloroethene	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
Chloroform	ND	U	0.50	0.096	1	10/22/03	10/22/03	KWG0317002	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
Carbon Tetrachloride	ND	U	0.50	0.13	1	10/22/03	10/22/03	KWG0317002	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
Trichloroethene (TCE)	ND	U	0.50	0.12	1	10/22/03	10/22/03	KWG0317002	
1,2-Dichloropropane	ND	U	0.50	0.13	1	10/22/03	10/22/03	KWG0317002	
Bromodichloromethane	ND	U	0.50	0.085	1	10/22/03	10/22/03	KWG0317002	
2-Chloroethyl Vinyl Ether	ND	U	5.0	0.24	1	10/22/03	10/22/03	KWG0317002	
cis-1,3-Dichloropropene	ND	U	0.50	0.085	1	10/22/03	10/22/03	KWG0317002	
trans-1,3-Dichloropropene	ND	U	0.50	0.087	1	10/22/03	10/22/03	KWG0317002	
1,1,2-Trichloroethane	ND	U	0.50	0.10	1	10/22/03	10/22/03	KWG0317002	
Tetrachloroethene (PCE)	ND	U	0.50	0.11	1	10/22/03	10/22/03	KWG0317002	
Dibromochloromethane	ND	U	0.50	0.082	1	10/22/03	10/22/03	KWG0317002	
Chlorobenzene	ND	U	0.50	0.094	1	10/22/03	10/22/03	KWG0317002	
Bromoform	ND	U	0.50	0.28	1	10/22/03	10/22/03	KWG0317002	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.14	1	10/22/03	10/22/03	KWG0317002	
1,3-Dichlorobenzene	ND	U	0.50	0.11	1	10/22/03	10/22/03	KWG0317002	
1,4-Dichlorobenzene	ND	U	0.50	0.098	1	10/22/03	10/22/03	KWG0317002	
1,2-Dichlorobenzene	ND	U	0.50	0.088	1	10/22/03	10/22/03	KWG0317002	

000008

Comments:

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG0317002-4

Units: ug/L
Basis: NA

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	95	78-124	10/22/03	Acceptable
Toluene-d8	100	87-118	10/22/03	Acceptable
4-Bromofluorobenzene	90	81-113	10/22/03	Acceptable

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Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Extracted: 10/22/2003
Date Analyzed: 10/22/2003

Matrix Spike/Duplicate Matrix Spike Summary
Volatile Organic Compounds

Sample Name: GP-2
Lab Code: K2308015-006

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0317002

Analyte Name	Sample Result	GP-2MS KWG0317002-1 Matrix Spike			GP-2DMS KWG0317002-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Expected	%Rec	Result	Expected	%Rec			
1,1-Dichloroethene	ND	11.9	10.0	119	11.4	10.0	114	67-157	5	30
Trichloroethene (TCE)	ND	10.7	10.0	107	10.3	10.0	103	66-149	4	30
Chlorobenzene	ND	9.67	10.0	97	9.53	10.0	95	70-131	1	30
1,2-Dichlorobenzene	ND	9.20	10.0	92	9.18	10.0	92	70-126	0	30

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000010

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Water

Service Request: K2308015
Date Extracted: 10/22/2003
Date Analyzed: 10/22/2003

Lab Control Spike Summary
Volatile Organic Compounds

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0317002

Lab Control Sample
KWG0317002-3
Lab Control Spike

Analyte Name	Result	Expected	%Rec	%Rec Limits
Dichlorodifluoromethane	11.2	10.0	112	33-189
Chloromethane	9.02	10.0	90	66-128
Vinyl Chloride	9.70	10.0	97	76-135
Bromomethane	9.21	10.0	92	30-188
Chloroethane	8.93	10.0	89	79-131
Trichlorofluoromethane	8.68	10.0	87	73-127
1,1-Dichloroethene	9.53	10.0	95	79-137
Trichlorotrifluoroethane	9.53	10.0	95	72-136
Methylene Chloride	11.9	10.0	119	68-135
trans-1,2-Dichloroethene	9.23	10.0	92	88-127
[illegible]ichloroethane	9.59	10.0	96	89-133
cis-1,2-Dichloroethene	9.14	10.0	91	90-126
Chloroform	9.51	10.0	95	88-117
1,1,1-Trichloroethane (TCA)	9.28	10.0	93	83-122
Carbon Tetrachloride	9.25	10.0	93	87-131
1,2-Dichloroethane (EDC)	9.70	10.0	97	73-130
Trichloroethene (TCE)	9.28	10.0	93	83-131
1,2-Dichloropropane	9.20	10.0	92	87-121
Bromodichloromethane	9.38	10.0	94	84-114
2-Chloroethyl Vinyl Ether	8.80	10.0	88	59-144
cis-1,3-Dichloropropene	9.19	10.0	92	90-126
trans-1,3-Dichloropropene	8.35	10.0	84	77-113
1,1,2-Trichloroethane	9.51	10.0	95	81-116
Tetrachloroethene (PCE)	8.95	10.0	90	82-123
Dibromochloromethane	9.45	10.0	95	83-119
Chlorobenzene	8.94	10.0	89	86-115
Bromoform	9.28	10.0	93	76-125
1,1,2,2-Tetrachloroethane	8.29	10.0	83	78-117
1,3-Dichlorobenzene	8.68	10.0	87	87-116
1,4-Dichlorobenzene	8.91	10.0	89	86-115
1,2-Dichlorobenzene	8.79	10.0	88	85-113

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[illegible] flagged with an asterisk (*) indicate values outside control criteria.
ercent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

1317 South 13th Avenue P.O. Box 479 Kelso, Washington 98626 (360) 577-7222 ph (360) 636-1068 fax

Columbia Analytical Services INC
An Employee - Owned Company

December 11, 2003

Service Request No: K2309245

Craig Arola
RSV Engineering Inc.
31960 SW Charbonneau Drive
Suite 201
Wilsonville, OR 97070

RE: Niemi Highway Services

Dear Craig:

Enclosed are the results of the sample(s) submitted to our laboratory on October 13, 2003. For your reference, these analyses have been assigned our service request number K2309245.

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAC standards except as noted in the case narrative report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3280.

Respectfully submitted,

Columbia Analytical Services, Inc.

Les Kennedy
Project Chemist

LK/afs

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
B	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.
*	The duplicate analysis not within control limits. See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a chromatographic interference.
X	See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

Case Narrative

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	RSV Engineering	**Service Request No.:**	K2309245
Project:	Niemi Highway Service	**Date Received:**	10/13/03
Sample Matrix:	Soil		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier III validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Two samples that were received for analysis at Columbia Analytical Services on 10/13/03 under service request K2308015, were re-issued for analysis of Volatiles (EPA 8260) and PAHs (EPA 8270-SIM) on 1111/20/03 past the recommended holding time.

Volatile Organic Compounds by EPA Method 8260B

Holding Time Exceptions:
Samples GP-5@2'-4' and GP-5@16'-18' were requested past the recommended holding time. The analysis was performed as soon as possible after the samples were re-issued. The data is flagged to indicate the holding time exceedence.

Laboratory Control Sample (LCS) Exceptions
The advisory criterion was exceeded for the following analytes in LCS KWG0318965-1: 1,1-Dichloroethane, 1,2-Dichloropropane, 2-Chloroethyl Vinyl Ether, cis-1,3-Dichloropropene, and 1,2-Dibromoethane (EDB). As per the CAS/Kelso Standard Operating Procedure (SOP) for this method, these compounds are not included in the subset of analytes used to control the analysis. The recovery information reported for these analytes is for advisory purposes only (i.e. to provide additional detail related to the performance of each individual compound). No further corrective action was required.

Polynuclear Aromatic Hydrocarbons by EPA Method 8270C

Hold Time Exceptions
Samples GP-5@2'-4' and GP-5@16'-18' were extracted past the recommended holding time at the client's request. The lab performed the analysis as soon as possible after the samples were re-issued. The data is flagged to indicate the holding time exceedence.

Approved by ll Date 12/12/03

Chain of Custody Documentation

CHAIN OF CUSTODY

Columbia Analytical Services INC.
An Employee - Owned Company

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222x07 • FAX (360) 636-1068

SR#: K2308015

PAGE 1 OF 2 COC #

PROJECT NAME: Niemi Highway Service
PROJECT NUMBER:
PROJECT MANAGER:
COMPANY/ADDRESS: RSI Engineering Inc. 31960 SW Charbonneau Dr. #101
CITY/STATE/ZIP: Wilsonville, OR 97070
E-MAIL ADDRESS:
PHONE #: (503)694-6960 FAX#: (503)694-6962
SAMPLER'S SIGNATURE:

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐	Volatile Organics 624☐ 8260☐	Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐	8021☐ BTEX☐	Fuel Fingerprint (FIQ) NW-HCID Screen	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCB's Arocolors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081A☐ 8141A☐ 8151A☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	PAHS 8310☐ SIM☐	Metals, Total or Dissolved (See list below)	Cyanide☐	Hex-Chrom☐	pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC DOC (circle) NO_2+NO_3	TOX 9020☐ AOX 1650☐ 506☐	REMARKS
GP-2@2'-4'	10/10/03	9:40	1	S	2					X												
GP-2@17'-18'	"	10:00	2	S	2					X												
GP-2	"	10:10	3	W	8					X												
GP-2@2'-4'	"	11:20	4	S	2					X												
GP-2@17'-19'	"	1:40	5	S	2					X												
GP-2	"	1145	6	W	8					X												
GP-3@2'-4'	"	2:15	7	S	2					X												
GP-3@17'-19'	"	2:50	8	S	2					X												
GP-4@2'-4'	"	2:45	9	S	2					X												
GP-4@15'-17'	"	3:00	10	S	2					X												

REPORT REQUIREMENTS

- ● I. Routine Report: Method Blank, Surrogate, as required
- ___ II. Report Dup., MS, MSD as required
- ___ III. Data Validation Report (includes all raw data)
- ___ IV. CLP Deliverable Report
- ___ V. EDD

INVOICE INFORMATION

P.O. #
Bill To:

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard (10-15 working days)
___ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER:_____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

See Attached instructions

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature:	Signature:	Signature:
Printed Name:	Printed Name:	Printed Name:	Printed Name:
Firm:	Firm: CAS	Firm:	Firm: CAS
Date/Time: 10/10/03 9:00 AM	Date/Time: 10-13-03 10:40	Date/Time: 10-13-03 1:25	Date/Time: 10/13/03 1335

CHAIN OF CUSTODY

Columbia Analytical Services INC.
An Employee - Owned Company

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SR#: K2308015

PAGE 2 OF 2 COC #

PROJECT NAME: Niemi Highway Service
PROJECT NUMBER:
PROJECT MANAGER:
COMPANY/ADDRESS: RSV Engineering, Inc.
31960 SW Charbonneau Dr. #101
CITY/STATE/ZIP: Wilsonville, OR 97070
E-MAIL ADDRESS:
PHONE: (503) 694-6960 FAX: (503) 694-6962
SAMPLER'S SIGNATURE:

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐	Volatile Organics 624☐ 8260☐	Hydrocarbons 8021☐ BTEX☐ Gas☐ Diesel☐ (*see below) Oil☐	☐ Fuel Fingerprint (FIQ) ☒ NW-HCID Screen	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCB's Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081A☐ 8141A☐ 8151A☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	PAHS 8310☐ SIM☐	Metals, Total or Dissolved (See list below)	Cyanide☐	pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle) NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020☐ AOX 1650☐ 506☐	REMARKS
GP-5 @ 2'-4'	10/10/03	3:20	11		2				X										
GP-5 @ 16'-18'	"	3:45	12		2				X										
GP-6 @ 2'-4'	"	4:30	13		2				X										
Trip Blank			14		1				X										

REPORT REQUIREMENTS

- ● I. Routine Report: Method Blank, Surrogate, as required
- ___ II. Report Dup., MS, MSD as required
- ___ III. Data Validation Report (includes all raw data)
- ___ IV. CLP Deliverable Report
- ___ V. EDD

INVOICE INFORMATION

P.O. #
Bill To: Invoice

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard (10-15 working days)
___ Provide FAX Results
___ Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER:_____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

See attached instructions.

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature	Signature	Signature	Signature
Printed Name	Printed Name	Printed Name	Printed Name
Firm	Firm	Firm	Firm
Date/Time 10/13/03 9:00AM	Date/Time 10/13/03 10:40	Date/Time 10/13/03	Date/Time 1335 10/13/03

Columbia Analytical Services Inc.
Cooler Receipt And Preservation Form

Project/Client RSV Engineering Work Order K23 8015

Cooler received on 10/03/03. and opened on 10/03/03. by KM.

1.	Were custody seals on outside of cooler? If yes, how many and where?		Y N
2.	Were seals intact and signature & date correct?		Y N
3.	Is the shipper's airbill available and filed? If no, record airbill number:	CAS	~~Y~~ N
4.	COC #		
	Temperature of cooler(s) upon receipt:	2.5 / 1.8	
	Temperature Blank:	5.1 / NP KM 8.4	
5.	Were custody papers properly filled out (ink, signed, etc.)?		Y N
6.	Type of packing material present	ICE	
7.	Did all bottles arrive in good condition (unbroken)?		Y N
8.	Were all bottle labels complete (*i.e.* analysis, preservation, etc.)?		Y N
9.	Did all bottle labels and tags agree with custody papers?		Y N
10.	Were the correct types of bottles used for the tests indicated?		Y N
11.	Were all of the preserved bottles received at the lab with the appropriate pH?		Y N
12.	Were VOA vials checked for absence of air bubbles, and if present, noted below?		Y N
13.	Did the bottles originate from CAS/K or a branch laboratory?		Y N
14.	Are CWA Microbiology samples received with > ½ the 24 hr. hold time remaining from collection?		Y N
15.	Was Cl2/Res negative?		~~Y~~ N

Explain any discrepancies:

RESOLUTION:

Samples that required preservation or received out of temperature:

Sample ID	Reagent	Volume	Lot Number	Bottle Type	Rec'd out of Temperature	Initials
					10:30	KM

000009

CRFREV.DOC3/5/2003

Volatile Organic Compounds
Method 8260

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-5@2'-4'
Lab Code: K2309245-001

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	6.1	0.87	1	11/22/03	11/22/03	KWG0318931	*
Chloromethane	ND	U	6.1	1.3	1	11/22/03	11/22/03	KWG0318931	*
Vinyl Chloride	ND	U	6.1	0.77	1	11/22/03	11/22/03	KWG0318931	*
Bromomethane	ND	U	6.1	0.99	1	11/22/03	11/22/03	KWG0318931	*
Chloroethane	ND	U	6.1	0.97	1	11/22/03	11/22/03	KWG0318931	*
Trichlorofluoromethane	ND	U	6.1	0.90	1	11/22/03	11/22/03	KWG0318931	*
,1-Dichloroethene	ND	U	6.1	0.85	1	11/22/03	11/22/03	KWG0318931	*
Trichlorotrifluoroethane	ND	U	6.1	0.92	1	11/22/03	11/22/03	KWG0318931	*
Methylene Chloride	**1.6**	J	13	1.2	1	11/22/03	11/22/03	KWG0318931	*
Methyl tert-Butyl Ether	ND	U	6.1	0.79	1	11/22/03	11/22/03	KWG0318931	*
rans-1,2-Dichloroethene	ND	U	6.1	0.90	1	11/22/03	11/22/03	KWG0318931	*
,1-Dichloroethane	ND	U	6.1	0.97	1	11/22/03	11/22/03	KWG0318931	*
is-[redacted]Dichloroethene	ND	U	6.1	1.1	1	11/22/03	11/22/03	KWG0318931	*
Chloroform	ND	U	6.1	0.71	1	11/22/03	11/22/03	KWG0318931	*
,1,1-Trichloroethane (TCA)	ND	U	6.1	0.71	1	11/22/03	11/22/03	KWG0318931	*
Carbon Tetrachloride	ND	U	6.1	0.74	1	11/22/03	11/22/03	KWG0318931	*
enzene	ND	U	6.1	0.98	1	11/22/03	11/22/03	KWG0318931	*
,2-Dichloroethane (EDC)	ND	U	6.1	0.83	1	11/22/03	11/22/03	KWG0318931	*
richloroethene (TCE)	ND	U	6.1	0.35	1	11/22/03	11/22/03	KWG0318931	*
,2-Dichloropropane	ND	U	6.1	0.89	1	11/22/03	11/22/03	KWG0318931	*
romodichloromethane	ND	U	6.1	0.66	1	11/22/03	11/22/03	KWG0318931	*
-Chloroethyl Vinyl Ether	ND	U	13	1.3	1	11/22/03	11/22/03	KWG0318931	*
s-1,3-Dichloropropene	ND	U	6.1	0.94	1	11/22/03	11/22/03	KWG0318931	*
oluene	ND	U	6.1	1.1	1	11/22/03	11/22/03	KWG0318931	*
ans-1,3-Dichloropropene	ND	U	6.1	0.74	1	11/22/03	11/22/03	KWG0318931	*
1,2-Trichloroethane	ND	U	6.1	0.85	1	11/22/03	11/22/03	KWG0318931	*
etrachloroethene (PCE)	ND	U	6.1	0.39	1	11/22/03	11/22/03	KWG0318931	*
ibromochloromethane	ND	U	6.1	0.74	1	11/22/03	11/22/03	KWG0318931	*
2-Dibromoethane (EDB)	ND	U	25	0.98	1	11/22/03	11/22/03	KWG0318931	*
ılorobenzene	ND	U	6.1	0.87	1	11/22/03	11/22/03	KWG0318931	*
hylbenzene	ND	U	6.1	0.71	1	11/22/03	11/22/03	KWG0318931	*
p-Xylenes	ND	U	6.1	1.9	1	11/22/03	11/22/03	KWG0318931	*
Xylene	ND	U	6.1	0.85	1	11/22/03	11/22/03	KWG0318931	*
omoform	ND	U	6.1	0.81	1	11/22/03	11/22/03	KWG0318931	*

mments:

000011

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-5@2'-4'
Lab Code: K2309245-001

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND	U	25	0.84	1	11/22/03	11/22/03	KWG0318931	*
1,1,2,2-Tetrachloroethane	ND	U	6.1	0.90	1	11/22/03	11/22/03	KWG0318931	*
n-Propylbenzene	ND	U	25	0.89	1	11/22/03	11/22/03	KWG0318931	*
1,3,5-Trimethylbenzene	ND	U	25	4.7	1	11/22/03	11/22/03	KWG0318931	*
1,2,4-Trimethylbenzene	ND	U	25	1.1	1	11/22/03	11/22/03	KWG0318931	*
1,3-Dichlorobenzene	ND	U	6.1	0.88	1	11/22/03	11/22/03	KWG0318931	*
1,4-Dichlorobenzene	ND	U	6.1	1.1	1	11/22/03	11/22/03	KWG0318931	*
1,2-Dichlorobenzene	ND	U	6.1	0.81	1	11/22/03	11/22/03	KWG0318931	*
Naphthalene	ND	U	25	1.1	1	11/22/03	11/22/03	KWG0318931	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	89	84-121	11/22/03	Acceptable
Toluene-d8	95	80-125	11/22/03	Acceptable
4-Bromofluorobenzene	94	80-123	11/22/03	Acceptable

Comments:

000012

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-5@16'-18'
Lab Code: K2309245-002

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	6.8	0.98	1	11/24/03	11/24/03	KWG0318965	*
Chloromethane	ND	U	6.8	1.4	1	11/24/03	11/24/03	KWG0318965	*
Vinyl Chloride	ND	U	6.8	0.87	1	11/24/03	11/24/03	KWG0318965	*
Bromomethane	ND	U	6.8	1.2	1	11/24/03	11/24/03	KWG0318965	*
Chloroethane	ND	U	6.8	1.1	1	11/24/03	11/24/03	KWG0318965	*
Trichlorofluoromethane	ND	U	6.8	1.1	1	11/24/03	11/24/03	KWG0318965	*
,1-Dichloroethene	ND	U	6.8	0.97	1	11/24/03	11/24/03	KWG0318965	*
Trichlorotrifluoroethane	ND	U	6.8	1.1	1	11/24/03	11/24/03	KWG0318965	*
Methylene Chloride	**22**		14	1.4	1	11/24/03	11/24/03	KWG0318965	*
Methyl tert-Butyl Ether	ND	U	6.8	0.90	1	11/24/03	11/24/03	KWG0318965	*
rans-1,2-Dichloroethene	ND	U	6.8	1.1	1	11/24/03	11/24/03	KWG0318965	*
,1-Dichloroethane	ND	U	6.8	1.1	1	11/24/03	11/24/03	KWG0318965	*
is-1,2-Dichloroethene	ND	U	6.8	1.2	1	11/24/03	11/24/03	KWG0318965	*
Chloroform	ND	U	6.8	0.80	1	11/24/03	11/24/03	KWG0318965	*
,1,1-Trichloroethane (TCA)	ND	U	6.8	0.80	1	11/24/03	11/24/03	KWG0318965	*
Carbon Tetrachloride	ND	U	6.8	0.84	1	11/24/03	11/24/03	KWG0318965	*
Benzene	ND	U	6.8	1.2	1	11/24/03	11/24/03	KWG0318965	*
,2-Dichloroethane (EDC)	ND	U	6.8	0.94	1	11/24/03	11/24/03	KWG0318965	*
richloroethene (TCE)	ND	U	6.8	0.39	1	11/24/03	11/24/03	KWG0318965	*
,2-Dichloropropane	ND	U	6.8	1.1	1	11/24/03	11/24/03	KWG0318965	*
romodichloromethane	ND	U	6.8	0.74	1	11/24/03	11/24/03	KWG0318965	*
-Chloroethyl Vinyl Ether	ND	U	14	1.4	1	11/24/03	11/24/03	KWG0318965	*
s-1,3-Dichloropropene	ND	U	6.8	1.1	1	11/24/03	11/24/03	KWG0318965	*
oluene	ND	U	6.8	1.2	1	11/24/03	11/24/03	KWG0318965	*
ans-1,3-Dichloropropene	ND	U	6.8	0.84	1	11/24/03	11/24/03	KWG0318965	*
1,2-Trichloroethane	ND	U	6.8	0.97	1	11/24/03	11/24/03	KWG0318965	*
etrachloroethene (PCE)	ND	U	6.8	0.44	1	11/24/03	11/24/03	KWG0318965	*
ibromochloromethane	ND	U	6.8	0.84	1	11/24/03	11/24/03	KWG0318965	*
2-Dibromoethane (EDB)	ND	U	27	1.2	1	11/24/03	11/24/03	KWG0318965	*
ılorobenzene	ND	U	6.8	0.98	1	11/24/03	11/24/03	KWG0318965	*
hylbenzene	**7.3**		6.8	0.80	1	11/24/03	11/24/03	KWG0318965	*
p-Xylenes	**39**		6.8	2.1	1	11/24/03	11/24/03	KWG0318965	*
Xylene	**4.4**	J	6.8	0.97	1	11/24/03	11/24/03	KWG0318965	*
omoform	ND	U	6.8	0.91	1	11/24/03	11/24/03	KWG0318965	*

mments:

000013

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-5@16'-18'
Lab Code: K2309245-002

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	3.6	J	27	0.95	1	11/24/03	11/24/03	KWG0318965	*
1,1,2,2-Tetrachloroethane	ND	U	6.8	1.1	1	11/24/03	11/24/03	KWG0318965	*
n-Propylbenzene	9.0	J	27	1.1	1	11/24/03	11/24/03	KWG0318965	*
1,3,5-Trimethylbenzene	7.0	J	27	5.3	1	11/24/03	11/24/03	KWG0318965	*
1,2,4-Trimethylbenzene	61		27	1.2	1	11/24/03	11/24/03	KWG0318965	*
1,3-Dichlorobenzene	ND	U	6.8	0.99	1	11/24/03	11/24/03	KWG0318965	*
1,4-Dichlorobenzene	ND	U	6.8	1.2	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichlorobenzene	ND	U	6.8	0.91	1	11/24/03	11/24/03	KWG0318965	*
Naphthalene	1.6	J	27	1.3	1	11/24/03	11/24/03	KWG0318965	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	89	84-121	11/24/03	Acceptable
Toluene-d8	94	80-125	11/24/03	Acceptable
4-Bromofluorobenzene	87	80-123	11/24/03	Acceptable

Comments:

000014

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG0318931-5

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	5.0	0.70	1	11/22/03	11/22/03	KWG0318931	
Chloromethane	ND	U	5.0	0.99	1	11/22/03	11/22/03	KWG0318931	
Vinyl Chloride	ND	U	5.0	0.62	1	11/22/03	11/22/03	KWG0318931	
Bromomethane	ND	U	5.0	0.80	1	11/22/03	11/22/03	KWG0318931	
Chloroethane	ND	U	5.0	0.78	1	11/22/03	11/22/03	KWG0318931	
Trichlorofluoromethane	ND	U	5.0	0.73	1	11/22/03	11/22/03	KWG0318931	
,1-Dichloroethene	ND	U	5.0	0.69	1	11/22/03	11/22/03	KWG0318931	
Trichlorotrifluoroethane	ND	U	5.0	0.74	1	11/22/03	11/22/03	KWG0318931	
Methylene Chloride	ND	U	10	0.96	1	11/22/03	11/22/03	KWG0318931	
Methyl tert-Butyl Ether	ND	U	5.0	0.64	1	11/22/03	11/22/03	KWG0318931	
rans-1,2-Dichloroethene	ND	U	5.0	0.73	1	11/22/03	11/22/03	KWG0318931	
,1-Dichloroethane	ND	U	5.0	0.78	1	11/22/03	11/22/03	KWG0318931	
is Dichloroethene	ND	U	5.0	0.83	1	11/22/03	11/22/03	KWG0318931	
Chloroform	ND	U	5.0	0.57	1	11/22/03	11/22/03	KWG0318931	
,1,1-Trichloroethane (TCA)	ND	U	5.0	0.57	1	11/22/03	11/22/03	KWG0318931	
Carbon Tetrachloride	ND	U	5.0	0.60	1	11/22/03	11/22/03	KWG0318931	
Benzene	ND	U	5.0	0.79	1	11/22/03	11/22/03	KWG0318931	
,2-Dichloroethane (EDC)	ND	U	5.0	0.67	1	11/22/03	11/22/03	KWG0318931	
richloroethene (TCE)	ND	U	5.0	0.28	1	11/22/03	11/22/03	KWG0318931	
,2-Dichloropropane	ND	U	5.0	0.72	1	11/22/03	11/22/03	KWG0318931	
Bromodichloromethane	ND	U	5.0	0.53	1	11/22/03	11/22/03	KWG0318931	
-Chloroethyl Vinyl Ether	ND	U	10	1.0	1	11/22/03	11/22/03	KWG0318931	
is-1,3-Dichloropropene	ND	U	5.0	0.76	1	11/22/03	11/22/03	KWG0318931	
oluene	ND	U	5.0	0.84	1	11/22/03	11/22/03	KWG0318931	
ans-1,3-Dichloropropene	ND	U	5.0	0.60	1	11/22/03	11/22/03	KWG0318931	
,1,2-Trichloroethane	ND	U	5.0	0.69	1	11/22/03	11/22/03	KWG0318931	
etrachloroethene (PCE)	ND	U	5.0	0.31	1	11/22/03	11/22/03	KWG0318931	
ibromochloromethane	ND	U	5.0	0.60	1	11/22/03	11/22/03	KWG0318931	
,2-Dibromoethane (EDB)	ND	U	20	0.79	1	11/22/03	11/22/03	KWG0318931	
hlorobenzene	ND	U	5.0	0.70	1	11/22/03	11/22/03	KWG0318931	
thylbenzene	ND	U	5.0	0.57	1	11/22/03	11/22/03	KWG0318931	
,p-Xylenes	ND	U	5.0	1.5	1	11/22/03	11/22/03	KWG0318931	
-Xylene	ND	U	5.0	0.69	1	11/22/03	11/22/03	KWG0318931	
romoform	ND	U	5.0	0.65	1	11/22/03	11/22/03	KWG0318931	

omments:

000015

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG0318931-5

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
sopropylbenzene	ND	U	20	0.68	1	11/22/03	11/22/03	KWG0318931	
,1,2,2-Tetrachloroethane	ND	U	5.0	0.73	1	11/22/03	11/22/03	KWG0318931	
-Propylbenzene	ND	U	20	0.72	1	11/22/03	11/22/03	KWG0318931	
,3,5-Trimethylbenzene	ND	U	20	3.8	1	11/22/03	11/22/03	KWG0318931	
,2,4-Trimethylbenzene	ND	U	20	0.82	1	11/22/03	11/22/03	KWG0318931	
,3-Dichlorobenzene	ND	U	5.0	0.71	1	11/22/03	11/22/03	KWG0318931	
,4-Dichlorobenzene	ND	U	5.0	0.82	1	11/22/03	11/22/03	KWG0318931	
,2-Dichlorobenzene	ND	U	5.0	0.65	1	11/22/03	11/22/03	KWG0318931	
Naphthalene	ND	U	20	0.89	1	11/22/03	11/22/03	KWG0318931	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	92	84-121	11/22/03	Acceptable
Toluene-d8	91	80-125	11/22/03	Acceptable
-Bromofluorobenzene	98	80-123	11/22/03	Acceptable

Comments:

000016

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG0318965-3

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	5.0	0.70	1	11/24/03	11/24/03	KWG0318965	
Chloromethane	ND	U	5.0	0.99	1	11/24/03	11/24/03	KWG0318965	
Vinyl Chloride	ND	U	5.0	0.62	1	11/24/03	11/24/03	KWG0318965	
Bromomethane	ND	U	5.0	0.80	1	11/24/03	11/24/03	KWG0318965	
Chloroethane	ND	U	5.0	0.78	1	11/24/03	11/24/03	KWG0318965	
Trichlorofluoromethane	ND	U	5.0	0.73	1	11/24/03	11/24/03	KWG0318965	
1,1-Dichloroethene	ND	U	5.0	0.69	1	11/24/03	11/24/03	KWG0318965	
Trichlorotrifluoroethane	ND	U	5.0	0.74	1	11/24/03	11/24/03	KWG0318965	
Methylene Chloride	ND	U	10	0.96	1	11/24/03	11/24/03	KWG0318965	
Methyl tert-Butyl Ether	ND	U	5.0	0.64	1	11/24/03	11/24/03	KWG0318965	
rans-1,2-Dichloroethene	ND	U	5.0	0.73	1	11/24/03	11/24/03	KWG0318965	
1,1-Dichloroethane	ND	U	5.0	0.78	1	11/24/03	11/24/03	KWG0318965	*
is Dichloroethene	ND	U	5.0	0.83	1	11/24/03	11/24/03	KWG0318965	
Chloroform	ND	U	5.0	0.57	1	11/24/03	11/24/03	KWG0318965	
,1,1-Trichloroethane (TCA)	ND	U	5.0	0.57	1	11/24/03	11/24/03	KWG0318965	
Carbon Tetrachloride	ND	U	5.0	0.60	1	11/24/03	11/24/03	KWG0318965	
Benzene	ND	U	5.0	0.79	1	11/24/03	11/24/03	KWG0318965	
,2-Dichloroethane (EDC)	ND	U	5.0	0.67	1	11/24/03	11/24/03	KWG0318965	
Trichloroethene (TCE)	ND	U	5.0	0.28	1	11/24/03	11/24/03	KWG0318965	
,2-Dichloropropane	ND	U	5.0	0.72	1	11/24/03	11/24/03	KWG0318965	*
Bromodichloromethane	ND	U	5.0	0.53	1	11/24/03	11/24/03	KWG0318965	
-Chloroethyl Vinyl Ether	ND	U	10	1.0	1	11/24/03	11/24/03	KWG0318965	*
is-1,3-Dichloropropene	ND	U	5.0	0.76	1	11/24/03	11/24/03	KWG0318965	*
Toluene	ND	U	5.0	0.84	1	11/24/03	11/24/03	KWG0318965	
rans-1,3-Dichloropropene	ND	U	5.0	0.60	1	11/24/03	11/24/03	KWG0318965	
,1,2-Trichloroethane	ND	U	5.0	0.69	1	11/24/03	11/24/03	KWG0318965	
Tetrachloroethene (PCE)	ND	U	5.0	0.31	1	11/24/03	11/24/03	KWG0318965	
Dibromochloromethane	ND	U	5.0	0.60	1	11/24/03	11/24/03	KWG0318965	
,2-Dibromoethane (EDB)	ND	U	20	0.79	1	11/24/03	11/24/03	KWG0318965	*
hlorobenzene	ND	U	5.0	0.70	1	11/24/03	11/24/03	KWG0318965	
thylbenzene	ND	U	5.0	0.57	1	11/24/03	11/24/03	KWG0318965	
,p-Xylenes	ND	U	5.0	1.5	1	11/24/03	11/24/03	KWG0318965	
-Xylene	ND	U	5.0	0.69	1	11/24/03	11/24/03	KWG0318965	
romoform	ND	U	5.0	0.65	1	11/24/03	11/24/03	KWG0318965	

Comments:

000017

lient: RSV Engineering, Inc.
roject: Niemi Highway Services
a e Matrix: Soil

Service Request: K2309245
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

ample Name: Method Blank
ab Code: KWG0318965-3

xtraction Method: EPA 5030A
nalysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low

nalyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
sopropylbenzene	ND	U	20	0.68	1	11/24/03	11/24/03	KWG0318965	
,1,2,2-Tetrachloroethane	ND	U	5.0	0.73	1	11/24/03	11/24/03	KWG0318965	
-Propylbenzene	ND	U	20	0.72	1	11/24/03	11/24/03	KWG0318965	
,3,5-Trimethylbenzene	ND	U	20	3.8	1	11/24/03	11/24/03	KWG0318965	
,2,4-Trimethylbenzene	ND	U	20	0.82	1	11/24/03	11/24/03	KWG0318965	
,3-Dichlorobenzene	ND	U	5.0	0.71	1	11/24/03	11/24/03	KWG0318965	
,4-Dichlorobenzene	ND	U	5.0	0.82	1	11/24/03	11/24/03	KWG0318965	
,2-Dichlorobenzene	ND	U	5.0	0.65	1	11/24/03	11/24/03	KWG0318965	
laphthalene	ND	U	20	0.89	1	11/24/03	11/24/03	KWG0318965	

See Case Narrative

urrogate Name	%Rec	Control Limits	Date Analyzed	Note
ibromofluoromethane	88	84-121	11/24/03	Acceptable
oluene-d8	100	80-125	11/24/03	Acceptable
-Bromofluorobenzene	95	80-123	11/24/03	Acceptable

mments:

000018

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245

Surrogate Recovery Summary
Volatile Organic Compounds

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
GP-5@2'-4'	K2309245-001	89	95	94
GP-5@16'-18'	K2309245-002	89	94	87
Method Blank	KWG0318931-5	92	91	98
Method Blank	KWG0318965-3	88	100	95
Lab Control Sample	KWG0318931-3	88	96	94
Duplicate Lab Control Sample	KWG0318931-4	90	93	97
Lab Control Sample	KWG0318965-1	84	102	97
Duplicate Lab Control Sample	KWG0318965-2	84	96	97

Surrogate Recovery Control Limits (%)

Sur1 =	Dibromofluoromethane	84-121
Sur2 =	Toluene-d8	80-125
Sur3 =	4-Bromofluorobenzene	80-123

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

000019

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245
Date Extracted: 11/22/2003
Date Analyzed: 11/22/2003

Lab Control Spike/Duplicate Lab Control Spike Summary
Volatile Organic Compounds

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG0318931

	Lab Control Sample KWG0318931-3 Lab Control Spike			Duplicate Lab Control Sample KWG0318931-4 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Expected**	**%Rec**	**Result**	**Expected**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Dichlorodifluoromethane	52.5	50.0	105	52.4	50.0	105	46-130	0	40
Chloromethane	41.3	50.0	83	41.5	50.0	83	55-118	1	40
Vinyl Chloride	46.6	50.0	93	41.4	50.0	83	64-137	12	40
Bromomethane	39.7	50.0	79	39.4	50.0	79	58-147	1	40
Chloroethane	42.1	50.0	84	41.5	50.0	83	60-137	2	40
Trichlorofluoromethane	42.9	50.0	86	42.6	50.0	85	58-125	1	40
,1-Dichloroethene	49.2	50.0	98	49.2	50.0	98	76-135	0	40
Trichlorotrifluoroethane	47.6	50.0	95	47.3	50.0	95	72-133	1	40
Methylene Chloride	44.3	50.0	89	44.6	50.0	89	76-117	1	40
Methyl tert-Butyl Ether	44.3	50.0	89	43.7	50.0	87	71-143	1	40
ra[illegible]2-Dichloroethene	45.6	50.0	91	45.4	50.0	91	77-132	0	40
,1[illegible]hloroethane	44.8	50.0	90	45.4	50.0	91	84-122	1	40
is-1,2-Dichloroethene	46.0	50.0	92	45.8	50.0	92	79-123	1	40
Chloroform	46.3	50.0	93	46.8	50.0	94	74-122	1	40
,1,1-Trichloroethane (TCA)	48.5	50.0	97	46.6	50.0	93	66-137	4	40
Carbon Tetrachloride	49.2	50.0	98	47.6	50.0	95	70-142	3	40
Benzene	48.8	50.0	98	48.5	50.0	97	84-115	1	40
,2-Dichloroethane (EDC)	45.0	50.0	90	45.3	50.0	91	67-132	1	40
Trichloroethene (TCE)	47.5	50.0	95	46.6	50.0	93	78-128	2	40
,2-Dichloropropane	45.3	50.0	91	45.0	50.0	90	84-114	1	40
Bromodichloromethane	48.2	50.0	96	46.1	50.0	92	72-120	4	40
-Chloroethyl Vinyl Ether	47.5	50.0	95	45.6	50.0	91	88-145	4	40
is-1,3-Dichloropropene	46.4	50.0	93	45.1	50.0	90	88-122	3	40
oluene	49.1	50.0	98	45.6	50.0	91	80-119	7	40
ans-1,3-Dichloropropene	45.1	50.0	90	43.5	50.0	87	73-116	4	40
,1,2-Trichloroethane	46.9	50.0	94	47.2	50.0	94	76-115	1	40
etrachloroethene (PCE)	48.9	50.0	98	49.0	50.0	98	71-129	0	40
ibromochloromethane	47.6	50.0	95	47.3	50.0	95	79-121	1	40
2-Dibromoethane (EDB)	45.2	50.0	90	45.6	50.0	91	80-121	1	40
hlorobenzene	48.4	50.0	97	47.3	50.0	95	77-117	2	40
thylbenzene	50.2	50.0	100	49.4	50.0	99	78-125	2	40
,p-Xylenes	95.9	100	96	98.1	100	98	74-122	2	40
Xylene	47.3	50.0	95	49.1	50.0	98	76-123	4	40
romoform	47.1	50.0	94	47.9	50.0	96	75-139	2	40
opropylbenzene	42.6	50.0	85	43.4	50.0	87	71-123	2	40
1,2,2-Tetrachloroethane	44.8	50.0	90	44.0	50.0	88	72-120	2	40

sults flagged with an asterisk (*) indicate values outside control criteria.
rcent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000020

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245
Date Extracted: 11/22/2003
Date Analyzed: 11/22/2003

Lab Control Spike/Duplicate Lab Control Spike Summary
Volatile Organic Compounds

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG0318931

Analyte Name	Lab Control Sample KWG0318931-3 Lab Control Spike			Duplicate Lab Control Sample KWG0318931-4 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Expected	%Rec	Result	Expected	%Rec			
-Propylbenzene	48.1	50.0	96	47.5	50.0	95	70-123	1	40
,3,5-Trimethylbenzene	49.9	50.0	100	49.4	50.0	99	70-127	1	40
,2,4-Trimethylbenzene	51.0	50.0	102	50.7	50.0	101	73-138	1	40
,3-Dichlorobenzene	48.5	50.0	97	47.4	50.0	95	72-122	2	40
,4-Dichlorobenzene	49.4	50.0	99	48.2	50.0	96	74-119	2	40
,2-Dichlorobenzene	48.0	50.0	96	46.4	50.0	93	72-121	3	40
Naphthalene	47.3	50.0	95	47.4	50.0	95	74-127	0	40

sults flagged with an asterisk (*) indicate values outside control criteria.
cent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000021

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245
Date Extracted: 11/24/2003
Date Analyzed: 11/24/2003

Lab Control Spike/Duplicate Lab Control Spike Summary
Volatile Organic Compounds

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG0318965

Analyte Name	Lab Control Sample KWG0318965-1 Lab Control Spike Result	Expected	%Rec		Duplicate Lab Control Sample KWG0318965-2 Duplicate Lab Control Spike Result	Expected	%Rec	%Rec Limits	RPD	RPD Limit
Dichlorodifluoromethane	45.2	50.0	90		43.2	50.0	86	46-130	5	40
Chloromethane	36.5	50.0	73		37.7	50.0	75	55-118	3	40
Vinyl Chloride	43.9	50.0	88		44.1	50.0	88	64-137	0	40
Bromomethane	40.1	50.0	80		34.7	50.0	69	58-147	14	40
Chloroethane	38.1	50.0	76		38.5	50.0	77	60-137	1	40
Trichlorofluoromethane	42.5	50.0	85		42.1	50.0	84	58-125	1	40
,1-Dichloroethene	44.1	50.0	88		45.3	50.0	91	76-135	3	40
Trichlorotrifluoroethane	44.4	50.0	89		44.8	50.0	90	72-133	1	40
Methylene Chloride	40.8	50.0	82		41.9	50.0	84	76-117	3	40
Methyl tert-Butyl Ether	40.1	50.0	80		43.2	50.0	86	71-143	7	40
[illegible]2-Dichloroethene	42.2	50.0	84		42.5	50.0	85	77-132	1	40
,1-Dichloroethane	41.7	50.0	83	*	42.1	50.0	84	84-122	1	40
is-1,2-Dichloroethene	42.8	50.0	86		44.3	50.0	89	79-123	3	40
Chloroform	42.8	50.0	86		45.0	50.0	90	74-122	5	40
,1,1-Trichloroethane (TCA)	45.5	50.0	91		45.9	50.0	92	66-137	1	40
Carbon Tetrachloride	45.2	50.0	90		46.1	50.0	92	70-142	2	40
Benzene	45.7	50.0	91		47.4	50.0	95	84-115	4	40
,2-Dichloroethane (EDC)	42.4	50.0	85		44.2	50.0	88	67-132	4	40
richloroethene (TCE)	45.2	50.0	90		47.5	50.0	95	78-128	5	40
,2-Dichloropropane	41.6	50.0	83	*	44.1	50.0	88	84-114	6	40
romodichloromethane	43.6	50.0	87		45.7	50.0	91	72-120	5	40
-Chloroethyl Vinyl Ether	43.5	50.0	87	*	46.4	50.0	93	88-145	6	40
s-1,3-Dichloropropene	41.9	50.0	84	*	45.0	50.0	90	88-122	7	40
oluene	47.8	50.0	96		47.5	50.0	95	80-119	1	40
ans-1,3-Dichloropropene	37.8	50.0	76		41.3	50.0	83	73-116	9	40
1,2-Trichloroethane	40.0	50.0	80		44.6	50.0	89	76-115	11	40
etrachloroethene (PCE)	44.6	50.0	89		45.9	50.0	92	71-129	3	40
ibromochloromethane	41.5	50.0	83		45.1	50.0	90	79-121	8	40
2-Dibromoethane (EDB)	39.0	50.0	78	*	43.2	50.0	86	80-121	10	40
hlorobenzene	44.4	50.0	89		45.9	50.0	92	77-117	3	40
hylbenzene	46.8	50.0	94		48.4	50.0	97	78-125	3	40
,p-Xylenes	92.5	100	93		95.0	100	95	74-122	3	40
Xylene	45.0	50.0	90		46.7	50.0	93	76-123	4	40
romoform	42.5	50.0	85		46.2	50.0	92	75-139	8	40
opropylbenzene	41.3	50.0	83		42.4	50.0	85	71-123	3	40
1,2,2-Tetrachloroethane	36.3	50.0	73		38.2	50.0	76	72-120	5	40

sults flagged with an asterisk (*) indicate values outside control criteria.
rcent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000022

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245
Date Extracted: 11/24/2003
Date Analyzed: 11/24/2003

Lab Control Spike/Duplicate Lab Control Spike Summary
Volatile Organic Compounds

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG0318965

Analyte Name	Lab Control Sample KWG0318965-1 Lab Control Spike			Duplicate Lab Control Sample KWG0318965-2 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Expected	%Rec	Result	Expected	%Rec			
n-Propylbenzene	45.3	50.0	91	46.3	50.0	93	70-123	2	40
1,3,5-Trimethylbenzene	45.4	50.0	91	47.8	50.0	96	70-127	5	40
1,2,4-Trimethylbenzene	48.0	50.0	96	46.8	50.0	94	73-138	2	40
1,3-Dichlorobenzene	45.5	50.0	91	46.8	50.0	94	72-122	3	40
1,4-Dichlorobenzene	45.9	50.0	92	47.0	50.0	94	74-119	2	40
1,2-Dichlorobenzene	45.1	50.0	90	45.9	50.0	92	72-121	2	40
Naphthalene	39.3	50.0	79	44.2	50.0	88	74-127	12	40

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000023

Polynuclear Aromatic Hydrocarbons
Method 8270

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245
Date Collected: 10/10/2003
Date Received: 10/13/2003

Polynuclear Aromatic Hydrocarbons

Sample Name: GP-5@2'-4'
Lab Code: K2309245-001

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	0.45	J	5.0	0.26	1	11/24/03	12/08/03	KWG0318909	*
2-Methylnaphthalene	0.33	J	5.0	0.26	1	11/24/03	12/08/03	KWG0318909	*
Acenaphthylene	0.38	J	5.0	0.20	1	11/24/03	12/08/03	KWG0318909	*
Acenaphthene	ND	U	5.0	0.26	1	11/24/03	12/08/03	KWG0318909	*
Dibenzofuran	ND	U	5.0	0.25	1	11/24/03	12/08/03	KWG0318909	*
Fluorene	ND	U	5.0	0.21	1	11/24/03	12/08/03	KWG0318909	*
Phenanthrene	3.5	J	5.0	0.19	1	11/24/03	12/08/03	KWG0318909	*
Anthracene	0.47	J	5.0	0.24	1	11/24/03	12/08/03	KWG0318909	*
Fluoranthene	6.2		5.0	0.21	1	11/24/03	12/08/03	KWG0318909	*
Pyrene	10		5.0	0.14	1	11/24/03	12/08/03	KWG0318909	*
Benz(a)anthracene	2.3	J	5.0	0.17	1	11/24/03	12/08/03	KWG0318909	*
Chrysene	4.1	J	5.0	0.19	1	11/24/03	12/08/03	KWG0318909	*
Benzo(b)fluoranthene	2.6	J	5.0	0.18	1	11/24/03	12/08/03	KWG0318909	*
Benzo(k)fluoranthene	2.0	J	5.0	0.19	1	11/24/03	12/08/03	KWG0318909	*
Benzo(a)pyrene	3.1	J	5.0	0.18	1	11/24/03	12/08/03	KWG0318909	*
Indeno(1,2,3-cd)pyrene	3.1	J	5.0	0.19	1	11/24/03	12/08/03	KWG0318909	*
Dibenz(a,h)anthracene	0.49	J	5.0	0.23	1	11/24/03	12/08/03	KWG0318909	*
Benzo(g,h,i)perylene	4.9	J	5.0	0.13	1	11/24/03	12/08/03	KWG0318909	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	70	27-110	12/08/03	Acceptable
Fluoranthene-d10	76	34-122	12/08/03	Acceptable
Terphenyl-d14	112	50-132	12/08/03	Acceptable

Comments:

000025

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245
Date Collected: 10/10/2003
Date Received: 10/13/2003

Polynuclear Aromatic Hydrocarbons

Sample Name: GP-5@16'-18'
Lab Code: K2309245-002

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**19**		5.1	0.30	1	11/24/03	12/06/03	KWG0318909	*
2-Methylnaphthalene	**2.8**	J	5.1	0.30	1	11/24/03	12/06/03	KWG0318909	*
Acenaphthylene	ND	U	5.1	0.23	1	11/24/03	12/06/03	KWG0318909	*
Acenaphthene	**1.3**	J	5.1	0.30	1	11/24/03	12/06/03	KWG0318909	*
Dibenzofuran	**0.91**	J	5.1	0.28	1	11/24/03	12/06/03	KWG0318909	*
Fluorene	**1.3**	J	5.1	0.24	1	11/24/03	12/06/03	KWG0318909	*
Phenanthrene	**6.7**		5.1	0.21	1	11/24/03	12/06/03	KWG0318909	*
Anthracene	**0.30**	J	5.1	0.27	1	11/24/03	12/06/03	KWG0318909	*
Fluoranthene	**3.3**	J	5.1	0.24	1	11/24/03	12/06/03	KWG0318909	*
Pyrene	**11**		5.1	0.16	1	11/24/03	12/06/03	KWG0318909	*
Benz(a)anthracene	**1.1**	J	5.1	0.19	1	11/24/03	12/06/03	KWG0318909	*
Chrysene	**2.4**	J	5.1	0.21	1	11/24/03	12/06/03	KWG0318909	*
Benzo(b)fluoranthene	ND	U	5.1	0.20	1	11/24/03	12/06/03	KWG0318909	*
Benzo(k)fluoranthene	ND	U	5.1	0.21	1	11/24/03	12/06/03	KWG0318909	*
Benzo(a)pyrene	ND	U	5.1	0.20	1	11/24/03	12/06/03	KWG0318909	*
Indeno(1,2,3-cd)pyrene	**0.91**	J	5.1	0.21	1	11/24/03	12/06/03	KWG0318909	*
Dibenz(a,h)anthracene	ND	U	5.1	0.26	1	11/24/03	12/06/03	KWG0318909	*
Benzo(g,h,i)perylene	**2.2**	J	5.1	0.14	1	11/24/03	12/06/03	KWG0318909	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	67	27-110	12/06/03	Acceptable
Fluoranthene-d10	67	34-122	12/06/03	Acceptable
Terphenyl-d14	124	50-132	12/06/03	Acceptable

Comments:

000026

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245
Date Collected: NA
Date Received: NA

Polynuclear Aromatic Hydrocarbons

Sample Name: Method Blank
Lab Code: KWG0318909-5

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	ND	U	2.5	0.21	1	11/24/03	12/08/03	KWG0318909	
2-Methylnaphthalene	ND	U	2.5	0.21	1	11/24/03	12/08/03	KWG0318909	
Acenaphthylene	ND	U	2.5	0.16	1	11/24/03	12/08/03	KWG0318909	
Acenaphthene	ND	U	2.5	0.21	1	11/24/03	12/08/03	KWG0318909	
Dibenzofuran	ND	U	2.5	0.20	1	11/24/03	12/08/03	KWG0318909	
Fluorene	ND	U	2.5	0.17	1	11/24/03	12/08/03	KWG0318909	
Phenanthrene	ND	U	2.5	0.15	1	11/24/03	12/08/03	KWG0318909	
Anthracene	ND	U	2.5	0.19	1	11/24/03	12/08/03	KWG0318909	
Fluoranthene	ND	U	2.5	0.17	1	11/24/03	12/08/03	KWG0318909	
Pyrene	ND	U	2.5	0.11	1	11/24/03	12/08/03	KWG0318909	
Benz(a)anthracene	ND	U	2.5	0.13	1	11/24/03	12/08/03	KWG0318909	
Chrysene	ND	U	2.5	0.15	1	11/24/03	12/08/03	KWG0318909	
B(b)fluoranthene	ND	U	2.5	0.14	1	11/24/03	12/08/03	KWG0318909	
Benzo(k)fluoranthene	ND	U	2.5	0.15	1	11/24/03	12/08/03	KWG0318909	
Benzo(a)pyrene	ND	U	2.5	0.14	1	11/24/03	12/08/03	KWG0318909	
Indeno(1,2,3-cd)pyrene	ND	U	2.5	0.15	1	11/24/03	12/08/03	KWG0318909	
Dibenz(a,h)anthracene	ND	U	2.5	0.18	1	11/24/03	12/08/03	KWG0318909	
Benzo(g,h,i)perylene	ND	U	2.5	0.10	1	11/24/03	12/08/03	KWG0318909	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	84	27-110	12/08/03	Acceptable
Fluoranthene-d10	85	34-122	12/08/03	Acceptable
Terphenyl-d14	128	50-132	12/08/03	Acceptable

Comments:

000027

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
GP-5@2'-4'	K2309245-001	70	76	112
GP-5@16'-18'	K2309245-002	67	67	124
Method Blank	KWG0318909-5	84	85	128
Batch QC	K2309235-013	65	70	85
Batch QCMS	KWG0318909-1	63	73	81
Batch QCDMS	KWG0318909-2	65	76	88
Lab Control Sample	KWG0318909-3	76	87	103
Duplicate Lab Control Sample	KWG0318909-4	81	91	107

urrogate Recovery Control Limits (%)

ur1 =	Fluorene-d10	27-110
ur2 =	Fluoranthene-d10	34-122
ur3 =	Terphenyl-d14	50-132

esul gged with an asterisk (*) indicate values outside control criteria.
esults flagged with a pound (#) indicate the control criteria is not applicable.

000028

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Sediment

Service Request: K2309245
Date Extracted: 11/24/2003
Date Analyzed: 12/08/2003

Matrix Spike/Duplicate Matrix Spike Summary
Polynuclear Aromatic Hydrocarbons

Sample Name: Batch QC
Lab Code: K2309235-013

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry

Level: Low
Extraction Lot: KWG0318909

Analyte Name	Sample Result	Batch QCMS KWG0318909-1 Matrix Spike			Batch QCDMS KWG0318909-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Expected	%Rec	Result	Expected	%Rec			
Naphthalene	7.2	140	244	55	138	239	55	22-101	2	40
2-Methylnaphthalene	5.1	160	244	63	159	239	64	27-106	0	40
Acenaphthylene	5.4	179	244	71	184	239	74	36-113	2	40
Acenaphthene	10	183	244	71	187	239	74	32-114	3	40
Dibenzofuran	5.0	178	244	71	185	239	75	33-110	4	40
Fluorene	6.6	193	244	76	203	239	82	39-118	5	40
Phenanthrene	70	221	244	62	232	239	68	29-130	5	40
Anthracene	19	208	244	78	218	239	83	38-133	5	40
Fluoranthene	120	265	244	57	264	239	58	30-143	0	40
Pyrene	150	276	244	52	276	239	53	28-143	0	40
Benz(a)anthracene	48	229	244	75	239	239	80	24-149	4	40
Chrysene	81	249	244	69	265	239	77	38-133	6	40
Benzo(b)fluoranthene	63	243	244	74	254	239	80	26-144	5	40
Benzo(k)fluoranthene	56	222	244	68	232	239	74	29-136	4	40
Benzo(a)pyrene	71	245	244	72	255	239	77	30-146	4	40
Indeno(1,2,3-cd)pyrene	61	254	244	79	260	239	83	24-147	2	40
Dibenz(a,h)anthracene	12	226	244	88	231	239	92	33-136	2	40
Benzo(g,h,i)perylene	77	279	244	83	281	239	85	23-142	1	40

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000029

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Services
Sample Matrix: Soil

Service Request: K2309245
Date Extracted: 11/24/2003
Date Analyzed: 12/08/2003

Lab Control Spike/Duplicate Lab Control Spike Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG0318909

Analyte Name	Lab Control Sample KWG0318909-3 Lab Control Spike			Duplicate Lab Control Sample KWG0318909-4 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Expected	%Rec	Result	Expected	%Rec			
Naphthalene	199	250	79	209	250	83	43-102	5	40
2-Methylnaphthalene	208	250	83	217	250	87	44-105	4	40
Acenaphthylene	209	250	84	220	250	88	51-107	5	40
Acenaphthene	206	250	83	220	250	88	50-105	6	40
Dibenzofuran	204	250	81	218	250	87	50-106	7	40
Fluorene	215	250	86	232	250	93	54-108	8	40
Phenanthrene	223	250	89	242	250	97	58-106	8	40
Anthracene	223	250	89	240	250	96	61-113	7	40
Fluoranthene	244	250	98	259	250	104	63-117	6	40
Pyrene	255	250	102	269	250	108	59-121	5	40
Benz(a)anthracene	238	250	95	251	250	100	57-120	5	40
Chrysene	249	250	100	263	250	105	64-116	5	40
Benzo(b)fluoranthene	259	250	103	275	250	110	58-126	6	40
Benzo(k)fluoranthene	257	250	103	271	250	108	61-122	5	40
Benzo(a)pyrene	255	250	102	267	250	107	58-128	4	40
Indeno(1,2,3-cd)pyrene	245	250	98	256	250	102	46-133	4	40
Dibenz(a,h)anthracene	248	250	99	257	250	103	50-128	4	40
Benzo(g,h,i)perylene	264	250	106	275	250	110	52-125	4	40

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000030

1317 South 13th Avenue P.O. Box 479 Kelso, Washington 98626 (360) 577-7222 ph (360) 636-1068 fax

Columbia Analytical Services INC.
An Employee - Owned Company

December 12, 2003 Service Request No: K2309246

Craig Arola
RSV Engineering Inc.
31960 SW Charbonneau Drive
Suite 201
Wilsonville, OR 97070

RE: Niemi Highway Service

Dear Craig:

Enclosed are the results of the sample(s) submitted to our laboratory on October 13, 2003. For your reference, these analyses have been assigned our service request number K2309246.

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAC standards except as noted in the case narrative report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3280.

Respectfully submitted,

Columbia Analytical Services, Inc.

Les Kennedy
Project Chemist

LK/jeb

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
B	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.
*	The duplicate analysis not within control limits. See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a chromatographic interference.
X	See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

Case Narrative

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	RSV Engineering	**Service Request No.:**	K2309246
Project:	Niemi Highway Services	**Date Received:**	10/13/03
Sample Matrix:	Soil		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), and Laboratory Control Sample (LCS).

Sample Receipt

Six soil samples received for analysis at Columbia Analytical Services on 10/13/03 under service request 8015, were re-issued for additional analyses on 11/20/03 past the recommended holding time.

Total Metals

No anomalies associated with the analysis of this batch were observed.

Diesel Range Organics by EPA Method 8015B

Sample Notes & Discussion
Samples GP-2@2'-4', GP-2@17'-19', GP-3@2'-4', GP-3@17'-19', GP-4@2'-4', GP-4@15'-17' were requested past the recommended holding time. The analysis was performed as soon as possible after re-issue. The data is flagged to indicate the holding time exceedence.

Gasoline Range Organics by EPA Method 8015B

Sample Notes & Discussion
Samples GP-2@2'-4', GP-2@17'-19', GP-3@2'-4', GP-3@17'-19', GP-4@2'-4', GP-4@15'-17' were requested past the recommended holding time. The analysis was performed as soon as possible after re-issue. The data is flagged to indicate the holding time exceedence.

PCB Aroclors by EPA Method 8082

Sample Notes & Discussion
Samples GP-2@2'-4', GP-2@17'-19', GP-3@2'-4', GP-3@17'-19', GP-4@2'-4', GP-4@15'-17' were requested past the recommended holding time. The analysis was performed as soon as possible after re-issue. The data is flagged to indicate the holding time exceedence.

Matrix Spike Recovery Exceptions
The control criteria for matrix spike and duplicate matrix spike recovery of Aroclor 1260 for sample Batch QC is not applicable. The analyte concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery. Recovery in the Laboratory Control Sample (LCS) was acceptable, which indicates the analytical batch was in control. No further corrective action was appropriate.

Approved by _____ Date 12/12/03

Volatile Organic Compounds by EPA Method 8260B

Sample Notes & Discussion
Samples GP-2@2'-4', GP-2@17'-19', GP-3@2'-4', GP-3@17'-19', GP-4@2'-4', GP-4@15'-17' were requested past the recommended holding time. The analysis was performed as soon as possible after re-issue. The data is flagged to indicate the holding time exceedence.

Laboratory Control Sample (LCS) Exceptions
The advisory criterion was exceeded for the following analytes in LCS KWG0318965-1: 1,1-Dichloroethane, 1,2-Dichloropropane, 2-Chloroethyl Vinyl Ether, cis-1,3-Dichloropropene, and 1,2-Dibromomethane (EDB). As per the CAS/Kelso Standard Operating Procedure (SOP) for this method, these compounds are not included in the subset of analytes used to control the analysis. The recovery information reported for these analytes is for advisory purposes only (i.e. to provide additional detail related to the performance of each individual compound). No further corrective action was required.

Polynuclear Aromatic Hydrocarbons by EPA Method 8270C

Sample Notes & Discussion
Samples GP-2@2'-4', GP-2@17'-19', GP-3@2'-4', GP-3@17'-19', GP-4@2'-4', GP-4@15'-17' were requested past the recommended holding time. The analysis was performed as soon as possible after re-issue. The data is flagged to indicate the holding time exceedence.

Approved by _____ **Date** 12/12/03

Chain of Custody Documentation

Columbia Analytical Services INC.
An Employee - Owned Company

CHAIN OF CUSTODY

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222x07 • FAX (360) 636-1068

SH#: [illegible]

PAGE 1 OF 2 COC #

PROJECT NAME: Niemi Highway Service
PROJECT NUMBER:
PROJECT MANAGER:
COMPANY/ADDRESS: RSI Engineering Inc.
31960 SW Chachanneau Dr #101
CITY/STATE/ZIP: Wilsonville, OR 97070
E-MAIL ADDRESS:
PHONE # (503)694-6960 FAX# (503)694-6962
SAMPLER'S SIGNATURE:

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐	Volatile Organics 624☐ 8260☐	Hydrocarbons Gas☐ Diesel☐ (*see below) Oil☐	BTEX☐ 8021☐	Fuel Fingerprint (FIQ)☐ NW-HCID Screen☐	Oil & Grease/TRPH 1664 SGT☐ 1664 HEM☐	PCB's Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081A☐ 8141A☐ 8151A☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	PAHS 8310☐ SIM☐	Metals, Total or Dissolved (See list below)	Cyanide☐	Hex-Chrom☐	pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020☐ AOX 1650☐ 506☐						REMARKS
GP-2@2'-4'	10/10/03	9:40	1	S	2					X																
GP-2@17'-18'	"	10:00	2	S	2					X																
GP-2	"	10:10	3	W	8					X																
GP-2@2'-4'	"	11:20	4	S	2					X																
GP-2@17'-19'	"	11:40	5	S	2					X																
GP-2	"	11:45	6	W	8					X																
GP-3@2'-4'	"	2:15	7	S	2					X																
GP-3@17'-19'	"	2:30	8	S	2					X																
GP-4@2'-4'	"	2:45	9	S	2					X																
GP-4@15'-17'	"	3:00	10	S	2					X																

0000008

REPORT REQUIREMENTS

- ☐ I. Routine Report: Method Blank, Surrogate, as required
- ☐ II. Report Dup., MS, MSD as required
- ☐ III. Data Validation Report (includes all raw data)
- ☐ IV. CLP Deliverable Report
- ☐ V. EDD

INVOICE INFORMATION

P.O. #
Bill To:

TURNAROUND REQUIREMENTS

- ☐ 24 hr. ☐ 48 hr.
- ☐ 5 Day
- ☒ Standard (10-15 working days)
- ☐ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

See Attached instructions

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature:	Signature:	Signature:
Date/Time: 10/13/03 9:00 AM	Date/Time: 10/13/03 10:40	Date/Time: 10/13/03 1:25	Date/Time: 10/13/03 1334
Printed Name:	Printed Name:	Printed Name:	Printed Name:
Firm:	Firm: CAS	Firm: CAS	Firm: CAS

CHAIN OF CUSTODY

SR#: 0310013

Columbia Analytical Services, Inc.
An Employee - Owned Company

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PAGE 2 OF 2 COC #

PROJECT NAME: Niemi Highway Service
PROJECT NUMBER:
PROJECT MANAGER:
COMPANY/ADDRESS: RSV Engineering, Inc. 31960 SW Charbonneau Dr. #101
CITY/STATE/ZIP: Wilsonville, OR 97070
E-MAIL ADDRESS:
PHONE: (503) 694-6960 FAX: (503) 694-6962
SAMPLER'S SIGNATURE:

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625 ☐ 8270 ☐ 8270LL ☐	Volatile Organics 624 ☐ 8260 ☐	Hydrocarbons Gas ☐ 8021 ☐ BTEX ☐ Diesel ☐ (*see below) Oil ☐ ☐ Fuel Fingerprint (FIQ) ☐ NW-HCID Screen	Oil & Grease/TRPH 1664 SGT ☐ 1664 HEM ☐	PCB's Aroclors ☐ Congeners ☐	Pesticides/Herbicides 608 ☐ 8081A ☐ 8141A ☐ 8151A ☐	Chlorophenolics - 8151M Tri ☐ Tetra ☐ PCP ☐	PAHS 8310 ☐ SIM ☐	Metals: Total or Dissolved (See list below)	Cyanide ☐	Hex-Chrom ☐	pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020 ☐ AOX 1650 ☐ 506 ☐	031003	REMARKS
GP-5 @ 2'-4'	10/10/03	3:20	11		2			X														
GP-5 @ 16'-18'	"	3:45	12		2			X														
GP-6 @ 2'-4'	"	4:30	13		2			X														
Trip Blank			14		1			X														

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required
___ II. Report Dup., MS, MSD as required
___ III. Data Validation Report (includes all raw data)
___ IV. CLP Deliverable Report
___ V. EDD

INVOICE INFORMATION

P.O. #
Bill To: Same

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard (10-15 working days)
___ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER:_____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

See attached instructions

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature	Signature	Signature	Signature
Printed Name	Printed Name	Printed Name	Printed Name
Date/Time 10/13/03 9:00AM	Date/Time 10/13/03 10:40	Date/Time 10-13-03	Date/Time 1335 10/13/03
Firm	Firm CAS	Firm CAS	Firm CAS

Columbia Analytical Services Inc.
Cooler Receipt And Preservation Form

Project/Client RSV Engineering Work Order K23 8015

Cooler received on 10/03/03. and opened on 10/03/03. by KM.

1.	Were custody seals on outside of cooler? If yes, how many and where?				Y (N)
2.	Were seals intact and signature & date correct?				Y (N)
3.	Is the shipper's airbill available and filed? If no, record airbill number: CAS				~~Y N~~
4.	COC #				
	Temperature of cooler(s) upon receipt:	2.5	1.8		
	Temperature Blank:	5.1	~~NR~~ 8.4		
5.	Were custody papers properly filled out (ink, signed, etc.)?				(Y) N
6.	Type of packing material present ICE				
7.	Did all bottles arrive in good condition (unbroken)?				(Y) N
8.	Were all bottle labels complete (*i.e.* analysis, preservation, etc.)?				(Y) N
9.	Did all bottle labels and tags agree with custody papers?				(Y) N
10.	Were the correct types of bottles used for the tests indicated?				(Y) N
11.	Were all of the preserved bottles received at the lab with the appropriate pH?				(Y) N
12.	Were VOA vials checked for absence of air bubbles, and if present, noted below?				(Y) N
13.	Did the bottles originate from CAS/K or a branch laboratory?				(Y) N
14.	Are CWA Microbiology samples received with > ½ the 24 hr. hold time remaining from collection?				~~Y N~~
15.	Was Cl2/Res negative?				(Y) N

Explain any discrepancies: _____

RESOLUTION: _____

Samples that required preservation or received out of temperature:

Sample ID	Reagent	Volume	Lot Number	Bottle Type	Rec'd out of Temperature	Initials
					000010	

Metals

METALS

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: RSV Engineering, Inc. Service Request: K2309246

Project No.:

Project Name: Niemi Highway Service

Sample No.	Lab Sample ID.
GP-2@2'-4'	K2309246-001
GP-2@17'-19'	K2309246-002
GP-3@2'-4'	K2309246-003
GP-3@17'-19'	K2309246-004
GP-4@2'-4'	K2309246-005
GP-4@15'-17'	K2309246-006
GP-4@15'-17'D	K2309246-006D
GP-4@15'-17'S	K2309246-006S
Method Blank	K2309246-MB

ere ICP interelement corrections applied? Yes/No YES

ere ICP background corrections applied? Yes/No YES

If yes-were raw data generated before application of background corrections? Yes/No NO

omments:

certify that this data package is in compliance with the terms and conditions of the ontract, both technically and for completeness, for other than the conditions detailed bove. Release of the data contained in this hardcopy data package and in the omputer-readable data submitted on diskette has been authorized by the Laboratory Manager or he Manager's designee, as verified by the following signature.

ignature: Date: 12/11/03

000012

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: NA
Project Name: Niemi Highway Service
Matrix: SOIL

Service Request: K2309246
Date Collected: 10/10/03
Date Received: 10/13/03
Units: MG/KG
Basis: Dry

Sample Name: GP-2@2'-4'
Lab Code: K2309246-001

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	200.8	0.268	0.032	25	11/26/03	12/2/03	0.352		
Chromium	200.8	1.07	0.21	25	11/26/03	12/2/03	44.1		
Lead	200.8	0.27	0.11	25	11/26/03	12/2/03	6.51		

% Solids: 77.8

Comments:

000013

METALS
-1-
INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc
Project No.: NA
Project Name: Niemi Highway Service
Matrix: SOIL

Service Request: K2309246
Date Collected: 10/10/03
Date Received: 10/13/03
Units: MG/KG
Basis: Dry

Sample Name: GP-2@17'-19'
Lab Code: K2309246-002

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	200.8	0.055	0.007	5	11/26/03	12/2/03	0.030	B	
Chromium	200.8	0.22	0.04	5	11/26/03	12/2/03	7.23		
Lead	200.8	0.06	0.02	5	11/26/03	12/2/03	2.26		

% Solids: 90.2

Comments:

000014

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: NA
Project Name: Niemi Highway Service
Matrix: SOIL

Service Request: K2309246
Date Collected: 10/10/03
Date Received: 10/13/03
Units: MG/KG
Basis: Dry

Sample Name: GP-3@2'-4'
Lab Code: K2309246-003

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	200.8	0.263	0.032	25	11/26/03	12/2/03	0.291		
Chromium	200.8	1.05	0.21	25	11/26/03	12/2/03	40.6		
Lead	200.8	0.26	0.11	25	11/26/03	12/2/03	9.44		

% Solids: 79.3

Comments:

000015

METALS
-1-
INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: NA
Project Name: Niemi Highway Service
Matrix: SOIL

Service Request: K2309246
Date Collected: 10/10/03
Date Received: 10/13/03
Units: MG/KG
Basis: Dry

Sample Name: GP-3@17'-19'
Lab Code: K2309246-004

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	200.8	0.056	0.007	5	11/26/03	12/2/03	0.039	B	
Chromium	200.8	0.23	0.05	5	11/26/03	12/2/03	9.81		
Lead	200.8	0.06	0.02	5	11/26/03	12/2/03	2.49		

% Solids: 88.8

Comments:

000016

METALS
-1-
INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: NA
Project Name: Niemi Highway Service
Matrix: SOIL

Service Request: K2309246
Date Collected: 10/10/03
Date Received: 10/13/03
Units: MG/KG
Basis: Dry

Sample Name: GP-4@2'-4'
Lab Code: K2309246-005

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	200.8	0.261	0.031	25	11/26/03	12/2/03	0.417		
Chromium	200.8	1.04	0.21	25	11/26/03	12/2/03	30.8		
Lead	200.8	0.26	0.10	25	11/26/03	12/2/03	7.78		

% Solids: 79.8

Comments:

000017

METALS
-1-
INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: NA
Project Name: Niemi Highway Service
Matrix: SOIL

Service Request: K2309246
Date Collected: 10/10/03
Date Received: 10/13/03
Units: MG/KG
Basis: Dry

Sample Name: GP-4@15'-17'
Lab Code: K2309246-006

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	200.8	0.053	0.006	5	11/26/03	12/2/03	0.031	B	
Chromium	200.8	0.21	0.04	5	11/26/03	12/2/03	7.58		
Lead	200.8	0.05	0.02	5	11/26/03	12/2/03	2.07		

% Solids: 94.3

Comments:

METALS
-1-
INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: NA
Project Name: Niemi Highway Service
Matrix: SOIL

Service Request: K2309246
Date Collected:
Date Received:
Units: MG/KG
Basis: Dry

Sample Name: Method Blank
Lab Code: K2309246-MB

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	200.8	0.050	0.006	5	11/26/03	12/2/03	0.006	U	
Chromium	200.8	0.20	0.04	5	11/26/03	12/2/03	0.07	B	
Lead	200.8	0.05	0.02	5	11/26/03	12/2/03	0.02	U	

% Solids: 100.0

Comments:

METALS
-5a-
SPIKE SAMPLE RECOVERY

Client: RSV Engineering, Inc.
Service Request: K2309246
Project No.:
Units: mg/kg
Project Name: Niemi Highway Service
Basis: Dry
Matrix: SOIL
% Solids: 94.3

Sample Name: GP-4@15'-17'S
Lab Code: K2309246-006S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Cadmium	70 - 130	11.0		0.031	B	10.6	103		200.8
Chromium	70 - 130	50.0		7.58		42.4	100		200.8
Lead	70 - 130	105		2.07		106	97		200.8

An empty field in the Control Limit column indicates the control limit is not applicable.

METALS
-6-
DUPLICATES

Client: RSV Engineering, Inc.
Service Request: K2309246
Project No.:
Units: mg/kg
Project Name: Niemi Highway Service
Basis: Dry
Matrix: SOIL
% Solids: 94.3

Sample Name: GP-4@15'-17'D
Lab Code: K2309246-006D

Analyte	Control Limit(%)	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Cadmium		0.031	B	0.029	B	7		200.8
Chromium	30	7.58		7.62		1		200.8
Lead	30	2.07		1.86		11		200.8

An empty field in the Control Limit column indicates the control limit is not applicable.

Diesel and Residual Range Organics

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Diesel and Residual Range Organics

Sample Name: GP-2@2'-4'
Lab Code: K2309246-001

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND	U	31	9.2	1	11/24/03	11/25/03	KWG0318906	*
Residual Range Organics (RRO)	ND	U	130	6.0	1	11/24/03	11/25/03	KWG0318906	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	82	50-150	11/25/03	Acceptable
n-Triacontane	102	50-150	11/25/03	Acceptable

Comments:

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Diesel and Residual Range Organics

Sample Name: GP-2@17'-19'
Lab Code: K2309246-002

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND	U	28	7.9	1	11/24/03	11/25/03	KWG0318906	*
Residual Range Organics (RRO)	ND	U	110	5.1	1	11/24/03	11/25/03	KWG0318906	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	82	50-150	11/25/03	Acceptable
n-Triacontane	102	50-150	11/25/03	Acceptable

Comments:

000023

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Diesel and Residual Range Organics

Sample Name: GP-3@2'-4'
Lab Code: K2309246-003

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND	U	32	9.0	1	11/24/03	11/25/03	KWG0318906	*
Residual Range Organics (RRO)	7.2	J	130	5.9	1	11/24/03	11/25/03	KWG0318906	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	79	50-150	11/25/03	Acceptable
n-Triacontane	98	50-150	11/25/03	Acceptable

Comments:

000024

Analytical Results

Client:	RSV Engineering, Inc.	**Service Request:**	K2309246
Project:	Niemi Highway Service	**Date Collected:**	10/10/2003
Sample Matrix:	Soil	**Date Received:**	10/13/2003

Diesel and Residual Range Organics

Sample Name:	GP-3@17'-19'	**Units:**	mg/Kg
Lab Code:	K2309246-004	**Basis:**	Dry
Extraction Method:	EPA 3550B	**Level:**	Low
Analysis Method:	NWTPH-Dx		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	11	J	28	8.0	1	11/24/03	11/25/03	KWG0318906	*
Residual Range Organics (RRO)	85	J	120	5.2	1	11/24/03	11/25/03	KWG0318906	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	85	50-150	11/25/03	Acceptable
n-Triacontane	110	50-150	11/25/03	Acceptable

Comments:

000025

Analytical Results

Client:	RSV Engineering, Inc.	**Service Request:**	K2309246
Project:	Niemi Highway Service	**Date Collected:**	10/10/2003
Sample Matrix:	Soil	**Date Received:**	10/13/2003

Diesel and Residual Range Organics

Sample Name:	GP-4@2'-4'	**Units:**	mg/Kg
Lab Code:	K2309246-005	**Basis:**	Dry
Extraction Method:	EPA 3550B	**Level:**	Low
Analysis Method:	NWTPH-Dx		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND	U	31	8.9	1	11/24/03	11/25/03	KWG0318906	*
Residual Range Organics (RRO)	9.6	J	130	5.8	1	11/24/03	11/25/03	KWG0318906	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	79	50-150	11/25/03	Acceptable
n-Triacontane	99	50-150	11/25/03	Acceptable

Comments:

000026

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Diesel and Residual Range Organics

Sample Name: GP-4@15'-17'
Lab Code: K2309246-006

Units: mg/Kg
Basis: Dry

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND	U	26	7.6	1	11/24/03	11/25/03	KWG0318906	*
Residual Range Organics (RRO)	ND	U	110	4.9	1	11/24/03	11/25/03	KWG0318906	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	82	50-150	11/25/03	Acceptable
n-Triacontane	104	50-150	11/25/03	Acceptable

Comments:

000027

Analytical Results

Client:	RSV Engineering, Inc.	**Service Request:**	K2309246
Project:	Niemi Highway Service	**Date Collected:**	NA
Sample Matrix:	Sediment	**Date Received:**	NA

Diesel and Residual Range Organics

Sample Name:	Method Blank	**Units:**	mg/Kg
Lab Code:	KWG0318906-4	**Basis:**	Dry
Extraction Method:	EPA 3550B	**Level:**	Low
Analysis Method:	NWTPH-Dx		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND	U	25	7.1	1	11/24/03	11/25/03	KWG0318906	
Residual Range Organics (RRO)	ND	U	100	4.6	1	11/24/03	11/25/03	KWG0318906	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	82	50-150	11/25/03	Acceptable
n-Triacontane	98	50-150	11/25/03	Acceptable

Comments:

000028

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246

Surrogate Recovery Summary
Diesel and Residual Range Organics

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2
GP-2@2'-4'	K2309246-001	82	102
GP-2@17'-19'	K2309246-002	82	102
GP-3@2'-4'	K2309246-003	79	98
GP-3@17'-19'	K2309246-004	85	110
GP-4@2'-4'	K2309246-005	79	99
GP-4@15'-17'	K2309246-006	82	104
GP-4@15'-17'DUP	KWG0318906-1	92	117
Method Blank	KWG0318906-4	82	98
Lab Control Sample	KWG0318906-3	85	102

Surrogate Recovery Control Limits (%)

Sur1 = o-Terphenyl	50-150
Sur2 = n-Triacontane	50-150

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

000029

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Extracted: 11/24/2003
Date Analyzed: 11/26/2003

Duplicate Sample Summary
Diesel and Residual Range Organics

Sample Name: GP-4@15'-17'
Lab Code: K2309246-006

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: mg/Kg
Basis: Dry

Level: Low
Extraction Lot: KWG0318906

Analyte Name	MRL	MDL	Sample Result	GP-4@15'-17'DUP KWG0318906-1 Duplicate Sample Result	Average	Relative Percent Difference	RPD Limit
Diesel Range Organics (DRO)	26	7.6	ND	ND	ND	-	40
Residual Range Organics (RRO)	110	4.9	ND	ND	ND	-	40

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000030

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Sediment

Service Request: K2309246
Date Extracted: 11/24/2003
Date Analyzed: 11/25/2003

Lab Control Spike Summary
Diesel and Residual Range Organics

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: mg/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG0318906

Analyte Name	Lab Control Sample KWG0318906-3 Lab Control Spike Result	Expected	%Rec	%Rec Limits
Diesel Range Organics (DRO)	158	160	98	63-133
Residual Range Organics (RRO)	163	160	102	69-124

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000031

Gasoline Range Organics

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Gasoline Range Organics

Sample Name: GP-2@2'-4'
Lab Code: K2309246-001

Units: mg/Kg
Basis: Dry

Extraction Method: EPA 5035/5030B
Analysis Method: NWTPH-Gx

Level: Med

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics (GRO)	ND	U	6.2	1.3	1	12/04/03	12/04/03	KWG0319481	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
4-Bromofluorobenzene	80	50-150	12/04/03	Acceptable

Comments:

000033

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Gasoline Range Organics

Sample Name: GP-2@17'-19'
Lab Code: K2309246-002

Extraction Method: EPA 5035/5030B
Analysis Method: NWTPH-Gx

Units: mg/Kg
Basis: Dry
Level: Med

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics (GRO)	ND	U	5.5	1.1	1	12/04/03	12/04/03	KWG0319481	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
4-Bromofluorobenzene	73	50-150	12/04/03	Acceptable

Comments:

000034

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Gasoline Range Organics

Sample Name: GP-3@2'-4'
Lab Code: K2309246-003

Extraction Method: EPA 5035/5030B
Analysis Method: NWTPH-Gx

Units: mg/Kg
Basis: Dry
Level: Med

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics (GRO)	ND	U	6.2	1.3	1	12/04/03	12/04/03	KWG0319481	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
4-Bromofluorobenzene	83	50-150	12/04/03	Acceptable

Comments:

000035

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Gasoline Range Organics

Sample Name: GP-3@17'-19'
Lab Code: K2309246-004

Extraction Method: EPA 5035/5030B
Analysis Method: NWTPH-Gx

Units: mg/Kg
Basis: Dry
Level: Med

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics (GRO)	ND	U	5.6	1.1	1	12/04/03	12/04/03	KWG0319481	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
4-Bromofluorobenzene	75	50-150	12/04/03	Acceptable

Comments:

000036

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	RSV Engineering, Inc.	**Service Request:**	K2309246
Project:	Niemi Highway Service	**Date Collected:**	10/10/2003
Sample Matrix:	Soil	**Date Received:**	10/13/2003

Gasoline Range Organics

Sample Name:	GP-4@2'-4'	**Units:**	mg/Kg
Lab Code:	K2309246-005	**Basis:**	Dry
Extraction Method:	EPA 5035/5030B	**Level:**	Med
Analysis Method:	NWTPH-Gx		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics (GRO)	ND	U	6.3	1.3	1	12/04/03	12/04/03	KWG0319481	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
4-Bromofluorobenzene	74	50-150	12/04/03	Acceptable

000037

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Gasoline Range Organics

Sample Name: GP-4@15'-17'
Lab Code: K2309246-006

Extraction Method: EPA 5035/5030B
Analysis Method: NWTPH-Gx

Units: mg/Kg
Basis: Dry
Level: Med

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics (GRO)	ND	U	5.2	1.1	1	12/04/03	12/04/03	KWG0319481	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
4-Bromofluorobenzene	75	50-150	12/04/03	Acceptable

Comments:

000033

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: NA
Date Received: NA

Gasoline Range Organics

Sample Name: Method Blank
Lab Code: KWG0319481-4

Extraction Method: EPA 5035/5030B
Analysis Method: NWTPH-Gx

Units: mg/Kg
Basis: Dry
Level: Med

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics (GRO)	ND	U	5.0	0.96	1	12/04/03	12/04/03	KWG0319481	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
4-Bromofluorobenzene	77	50-150	12/04/03	Acceptable

Comments:

000039

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246

Surrogate Recovery Summary
Gasoline Range Organics

Extraction Method: EPA 5035/5030B
Analysis Method: NWTPH-Gx

Units: PERCENT
Level: Med

Sample Name	Lab Code	Sur1
GP-2@2'-4'	K2309246-001	80
GP-2@17'-19'	K2309246-002	73
GP-3@2'-4'	K2309246-003	83
GP-3@17'-19'	K2309246-004	75
GP-4@2'-4'	K2309246-005	74
GP-4@15'-17'	K2309246-006	75
Method Blank	KWG0319481-4	77
GP-2@17'-19'MS	KWG0319481-1	102
GP-2@17'-19'DMS	KWG0319481-2	97
Lab Control Sample	KWG0319481-3	106

Surrogate Recovery Control Limits (%)

Sur1 = 4-Bromofluorobenzene 50-150

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

000040
~~000041~~

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Extracted: 12/04/2003
Date Analyzed: 12/04/2003

Matrix Spike/Duplicate Matrix Spike Summary
Gasoline Range Organics

Sample Name: GP-2@17'-19'
Lab Code: K2309246-002

Units: mg/Kg
Basis: Dry

Extraction Method: EPA 5035/5030B
Analysis Method: NWTPH-Gx

Level: Med
Extraction Lot: KWG0319481

Analyte Name	Sample Result	GP-2@17'-19'MS KWG0319481-1 Matrix Spike			GP-2@17'-19'DMS KWG0319481-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Expected	%Rec	Result	Expected	%Rec			
Gasoline Range Organics (GRO)	ND	51.5	53.7	96	49.7	54.3	92	42-125	3	40

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000041

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Extracted: 12/04/2003
Date Analyzed: 12/04/2003

Lab Control Spike Summary
Gasoline Range Organics

Extraction Method: EPA 5035/5030B
Analysis Method: NWTPH-Gx

Units: mg/Kg
Basis: Dry
Level: Med
Extraction Lot: KWG0319481

Analyte Name	Lab Control Sample KWG0319481-3 Lab Control Spike Result	Expected	%Rec	%Rec Limits
Gasoline Range Organics (GRO)	50.0	50.0	100	78-128

esult[illegible]ed with an asterisk (*) indicate values outside control criteria.
ercent [illegible]overies and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000042

Polychlorinated Biphenlys
(PCB's)
Method 8082

Analytical Results

Client:	RSV Engineering, Inc.	**Service Request:**	K2309246
Project:	Niemi Highway Service	**Date Collected:**	10/10/2003
Sample Matrix:	Soil	**Date Received:**	10/13/2003

Polychlorinated Biphenyls (PCBs)

Sample Name:	GP-2@2'-4'	**Units:**	mg/Kg
Lab Code:	K2309246-001	**Basis:**	Dry
Extraction Method:	EPA 3545	**Level:**	Low
Analysis Method:	8082		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.10	0.052	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1221	ND	U	0.20	0.0071	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1232	ND	U	0.10	0.017	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1242	ND	U	0.10	0.012	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1248	ND	U	0.10	0.0054	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1254	ND	U	0.10	0.0056	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1260	ND	U	0.10	0.0060	1	11/25/03	11/26/03	KWG0319065	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	92	40-145	11/26/03	Acceptable

Comments:

0000044

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Polychlorinated Biphenyls (PCBs)

Sample Name: GP-2@17'-19'
Lab Code: K2309246-002

Units: mg/Kg
Basis: Dry

Extraction Method: EPA 3545
Analysis Method: 8082

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.098	0.045	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1221	ND	U	0.20	0.0061	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1232	ND	U	0.098	0.015	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1242	ND	U	0.098	0.0098	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1248	ND	U	0.098	0.0047	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1254	ND	U	0.098	0.0048	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1260	ND	U	0.098	0.0051	1	11/25/03	11/26/03	KWG0319065	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	93	40-145	11/26/03	Acceptable

Comments:

000045

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Polychlorinated Biphenyls (PCBs)

Sample Name: GP-3@2'-4'
Lab Code: K2309246-003

Extraction Method: EPA 3545
Analysis Method: 8082

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.099	0.051	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1221	ND	U	0.20	0.0070	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1232	ND	U	0.099	0.017	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1242	ND	U	0.099	0.012	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1248	ND	U	0.099	0.0053	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1254	ND	U	0.099	0.0055	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1260	ND	U	0.099	0.0059	1	11/25/03	11/26/03	KWG0319065	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	92	40-145	11/26/03	Acceptable

Comments:

000046

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Polychlorinated Biphenyls (PCBs)

Sample Name: GP-3@17'-19'
Lab Code: K2309246-004

Units: mg/Kg
Basis: Dry

Extraction Method: EPA 3545
Analysis Method: 8082

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.099	0.046	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1221	ND	U	0.20	0.0062	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1232	ND	U	0.099	0.015	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1242	ND	U	0.099	0.010	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1248	ND	U	0.099	0.0048	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1254	ND	U	0.099	0.0049	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1260	ND	U	0.099	0.0052	1	11/25/03	11/26/03	KWG0319065	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	89	40-145	11/26/03	Acceptable

Comments:

000047

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Polychlorinated Biphenyls (PCBs)

Sample Name: GP-4@2'-4'
Lab Code: K2309246-005

Units: mg/Kg
Basis: Dry

Extraction Method: EPA 3545
Analysis Method: 8082

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.099	0.051	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1221	ND	U	0.20	0.0069	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1232	ND	U	0.099	0.017	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1242	ND	U	0.099	0.012	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1248	ND	U	0.099	0.0053	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1254	ND	U	0.099	0.0054	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1260	ND	U	0.099	0.0058	1	11/25/03	11/26/03	KWG0319065	*

See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	91	40-145	11/26/03	Acceptable

000048

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Polychlorinated Biphenyls (PCBs)

Sample Name: GP-4@15'-17'
Lab Code: K2309246-006

Extraction Method: EPA 3545
Analysis Method: 8082

Units: mg/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.10	0.043	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1221	ND	U	0.20	0.0059	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1232	ND	U	0.10	0.014	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1242	ND	U	0.10	0.0094	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1248	ND	U	0.10	0.0045	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1254	ND	U	0.10	0.0046	1	11/25/03	11/26/03	KWG0319065	*
Aroclor 1260	ND	U	0.10	0.0049	1	11/25/03	11/26/03	KWG0319065	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	89	40-145	11/26/03	Acceptable

Comments:

000049

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

lient: RSV Engineering, Inc.
ro[illegible]t: Niemi Highway Service
a[illegible] Matrix: Soil

Service Request: K2309246
Date Collected: NA
Date Received: NA

Polychlorinated Biphenyls (PCBs)

ample Name: Method Blank
ab Code: KWG0319065-4

Units: mg/Kg
Basis: Dry
Level: Low

xtraction Method: EPA 3545
nalysis Method: 8082

nalyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
roclor 1016	ND	U	0.078	0.040	1	11/25/03	11/26/03	KWG0319065	
roclor 1221	ND	U	0.16	0.0055	1	11/25/03	11/26/03	KWG0319065	
roclor 1232	ND	U	0.078	0.013	1	11/25/03	11/26/03	KWG0319065	
roclor 1242	ND	U	0.078	0.0088	1	11/25/03	11/26/03	KWG0319065	
roclor 1248	ND	U	0.078	0.0042	1	11/25/03	11/26/03	KWG0319065	
roclor 1254	ND	U	0.078	0.0043	1	11/25/03	11/26/03	KWG0319065	
roclor 1260	ND	U	0.078	0.0046	1	11/25/03	11/26/03	KWG0319065	

ur[illegible]ate Name	%Rec	Control Limits	Date Analyzed	Note
ecachlorobiphenyl	95	40-145	11/26/03	Acceptable

Comments:

000050

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Service Request: K2309246

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Surrogate Recovery Summary
Polychlorinated Biphenyls (PCBs)

Extraction Method: EPA 3545
Analysis Method: 8082

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1
GP-2@2'-4'	K2309246-001	92
GP-2@17'-19'	K2309246-002	93
GP-3@2'-4'	K2309246-003	92
GP-3@17'-19'	K2309246-004	89
GP-4@2'-4'	K2309246-005	91
GP-4@15'-17'	K2309246-006	89
Method Blank	KWG0319065-4	95
Batch QC	K2309297-006	140 D
Batch QCMS	KWG0319065-1	121 D
Batch QCDMS	KWG0319065-2	118 D
Lab Control Sample	KWG0319065-3	94

Surrogate Recovery Control Limits (%)

Sur1 = Decachlorobiphenyl	40-145

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

000051

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Matrix: Soil

Service Request: K2309246
Date Extracted: 11/25/2003
Date Analyzed: 11/28/2003

Matrix Spike/Duplicate Matrix Spike Summary
Polychlorinated Biphenyls (PCBs)

Sample Name: Batch QC
Lab Code: K2309297-006

Extraction Method: EPA 3545
Analysis Method: 8082

Units: mg/Kg
Basis: Dry

Level: Low
Extraction Lot: KWG0319065

Analyte Name	Sample Result	Batch QCMS KWG0319065-1 Matrix Spike Result	Matrix Spike Expected	Matrix Spike %Rec	Batch QCDMS KWG0319065-2 Duplicate Matrix Spike Result	Duplicate Matrix Spike Expected	Duplicate Matrix Spike %Rec	%Rec Limits	RPD	RPD Limit
Aroclor 1016	ND	1.31	0.982	133	1.25	0.989	126	44-149	4	50
Aroclor 1260	4.9	3.77	0.982	-116 #	3.44	0.989	-149 #	29-169	9	50

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000052

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Extracted: 11/25/2003
Date Analyzed: 11/26/2003

Lab Control Spike Summary
Polychlorinated Biphenyls (PCBs)

Extraction Method: EPA 3545
Analysis Method: 8082

Units: mg/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG0319065

Analyte Name	Lab Control Sample KWG0319065-3 Lab Control Spike Result	Expected	%Rec	%Rec Limits
Aroclor 1016	0.984	1.00	98	47-138
Aroclor 1260	0.960	1.00	96	48-149

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000053

Volatile Organic Compounds
Method 8260

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-2@2'-4'
Lab Code: K2309246-001

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	6.3	0.90	1	11/24/03	11/24/03	KWG0318965	*
Chloromethane	ND	U	6.3	1.3	1	11/24/03	11/24/03	KWG0318965	*
Vinyl Chloride	ND	U	6.3	0.80	1	11/24/03	11/24/03	KWG0318965	*
Bromomethane	ND	U	6.3	1.1	1	11/24/03	11/24/03	KWG0318965	*
Chloroethane	ND	U	6.3	1.1	1	11/24/03	11/24/03	KWG0318965	*
Trichlorofluoromethane	ND	U	6.3	0.94	1	11/24/03	11/24/03	KWG0318965	*
1,1-Dichloroethene	ND	U	6.3	0.89	1	11/24/03	11/24/03	KWG0318965	*
Trichlorotrifluoroethane	ND	U	6.3	0.96	1	11/24/03	11/24/03	KWG0318965	*
Methylene Chloride	**3.5**	J	13	1.3	1	11/24/03	11/24/03	KWG0318965	*
Methyl tert-Butyl Ether	ND	U	6.3	0.83	1	11/24/03	11/24/03	KWG0318965	*
trans-1,2-Dichloroethene	ND	U	6.3	0.94	1	11/24/03	11/24/03	KWG0318965	*
1,1-Dichloroethane	ND	U	6.3	1.1	1	11/24/03	11/24/03	KWG0318965	*
cis-1,2-Dichloroethene	ND	U	6.3	1.1	1	11/24/03	11/24/03	KWG0318965	*
Chloroform	ND	U	6.3	0.74	1	11/24/03	11/24/03	KWG0318965	*
1,1,1-Trichloroethane (TCA)	ND	U	6.3	0.74	1	11/24/03	11/24/03	KWG0318965	*
Carbon Tetrachloride	ND	U	6.3	0.78	1	11/24/03	11/24/03	KWG0318965	*
Benzene	ND	U	6.3	1.1	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichloroethane (EDC)	ND	U	6.3	0.87	1	11/24/03	11/24/03	KWG0318965	*
Trichloroethene (TCE)	ND	U	6.3	0.36	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichloropropane	ND	U	6.3	0.93	1	11/24/03	11/24/03	KWG0318965	*
Bromodichloromethane	ND	U	6.3	0.69	1	11/24/03	11/24/03	KWG0318965	*
2-Chloroethyl Vinyl Ether	ND	U	13	1.3	1	11/24/03	11/24/03	KWG0318965	*
cis-1,3-Dichloropropene	ND	U	6.3	0.98	1	11/24/03	11/24/03	KWG0318965	*
Toluene	ND	U	6.3	1.1	1	11/24/03	11/24/03	KWG0318965	*
trans-1,3-Dichloropropene	ND	U	6.3	0.78	1	11/24/03	11/24/03	KWG0318965	*
1,1,2-Trichloroethane	ND	U	6.3	0.89	1	11/24/03	11/24/03	KWG0318965	*
Tetrachloroethene (PCE)	ND	U	6.3	0.40	1	11/24/03	11/24/03	KWG0318965	*
Dibromochloromethane	ND	U	6.3	0.78	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dibromoethane (EDB)	ND	U	26	1.1	1	11/24/03	11/24/03	KWG0318965	*
Chlorobenzene	ND	U	6.3	0.90	1	11/24/03	11/24/03	KWG0318965	*
Ethylbenzene	ND	U	6.3	0.74	1	11/24/03	11/24/03	KWG0318965	*
m,p-Xylenes	ND	U	6.3	2.0	1	11/24/03	11/24/03	KWG0318965	*
o-Xylene	ND	U	6.3	0.89	1	11/24/03	11/24/03	KWG0318965	*
Bromoform	ND	U	6.3	0.84	1	11/24/03	11/24/03	KWG0318965	*

Comments:

000055

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-2@2'-4'
Lab Code: K2309246-001

Units: ug/Kg
Basis: Dry

Extraction Method: EPA 5030A
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND	U	26	0.88	1	11/24/03	11/24/03	KWG0318965	*
1,1,2,2-Tetrachloroethane	ND	U	6.3	0.94	1	11/24/03	11/24/03	KWG0318965	*
n-Propylbenzene	ND	U	26	0.93	1	11/24/03	11/24/03	KWG0318965	*
1,3,5-Trimethylbenzene	ND	U	26	4.9	1	11/24/03	11/24/03	KWG0318965	*
1,2,4-Trimethylbenzene	ND	U	26	1.1	1	11/24/03	11/24/03	KWG0318965	*
1,3-Dichlorobenzene	ND	U	6.3	0.92	1	11/24/03	11/24/03	KWG0318965	*
1,4-Dichlorobenzene	ND	U	6.3	1.1	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichlorobenzene	ND	U	6.3	0.84	1	11/24/03	11/24/03	KWG0318965	*
Naphthalene	ND	U	26	1.2	1	11/24/03	11/24/03	KWG0318965	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	87	84-121	11/24/03	Acceptable
Toluene-d8	97	80-125	11/24/03	Acceptable
4-Bromofluorobenzene	95	80-123	11/24/03	Acceptable

Comments:

000056

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-2@17'-19'
Lab Code: K2309246-002

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	5.5	0.78	1	11/24/03	11/24/03	KWG0318965	*
Chloromethane	ND	U	5.5	1.1	1	11/24/03	11/24/03	KWG0318965	*
Vinyl Chloride	ND	U	5.5	0.69	1	11/24/03	11/24/03	KWG0318965	*
Bromomethane	ND	U	5.5	0.89	1	11/24/03	11/24/03	KWG0318965	*
Chloroethane	ND	U	5.5	0.87	1	11/24/03	11/24/03	KWG0318965	*
Trichlorofluoromethane	ND	U	5.5	0.81	1	11/24/03	11/24/03	KWG0318965	*
1,1-Dichloroethene	ND	U	5.5	0.77	1	11/24/03	11/24/03	KWG0318965	*
Trichlorotrifluoroethane	ND	U	5.5	0.83	1	11/24/03	11/24/03	KWG0318965	*
Methylene Chloride	**2.5**	J	11	1.1	1	11/24/03	11/24/03	KWG0318965	*
Methyl tert-Butyl Ether	ND	U	5.5	0.71	1	11/24/03	11/24/03	KWG0318965	*
trans-1,2-Dichloroethene	ND	U	5.5	0.81	1	11/24/03	11/24/03	KWG0318965	*
1,1-Dichloroethane	ND	U	5.5	0.87	1	11/24/03	11/24/03	KWG0318965	*
cis-1,2-Dichloroethene	ND	U	5.5	0.93	1	11/24/03	11/24/03	KWG0318965	*
Chloroform	ND	U	5.5	0.64	1	11/24/03	11/24/03	KWG0318965	*
1,1,1-Trichloroethane (TCA)	ND	U	5.5	0.64	1	11/24/03	11/24/03	KWG0318965	*
Carbon Tetrachloride	ND	U	5.5	0.67	1	11/24/03	11/24/03	KWG0318965	*
Benzene	ND	U	5.5	0.88	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichloroethane (EDC)	ND	U	5.5	0.75	1	11/24/03	11/24/03	KWG0318965	*
Trichloroethene (TCE)	ND	U	5.5	0.32	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichloropropane	ND	U	5.5	0.80	1	11/24/03	11/24/03	KWG0318965	*
Bromodichloromethane	ND	U	5.5	0.59	1	11/24/03	11/24/03	KWG0318965	*
2-Chloroethyl Vinyl Ether	ND	U	11	1.2	1	11/24/03	11/24/03	KWG0318965	*
cis-1,3-Dichloropropene	ND	U	5.5	0.85	1	11/24/03	11/24/03	KWG0318965	*
Toluene	ND	U	5.5	0.94	1	11/24/03	11/24/03	KWG0318965	*
trans-1,3-Dichloropropene	ND	U	5.5	0.67	1	11/24/03	11/24/03	KWG0318965	*
1,1,2-Trichloroethane	ND	U	5.5	0.77	1	11/24/03	11/24/03	KWG0318965	*
Tetrachloroethene (PCE)	ND	U	5.5	0.35	1	11/24/03	11/24/03	KWG0318965	*
Dibromochloromethane	ND	U	5.5	0.67	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dibromoethane (EDB)	ND	U	22	0.88	1	11/24/03	11/24/03	KWG0318965	*
Chlorobenzene	ND	U	5.5	0.78	1	11/24/03	11/24/03	KWG0318965	*
Ethylbenzene	ND	U	5.5	0.64	1	11/24/03	11/24/03	KWG0318965	*
m,p-Xylenes	ND	U	5.5	1.7	1	11/24/03	11/24/03	KWG0318965	*
o-Xylene	ND	U	5.5	0.77	1	11/24/03	11/24/03	KWG0318965	*
Bromoform	ND	U	5.5	0.73	1	11/24/03	11/24/03	KWG0318965	*

Comments:

000057

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-2@17'-19'
Lab Code: K2309246-002

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND	U	22	0.76	1	11/24/03	11/24/03	KWG0318965	*
1,1,2,2-Tetrachloroethane	ND	U	5.5	0.81	1	11/24/03	11/24/03	KWG0318965	*
n-Propylbenzene	ND	U	22	0.80	1	11/24/03	11/24/03	KWG0318965	*
1,3,5-Trimethylbenzene	ND	U	22	4.3	1	11/24/03	11/24/03	KWG0318965	*
1,2,4-Trimethylbenzene	ND	U	22	0.91	1	11/24/03	11/24/03	KWG0318965	*
1,3-Dichlorobenzene	ND	U	5.5	0.79	1	11/24/03	11/24/03	KWG0318965	*
1,4-Dichlorobenzene	ND	U	5.5	0.91	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichlorobenzene	ND	U	5.5	0.73	1	11/24/03	11/24/03	KWG0318965	*
Naphthalene	ND	U	22	0.99	1	11/24/03	11/24/03	KWG0318965	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	87	84-121	11/24/03	Acceptable
Toluene-d8	97	80-125	11/24/03	Acceptable
4-Bromofluorobenzene	95	80-123	11/24/03	Acceptable

Comments:

000058

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-3@2'-4'
Lab Code: K2309246-003

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	6.2	0.89	1	11/24/03	11/24/03	KWG0318965	*
Chloromethane	ND	U	6.2	1.3	1	11/24/03	11/24/03	KWG0318965	*
Vinyl Chloride	ND	U	6.2	0.79	1	11/24/03	11/24/03	KWG0318965	*
Bromomethane	ND	U	6.2	1.1	1	11/24/03	11/24/03	KWG0318965	*
Chloroethane	ND	U	6.2	0.99	1	11/24/03	11/24/03	KWG0318965	*
Trichlorofluoromethane	ND	U	6.2	0.93	1	11/24/03	11/24/03	KWG0318965	*
1,1-Dichloroethene	ND	U	6.2	0.88	1	11/24/03	11/24/03	KWG0318965	*
Trichlorotrifluoroethane	ND	U	6.2	0.94	1	11/24/03	11/24/03	KWG0318965	*
Methylene Chloride	**4.1**	J	13	1.3	1	11/24/03	11/24/03	KWG0318965	*
Methyl tert-Butyl Ether	**1.0**	J	6.2	0.81	1	11/24/03	11/24/03	KWG0318965	*
trans-1,2-Dichloroethene	ND	U	6.2	0.93	1	11/24/03	11/24/03	KWG0318965	*
1,1-Dichloroethane	ND	U	6.2	0.99	1	11/24/03	11/24/03	KWG0318965	*
cis-1,2-Dichloroethene	ND	U	6.2	1.1	1	11/24/03	11/24/03	KWG0318965	*
Chloroform	ND	U	6.2	0.72	1	11/24/03	11/24/03	KWG0318965	*
1,1,1-Trichloroethane (TCA)	ND	U	6.2	0.72	1	11/24/03	11/24/03	KWG0318965	*
Carbon Tetrachloride	ND	U	6.2	0.76	1	11/24/03	11/24/03	KWG0318965	*
Benzene	ND	U	6.2	1.0	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichloroethane (EDC)	ND	U	6.2	0.85	1	11/24/03	11/24/03	KWG0318965	*
Trichloroethene (TCE)	ND	U	6.2	0.36	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichloropropane	ND	U	6.2	0.91	1	11/24/03	11/24/03	KWG0318965	*
Bromodichloromethane	ND	U	6.2	0.67	1	11/24/03	11/24/03	KWG0318965	*
2-Chloroethyl Vinyl Ether	ND	U	13	1.3	1	11/24/03	11/24/03	KWG0318965	*
cis-1,3-Dichloropropene	ND	U	6.2	0.96	1	11/24/03	11/24/03	KWG0318965	*
Toluene	ND	U	6.2	1.1	1	11/24/03	11/24/03	KWG0318965	*
trans-1,3-Dichloropropene	ND	U	6.2	0.76	1	11/24/03	11/24/03	KWG0318965	*
1,1,2-Trichloroethane	ND	U	6.2	0.88	1	11/24/03	11/24/03	KWG0318965	*
Tetrachloroethene (PCE)	ND	U	6.2	0.40	1	11/24/03	11/24/03	KWG0318965	*
Dibromochloromethane	ND	U	6.2	0.76	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dibromoethane (EDB)	ND	U	25	1.0	1	11/24/03	11/24/03	KWG0318965	*
Chlorobenzene	ND	U	6.2	0.89	1	11/24/03	11/24/03	KWG0318965	*
Ethylbenzene	ND	U	6.2	0.72	1	11/24/03	11/24/03	KWG0318965	*
m,p-Xylenes	ND	U	6.2	1.9	1	11/24/03	11/24/03	KWG0318965	*
o-Xylene	ND	U	6.2	0.88	1	11/24/03	11/24/03	KWG0318965	*
Bromoform	ND	U	6.2	0.82	1	11/24/03	11/24/03	KWG0318965	*

Comments:

000059

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-3@2'-4'
Lab Code: K2309246-003

Units: ug/Kg
Basis: Dry

Extraction Method: EPA 5030A
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND	U	25	0.86	1	11/24/03	11/24/03	KWG0318965	*
1,1,2,2-Tetrachloroethane	ND	U	6.2	0.93	1	11/24/03	11/24/03	KWG0318965	*
n-Propylbenzene	ND	U	25	0.91	1	11/24/03	11/24/03	KWG0318965	*
1,3,5-Trimethylbenzene	ND	U	25	4.8	1	11/24/03	11/24/03	KWG0318965	*
1,2,4-Trimethylbenzene	ND	U	25	1.1	1	11/24/03	11/24/03	KWG0318965	*
1,3-Dichlorobenzene	ND	U	6.2	0.90	1	11/24/03	11/24/03	KWG0318965	*
1,4-Dichlorobenzene	ND	U	6.2	1.1	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichlorobenzene	ND	U	6.2	0.82	1	11/24/03	11/24/03	KWG0318965	*
Naphthalene	ND	U	25	1.2	1	11/24/03	11/24/03	KWG0318965	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	86	84-121	11/24/03	Acceptable
Toluene-d8	97	80-125	11/24/03	Acceptable
4-Bromofluorobenzene	93	80-123	11/24/03	Acceptable

Comments:

000060

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-3@17'-19'
Lab Code: K2309246-004

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	5.6	0.79	1	11/24/03	11/24/03	KWG0318965	*
Chloromethane	ND	U	5.6	1.2	1	11/24/03	11/24/03	KWG0318965	*
Vinyl Chloride	ND	U	5.6	0.70	1	11/24/03	11/24/03	KWG0318965	*
Bromomethane	ND	U	5.6	0.91	1	11/24/03	11/24/03	KWG0318965	*
Chloroethane	ND	U	5.6	0.88	1	11/24/03	11/24/03	KWG0318965	*
Trichlorofluoromethane	ND	U	5.6	0.83	1	11/24/03	11/24/03	KWG0318965	*
1,1-Dichloroethene	ND	U	5.6	0.78	1	11/24/03	11/24/03	KWG0318965	*
Trichlorotrifluoroethane	ND	U	5.6	0.84	1	11/24/03	11/24/03	KWG0318965	*
Methylene Chloride	**2.4**	J	12	1.1	1	11/24/03	11/24/03	KWG0318965	*
Methyl tert-Butyl Ether	ND	U	5.6	0.73	1	11/24/03	11/24/03	KWG0318965	*
trans-1,2-Dichloroethene	ND	U	5.6	0.83	1	11/24/03	11/24/03	KWG0318965	*
1,1-Dichloroethane	ND	U	5.6	0.88	1	11/24/03	11/24/03	KWG0318965	*
cis-1,2-Dichloroethene	ND	U	5.6	0.94	1	11/24/03	11/24/03	KWG0318965	*
Chloroform	ND	U	5.6	0.65	1	11/24/03	11/24/03	KWG0318965	*
1,1,1-Trichloroethane (TCA)	ND	U	5.6	0.65	1	11/24/03	11/24/03	KWG0318965	*
Carbon Tetrachloride	ND	U	5.6	0.68	1	11/24/03	11/24/03	KWG0318965	*
Benzene	ND	U	5.6	0.89	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichloroethane (EDC)	ND	U	5.6	0.76	1	11/24/03	11/24/03	KWG0318965	*
Trichloroethene (TCE)	ND	U	5.6	0.32	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichloropropane	ND	U	5.6	0.82	1	11/24/03	11/24/03	KWG0318965	*
Bromodichloromethane	ND	U	5.6	0.60	1	11/24/03	11/24/03	KWG0318965	*
2-Chloroethyl Vinyl Ether	ND	U	12	1.2	1	11/24/03	11/24/03	KWG0318965	*
cis-1,3-Dichloropropene	ND	U	5.6	0.86	1	11/24/03	11/24/03	KWG0318965	*
Toluene	ND	U	5.6	0.95	1	11/24/03	11/24/03	KWG0318965	*
trans-1,3-Dichloropropene	ND	U	5.6	0.68	1	11/24/03	11/24/03	KWG0318965	*
1,1,2-Trichloroethane	ND	U	5.6	0.78	1	11/24/03	11/24/03	KWG0318965	*
Tetrachloroethene (PCE)	ND	U	5.6	0.35	1	11/24/03	11/24/03	KWG0318965	*
Dibromochloromethane	ND	U	5.6	0.68	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dibromoethane (EDB)	ND	U	23	0.89	1	11/24/03	11/24/03	KWG0318965	*
Chlorobenzene	ND	U	5.6	0.79	1	11/24/03	11/24/03	KWG0318965	*
Ethylbenzene	ND	U	5.6	0.65	1	11/24/03	11/24/03	KWG0318965	*
m,p-Xylenes	ND	U	5.6	1.7	1	11/24/03	11/24/03	KWG0318965	*
o-Xylene	ND	U	5.6	0.78	1	11/24/03	11/24/03	KWG0318965	*
Bromoform	ND	U	5.6	0.74	1	11/24/03	11/24/03	KWG0318965	*

Comments:

000061

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-3@17'-19'
Lab Code: K2309246-004

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND	U	23	0.77	1	11/24/03	11/24/03	KWG0318965	*
1,1,2,2-Tetrachloroethane	ND	U	5.6	0.83	1	11/24/03	11/24/03	KWG0318965	*
n-Propylbenzene	ND	U	23	0.82	1	11/24/03	11/24/03	KWG0318965	*
1,3,5-Trimethylbenzene	ND	U	23	4.3	1	11/24/03	11/24/03	KWG0318965	*
1,2,4-Trimethylbenzene	ND	U	23	0.93	1	11/24/03	11/24/03	KWG0318965	*
1,3-Dichlorobenzene	ND	U	5.6	0.80	1	11/24/03	11/24/03	KWG0318965	*
1,4-Dichlorobenzene	ND	U	5.6	0.93	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichlorobenzene	ND	U	5.6	0.74	1	11/24/03	11/24/03	KWG0318965	*
Naphthalene	ND	U	23	1.1	1	11/24/03	11/24/03	KWG0318965	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	88	84-121	11/24/03	Acceptable
Toluene-d8	101	80-125	11/24/03	Acceptable
4-Bromofluorobenzene	96	80-123	11/24/03	Acceptable

Comments:

000062

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-4@2'-4'
Lab Code: K2309246-005

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	6.2	0.88	1	11/24/03	11/24/03	KWG0318965	*
Chloromethane	ND	U	6.2	1.3	1	11/24/03	11/24/03	KWG0318965	*
Vinyl Chloride	ND	U	6.2	0.78	1	11/24/03	11/24/03	KWG0318965	*
Bromomethane	ND	U	6.2	1.1	1	11/24/03	11/24/03	KWG0318965	*
Chloroethane	ND	U	6.2	0.98	1	11/24/03	11/24/03	KWG0318965	*
Trichlorofluoromethane	ND	U	6.2	0.92	1	11/24/03	11/24/03	KWG0318965	*
1,1-Dichloroethene	ND	U	6.2	0.87	1	11/24/03	11/24/03	KWG0318965	*
Trichlorotrifluoroethane	ND	U	6.2	0.93	1	11/24/03	11/24/03	KWG0318965	*
Methylene Chloride	**3.0**	J	13	1.3	1	11/24/03	11/24/03	KWG0318965	*
Methyl tert-Butyl Ether	ND	U	6.2	0.81	1	11/24/03	11/24/03	KWG0318965	*
trans-1,2-Dichloroethene	ND	U	6.2	0.92	1	11/24/03	11/24/03	KWG0318965	*
1,1-Dichloroethane	ND	U	6.2	0.98	1	11/24/03	11/24/03	KWG0318965	*
cis-1,2-Dichloroethene	ND	U	6.2	1.1	1	11/24/03	11/24/03	KWG0318965	*
Chloroform	ND	U	6.2	0.72	1	11/24/03	11/24/03	KWG0318965	*
1,1,1-Trichloroethane (TCA)	ND	U	6.2	0.72	1	11/24/03	11/24/03	KWG0318965	*
Carbon Tetrachloride	ND	U	6.2	0.76	1	11/24/03	11/24/03	KWG0318965	*
Benzene	ND	U	6.2	0.99	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichloroethane (EDC)	ND	U	6.2	0.84	1	11/24/03	11/24/03	KWG0318965	*
Trichloroethene (TCE)	ND	U	6.2	0.36	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichloropropane	ND	U	6.2	0.91	1	11/24/03	11/24/03	KWG0318965	*
Bromodichloromethane	ND	U	6.2	0.67	1	11/24/03	11/24/03	KWG0318965	*
2-Chloroethyl Vinyl Ether	ND	U	13	1.3	1	11/24/03	11/24/03	KWG0318965	*
cis-1,3-Dichloropropene	ND	U	6.2	0.96	1	11/24/03	11/24/03	KWG0318965	*
Toluene	ND	U	6.2	1.1	1	11/24/03	11/24/03	KWG0318965	*
trans-1,3-Dichloropropene	ND	U	6.2	0.76	1	11/24/03	11/24/03	KWG0318965	*
1,1,2-Trichloroethane	ND	U	6.2	0.87	1	11/24/03	11/24/03	KWG0318965	*
Tetrachloroethene (PCE)	ND	U	6.2	0.39	1	11/24/03	11/24/03	KWG0318965	*
Dibromochloromethane	ND	U	6.2	0.76	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dibromoethane (EDB)	ND	U	25	0.99	1	11/24/03	11/24/03	KWG0318965	*
Chlorobenzene	ND	U	6.2	0.88	1	11/24/03	11/24/03	KWG0318965	*
Ethylbenzene	ND	U	6.2	0.72	1	11/24/03	11/24/03	KWG0318965	*
m,p-Xylenes	ND	U	6.2	1.9	1	11/24/03	11/24/03	KWG0318965	*
o-Xylene	ND	U	6.2	0.87	1	11/24/03	11/24/03	KWG0318965	*
Bromoform	ND	U	6.2	0.82	1	11/24/03	11/24/03	KWG0318965	*

Comments:

000063

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-4@2'-4'
Lab Code: K2309246-005

Units: ug/Kg
Basis: Dry

Extraction Method: EPA 5030A
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND	U	25	0.86	1	11/24/03	11/24/03	KWG0318965	*
1,1,2,2-Tetrachloroethane	ND	U	6.2	0.92	1	11/24/03	11/24/03	KWG0318965	*
n-Propylbenzene	ND	U	25	0.91	1	11/24/03	11/24/03	KWG0318965	*
1,3,5-Trimethylbenzene	ND	U	25	4.8	1	11/24/03	11/24/03	KWG0318965	*
1,2,4-Trimethylbenzene	ND	U	25	1.1	1	11/24/03	11/24/03	KWG0318965	*
1,3-Dichlorobenzene	ND	U	6.2	0.89	1	11/24/03	11/24/03	KWG0318965	*
1,4-Dichlorobenzene	ND	U	6.2	1.1	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichlorobenzene	ND	U	6.2	0.82	1	11/24/03	11/24/03	KWG0318965	*
Naphthalene	ND	U	25	1.2	1	11/24/03	11/24/03	KWG0318965	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	87	84-121	11/24/03	Acceptable
Toluene-d8	97	80-125	11/24/03	Acceptable
4-Bromofluorobenzene	95	80-123	11/24/03	Acceptable

Comments:

000064

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-4@15'-17'
Lab Code: K2309246-006

Units: ug/Kg
Basis: Dry

Extraction Method: EPA 5030A
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	5.2	0.75	1	11/24/03	11/24/03	KWG0318965	*
Chloromethane	ND	U	5.2	1.1	1	11/24/03	11/24/03	KWG0318965	*
Vinyl Chloride	ND	U	5.2	0.66	1	11/24/03	11/24/03	KWG0318965	*
Bromomethane	ND	U	5.2	0.85	1	11/24/03	11/24/03	KWG0318965	*
Chloroethane	ND	U	5.2	0.83	1	11/24/03	11/24/03	KWG0318965	*
Trichlorofluoromethane	ND	U	5.2	0.78	1	11/24/03	11/24/03	KWG0318965	*
1,1-Dichloroethene	ND	U	5.2	0.74	1	11/24/03	11/24/03	KWG0318965	*
Trichlorotrifluoroethane	ND	U	5.2	0.79	1	11/24/03	11/24/03	KWG0318965	*
Methylene Chloride	**1.4**	J	11	1.1	1	11/24/03	11/24/03	KWG0318965	*
Methyl tert-Butyl Ether	ND	U	5.2	0.68	1	11/24/03	11/24/03	KWG0318965	*
trans-1,2-Dichloroethene	ND	U	5.2	0.78	1	11/24/03	11/24/03	KWG0318965	*
1,1-Dichloroethane	ND	U	5.2	0.83	1	11/24/03	11/24/03	KWG0318965	*
cis-1,2-Dichloroethene	ND	U	5.2	0.89	1	11/24/03	11/24/03	KWG0318965	*
Chloroform	ND	U	5.2	0.61	1	11/24/03	11/24/03	KWG0318965	*
1,1,1-Trichloroethane (TCA)	ND	U	5.2	0.61	1	11/24/03	11/24/03	KWG0318965	*
Carbon Tetrachloride	ND	U	5.2	0.64	1	11/24/03	11/24/03	KWG0318965	*
Benzene	ND	U	5.2	0.84	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichloroethane (EDC)	ND	U	5.2	0.72	1	11/24/03	11/24/03	KWG0318965	*
Trichloroethene (TCE)	ND	U	5.2	0.30	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichloropropane	ND	U	5.2	0.77	1	11/24/03	11/24/03	KWG0318965	*
Bromodichloromethane	ND	U	5.2	0.57	1	11/24/03	11/24/03	KWG0318965	*
2-Chloroethyl Vinyl Ether	ND	U	11	1.1	1	11/24/03	11/24/03	KWG0318965	*
cis-1,3-Dichloropropene	ND	U	5.2	0.81	1	11/24/03	11/24/03	KWG0318965	*
Toluene	ND	U	5.2	0.90	1	11/24/03	11/24/03	KWG0318965	*
trans-1,3-Dichloropropene	ND	U	5.2	0.64	1	11/24/03	11/24/03	KWG0318965	*
1,1,2-Trichloroethane	ND	U	5.2	0.74	1	11/24/03	11/24/03	KWG0318965	*
Tetrachloroethene (PCE)	ND	U	5.2	0.33	1	11/24/03	11/24/03	KWG0318965	*
Dibromochloromethane	ND	U	5.2	0.64	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dibromoethane (EDB)	ND	U	21	0.84	1	11/24/03	11/24/03	KWG0318965	*
Chlorobenzene	ND	U	5.2	0.75	1	11/24/03	11/24/03	KWG0318965	*
Ethylbenzene	ND	U	5.2	0.61	1	11/24/03	11/24/03	KWG0318965	*
m,p-Xylenes	ND	U	5.2	1.6	1	11/24/03	11/24/03	KWG0318965	*
o-Xylene	ND	U	5.2	0.74	1	11/24/03	11/24/03	KWG0318965	*
Bromoform	ND	U	5.2	0.69	1	11/24/03	11/24/03	KWG0318965	*

Comments:

000065

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Volatile Organic Compounds

Sample Name: GP-4@15'-17'
Lab Code: K2309246-006

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND	U	21	0.73	1	11/24/03	11/24/03	KWG0318965	*
1,1,2,2-Tetrachloroethane	ND	U	5.2	0.78	1	11/24/03	11/24/03	KWG0318965	*
n-Propylbenzene	ND	U	21	0.77	1	11/24/03	11/24/03	KWG0318965	*
1,3,5-Trimethylbenzene	ND	U	21	4.1	1	11/24/03	11/24/03	KWG0318965	*
1,2,4-Trimethylbenzene	ND	U	21	0.87	1	11/24/03	11/24/03	KWG0318965	*
1,3-Dichlorobenzene	ND	U	5.2	0.76	1	11/24/03	11/24/03	KWG0318965	*
1,4-Dichlorobenzene	ND	U	5.2	0.87	1	11/24/03	11/24/03	KWG0318965	*
1,2-Dichlorobenzene	ND	U	5.2	0.69	1	11/24/03	11/24/03	KWG0318965	*
Naphthalene	ND	U	21	0.95	1	11/24/03	11/24/03	KWG0318965	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	90	84-121	11/24/03	Acceptable
Toluene-d8	98	80-125	11/24/03	Acceptable
4-Bromofluorobenzene	99	80-123	11/24/03	Acceptable

Comments:

000066

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG0318965-3

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	5.0	0.70	1	11/24/03	11/24/03	KWG0318965	
Chloromethane	ND	U	5.0	0.99	1	11/24/03	11/24/03	KWG0318965	
Vinyl Chloride	ND	U	5.0	0.62	1	11/24/03	11/24/03	KWG0318965	
Bromomethane	ND	U	5.0	0.80	1	11/24/03	11/24/03	KWG0318965	
Chloroethane	ND	U	5.0	0.78	1	11/24/03	11/24/03	KWG0318965	
Trichlorofluoromethane	ND	U	5.0	0.73	1	11/24/03	11/24/03	KWG0318965	
1,1-Dichloroethene	ND	U	5.0	0.69	1	11/24/03	11/24/03	KWG0318965	
Trichlorotrifluoroethane	ND	U	5.0	0.74	1	11/24/03	11/24/03	KWG0318965	
Methylene Chloride	ND	U	10	0.96	1	11/24/03	11/24/03	KWG0318965	
Methyl tert-Butyl Ether	ND	U	5.0	0.64	1	11/24/03	11/24/03	KWG0318965	
trans-1,2-Dichloroethene	ND	U	5.0	0.73	1	11/24/03	11/24/03	KWG0318965	
[redacted]Dichloroethane	ND	U	5.0	0.78	1	11/24/03	11/24/03	KWG0318965	*
cis-1,2-Dichloroethene	ND	U	5.0	0.83	1	11/24/03	11/24/03	KWG0318965	
Chloroform	ND	U	5.0	0.57	1	11/24/03	11/24/03	KWG0318965	
1,1,1-Trichloroethane (TCA)	ND	U	5.0	0.57	1	11/24/03	11/24/03	KWG0318965	
Carbon Tetrachloride	ND	U	5.0	0.60	1	11/24/03	11/24/03	KWG0318965	
Benzene	ND	U	5.0	0.79	1	11/24/03	11/24/03	KWG0318965	
1,2-Dichloroethane (EDC)	ND	U	5.0	0.67	1	11/24/03	11/24/03	KWG0318965	
Trichloroethene (TCE)	ND	U	5.0	0.28	1	11/24/03	11/24/03	KWG0318965	
1,2-Dichloropropane	ND	U	5.0	0.72	1	11/24/03	11/24/03	KWG0318965	*
Bromodichloromethane	ND	U	5.0	0.53	1	11/24/03	11/24/03	KWG0318965	
2-Chloroethyl Vinyl Ether	ND	U	10	1.0	1	11/24/03	11/24/03	KWG0318965	*
cis-1,3-Dichloropropene	ND	U	5.0	0.76	1	11/24/03	11/24/03	KWG0318965	*
Toluene	ND	U	5.0	0.84	1	11/24/03	11/24/03	KWG0318965	
trans-1,3-Dichloropropene	ND	U	5.0	0.60	1	11/24/03	11/24/03	KWG0318965	
1,1,2-Trichloroethane	ND	U	5.0	0.69	1	11/24/03	11/24/03	KWG0318965	
Tetrachloroethene (PCE)	ND	U	5.0	0.31	1	11/24/03	11/24/03	KWG0318965	
Dibromochloromethane	ND	U	5.0	0.60	1	11/24/03	11/24/03	KWG0318965	
1,2-Dibromoethane (EDB)	ND	U	20	0.79	1	11/24/03	11/24/03	KWG0318965	*
Chlorobenzene	ND	U	5.0	0.70	1	11/24/03	11/24/03	KWG0318965	
Ethylbenzene	ND	U	5.0	0.57	1	11/24/03	11/24/03	KWG0318965	
m,p-Xylenes	ND	U	5.0	1.5	1	11/24/03	11/24/03	KWG0318965	
o-Xylene	ND	U	5.0	0.69	1	11/24/03	11/24/03	KWG0318965	
Bromoform	ND	U	5.0	0.65	1	11/24/03	11/24/03	KWG0318965	

[redacted]

Comments:

000067

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG0318965-3

Units: ug/Kg
Basis: Dry

Extraction Method: EPA 5030A
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND	U	20	0.68	1	11/24/03	11/24/03	KWG0318965	
1,1,2,2-Tetrachloroethane	ND	U	5.0	0.73	1	11/24/03	11/24/03	KWG0318965	
n-Propylbenzene	ND	U	20	0.72	1	11/24/03	11/24/03	KWG0318965	
1,3,5-Trimethylbenzene	ND	U	20	3.8	1	11/24/03	11/24/03	KWG0318965	
1,2,4-Trimethylbenzene	ND	U	20	0.82	1	11/24/03	11/24/03	KWG0318965	
1,3-Dichlorobenzene	ND	U	5.0	0.71	1	11/24/03	11/24/03	KWG0318965	
1,4-Dichlorobenzene	ND	U	5.0	0.82	1	11/24/03	11/24/03	KWG0318965	
1,2-Dichlorobenzene	ND	U	5.0	0.65	1	11/24/03	11/24/03	KWG0318965	
Naphthalene	ND	U	20	0.89	1	11/24/03	11/24/03	KWG0318965	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	88	84-121	11/24/03	Acceptable
Toluene-d8	100	80-125	11/24/03	Acceptable
4-Bromofluorobenzene	95	80-123	11/24/03	Acceptable

Comments:

000068

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246

Surrogate Recovery Summary
Volatile Organic Compounds

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
GP-2@2'-4'	K2309246-001	87	97	95
GP-2@17'-19'	K2309246-002	87	97	95
GP-3@2'-4'	K2309246-003	86	97	93
GP-3@17'-19'	K2309246-004	88	101	96
GP-4@2'-4'	K2309246-005	87	97	95
GP-4@15'-17'	K2309246-006	90	98	99
Method Blank	KWG0318965-3	88	100	95
Lab Control Sample	KWG0318965-1	84	102	97
Duplicate Lab Control Sample	KWG0318965-2	84	96	97

Surrogate Recovery Control Limits (%)

Sur1 =	Dibromofluoromethane	84-121
Sur2 =	Toluene-d8	80-125
Sur3 =	4-Bromofluorobenzene	80-123

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

000069

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Extracted: 11/24/2003
Date Analyzed: 11/24/2003

Lab Control Spike/Duplicate Lab Control Spike Summary
Volatile Organic Compounds

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG0318965

	Lab Control Sample KWG0318965-1 Lab Control Spike				Duplicate Lab Control Sample KWG0318965-2 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Expected**	**%Rec**		**Result**	**Expected**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Dichlorodifluoromethane	45.2	50.0	90		43.2	50.0	86	46-130	5	40
Chloromethane	36.5	50.0	73		37.7	50.0	75	55-118	3	40
Vinyl Chloride	43.9	50.0	88		44.1	50.0	88	64-137	0	40
Bromomethane	40.1	50.0	80		34.7	50.0	69	58-147	14	40
Chloroethane	38.1	50.0	76		38.5	50.0	77	60-137	1	40
Trichlorofluoromethane	42.5	50.0	85		42.1	50.0	84	58-125	1	40
1,1-Dichloroethene	44.1	50.0	88		45.3	50.0	91	76-135	3	40
Trichlorotrifluoroethane	44.4	50.0	89		44.8	50.0	90	72-133	1	40
Methylene Chloride	40.8	50.0	82		41.9	50.0	84	76-117	3	40
Methyl tert-Butyl Ether	40.1	50.0	80		43.2	50.0	86	71-143	7	40
trans-1,2-Dichloroethene	42.2	50.0	84		42.5	50.0	85	77-132	1	40
1,1-Dichloroethane	41.7	50.0	83	*	42.1	50.0	84	84-122	1	40
cis-1,2-Dichloroethene	42.8	50.0	86		44.3	50.0	89	79-123	3	40
Chloroform	42.8	50.0	86		45.0	50.0	90	74-122	5	40
1,1,1-Trichloroethane (TCA)	45.5	50.0	91		45.9	50.0	92	66-137	1	40
Carbon Tetrachloride	45.2	50.0	90		46.1	50.0	92	70-142	2	40
Benzene	45.7	50.0	91		47.4	50.0	95	84-115	4	40
1,2-Dichloroethane (EDC)	42.4	50.0	85		44.2	50.0	88	67-132	4	40
Trichloroethene (TCE)	45.2	50.0	90		47.5	50.0	95	78-128	5	40
1,2-Dichloropropane	41.6	50.0	83	*	44.1	50.0	88	84-114	6	40
Bromodichloromethane	43.6	50.0	87		45.7	50.0	91	72-120	5	40
2-Chloroethyl Vinyl Ether	43.5	50.0	87	*	46.4	50.0	93	88-145	6	40
cis-1,3-Dichloropropene	41.9	50.0	84	*	45.0	50.0	90	88-122	7	40
Toluene	47.8	50.0	96		47.5	50.0	95	80-119	1	40
trans-1,3-Dichloropropene	37.8	50.0	76		41.3	50.0	83	73-116	9	40
1,1,2-Trichloroethane	40.0	50.0	80		44.6	50.0	89	76-115	11	40
Tetrachloroethene (PCE)	44.6	50.0	89		45.9	50.0	92	71-129	3	40
Dibromochloromethane	41.5	50.0	83		45.1	50.0	90	79-121	8	40
1,2-Dibromoethane (EDB)	39.0	50.0	78	*	43.2	50.0	86	80-121	10	40
Chlorobenzene	44.4	50.0	89		45.9	50.0	92	77-117	3	40
Ethylbenzene	46.8	50.0	94		48.4	50.0	97	78-125	3	40
m,p-Xylenes	92.5	100	93		95.0	100	95	74-122	3	40
o-Xylene	45.0	50.0	90		46.7	50.0	93	76-123	4	40
Bromoform	42.5	50.0	85		46.2	50.0	92	75-139	8	40
Isopropylbenzene	41.3	50.0	83		42.4	50.0	85	71-123	3	40
1,1,2,2-Tetrachloroethane	36.3	50.0	73		38.2	50.0	76	72-120	5	40

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000070

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Extracted: 11/24/2003
Date Analyzed: 11/24/2003

Lab Control Spike/Duplicate Lab Control Spike Summary
Volatile Organic Compounds

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG0318965

Analyte Name	Lab Control Sample KWG0318965-1 Lab Control Spike Result	Expected	%Rec	Duplicate Lab Control Sample KWG0318965-2 Duplicate Lab Control Spike Result	Expected	%Rec	%Rec Limits	RPD	RPD Limit
n-Propylbenzene	45.3	50.0	91	46.3	50.0	93	70-123	2	40
1,3,5-Trimethylbenzene	45.4	50.0	91	47.8	50.0	96	70-127	5	40
1,2,4-Trimethylbenzene	48.0	50.0	96	46.8	50.0	94	73-138	2	40
1,3-Dichlorobenzene	45.5	50.0	91	46.8	50.0	94	72-122	3	40
1,4-Dichlorobenzene	45.9	50.0	92	47.0	50.0	94	74-119	2	40
1,2-Dichlorobenzene	45.1	50.0	90	45.9	50.0	92	72-121	2	40
Naphthalene	39.3	50.0	79	44.2	50.0	88	74-127	12	40

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000071

Polynuclear Aromatic Hydrocarbons
Method 8270

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Polynuclear Aromatic Hydrocarbons

Sample Name: GP-2@2'-4'
Lab Code: K2309246-001

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**0.36**	J	5.0	0.27	1	12/01/03	12/08/03	KWG0319236	*
2-Methylnaphthalene	**0.35**	J	5.0	0.27	1	12/01/03	12/08/03	KWG0319236	*
Acenaphthylene	ND	U	5.0	0.21	1	12/01/03	12/08/03	KWG0319236	*
Acenaphthene	ND	U	5.0	0.27	1	12/01/03	12/08/03	KWG0319236	*
Dibenzofuran	ND	U	5.0	0.26	1	12/01/03	12/08/03	KWG0319236	*
Fluorene	ND	U	5.0	0.22	1	12/01/03	12/08/03	KWG0319236	*
Phenanthrene	**0.54**	J	5.0	0.20	1	12/01/03	12/08/03	KWG0319236	*
Anthracene	ND	U	5.0	0.25	1	12/01/03	12/08/03	KWG0319236	*
Fluoranthene	ND	U	5.0	0.22	1	12/01/03	12/08/03	KWG0319236	*
Pyrene	ND	U	5.0	0.15	1	12/01/03	12/08/03	KWG0319236	*
Benz(a)anthracene	ND	U	5.0	0.17	1	12/01/03	12/08/03	KWG0319236	*
Chrysene	**0.29**	J	5.0	0.20	1	12/01/03	12/08/03	KWG0319236	*
Be[illegible]b)fluoranthene	ND	U	5.0	0.18	1	12/01/03	12/08/03	KWG0319236	*
Benzo(k)fluoranthene	ND	U	5.0	0.20	1	12/01/03	12/08/03	KWG0319236	*
Benzo(a)pyrene	ND	U	5.0	0.18	1	12/01/03	12/08/03	KWG0319236	*
Indeno(1,2,3-cd)pyrene	ND	U	5.0	0.20	1	12/01/03	12/08/03	KWG0319236	*
Dibenz(a,h)anthracene	ND	U	5.0	0.24	1	12/01/03	12/08/03	KWG0319236	*
Benzo(g,h,i)perylene	**0.15**	J	5.0	0.13	1	12/01/03	12/08/03	KWG0319236	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	70	27-110	12/08/03	Acceptable
Fluoranthene-d10	78	34-122	12/08/03	Acceptable
Terphenyl-d14	115	50-132	12/08/03	Acceptable

Comments:

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Polynuclear Aromatic Hydrocarbons

Sample Name: GP-2@17'-19'
Lab Code: K2309246-002

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**0.47**	J	5.0	0.24	1	12/01/03	12/05/03	KWG0319236	*
2-Methylnaphthalene	**0.26**	J	5.0	0.24	1	12/01/03	12/05/03	KWG0319236	*
Acenaphthylene	ND	U	5.0	0.18	1	12/01/03	12/05/03	KWG0319236	*
Acenaphthene	ND	U	5.0	0.24	1	12/01/03	12/05/03	KWG0319236	*
Dibenzofuran	ND	U	5.0	0.23	1	12/01/03	12/05/03	KWG0319236	*
Fluorene	ND	U	5.0	0.19	1	12/01/03	12/05/03	KWG0319236	*
Phenanthrene	**0.22**	J	5.0	0.17	1	12/01/03	12/05/03	KWG0319236	*
Anthracene	ND	U	5.0	0.22	1	12/01/03	12/05/03	KWG0319236	*
Fluoranthene	ND	U	5.0	0.19	1	12/01/03	12/05/03	KWG0319236	*
Pyrene	ND	U	5.0	0.13	1	12/01/03	12/05/03	KWG0319236	*
Benz(a)anthracene	ND	U	5.0	0.15	1	12/01/03	12/05/03	KWG0319236	*
Chrysene	ND	U	5.0	0.17	1	12/01/03	12/05/03	KWG0319236	*
Benzo(b)fluoranthene	ND	U	5.0	0.16	1	12/01/03	12/05/03	KWG0319236	*
Benzo(k)fluoranthene	ND	U	5.0	0.17	1	12/01/03	12/05/03	KWG0319236	*
Benzo(a)pyrene	ND	U	5.0	0.16	1	12/01/03	12/05/03	KWG0319236	*
Indeno(1,2,3-cd)pyrene	ND	U	5.0	0.17	1	12/01/03	12/05/03	KWG0319236	*
Dibenz(a,h)anthracene	ND	U	5.0	0.20	1	12/01/03	12/05/03	KWG0319236	*
Benzo(g,h,i)perylene	ND	U	5.0	0.12	1	12/01/03	12/05/03	KWG0319236	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	72	27-110	12/05/03	Acceptable
Fluoranthene-d10	76	34-122	12/05/03	Acceptable
Terphenyl-d14	115	50-132	12/05/03	Acceptable

Comments:

000074

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Polynuclear Aromatic Hydrocarbons

Sample Name: GP-3@2'-4'
Lab Code: K2309246-003

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**0.68**	J	5.1	0.27	1	12/01/03	12/05/03	KWG0319236	*
2-Methylnaphthalene	**0.84**	J	5.1	0.27	1	12/01/03	12/05/03	KWG0319236	*
Acenaphthylene	ND	U	5.1	0.21	1	12/01/03	12/05/03	KWG0319236	*
Acenaphthene	ND	U	5.1	0.27	1	12/01/03	12/05/03	KWG0319236	*
Dibenzofuran	ND	U	5.1	0.26	1	12/01/03	12/05/03	KWG0319236	*
Fluorene	ND	U	5.1	0.22	1	12/01/03	12/05/03	KWG0319236	*
Phenanthrene	**0.40**	J	5.1	0.19	1	12/01/03	12/05/03	KWG0319236	*
Anthracene	ND	U	5.1	0.24	1	12/01/03	12/05/03	KWG0319236	*
Fluoranthene	**0.30**	J	5.1	0.22	1	12/01/03	12/05/03	KWG0319236	*
Pyrene	**0.31**	J	5.1	0.14	1	12/01/03	12/05/03	KWG0319236	*
Benz(a)anthracene	ND	U	5.1	0.17	1	12/01/03	12/05/03	KWG0319236	*
Chrysene	**0.26**	J	5.1	0.19	1	12/01/03	12/05/03	KWG0319236	*
B[illegible](b)fluoranthene	ND	U	5.1	0.18	1	12/01/03	12/05/03	KWG0319236	*
Benzo(k)fluoranthene	ND	U	5.1	0.19	1	12/01/03	12/05/03	KWG0319236	*
Benzo(a)pyrene	ND	U	5.1	0.18	1	12/01/03	12/05/03	KWG0319236	*
Indeno(1,2,3-cd)pyrene	ND	U	5.1	0.19	1	12/01/03	12/05/03	KWG0319236	*
Dibenz(a,h)anthracene	ND	U	5.1	0.23	1	12/01/03	12/05/03	KWG0319236	*
Benzo(g,h,i)perylene	**0.22**	J	5.1	0.13	1	12/01/03	12/05/03	KWG0319236	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	72	27-110	12/05/03	Acceptable
Fluoranthene-d10	77	34-122	12/05/03	Acceptable
Terphenyl-d14	118	50-132	12/05/03	Acceptable

Comments:

000075

Analytical Results

Client:	RSV Engineering, Inc.	Service Request:	K2309246
Project:	Niemi Highway Service	Date Collected:	10/10/2003
Sample Matrix:	Soil	Date Received:	10/13/2003

Polynuclear Aromatic Hydrocarbons

Sample Name:	GP-3@17'-19'	Units:	ug/Kg
Lab Code:	K2309246-004	Basis:	Dry
Extraction Method:	EPA 3541	Level:	Low
Analysis Method:	8270C SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	0.67	J	5.0	0.24	1	12/01/03	12/05/03	KWG0319236	*
2-Methylnaphthalene	1.7	J	5.0	0.24	1	12/01/03	12/05/03	KWG0319236	*
Acenaphthylene	ND	U	5.0	0.19	1	12/01/03	12/05/03	KWG0319236	*
Acenaphthene	ND	U	5.0	0.24	1	12/01/03	12/05/03	KWG0319236	*
Dibenzofuran	0.28	J	5.0	0.23	1	12/01/03	12/05/03	KWG0319236	*
Fluorene	0.29	J	5.0	0.20	1	12/01/03	12/05/03	KWG0319236	*
Phenanthrene	6.9		5.0	0.17	1	12/01/03	12/05/03	KWG0319236	*
Anthracene	0.31	J	5.0	0.22	1	12/01/03	12/05/03	KWG0319236	*
Fluoranthene	1.7	J	5.0	0.20	1	12/01/03	12/05/03	KWG0319236	*
Pyrene	4.2	J	5.0	0.13	1	12/01/03	12/05/03	KWG0319236	*
Benz(a)anthracene	1.7	J	5.0	0.15	1	12/01/03	12/05/03	KWG0319236	*
Chrysene	8.9		5.0	0.17	1	12/01/03	12/05/03	KWG0319236	*
Benzo(b)fluoranthene	3.0	J	5.0	0.16	1	12/01/03	12/05/03	KWG0319236	*
Benzo(k)fluoranthene	ND	U	5.0	0.17	1	12/01/03	12/05/03	KWG0319236	*
Benzo(a)pyrene	1.6	J	5.0	0.16	1	12/01/03	12/05/03	KWG0319236	*
Indeno(1,2,3-cd)pyrene	0.67	J	5.0	0.17	1	12/01/03	12/05/03	KWG0319236	*
Dibenz(a,h)anthracene	2.1	J	5.0	0.21	1	12/01/03	12/05/03	KWG0319236	*
Benzo(g,h,i)perylene	4.6	J	5.0	0.12	1	12/01/03	12/05/03	KWG0319236	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	77	27-110	12/05/03	Acceptable
Fluoranthene-d10	85	34-122	12/05/03	Acceptable
Terphenyl-d14	106	50-132	12/05/03	Acceptable

Comments:

000076

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: 10/10/2003
Date Received: 10/13/2003

Polynuclear Aromatic Hydrocarbons

Sample Name: GP-4@2'-4'
Lab Code: K2309246-005

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**0.30**	J	5.0	0.27	1	12/01/03	12/05/03	KWG0319236	*
2-Methylnaphthalene	ND	U	5.0	0.27	1	12/01/03	12/05/03	KWG0319236	*
Acenaphthylene	ND	U	5.0	0.21	1	12/01/03	12/05/03	KWG0319236	*
Acenaphthene	ND	U	5.0	0.27	1	12/01/03	12/05/03	KWG0319236	*
Dibenzofuran	ND	U	5.0	0.26	1	12/01/03	12/05/03	KWG0319236	*
Fluorene	ND	U	5.0	0.22	1	12/01/03	12/05/03	KWG0319236	*
Phenanthrene	**0.56**	J	5.0	0.19	1	12/01/03	12/05/03	KWG0319236	*
Anthracene	ND	U	5.0	0.24	1	12/01/03	12/05/03	KWG0319236	*
Fluoranthene	**0.37**	J	5.0	0.22	1	12/01/03	12/05/03	KWG0319236	*
Pyrene	**0.42**	J	5.0	0.14	1	12/01/03	12/05/03	KWG0319236	*
Benz(a)anthracene	ND	U	5.0	0.17	1	12/01/03	12/05/03	KWG0319236	*
Chrysene	**0.26**	J	5.0	0.19	1	12/01/03	12/05/03	KWG0319236	*
Benzo(b)fluoranthene	ND	U	5.0	0.18	1	12/01/03	12/05/03	KWG0319236	*
Benzo(k)fluoranthene	ND	U	5.0	0.19	1	12/01/03	12/05/03	KWG0319236	*
Benzo(a)pyrene	ND	U	5.0	0.18	1	12/01/03	12/05/03	KWG0319236	*
Indeno(1,2,3-cd)pyrene	**0.23**	J	5.0	0.19	1	12/01/03	12/05/03	KWG0319236	*
Dibenz(a,h)anthracene	ND	U	5.0	0.23	1	12/01/03	12/05/03	KWG0319236	*
Benzo(g,h,i)perylene	**0.22**	J	5.0	0.13	1	12/01/03	12/05/03	KWG0319236	*

See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	56	27-110	12/05/03	Acceptable
Fluoranthene-d10	68	34-122	12/05/03	Acceptable
Terphenyl-d14	104	50-132	12/05/03	Acceptable

Comm

000077

Analytical Results

Client:	RSV Engineering, Inc.	Service Request:	K2309246
Project:	Niemi Highway Service	Date Collected:	10/10/2003
Sample Matrix:	Soil	Date Received:	10/13/2003

Polynuclear Aromatic Hydrocarbons

Sample Name:	GP-4@15'-17'	Units:	ug/Kg
Lab Code:	K2309246-006	Basis:	Dry
Extraction Method:	EPA 3541	Level:	Low
Analysis Method:	8270C SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**0.38**	J	4.9	0.23	1	12/01/03	12/05/03	KWG0319236	*
2-Methylnaphthalene	**0.33**	J	4.9	0.23	1	12/01/03	12/05/03	KWG0319236	*
Acenaphthylene	ND	U	4.9	0.17	1	12/01/03	12/05/03	KWG0319236	*
Acenaphthene	ND	U	4.9	0.23	1	12/01/03	12/05/03	KWG0319236	*
Dibenzofuran	ND	U	4.9	0.22	1	12/01/03	12/05/03	KWG0319236	*
Fluorene	ND	U	4.9	0.19	1	12/01/03	12/05/03	KWG0319236	*
Phenanthrene	**0.21**	J	4.9	0.16	1	12/01/03	12/05/03	KWG0319236	*
Anthracene	ND	U	4.9	0.21	1	12/01/03	12/05/03	KWG0319236	*
Fluoranthene	ND	U	4.9	0.19	1	12/01/03	12/05/03	KWG0319236	*
Pyrene	**0.15**	J	4.9	0.12	1	12/01/03	12/05/03	KWG0319236	*
Benz(a)anthracene	ND	U	4.9	0.14	1	12/01/03	12/05/03	KWG0319236	*
Chrysene	ND	U	4.9	0.16	1	12/01/03	12/05/03	KWG0319236	*
Benzo(b)fluoranthene	ND	U	4.9	0.15	1	12/01/03	12/05/03	KWG0319236	*
Benzo(k)fluoranthene	ND	U	4.9	0.16	1	12/01/03	12/05/03	KWG0319236	*
Benzo(a)pyrene	ND	U	4.9	0.15	1	12/01/03	12/05/03	KWG0319236	*
Indeno(1,2,3-cd)pyrene	ND	U	4.9	0.16	1	12/01/03	12/05/03	KWG0319236	*
Dibenz(a,h)anthracene	ND	U	4.9	0.20	1	12/01/03	12/05/03	KWG0319236	*
Benzo(g,h,i)perylene	**0.18**	J	4.9	0.11	1	12/01/03	12/05/03	KWG0319236	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	64	27-110	12/05/03	Acceptable
Fluoranthene-d10	78	34-122	12/05/03	Acceptable
Terphenyl-d14	117	50-132	12/05/03	Acceptable

Comments:

000078

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Collected: NA
Date Received: NA

Polynuclear Aromatic Hydrocarbons

Sample Name: Method Blank
Lab Code: KWG0319236-5

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	ND	U	3.6	0.21	1	12/01/03	12/05/03	KWG0319236	
2-Methylnaphthalene	ND	U	3.6	0.21	1	12/01/03	12/05/03	KWG0319236	
Acenaphthylene	ND	U	3.6	0.16	1	12/01/03	12/05/03	KWG0319236	
Acenaphthene	ND	U	3.6	0.21	1	12/01/03	12/05/03	KWG0319236	
Dibenzofuran	ND	U	3.6	0.20	1	12/01/03	12/05/03	KWG0319236	
Fluorene	ND	U	3.6	0.17	1	12/01/03	12/05/03	KWG0319236	
Phenanthrene	ND	U	3.6	0.15	1	12/01/03	12/05/03	KWG0319236	
Anthracene	ND	U	3.6	0.19	1	12/01/03	12/05/03	KWG0319236	
Fluoranthene	ND	U	3.6	0.17	1	12/01/03	12/05/03	KWG0319236	
Pyrene	ND	U	3.6	0.11	1	12/01/03	12/05/03	KWG0319236	
Benz(a)anthracene	ND	U	3.6	0.13	1	12/01/03	12/05/03	KWG0319236	
Chrysene	ND	U	3.6	0.15	1	12/01/03	12/05/03	KWG0319236	
B[illegible](b)fluoranthene	ND	U	3.6	0.14	1	12/01/03	12/05/03	KWG0319236	
Benzo(k)fluoranthene	ND	U	3.6	0.15	1	12/01/03	12/05/03	KWG0319236	
Benzo(a)pyrene	ND	U	3.6	0.14	1	12/01/03	12/05/03	KWG0319236	
Indeno(1,2,3-cd)pyrene	ND	U	3.6	0.15	1	12/01/03	12/05/03	KWG0319236	
Dibenz(a,h)anthracene	ND	U	3.6	0.18	1	12/01/03	12/05/03	KWG0319236	
Benzo(g,h,i)perylene	ND	U	3.6	0.10	1	12/01/03	12/05/03	KWG0319236	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	58	27-110	12/05/03	Acceptable
Fluoranthene-d10	70	34-122	12/05/03	Acceptable
Terphenyl-d14	101	50-132	12/05/03	Acceptable

Comments:

000079

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
GP-2@2'-4'	K2309246-001	70	78	115
GP-2@17'-19'	K2309246-002	72	76	115
GP-3@2'-4'	K2309246-003	72	77	118
GP-3@17'-19'	K2309246-004	77	85	106
GP-4@2'-4'	K2309246-005	56	68	104
GP-4@15'-17'	K2309246-006	64	78	117
Method Blank	KWG0319236-5	58	70	101
GP-4@15'-17'MS	KWG0319236-1	80	88	100
GP-4@15'-17'DMS	KWG0319236-2	77	88	100
Lab Control Sample	KWG0319236-3	78	87	97
Duplicate Lab Control Sample	KWG0319236-4	78	89	102

Surrogate Recovery Control Limits (%)

Sur1 = Fluorene-d10	27-110
Sur2 = Fluoranthene-d10	34-122
Sur3 = Terphenyl-d14	50-132

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

000080

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Extracted: 12/01/2003
Date Analyzed: 12/05/2003

Matrix Spike/Duplicate Matrix Spike Summary
Polynuclear Aromatic Hydrocarbons

Sample Name: GP-4@15'-17'
Lab Code: K2309246-006

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry

Level: Low
Extraction Lot: KWG0319236

Analyte Name	Sample Result	GP-4@15'-17'MS KWG0319236-1 Matrix Spike			GP-4@15'-17'DMS KWG0319236-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Expected	%Rec	Result	Expected	%Rec			
Naphthalene	0.38	210	244	86	220	244	90	22-101	5	40
2-Methylnaphthalene	0.33	221	244	91	233	244	95	27-106	5	40
Acenaphthylene	ND	227	244	93	238	244	97	36-113	5	40
Acenaphthene	ND	225	244	92	233	244	95	32-114	4	40
Dibenzofuran	ND	224	244	92	233	244	95	33-110	4	40
Fluorene	ND	238	244	98	247	244	101	39-118	4	40
Phenanthrene	0.21	242	244	99	253	244	103	29-130	4	40
Anthracene	ND	245	244	100	252	244	103	38-133	3	40
Fluoranthene	ND	249	244	102	263	244	108	30-143	6	40
[illegible]	0.15	256	244	105	267	244	109	28-143	4	40
[illegible]a)anthracene	ND	246	244	101	257	244	105	24-149	4	40
Chrysene	ND	248	244	102	261	244	107	38-133	5	40
Benzo(b)fluoranthene	ND	246	244	101	261	244	107	26-144	6	40
Benzo(k)fluoranthene	ND	237	244	97	256	244	105	29-136	8	40
Benzo(a)pyrene	ND	245	244	101	260	244	106	30-146	6	40
Indeno(1,2,3-cd)pyrene	ND	238	244	98	246	244	101	24-147	3	40
Dibenz(a,h)anthracene	ND	240	244	98	248	244	101	33-136	3	40
Benzo(g,h,i)perylene	0.18	245	244	100	246	244	101	23-142	1	40

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000081

Client: RSV Engineering, Inc.
Project: Niemi Highway Service
Sample Matrix: Soil

Service Request: K2309246
Date Extracted: 12/01/2003
Date Analyzed: 12/05/2003

Lab Control Spike/Duplicate Lab Control Spike Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG0319236

Analyte Name	Lab Control Sample KWG0319236-3 Lab Control Spike Result	Expected	%Rec	Duplicate Lab Control Sample KWG0319236-4 Duplicate Lab Control Spike Result	Expected	%Rec	%Rec Limits	RPD	RPD Limit
Naphthalene	225	250	90	227	250	91	43-102	1	40
2-Methylnaphthalene	238	250	95	238	250	95	44-105	0	40
Acenaphthylene	240	250	96	242	250	97	51-107	1	40
Acenaphthene	236	250	94	239	250	96	50-105	1	40
Dibenzofuran	233	250	93	238	250	95	50-106	2	40
Fluorene	243	250	97	253	250	101	54-108	4	40
Phenanthrene	249	250	99	260	250	104	58-106	5	40
Anthracene	252	250	101	263	250	105	61-113	4	40
Fluoranthene	260	250	104	276	250	111	63-117	6	40
Pyrene	265	250	106	281	250	112	59-121	6	40
[illegible]anthracene	259	250	104	280	250	112	57-120	8	40
Chrysene	260	250	104	282	250	113	64-116	8	40
Benzo(b)fluoranthene	251	250	100	275	250	110	58-126	9	40
Benzo(k)fluoranthene	247	250	99	268	250	107	61-122	8	40
Benzo(a)pyrene	257	250	103	277	250	111	58-128	8	40
Indeno(1,2,3-cd)pyrene	248	250	99	251	250	100	46-133	1	40
Dibenz(a,h)anthracene	251	250	100	264	250	105	50-128	5	40
Benzo(g,h,i)perylene	254	250	101	261	250	104	52-125	3	40

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

000182

APPENDIX E

WELL LOG REPORT

Well Log Report

Township: 8N, Range: 9W, Section: 10,15,16,17,8,9

Well Log	T-R-S/ QQ-Q	Taxlot	Street of Well	Owner	Company	Well Type	First Water	Completed Depth	Static Water Level	Yield	Completed Date	Received Date	Bonded Constructor	Startcard	Well Id #	Construction Type				
																New	Abandon	Deepen	Recond.	Repair
CLAT 50294	8N-9W-8 NE-SE		2264 MARINE DR, ASTORIA	CARLOUGH, MATT		G		16			4/2/1997	5/1/1997				X				
CLAT 50296	8N-9W-8 NE-SE		2264 MARINE DR, ASTORIA	CARLOUGH, MATT		G		4			4/2/1997	5/1/1997				X				
CLAT 50824	8N-9W-8 NW-SE	301	1792 MARINE DR		COLUMBIA RIVER MARITIME MUSEUM	G		50			5/7/1999	6/7/1999				X	X			
CLAT 51135	8N-9W-8 NW-SW	5500	927 MARINE DR		UNION BANK OF CALIFORNIA; MARGERY HANGERUD TRUST	M	2.5	7.5	2.5		4/10/2001	5/10/2001	KLOSTERMANN, BILL GEO-TECH EXPLORATIONS INC	134928	43811	X				
CLAT 51348	8N-9W-8 SW-NW	8200	900 MARINE DR		SUNSET EMPIRE TRANSIT DISTRICT	G		0	4.2		5/2/2002	5/30/2002				X	X			
CLAT 51402	8N-9W-8 NE-SW				OREGON DEPARTMENT OF TRANSPORTATION; ASTORIA SIGNAL UPGRADE PROJECT	G		0			7/23/2002	9/3/2002				X	X			
CLAT 515	8N-9W-9 NW-SW		ASTORIA PLYWOOD; 2880 MARINE DR		MCCALLISTER AND SNOW ATTORNEYS	M	6	8	6		6/2/1995	7/13/1995	BOESE, ROBERT L	71467		X	X			
CLAT 50422	8N-9W-9 SE-NE		NE CORNER HWY 30 AND 34TH ST		SUPER ONE INC.; ILG, ANDREW	G		0	7		11/7/1997	12/11/1997				X	X			
CLAT 50518	8N-9W-9 NW-SW		409 23RD ST		CITY OF ASTORIA	G		0	10		4/23/1998	5/26/1998				X	X			
CLAT 50308	8N-9W-17 SW-SW		BETWEEN 9TH AND 11TH, ON OLNEY ROAD	CLATSOP, CARE CENTER	CLATSOP CARE CENTER	G		20	18		5/21/1997	6/3/1997				X				

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▶Download tabular data in an ascii tab delmited format

▶Return to the Query screen

The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

WATER WELL REPORT
STATE OF OREGON
(Please type or print) (Do not write above this line)

RECEIVED
MAR 20 1978
WATER RESOURCES DEPT.
SALEM, OREGON

State Well No. 8N/9W-32
State Permit No.

(1) OWNER:
Name Phillip L Johnson
Address 1586 4th St
Astoria ORE 97103

(2) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☑ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

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

CASING INSTALLED: Threaded ☐ Welded ☑
6" Diam. from 0 ft. to 40 ft. Gage .250
5" Diam. from 3 ft. to 190 ft. Gage .188
" Diam. from ft. to ft. Gage

PERFORATIONS: Perforated? ☑ Yes ☐ No
Type of perforator used Torch
Size of perforations 1/4 in. by 6 in.
20 perforations from 50 ft. to 70 ft.
20 perforations from 130 ft. to 150 ft.
20 perforations from 170 ft. to 190 ft.

(7) SCREENS: Well screen installed? ☐ Yes ☑ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☑ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "
Bailer test 4 gal./min. with 150 ft. drawdown after 1 hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Cement
Well sealed from land surface to 40 ft.
Diameter of well bore to bottom of seal 9 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 7 sacks
How was cement grout placed? Poured
Was a drive shoe used? ☐ Yes ☑ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☑ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☑ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Clatsop Driller's well number
¼ ¼ Section 32 T. 8N R. 9W W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 24 ft.
Static level 20 ft. below land surface. Date 3-15-79
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 6
Depth drilled 190 ft. Depth of completed well 190 ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Top Soil	0	2	
Lt Brn Sandy Clay, Fine	2	19	
Lt Brn Sandy Clay, Course	19	24	
Brn Sandy Clay	24	33	
Brn Shale	33	94	
White Sandstone	94	102	
Brn Shale	102	119	
White Sandstone	119	123	
Brn Shale	123	190	

Work started 3-14 1979 Completed 3-15 1979
Date well drilling machine moved off of well 3-15 1979

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Ralph Turner (Drilling Machine Operator) Date 3-15, 1979
Drilling Machine Operator's License No. 254

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name TURNER DRILLING CO (Person, firm or corporation) (Type or print)
Address Rt 1 Box 141 Hillsboro, 97123
[Signed] Ralph Turner (Water Well Contractor)
Contractor's License No. 249 Date 3-15, 1979

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

RECEIVED

DEC 30 1987

WATER RESOURCES DEPT

CLAT 293

8N/9W-21

(1) OWNER:

Owner/Well Number

Name Ron Mulhern SALEM OREGON

Address 115 Holiday

City Seaside State Ore Zip 97138

(2) TYPE OF WORK:

☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:

☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Other

(4) PROPOSED USE:

☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:

Depth of Completed Well 240 ft.

Special Standards date of approval

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
10	0	25	Cement	0	30	10 sacks
6	25	240				

How was seal placed? Method ☐ A ☐ B ☒ C ☐ D ☐ E

☐ Other

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6	+1	80	250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	4½	4	240	160	☐	☒	☒	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:

☐ Perforations Method NONE

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Pumping level	Drill stem at	Time
5	160	240	½ hr
A	160	240	1 hr

Temperature of water Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata:

(9) LOCATION OF WELL by legal description:

County Clatsop Latitude ' " Longitude ' "

Township 8 N N or S, Range 9 W E or W, WM.

Section 21 ¼ ¼

Tax Lot 900 Lot Block Subdivision

Street Address of Well (or nearest address)

(10) STATIC WATER LEVEL:

140 ft. below land surface. Date 11-9-87

Artesian pressure lb. per square inch. Date

(11) WELL LOG:

Ground elevation

Material	From	To	WB?	SWL
Brown Soil	0	2		
Brown clay	2	4		
Yellow Clay	4	15		
Brown Sand Stone	15	35		
Tan Sand Stone	35	60		
Brown Clay Stone	60	110		
Fine Sand Stone	110	220		
Brown Sand Stone	220	230		160
Gray Sandstone	230	245		140

Date started 11-5-87 Completed 11-9-87

(unbonded) Water Well Constructor Certification:

I constructed this well in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

Signed Date

(bonded) Water Well Constructor Certification:

I accept responsibility for construction of this well and its compliance with all Oregon water well standards. This report is true to the best of my knowledge and belief.

Signed Date 11-10-87

Company McMullen Drilling Co. Job No.

9609C 10/85

NOTICE TO WATER WELL CONTRACTOR: The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

RECEIVED JUL 5 1972 STATE ENGINEER SALEM OREGON

WATER WELL REPORT
STATE OF OREGON

(Please type or print) (Do not write above this line)

CL 294

State Well No. 8N/9W-24+25

State Permit No. _____

(1) OWNER:
Name James Sprauge
Address Astoria Oregon

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

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

(5) CASING INSTALLED:
Threaded ☐ Welded ☒
6" Diam. from 0 ft. to 30 ft. Gage .250
_____" Diam. from _____ ft. to _____ ft. Gage _____
_____" Diam. from _____ ft. to _____ ft. Gage _____

(6) PERFORATIONS:
Perforated? ☐ Yes ☒ No.
Type of perforator used
Size of perforations in. by in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. _____ Slot size _____ Set from _____ ft. to _____ ft.
Diam. _____ Slot size _____ Set from _____ ft. to _____ ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
" " " " "
" " " " "
Bailer test 0 gal./min. with 0 ft. drawdown after 0 hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered _____ ft.

(9) CONSTRUCTION:
Well seal—Material used Cement
Well sealed from land surface to 22 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 4 sacks
Number of sacks of bentonite used in well seal _____ sacks
Brand name of bentonite
Number of pounds of bentonite per 100 gallons of water _____ lbs./100 gals.
Was a drive shoe used? ☒ Yes ☐ No Plugs _____ Size: location _____ ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from _____ ft. to _____ ft.

(10) LOCATION OF WELL:
County Clatsop Driller's well number
¼ ¼ Section 24 & 25 T. 8N R. 9W W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found No water ft.
Static level — ft. below land surface. Date 6-6-72
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 6
Depth drilled 200 ft. Depth of completed well 200 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. *Report each change in position of Static Water Level and indicate principal water-bearing strata.*

MATERIAL	From	To	SWL
Yellow Clay	0	26	
Blue Sandrock	26	200	
No water			
Well Capped			

Work started 5-25 1972 Completed 6-6 1972
Date well drilling machine moved off of well 6-6 1972

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Arthur T. Meyerin (Drilling Machine Operator) Date 6-29-, 1972
Drilling Machine Operator's License No. 575

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Williams Well Drilling Co (Person, firm or corporation) (Type or print)
Address Rt 1 Box 128 Toledo, WN
[Signed] W. T. Williams (Water Well Contractor)
Contractor's License No. 455 Date 6-13, 1972

(USE ADDITIONAL SHEETS IF NECESSARY)

SP-5658-119

WATER WELL REPORT
STATE OF OREGON

RECEIVED
SEP 22 1981
WATER RESOURCES DEPT
SALEM, OREGON

CLAT 29 5

State Well No. 8N/9W-31

State Permit No. Deepening

(1) OWNER:

Name Vince Tarabochia
Address Rt. 3 Box 2300
City Astoria State Oregon

(2) TYPE OF WORK (check):

New Well ☐ Deepening ☒ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☐ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☒ Bored ☐

(4) PROPOSED USE (check):

Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐
Thermal: Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED:

Steel ☐ Plastic ☐
Threaded ☐ Welded ☒

~~Apr~~ 10 new
6 " Diam. from 0 ft. to 50 ft. Gauge .250
" Diam. from ft. to ft. Gauge

LINER INSTALLED:

" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:

Perforated? ☐ Yes ☒ No

Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☒ No

Manufacturer's Name
Type Model No.
Diam. Slot Size Set from ft. to ft.
Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?
gal/min. with ft. drawdown after hrs.
" " " "
Air test gal/min. with drill stem at ft. hrs.
Bailer test 7 gal/min. with 25 ft. drawdown after 1 hrs.
Artesian flow g.p.m.
Temperature of water 49 Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Special standards: Yes ☐ No ☒

Well seal—Material used cement
Well sealed from land surface to 20 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 5 sacks
How was cement grout placed? pumped

Was pump installed? Type HP Depth ft.
Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:

County Clatsop Driller's well number
¼ ¼ Section 31 T. 8N R. 9W W.M.
Tax Lot # Lot Blk Subdivision
Address at well location: Same

(11) WATER LEVEL: Completed well.

Depth at which water was first found 110 ft.
Static level 80 ft. below land surface. Date
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 6"
Depth drilled 115 ft. Depth of completed well 115 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Mud Stone blue	60	115	80

Work started 8/4 19 81 Completed 8/4 19 81
Date well drilling machine moved off of well 8/4 19 81

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Bryant C. Luttrell (Drilling Machine Operator) Date 8/4, 19 81

Drilling Machine Operator's License No. 1074

Water Well Contractor's Certification:

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

Name Luttrell Well Drilling (Person, firm or corporation) (Type or print)
Address Rt. 1 Box 1630 St. Helens, Oregon
[Signed] Bryant C. Luttrell (Water Well Contractor)
Contractor's License No. 238 Date 8/4, 19 81

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP*12656-690

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the
WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.

WATER WELL REPORT
STATE OF OREGON
(Please type or print)
(Do not write above this line)

CLA 296

State Well No. 8N/9W-31bd
State Permit No.

(1) OWNER:
Name Jay Shepherd
Address Rt. 3 Box 2245 Astoria, Oregon

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

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

(5) CASING INSTALLED:
Threaded ☐ Welded ☒
6" Diam. from 0 ft. to 54 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(6) PERFORATIONS:
Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "
Bailer test 20 gal./min. with 40 ft. drawdown after 1 hrs.
Artesian flow g.p.m.
Temperature of water 49 Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used cement
Well sealed from land surface to 18 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 5 sacks
How was cement grout placed? pumped
Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Clatsop Driller's well number
NE ¼ NW ¼ Section 31 T. 8 N. R. 9 W. W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 60 ft.
Static level 13 ft. below land surface. Date 5/31/80
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 6"
Depth drilled 71 ft. Depth of completed well 71 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
clay brown	0	12	
clay yellow	12	20	
clay blue grey	20	38	
mud stone blue	38	49	
sandstone blue	49	71	13

RECEIVED
OCT 31 1980
WATER RESOURCES DEPT
SALEM, OREGON

Work started 5/28 19 80 Completed 5/31 19 80
Date well drilling machine moved off of well 5/31 19 80

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Bryant C Luttrell (Drilling Machine Operator) Date 5/31, 19 80
Drilling Machine Operator's License No. 1074

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name G. Luttrell Well Drilling (Person, firm or corporation) (Type or print)
Address Rt. 1 Box 1630 St. Helens, Oregon
[Signed] G A Luttrell (Water Well Contractor)
Contractor's License No. 238 Date 5/31, 19 80

(USE ADDITIONAL SHEETS IF NECESSARY)

SP-45556-119

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the
WATER RESOURCES DEPARTMENT
SALEM, OREGON 97310
within 30 days from the date of well completion.

CLAT 297

WATER WELL REPORT
STATE OF OREGON
(Please type or print)
(Do not write above this line)

State Well No. 8N/9W-31 6a

State Permit No.

(1) OWNER:
Name Harold Culver

Address Rt. 3 Box 206-J Astoria, Oregon

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

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

(5) CASING INSTALLED:
Threaded ☐ Welded ☒

6 " Diam. from 0 ft. to 50 ft. Gage .250

" Diam. from ft. to ft. Gage

" Diam. from ft. to ft. Gage

(6) PERFORATIONS:
Perforated? ☐ Yes ☒ No.

Type of perforator used

Size of perforations in. by in.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No

Manufacturer's Name

Type Model No.

Diam. Slot size Set from ft. to ft.

Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☐ No If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.

" " " "

" " " "

Bailer test 20 gal./min. with 30 ft. drawdown after 1 hrs.

Artesian flow g.p.m.

Temperature of water 49 Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used cement

Well sealed from land surface to 18 ft.

Diameter of well bore to bottom of seal 10 in.

Diameter of well bore below seal 6 in.

Number of sacks of cement used in well seal 5 sacks

How was cement grout placed? pumped

Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.

Did any strata contain unusable water? ☐ Yes ☐ No

Type of water? depth of strata

Method of sealing strata off

Was well gravel packed? ☐ Yes ☒ No Size of gravel:

Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Clatsop Driller's well number

N.E. ¼ N.W. ¼ Section 31 T. 8N R. 9W W.M.

Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 57 ft.

Static level 25 ft. below land surface. Date 6/4/80

Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 6"

Depth drilled 75 ft. Depth of completed well 75 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
clay brown	0	30	
clay sandy grey	30	40	
mudstone grey blue	40	75	25

RECEIVED
OCT 17 1980
WATER RESOURCES DEPT
SALEM, OREGON

Work started 6/2 1980 Completed 6/4 1980

Date well drilling machine moved off of well 6/4 1980

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Bryant C. Luttrell (Drilling Machine Operator) Date 6/4/80, 19

Drilling Machine Operator's License No. 1074

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Name Luttrell Well Drilling (Person, firm or corporation) (Type or print)

Address Rt. 1, Box 1630 St. Helens, Oregon

[Signed] B. L. Luttrell G. A. Luttrell (Water Well Contractor)

Contractor's License No. 238 Date 6/4, 1980

(USE ADDITIONAL SHEETS IF NECESSARY)

SP-45656-119

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the
WATER RESOURCES DEPARTMENT
SALEM, OREGON 97310
within 30 days from the date of well completion.

AT 298

WATER WELL REPORT
STATE OF OREGON
(Please type or print)
(Do not write above this line)

State Well No. 8N/9W-31
State Permit No.

(1) OWNER:
Name Vince Tarabochia
Address 167 S.W. Clover Lane Astoria, Oregon

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
[illegible] ☐ Bored ☐

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

(5) CASING INSTALLED: Threaded ☐ Welded ☒
6" Diam. from 0 ft. to 40 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(6) PERFORATIONS: Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
[illegible]: gal./min. with ft. drawdown after hrs.
" " " "
" " " "
Bailer test 5 gal./min. with 33 ft. drawdown after 1 hrs.
[illegible]sian flow g.p.m.
Temperature of water 50 Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Cement
Well sealed from land surface to 20 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 5 sacks
How was cement grout placed? Pumped
Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Clatsop Driller's well number
¼ ¼ Section 31 T. 8N R. 9W W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found ft.
Static level 20 ft. below land surface. Date 12-6-79
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 6"
Depth drilled 60 ft. Depth of completed well 60 ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
SOIL BROWN	0	2	
CLAY BROWN	2	38	
MUD STONE BLUE	38	60	20

RECEIVED
JAN 20 1980
WATER RESOURCES DEPT
SALEM, OREGON

Work started 12-4 1979 Completed 12-6 1979
Date well drilling machine moved off of well 12-6 1979

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Bryant C. Luttrell (Drilling Machine Operator) Date 12-6, 1979
Drilling Machine Operator's License No. 1074

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Guy A. Luttrell Well Drilling (Person, firm or corporation) (Type or print)
Address Rt. 1 Box 1630 St. Helens, Ore.
[Signed] G. A. Luttrell (Water Well Contractor)
Contractor's License No. 234 Date 12-6, 1979

(USE ADDITIONAL SHEETS IF NECESSARY)

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

RECEIVED
SEP - 2 1986
WATER RESOURCES DEPT
SALEM, OREGON

CLAT 299

8N/9W-35

(1) OWNER:

Owner's Well Number:

Name JACK RITTER

Address 539 Commercial

City ASTORIA State Ore. Zip

(2) TYPE OF WORK:

☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:

☐ Rotary Air ☐ Rotary Mud ☒ Cable ☐ Other

(4) PROPOSED USE:

☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:

Depth of Completed Well 200 ft.

Special Standards date of approval

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
12	0	30	Cement	0	30	12

How was seal placed? Method ☐ A ☐ B ☐ C ☐ D ☒ E

☐ Other

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	8.50	+1	30	250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) 530'

(7) PERFORATIONS/SCREENS:

☐ Perforations Method

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☒ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Pumping level	Drill stem at	Time
1/2	60		½ hr
1/2	200		1 hr

Temperature of water Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata:

(9) LOCATION OF WELL by legal description:

County Clatsop Latitude ' " Longitude ' "

Township 8N N or S, Range 9W E or W, WM.

Section 35 ¼ ¼

Tax Lot 6802 Lot Block Subdivision

Street Address of Well (or nearest address) Mudd Rd Astoria

(10) STATIC WATER LEVEL:

ft. below land surface. Date

Artesian pressure lb. per square inch. Date

(11) WELL LOG:

Ground elevation

Material	From	To	WB?	SWL
Top Soil	0	5		
Yellow Clay	5	15		
Gray Clay	15	200		60

Date started 7/15 Completed 7-25

(unbonded) Water Well Constructor Certification:

I constructed this well in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

Signed Date

(bonded) Water Well Constructor Certification:

I accept responsibility for construction of this well and its compliance with all Oregon water well standards. This report is true to the best of my knowledge and belief.

Signed [signature] Date 7/30/86

Company Hofwood McMinnville Co. Job No.

3509C 10/85

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

CLSP 054

RECEIVED
MAR 29 1993

8N/4W/31CC
(START CARD) # 48599

(1) OWNER:
Well Number
Name David Hoffman
Address Rt. 3, Box 253B
City Astoria State Oregon Zip 97103

(2) TYPE OF WORK:
[X] New Well [ ] Deepen [ ] Recondition [ ] Abandon

(3) DRILL METHOD:
[X] Rotary Air [ ] Rotary Mud [ ] Cable
[ ] Other

(4) PROPOSED USE:
[X] Domestic [ ] Community [ ] Industrial [ ] Irrigation
[ ] Thermal [ ] Injection [ ] Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval [ ] Yes [X] No Depth of Completed Well 165 ft.
Explosives used [ ] Yes [X] No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
10	0	25	Bentonite	0	25	24
7½	25	79	—	25	79	—
6	79	165	—	—	—	—

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[X] Other Placed in Dry & pradded
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6	+2	79	160	[X]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
Liner:					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
[ ] Perforations Method
[ ] Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]

(8) WELL TESTS: Minimum testing time is 1 hour
[ ] Pump [ ] Bailer [ ] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
			1 hr.

Temperature of Water Depth Artesian Flow Found
Was a water analysis done? [ ] Yes By whom
Did any strata contain water not suitable for intended use? [ ] Too little
[ ] Salty [ ] Muddy [ ] Odor [ ] Colored [ ] Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Clatsop Latitude Longitude
Township 8N N or S. Range 4W E or W. WM.
Section 31 SW ¼ SW ¼
Tax Lot 2400 Lot Block Subdivision
Street Address of Well (or nearest address) SAME

(10) STATIC WATER LEVEL:
ft. below land surface. Date
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found

From	To	Estimated Flow Rate	SWL

(12) WELL LOG:
Ground elevation

Material	From	To	SWL
Top soil	0	1	
Brown Clay	1	19	
Gray Claystone	19	165	
No Measurable Water			

Date started 3-24-93 Completed 3-25-93

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 1221
Signed Larry C Eck Date 3-25-93

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STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

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SALEM, OREGON

CLT 387

8N/9W/34da

(START CARD) # 60052

Well Number 1

(1) OWNER:

Name Roger Nelson

Address 3092 Cullaby Lake Rd.

City Warrenton State Oregon Zip 97146

(2) TYPE OF WORK:

☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:

☒ Rotary Air ☐ Rotary Mud ☐ Cable

☐ Other

(4) PROPOSED USE:

☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:

Special Construction approval ☐ Yes ☒ No Depth of Completed Well 410 ft.

Explosives used ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount (sacks) or pounds
10	0	25	Bentonite	0	25	19
6	25	134	—	—	—	—
8	134	139	Cement	134	139	4
6	139	410	—	—	—	—

How was seal placed: Method ☐ A ☒ B ☐ C ☐ D ☐ E

☒ Other Placed in dry & prodded

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6	+1	139	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	4	0	440	160	☐	☒	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) 139

(7) PERFORATIONS/SCREENS:

☒ Perforations Method Drilled

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Telescope size	Casing	Liner
530	410	—	320	3/8	4	☐	☒
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
2	369	395	1 hr.

Temperature of Water 54 Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata:

(9) LOCATION OF WELL by legal description:

County Clatsop Latitude Longitude

Township 8N N or S. Range 9W E or W. WM.

Section 34 NE ¼ SE ¼

Tax Lot 301 Lot Block Subdivision

Street Address of Well (or nearest address) Rt. 1, Box 914F. Astoria, Oregon 97103

(10) STATIC WATER LEVEL:

26 ft. below land surface. Date 10-20-93

Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:

Depth at which water was first found 286

From	To	Estimated Flow Rate	SWL

(12) WELL LOG:

Ground elevation

Material	From	To	SWL
Brown Clay	0	49	
Gray Sandstone	49	97	
Gray Claystone	97	397	26
Gray Claystone w/Fine Sand	397	410	26

Date started 10-19-93 Completed 10-20-93

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

WWC Number

Signed Date

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 1221

Signed Larry C Ray Date 10-20-93

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CLAT
51030

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

Instructions for completing this report are on the last page of this form.

WELL I.D. # L 37007
START CARD # 126411

(1) OWNER: Well Number 2
Name NICK GRAFF
Address 121 SW WILLOW LN
City ASTORIA State OR Zip 97103

(2) TYPE OF WORK
☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger
☐ Other

(4) PROPOSED USE:
☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of Completed Well 140 ft.
Explosives used ☐ Yes ☐ No Type _____ Amount _____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10"	0	20	Bentonite	0	20	10 Sacks
6"	20	140				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other POUR
Backfill placed from ____ ft. to ____ ft. Material _____
Gravel placed from ____ ft. to ____ ft. Size of gravel _____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+1	30	250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	4"	-10	140		☐	☒	☒	☐
					☐	☐	☐	☐

Final location of shoe(s) 30

(7) PERFORATIONS/SCREENS:
☒ Perforations Method DRILL HOLE
☐ Screens Type _____ Material _____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
100	140	1/2	1 FT	4		☐	☒
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
10 GAM		140	1 hr.

Temperature of water 52° Depth Artesian Flow Found _____
Was a water analysis done? ☐ Yes By whom _____
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____
Depth of strata: _____

(9) LOCATION OF WELL by legal description:
County CLATSOP Latitude _____ Longitude _____
Township 8N N or S Range 9W E or W. WM.
Section 23 NW 1/4 NW 1/4
Tax Lot 1300 Lot _____ Block _____ Subdivision _____
Street Address of Well (or nearest address) Grimstad Rd; Thun Day River Rd - Astoria, OR 97103

(10) STATIC WATER LEVEL:
-3 ft. below land surface. Date 4/26/00
Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:
Depth at which water was first found 130

From	To	Estimated Flow Rate	SWL
130	133	10	-3

(12) WELL LOG:
Ground Elevation _____

Material	From	To	SWL
CLAY, BROWN	0	5	-3
CLAY, GRAY, SILTY	5	12	
CLAYSTONE, GRAY	12	140	

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OCT 17 2000
WATER RESOURCES DEPT.
SALEM, OREGON

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JUL 05 2000
WATER RESOURCES DEPT.
SALEM, OREGON

Date started 4/24/00 Completed 4/26/00

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number _____
Signed _____ Date _____

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 1430
Signed A McMinn Date 4/26/00

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RE[illegible] CLAT
51163

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537 [illegible])
Instructions for completing this report are on the last page of this form.

WELL I.D. # L 45021
START CARD # 134374

(1) LAND OWNER Well Number 1
Name Kathleen Gowing
Address P.O. Box 1239
City Astoria State Oregon Zip 97103

(2) TYPE OF WORK
[X] New Well [ ] Deepening [ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD:
[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger
[ ] Other

(4) PROPOSED USE:
[X] Domestic [ ] Community [ ] Industrial [ ] Irrigation
[ ] Thermal [ ] Injection [ ] Livestock [ ] Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval [ ] Yes [X] No Depth of Completed Well 185 ft.
Explosives used [ ] Yes [X] No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10	0	20	Bentonite	0	20	37
6	20	185	—	—	—	—

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[X] Other placed in dry & prodded
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6	+2	98	.250	[X]	[ ]	[X]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
Liner:	4½	85	185	160	[ ]	[X]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]

Drive Shoe used [ ] Inside [X] Outside [ ] None
Final location of shoe(s) 98

(7) PERFORATIONS/SCREENS:
[X] Perforations Method Drilled
[ ] Screens Type Material

From	To	Slot size	Number	Diameter	Telescope size	Casing	Liner
125	185	—	240	3/8	4½	[ ]	[X]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]

(8) WELL TESTS: Minimum testing time is 1 hour
[ ] Pump [ ] Bailer [X] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
5	68	150	1 hr.

Temperature of water 55 Depth Artesian Flow Found
Was a water analysis done? [ ] Yes By whom
Did any strata contain water not suitable for intended use? [ ] Too little
[ ] Salty [ ] Muddy [ ] Odor [ ] Colored [ ] Other
Depth of strata

(9) LOCATION OF WELL by legal description:
County Clatsop Latitude Longitude
Township 8N N or S Range 9W E or W WM
Section 21 NE 1/4 NW 1/4
Tax Lot 3000 Lot Block Subdivision
Street Address of Well (or nearest address) 92931 Hwy. 202

(10) STATIC WATER LEVEL:
82 ft. below land surface. Date 6-4-01
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES:
Depth at which water was first found 97

From	To	Estimated Flow Rate	SWL
97	98	T	98
151	185	5	82

(12) WELL LOG:
Ground Elevation

Material	From	To	SWL
Yellow Clay	0	13	
Med. Gray Sandstone	13	185	82

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SALEM, OREGON

Date Started 6-1-01 Completed 6-4-01

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 1221
Signed Tommy C Gray Date 6-4-01

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CLAT 51578

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)
Instructions for completing this report are on the last page of this form.

WELL I.D. # L 61956
START CARD # 155357

(1) LAND OWNER Well Number
Name ROGER NELSON
Address 33680 CULLABY LAKE LANE
City WARRENTON State OR Zip 97146

(2) TYPE OF WORK
☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger
☐ Other

(4) PROPOSED USE:
☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of Completed Well 275 ft.
Explosives used ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10"	0	60	Cem/Bent	0	250	63 SKS
8"	60	250	"			
6"	250	275				

How was seal placed: Method ☐ A ☒ B ☒ C ☐ D ☐ E
☐ Other
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+2	250	.250	☒	☐	☒	☐
Liner:	4½"	235	275	160psi	☒	☒	☒	☐

Drive Shoe used ☐ Inside ☐ Outside ☒ None
Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☒ Perforations Method Saw Cut
☐ Screens Type Material PVC - 160

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
255	275	¼x8	36	4½"	Pipe	☐	☒

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
5½		275	1 hr.
5		243	"

Temperature of water 54°F Depth Artesian Flow Found
Was a water analysis done? ☒ Yes By whom AMJ
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Clatsop Latitude Longitude
Township 8N N or S Range 9W E or W. WM.
Section 34 NE ¼ SE ¼
Tax Lot 301 Lot Block Subdivision
Street Address of Well (or nearest address) 37177 Christians Lane, Astoria, Or 97103

(10) STATIC WATER LEVEL:
8' ft. below land surface. Date 2-5-03
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES:
Depth at which water was first found 253

From	To	Estimated Flow Rate	SWL
253	243	5½	8'

(12) WELL LOG:
Ground Elevation

Material	From	To	SWL
Brn clay	0	4	
Orange brn clay	4	8	
Soft Brn silty clay	8	52	
Gry silty clay	52	55	
Soft gry sandstone	55	248	
Firm gry sandstone w/ gry claystone.	248	275	8'

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SALEM, OREGON

Date started 1-22-03 Completed 2-6-03

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number 1492
Signed Mac Bigby Date 2/7/03

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 1266
Signed Date 2/7/03

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SECOND QUARTER 2008
HIWAY SERVICE 76 STATION
1308 MARINE DRIVE
ASTORIA, OREGON

DEQ File No. 04-99-1193

July 14, 2008

Prepared For:

Niemi Oil Company, Inc.
Etu, Inc.
P.O. Box 989
Astoria, Oregon 97103

Prepared By:

RSV Engineering, Inc.
31960 SW Charbonneau Drive, Suite 101
Wilsonville, Oregon 97070
(503) 694.6960

RSV Project No. 03-135

SECOND QUARTER 2008
HIWAY SERVICE 76 STATION
1308 MARINE DRIVE
ASTORIA, OREGON

DEPT OF ENVIRONMENTAL QUALITY
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NORTHWEST REGION

RSV Engineering, Inc. is submitting this Second Quarter 2008 Groundwater Monitoring Report on behalf of the Niemi Oil Company to document work performed at the Hiway Service 76 Service Station site located at 1308 Marine Drive in Astoria, Oregon. The report was prepared in conformance with RSV Engineering's quality assurance/quality control procedures to ensure that the report meets industry standards in terms of the methods used and the information presented. If you have any questions or comments concerning this report, please contact one of the individuals listed below.

Respectfully submitted,

RSV ENGINEERING INC.

Daniel E. Becraft, R.G.
Project Geologist

for;

Brad J. Berggren, P.E., R.G.
Vice President

REGISTERED
OREGON
DANIEL E. BECRAFT
G1974
GEOLOGIST

EXPIRES: 4/30/2009

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Appendix A Laboratory Report and Chain of Custody Documentation

NIEMI OIL COMPANY
SECOND QUARTER 2008
HIWAY SERVICE 76 STATION
1308 MARINE DRIVE
ASTORIA, OREGON

INTRODUCTION

This report summarizes the activities and results of the second quarter 2008 quarterly groundwater monitoring conducted on May 29, 2008 by RSV Engineering, Inc. (RSV) at the Niemi Oil Company Hiway Service 76 Station located at 1308 Marine Drive in Astoria, Oregon (Figure 1). The analytical results from the second quarter 2008 are consistent with previous sampling results.

Soil and groundwater investigation activities have been conducted at the site to define the nature and extent of petroleum hydrocarbons associated with a release from a 550-gallon waste-oil tank decommissioned in 1999 (Figure 2). The Oregon Department of Environmental Quality (DEQ) has listed the site as a Leaking Underground Storage Tank (LUST) site with File Number 04-99-1193.

In October 2007, four monitoring wells were installed and groundwater samples collected for analysis as requested by DEQ in a September 23, 2005 letter responding to a Niemi Oil Company (Niemi) request for a "No Further Action" (NFA) determination for the site. Niemi's request for site closure was based on the results of direct-push soil and groundwater investigations conducted at the site in 2003 and 2004. The soil and groundwater analytical results from site investigations were compared to Risk-Based Concentrations (RBCs) in accordance with Oregon Administrative Rule (OAR) 340-122-0244. The following investigation results formed the basis of the 2005 NFA request.

1) Contamination at the site is limited to petroleum based constituents.
2) Petroleum-related hazardous constituents identified at the site are listed in the DEQ Appendix A Table of RBCs.
3) The site is zoned commercial and the current and future planned use of the site is as a gasoline and service station. The only RBC exceedances for applicable potential exposure pathways were ingestion, inhalation, and dermal contact for

soils impacted with TPH-Oil, and migration to groundwater from soils impacted with TPH-Oil and metals in the vicinity of the former location of the waste-oil UST. However, the soil exceeding the ingestion, inhalation, and dermal contact exposure pathway is 6 ft or more below ground surface and deeper than the 3-ft depth considered reasonable for occupational workers per DEQ guidance. No site development is expected or planned in the future, and exposure to the impacted soils is unlikely.

4) Groundwater samples did not reveal exceedances of DEQ Appendix A or site-specific RBCs for applicable potential exposure pathways identified for the site (i.e., Volatilization to Outdoor Air, Vapor Intrusion into Buildings, or Groundwater in an Excavation for Occupational, Construction worker or Excavation worker pathways).

In its September 23, 2005 letter, DEQ acknowledged that the petroleum hydrocarbon concentrations detected in soil and groundwater samples collected from the Hiway Service site meet the criteria for site closure. DEQ, however, expressed concern that gasoline-range hydrocarbons detected in downgradient groundwater grab samples in October 2004 might indicate a release from the active UST fueling system in addition to the known release from the decommissioned waste-oil UST. Therefore, DEQ requested groundwater monitoring wells be installed in accordance with OAR 340-122-0240.

The 2007 monitoring well installation activities and associated groundwater sampling results were evaluated in a report submitted to DEQ in December 2007. The results of the site investigation and quarterly groundwater monitoring events do not indicate a release from the active UST fueling system. In addition, the results indicate that, although relatively low concentrations of gasoline-range hydrocarbons (i.e., below applicable RBCs) were detected in groundwater downgradient of the former used-oil UST in October 2004, those concentrations have attenuated below reporting limits with time, and are not indicative of an ongoing release.

The groundwater analytical data continue to indicate that petroleum hydrocarbons are limited to the vicinity of the former 550-gallon waste-oil UST cavity, and at relatively

low concentrations. Consistent with the analytical results for all soil and groundwater samples collected during this and previous site investigations associated with the Hiway Service site, the detected concentrations do not exceed applicable RBCs.

The four monitoring wells will be sampled again during the third quarter of 2008 such that seasonal trends in groundwater quality and flow can be established. After one year of groundwater monitoring is completed, Niemi will again submit an NFA request to DEQ, if appropriate, based on the groundwater monitoring results.

BACKGROUND

The Hiway Service site is an active 76 Service Station. There are three registered fuel product USTs located at the site, two 4,000-gallon gasoline USTs and one 1,500-gallon gasoline UST.

On October 18, 1999, a 550-gallon used-oil UST was removed from the site near the northeast corner of the station building (Figure 2). At that time, petroleum product odor and staining were noted in the soils from the used-oil UST excavation. Two soil samples were collected from the bottom of the UST excavation from a depth of 6ft and analyzed for Total Petroleum Hydrocarbon–Hydrocarbon Identification (TPH-HCID), with both diesel and heavy oil detected in both samples. Follow-up analyses for TPH in the diesel and heavy oil ranges detected only heavy oil to a maximum concentration of 78,000 mg/kg. TPH in the diesel range was not detected in either sample. The soil contamination was reported to the DEQ on October 21, 1999.

Previous Investigations

On September 29, 2003 a magnetometer/ground penetrating radar (GPR) survey was performed by GeoPotential, Inc. of Gresham, Oregon to locate in-use and previously abandoned underground storage tanks (USTs) beneath the site. Three USTs, all of which are in use, were located in the northwest central part of the site. The number of the

detected tanks is consistent with the number of tanks currently registered for the site, and no other USTs were detected during the geophysical survey.

RSV conducted an initial soil and groundwater investigation at the site in October 2003. Laboratory analytical results indicated relatively low concentrations of petroleum related compounds in soil and groundwater beneath the site (RSV 2004). A Site Characterization Report was submitted to DEQ in February 2004, and in April 2004, DEQ requested additional site characterization work to better define the extent of petroleum hydrocarbons.

In October 2004, RSV completed three soil borings to further assess the extent of petroleum hydrocarbons associated with the former used-oil UST. Boring B-7 was completed adjacent to the former location of the used-oil UST, and Borings B-8 and B-9 were completed to the north and hydraulically downgradient of the former waste-oil UST area (Figure 2).

Analysis of samples collected from Soil Boring B-7 revealed detections of petroleum constituents in soil and groundwater consistent with a release from a used-oil tank. Groundwater samples collected from Soil Borings B-8 and B-9, completed downgradient of the former waste-oil UST area, revealed relatively low detections of several petroleum-related compounds more typically associated with gasoline (RSV, 2005).

A conceptual site model was developed and potential occupational exposure routes were considered for employees and workers at the site based on the current and expected future commercial use of the site. The potential pathways associated with the conceptual site model include direct contact with soil, dermal absorption and inhalation of volatiles, inhalation of chemicals volatilized into outdoor air, inhalation of chemicals volatilized into buildings, and leaching to groundwater. Ingestion of groundwater was excluded as a potential pathway at the site, as described in the beneficial water determination presented later in this report.

The only RBC exceedances in soils for applicable occupational exposure pathways were for soils in or near the former waste-oil UST excavation. However, the soils with concentrations exceeding applicable RBCs were encountered at depths greater than 3 feet below ground surface, or below the depth considered to present reasonable exposure scenarios for occupational workers (DEQ, 2003). RBCs were exceeded for soil ingestion, inhalation, and dermal contact for employees and construction and excavation workers for TPH-Oil, and migration to groundwater from soils for TPH-Oil and metals near the former UST tank pit. Exposure to soil exceeding the ingestion, inhalation, and dermal contact exposure pathway for construction and excavation workers is not reasonably likely since the soil exceedances were from a depth of 6 feet or more, the current and planned future use of the site is as a gasoline and service station, and no site development activities are expected or planned in the future.

RSV calculated site-specific soil and groundwater RBCs for TPH-Oil using DEQ's RBC computer spreadsheet (DEQ, 2003a). The calculation assumed that all of the TPH detected in soil samples at the site were within the range that yields the most conservative site-specific RBC (RSV, 2004). In its September 23, 2005 letter, DEQ presented TPH-Oil RBCs that DEQ had calculated using site specific TPH and constituent concentration data for soil samples collected from the former waste-oil UST area. As DEQ indicated in their letter, the site specific RBCs calculated by DEQ indicate that remaining heavy oil concentrations at the Hiway Service site are within the applicable cleanup standards.

With respect to leaching to groundwater RBC exceedances, ingestion and inhalation of groundwater is not considered an applicable exposure pathway at the site.

Groundwater Monitoring Wells MW-1 through MW-4 were installed during October 2007 and groundwater samples collected for laboratory analysis. The groundwater analytical data from the monitoring wells indicate that petroleum hydrocarbons are limited to Monitoring Well MW-3 and the vicinity of the former 550-gallon waste-oil UST cavity, and at relatively low concentrations. Metals (cadmium, chromium, and lead) were not detected above reporting limits in any groundwater sample.

An evaluation of current and reasonably likely future land use was conducted for the site. The results indicate the current use of the Niemi property as a service station is expected to continue into the foreseeable future. The results of the beneficial water use determination for the site indicate there are no current or reasonably likely future beneficial uses of shallow groundwater at the Hiway Service site.

Consistent with the analytical results for all soil and groundwater samples collected during this and previous site investigations associated with the Hiway Service site, the detected concentrations do not exceed applicable occupational RBCs.

Physical Setting and Local Geology

The Hiway Service site is located approximately 550 ft south of the Columbia River. A bedrock high is located approximately one-half mile to the south of the site. Floodplain sediments in the vicinity of the Columbia River in this part of Astoria generally consist of primarily sands and gravels with minor amounts of clay. Underlying unconsolidated sediments in the area is the Astoria Formation, which is characterized by an upper sandstone unit of Miocene age, a middle shale unit, and a lower sandstone unit. According to the Hiway Service station manager, depth to bedrock encountered during geotechnical borings completed at an adjacent site south and across Marine Drive from the Hiway Service site indicated bedrock occurs approximately 28 ft bgs.

Shallow soils in the vicinity of the site have been mapped as Walluski Silt Loam. The Walluski Silt Loam is typically moderately well drained and has a slow permeability. A typical profile consists of 14 inches of very dark grayish brown silt loam, 7 inches of dark brown silt loam, and 39 inches of dark yellowish brown, yellowish brown, and light brownish gray, mottled silty clay loam.

At the Hiway Service property, there is a sharp ground surface elevation difference of approximately 10 feet between the northern portion of the property in the vicinity of Borings B-8 and B-9, due to a retaining wall behind the storage shed constructed on the north side of the station building (Figure 2). Fill material was placed on the south side of

the retaining wall to build up the property such that the Service Station could be constructed.

Shallow soils at the site vary and include sand (MW-2), silty sand (MW-1), and silty clayey gravel (MW-3). The proximity of Monitoring Wells MW-2 and MW-3 to the retaining wall, as well as, glass and metal fragments observed from the depth of 8 ft in Boring MW-2, indicate the shallow soils in these borings is fill material.

Beneath the site fill, sand was encountered in Borings MW-2 and MW-3, and sand and silty sand in Boring MW-1, until silty clayey gravel was encountered in each boring at the depths of and 18 ft. (MW-1), 22.5 ft (MW-2), and 19.5 ft (MW-3) below ground surface. The driller reported the gravel was relatively difficult drilling, and it was this gravel that had caused direct-push (i.e., Geoprobe) refusal in some borings during previous site investigations. In addition, where the water table was encountered within the clayey gravel, a water sample was not always obtained due to the low yield of the strata. Only sand was encountered in Boring MW-4.

Groundwater was encountered at depths ranging from approximately 6.5' ft (MW-4) to 18.5 ft (MW-1, MW-2, and MW-3) below ground surface. This approximately 12-ft difference in depths to water is primarily attributable to ground surface elevation differences between the north and south side of the site retaining wall.

The direction of groundwater flow is predominantly towards the north. This groundwater flow direction was anticipated and is consistent with the topography of the site area and location of the Columbia River relative to the site.

QUARTERLY GROUNDWATER MONITORING METHODS

The scope of work for the second quarter 2008 groundwater-monitoring event is summarized below.

1. Measure the depths to groundwater in Monitoring Wells MW-1 through MW-4 to the nearest 0.01 foot and check the groundwater surface in the monitoring wells for free (floating) product.

2. Purge at least three well volumes of water from each well and collect temperature, pH, specific conductance, and ORP measurements.

3. Obtain groundwater samples from Monitoring Wells MW-1 through MW-4 for laboratory analysis of volatile organic compounds (VOCs) including benzene, ethylbenzene, toluene, xylenes, isopropylbenzene, n-propylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane and 1,2-dibromoethane by U.S. Environmental Protection Agency (EPA) Method 8260, and TPH in the gasoline, diesel and heavy-oil ranges using Methods NWTPH-Gx and NWTPH-Dx. In addition, as requested by DEQ in a February 1, 2008 electronic mail, the groundwater sample obtained from Monitoring Well MW-3 was further analyzed for polycyclic aromatic hydrocarbons (PAHs) per EPA Method 8270.

Depths to groundwater were measured using an electronic water level indicator with accuracy of 0.01 foot. The electronic water level indicator was decontaminated prior to use in each well. Groundwater elevations were calculated by subtracting the depths to groundwater from the top of casing elevations. Groundwater was checked for the presence of floating product using disposable polyethylene (PE) bailers. A new bailer and line were used for each well. A minimum of three (3) well volumes of water were purged from the monitoring wells using a peristaltic pump. Groundwater samples for TPH and PAH analysis were collected using a peristaltic pump, while samples for VOC analysis were collected using a disposable bailer. Purge water was contained on-site in a 55-gallon labeled drum.

QUARTERLY GROUNDWATER MONITORING RESULTS

Depth to Groundwater

The depths to groundwater and groundwater elevations for this and previous quarterly groundwater monitoring events are summarized in Table 1. Groundwater elevations

based on the January 31, 2008 measurements are shown in Figure 2. The following observations were made as part of depth to groundwater measurements.

- Depths to groundwater in monitoring wells ranged from 5.63 ft (MW-4) to 16.21 ft (MW-3) below the top of casing.

- Groundwater elevations ranged from 6.81 ft above mean sea level (MSL) (MW-1) to 5.52 ft MSL (MW-4).

- The direction of shallow groundwater flow beneath the site, based on the most recent quarterly groundwater elevation data from May 29, 2008 was toward the north. This groundwater flow direction is consistent with previously measured results, as well as, the topography of the site area and location of the Columbia River relative to the site.

Laboratory Analytical Results

Groundwater analytical data for the second quarter 2008 groundwater samples are summarized in Table 2. The laboratory report and chain-of-custody documentation are included in Appendix A.

As indicated in Table 2, petroleum hydrocarbons were not detected above reporting limits in groundwater samples from Monitoring Wells MW-1, MW-2, and MW-4. As with previous sampling results, the only sample with petroleum constituents detected above reporting limits is the sample from Monitoring Well MW-3, located near the former waste-oil UST cavity.

In Sample MW-3, TPH in the gasoline and diesel ranges were detected at concentrations of 1,350 µg/l and 487 µg/l, respectively. TPH in the heavy-oil range was not detected.

The only VOCs detected were benzene (100 µg/l), ethylbenzene (1.93 µg/l), isopropylbenzene (41.6 µg/l) and n-propylbenzene (84 µg/l). The only PAH detected was naphthalene at a concentration of 0.525 µg/l.

COMPARISON OF GROUNDWATER MONITORING ANALYTICAL RESULTS TO RISK-BASED CONCENTRATIONS

In Table 2, the groundwater analytical results are compared to applicable occupational RBCs associated with groundwater at the Hiway Service site. Review of the table indicates that no applicable occupational groundwater RBCs are exceeded by the relatively low petroleum concentrations detected in samples from Monitoring Well MW-3.

The current use of the Niemi Hiway Service property as a retail service station is expected to continue in the future. In addition, the relatively low petroleum concentrations detected in groundwater in the vicinity of the former waste oil tank is of limited extent and will likely attenuate with time. Although site redevelopment as a stand alone parcel is not reasonably likely in the future, the property zoning does permit apartments and rowhouses, uses consistent with the urban residential receptor. Review of Table 2 indicates that, even if the site were redeveloped in the future to include urban residential uses, the urban residential RBCs for volatilization to outdoor air or vapor intrusion into buildings are not exceeded.

SUMMARY

The second quarter 2008 groundwater monitoring event was conducted on May 29, 2008 as part of on-going quarterly groundwater monitoring conducted at the site as requested by DEQ. Results from the quarterly groundwater-monitoring event are summarized in Tables 1 and 2 of this report.

The most recent groundwater quality data from the monitoring wells at the site are generally consistent with the previous sampling round. Consistent with the analytical results for all soil and groundwater samples collected during this and previous site investigations associated with the Hiway Service site, the detected concentrations do not exceed applicable occupational RBCs.

The next quarterly groundwater-sampling event is scheduled for August 2008.

REFERENCES

Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites.
Oregon Department of Environmental Quality, September 22, 2003.

Site Characterization Report.
RSV Engineering, Inc. February, 2004.

Additional Site Characterization Report.
RSV Engineering, Inc. May, 2005.

Additional Site Characterization Report.
RSV Engineering, Inc. December, 2007.

TABLES

Table 1
Summary of Groundwater Elevation Data
Niemi Oil Company
Hiway Service 76 Station
Astoria, Oregon

Monitoring Well Number[1]	Casing Elevation (feet)	Date Measured	Depth to Water[2] (feet)	Water Table Elevation[3] (feet)
MW-1	21.58	11/01/07	15.71	5.87
		11/27/07	15.49	6.09
		01/31/08	13.98	7.60
		05/29/08	14.77	6.81
MW-2	21.97	11/01/07	16.88	5.09
		11/27/07	16.64	5.33
		01/31/08	14.61	7.36
		05/29/08	15.80	6.17
MW-3	22.20	11/01/07	17.22	4.98
		11/27/07	17.04	5.16
		01/31/08	15.04	7.16
		05/29/08	16.21	5.99
MW-4	11.15	11/01/07	6.88	4.27
		11/27/07	6.33	4.82
		01/01/00	4.62	6.53
		05/29/08	5.63	5.52

Notes:

[1]Approximate locations of monitoring wells are shown on Figure 2.

[2]Depth to water measured from the top-of-casing rim.

[3]Water table elevation calculated by subtracting measured depth to water from the top-of-casing elevatio
Casing rim elevations were surveyed by Coast Surveying Inc. of Warrenton, OR.

TABLE 2
SUMMARY of GROUNDWATER ANALYTICAL DATA for PETROLEUM HYDROCARBONS
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

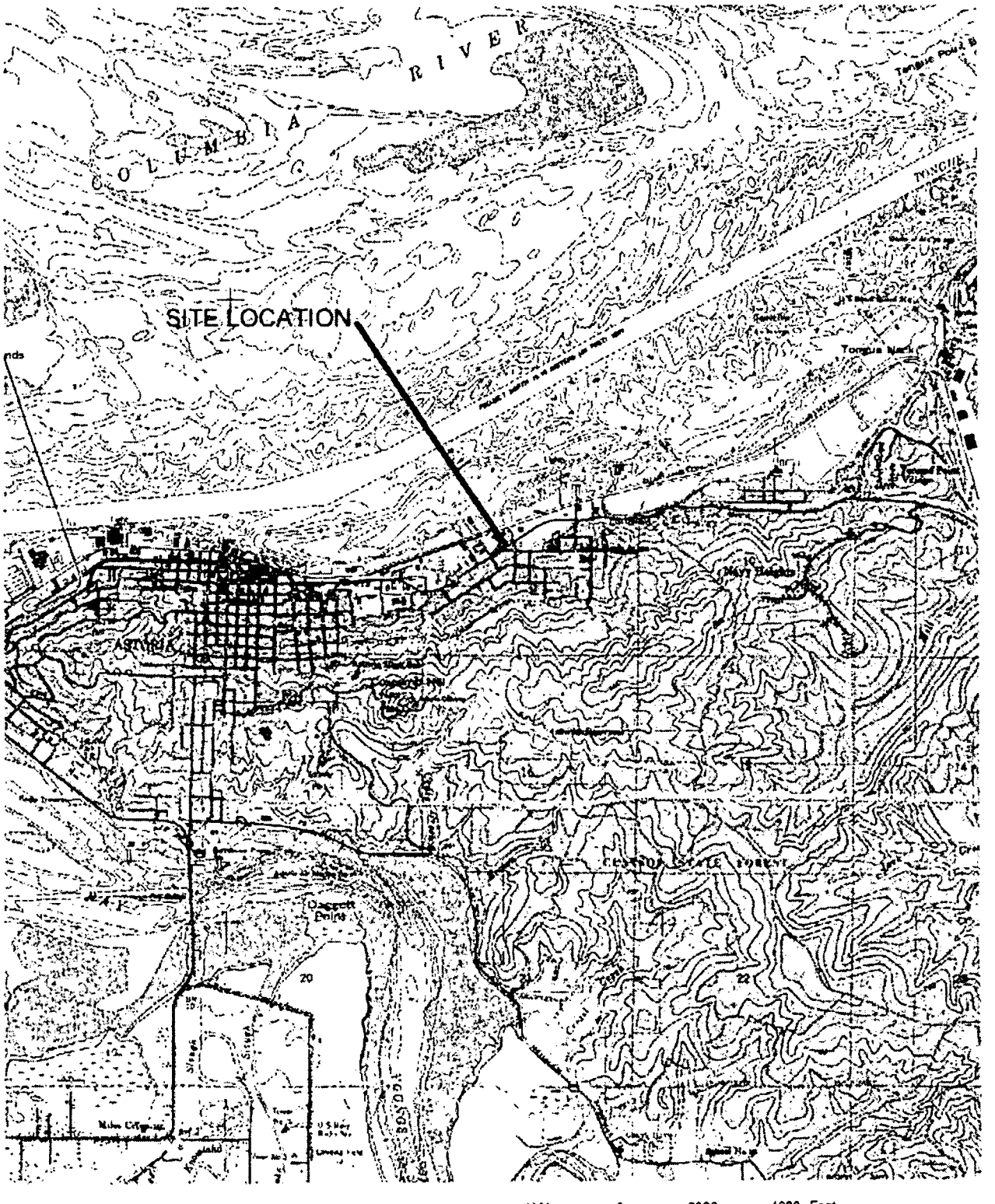
Groundwater Sample ID	Sample Date	Gasoline-range Petroleum Hydrocarbons (Method NWTPH-Gx) (µg/l)	Diesel- and Heavy Oil-range Petroleum Hydrocarbons (Method NWTPH-Dx) (µg/l)		Volatile Organic Compounds (EPA Method 8260B) (µg/l)											Detected PAHs (EPA Method 8270) (µg/l)
			Diesel-range	Oil-range	Benzene	1,2, Dibromoethane	1,2, Dichloroethane	Ethylbenzene	Methyl tert-butyl ether	Toluene	Xylenes	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Isopropylbenzene	n-propylbenzene	Naphthalene
MW-1	11/1/2007	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	---	---	---	---	---
	1/31/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
	5/29/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
MW-2	11/1/2007	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	---	---	---	---	---
	1/31/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
	5/29/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
MW-3	11/1/2007	**1,350**	**522**	ND<476	**31.9**	ND<1	ND<1	**19.6**	ND<1	**2.59**	**2.41**	---	---	---	---	---
	1/31/2008	**885**	**989**	**615**	**2.24**	ND<1	ND<1	**2.34**	ND<1	ND<1	ND<2	ND<2	ND<1	**30**	**48.9**	**0.211**
	5/29/2008	**1,350**	**487**	ND<476	**100**	ND<1	ND<1	**1.93**	ND<1	**0.58**	ND<2	ND<2	ND<1	**41.6**	**84**	**0.525**
MW-4	11/1/2007	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	---	---	---	---	---
	1/31/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
	5/29/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
Urban Residential RBCs for Vapor Intrusion into Buildings		-	-	-	340	87	460	-	70,000	-	59,000	4,300	3,200	-	11,000	29,000
Urban Residential RBCs for Volatilization to Outdoor Air		-	-	-	5,100	360	3,400	-	410,000	-	-	-	-	-	-	-
Occupational RBCs for Volatilization to Outdoor Air		-	-	-	13,000	960	9,000	-	1,100,0000	-	-	-	-	-	-	-
Occupational RBCs for Vapor Intrusion into Buildings		-	-	-	2,700	690	3,600	-	560,000	-	-	51,000	38,000	-	-	-
RBCs for Groundwater in Excavation for Construction and Excavation Workers		12,000	9,700	18,000	1,700	28	600	110,000	59,000	200,000	22,000	1,300	1,400	51,000	4,500	680

Notes:

mg/l - Milligrams per liter
µg/l - Micrograms per liter
ND - Not detected above reporting limits.
NV - No RBC value for this constituent.

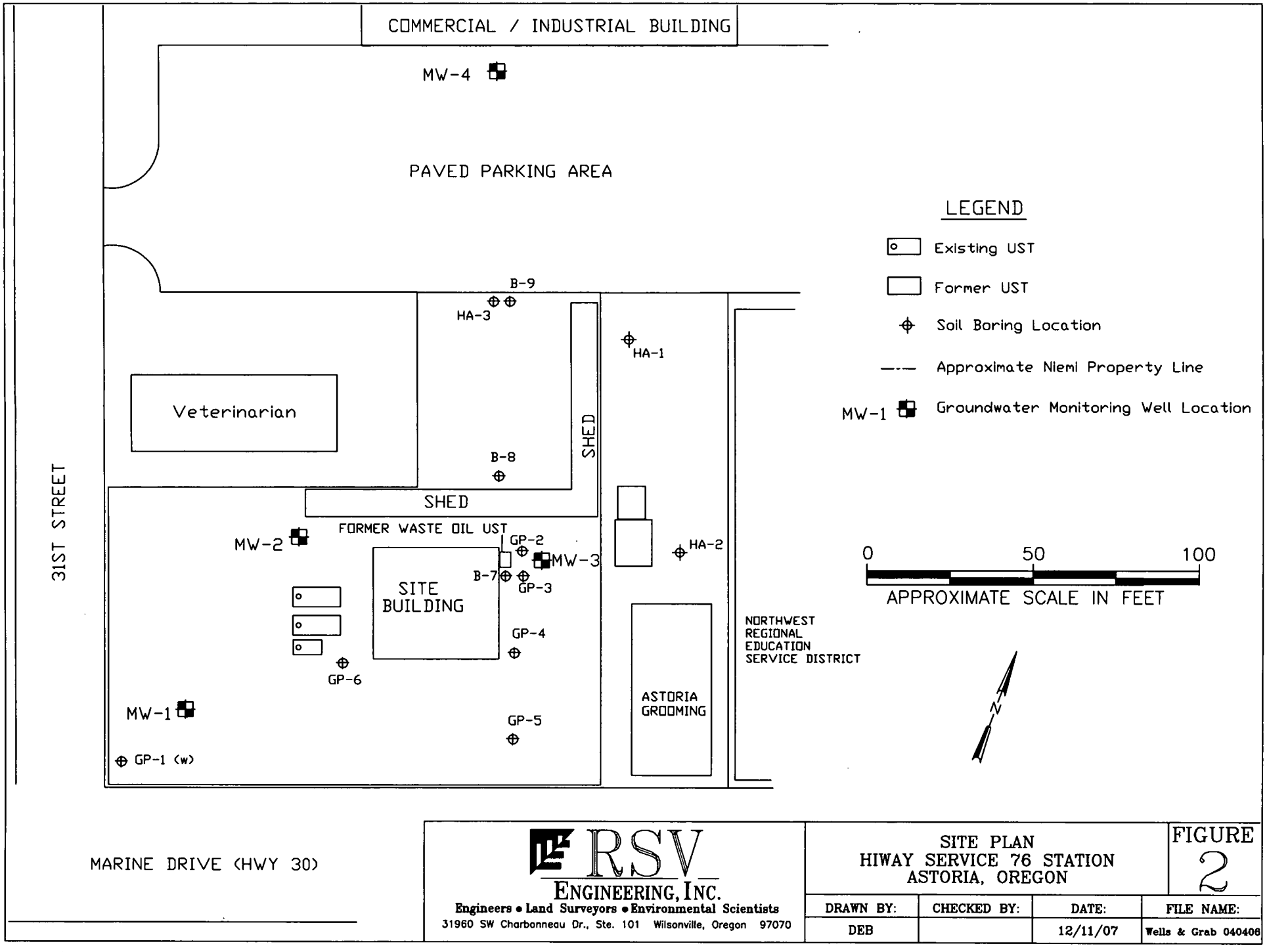
RBCs - Generic Risk-Based Concentrations per DEQ Risk-Based Decision Making for Petroleum Contaminated Sites, Appendix A.
"-" Indicates that RBC exceeds solubility limit.
"---" Indicates sample not analyzed for this constituent.

FIGURES



Adapted from the USGS Astoria, Oregon-Washington 1:24,000 topographic map, 1949, Photorevised 1964

RSV ENGINEERING, INC.	SITE LOCATION MAP				FIGURE
	NIEMI OIL - HIGHWAY SERVICE ASTORIA, OREGON				1
DRAWN	CHECKED	APPROVED	DATE	DRAWING NO.	
CCA			11/6/03	03-135-01	

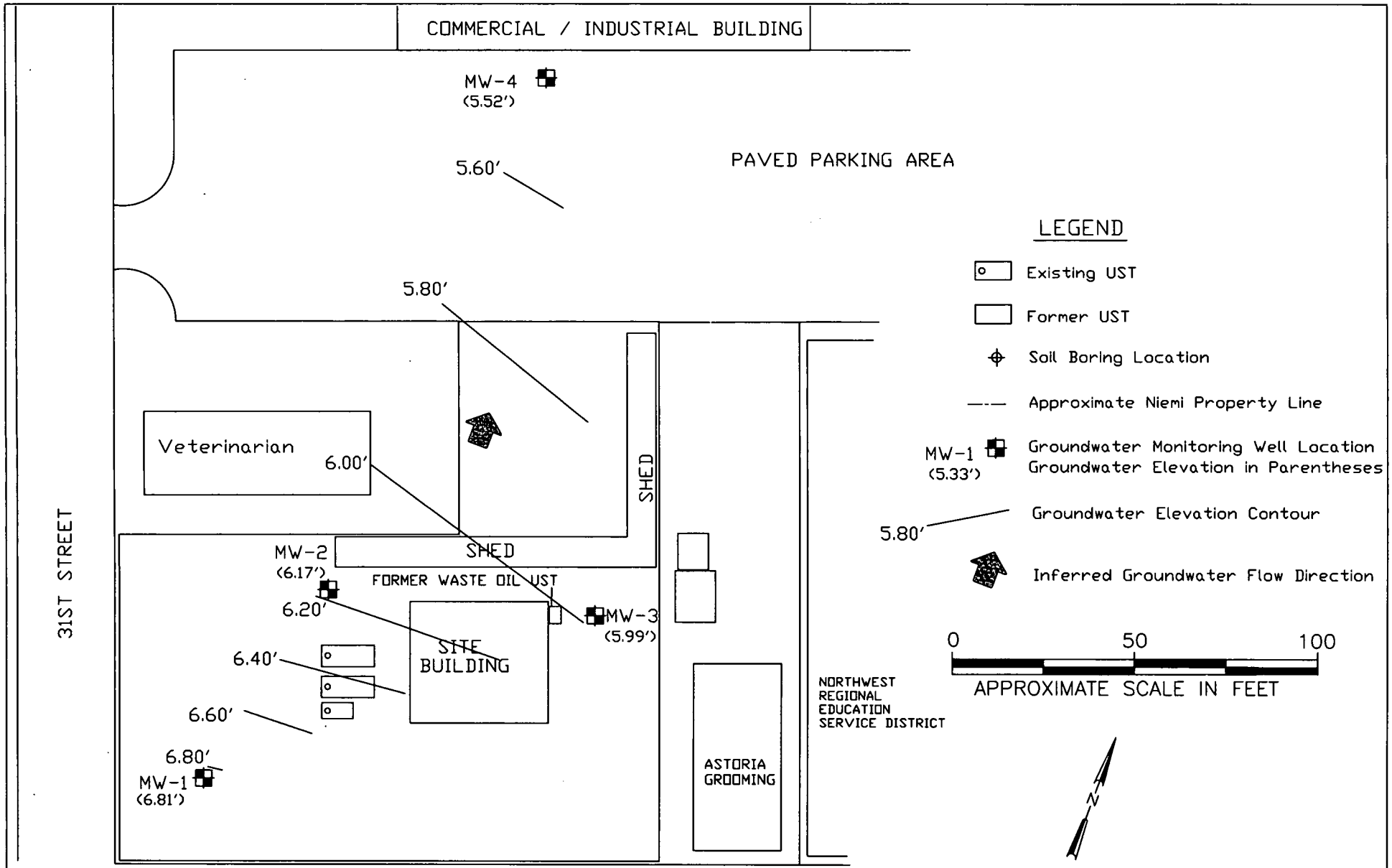


RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

SITE PLAN
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 2

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		12/11/07	Wells & Grab 040408



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GROUNDWATER FLOW MAP
MAY 29, 2008
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 3

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		6/38/07	Figure 3 - GW FLOW

A

APPENDIX A

LABORATORY REPORT and CHAIN-OF-CUSTODY DOCUMENTATION

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

ORELAP#: OR100021

June 13, 2008

Dan Becraft
RSV Engineering, Inc.
31960 SW Charbonneau Drive - Suite 101
Wilsonville, OR 97070

RE: Niemi Hiway Service

Enclosed are the results of analyses for samples received by the laboratory on 05/30/08 17:15. The following list is a summary of the Work Orders contained in this report, generated on 06/13/08 13:48.

If you have any questions concerning this report, please feel free to contact me.

Work Order	Project	ProjectNumber
PRE1069	Niemi Hiway Service	03-135

TestAmerica Portland

Darrell Auvil, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.

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PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	06/13/08 13:48

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-4	PRE1069-01	Water	05/29/08 05:40	05/30/08 17:15
MW-1	PRE1069-02	Water	05/29/08 06:15	05/30/08 17:15
MW-2	PRE1069-03	Water	05/29/08 07:05	05/30/08 17:15
MW-3	PRE1069-04	Water	05/29/08 08:15	05/30/08 17:15

TestAmerica Portland

Darrell W. Auvil

Darrell Auvil, Project Manager

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	06/13/08 13:48

Gasoline Hydrocarbons per NW TPH-Gx Method

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PRE1069-01 (MW-4)			**Water**			**Sampled: 05/29/08 05:40**				
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	----	80.0	ug/l	1x	8060086	06/03/08 11:26	06/03/08 13:51	
Surrogate(s): 4-BFB				*89.9%*		*50 - 150 %*	"		"	
PRE1069-02 (MW-1)			**Water**			**Sampled: 05/29/08 06:15**				
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	----	80.0	ug/l	1x	8060086	06/03/08 11:26	06/03/08 14:19	
Surrogate(s): 4-BFB				*96.2%*		*50 - 150 %*	"		"	
PRE1069-03 (MW-2)			**Water**			**Sampled: 05/29/08 07:05**				
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	----	80.0	ug/l	1x	8060086	06/03/08 11:26	06/03/08 14:47	
Surrogate(s): 4-BFB				*95.7%*		*50 - 150 %*	"		"	
PRE1069-04 (MW-3)			**Water**			**Sampled: 05/29/08 08:15**				
Gasoline Range Hydrocarbons	NW TPH-Gx	**1350**	----	80.0	ug/l	1x	8060086	06/03/08 11:26	06/03/08 15:15	
Surrogate(s): 4-BFB				*262%*		*50 - 150 %*	"		"	*ZX*

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Darrell Auvil, Project Manager

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	06/13/08 13:48

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PRE1069-01 (MW-4)			Water			Sampled: 05/29/08 05:40				
Diesel Range Organics	NWTPH-Dx	ND	----	0.238	mg/l	1x	8060066	06/03/08 15:00	06/04/08 09:23	
Heavy Oil Range Hydrocarbons	"	ND	----	0.476	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane				*91.7%*		*50 - 150 %*	"			"
PRE1069-02 (MW-1)			Water			Sampled: 05/29/08 06:15				
Diesel Range Organics	NWTPH-Dx	ND	----	0.238	mg/l	1x	8060066	06/03/08 15:00	06/04/08 09:41	
Heavy Oil Range Hydrocarbons	"	ND	----	0.476	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane				*91.9%*		*50 - 150 %*	"			"
PRE1069-03 (MW-2)			Water			Sampled: 05/29/08 07:05				
Diesel Range Organics	NWTPH-Dx	ND	----	0.238	mg/l	1x	8060066	06/03/08 15:00	06/04/08 09:59	
Heavy Oil Range Hydrocarbons	"	ND	----	0.476	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane				*85.6%*		*50 - 150 %*	"			"
PRE1069-04 (MW-3)			Water			Sampled: 05/29/08 08:15				
Diesel Range Organics	NWTPH-Dx	**0.487**	----	0.238	mg/l	1x	8060066	06/03/08 15:00	06/04/08 10:53	Q9
Heavy Oil Range Hydrocarbons	"	ND	----	0.476	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane				*87.4%*		*50 - 150 %*	"			"

TestAmerica Portland

Darrell W. Auvil

Darrell Auvil, Project Manager

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PORTLAND, OR 9405 S.W. NIMBUS AVENUE
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ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	06/13/08 13:48

Selected Volatile Organic Compounds (Including BTEX) per EPA Method 8260B

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PRE1069-01 (MW-4)			**Water**			**Sampled: 05/29/08 05:40**				
1,2-Dibromoethane	EPA 8260B	ND	----	0.500	ug/l	1x	8060067	06/03/08 07:00	06/03/08 10:57	
1,2-Dichloroethane	"	ND	----	0.500	"	"	"	"	"	
Benzene	"	ND	----	0.200	"	"	"	"	"	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	----	2.00	"	"	"	"	"	
Naphthalene	"	ND	----	2.00	"	"	"	"	"	
1,2,4-Trimethylbenzene	"	ND	----	1.00	"	"	"	"	"	
1,3,5-Trimethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Isopropylbenzene	"	ND	----	2.00	"	"	"	"	"	
n-Propylbenzene	"	ND	----	0.500	"	"	"	"	"	
Surrogate(s):	*4-BFB*			*96.8%*		*80 - 120 %*	"			"
	1,2-DCA-d4			*96.4%*		*80 - 120 %*	"			"
	Dibromofluoromethane			*96.6%*		*80 - 120 %*	"			"
	Toluene-d8			*101%*		*80 - 120 %*	"			"
PRE1069-02 (MW-1)			**Water**			**Sampled: 05/29/08 06:15**				
1,2-Dibromoethane	EPA 8260B	ND	----	0.500	ug/l	1x	8060067	06/03/08 07:00	06/03/08 11:24	
1,2-Dichloroethane	"	ND	----	0.500	"	"	"	"	"	
Benzene	"	ND	----	0.200	"	"	"	"	"	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	----	2.00	"	"	"	"	"	
Naphthalene	"	ND	----	2.00	"	"	"	"	"	
1,2,4-Trimethylbenzene	"	ND	----	1.00	"	"	"	"	"	
1,3,5-Trimethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Isopropylbenzene	"	ND	----	2.00	"	"	"	"	"	
n-Propylbenzene	"	ND	----	0.500	"	"	"	"	"	
Surrogate(s):	*4-BFB*			*99.0%*		*80 - 120 %*	"			"
	1,2-DCA-d4			*104%*		*80 - 120 %*	"			"
	Dibromofluoromethane			*102%*		*80 - 120 %*	"			"
	Toluene-d8			*102%*		*80 - 120 %*	"			"

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Darrell W. Auvil

Darrell Auvil, Project Manager

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PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	06/13/08 13:48

Selected Volatile Organic Compounds (Including BTEX) per EPA Method 8260B

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PRE1069-03 (MW-2)			**Water**			**Sampled: 05/29/08 07:05**				
1,2-Dibromoethane	EPA 8260B	ND	-----	0.500	ug/l	1x	8060067	06/03/08 07:00	06/03/08 11:51	
1,2-Dichloroethane	"	ND	-----	0.500	"	"	"	"	"	
Benzene	"	ND	-----	0.200	"	"	"	"	"	
Toluene	"	ND	-----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	2.00	"	"	"	"	"	
Naphthalene	"	ND	-----	2.00	"	"	"	"	"	
1,2,4-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
1,3,5-Trimethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Isopropylbenzene	"	ND	-----	2.00	"	"	"	"	"	
n-Propylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Surrogate(s): *4-BFB*				*99.0%*		*80 - 120 %*	"			"
1,2-DCA-d4				*104%*		*80 - 120 %*	"			"
Dibromofluoromethane				*103%*		*80 - 120 %*	"			"
Toluene-d8				*103%*		*80 - 120 %*	"			"
PRE1069-04 (MW-3)			**Water**			**Sampled: 05/29/08 08:15**				
1,2-Dibromoethane	EPA 8260B	ND	-----	0.500	ug/l	1x	8060067	06/03/08 07:00	06/03/08 12:17	
1,2-Dichloroethane	"	ND	-----	0.500	"	"	"	"	"	
Benzene	"	**100**	-----	0.200	"	"	"	"	"	
Toluene	"	**0.580**	-----	0.500	"	"	"	"	"	
Ethylbenzene	"	**1.93**	-----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	2.00	"	"	"	"	"	
Naphthalene	"	ND	-----	2.00	"	"	"	"	"	
1,2,4-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
1,3,5-Trimethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Isopropylbenzene	"	**41.6**	-----	2.00	"	"	"	"	"	
n-Propylbenzene	"	**84.0**	-----	0.500	"	"	"	"	"	
Surrogate(s): *4-BFB*				*99.0%*		*80 - 120 %*	"			"
1,2-DCA-d4				*104%*		*80 - 120 %*	"			"
Dibromofluoromethane				*106%*		*80 - 120 %*	"			"
Toluene-d8				*104%*		*80 - 120 %*	"			"

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Darrell Auvil, Project Manager

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	06/13/08 13:48

Polynuclear Aromatic Compounds per EPA 8270M-SIM

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PRE1069-04 (MW-3)			**Water**			**Sampled: 05/29/08 08:15**				
Acenaphthene	EPA 8270m	ND	----	0.0952	ug/l	1x	8060090	06/03/08 14:35	06/09/08 23:27	
Acenaphthylene	"	ND	----	0.0952	"	"	"	"	"	
Anthracene	"	ND	----	0.0952	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.0952	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.0952	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.0952	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.0952	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.0952	"	"	"	"	"	
Chrysene	"	ND	----	0.0952	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.190	"	"	"	"	"	
Fluoranthene	"	ND	----	0.0952	"	"	"	"	"	
Fluorene	"	ND	----	0.0952	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.0952	"	"	"	"	"	
Naphthalene	"	**0.525**	----	0.0952	"	"	"	"	"	
Phenanthrene	"	ND	----	0.0952	"	"	"	"	"	
Pyrene	"	ND	----	0.0952	"	"	"	"	"	
Surrogate(s): Fluorene-d10				*74.7%*		*25 - 125 %*	"			"
Pyrene-d10				*88.2%*		*23 - 150 %*	"			"
Benzo (a) pyrene-d12				*75.8%*		*10 - 125 %*	"			"

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31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	06/13/08 13:48

Gasoline Hydrocarbons per NW TPH-Gx Method - Laboratory Quality Control Results

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QC Batch: 8060086 **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8060086-BLK1)								Extracted: 06/03/08 11:26						
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	---	80.0	ug/l	1x	--	--	--	--	--	--	06/03/08 13:24	
Surrogate(s): 4-BFB		*Recovery: 96.6%*			*Limits: 50-150%*	"							*06/03/08 13:24*	
LCS (8060086-BS1)								Extracted: 06/03/08 11:26						
Gasoline Range Hydrocarbons	NW TPH-Gx	505	---	80.0	ug/l	1x	--	500	101%	(70-130)	--	--	06/03/08 12:29	
Surrogate(s): 4-BFB		*Recovery: 109%*			*Limits: 50-150%*	"							*06/03/08 12:29*	
LCS Dup (8060086-BSD1)								Extracted: 06/03/08 11:26						
Gasoline Range Hydrocarbons	NW TPH-Gx	531	---	80.0	ug/l	1x	--	500	106%	(70-130)	5.07%	(35)	06/03/08 12:56	
Surrogate(s): 4-BFB		*Recovery: 111%*			*Limits: 50-150%*	"							*06/03/08 12:56*	
Duplicate (8060086-DUP1)							QC Source: PRF0017-05	Extracted: 06/03/08 11:26						
Gasoline Range Hydrocarbons	NW TPH-Gx	704	---	80.0	ug/l	1x	600	--	--	--	16.0%	(35)	06/03/08 15:42	Q8
Surrogate(s): 4-BFB		*Recovery: 109%*			*Limits: 50-150%*	"							*06/03/08 15:42*	
Duplicate (8060086-DUP2)							QC Source: PRF0017-09	Extracted: 06/03/08 11:26						
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	---	80.0	ug/l	1x	ND	--	--	--	4.59%	(35)	06/03/08 17:32	
Surrogate(s): 4-BFB		*Recovery: 98.0%*			*Limits: 50-150%*	"							*06/03/08 17:32*	

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31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	06/13/08 13:48

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8060066 **Water Preparation Method: EPA 3510 Fuels**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8060066-BLK1)								Extracted: 06/03/08 15:00						
Diesel Range Organics	NWTPH-Dx	ND	---	0.250	mg/l	1x	--	--	--	--	--	--	06/04/08 07:19	
Heavy Oil Range Hydrocarbons	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 80.9%*			*Limits: 50-150%*	"							*06/04/08 07:19*	
LCS (8060066-BS1)								Extracted: 06/03/08 15:00						
Diesel Range Organics	NWTPH-Dx	2.34	---	0.250	mg/l	1x	--	2.50	93.5%	(50-150)	--	--	06/04/08 07:34	
Heavy Oil Range Hydrocarbons	"	1.61	---	0.500	"	"	--	1.51	107%	"	--	--	"	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 93.5%*			*Limits: 50-150%*	"							*06/04/08 07:34*	
LCS Dup (8060066-BSD1)								Extracted: 06/03/08 15:00						
Diesel Range Organics	NWTPH-Dx	2.28	---	0.250	mg/l	1x	--	2.50	91.2%	(50-150)	2.50%	(35)	06/04/08 07:53	
Heavy Oil Range Hydrocarbons	"	1.54	---	0.500	"	"	--	1.51	102%	"	4.70%	"	"	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 95.9%*			*Limits: 50-150%*	"							*06/04/08 07:53*	

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31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	06/13/08 13:48

Selected Volatile Organic Compounds (Including BTEX) per EPA Method 8260B - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8060067 **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8060067-BLK1)								Extracted: 06/03/08 07:00						
1,2-Dibromoethane	EPA 8260B	ND	---	0.500	ug/l	1x	--	--	--	--	--	--	06/03/08 10:04	
1,2-Dichloroethane	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Benzene	"	ND	---	0.200	"	"	--	--	--	--	--	--	"	
Toluene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Ethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Xylenes (total)	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
Methyl tert-butyl ether	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
Naphthalene	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
1,2,4-Trimethylbenzene	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
1,3,5-Trimethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Isopropylbenzene	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
n-Propylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Surrogate(s): 4-BFB		*Recovery: 95.7%*			*Limits: 80-120%*	"							*06/03/08 10:04*	
1,2-DCA-d4		*96.9%*			*80-120%*	"							"	
Dibromofluoromethane		*96.0%*			*80-120%*	"							"	
Toluene-d8		*99.4%*			*80-120%*	"							"	
LCS (8060067-BS1)								Extracted: 06/03/08 07:00						
1,2-Dibromoethane	EPA 8260B	21.4	---	0.500	ug/l	1x	--	20.0	107%	(80-140)	--	--	06/03/08 08:43	
1,2-Dichloroethane	"	20.3	---	0.500	"	"	--	"	101%	(75-135)	--	--	"	
Benzene	"	19.8	---	0.200	"	"	--	"	99.2%	(80-120)	--	--	"	
Toluene	"	21.5	---	0.500	"	"	--	"	107%	(80-125)	--	--	"	
Ethylbenzene	"	21.1	---	0.500	"	"	--	"	106%	(80-130)	--	--	"	
Xylenes (total)	"	66.6	---	1.00	"	"	--	60.0	111%	"	--	--	"	
Methyl tert-butyl ether	"	19.8	---	2.00	"	"	--	20.0	99.0%	(80-135)	--	--	"	
Naphthalene	"	21.4	---	2.00	"	"	--	"	107%	(60-150)	--	--	"	
1,2,4-Trimethylbenzene	"	19.2	---	1.00	"	"	--	"	95.8%	(75-125)	--	--	"	
1,3,5-Trimethylbenzene	"	20.8	---	0.500	"	"	--	"	104%	(75-135)	--	--	"	
Isopropylbenzene	"	22.1	---	2.00	"	"	--	"	111%	(80-140)	--	--	"	
n-Propylbenzene	"	22.2	---	0.500	"	"	--	"	111%	(80-130)	--	--	"	
Surrogate(s): 4-BFB		*Recovery: 102%*			*Limits: 80-120%*	"							*06/03/08 08:43*	
1,2-DCA-d4		*98.7%*			*80-120%*	"							"	
Dibromofluoromethane		*98.8%*			*80-120%*	"							"	
Toluene-d8		*104%*			*80-120%*	"							"	

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31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	06/13/08 13:48

Selected Volatile Organic Compounds (Including BTEX) per EPA Method 8260B - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8060067 **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
LCS Dup (8060067-BSD1)							**Extracted: 06/03/08 07:00**							
1,2-Dibromoethane	EPA 8260B	20.4	---	0.500	ug/l	1x	--	20.0	102%	(80-140)	4.40%	(25)	06/03/08 09:10	
1,2-Dichloroethane	"	19.3	---	0.500	"	"	--	"	96.4%	(75-135)	5.11%	"	"	
Benzene	"	19.1	---	0.200	"	"	--	"	95.7%	(80-120)	3.64%	"	"	
Toluene	"	20.2	---	0.500	"	"	--	"	101%	(80-125)	5.85%	"	"	
Ethylbenzene	"	19.4	---	0.500	"	"	--	"	97.0%	(80-130)	8.40%	"	"	
Xylenes (total)	"	60.5	---	1.00	"	"	--	60.0	101%	"	9.62%	"	"	
Methyl tert-butyl ether	"	20.0	---	2.00	"	"	--	20.0	99.9%	(80-135)	0.955%	"	"	
Naphthalene	"	21.3	---	2.00	"	"	--	"	107%	(60-150)	0.188%	"	"	
1,2,4-Trimethylbenzene	"	17.8	---	1.00	"	"	--	"	88.8%	(75-125)	7.48%	"	"	
1,3,5-Trimethylbenzene	"	19.2	---	0.500	"	"	--	"	95.8%	(75-135)	8.11%	"	"	
Isopropylbenzene	"	20.4	---	2.00	"	"	--	"	102%	(80-140)	8.19%	"	"	
n-Propylbenzene	"	20.3	---	0.500	"	"	--	"	102%	(80-130)	8.71%	"	"	
Surrogate(s):	*4-BFB*	*Recovery:*	*102%*		*Limits:*	*80-120%*	"						*06 03 08 09:10*	
	1,2-DCA-d4		*101%*			*80-120%*	"						"	
	Dibromofluoromethane		*101%*			*80-120%*	"						"	
	Toluene-d8		*105%*			*80-120%*	"						"	

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31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	06/13/08 13:48

Polynuclear Aromatic Compounds per EPA 8270M-SIM - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8060090 **Water Preparation Method: 3520B Liq-Liq**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8060090-BLK1)								Extracted: 06/03/08 14:35						
Acenaphthene	EPA 8270m	ND	---	0.100	ug/l	1x	--	--	--	--	--	--	06/06/08 20:16	
Acenaphthylene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Anthracene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (a) anthracene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (a) pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (b) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (ghi) perylene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (k) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Chrysene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Dibenzo (a,h) anthracene	"	ND	---	0.200	"	"	--	--	--	--	--	--	"	
Fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Fluorene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Indeno (1,2,3-cd) pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Naphthalene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Phenanthrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Surrogate(s): Fluorene-d10		*Recovery: 88.9%*			*Limits: 25-125%*	"							*06/06/08 20:16*	
Pyrene-d10		*96.9%*			*23-150%*	"							"	
Benzo (a) pyrene-d12		*81.4%*			*10-125%*	"							"	
LCS (8060090-BS1)								Extracted: 06/03/08 14:35						
Acenaphthene	EPA 8270m	2.55	---	0.100	ug/l	1x	--	2.50	102%	(26-135)	--	--	06/06/08 20:49	
Benzo (a) pyrene	"	2.41	---	0.100	"	"	--	"	96.2%	(38-137)	--	--	"	
Pyrene	"	2.73	---	0.100	"	"	--	"	109%	(33-133)	--	--	"	
Surrogate(s): Fluorene-d10		*Recovery: 83.2%*			*Limits: 25-125%*	"							*06/06/08 20:49*	
Pyrene-d10		*87.1%*			*23-150%*	"							"	
Benzo (a) pyrene-d12		*81.1%*			*10-125%*	"							"	
Matrix Spike (8060090-MS1)					QC Source: PRF0034-05			Extracted: 06/03/08 14:35						
Acenaphthene	EPA 8270m	2.36	---	0.100	ug/l	1x	ND	2.50	94.6%	(26-135)	--	--	06/06/08 21:22	
Benzo (a) pyrene	"	2.24	---	0.100	"	"	ND	"	89.5%	(38-137)	--	--	"	
Pyrene	"	2.65	---	0.100	"	"	ND	"	106%	(33-133)	--	--	"	
Surrogate(s): Fluorene-d10		*Recovery: 75.2%*			*Limits: 25-125%*	"							*06/06/08 21:22*	
Pyrene-d10		*82.2%*			*23-150%*	"							"	
Benzo (a) pyrene-d12		*69.7%*			*10-125%*	"							"	

TestAmerica Portland

Darrell W. Auvil

Darrell Auvil, Project Manager

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THE LEADER IN ENVIRONMENTAL TESTING

PORTLAND, OR 9405 S.W. NIMBUS AVENUE
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ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	06/13/08 13:48

Polynuclear Aromatic Compounds per EPA 8270M-SIM - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8060090 **Water Preparation Method: 3520B Liq-Liq**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Matrix Spike Dup (8060090-MSD1)					QC Source: PRF0034-05			Extracted: 06/03/08 14:35						
Acenaphthene	EPA 8270m	2.47	---	0.100	ug/l	1x	ND	2.50	98.9%	(26-135)	4.47%	(60)	06/06/08 21:55	
Benzo (a) pyrene	"	2.38	---	0.100	"	"	ND	"	95.2%	(38-137)	6.16%	"	"	
Pyrene	"	2.76	---	0.100	"	"	ND	"	111%	(33-133)	4.07%	"	"	
Surrogate(s): Fluorene-d10		*Recovery: 79.4%*			*Limits: 25-125%*	"							*06/06/08 21:55*	
Pyrene-d10		*86.8%*			*23-150%*	"							"	
Benzo (a) pyrene-d12		*74.9%*			*10-125%*	"							"	

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31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	06/13/08 13:48

Notes and Definitions

Report Specific Notes:

Q8	-	Detected hydrocarbons in the gasoline range appear to be due to overlap of diesel range hydrocarbons.
Q9	-	Hydrocarbon pattern most closely resembles a heavy gas/light diesel range component.
ZX	-	Due to sample matrix effects, the surrogate recovery was outside the acceptance limits.

Laboratory Reporting Conventions:

DET	-	Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.
ND	-	Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).
NR/NA	-	Not Reported / Not Available
dry	-	Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight.
wet	-	Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis.
RPD	-	RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries).
MRL	-	METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.
MDL*	-	METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results.
Dil	-	Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
Reporting Limits	-	Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.
Electronic Signature	-	Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy.* Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Darrell W. Auvil

Darrell Auvil, Project Manager

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2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #: PRE1069

CLIENT: RSV Engineering Inc.

REPORT TO: Brad Bergsrud

ADDRESS: 31960 SW Charbonneau Dr. #101, Wilsonville, OR 97070

PHONE: 694-6960 FAX: 694-6962

INVOICE TO: SAME

P.O. NUMBER:

PROJECT NAME: Niemi Hiway Service

PROJECT NUMBER: 03-135

SAMPLED BY: Dan Becraft

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: [X] STD. [7] [5] [4] [3] [2] [1] [<1]

Petroleum Hydrocarbon Analyses: [X] STD. [4] [3] [2] [1] [<1]

[OTHER] Specify

* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE	REQUESTED ANALYSES: TPH-1 6x	TPH-DX	VOC 8260	PAHs 8270	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	MW-4	5/29/08 / 5:40 PM		X	X	X		W	4		
2	MW-1	/ 6:15		X	X	X		W	4		
3	MW-2	/ 7:05		X	X	X		W	4		
4	MW-3	/ 8:15		X	X	X	X	W	6		
5											
6											
7											
8											
9											
10											

RELEASED BY: Daniel E. Becraft DATE: 5/30/08

PRINT NAME: Daniel Becraft FIRM: RSV Engs. TIME: 1715

RECEIVED BY: Peggy Sieffried DATE: 5/30/08

PRINT NAME: Peggy Sieffried FIRM: TAP TIME: 1715

RELEASED BY: DATE:

PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:

PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

8260 VOCs to include: BTEX, EDB, EDC, MTBE, isopropylbenzene, n-propylbenzene, 1,2,4-TMB, 1,3,5-TMB, and naphthalene.

TEMP: 5.2

PAGE 1 OF 1

TAL-10000108)

TestAmerica Sample Receipt Checklist

Received by: (section A) Date: 5/30/08 Time: 2:15 Initials: —

Unpacked by: (section B) Date: 5/30/08 Initials: [illegible]

Logged-in by: Date: 5/30/08 Initials: JT

Work Order No. PRE1069

Client: RSV Engineering Inc.

Project: Niemi Hiway Service

Temperature out of range:

___Not enough Ice
___*No Ice*
___*Ice Melted*
___*Win 4 Hours*
___*Other:*_____

***ESI Clients *(see Section C)*

Cooler Temperature (IR): 5.2 °C plastic glass NA *(oil/air OR ESI client)* Temperature Blank: 5.1 °C DIGI #1 #2

A

Custody Seals: (#___)

Signature: Y N Dated:_____

X None

Container Type:

1 #Cooler(s)

___#Box(s)

___None (___#Other:_____)

Coolant Type:

___Gel/ Blue Ice

X Loose Ice

___None

Packing Material:

X Bubble Bags

X Styrofoam Cubbies

___Peanuts

___None (___Other:_____)

Received from:

___TA Courier
___Senvoy
___UPS
___Fed Ex
X Client
___TDP
___USPS
___SDS
___Mid-Valley
___GS/TA
___GS/Senvoy
___Other:

_____

B

Sample Status:

(If N circled, see NOD)

General:			
Intact?	Y	N	
# Containers Match COC?	Y	N	none given
IDs Match COC?	Y	N	
For Analyses Requested:			
Cyanide checked?	Y	N	NA
Correct Type & Preservation?	Y	N	
Adequate Volume?	Y	N	
Within Hold Time?	Y	N	
Volatiles/ Oil Quality:			
VOAs/ Syringes free of Headspace?	Y	N	NA
TB on COC? not provided	Y	N	NA
Metals:			
HNO3 Preserved?	Y	N	NA
Dissolved Metals Filtered?	Y	N	NA

C

***ESI Clients Only:

Temperature Blank: _____ °C not provided DIGI #1 #2

All preserved bottles checked Y N NA *(voas/soils/all unp.)*

All preserved accordingly? Y N *(see NOD)* NA *(voas/soils/all unp.)*

FED EX/ UPS: Was the tracking paper keepable? YES NO

If circled NO, what is the Tracking number? _____

FED EX Goldstreak UPS DHL Other: _____

Project Managers:

Comments: _____

PM Reviewed: _____ *(Initial/Date)*

FIRST QUARTER 2008
HIWAY SERVICE 76 STATION
1308 MARINE DRIVE
ASTORIA, OREGON

DEQ File No. 04-99-1193

March 13, 2008

Prepared For:

Niemi Oil Company, Inc.
Etu, Inc.
P.O. Box 989
Astoria, Oregon 97103

Prepared By:

RSV Engineering, Inc.
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Wilsonville, Oregon 97070
(503) 694.6960

RSV Project No. 03-135

FIRST QUARTER 2008
HIWAY SERVICE 76 STATION
1308 MARINE DRIVE
ASTORIA, OREGON

RSV Engineering, Inc. is submitting this First Quarter 2008 Groundwater Monitoring Report on behalf of the Niemi Oil Company to document work performed at the Hiway Service 76 Service Station site located at 1308 Marine Drive in Astoria, Oregon. The report was prepared in conformance with RSV Engineering's quality assurance/quality control procedures to ensure that the report meets industry standards in terms of the methods used and the information presented. If you have any questions or comments concerning this report, please contact one of the individuals listed below.

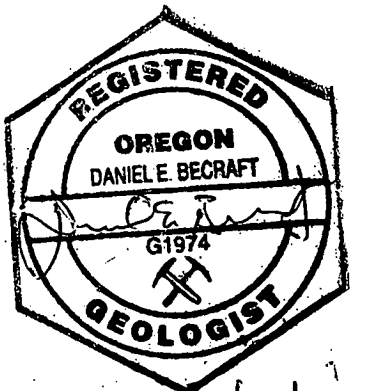
Respectfully submitted,

RSV ENGINEERING INC.

Daniel E. Becraft, R.G.
Project Geologist

Brad J. Berggren, P.E., R.G.
Vice President

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED
MAR 17 2008
NORTHWEST REGION



EXPIRES: 4/30/08

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NIEMI OIL COMPANY
FIRST QUARTER 2008
HIWAY SERVICE 76 STATION
1308 MARINE DRIVE
ASTORIA, OREGON

INTRODUCTION

This report summarizes the activities and results of the first quarter 2008 quarterly groundwater monitoring conducted on January 31, 2008 by RSV Engineering, Inc. (RSV) at the Niemi Oil Company Hiway Service 76 Station located at 1308 Marine Drive in Astoria, Oregon (Figure 1). In addition, this report presents the current and reasonably likely future land use and beneficial water use determinations requested by the Oregon Department of Environmental Quality (DEQ) in a January 31, 2008 electronic mail. The analytical results from the first quarter 2008 are consistent with the initial sampling results following monitoring well installations in October 2007.

Soil and groundwater investigation activities have been conducted at the site to define the nature and extent of petroleum hydrocarbons associated with a release from a 550-gallon waste-oil tank decommissioned in 1999 (Figure 2). DEQ has listed the site as a Leaking Underground Storage Tank (LUST) site with File Number 04-99-1193.

In October 2007, four monitoring wells were installed and groundwater samples collected for analysis as requested by DEQ in a September 23, 2005 letter responding to a Niemi Oil Company (Niemi) request for a "No Further Action" (NFA) determination for the site. Niemi's request for site closure was based on the results of direct-push soil and groundwater investigations conducted at the site in 2003 and 2004. The soil and groundwater analytical results from site investigations were compared to Risk-Based Concentrations (RBCs) in accordance with Oregon Administrative Rule (OAR) 340-122-0244. The following investigation results formed the basis of the 2005 NFA request.

1) Contamination at the site is limited to petroleum based constituents.
2) Petroleum-related hazardous constituents identified at the site are listed in the DEQ Appendix A Table of RBCs.

3) The site is zoned commercial and the current and future planned use of the site is as a gasoline and service station. The only RBC exceedances for applicable potential exposure pathways were ingestion, inhalation, and dermal contact for soils impacted with TPH-Oil, and migration to groundwater from soils impacted with TPH-Oil and metals in the vicinity of the former location of the waste-oil UST. However, the soil exceeding the ingestion, inhalation, and dermal contact exposure pathway is 6 ft or more below ground surface, and deeper than the 3-ft depth considered reasonable for occupational workers per DEQ guidance. No site development is expected or planned in the future, and exposure to the impacted soils is unlikely.
4) Groundwater samples did not reveal exceedances of DEQ Appendix A or site-specific RBCs for applicable potential exposure pathways identified for the site (i.e., Volatilization to Outdoor Air, Vapor Intrusion into Buildings, or Groundwater in an Excavation for Occupational, Construction worker or Excavation worker pathways).

In its September 23, 2005 letter, DEQ acknowledged that the petroleum hydrocarbon concentrations detected in soil and groundwater samples collected from the Hiway Service site meet the criteria for site closure. DEQ, however, expressed concern that gasoline-range hydrocarbons detected in downgradient groundwater grab samples in October 2004 might indicate a release from the active UST fueling system in addition to the known release from the decommissioned waste-oil UST. Therefore, DEQ requested groundwater monitoring wells be installed in accordance with OAR 340-122-0240.

The 2007 monitoring well installation activities and associated groundwater sampling results were evaluated in a report submitted to DEQ in December 2007. The results of the site investigation and first quarterly groundwater monitoring event do not indicate a release from the active UST fueling system. In addition, the results indicate that, although relatively low concentrations of gasoline-range hydrocarbons (i.e., below applicable RBCs) were detected in groundwater downgradient of the former used-oil UST in October 2004, those concentrations have attenuated below reporting limits with time, and are not indicative of an ongoing release.

The recent groundwater analytical data further indicate that petroleum hydrocarbons are limited to the vicinity of the former 550-gallon waste-oil UST cavity, and at relatively low concentrations. Consistent with the analytical results for all soil and groundwater samples collected during this and previous site investigations associated with the Hiway Service site, the detected concentrations do not exceed applicable RBCs.

The four monitoring wells will be sampled again during the second and third quarters of 2008 such that trends in groundwater quality and flow can be established. After one year of groundwater monitoring is completed, Niemi will again submit an NFA request to DEQ, if appropriate, based on the groundwater monitoring results.

BACKGROUND

The Hiway Service site is an active 76 Service Station. There are three registered fuel product USTs located at the site, two 4,000-gallon gasoline USTs and one 1,500-gallon gasoline UST.

On October 18, 1999, a 550-gallon used-oil UST was removed from the site near the northeast corner of the station building (Figure 2). At that time, petroleum product odor and staining were noted in the soils from the used-oil UST excavation. Two soil samples were collected from the bottom of the UST excavation from a depth of 6ft and analyzed for Total Petroleum Hydrocarbon–Hydrocarbon Identification (TPH-HCID), with both diesel and heavy oil detected in both samples. Follow-up analyses for TPH in the diesel and heavy oil ranges detected only heavy oil to a maximum concentration of 78,000 mg/kg. TPH in the diesel range was not detected in either sample. The soil contamination was reported to the DEQ on October 21, 1999.

Previous Investigations

On September 29, 2003 a magnetometer/ground penetrating radar (GPR) survey was performed by GeoPotential, Inc. of Gresham, Oregon to locate in-use and previously

abandoned underground storage tanks (USTs) beneath the site. Three USTs, all of which are in use, were located in the northwest central part of the site. The number of the detected tanks is consistent with the number of tanks currently registered for the site, and no other USTs were detected during the geophysical survey.

RSV conducted an initial soil and groundwater investigation at the site in October 2003. Laboratory analytical results indicated relatively low concentrations of petroleum related compounds in soil and groundwater beneath the site (RSV 2004). A Site Characterization Report was submitted to DEQ in February 2004, and in April 2004, DEQ requested additional site characterization work to better define the extent of petroleum hydrocarbons.

In October 2004, RSV completed three soil borings to further assess the extent of petroleum hydrocarbons associated with the former used-oil UST. Boring B-7 was completed adjacent to the former location of the used-oil UST, and Borings B-8 and B-9 were completed to the north and hydraulically downgradient of the former waste-oil UST area (Figure 2).

Analysis of samples collected from Soil Boring B-7 revealed detections of petroleum constituents in soil and groundwater consistent with a release from a used-oil tank. Groundwater samples collected from Soil Borings B-8 and B-9, completed downgradient of the former waste-oil UST area, revealed relatively low detections of several petroleum-related compounds more typically associated with gasoline (RSV, 2005).

A conceptual site model was developed and potential occupational exposure routes were considered for employees and workers at the site based on the current and expected future commercial use of the site. The potential pathways associated with the conceptual site model include direct contact with soil, dermal absorption and inhalation of volatiles, inhalation of chemicals volatilized into outdoor air, inhalation of chemicals volatilized into buildings, and leaching to groundwater. Ingestion of groundwater was excluded as a potential pathway at the site, as described in the beneficial water determination presented later in this report.

The only RBC exceedances in soils for applicable occupational exposure pathways were for soils in or near the former waste-oil UST excavation. However, the soils with concentrations exceeding applicable RBCs were encountered at depths greater than 3 feet below ground surface, or below the depth considered to present reasonable exposure scenarios for occupational workers (DEQ, 2003). RBCs were exceeded for soil ingestion, inhalation, and dermal contact for employees and construction and excavation workers for TPH-Oil, and migration to groundwater from soils for TPH-Oil and metals near the former UST tank pit. Exposure to soil exceeding the ingestion, inhalation, and dermal contact exposure pathway for construction and excavation workers is not reasonably likely since the soil exceedances were from a depth of 6 feet or more, the current and planned future use of the site is as a gasoline and service station, and no site development activities are expected or planned in the future.

RSV calculated site-specific soil and groundwater RBCs for TPH-Oil using DEQ's RBC computer spreadsheet (DEQ, 2003a). The calculation assumed that all of the TPH detected in soil samples at the site were within the range that yields the most conservative site-specific RBC (RSV, 2004). In its September 23, 2005 letter, DEQ presented TPH-Oil RBCs that DEQ had calculated using site specific TPH and constituent concentration data for soil samples collected from the former waste-oil UST area. As DEQ indicated in their letter, the site specific RBCs calculated by DEQ indicate that remaining heavy oil concentrations at the Hiway Service site are within the applicable cleanup standards.

With respect to leaching to groundwater RBC exceedances, ingestion and inhalation of groundwater is not considered an applicable exposure pathway at the site.

Groundwater Monitoring Wells MW-1 through MW-4 were installed during October 2007 and groundwater samples collected for laboratory analysis. The groundwater analytical data from the monitoring wells indicate that petroleum hydrocarbons are limited to Monitoring Well MW-3 and the vicinity of the former 550-gallon waste-oil UST cavity, and at relatively low concentrations. Metals (cadmium, chromium, and lead) were not detected above reporting limits in any groundwater sample.

Consistent with the analytical results for all soil and groundwater samples collected during this and previous site investigations associated with the Hiway Service site, the detected concentrations do not exceed applicable occupational RBCs.

Physical Setting and Local Geology

The Hiway Service site is located approximately 550 ft south of the Columbia River. A bedrock high is located approximately one-half mile to the south of the site. Floodplain sediments in the vicinity of the Columbia River in this part of Astoria generally consist of primarily sands and gravels with minor amounts of clay. Underlying unconsolidated sediments in the area is the Astoria Formation, which is characterized by an upper sandstone unit of Miocene age, a middle shale unit, and a lower sandstone unit. According to the Hiway Service station manager, depth to bedrock encountered during geotechnical borings completed at an adjacent site south and across Marine Drive from the Hiway Service site indicated bedrock occurs approximately 28 ft bgs.

Shallow soils in the vicinity of the site have been mapped as Walluski Silt Loam. The Walluski Silt Loam is typically moderately well drained and has a slow permeability. A typical profile consists of 14 inches of very dark grayish brown silt loam, 7 inches of dark brown silt loam, and 39 inches of dark yellowish brown, yellowish brown, and light brownish gray, mottled silty clay loam.

At the Hiway Service property, there is a sharp ground surface elevation difference of approximately 10 feet between the northern portion of the property in the vicinity of Borings B-8 and B-9, due to a retaining wall behind the storage shed constructed on the north side of the station building (Figure 2). Fill material was placed on the south side of the retaining wall to build up the property such that the Service Station could be constructed.

Shallow soils at the site vary and include sand (MW-2), silty sand (MW-1), and silty clayey gravel (MW-3). The proximity of Monitoring Wells MW-2 and MW-3 to the

retaining wall, as well as, glass and metal fragments observed from the depth of 8 ft in Boring MW-2, indicate the shallow soils in these borings is fill material.

Beneath the site fill, sand was encountered in Borings MW-2 and MW-3, and sand and silty sand in Boring MW-1, until silty clayey gravel was encountered in each boring at the depths of and 18 ft. (MW-1), 22.5 ft (MW-2), and 19.5 ft (MW-3) below ground surface. The driller reported the gravel was relatively difficult drilling, and it was this gravel that had caused direct-push (i.e., Geoprobe) refusal in some borings during previous site investigations. In addition, where the water table was encountered within the clayey gravel, a water sample was not always obtained due to the low yield of the strata. Only sand was encountered in Boring MW-4.

Groundwater was encountered at depths ranging from approximately 6.5' ft (MW-4) to 18.5 ft (MW-1, MW-2, and MW-3) below ground surface. This approximately 12-ft difference in depths to water is primarily attributable to ground surface elevation differences between the north and south side of the site retaining wall.

The direction of groundwater flow is predominantly towards the north. This groundwater flow direction was anticipated and is consistent with the topography of the site area and location of the Columbia River relative to the site.

QUARTERLY GROUNDWATER MONITORING METHODS

The scope of work for the first quarter 2008 groundwater-monitoring event is summarized below.

1. Measure the depths to groundwater in Monitoring Wells MW-1 through MW-4 to the nearest 0.01 foot and check the groundwater surface in the monitoring wells for free (floating) product.

2. Purge at least three well volumes of water from each well and collect temperature, pH, specific conductance, and ORP measurements.

3. Obtain groundwater samples from Monitoring Wells MW-1 through MW-4 for laboratory analysis of volatile organic compounds (VOCs) including benzene, ethylbenzene, toluene, xylenes, isopropylbenzene, n-propylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane and 1,2-dibromoethane by U.S. Environmental Protection Agency (EPA) Method 8260, and TPH in the gasoline, diesel and heavy-oil ranges using Methods NWTPH-Gx and NWTPH-Dx. In addition, as requested by DEQ in a February 1, 2008 electronic mail, the groundwater sample obtained from Monitoring Well MW-3 was further analyzed for polycyclic aromatic hydrocarbons (PAHs) per EPA Method 8270.

Depths to groundwater were measured using an electronic water level indicator with accuracy of 0.01 foot. The electronic water level indicator was decontaminated prior to use in each well. Groundwater elevations were calculated by subtracting the depths to groundwater from the top of casing elevations. Groundwater was checked for the presence of floating product using disposable polyethylene (PE) bailers. A new bailer and rope were used to for each well. A minimum of three (3) well volumes of water were purged from the monitoring wells using a peristaltic pump. Groundwater samples for TPH and PAH analysis were collected using a peristaltic pump, while samples for VOC analysis were collected using a disposable bailer. Purge water was contained on-site in a 55-gallon labeled drum.

QUARTERLY GROUNDWATER MONITORING RESULTS

Depth to Groundwater

The depths to groundwater and groundwater elevations for this and previous quarterly groundwater monitoring events are summarized in Table 1. Groundwater elevations based on the January 31, 2008 measurements are shown in Figure 2. The following observations were made as part of depth to groundwater measurements.

- Depths to groundwater in monitoring wells ranged from 4.62 ft (MW-4) to 15.04 ft (MW-3) below the top of casing.

- Groundwater elevations ranged from 7.60 ft above mean sea level (MSL) (MW-1) to 6.53 ft MSL (MW-4).

- The direction of shallow groundwater flow beneath the site, based on the most recent quarterly groundwater elevation data from January 31, 2008 was toward the north. This groundwater flow direction is consistent with previously measured results, as well as, the topography of the site area and location of the Columbia River relative to the site.

Laboratory Analytical Results

Groundwater analytical data for the first quarter 2008 groundwater samples are summarized in Table 2. The laboratory report and chain-of-custody documentation are included in Appendix A.

As indicated in Table 2, petroleum hydrocarbons were not detected above reporting limits in groundwater samples from Monitoring Wells MW-1, MW-2, and MW-4. As with previous sampling results, the only sample with petroleum constituent detections above reporting limits is the sample from Monitoring Well MW-3, located near the former waste-oil UST cavity. In Sample MW-3, TPH in the gasoline and diesel ranges were detected at concentrations of 885 µg/l and 989 µg/l, respectively. In addition, TPH in the heavy-oil range was detected for the first time, and at a concentration of 615 µg/l.

The only VOCs detected were relatively low concentrations of benzene (2.24 µg/l) ethylbenzene (2.34 µg/l), isopropylbenzne (30 µg/l) and n-propylbenzne (48.9 µg/l). The only PAH detected is naphthalene at a concentration of 0.211 µg/l.

CURRENT AND REASONABLY LIKELY FUTURE LAND USE

As requested by DEQ in a February 1, 2008 electronic mail, the City of Astoria Zoning Map for the Hiway Service property and surrounding area is presented in Appendix B. The site is located within Block 149, as shown on the map. Review of the zoning map

indicates that Block 149, and all adjacent properties are located within an area with a zoning designation of C-3: General Commercial Zone.

The permitted uses of the C-3 zoning are also included in Appendix B. Review of the permitted uses indicates that in addition to commercial/occupational uses, multi-family dwellings (i.e., apartments, rowhouses, etc.), and single and multi-family dwellings located above or below commercial facilities on the first floor of the structure, are permitted uses for C-3 zoning.

Niemi does not currently plan to sell or redevelop the Hiway Service property, but rather continue the current use as a retail service station. It is not reasonably likely that the Niemi Hiway service property would be a cost-effective redevelopment as a stand-alone property when considering:

- The irregular shape and relatively small size of the Hiway Service parcel;
- The on-site retaining wall creates a sharp elevation difference and redevelopment would require substantial earthwork and new retaining walls or other foundation support; and,
- The costs of removing the service station infrastructure.

Therefore, future redevelopment of the Niemi parcel would likely also include redevelopment of adjacent parcels.

Information obtained from the City of Astoria Planning Department indicates that, although the City of Astoria Comprehensive Plan is being updated, the updates will not change the zoning from the current C-3 General Commercial designation for the Hiway Service site and surrounding properties.

In addition, considering that the City of Astoria is addressing ongoing landslide and slope stability issues for the residential zoned area on the opposite (south) side of Marine Drive from the site, a potential future developer would also likely have significant concern regarding the stability of property south of the site and the potential effect on a property redevelopment and/or future property value.

In conclusion, the current use of the Niemi Hiway Service property as a retail service station is expected to continue for the foreseeable future.

BENEFICIAL WATER USE DETERMINATION

DEQ has requested a beneficial water use determination for the Hiway Service site. The following sections provide a beneficial water use determination consistent with OAR 340-122-080(3)(f).

Locality of the Facility

Beneficial water use determinations are required for the "locality of the facility." DEQ defines the "locality of the facility" as "any point where a human or an ecological receptor contacts or is reasonably likely to come into contact with facility-related hazardous substances." When applying this definition to the Niemi Hiway Service site, and considering that:

- The site investigation data indicate that petroleum hydrocarbons are limited to the vicinity of the former 550-gallon waste-oil UST cavity; Petroleum concentrations in soil that exceed applicable RBCs are six feet below ground surface, and therefore below the depth considered to present reasonable exposure scenarios for occupational workers;
- Petroleum hydrocarbons associated with the Hiway Service site have not been detected in off-site groundwater samples collected at adjacent properties;
- Petroleum concentrations in groundwater are relatively low, and groundwater is not used as drinking water; and,
- DEQ has already acknowledged that petroleum concentrations at the site meet the criteria for site closure,

Site data indicate that there is no point where a human or ecological receptor is reasonably likely to come into contact with petroleum in the former waste oil UST location at the Hiway Service site. Nevertheless, for the purpose of completing the

beneficial water use determination, Niemi will use the Hiway Service property boundary as the locality of the facility.

Current and Future Uses of Water

The site and surrounding area receives its water supply from the City of Astoria. The City of Astoria receives an abundant water supply from the Astoria Reservoir.

The site is located in Township 8 North, Range 9 West, Section 9. A search for water supply wells was conducted from the well log query database available from the Oregon Department of Water Resources (ODWR). The ODWR database search included Township 8 North, Range 9 West, Sections 7 through 24. The Well Log Query Results for water supply wells in these sections are presented in Appendix B, along with the Water Well Report for each well identified as a water supply well.

Review of the Well Log Query Results indicates twelve water supply wells identified within the search area; however, review of the Water Well Reports indicates that only four of the twelve logs are truly water supply wells. Of the remaining wells incorrectly identified as being water supply wells, three wells (CLAT_287, CLAT_292, and CLAT_2657) are cathodic protection for Northwest Natural Gas facilities and each of these logs is stamped as "Not a Water Well", and five wells (CLAT_51810 through CLAT_51814) are abandoned groundwater monitoring wells.

The four wells correctly identified as water supply wells are all domestic wells located in Sections 21 (CLAT_293 and CLAT_51153), 23 (CLAT_51030), and 24 (CLAT_294), and each well is located over 1.5 miles from the Hiway Service site. No industrial or irrigation wells were identified by the query.

Review of the Well Log Reports indicates that the domestic wells are cased to depths between 20 and 30 ft below ground surface, with total completed depths ranging from 140 to 240 ft below ground surface, indicating deeper water sources than the shallow

water at the Hiway Service site. Review of Water Well Report CLAT-294, indicates that usable water was not encountered in that well.

Each of the wells identified as domestic supply wells are located on the south side of Coxcomb Hill, where the water shed drains toward the south-southwest and to the Young's River and Young's Bay (Figure 1). This flow direction is the opposite of shallow water flow at the Hiway Service site, which is located on the north side of Coxcomb Hill, where the water shed drains in the opposite direction toward the north to the Columbia River.

In addition, the shallow site hydrogeology at the Hiway Service site is not conducive for a water supply well. Clayey gravel was encountered between approximately 18 feet and 22.5 feet below ground surface. The water table has been encountered within the clayey gravel during investigations conducted during the end of the dry season (i.e., October) when groundwater elevation is at its lowest, and groundwater samples were not always successfully obtained from this low-yielding strata.

There are no surface water bodies within the locality of the Hiway Service site. Shallow groundwater from the site ultimately flows to the nearest surface water body, the Columbia River, located approximately 550 ft north of the site. The river is not within the locality of the Hiway Service site, and no aquatic, recreational, or aesthetic uses of the river are therefore affected. As noted above, petroleum hydrocarbons associated with the Hiway Service site have not been detected in off-site groundwater samples collected from downgradient property.

With regard to future water use, considering that the site and area are provided with a municipal water supply and the clayey gravel beneath the site does not readily yield water, future installation of a drinking water supply well in the site locality and surrounding area is not reasonably likely.

Results

The results of the beneficial water use determination indicate that there are no current or reasonably likely future beneficial uses of shallow groundwater at the Hiway Service site.

COMPARISON OF GROUNDWATER MONITORING ANALYTICAL RESULTS TO RISK-BASED CONCENTRATIONS

In Table 2, the groundwater analytical results are compared to applicable occupational RBCs associated with groundwater at the Hiway Service site. Review of the table indicates that no applicable occupational groundwater RBCs are exceeded by the relatively low petroleum concentrations detected in samples from Monitoring Well MW-3.

The current use of the Niemi Hiway Service property as a retail service station is expected to continue in the future. In addition, the relatively low petroleum concentrations detected in groundwater in the vicinity of the former waste oil tank is of limited extent and will likely attenuate with time. Although site redevelopment as a stand alone parcel is not reasonably likely in the future, the C-3 General Commercial zoning does permit apartments and rowhouses, uses consistent with the urban residential receptor. Review of Table 2 indicates that, even if the site were redeveloped in the future to include urban residential uses, the urban residential RBCs for volatilization to outdoor air or vapor intrusion into buildings are not exceeded.

SUMMARY

The first quarter 2008 groundwater monitoring event was conducted on January 31, 2008 as part of on-going quarterly groundwater monitoring conducted at the site as requested by DEQ. Results from the quarterly groundwater-monitoring event are summarized in Tables 1 and 2 of this report.

With regard to land use, the current use of the Niemi Hiway Service property as a retail service station is expected to continue for the foreseeable future.

The results of the beneficial water use determination indicate that there are no current or reasonably likely future beneficial uses of shallow groundwater at the Hiway Service site.

The most recent groundwater quality data from the monitoring wells at the site are generally consistent with the previous sampling round.

Consistent with the analytical results for all soil and groundwater samples collected during this and previous site investigations associated with the Hiway Service site, the detected concentrations do not exceed applicable occupational RBCs.

The next quarterly groundwater-sampling event is scheduled for May 2008.

REFERENCES

Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites.
Oregon Department of Environmental Quality, September 22, 2003.

Site Characterization Report.
RSV Engineering, Inc. February, 2004.

Additional Site Characterization Report.
RSV Engineering, Inc. May, 2005.

Additional Site Characterization Report.
RSV Engineering, Inc. December, 2007.

TABLES

Table 1
Summary of Groundwater Elevation Data
Niemi Oil Company
Hiway Service 76 Station
Astoria, Oregon

Monitoring Well Number[1]	Casing Elevation (feet)	Date Measured	Depth to Water[2] (feet)	Water Table Elevation[3] (feet)
MW-1	21.58	11/01/07	15.71	5.87
		11/27/07	15.49	6.09
		01/31/08	13.98	7.60
MW-2	21.97	11/01/07	16.88	5.09
		11/27/07	16.64	5.33
		01/31/08	14.61	7.36
MW-3	22.20	11/01/07	17.22	4.98
		11/27/07	17.04	5.16
		01/31/08	15.04	7.16
MW-4	11.15	11/01/07	6.88	4.27
		11/27/07	6.33	4.82
		01/31/08	4.62	6.53

Notes:
[1]Approximate locations of monitoring wells are shown on Figure 2.
[2]Depth to water measured from the top-of-casing rim.
[3]Water table elevation calculated by subtracting measured depth to water from the top-of-casing elevatio
Casing rim elevations were surveyed by Coast Surveying Inc. of Warrenton, OR.

TABLE 2
SUMMARY of GROUNDWATER ANALYTICAL DATA for PETROLEUM HYDROCARBONS
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

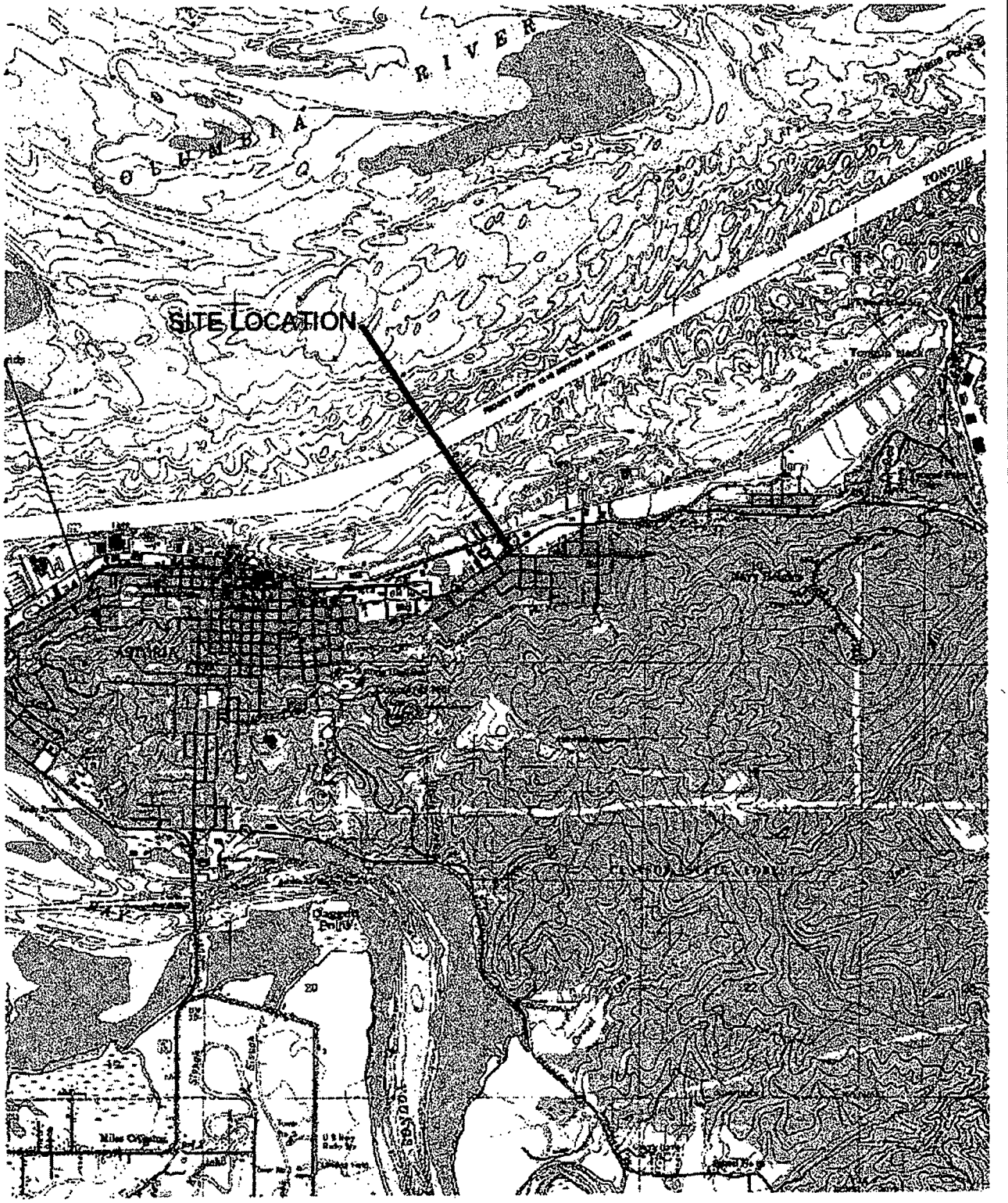
Groundwater Sample ID	Sample Date	Gasoline-range Petroleum Hydrocarbons (Method NWTPH-Gx) (µg/l)	Diesel- and Heavy Oil-range Petroleum Hydrocarbons (Method NWTPH-Dx) (µg/l)		Volatile Organic Compounds (EPA Method 8260B) (µg/l)											Detected PAHs (EPA Method 8270) (µg/l)
			Diesel-range	Oil-range	Benzene	1,2, Dibromoethane	1,2, Dichloroethane	Ethylbenzene	Methyl tert-butyl ether	Toluene	Xylenes	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Isopropylbenzene	n-propylbenzene	Naphthalene
MW-1	11/1/2007	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	---	---	---	---	---
	1/31/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
MW-2	11/1/2007	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	---	---	---	---	---
	1/31/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
MW-3	11/1/2007	**1,350**	**522**	ND<476	**31.9**	ND<1	ND<1	**19.6**	ND<1	**2.59**	**2.41**	---	---	---	---	---
	1/31/2008	**885**	**989**	**615**	**2.24**	ND<1	ND<1	**2.34**	ND<1	ND<1	ND<2	ND<2	ND<1	**30**	**48.9**	**0.211**
MW-4	11/1/2007	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	---	---	---	---	---
	1/31/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
Urban Residential RBCs for Vapor Intrusion into Buildings		-	-	-	340	87	460	-	70,000	-	59,000	4,300	3,200	-	11,000	29,000
Urban Residential RBCs for Volatilization to Outdoor Air		-	-	-	5,100	360	3,400	-	410,000	-	-	-	-	-	-	-
Occupational RBCs for Volatilization to Outdoor Air		-	-	-	13,000	960	9,000	-	1,100,0000	-	-	-	-	-	-	-
Occupational RBCs for Vapor Intrusion into Buildings		-	-	-	2,700	690	3,600	-	560,000	-	-	51,000	38,000	-	-	-
RBCs for Groundwater in Excavation for Construction and Excavation Workers		12,000	9,700	18,000	1,700	28	600	110,000	59,000	200,000	22,000	1,300	1,400	51,000	4,500	680

Notes:

mg/l - Milligrams per liter
µg/l - Micrograms per liter
ND - Not detected above reporting limits.
NV - No RBC value for this constituent.

RBCs - Generic Risk-Based Concentrations per DEQ Risk-Based Decision Making for Petroleum Contaminated Sites, Appendix A.
"-" Indicates that RBC exceeds solubility limit.
"---" Indicates sample not analyzed for this constituent.

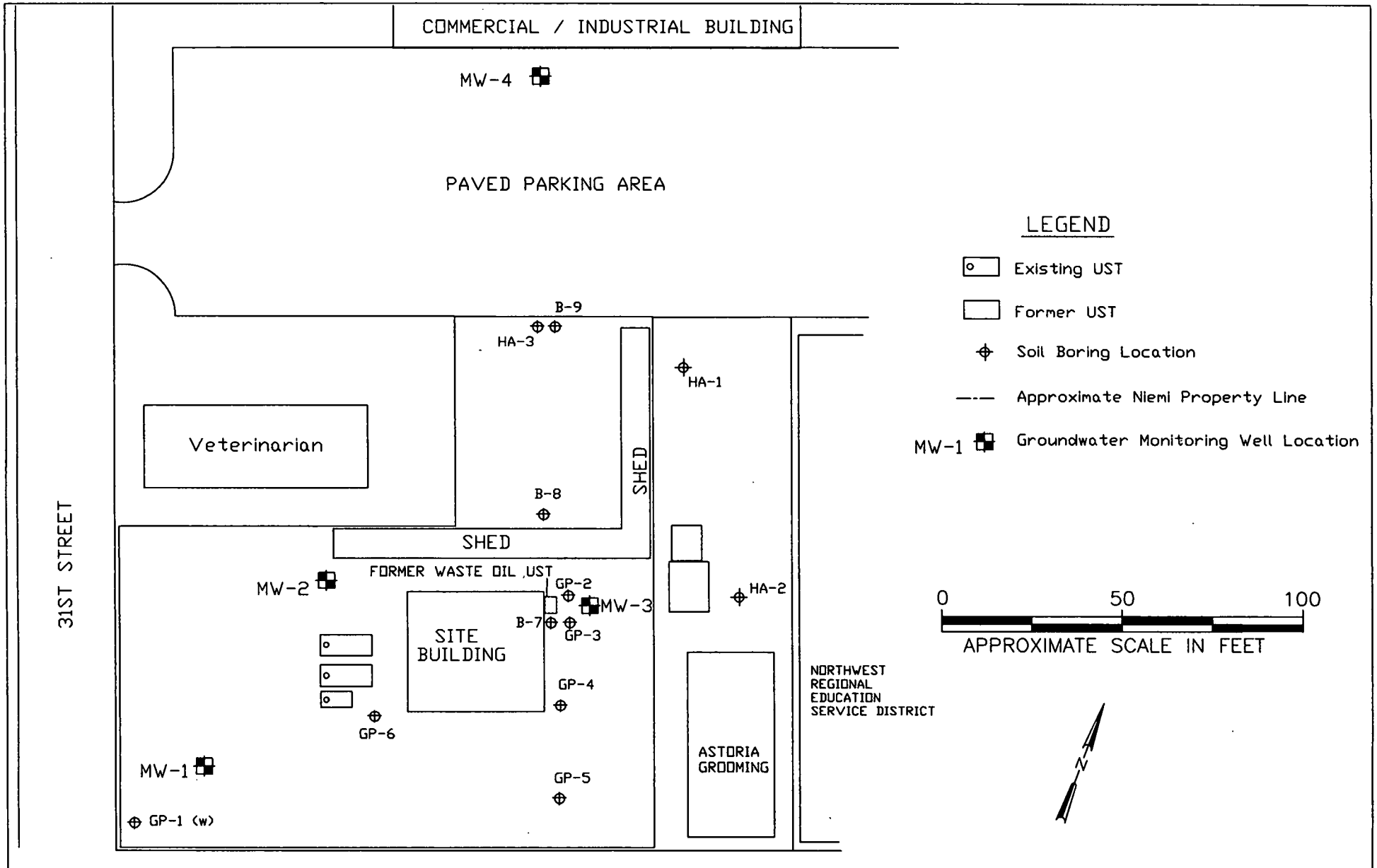
FIGURES



Adapted from the USGS Astoria, Oregon-Washington 1:24,000 topographic map, 1949, Photorevised 1984

RSV ENGINEERING, INC.

SITE LOCATION MAP				FIGURE
NIEMI OIL - HIGHWAY SERVICE ASTORIA, OREGON				1
DRAWN	CHECKED	APPROVED	DATE	DRAWING NO.
CCA			11/6/03	03-135-01

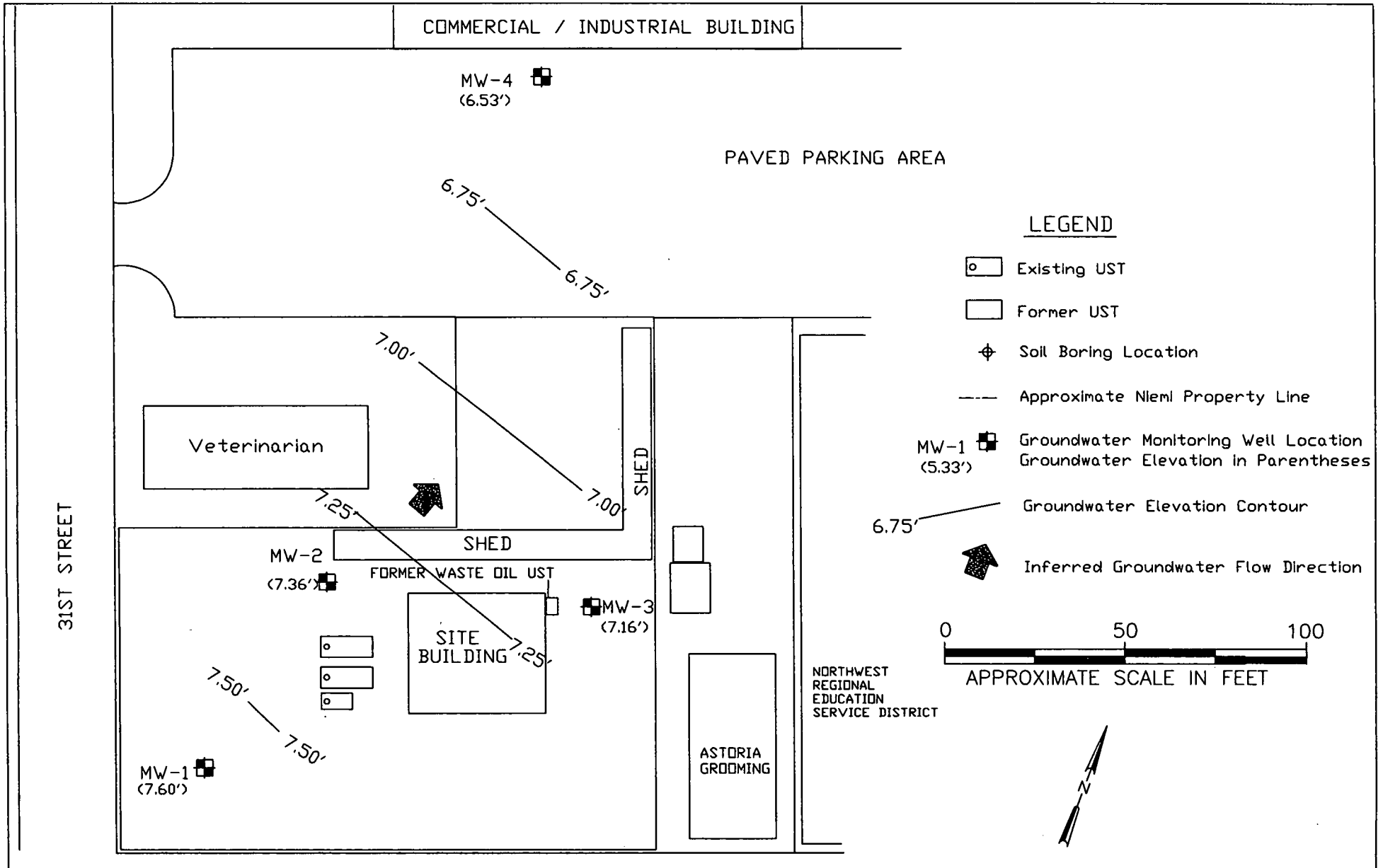


RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

SITE PLAN
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 2

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		12/11/07	Wells & Grab 040408



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GROUNDWATER FLOW MAP
January 31, 2008
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 3

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		12/12/07	Figure 3 – GW FLOW

A

APPENDIX A

LABORATORY REPORT and CHAIN-OF-CUSTODY DOCUMENTATION

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

February 15, 2008

Dan Becraft
RSV Engineering, Inc.
31960 SW Charbonneau Drive - Suite 101
Wilsonville, OR 97070

RE: Niemi Hiway Service

Enclosed are the results of analyses for samples received by the laboratory on 02/01/08 16:40. The following list is a summary of the Work Orders contained in this report, generated on 02/15/08 12:36.

If you have any questions concerning this report, please feel free to contact me.

Work Order	Project	ProjectNumber
PRB0040	Niemi Hiway Service	03-135

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.

Darrell Auvil, Project Manager

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	02/15/08 12:36

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	PRB0040-01	Water	01/31/08 15:40	02/01/08 16:40
MW-2	PRB0040-02	Water	01/31/08 16:40	02/01/08 16:40
MW-3	PRB0040-03	Water	01/31/08 17:30	02/01/08 16:40
MW-4	PRB0040-04	Water	01/31/08 14:55	02/01/08 16:40

TestAmerica Portland

Darrell Auvil, Project Manager

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	02/15/08 12:36

Gasoline Hydrocarbons per NW TPH-Gx Method

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PRB0040-01 (MW-1)		**Water**			**Sampled: 01/31/08 15:40**					
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	----	80.0	ug/l	1x	8020078	02/04/08 16:41	02/05/08 11:23	
Surrogate(s): 4-BFB			*96.6%*		*50 - 150 %*	"			"	
PRB0040-02 (MW-2)		**Water**			**Sampled: 01/31/08 16:40**					
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	----	80.0	ug/l	1x	8020078	02/04/08 16:41	02/05/08 11:50	
Surrogate(s): 4-BFB			*95.7%*		*50 - 150 %*	"			"	
PRB0040-03 (MW-3)		**Water**			**Sampled: 01/31/08 17:30**					
Gasoline Range Hydrocarbons	NW TPH-Gx	885	----	80.0	ug/l	1x	8020078	02/04/08 16:41	02/05/08 12:44	
Surrogate(s): 4-BFB			*196%*		*50 - 150 %*	"			"	*ZX*
PRB0040-04 (MW-4)		**Water**			**Sampled: 01/31/08 14:55**					
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	----	80.0	ug/l	1x	8020078	02/04/08 16:41	02/05/08 12:17	
Surrogate(s): 4-BFB			*93.3%*		*50 - 150 %*	"			"	

TestAmerica Portland

Darrell W. Auvil

Darrell Auvil, Project Manager

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ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	02/15/08 12:36

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PRB0040-01 (MW-1)		**Water**			**Sampled: 01/31/08 15:40**					
Diesel Range Organics	NWTPH-Dx	ND	----	0.238	mg/l	1x	8020066	02/05/08 10:00	02/05/08 19:28	
Heavy Oil Range Hydrocarbons	"	ND	----	0.476	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane			*80.7%*		*50 - 150 %*	"			"	
PRB0040-02 (MW-2)		**Water**			**Sampled: 01/31/08 16:40**					
Diesel Range Organics	NWTPH-Dx	ND	----	0.238	mg/l	1x	8020066	02/05/08 10:00	02/05/08 19:48	
Heavy Oil Range Hydrocarbons	"	ND	----	0.476	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane			*84.7%*		*50 - 150 %*	"			"	
PRB0040-03 (MW-3)		**Water**			**Sampled: 01/31/08 17:30**					
Diesel Range Organics	NWTPH-Dx	**0.989**	----	0.238	mg/l	1x	8020066	02/05/08 10:00	02/05/08 20:07	A-01
Heavy Oil Range Hydrocarbons	"	**0.615**	----	0.476	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane			*81.2%*		*50 - 150 %*	"			"	
PRB0040-04 (MW-4)		**Water**			**Sampled: 01/31/08 14:55**					
Diesel Range Organics	NWTPH-Dx	ND	----	0.238	mg/l	1x	8020066	02/05/08 10:00	02/05/08 20:27	
Heavy Oil Range Hydrocarbons	"	ND	----	0.476	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane			*86.4%*		*50 - 150 %*	"			"	

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Darrell W. Auvil

Darrell Auvil, Project Manager

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ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	02/15/08 12:36

Selected Volatile Organic Compounds (Including BTEX) per EPA Method 8260B

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PRB0040-01 (MW-1)		**Water**			**Sampled: 01/31/08 15:40**					
1,2-Dibromoethane	EPA 8260B	ND	-----	0.500	ug/l	1x	8020289	02/10/08 06:11	02/10/08 07:57	
1,2-Dichloroethane	"	ND	-----	0.500	"	"	"	"	"	
Benzene	"	ND	-----	0.200	"	"	"	"	"	
Toluene	"	ND	-----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	2.00	"	"	"	"	"	
1,2,4-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
1,3,5-Trimethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Isopropylbenzene	"	ND	-----	2.00	"	"	"	"	"	
n-Propylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Surrogate(s):	*4-BFB*		*92.8%*		*80 - 120 %*	"			"	
	1,2-DCA-d4		*114%*		*80 - 120 %*	"			"	
	Dibromofluoromethane		*103%*		*80 - 120 %*	"			"	
	Toluene-d8		*103%*		*80 - 120 %*	"			"	
PRB0040-02 (MW-2)		**Water**			**Sampled: 01/31/08 16:40**					
1,2-Dibromoethane	EPA 8260B	ND	-----	0.500	ug/l	1x	8020289	02/10/08 06:11	02/10/08 08:25	
1,2-Dichloroethane	"	ND	-----	0.500	"	"	"	"	"	
Benzene	"	ND	-----	0.200	"	"	"	"	"	
Toluene	"	ND	-----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	2.00	"	"	"	"	"	
1,2,4-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
1,3,5-Trimethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Isopropylbenzene	"	ND	-----	2.00	"	"	"	"	"	
n-Propylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Surrogate(s):	*4-BFB*		*94.2%*		*80 - 120 %*	"			"	
	1,2-DCA-d4		*122%*		*80 - 120 %*	"			"	*Z2*
	Dibromofluoromethane		*106%*		*80 - 120 %*	"			"	
	Toluene-d8		*105%*		*80 - 120 %*	"			"	

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Darrell W. Auvil

Darrell Auvil, Project Manager

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PORTLAND, OR 9405 S.W. NIMBUS AVENUE
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ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	02/15/08 12:36

Selected Volatile Organic Compounds (Including BTEX) per EPA Method 8260B

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PRB0040-03RE1 (MW-3)		**Water**			**Sampled: 01/31/08 17:30**					**RL7**
1,2-Dibromoethane	EPA 8260B	ND	-----	1.00	ug/l	2x	8020398	02/13/08 11:04	02/14/08 07:11	
1,2-Dichloroethane	"	ND	-----	1.00	"	"	"	"	"	
Benzene	"	**2.24**	-----	0.400	"	"	"	"	"	
Toluene	"	ND	-----	1.00	"	"	"	"	"	
Ethylbenzene	"	**2.34**	-----	1.00	"	"	"	"	"	
Xylenes (total)	"	ND	-----	2.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	4.00	"	"	"	"	"	
1,2,4-Trimethylbenzene	"	ND	-----	2.00	"	"	"	"	"	
1,3,5-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Isopropylbenzene	"	**30.0**	-----	4.00	"	"	"	"	"	
n-Propylbenzene	"	**48.9**	-----	1.00	"	"	"	"	"	
Surrogate(s): *4-BFB*		*100%*		*80 - 120 %*		*1x*			"	
1,2-DCA-d4		*95.8%*		*80 - 120 %*		"			"	
Dibromofluoromethane		*94.2%*		*80 - 120 %*		"			"	
Toluene-d8		*101%*		*80 - 120 %*		"			"	
PRB0040-04 (MW-4)		**Water**			**Sampled: 01/31/08 14:55**					
1,2-Dibromoethane	EPA 8260B	ND	-----	0.500	ug/l	1x	8020289	02/10/08 06:11	02/10/08 08:52	
1,2-Dichloroethane	"	ND	-----	0.500	"	"	"	"	"	
Benzene	"	ND	-----	0.200	"	"	"	"	"	
Toluene	"	ND	-----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	2.00	"	"	"	"	"	
1,2,4-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
1,3,5-Trimethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Isopropylbenzene	"	ND	-----	2.00	"	"	"	"	"	
n-Propylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Surrogate(s): *4-BFB*		*88.8%*		*80 - 120 %*		"			"	
1,2-DCA-d4		*120%*		*80 - 120 %*		"			"	
Dibromofluoromethane		*107%*		*80 - 120 %*		"			"	
Toluene-d8		*104%*		*80 - 120 %*		"			"	

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	02/15/08 12:36

Polynuclear Aromatic Compounds per EPA 8270M-SIM

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PRB0040-03 (MW-3)		**Water**			**Sampled: 01/31/08 17:30**					
Acenaphthene	EPA 8270m	ND	-----	0.0952	ug/l	1x	8020050	02/04/08 12:40	02/08/08 21:12	
Acenaphthylene	"	ND	-----	0.0952	"	"	"	"	"	
Anthracene	"	ND	-----	0.0952	"	"	"	"	"	
Benzo (a) anthracene	"	ND	-----	0.0952	"	"	"	"	"	
Benzo (a) pyrene	"	ND	-----	0.0952	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	-----	0.0952	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	-----	0.0952	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	-----	0.0952	"	"	"	"	"	
Chrysene	"	ND	-----	0.0952	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	-----	0.190	"	"	"	"	"	
Fluoranthene	"	ND	-----	0.0952	"	"	"	"	"	
Fluorene	"	ND	-----	0.0952	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	-----	0.0952	"	"	"	"	"	
Naphthalene	"	**0.211**	-----	0.0952	"	"	"	"	"	
Phenanthrene	"	ND	-----	0.0952	"	"	"	"	"	
Pyrene	"	ND	-----	0.0952	"	"	"	"	"	
Surrogate(s): Fluorene-d10			*54.9%*		*25 - 125 %*	"			"	
Pyrene-d10			*60.5%*		*23 - 150 %*	"			"	
Benzo (a) pyrene-d12			*50.0%*		*10 - 125 %*	"			"	

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	02/15/08 12:36

Gasoline Hydrocarbons per NW TPH-Gx Method - Laboratory Quality Control Results

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QC Batch: 8020078 **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8020078-BLK1)								Extracted: 02/04/08 16:41						
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	---	80.0	ug/l	1x	--	--	--	--	--	--	02/05/08 04:12	
Surrogate(s): 4-BFB		*Recovery: 93.0%*			*Limits: 50-150%*	"							*02/05/08 04:12*	
LCS (8020078-BS2)								Extracted: 02/04/08 16:41						
Gasoline Range Hydrocarbons	NW TPH-Gx	461	---	80.0	ug/l	1x	--	500	92.2%	(70-130)	--	--	02/05/08 09:08	
Surrogate(s): 4-BFB		*Recovery: 99.9%*			*Limits: 50-150%*	"							*02/05/08 09:08*	
LCS Dup (8020078-BSD2)								Extracted: 02/04/08 16:41						
Gasoline Range Hydrocarbons	NW TPH-Gx	478	---	80.0	ug/l	1x	--	500	95.7%	(70-130)	3.69%	(35)	02/05/08 09:35	
Surrogate(s): 4-BFB		*Recovery: 100%*			*Limits: 50-150%*	"							*02/05/08 09:35*	
Duplicate (8020078-DUP1)						QC Source: PRB0017-04RE1		Extracted: 02/04/08 16:41						
Gasoline Range Hydrocarbons	NW TPH-Gx	11300	---	4000	ug/l	50x	11200	--	--	--	1.08%	(35)	02/05/08 00:37	
Surrogate(s): 4-BFB		*Recovery: 96.9%*			*Limits: 50-150%*	*1x*							*02/05/08 00:37*	
Duplicate (8020078-DUP2)						QC Source: PRB0017-09RE1		Extracted: 02/04/08 16:41						
Gasoline Range Hydrocarbons	NW TPH-Gx	5910	---	800	ug/l	10x	5870	--	--	--	0.677%	(35)	02/05/08 01:30	
Surrogate(s): 4-BFB		*Recovery: 110%*			*Limits: 50-150%*	*1x*							*02/05/08 01:30*	

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	02/15/08 12:36

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8020066 **Water Preparation Method: EPA 3520/600 Series**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8020066-BLK1)								Extracted: 02/05/08 10:00						
Diesel Range Organics	NWTPH-Dx	ND	---	0.250	mg/l	1x	--	--	--	--	--	--	02/05/08 15:11	
Heavy Oil Range Hydrocarbons	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 84.4%*			*Limits: 50-150%*	"							*02/05/08 15:11*	
LCS (8020066-BS1)								Extracted: 02/05/08 10:00						
Diesel Range Organics	NWTPH-Dx	2.44	---	0.250	mg/l	1x	--	2.50	97.4%	(50-150)	--	--	02/05/08 15:29	
Heavy Oil Range Hydrocarbons	"	1.58	---	0.500	"	"	--	1.50	105%	"	--	--	"	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 78.5%*			*Limits: 50-150%*	"							*02/05/08 15:29*	
LCS Dup (8020066-BSD1)								Extracted: 02/05/08 10:00						
Diesel Range Organics	NWTPH-Dx	2.33	---	0.250	mg/l	1x	--	2.50	93.0%	(50-150)	4.60%	(35)	02/05/08 15:47	
Heavy Oil Range Hydrocarbons	"	1.49	---	0.500	"	"	--	1.50	99.3%	"	5.30%	"	"	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 82.7%*			*Limits: 50-150%*	"							*02/05/08 15:47*	

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	02/15/08 12:36

Selected Volatile Organic Compounds (Including BTEX) per EPA Method 8260B - Laboratory Quality Control Results

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QC Batch: 8020289 **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8020289-BLK1)								Extracted: 02/10/08 04:19						
1,2-Dibromoethane	EPA 8260B	ND	---	0.500	ug/l	1x	--	--	--	--	--	--	02/10/08 07:30	
1,2-Dichloroethane	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Benzene	"	ND	---	0.200	"	"	--	--	--	--	--	--	"	
Toluene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Ethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Xylenes (total)	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
Methyl tert-butyl ether	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
Naphthalene	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
1,2,4-Trimethylbenzene	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
1,3,5-Trimethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Isopropylbenzene	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
n-Propylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Surrogate(s):	*4-BFB*	*Recovery:*	*91.6%*		*Limits:*	*80-120%*	"						*02/10/08 07:30*	
	1,2-DCA-d4		*118%*			*80-120%*	"						"	
	Dibromofluoromethane		*104%*			*80-120%*	"						"	
	Toluene-d8		*103%*			*80-120%*	"						"	
LCS (8020289-BS1)								Extracted: 02/10/08 04:19						
1,2-Dibromoethane	EPA 8260B	21.4	---	0.500	ug/l	1x	--	20.0	107%	(80-140)	--	--	02/10/08 06:07	
1,2-Dichloroethane	"	23.4	---	0.500	"	"	--	"	117%	(75-135)	--	--	"	
Benzene	"	20.4	---	0.200	"	"	--	"	102%	(80-120)	--	--	"	
Toluene	"	21.0	---	0.500	"	"	--	"	105%	(80-125)	--	--	"	
Ethylbenzene	"	18.7	---	0.500	"	"	--	"	93.6%	(80-130)	--	--	"	
Xylenes (total)	"	54.9	---	1.00	"	"	--	60.0	91.5%	"	--	--	"	
Methyl tert-butyl ether	"	21.0	---	2.00	"	"	--	20.0	105%	(80-135)	--	--	"	
Naphthalene	"	21.0	---	2.00	"	"	--	"	105%	(60-150)	--	--	"	
1,2,4-Trimethylbenzene	"	20.0	---	1.00	"	"	--	"	100%	(75-125)	--	--	"	
1,3,5-Trimethylbenzene	"	20.0	---	0.500	"	"	--	"	99.8%	(75-135)	--	--	"	
Isopropylbenzene	"	19.5	---	2.00	"	"	--	"	97.5%	(80-140)	--	--	"	
n-Propylbenzene	"	19.3	---	0.500	"	"	--	"	96.4%	(80-130)	--	--	"	
Surrogate(s):	*4-BFB*	*Recovery:*	*94.0%*		*Limits:*	*80-120%*	"						*02/10/08 06:07*	
	1,2-DCA-d4		*113%*			*80-120%*	"						"	
	Dibromofluoromethane		*106%*			*80-120%*	"						"	
	Toluene-d8		*105%*			*80-120%*	"						"	

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	02/15/08 12:36

Selected Volatile Organic Compounds (Including BTEX) per EPA Method 8260B - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8020289 **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
LCS Dup (8020289-BSD1)							Extracted: 02/10/08 04:19							
1,2-Dibromoethane	EPA 8260B	22.0	---	0.500	ug/l	1x	--	20.0	110%	(80-140)	2.49%	(25)	02/10/08 06:34	
1,2-Dichloroethane	"	23.7	---	0.500	"	"	--	"	118%	(75-135)	1.23%	"	"	
Benzene	"	21.4	---	0.200	"	"	--	"	107%	(80-120)	4.84%	"	"	
Toluene	"	21.1	---	0.500	"	"	--	"	105%	(80-125)	0.523%	"	"	
Ethylbenzene	"	19.5	---	0.500	"	"	--	"	97.6%	(80-130)	4.24%	"	"	
Xylenes (total)	"	58.1	---	1.00	"	"	--	60.0	96.9%	"	5.73%	"	"	
Methyl tert-butyl ether	"	22.0	---	2.00	"	"	--	20.0	110%	(80-135)	4.64%	"	"	
Naphthalene	"	21.8	---	2.00	"	"	--	"	109%	(60-150)	3.74%	"	"	
1,2,4-Trimethylbenzene	"	21.0	---	1.00	"	"	--	"	105%	(75-125)	4.93%	"	"	
1,3,5-Trimethylbenzene	"	21.1	---	0.500	"	"	--	"	105%	(75-135)	5.41%	"	"	
Isopropylbenzene	"	20.4	---	2.00	"	"	--	"	102%	(80-140)	4.71%	"	"	
n-Propylbenzene	"	20.1	---	0.500	"	"	--	"	101%	(80-130)	4.31%	"	"	
Surrogate(s): *4-BFB*		*Recovery:* *97.0%*			*Limits:* *80-120%*	"							*02/10/08 06:34*	
1,2-DCA-d4		*113%*			*80-120%*	"							"	
Dibromofluoromethane		*106%*			*80-120%*	"							"	
Toluene-d8		*108%*			*80-120%*	"							"	

QC Batch: 8020398 **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8020398-BLK1)							Extracted: 02/13/08 11:04							
1,2-Dibromoethane	EPA 8260B	ND	---	0.500	ug/l	1x	--	--	--	--	--	--	02/14/08 00:44	
1,2-Dichloroethane	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Benzene	"	ND	---	0.200	"	"	--	--	--	--	--	--	"	
Toluene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Ethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Xylenes (total)	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
Methyl tert-butyl ether	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
Naphthalene	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
1,2,4-Trimethylbenzene	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
1,3,5-Trimethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Isopropylbenzene	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
n-Propylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Surrogate(s): *4-BFB*		*Recovery:* *105%*			*Limits:* *80-120%*	"							*02/14/08 00:44*	
1,2-DCA-d4		*84.8%*			*80-120%*	"							"	
Dibromofluoromethane		*90.0%*			*80-120%*	"							"	
Toluene-d8		*97.9%*			*80-120%*	"							"	

TestAmerica Portland

Darrell Auvil, Project Manager

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	02/15/08 12:36

Selected Volatile Organic Compounds (Including BTEX) per EPA Method 8260B - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8020398 **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
LCS (8020398-BS1)									Extracted: 02/13/08 11:04					MNR1
1,2-Dibromoethane	EPA 8260B	20.6	---	0.500	ug/l	1x	--	20.0	103%	(80-140)	--	--	02/13/08 23:21	
1,2-Dichloroethane	"	17.1	---	0.500	"	"	--	"	85.5%	(75-135)	--	--	"	
Benzene	"	21.1	---	0.200	"	"	--	"	105%	(80-120)	--	--	"	
Toluene	"	21.0	---	0.500	"	"	--	"	105%	(80-125)	--	--	"	
Ethylbenzene	"	23.9	---	0.500	"	"	--	"	120%	(80-130)	--	--	"	
Xylenes (total)	"	75.6	---	1.00	"	"	--	60.0	126%	"	--	--	"	
Methyl tert-butyl ether	"	18.4	---	2.00	"	"	--	20.0	91.8%	(80-135)	--	--	"	
Naphthalene	"	21.4	---	2.00	"	"	--	"	107%	(60-150)	--	--	"	
1,2,4-Trimethylbenzene	"	23.6	---	1.00	"	"	--	"	118%	(75-125)	--	--	"	
1,3,5-Trimethylbenzene	"	24.4	---	0.500	"	"	--	"	122%	(75-135)	--	--	"	
Isopropylbenzene	"	24.2	---	2.00	"	"	--	"	121%	(80-140)	--	--	"	
n-Propylbenzene	"	24.4	---	0.500	"	"	--	"	122%	(80-130)	--	--	"	
Surrogate(s):	*4-BFB*	*Recovery:*	*108%*		*Limits:*	*80-120%*	"						*02/13/08 23:21*	
	1,2-DCA-d4		*80.4%*			*80-120%*	"						"	
	Dibromofluoromethane		*92.1%*			*80-120%*	"						"	
	Toluene-d8		*100%*			*80-120%*	"						"	
LCS Dup (8020398-BSD1)									Extracted: 02/13/08 11:04					MNR1
1,2-Dibromoethane	EPA 8260B	20.7	---	0.500	ug/l	1x	--	20.0	103%	(80-140)	0.291%	(25)	02/13/08 23:49	
1,2-Dichloroethane	"	16.2	---	0.500	"	"	--	"	80.8%	(75-135)	5.59%	"	"	
Benzene	"	20.0	---	0.200	"	"	--	"	99.8%	(80-120)	5.41%	"	"	
Toluene	"	20.1	---	0.500	"	"	--	"	100%	(80-125)	4.62%	"	"	
Ethylbenzene	"	23.1	---	0.500	"	"	--	"	116%	(80-130)	3.36%	"	"	
Xylenes (total)	"	71.7	---	1.00	"	"	--	60.0	119%	"	5.26%	"	"	
Methyl tert-butyl ether	"	17.7	---	2.00	"	"	--	20.0	88.6%	(80-135)	3.44%	"	"	
Naphthalene	"	21.0	---	2.00	"	"	--	"	105%	(60-150)	1.98%	"	"	
1,2,4-Trimethylbenzene	"	22.8	---	1.00	"	"	--	"	114%	(75-125)	3.88%	"	"	
1,3,5-Trimethylbenzene	"	23.5	---	0.500	"	"	--	"	117%	(75-135)	3.93%	"	"	
Isopropylbenzene	"	23.0	---	2.00	"	"	--	"	115%	(80-140)	5.08%	"	"	
n-Propylbenzene	"	23.0	---	0.500	"	"	--	"	115%	(80-130)	5.91%	"	"	
Surrogate(s):	*4-BFB*	*Recovery:*	*109%*		*Limits:*	*80-120%*	"						*02/13/08 23:49*	
	1,2-DCA-d4		*82.0%*			*80-120%*	"						"	
	Dibromofluoromethane		*93.2%*			*80-120%*	"						"	
	Toluene-d8		*102%*			*80-120%*	"						"	

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Darrell Auvil, Project Manager

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THE LEADER IN ENVIRONMENTAL TESTING

PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	02/15/08 12:36

Polynuclear Aromatic Compounds per EPA 8270M-SIM - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8020050 **Water Preparation Method: 3520B Liq-Liq**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8020050-BLK1)								Extracted: 02/04/08 12:40						
Acenaphthene	EPA 8270m	ND	---	0.100	ug/l	1x	--	--	--	--	--	--	02/06/08 10:53	
Acenaphthylene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Anthracene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (a) anthracene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (a) pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (b) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (ghi) perylene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (k) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Chrysene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Dibenzo (a,h) anthracene	"	ND	---	0.200	"	"	--	--	--	--	--	--	"	
Fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Fluorene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Indeno (1,2,3-cd) pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Naphthalene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Phenanthrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Surrogate(s):	*Fluorene-d10*	*Recovery:*	*65.2%*		*Limits:*	*25-125%*	"						*02/06/08 10:53*	
	Pyrene-d10		*61.2%*			*23-150%*	"						"	
	Benzo (a) pyrene-d12		*64.9%*			*10-125%*	"						"	
LCS (8020050-BS1)								Extracted: 02/04/08 12:40						
Acenaphthene	EPA 8270m	1.86	---	0.100	ug/l	1x	--	2.50	74.5%	(26-135)	--	--	02/06/08 11:23	
Benzo (a) pyrene	"	1.86	---	0.100	"	"	--	"	74.3%	(38-137)	--	--	"	
Pyrene	"	1.77	---	0.100	"	"	--	"	70.7%	(33-133)	--	--	"	
Surrogate(s):	*Fluorene-d10*	*Recovery:*	*70.5%*		*Limits:*	*25-125%*	"						*02/06/08 11:23*	
	Pyrene-d10		*64.6%*			*23-150%*	"						"	
	Benzo (a) pyrene-d12		*69.0%*			*10-125%*	"						"	
LCS Dup (8020050-BSD1)								Extracted: 02/04/08 12:40						
Acenaphthene	EPA 8270m	1.61	---	0.100	ug/l	1x	--	2.50	64.2%	(26-135)	14.8%	(60)	02/06/08 11:54	
Benzo (a) pyrene	"	1.66	---	0.100	"	"	--	"	66.3%	(38-137)	11.4%	"	"	
Pyrene	"	1.59	---	0.100	"	"	--	"	63.5%	(33-133)	10.6%	"	"	
Surrogate(s):	*Fluorene-d10*	*Recovery:*	*62.6%*		*Limits:*	*25-125%*	"						*02/06/08 11:54*	
	Pyrene-d10		*58.2%*			*23-150%*	"						"	
	Benzo (a) pyrene-d12		*61.6%*			*10-125%*	"						"	

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Darrell Auvil, Project Manager

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PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Dan Becraft	02/15/08 12:36

Notes and Definitions

Report Specific Notes:

A-01	-	Detected hydrocarbons appear to be due to heavy gas/light diesel range components as well as a light weight oil.
MNR1	-	There was no MS/MSD analyzed with this batch due to insufficient sample volume. See Blank Spike/Blank Spike Duplicate.
RL7	-	Sample required dilution due to high concentrations of target analyte.
Z2	-	Surrogate recovery was above the acceptance limits. Data not impacted.
ZX	-	Due to sample matrix effects, the surrogate recovery was outside the acceptance limits.

Laboratory Reporting Conventions:

DET	-	Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.
ND	-	Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).
NR/NA	-	Not Reported / Not Available
dry	-	Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight.
wet	-	Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis.
RPD	-	RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries).
MRL	-	METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.
MDL*	-	METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results.
Dil	-	Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
Reporting Limits	-	Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.
Electronic Signature	-	Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy.* Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Darrell W. Auvil

Darrell Auvil, Project Manager

TestAmerica
ANALYTICAL TESTING CORPORATION

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
[illegible] First Ave, Spokane, WA 99200-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
[illegible] 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #: PRB0040

CLIENT: RSV Engineering Inc

REPORT TO: Brad Berssren
ADDRESS: 31960 SW Charbonneau Drive #101
Wilsonville OR 97070
PHONE: 694-6960 FAX: 694-6962

INVOICE TO: SAME

P.O. NUMBER:

PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
SAMPLED BY: Dan Becroft

PRESERVATIVE:

REQUESTED ANALYSES

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: 10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1
Petroleum Hydrocarbon Analyses: X STD. | 4 | 3 | 2 | 1 | <1
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE TIME	NWTPH - GX	NWTPH - DX	8260 VOCs PAHs 8270		MATRIX (W, S, O)	# OF CONT.	LOCATION COMMENTS	TA WO ID
1	MW-1	1/31/08 / 3:40	X	X	X					
2	MW-2	11 / 4:40	X	X	X					
3	MW-3	11 / 5:30	X	X	X	X				
4	MW-4	11 / 2:55	X	X	X					
5										
6										
7										
8										
9										
10										

RELEASED BY: Dan Becroft — FIRM: RSV Engr. — DATE: 2/1/08 — TIME: 4:40
PRINT NAME: Dan Becroft

RECEIVED BY: Jamie Ireland — FIRM: TAP — DATE: 2/1/08 — TIME: 16:40
PRINT NAME: Jamie Ireland

RELEASED BY: — FIRM: — DATE: — TIME:
PRINT NAME:

RECEIVED BY: — FIRM: — DATE: — TIME:
PRINT NAME:

ADDITIONAL REMARKS:
VOCs to include only: BTEX, EDB, EDC, MTBE, n-propylbenzene, isopropylbenzene, 1,2,4-TMB and 1,3,5 TMB

TEMP: 2.8 — PAGE OF

TestAmerica Sample Receipt Checklist

Cooler ID(s):

Received by: (section A)
Date: 2/11/09
Time: 1:00 PM
Initials: JT

Unpacked by: (section B)
Date: 2/11/09
Initials: JT

Logged-in by:
Date: 2/11/09
Initials: JT

Work Order No.: PRB0040
Client: RSV Engineering Inc.
Project: Niemi Mining Service

Temperature out of range:
___Not enough Ice
___No Ice
___Ice Melted
___Win 4 Hours
___Other: _____

***ESI Clients (see Section C)

Cooler Temperature (IR): 2.5 °C plastic (glass) NA (oil/air samples, ESI client) Temperature Blank: _____ °C

A

Custody Seals: (#____)

Signature: Y N Dated: _____
X None

Container Type:
1 #Cooler(s)
___#Box(s)
___None (___#Other: _____)

Coolant Type:
___Gel Ice
X Loose Ice
___None

Packing Material:
X Bubble Bags
X Styrofoam Cubbies
___None (___Other: _____)

Received from:
___TA Courier
___Senvoy
___UPS
___Fed Ex
X Client
___TDP
___DHL
___SDS
___Mid-Valley
___GS/TA
___GS/Senvoy
___Other: _____

B

Sample Status:
(If N circled, see NOD)

General:
Intact? (Y) N
Containers Match COC? (Y) N none given
IDs Match COC? (Y) N

For Analyses Requested:
Correct Type & Preservation? (Y) N
Adequate Volume? (Y) N
Within Hold Time? (Y) N

Volatiles/ Oil Quality:
VOAs/ Syringes free of Headspace? (Y) N NA
TB on COC? not provided Y N NA

Metals:
HNO3 Preserved? Y N (NA)
Dissolved Metals Filtered? Y N (NA)

C

***ESI Clients Only:

Temperature Blank _____ °C not provided

All preserved bottles checked Y N NA (voas/soils/all unp.)
All preserved accordingly? Y N (see NOD) NA (voas/soils/all unp.)

FED EX/ UPS: Was the tracking paper keepable? YES (NO)

If circled NO, what is the Tracking number? _____

FED EX Goldstreak UPS DHL Other: _____

Project Managers

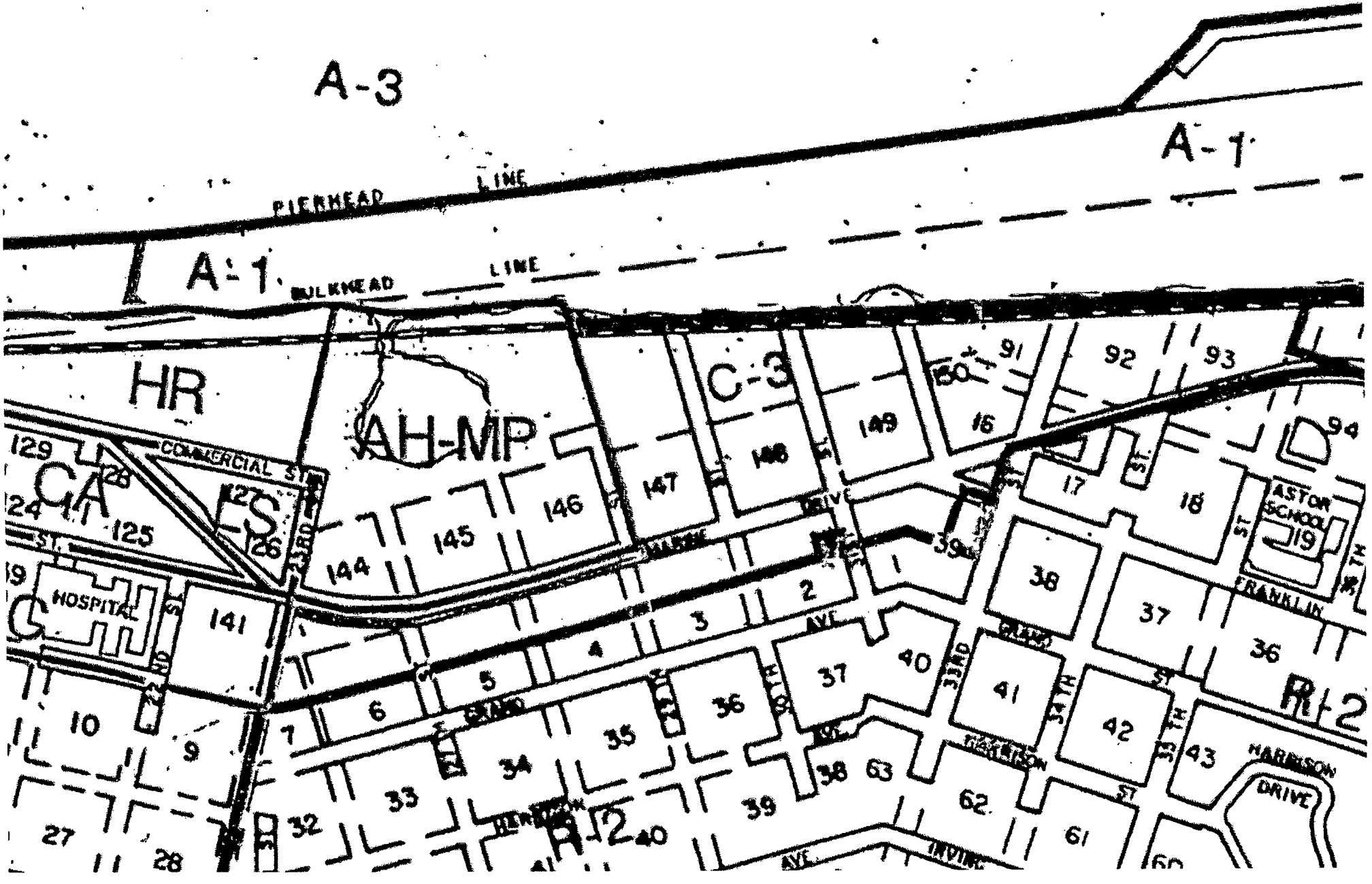
Comments: _____

PM Reviewed _____ (Initial/Date)

B

APPENDIX B

ZONING MAP AND C-3 ZONING INFORMATION


A-3
A-1
PIERHEAD LINE
A-1
BULKHEAD LINE
HR
AH-MP
C-3
CA
FS
COMMERCIAL ST.
HOSPITAL
ASTOR SCHOOL
FRANKLIN
HARRISON
DRIVE
IRVINE
AVE.
R-2
129
125
126
144
145
146
147
148
149
150
91
92
93
94
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27
28

C-3: GENERAL COMMERCIAL ZONE

2.385. PURPOSE.

This zone is primarily for a wide range of commercial businesses, including most of those allowed in other commercial zones. Compared to the C-4 Zone, the C-3 Zone is more appropriate for uses requiring a high degree of accessibility to vehicular traffic, low intensity uses on large tracts of land, most repair services, and small warehousing and wholesaling operations. Unlike the C-4 Zone, there are maximum lot coverage, landscaping, and off-street parking requirements for all uses.

2.390. USES PERMITTED OUTRIGHT.

The following uses and their accessory uses are permitted in a C-3 Zone if the Community Development Director determines that the uses will not violate standards referred to in Sections 2.400 through 2.415, additional Development Code provisions, the Comprehensive Plan, and other City laws:

1. Business service establishment.
2. Commercial laundry or dry cleaning establishment.
3. Commercial or public off-street parking lot.
4. Communication service establishment.
5. Construction service establishment.
6. Eating and drinking establishment.
7. Educational service establishment.
8. Family day care center in single-family, two-family, or multi-family dwelling.
9. Home occupation in existing dwelling.
10. Motel, hotel, bed and breakfast, inn, or other tourist lodging facility and associated uses.
11. Multi-family dwelling.

12. Personal service establishment.

13. Professional service establishment.

14. Public or semi-public use.

15. Repair service establishment, not including automotive, heavy equipment, or other major repair services.

16. Residential facility.

17. Retail sales establishment.

18. Single-family and two-family dwelling, located above or below the first floor of new or existing structures, with commercial facilities on the first floor of the structure.

(Section 2.390(18) amended by Ordinance 00-08, 9-6-00)

19. Transportation service establishment.

20. Conference Center.

(Section 2.390(20) added by Ordinance 94-06, 6-6-94)

21. Indoor family entertainment or recreation establishment.

(Section 2.390(21) added by Ordinance 98-01, 1-5-98)

2.395. CONDITIONAL USES PERMITTED.

The following uses and their accessory uses are permitted in a C-3 Zone if the Planning Commission, after a public hearing, determines that the location and development plans comply with applicable standards referred to in Sections 2.400 through 2.415, additional Development Code provisions, the Comprehensive Plan, and other City laws:

1. Animal hospital or kennel.

2. Automotive sales or service establishment.

3. Day care center.

4. Gasoline service station.

5. Hospital.

6. *(Section 2.395(6) deleted by Ordinance 98-01, 1-5-98)*

7. Light Manufacturing.

8. Recycling establishment.

9. Repair service establishment not allowed as an Outright Use.

10. Temporary use meeting the requirements of Sections 3.240.

11. Wholesale trade or warehouse establishment.

2.400. LOT COVERAGE.

Buildings will not cover more than 90 percent of the lot area.

2.405. LANDSCAPED OPEN AREA.

A minimum of 10 percent of the total lot area will be maintained as a landscaped open area.

2.410. HEIGHT OF STRUCTURES.

No structure will exceed a height of 45 feet above grade.

2.415. OTHER APPLICABLE USE STANDARDS.

1. Landscaping shall meet the requirements of Sections 3.105 through 3.120.

2. When a commercial use in a C-3 Zone abuts a lot in a residential zone, there will be an attractively designed and maintained buffer of at least five (5) feet in width, which can be in the form of hedges, fencing, or walls.

3. Outdoor storage areas will be enclosed by appropriate vegetation, fencing, or walls. This requirement does not apply to outdoor retail sales areas.

4. Where feasible, joint access points and parking facilities for more than one use should be established. This standard does not apply to multi-family residential developments.

5. All uses will comply with access, parking, and loading standards in Article 7.

6. Conditional uses will meet the requirements in Article 11.

7. Signs will comply with requirements in Article 8.

8. All structures will have storm drainage facilities that are channeled into the public storm drainage system or a natural drainage system approved by the City Engineer. Developments affecting natural drainage shall be approved by the City Engineer.

9. Where new development is within 100 feet of a known landslide hazard, a site investigation report will be prepared by a registered geologist. Recommendations contained in the site report will be incorporated into the building plans.

10. For uses located within the Astor-East Urban Renewal District, refer to the Urban Renewal Plan for additional standards.

C

APPENDIX C

WELL QUERY RESULTS AND WATER WELL REPORTS

Well Log Query Results

Township: 8 N, Range: 9 W, Sections: 7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24, Type of Log: W

Well Log	T-R-S/ QQ-Q	Taxlot	Street of Well	Owner	Company	Special Standards	Well Type	First Water	Completed Depth	Static Water Level	Yield	Completed Date	Received Date	Bonded Constructor	Startcard	Well Id #	New	Abandon	Deepen	Alteration	Conversion	Domestic	Irrigation	Community	Livestock	Industrial	Injection	Thermal	Dewatering	Piezometer
CLAT_287	8.00N-9.00W-7 -		W MARINE DR, ASTORIA		NORTHWEST NATURAL GAS CO., RECT 238 220 NW SECOND AVE PORTLAND OR 97209		W		0.00			05/09/1986	06/11/1986	HANSEN, JIM J HANSEN DRILLING CO. INC.			√														
CLAT_292	8.00N-9.00W-18 -		MARINE DR (TAYLOR AVE) & FRANKFERT		NORTHWEST NATURAL GAS CO. 220 NW SECOND AVE PORTLAND OR 97209		W		0.00			08/26/1985	09/05/1985	HANSEN, JIM J HANSEN DRILLING CO. INC.			√														
CLAT_293	8.00N-9.00W-21 -	900		MILIKEN, RON 1118 S HOLIDAY SEASIDE OR 97138			W		240.00	140.0	4.0	11/09/1987	12/30/1987	MCMULLEN, M MCMULLEN DRILLING			√					√									
CLAT_294	8.00N-9.00W-24 -			SPRAUGE, JAMES ASTORIA OR 97103			W		200.00		0.0	06/06/1972	07/03/1972	WILLIAMS, W T WILLIAMS WELL DRILLING CO.			√					√									
COLU_2657	8.00N-9.00W-10 -				N W NATURAL GAS CO. RECT 193 OR		W	0.00	400.00	0.0		09/20/1988	10/28/1988	HANSEN, JIM J			√														
CLAT_51030	8.00N-9.00W-23 NW-NW	1300	GRIMSTAD RD; JOHN DAY RIVER RD	GRAFF, NICK 121 SW WILLOW LANE ASTORIA OR 97103			W	130.00	140.00	3.0	10.0	04/26/2000	07/05/2000	MCMULLEN, ARTHUR D MCMULLEN DRILLING CORP.	126411	37007	√					√									
CLAT_51153	8.00N-9.00W-21 NE-NW	3000	92931 HWY 202	GOWING, KATHLEEN PO BOX 1239 ASTORIA OR 97103			W	97.00	185.00	82.0	5.0	06/04/2001	06/18/2001	EVEY, LARRY C LARRY EVEY WELL DRILLING	134374	43021	√					√									
CLAT_51810	8.00N-9.00W-7 NE-SW	2800	210 W MARINE DR, ASTORIA	DION, BRIAN 88786 BLUE HERRON RD GEARHART OR 97138		√	W	6.00	0.00	7.0		10/10/2003	10/23/2003	KNUTSON, BILL K & S ENVIRONMENTAL	42681	61721		√													
CLAT_51811	8.00N-9.00W-7 NE-SW	2800	210 W MARINE DR, ASTORIA	DION, BRIAN 88786 BLUE HERRON RD GEARHART OR 97138		√	W	6.00	0.00	7.0		10/10/2003	10/23/2003	KNUTSON, BILL K & S ENVIRONMENTAL	42682	54928		√													
CLAT_51812	8.00N-9.00W-7 NE-SW	2800	210 W MARINE DR, ASTORIA	DION, BRIAN 88786 BLUE HERRON RD GEARHART OR 97138		√	W	6.00	0.00	7.0		10/10/2003	10/23/2003	KNUTSON, BILL K & S ENVIRONMENTAL	42683	54937		√													

1 2

Report a problem with the web page or a well log
Download Data
Return to Well Log Query

Well Log Query Results

Township: 8 N, Range: 9 W, Sections: 7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24, Type of Log: W

Well Log	T-R-S/ QQ-Q	Taxlot	Street of Well	Owner	Company	Special Standards	Well Type	First Water	Completed Depth	Static Water Level	Yield	Completed Date	Received Date	Bonded Constructor	Startcard	Well Id #	New	Abandon	Deepen	Alteration	Conversion	Domestic	Irrigation	Community	Livestock	Industrial	Injection	Thermal	Dewatering	Piezometer
CLAT_51813	8.00N-9.00W-7 NE-SW	2800	210 W MARINE DR, ASTORIA	DION, BRIAN 88786 BLUE HERRON RD GEARHART OR 97138		√	W	6.00	0.00	7.0		10/10/2003	10/23/2003	KNUTSON, BILL K & S ENVIRONMENTAL	42684	61725		√												
CLAT_51814	8.00N-9.00W-7 NE-SW	2800	210 W MARINE DR, ASTORIA	DION, BRIAN 88786 BLUE HERRON RD GEARHART OR 97138		√	W	6.00	0.00	7.0		10/10/2003	10/23/2003	KNUTSON, BILL K & S ENVIRONMENTAL	42685	63023		√												

1 2

Report a problem with the web page or a well log
Download Data
Return to Well Log Query

RECEIVED
JUN 11 1986
WATER RESOURCES DEPT
SALEM, OREGON

CLAT 287

8N/7W-7
Monitoring 8

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

(1) OWNER: Owner's Well Number:
Name Northwest Natural Gas Co. Rect. # 238
Address 220 N.W. Second Ave.
City Portland State Oregon Zip 97209

(2) TYPE OF WORK: Cathodic Protection
☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:
☐ Rotary Air ☒ Rotary Mud ☐ Cable ☐

NOT A WATER WELL

(4) PROPOSED USE:
☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☒ Other Groundbed

) BORE HOLE CONSTRUCTION:
Depth of Completed Well 0 ft.
Special Standards date of approval

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
4	0	20	cement	0	20	8 sks.
8 3/4	20	400	cccc			

How was seal placed? Method ☐ A ☐ B ☒ C ☐ D ☐ E
☐ Other
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	10	0	20	.250	☒	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

) location of shoe(s)

) PERFORATIONS/SCREENS:
☐ Perforations Method
☐ Screens Type Material

om	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Pumping level	Drill stem at	Time
			1 hr

NOT A WATER WELL

Temperature of water Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Clatsop Latitude ' " Longitude ' "
Township 8 n N or S, Range 9 W E or W, WM.
Section 7 ¼ ¼
Tax Lot Lot Block Subdivision
Street Address of Well (or nearest address) NWNG Service Center W. Marine Dr. Astoria

(10) STATIC WATER LEVEL:
ft. below land surface. Date
Artesian pressure lb. per square inch. Date

(11) WELL LOG: Ground elevation

Material	From	To	WB?	SWL
Fill, concrete, rebar, asphalt	0	8		
Sandy clay & wood	8	26		
Clay & gravel	26	34		
Broken rock	34	40		
Broken rock & clay	40	65		
Mudstone	65	110		
Sandstone	110	115		
Sandy mudstone	115	140		
Shaly mudstone little sand mix	140	400		

NOT A WATER WELL

Date started May 7, 1986 Completed May 9, 1986

(unbonded) Water Well Constructor Certification:
I constructed this well in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for construction of this well and its compliance with all Oregon water well standards. This report is true to the best of my knowledge and belief.

Signed Jim J. Hanson Date May 12, 1986
Company Hansen Drilling Co. Inc. Co. Job No. Rect. #238

9809C 10/85

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

RECEIVED

SEP 05 1985

WATER RESOURCES DEPT
SALEM, OREGON

CLAT

PLEASE TYPE or PRINT IN INK 292

8N/9W-18

(for official use only)

(1) OWNER:

Name Northwest Natural Gas

Address 220 NW. Secound Ave.

City POrtland State Oregon

(2) TYPE OF WORK (check): Groundbed Cathodic Protection

New Well XX Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☐ Driven ☐

Rotary Mud XX Dug ☐

Cable ☐ Bored ☐

(4) PROPOSED USE (Check):

Domestic ☐ Industrial ☐ Municipal ☐

Irrigation ☐ Thermal ☐ Injection ☐

Other:

Dewatering ☐ Grounding XX Test ☐

NOT A WATER WELL

(5) CASING INSTALLED:

Steel XX Plastic ☐

Threaded ☐ Welded ☐

10 " Diam. from 0 ft. to 20 ft. Gauge .250

" Diam. from ft. to ft. Gauge

LINER INSTALLED:

Steel ☐ Plastic ☐

Threaded ☐ Welded ☐

" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:

Perforated? ☐ Yes ☐ No

Size of perforations in. by in.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☐ No

Manufacturer's Name

Type Model No.

Diam. Slot Size Set from ft. to ft.

Diam. Slot Size Set from ft. to ft.

NOT A WATER WELL

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☐ No If yes, by whom?

gal./min. with ft. drawdown after hrs.

Air test gal./min. with drill stem at ft. hrs.

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m.

Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Special standards: Yes ☐ No ☐

Well seal—Material used Cement

Well sealed from land surface to 20 ft.

Diameter of well bore to bottom of seal 14 in.

Diameter of well bore below seal 8 3/4 in.

Amount of sealing material 8 sacks XX pounds ☐

How was cement grout placed? Pumped

NOT A WATER WELL

Was pump installed? Type HP Depth ft.

Was a drive shoe used? ☐ Yes ☐ No Plugs Size: location ft.

Did any strata contain unusable water? ☐ Yes ☐ No

Type of Water? depth of strata

Method of sealing strata off

Was well gravel packed? ☐ Yes ☐ No Size of gravel:

Gravel placed from ft. to ft.

(10) LOCATION OF WELL by legal description:

County Clatsop ¼ ¼ of Section 18 of

Township T 8 W (Township is North or South), Range R 9 W (Range is East or West), WM.

Tax Lot Lot Block Subdivision

MAILING ADDRESS OF WELL (or nearest address) On Marine Dr. (Taylor Ave) & Frankfert St. Astoria

NOT A WATER WELL

(11) WATER LEVEL of COMPLETED WELL:

Depth at which water was first found ft.

Static level ft. below land surface. Date

Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing

Depth drilled 350 ft. Depth of completed well 08 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Base rock for road	0	3	
Clay brown	3	15	
Sand wood & little gravel	15	31	
Gravel sand & wood	31	40	
Clay	40	50	
Mudstone layers mostly clay	50	190	
Shale & mudstone mixed little clay layers	190	350	

NOT A WATER WELL

Date work started 8-22-85 /completed 8-26-85

Date well drilling machine moved off of well 8-26-85 19

(unbonded) Water Well Constructor Certification (if applicable):

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Date , 19

(bonded) Water Well Constructor Certification:

Bond # 68-0130-153844-82-1 Issued by: FUFS&G (Surety Company Name)

On behalf of Hansen Drilling CO. Inc. Jim Hansen (type or print name of Water Well Constructor)

NOT A WATER WELL

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

(Signed) Jim Hansen (Water Well Constructor)

(Dated) August 28, 1985

NOTICE TO WATER WELL CONSTRUCTOR

The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP*46866-690

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

RECEIVED

DEC 30 1987

WATER RESOURCES DEPT

CLAT 293

8N/9W-21

(1) OWNER:

Owner's Well Number

Name Bob McMillen SALEM OREGON

Address 415 3 Holiday

City Seaside State ORE Zip 97138

(2) TYPE OF WORK:

☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:

☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Other

(4) PROPOSED USE:

☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:

Depth of Completed Well 240 ft.

Special Standards date of approval

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
10	0	25	Cement	0	30	10 sacks
6	25	240				

How was seal placed? Method ☐ A ☐ B ☒ C ☐ D ☐ E

☐ Other

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6	+1	80	250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	4½	+1	240	160	☐	☒	☒	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS: NONE

☐ Perforations Method

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Pumping level	Drill stem at	Time
5	160	240	½ hr
4	160	240	1 hr ✓

Temperature of water Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata:

(9) LOCATION OF WELL by legal description:

County Clatsop Latitude ' " Longitude ' "

Township 8N N or S, Range 9W E or W, WM.

Section 21 ¼ ¼

Tax Lot 900 Lot Block Subdivision

Street Address of Well (or nearest address)

(10) STATIC WATER LEVEL:

140 ft. below land surface. Date 11-9-87

Artesian pressure lb. per square inch. Date

(11) WELL LOG:

Ground elevation

Material	From	To	WB?	SWL
Brown Soil	0	2		
Brown clay	2	8		
Yellow Clay	8	15		
Brown Sand & Stone	15	35		
Tan Sand Stone	35	60		
Brown Clay Stone	60	110		
Grey Sand Stone	110	220		
Brown Sand Stone	220	230		140
Grey Sand Stone	230	245		140

Date started 11-5-87 Completed 11-9-87

(unbonded) Water Well Constructor Certification:

I constructed this well in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

Signed Date

(bonded) Water Well Constructor Certification:

I accept responsibility for construction of this well and its compliance with all Oregon water well standards. This report is true to the best of my knowledge and belief.

Signed Date 11-10-87

Company McMillen Drilling Co. Job No.

9809C 10/85

NOTICE TO WATER WELL CONTRACTOR: The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

RECEIVED JUL 3 1972 STATE ENGINEER SALEM OREGON

WATER WELL REPORT
STATE OF OREGON

(Please type or print) (Do not write above this line)

CLAT 24

State Well No. 8N/9W-24 + 25

State Permit No. _____

(1) OWNER:
Name James Sprauge
Address Astoria Oregon

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

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

(5) CASING INSTALLED:
Threaded ☐ Welded ☒
6 " Diam. from 0 ft. to 30 ft. Gage 250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(6) PERFORATIONS:
Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "
Bailer test 0 gal./min. with 0 ft. drawdown after 0 hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Cement
Well sealed from land surface to 22 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 4 sacks
Number of sacks of bentonite used in well seal sacks
Brand name of bentonite
Number of pounds of bentonite per 100 gallons of water lbs./100 gals.
Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Clatsop Driller's well number
¼ ¼ Section 24 T. 8N R. 9W W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found No water ft.
Static level — ft. below land surface. Date 6-6-72
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 6
Depth drilled 200 ft. Depth of completed well 200 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. *Report each change in position of Static Water Level and indicate principal water-bearing strata.*

MATERIAL	From	To	SWL
Yellow Clay	0	26	
Blue Sandrock	26	200	
No water			
Well capped			

Work started 5-25 19 72 Completed 6-6 19 72
Date well drilling machine moved off of well 6-6 19 72

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Arthur T. Meservier (Drilling Machine Operator) Date 6-29-, 19 72
Drilling Machine Operator's License No. 575

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Williams Well Drilling Co (Person, firm or corporation) (Type or print)
Address Rt #1 Box 128 Toledo, WN
[Signed] W. T. Williams (Water Well Contractor)
Contractor's License No. 455 Date 6-13, 19 72

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

COLU 2657

RECEIVED OCT 28 1988

8N/9W/10

(1) OWNER:

Well Number: WATER

Name N.W. Natural Gas Co. Rect. 193

Address 220 NW. Second Ave.

City Portland State Ore. Zip 97209

(2) TYPE OF WORK: Cathodic Protection

☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD

☐ Rotary Air ☒ Rotary Mud ☐ Cable

☐ Other

(4) PROPOSED USE:

☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☒ Other Ground bed

(5) BORE HOLE CONSTRUCTION:

Special Construction approval Yes ☐ No ☒ Depth of Completed Well 0 ft.

Explosives used Yes ☐ No ☒ Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
14"	0	20	cement	0	20	8 sks.
8 3/4"	20	400				

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E

☐ Other

Backfill placed from ____ ft. to ____ ft. Material ____

Gravel placed from ____ ft. to ____ ft. Size of gravel ____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	10"	0	20	.250	☒	☐	☐	☐
Liner:					☐	☐	☐	☐

Final location of shoe(s) NOT A WATER WELL

PERFORATIONS/SCREENS:

☐ Perforations Method ____

☐ Screens Type ____ Material ____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian NOT A WATER WELL

Yield gal/min	Drawdown	Drill stem at	Time
			1 hr.

Temperature of water ____ Depth Artesian Flow Found ____

Was a water analysis done? ☐ Yes By whom ____

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other ____

Depth of strata: ____

(9) LOCATION OF WELL by legal description:

County XXXXXXX Clatsop Latitude ____ Longitude ____

Township 8 N N or S, Range 9W E or W, WM.

Section 10 ¼ ¼

Tax Lot ____ Lot ____ Block ____ Subdivision ____

Street Address of Well (or nearest address) Leif Erickson Dr

(10) STATIC WATER LEVEL:

____ ft. below land surface. Date ____

Artesian pressure ____ lb. per square inch. Date ____

(11) WATER BEARING ZONES:

NOT A WATER WELL

Depth at which water was first found ____

From	To	Estimated Flow Rate	SWL

(12) WELL LOG:

Ground elevation ____

Material	From	To	SWL
Brown clay	0	5	
Grey-blue clay	5	16	
Brown clay, little rock	16	23	
Grey shale, clay	23	390	
Grey rock	390	400	

NOT A WATER WELL

Date started Sept. 13,88 Completed Sept. 20,88

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

Signed Tim Jones WWC Number 1446

Date ____

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. all work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

Signed Jon J Hansen WWC Number 841

Date 9-27-88

RECEIVED OCT 27 1988

WHITE COPIES - WATER RESOURCES DEPARTMENT YELLOW COPY - CONSTRUCTOR PINK COPY - CUSTOMER 9809C 10/86

CLAT
51030

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

WELL I.D. # L 37007
START CARD # 126411

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number 2
Name NICK GRAFF
Address 121 SW WILLOW LN
City ASTORIA State OR Zip 97103

(2) TYPE OF WORK
☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger
☐ Other

(4) PROPOSED USE:
☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of Completed Well 140 ft.
Explosives used ☐ Yes ☐ No Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10"	0	20	BENTONITE	0	20	10 SACKS
6"	20	140				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other POUR
Backfill placed from ____ ft. to ____ ft. Material ____
Gravel placed from ____ ft. to ____ ft. Size of gravel ____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+1	30	250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	4"	-10	140		☐	☒	☒	☐
					☐	☐	☐	☐

Final location of shoe(s) 30

(7) PERFORATIONS/SCREENS:
☒ Perforations Method DRILL HOLE
☐ Screens Type ____ Material ____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
100	140	1/2	1 FT	4		☐	☒
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
10 GPM		140	1 hr.

Temperature of water 52° Depth Artesian Flow Found ____
Was a water analysis done? ☐ Yes By whom ____
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other ____
Depth of strata: ____

(9) LOCATION OF WELL by legal description:
County CLATSOP Latitude ____ Longitude ____
Township 8N N or S Range 9W E or W. WM.
Section 23 NW 1/4 NW 1/4
Tax Lot 1300 Lot ____ Block ____ Subdivision ____
Street Address of Well (or nearest address) Grimstad Rd; Dan Day River Rd. Astoria, OR 97103

(10) STATIC WATER LEVEL:
-3 ft. below land surface. Date 4/26/00
Artesian pressure ____ lb. per square inch. Date ____

(11) WATER BEARING ZONES:
Depth at which water was first found 130

From	To	Estimated Flow Rate	SWL
130	133	10	-3

(12) WELL LOG:
Ground Elevation ____

Material	From	To	SWL
CLAY, BROWN	0	5	-3
CLAY, GRAY, SILTY	5	12	
CLAYSTONE, GRAY	12	140	

CLAT
51153

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537 WATER)

WELL I.D. # L 43021
START CARD # 134374

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number 1
Name Kathleen Gowing
Address P.O. Box 1239
City Astoria State Oregon Zip 97103

(2) TYPE OF WORK
[X] New Well [ ] Deepening [ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD:
[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger
[ ] Other

(4) PROPOSED USE:
[X] Domestic [ ] Community [ ] Industrial [ ] Irrigation
[ ] Thermal [ ] Injection [ ] Livestock [ ] Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval [ ] Yes [X] No Depth of Completed Well 185 ft.
Explosives used [ ] Yes [X] No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10	0	20	Bentonite	0	20	37
6	20	185	—	—	—	—

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[X] Other Placed in dry & prodded
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6	+2	98	.250	[X]	[ ]	[X]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
Liner:	4½	85	185	160	[ ]	[X]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]

Drive Shoe used [ ] Inside [X] Outside [ ] None
Final location of shoe(s) 98

(7) PERFORATIONS/SCREENS:
[X] Perforations Method Drilled
[ ] Screens Type Material

From	To	Slot size	Number	Diameter	Telescope size	Casing	Liner
125	189	—	240	5/8	4½	[ ]	[X]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]

(8) WELL TESTS: Minimum testing time is 1 hour
[ ] Pump [ ] Bailer [X] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
5	68	150	1 hr.

Temperature of water 55 Depth Artesian Flow Found
Was a water analysis done? [ ] Yes By whom
Did any strata contain water not suitable for intended use? [ ] Too little
[ ] Salty [ ] Muddy [ ] Odor [ ] Colored [ ] Other
Depth of strata

(9) LOCATION OF WELL by legal description:
County Clatsop Latitude Longitude
Township 8N N or S Range 9W E or W WM
Section 21 NE 1/4 NW 1/4
Tax Lot 3000 Lot Block Subdivision
Street Address of Well (or nearest address) 92931 Hwy. 202

(10) STATIC WATER LEVEL:
82 ft. below land surface. Date 6-4-01
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES:
Depth at which water was first found 97

From	To	Estimated Flow Rate	SWL
97	98	T	98
151	185	5	82

(12) WELL LOG:
Ground Elevation

Material	From	To	SWL
Yellow Clay	0	13	
Med Gray Sandstone	13	185	82

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JUL 23 2001
WATER RESOURCES DEPT
SALEM, OREGON

Date Started 6-1-01 Completed 6-4-01

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 1221
Signed Sally C Gray Date 6-4-01

ORIGINAL – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER

CLAT 51811

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OAR 690-240-095)

Instructions for completing this report are on the last page of this form.

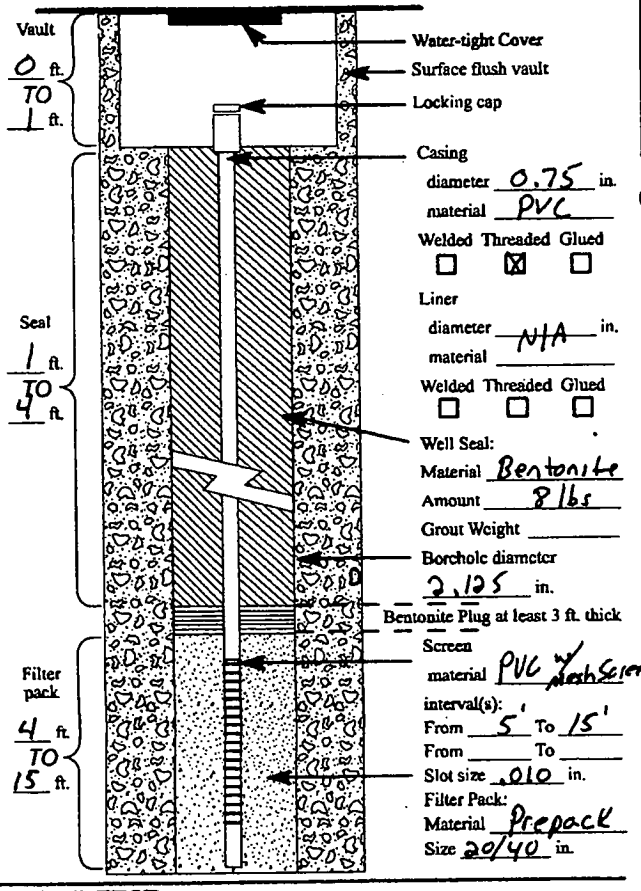
Well I.D. #: L 54928
Start Card #: 42682

(1) OWNER/PROJECT:
WELL NO. MW-2
Name Brian Dion
Address 88786 Blue Heron Rd.
City Cearhart State OR Zip 97138

(2) TYPE OF WORK:
☐ New construction ☐ Alteration (Repair/Recondition)
☐ Conversion ☐ Deepening ☒ Abandonment

(3) DRILLING METHOD:
☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger ☒ Other Push Probe

(4) BORE HOLE CONSTRUCTION:
Special Standards Yes ☒ No ☐ Depth of completed well 15 ft.



(5) WELL TEST:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian
Permeability Yield GPM
Conductivity pH
Temperature of Water °F Depth artesian flow found ft.
Was water analysis done? ☐ Yes ☐ No
By whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks
Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description
Well Location: County Clatsop
Township 8N N Range 9W E Section 7
1. NE ¼ of SW ¼ of above section.
2. Either Street address of well location 210 W. Marine Dr. Astoria, OR
or Tax lot number of well location 2800
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:
7 Ft. below land surface Date 10/10/03
Artesian Pressure lb/sq in. Date

(8) WATER BEARING ZONES:
Depth at which water was first found

From	To	Est. Flow Rate	SWL
6'	15	1 gpm	

(9) WELL LOG:
Ground elevation

Material	From	To	SWL
Brown Sand	0	15'	7'
Well Abandoned by filling casing w/ 3/8" chip bentonite & removing monuments.			

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SALEM, OREGON

Date started 10/10/03 Completed 10/10/03

(unbonded) Monitor Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.
MWC Number 10149
Signed Bill Rust Date 10/21/03

(bonded) Monitor Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
MWC Number 10149
Signed Bill Rust Date 10/21/03

CLAT 51810

STATE OF OREGON
MONITORING WELL REPORT

(as required by ORS 537.765 & OAR 690-240-095)

Instructions for completing this report are on the last page of this form.

Well I.D. #: L 61721

Start Card #: 42681

(1) OWNER/PROJECT:

WELL NO. MW-1

Name Brian Dion

Address 88786 Blue Heron Rd.

City Gearhart State OR Zip 97138

(2) TYPE OF WORK:

☐ New construction ☐ Alteration (Repair/Recondition)

☐ Conversion ☐ Deepening ☒ Abandonment

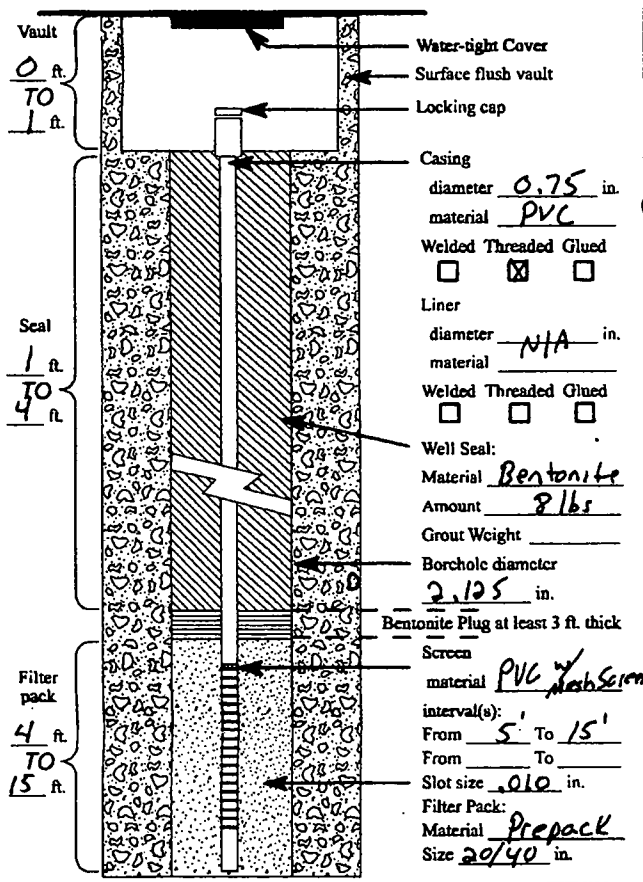
(3) DRILLING METHOD:

☐ Rotary Air ☐ Rotary Mud ☐ Cable

☐ Hollow Stem Auger ☒ Other Push Probe

(4) BORE HOLE CONSTRUCTION:

Special Standards Yes ☒ No ☐ Depth of completed well 15 ft.



(5) WELL TEST:

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Permeability Yield GPM

Conductivity pH

Temperature of Water °F Depth artesian flow found ft.

Was water analysis done? ☐ Yes ☐ No

By whom?

Depth of strata to be analyzed. From ft. to ft.

Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

Well Location: County Clatsop

Township 8N N Range 9W E Section 7

1. NE ¼ of SW ¼ of above section.
2. Either Street address of well location 210 W. Marine Dr. Astoria, OR
   or Tax lot number of well location 2800
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:

7 Ft. below land surface Date 10/10/03

Artesian Pressure lb/sq in. Date

(8) WATER BEARING ZONES:

Depth at which water was first found

From	To	Est. Flow Rate	SWL
6'	15	1gpm	

(9) WELL LOG:

Ground elevation

Material	From	To	SWL
Brown Sand	0	15'	7'
Well Abandoned by filling casing w/ 3/8" chip bentonite & removing monuments.			

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OCT 23 2003
WATER RESOURCES DEPT.
SALEM, OREGON

Date started 10/10/03 Completed 10/10/03

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

Signed Bill Rust MWC Number 10149

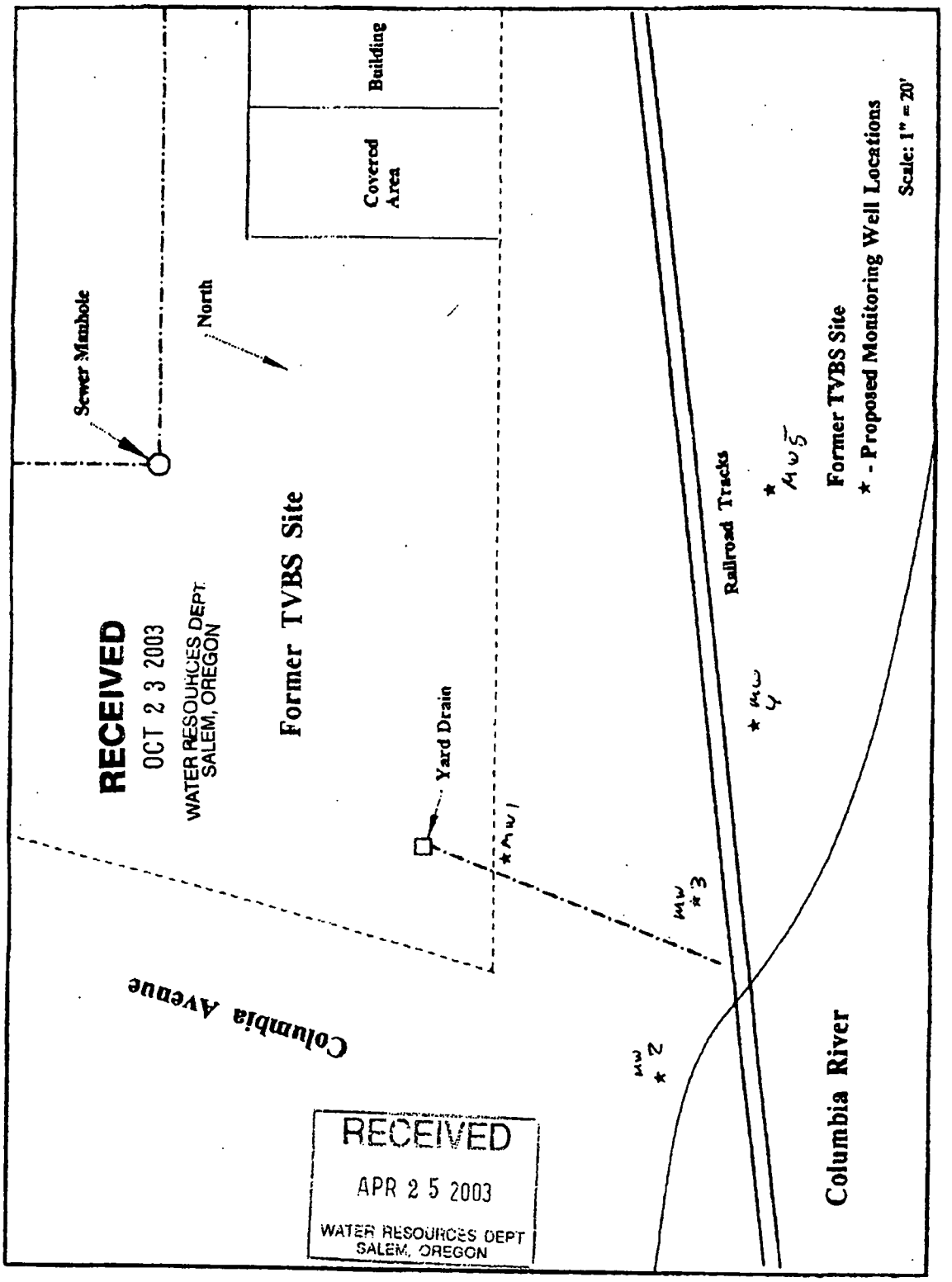
Date 10/21/03

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

Signed Bill Rust MWC Number 10149

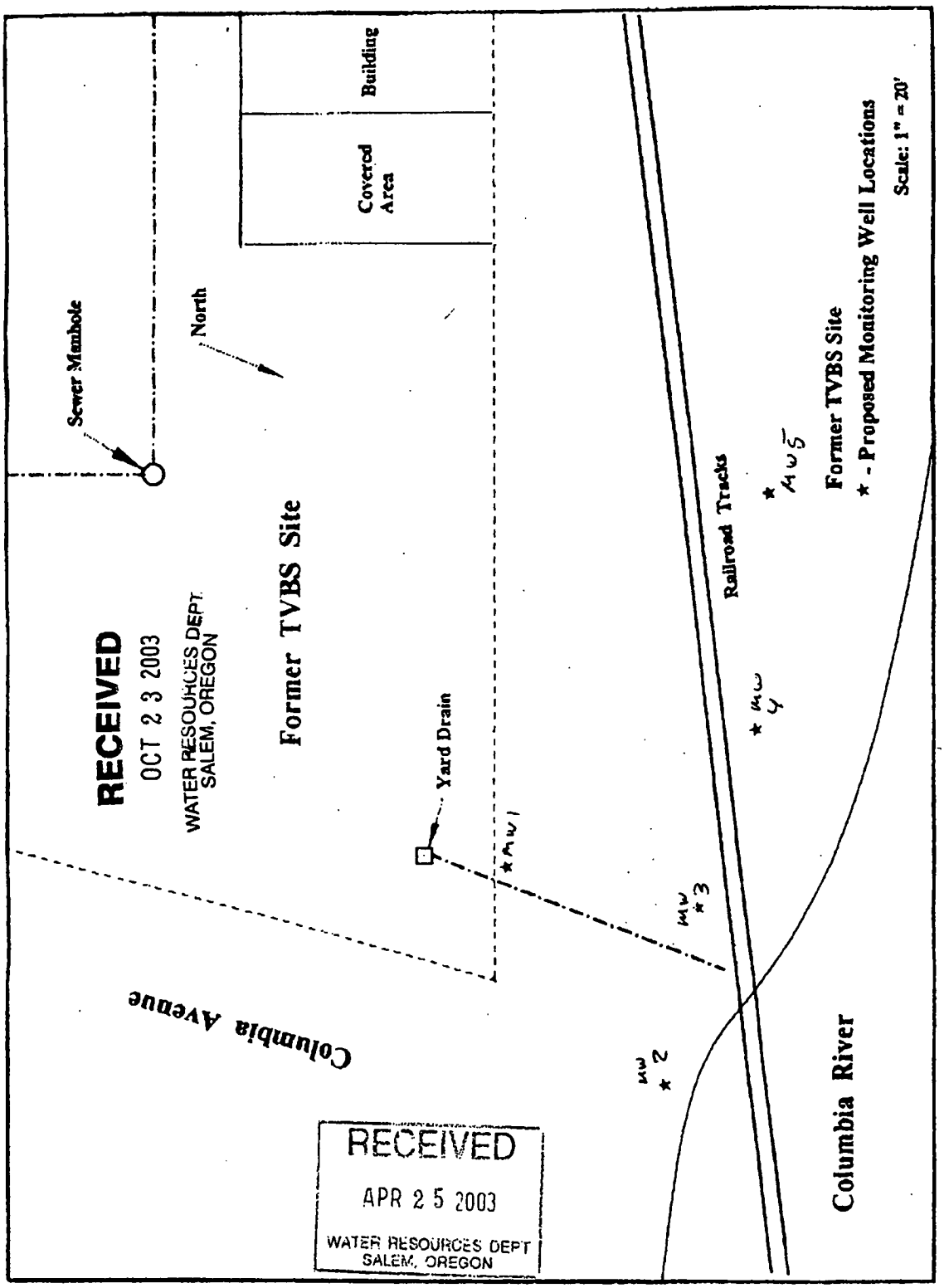
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STATE OF OREGON
MONITORING WELL REPORT

(as required by ORS 537.765 & OAR 690-240-095)

Instructions for completing this report are on the last page of this form.

Well I.D. #: L 61725

Start Card #: 42684

(1) OWNER/PROJECT:

WELL NO. MW-4

Name Brian Dion

Address 88786 Blue Heron Rd.

City Gearhart State OR Zip 97138

(2) TYPE OF WORK:

☐ New construction ☐ Alteration (Repair/Recondition)

☐ Conversion ☐ Deepening ☒ Abandonment

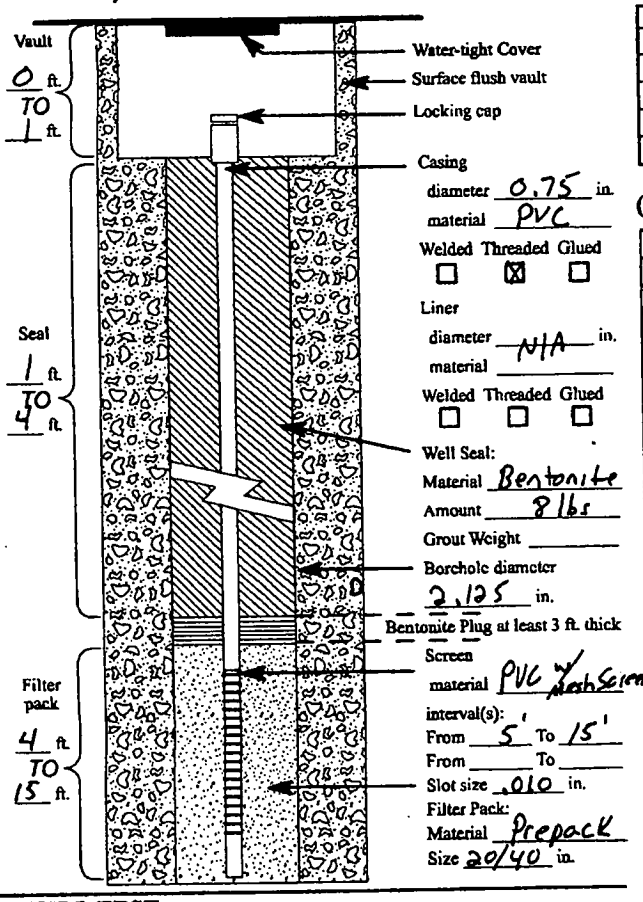
(3) DRILLING METHOD:

☐ Rotary Air ☐ Rotary Mud ☐ Cable

☐ Hollow Stem Auger ☒ Other Push Probe

(4) BORE HOLE CONSTRUCTION:

Special Standards Yes ☒ No ☐ Depth of completed well 15 ft.



(5) WELL TEST:

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Permeability _____ Yield _____ GPM

Conductivity _____ pH _____

Temperature of Water _____ °F Depth artesian flow found _____ ft.

Was water analysis done? ☐ Yes ☐ No

By whom? _____

Depth of strata to be analyzed. From _____ ft. to _____ ft.

Remarks _____

Name of supervising Geologist/Engineer _____

(6) LOCATION OF WELL By legal description

Well Location: County Clatsop

Township 8N N Range 9W E Section 7

1. NE ¼ of SW ¼ of above section.
2. Either Street address of well location 210 W. Marine Dr. Astoria, OR

   or Tax lot number of well location 2800
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:

7 Ft. below land surface Date 10/10/03

Artesian Pressure _____ lb/sq in. Date _____

(8) WATER BEARING ZONES:

Depth at which water was first found _____

From	To	Est. Flow Rate	SWL
6'	15	1 gpm	

(9) WELL LOG:

Ground elevation _____

Material	From	To	SWL
Brown Sand	0	15'	7'
Well Abandoned by filling casing w/ 3/8" chip bentonite & removing monuments.			

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Date started 10/10/03 Completed 10/10/03

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10149

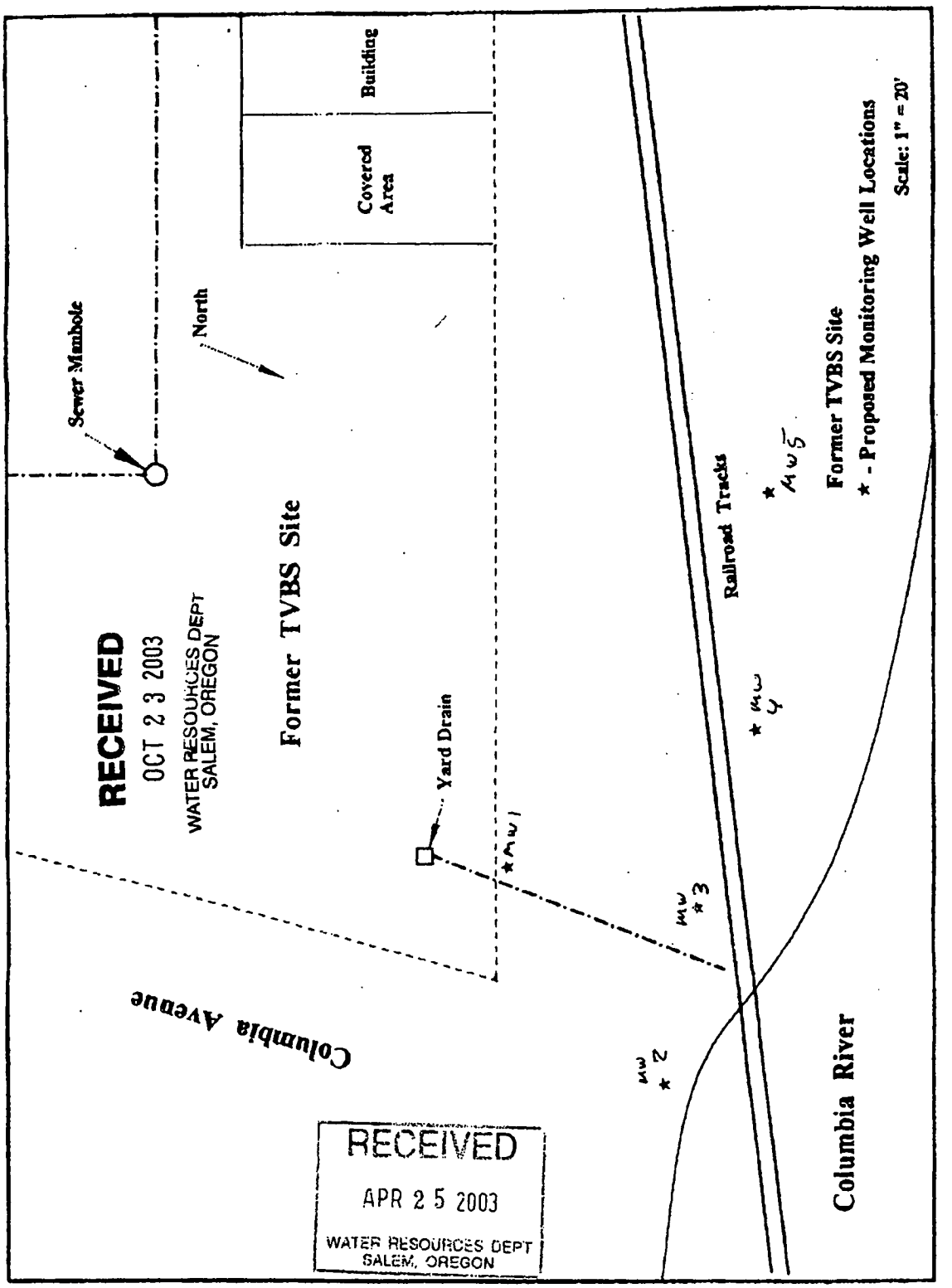
Signed [signature] Date 10/21/03

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10149

Signed [signature] Date 10/21/03



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CLAT 51814

STATE OF OREGON
MONITORING WELL REPORT
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Instructions for completing this report are on the last page of this form.

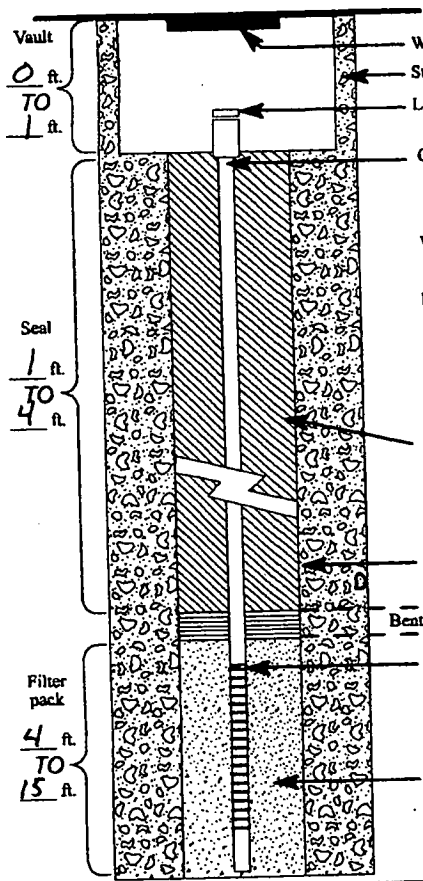
Well I.D. #: L 63023
Start Card #: 42685

(1) OWNER/PROJECT:
WELL NO. MW-5
Name Brian Dion
Address 88786 Blue Heron Rd.
City Gearhart State OR Zip 97138

(2) TYPE OF WORK:
☐ New construction ☐ Alteration (Repair/Recondition)
☐ Conversion ☐ Deepening ☒ Abandonment

(3) DRILLING METHOD:
☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger ☒ Other Push Probe

(4) BORE HOLE CONSTRUCTION:
Special Standards Yes ☒ No ☐ Depth of completed well 15 ft.



(5) WELL TEST:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian
Permeability ____ Yield ____ GPM
Conductivity ____ pH ____
Temperature of Water ____ °F Depth artesian flow found ____ ft.
Was water analysis done? ☐ Yes ☐ No
By whom? ____
Depth of strata to be analyzed. From ____ ft. to ____ ft.
Remarks ____
Name of supervising Geologist/Engineer ____

(6) LOCATION OF WELL By legal description
Well Location: County Clatsop
Township 8N N Range 9W E Section 7
1. NE ¼ of SW ¼ of above section.
2. Either Street address of well location 210 W. Marine Dr. Astoria, OR
or Tax lot number of well location 2800
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:
7 Ft. below land surface Date 10/10/03
Artesian Pressure ____ lb/sq in. Date ____

(8) WATER BEARING ZONES:
Depth at which water was first found ____

From	To	Est. Flow Rate	SWL
6'	15	1gpm	

(9) WELL LOG:
Ground elevation ____

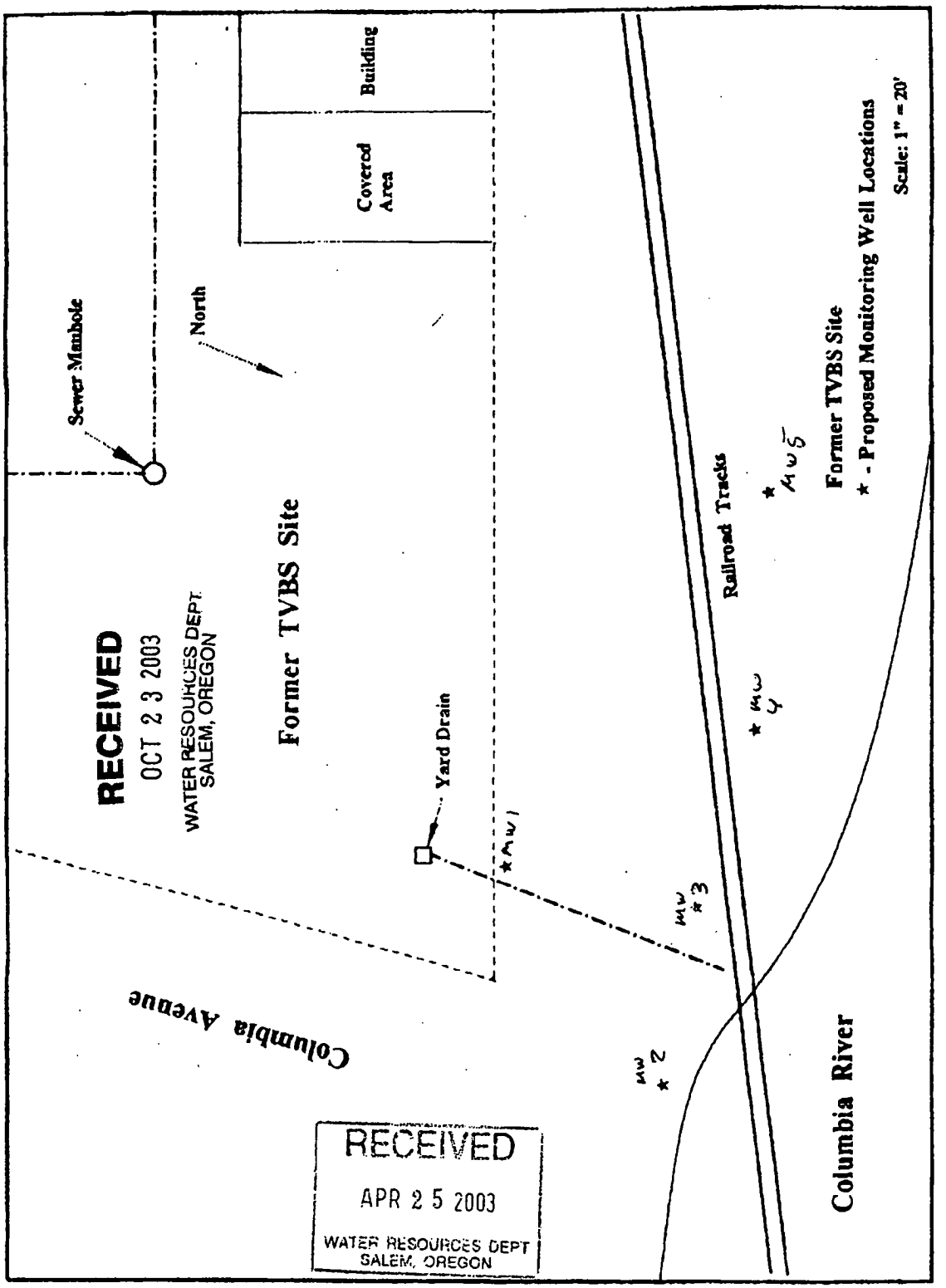
Material	From	To	SWL
Brown Sand	0	15'	7'
Well Abandoned by filling casing w/ 3/8" chip bentonite & removing monuments.			

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OCT 23 2003
WATER RESOURCES DEPT
SALEM, OREGON

Date started 10/10/03 Completed 10/10/03

(unbonded) Monitor Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.
MWC Number 10149
Signed [signature] Date 10/21/03

(bonded) Monitor Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
MWC Number 10149
Signed [signature] Date 10/21/03



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SALEM, OREGON

RECEIVED
APR 25 2003
WATER RESOURCES DEPT
SALEM, OREGON

ADDITIONAL SITE CHARACTERIZATION REPORT
HIWAY SERVICE 76 STATION
1308 MARINE DRIVE
ASTORIA, OREGON

DEQ File No. 04-99-1193

December 27, 2007

Prepared For:

Niemi Oil Company
P.O. Box 989
Astoria, Oregon 97103

Prepared By:

RSV Engineering, Inc.
31960 SW Charbonneau Drive, Suite 101
Wilsonville, Oregon 97070
(503) 694.6960

RSV Project No. 03-137

ADDITIONAL SITE CHARACTERIZATION REPORT
HIWAY SERVICE 76 STATION
1308 MARINE DRIVE
ASTORIA, OREGON

RSV Engineering, Inc. is submitting this report to the Niemi Oil Company to document groundwater investigation work performed for the Hiway Service 76 Station site located at 1380 Marine Drive in Astoria, Oregon. The report was prepared in conformance with RSV Engineering's quality assurance/quality control procedures to ensure that the report meets industry standards in terms of the methods used and the information presented. If you have any questions or comments concerning this report, please contact one of the individuals listed below.

Sincerely,

RSV ENGINEERING Inc.

Daniel E. Becraft, R.G.
Project Geologist

for:

Brad J. Berggren, P.E., R.G.
Vice President

REGISTERED
OREGON
DANIEL E. BECRAFT
G1974
GEOLOGIST
EXPIRES: 4/30/08

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SOIL SCREENING RESULTS 11
LABORATORY ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES 11

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RECOMMENDATIONS **15**

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Table 1 Summary of Groundwater Elevation Data
Table 2 Summary of Groundwater Analytical Data

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Figure 1 Site Location
Figure 2 Site Plan
Figure 3 Groundwater Flow – November 1, 2007
Figure 4 Groundwater Flow – November 27, 2007

APPENDICES

Appendix A Soil Boring and Monitoring Well Construction Logs
Appendix B Laboratory Data Sheets and Chain of Custody Forms
Appendix C Analytical Result Tables from 2003 and 2004 Investigations

ADDITIONAL CHARACTERIZATION REPORT
HIWAY SERVICE 76 STATION
1308 MARINE DRIVE
ASTORIA, OREGON

INTRODUCTION

RSV Engineering, Inc. has prepared this report describing additional characterization activities at the Hiway Service 76 Station site located at 3108 Marine Drive in Astoria, Oregon (Figure 1). Soil and groundwater investigation activities have been conducted at the site to define the nature and extent of petroleum hydrocarbons associated with a release from a 550-gallon waste-oil tank decommissioned in 1999. The Oregon Department of Environmental Quality (DEQ) has listed the site as a Leaking Underground Storage Tank (LUST) site with File Number 04-99-1193.

The activities described in this report were presented in a DEQ-approved scope of work dated April 4, 2006. The scope of work included installation and sampling of four groundwater-monitoring wells, and collection of three grab groundwater samples to further define the full lateral extent of petroleum constituents in groundwater.

This work was performed as requested by DEQ in a September 23, 2005 letter responding to a Niemi Oil Company (Niemi) request for a "No Further Action" (NFA) determination for the site. Niemi's request for site closure was based on the results of direct-push soil and groundwater investigations conducted at the site in 2003 and 2004. The soil and groundwater analytical results from these investigations were compared to Risk-Based Concentrations (RBCs) in accordance with Oregon Administrative Rule (OAR) 340-122-0244. Niemi believes the site should be closed based on the following investigation results.

1) Contamination at the site is limited to petroleum based constituents.
2) Petroleum related hazardous constituents identified at the site are listed in the DEQ Appendix A Table of RBCs.

3) The site is zoned commercial and the current and future planned use of the site is as a gasoline and service station. The only RBC exceedances for applicable exposure pathways were ingestion, inhalation, and dermal contact for soils impacted with TPH-Oil, and migration to groundwater from soils impacted with TPH-Oil and metals in the vicinity of the former location of the waste-oil UST. However, the soil exceeding the ingestion, inhalation, and dermal contact exposure pathway is 6 ft or more below ground surface, and deeper than the 3-ft depth considered for occupational workers per DEQ guidance. No site development is expected or planned in the future, and exposure to the impacted soils is unlikely.
4) Groundwater samples did not reveal exceedances of DEQ Appendix A or site-specific RBCs for applicable exposure pathways identified for the site (i.e., Volatilization to Outdoor Air, Vapor Intrusion into Buildings, or Groundwater in an Excavation for Occupational, Construction worker or Excavation worker pathways).

In its September 23, 2005 letter, DEQ acknowledged that the petroleum hydrocarbon concentrations detected in soil and groundwater samples collected from the Hiway Service site meet the criteria for site closure. DEQ, however, expressed concern that gasoline-range hydrocarbons detected in downgradient groundwater grab samples in October 2004, also might indicate a release from the active UST fueling system in addition to the known release from the decommissioned waste-oil UST. Therefore, DEQ requested groundwater monitoring wells be installed in accordance with OAR 340-122-0240.

The results of the additional characterization activities described in this report do not indicate a release from the active UST fueling system. In addition, the recent results indicate that, although relatively low concentrations of gasoline-range hydrocarbons (i.e., below applicable RBCs) were detected in groundwater downgradient of the former used-oil UST in October 2004, those concentrations have attenuated with time.

The recent groundwater analytical data further indicate that petroleum hydrocarbons are limited to the vicinity of the former 550-gallon waste-oil UST cavity, and at relatively low concentrations. Consistent with the analytical results for all soil and groundwater samples collected during this and previous site investigations associated with the Hiway Service site, the detected concentrations do not exceed applicable RBCs.

The four new monitoring wells will be sampled during the first three quarters of 2008 such that trends in groundwater quality and flow can be established. After one year of quarterly monitoring, Niemi will again submit an NFA request to DEQ, if appropriate, based on the groundwater monitoring results.

Previous Investigations

The Hiway Service site is an active 76 Service Station. There are three registered fuel product USTs located at the site, two 4,000-gallon gasoline USTs and one 1,500-gallon gasoline UST.

On October 18, 1999, a 550-gallon used-oil UST was removed from the site near the northeast corner of the station building (Figure 2). At that time, petroleum product odor and staining were noted in the soils from the used-oil UST excavation. Two soil samples were collected from the bottom of the UST excavation from a depth of 6ft and analyzed for Total Petroleum Hydrocarbon–Hydrocarbon Identification (TPH-HCID), with both diesel and heavy oil detected in both samples. Follow-up analyses for TPH in the diesel and heavy oil ranges detected only heavy oil to a maximum concentration of 78,000 mg/kg. TPH in the diesel range was not detected in either sample. The soil contamination was reported to the DEQ on October 21, 1999.

RSV conducted an initial soil and groundwater investigation at the site in October 2003. Laboratory analytical results indicated relatively low concentrations of petroleum related compounds in soil and groundwater beneath the site (RSV 2004). A Site Characterization Report was submitted to DEQ in February 2004, and in April 2004,

DEQ requested additional site characterization work to better define the extent of petroleum hydrocarbons.

In October 2004, RSV completed three soil borings to further assess the extent of petroleum hydrocarbons associated with the former used-oil UST. Boring B-7 was completed adjacent to the former location of the used-oil UST, and Borings B-8 and B-9 were completed to the north and hydraulically downgradient of the former waste-oil UST area (Figure 2).

Analysis of samples collected from Soil Boring B-7 revealed detections of petroleum constituents in soil and groundwater consistent with a release from a used-oil tank. Groundwater samples collected from Soil Borings B-8 and B-9, completed downgradient of the former waste-oil UST area, revealed relatively low detections of several petroleum related compounds more typically associated with gasoline (RSV, 2005).

A conceptual site model was developed and potential exposure routes were considered for employees and workers at the site based on the current and expected future commercial use of the site and surrounding properties. The potential pathways associated with the conceptual site model include direct contact with soil, dermal absorption and inhalation of volatiles, inhalation of chemicals volatilized into outdoor air, inhalation of chemicals volatilized into buildings, and leaching to groundwater. Ingestion of groundwater was excluded as a potential pathway at the site since the site receives its water supply from the City of Astoria. In addition, a review of well records available from the Oregon Department of Water Resources in the vicinity of the site indicated that no drinking water wells are located within approximately one mile of the site. (RSV, 2004).

The only RBC exceedances for applicable exposure pathways were for soils in or near the former waste-oil UST excavation. However, the impacts exceeding applicable RBCs were encountered at depths greater than 3 feet below ground surface, or below the depth considered to present reasonable exposure scenarios for occupational workers (DEQ,

2003). RBCs were exceeded for soil ingestion, inhalation, and dermal contact for employees and construction and excavation workers for TPH-Oil, and migration to groundwater from soils for TPH-Oil and metals near the former UST tank pit. Exposure to soil exceeding the ingestion, inhalation, and dermal contact exposure pathway for construction and excavation workers is not reasonably likely since the soil exceedances were from a depth of 6 feet or more, the current and planned future use of the site is as a gasoline and service station, and no site development activities are expected or planned in the future.

RSV calculated site-specific soil and groundwater RBCs for TPH-Oil using DEQ's RBC computer spreadsheet (DEQ, 2003a). The calculation assumed that all of the TPH detected in soil samples at the site were within the range that yields the most conservative site-specific RBC (RSV, 2004). In its September 23, 2005 letter, DEQ presented TPH-Oil RBCs that DEQ had calculated using site specific TPH and constituent concentration data for soil samples collected from the former waste-oil UST area. As DEQ indicated in their letter, the site specific RBCs calculated by DEQ indicate that remaining heavy oil concentrations at the Hiway Service site are within the applicable cleanup standards.

With respect to leaching to groundwater RBC exceedances, ingestion and inhalation of groundwater is not considered an applicable exposure pathway at the site.

In summary, the site data indicate that petroleum hydrocarbons are currently only detected in the vicinity of the former waste-oil tank. Comparison of petroleum concentrations detected in soil and groundwater samples to applicable RBCs, indicates that the RBCs are not exceeded by the relatively low concentrations of petroleum hydrocarbons associated with the Hiway Service site.

Physical Setting and Local Geology

The Hiway Service site is located approximately 550 ft south of the Columbia River. A bedrock high is located approximately one-half mile to the south of the site. Floodplain sediments in the vicinity of the Columbia River in this part of Astoria generally consist of

primarily sands and gravels with minor amounts of clay. Underlying unconsolidated sediments in the area is the Astoria Formation, which is characterized by an upper sandstone unit of Miocene age, a middle shale unit, and a lower sandstone unit. According to the Hiway Service station manager, depth to bedrock encountered during geotechnical borings completed at an adjacent site south and across Marine Drive from the Hiway Service site indicated bedrock occurs approximately 28 ft bgs.

Shallow soils in the vicinity of the site have been mapped as Walluski Silt Loam. The Walluski Silt Loam is typically moderately well drained and has a slow permeability. A typical profile consists of 14 inches of very dark grayish brown silt loam, 7 inches of dark brown silt loam, and 39 inches of dark yellowish brown, yellowish brown, and light brownish gray, mottled silty clay loam.

At the Hiway Service property, there is a sharp ground surface elevation difference of approximately 10 feet between the northern portion of the property in the vicinity of Borings B-8 and B-9, due to a retaining wall behind the storage shed constructed on the north side of the station building (Figure 2). Fill material was placed on the south side of the retaining wall to build up the property such that the Service Station could be constructed. Site specific geology is discussed in the results section of this report.

SCOPE OF WORK AND METHODS

RSV conducted the monitoring well installation and groundwater sampling fieldwork between October 29 and November 1, 2007. The scope of work for the investigation included the following tasks:

- Advance soil borings at seven locations: four on Niemi property; two on the Astoria Grooming property adjacent to the east; and, one in the Northwest Educational Services District parking lot adjacent to the northern Niemi property boundary (Figure 2). Soils were continuously logged and screened above the water table for the presence of volatile organics using a photoionization detector (PID). Borings MW-1 through MW-4 were completed using sonic drilling

methods, while Borings HA-1, HA-2 and HA-3 were completed by hand-auger methods.

- Collect one-time grab groundwater samples from Borings HA-1, HA-2, and HA-3.
- Install, develop, and sample Monitoring Wells MW-1 through MW-4 (Figure 2),
- Submit groundwater samples for laboratory analysis for the following analyses: volatile organic compounds (VOCs) of interest (benzene, ethylbenzene, toluene, xylenes, 1,2 Dibromoethane [EDB], 1,2 Dichloroethane [EDC], and Methyl tert-butyl ether [MTBE] by U.S. Environmental Protection Agency (EPA) Method 8260; TPH in the gasoline-, diesel-, and heavy-oil ranges by Northwest Methods TPH-Gx and TPH-Dx; and, dissolved and total cadmium, chromium, and lead by EPA Method 200.8.
- Survey the elevation of the top of each monitoring well casing relative to mean sea level, and collect depth-to-water measurements.

RSV directed drilling operations, logged and screened soils for volatile organics, developed the wells and collected groundwater samples. Boart Longyear/Geo-Tech Explorations, Inc. of Tualatin, Oregon, operated the sonic drilling equipment completed the hand-auger borings, and performed well constructions. Coast Surveying, Inc. of Warrenton, Oregon performed the survey work.

Each soil core recovered by the sonic drill rig was vibrated from the rig sampler into new clear soil sampling bags at 2.5 foot intervals. Upon retrieval, the sample bag was slit to to perform volatile organic vapor screening using the PID. In addition, soils were characterized consistent with American Society for Testing and Materials (ASTM) D-2488,

Following completion of the hand auger borings, 2-inch diameter 0.02-inch slotted Schedule 40 PVC temporary well screen was installed in each boring. Dedicated

peristaltic pump tubing was installed in each temporary well, and water pumped from the wells until the water ran relatively clear. Temperature, pH and specific conductance measurements were recorded. Samples for TPH and metals analysis were collected into containers provided by the laboratory using the peristaltic pump. Samples for dissolved metals analysis were filtered in the field using a 0.45 micron filter. Samples for VOC and TPH-Gx analysis were collected using disposable bailers.

Monitoring Wells MW-1 though MW-4 were installed, and hand-auger Borings HA-1, HA-2, and HA-3 abandoned, consistent with OAR 690-240, Administrative Rules for Construction, Maintenance, and Abandonment of Monitoring Wells and Other Holes in Oregon. The well construction logs and hand-auger boring abandonments are shown on the soil boring logs in Appendix A.

The hand auger borings were abandoned by backfilling with 3/8" bentonite chips that were hydrated following placement. Prior to hand augering, the concrete at Borings HA-1 and HA-2 was cored using a 12-inch diameter concrete core blade to allow access. After placement and hydration of the bentonite chips, the holes cored in the concrete were repaired with new concrete. The ground surface at HA-3 is grass and the grass core removed for drilling was replaced to complete abandonment.

The monitoring wells were constructed using 2-inch diameter threaded PVC casing and a 10-ft section of 0.02-inch slotted PVC well screen. A filter sand (#10-20 sand) was placed in the annular space between the borehole and the well screen. The wells were completed with a surface seal of bentonite, a flush-mounted traffic-rated monument set in concrete, and the top of the well casing secured with a locking well cap and lock.

Each monitoring well was developed by surging the well screen followed by groundwater pumping until the groundwater was relatively free of fines. The wells were allowed to equilibrate for 24 hours after development before groundwater samples were collected.

A minimum of three well volumes of groundwater were purged from the monitoring well and temperature, pH and specific conductance measurements collected prior to groundwater sampling. Groundwater samples for TPH-Dx and metals analysis were collected using a peristaltic pump with new tubing. Prior to sampling each boring, groundwater was purged until the groundwater was relatively free of fines. Groundwater samples for VOC and TPH-Gx analysis were collected using a new disposable bailer. Groundwater samples were labeled, placed in a cooler with ice, and delivered to Test America of Beaverton, Oregon within allowable holding times.

In addition to the depth-to-water measurements collected on November 1, 2007, water levels were also measured on November 27, 2007. Depth to groundwater was measured using an electronic water level indicator with accuracy of 0.01 foot. The electronic water level indicator was decontaminated prior to use in each well. Groundwater elevations were calculated by subtracting the depths to groundwater from the surveyed top of casing elevations.

Purge water and equipment decontamination water were contained in 55-gallon drums, labeled, and left on the Warrenton 76 Station property pending proper disposal.

RESULTS

Geology and Hydrogeology

Soil boring and well construction logs are presented in Appendix A. In general, sands, silty sands, and silty clayey gravel material were encountered. As review of the soil boring logs for MW-1, MW-2, and MW-3 indicate, shallow soils in these borings vary and include sand (MW-2), silty sand (MW-1), and silty clayey gravel (MW-3). The proximity of Monitoring Wells MW-2 and MW-3 to the retaining wall, as well as, glass and metal fragments observed from the depth of 8 ft in Boring MW-2, indicate the shallow soils in these borings is fill material.

Beneath the site fill sand was encountered in Borings MW-2 and MW-3, and sand and silty sand in Boring MW-1, until silty clayey gravel was encountered in these borings at the depths of and 18 ft. (MW-1), 22.5 ft (MW-2), and19.5 ft (MW-3) below ground surface. The driller reported the gravel was relatively difficult drilling, and it was this gravel that had prevented use of direct-push (e.g., Geoprobe) technology for monitoring well installations, and caused direct-push refusal during previous site investigations. Only sand was encountered in Boring MW-4.

Groundwater was observed during drilling at depths ranging from approximately 6.5' ft (HA-1, HA-2, HA-3, and MW-4) to 18.5 ft (MW-1, MW-2, and MW-3) below ground surface. This approximately 12-ft difference in depths to water is primarily attributable to ground surface elevation differences between the north and south side of the site retaining wall.

Groundwater flow maps based on the November 1 and 27, 2007 depth-to-water measurements are presented on Figures 3 and 4. As review of the flow maps indicates, the direction of groundwater flow is predominantly towards the north with a gradient of 0.007 ft/ft on November 1, and a gradient of 0.005 on November 27. This groundwater

flow direction was anticipated and is consistent with the topography of the site area and location of the Columbia River relative to the site.

Soil Screening Results

Soils above the water table were screened for the presence of volatile organic vapors using a PID, and the results included on the boring logs in Appendix A. The results of the PID screening did not indicate the presence of volatile organics in soils. In addition, no visual or olfactory indications of petroleum contamination were observed during soil logging. Based on the soil screening results and observations, no soil samples were collected from the soil borings for laboratory analysis.

Laboratory Analytical Results for Groundwater Samples

Groundwater analytical data for the additional site characterization groundwater samples are summarized in Table 2. The laboratory report and chain-of-custody documentation are included in Appendix B.

Review of Table 2 indicates that petroleum concentrations were not detected above reporting limits in groundwater samples from HA-1, HA-2, HA-3, MW-1, MW-2, and MW-4. The only sample with petroleum constituent detections above reporting limits is the sample from MW-3, located near the former waste-oil UST cavity. In Sample MW-3, TPH in the gasoline and diesel ranges were detected at concentrations of 1,350 µg/l and 522 µg/l, respectively. The only detected VOCs were relatively low concentrations of benzene (31.9 µg/l) ethylbenzene (19.6 µg/l), toluene (2.59 µg/l) and xylenes (2.41 µg/l). Metals were not detected above reporting limits in any groundwater sample.

SITE DATA SUMMARY

The following summarizes the results of site characterization work completed in 2003, 2004, and 2007. The work was requested by DEQ to further characterize a petroleum product release from a 550-gallon waste-oil UST decommissioned in 1999, as well as to verify that there has not been a release from the active UST fueling system. The soil and

groundwater analytical result tables from the 2003 and 2004 investigation reports are included in Appendix C. The following provides a summary of the site investigation data.

- The source of contamination (i.e., the former 550-gallon waste-oil UST) at the Hiway Service site was removed in 1999 when 3 Kings Environmental, Inc. (3 Kings) decommissioned the UST.

- Based upon the observation of product odors and staining in soil exposed during the UST removal in 1999, two soil samples were collected from the bottom of the excavation at a depth of 6 ft. TPH as heavy oil was detected in both samples at concentrations of 19,000 mg/kg and 78,000 mg/kg, respectively.

- No spills or leaks from the remaining three active USTs or associated fueling system at the site have been detected during tightness testing by Niemi Oil.

- Laboratory analytical results from sampling conducted in 2003, 2004, and 2007 indicate that soil and groundwater in the vicinity of the former waste-oil UST at the Hiway Service site have been impacted by relatively low concentrations of petroleum-related constituents.

- In general, sands, silty sands, and silty clayey gravel material were encountered in site investigations. Groundwater was observed during drilling in sands at depths ranging from approximately 6.5' ft to 18.5 ft (MW-1, MW-2, and MW-3) below ground surface. This approximately 12-ft difference in depths to water is primarily attributable to ground surface elevation differences between the north and south side of the site retaining wall.

- Groundwater flow maps based on the November 1, 2007 and November 27, 2007 depth-to-water measurements are presented on Figures 3 and 4. As review of the flow maps indicates, the direction of groundwater flow is predominantly towards

the north with a gradient of 0.007 ft/ft on November 1, and a gradient of 0.005 on November 27. This groundwater flow direction was anticipated and is consistent with the topography of the site area and location of the Columbia River relative to the site.

- A conceptual site model was developed and potential exposure routes were considered for employees and workers at the site based on the current and expected future commercial use of the site and surrounding properties. The potential pathways associated with the conceptual site model include direct contact with soil, dermal absorption and inhalation of volatiles, inhalation of chemicals volatilized into outdoor air, inhalation of chemicals volatilized into buildings, and leaching to groundwater. Ingestion of groundwater was excluded as a potential pathway at the site since the site receives its water supply from the City of Astoria and no drinking water wells are present within a mile of the site. In addition, a review of well records available from the Oregon Department of Water Resources in the vicinity of the site indicated that no drinking water wells are located within approximately one mile of the site.

- The only RBC exceedances for applicable exposure pathways were for soils in or near the former waste-oil UST excavation. RBCs were exceeded for soil ingestion, inhalation, and dermal contact for employees and construction and excavation workers for TPH-Oil, and migration to groundwater from soils for TPH-Oil and metals near the former UST tank pit. However, these soil samples exceeding applicable RBCs were collected from below a depth of 3 ft, considered a reasonable exposure depth for occupational workers (DEQ, 2003). Exposure to soil exceeding the ingestion, inhalation, and dermal contact exposure pathway for construction and excavation workers is not reasonably likely since the soil exceedances were from a depth of 6 ft or more, the current and planned future use of the site is as a gasoline and service station, and no site development activities are expected or planned in the future.

- RSV calculated site-specific soil and groundwater RBCs for TPH-Oil using DEQ's RBC computer spreadsheet (DEQ, 2003a). The calculation assumed that all of the TPH detected in soil samples at the site were within the range that yields the most conservative site-specific RBC (RSV, 2004). In their September 23, 2005 letter, DEQ presented TPH-Oil RBCs that DEQ had calculated using site specific TPH and constituent concentration data for soil samples collected from the former waste-oil UST area. As DEQ indicated in their letter, the site specific RBCs calculated by DEQ indicate that remaining heavy oil concentrations at the Hiway Service site are within the applicable cleanup standards.

- With respect to leaching to groundwater RBC exceedances, ingestion and inhalation of groundwater is not considered an applicable exposure pathway at the site, and no compounds were detected in onsite or offsite groundwater samples at concentrations above applicable DEQ Appendix A or site-specific RBCs.

- The groundwater analytical results from downgradient groundwater samples collected in October 2004, indicate relatively low concentrations of gasoline-range hydrocarbons (i.e., below applicable RBCs) were detected at that time. In general, the relatively low concentrations detected in 2004 declined substantially in the downgradient direction away from the vicinity of the former waste-oil UST.

  The recent analytical results from October and November 2007 indicate petroleum concentrations were not detected in onsite or offsite groundwater samples collected outside the vicinity of the former waste-oil UST, indicating low-level gasoline-range petroleum hydrocarbons detected in downgradient groundwater samples in 2004 have attenuated.

- In summary, the site data do not indicate a release from the active UST fueling system, and petroleum hydrocarbons are currently only detected in the vicinity of the former waste-oil tank. Comparison of petroleum concentrations detected in soil and groundwater samples to applicable RBCs, indicates that the RBCs are not

exceeded by the relatively low concentrations of petroleum hydrocarbons associated with the Hiway Service site.

RECOMMENDATIONS

Although RSV previously recommended that an NFA determination be issued by DEQ for the Hiway Service site, a position again supported by the most recent groundwater sampling results, the groundwater monitoring wells are required to be monitored and sampled for the next three quarters. After one year of quarterly monitoring, Niemi will again submit an NFA request to DEQ, if appropriate based on the year of groundwater monitoring results.

REFERENCES

Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites.
Oregon Department of Environmental Quality, September 22, 2003.

Site Characterization Report.
RSV Engineering, Inc. February, 2004.

Additional Site Characterization Report.
RSV Engineering, Inc. May, 2005.

TABLES

Table 1
Summary of Groundwater Elevation Data
Niemi Oil Company
Hiway Service 76 Station
Astoria, Oregon

Monitoring Well Number[1]	Casing Elevation (feet)	Date Measured	Depth to Water[2] (feet)	Water Table Elevation[3] (feet)
MW-1	21.58	11/01/07	15.71	5.87
		11/27/07	15.49	6.09
MW-2	21.97	11/01/07	16.88	5.09
		11/27/07	16.64	5.33
MW-3	22.20	11/01/07	17.22	4.98
		11/27/07	17.04	5.16
MW-4	11.15	11/01/07	6.88	4.27
		11/27/07	6.33	4.82

Notes:

[1]Approximate locations of monitoring wells are shown on Figure 2.

[2]Depth to water measured from the top-of-casing rim.

[3]Water table elevation calculated by subtracting measured depth to water from the top-of-casing elevatio
Casing rim elevations were surveyed by Coast Surveying Inc. of Warrenton, OR.

TABLE 2
SUMMARY of GROUNDWATER ANALYTICAL DATA
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

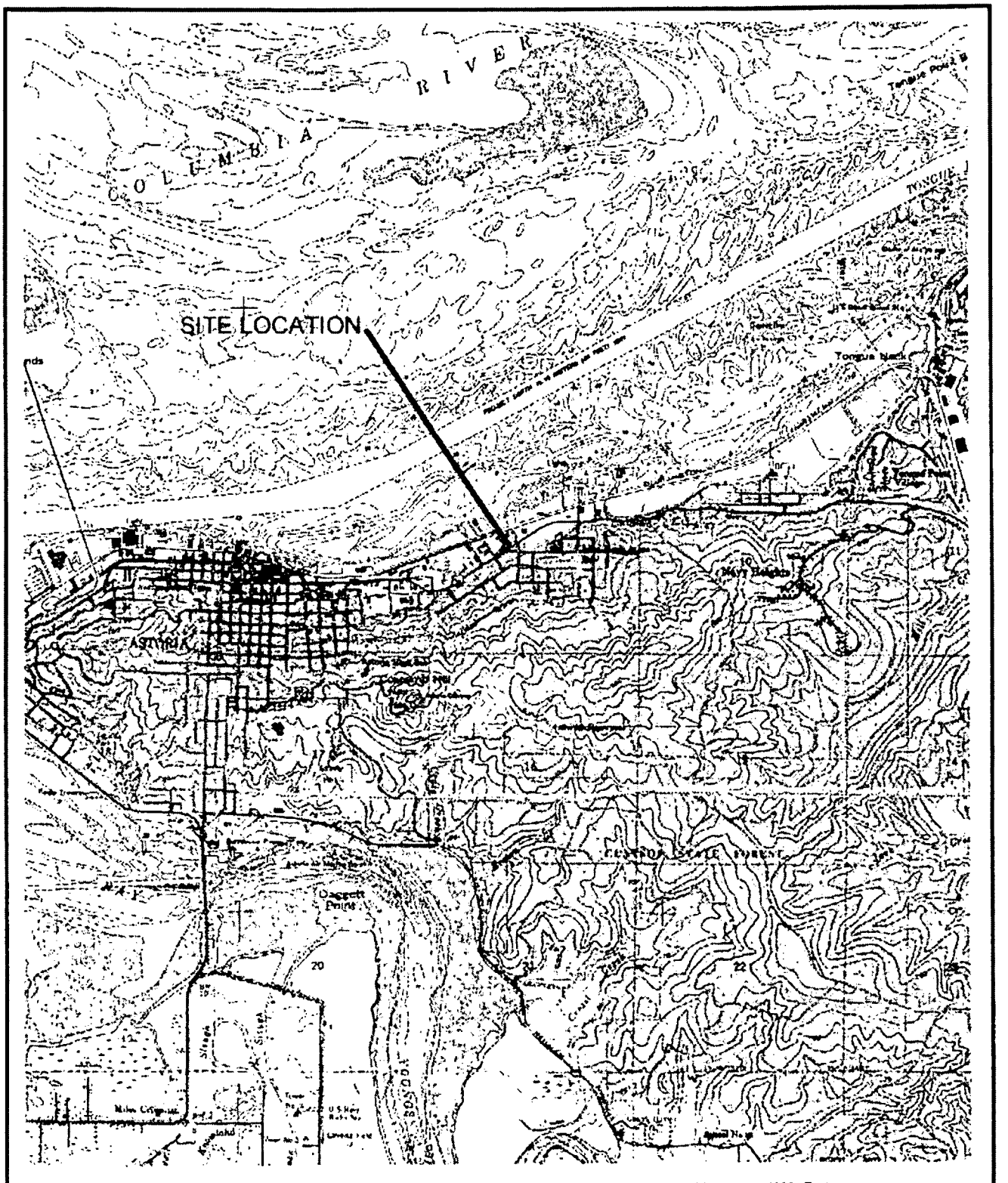
Groundwater Sample ID	Gasoline-range Petroleum Hydrocarbons (Method NWTPH-Gx) (µg/l)	Diesel- and Heavy Oil-range Petroleum Hydrocarbons (Method NWTPH-Dx) (µg/l)		Volatile Organic Compounds (EPA Method 8260B) (µg/l)							Cadmium, Chromium & Lead (EPA Method 200.8) (µg/l)					
		Diesel-range	Oil-range	Benzene	1,2, Dibromoethane	1,2, Dichloroethane	Ethylbenzene	Methyl tert-butyl eth	Toluene	Xylenes	Total Cadmium	Dissolved Cadmium	Total Chromium	Dissolved Chromiur	Total Lead	Dissolved Lead
HA-1	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
HA-2	ND<80	ND<236	ND<472	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
HA-3	ND<80	ND<245	ND<490	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
MW-1	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
MW-2	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
MW-3	**1,350**	**522**	ND<476	**31.9**	ND	ND	**19.6**	ND	**2.59**	**2.41**	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
MW-4	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
Occupational RBCs for Volatilization to Outdoor Air	-	-	-	13,000	960	9,000	-	1,100,0000	-	-	NV	NV	NV	NV	NV	NV
Occupational RBCs for Vapor Intrusion into Buildings	-	-	-	2,700	690	3,600	-	560,000	-	-	NV	NV	NV	NV	NV	NV
RBCs for Groundwater in Excavation for Construction and Excavation Workers	12,000	9,700	18,000	1,700	28	600	110,000	59,000	200,000	22,000	NV	NV	NV	NV	NV	NV

Notes:

mg/l - Milligrams per liter
µg/l - Micrograms per liter
ND - Not detected above reporting limits.
NV - No RBC value for this constituent.
"-" Indicates that RBC exceeds solubility limit.

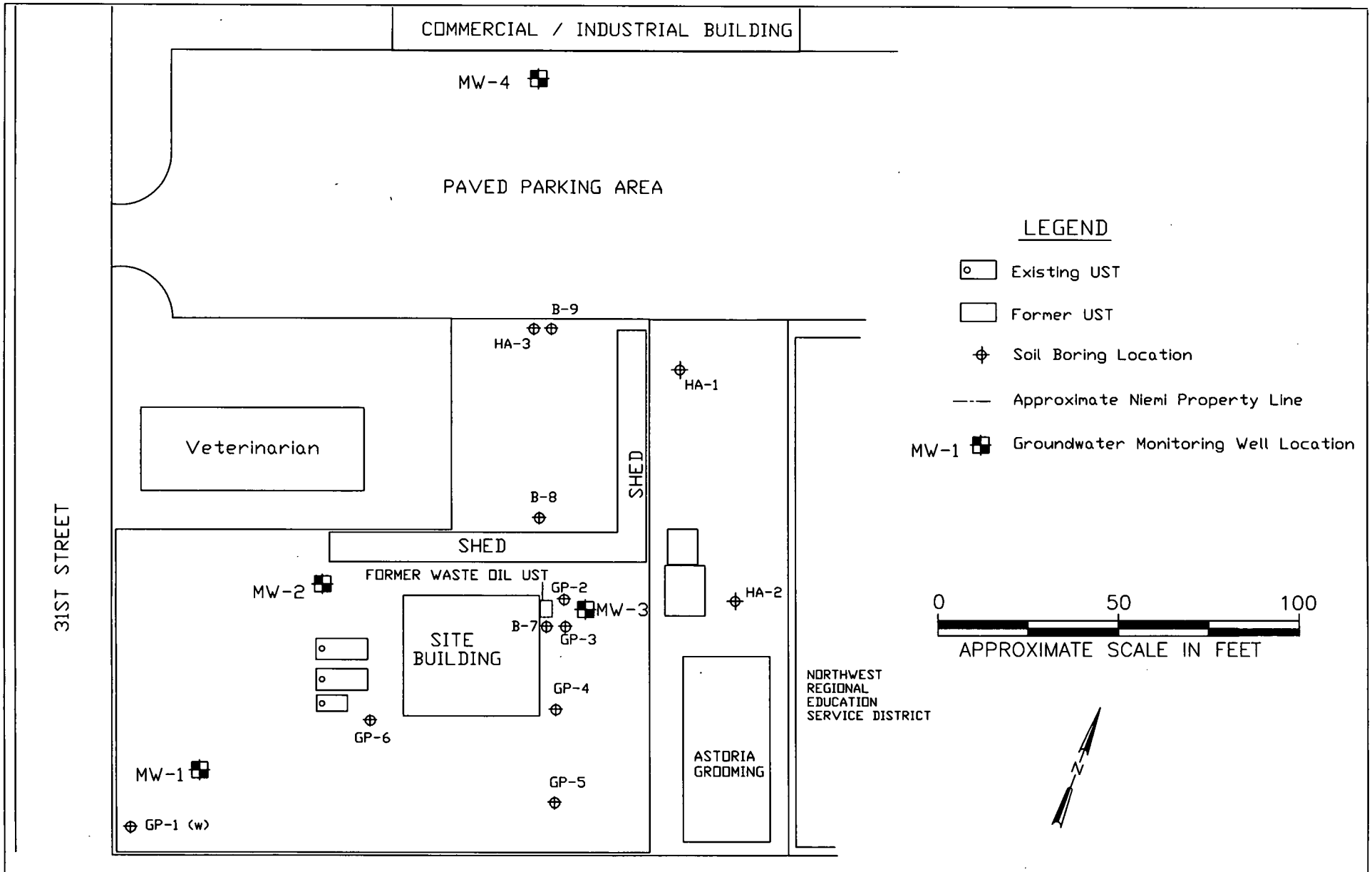
RBCs - Generic Risk-Based Concentrations per DEQ Risk-Based Decision Making for Petroleum Contaminated Sites, Appendix A.

FIGURES



Adapted from the USGS Astoria, Oregon-Washington 1:24,000 topographic map, 1948, Photorevised 1984

RSV ENGINEERING, INC.		SITE LOCATION MAP NIEMI OIL - HIGHWAY SERVICE ASTORIA, OREGON			FIGURE 1
DRAWN	CHECKED	APPROVED	DATE	DRAWING NO	
CCA			11/6/03	03-135-01	

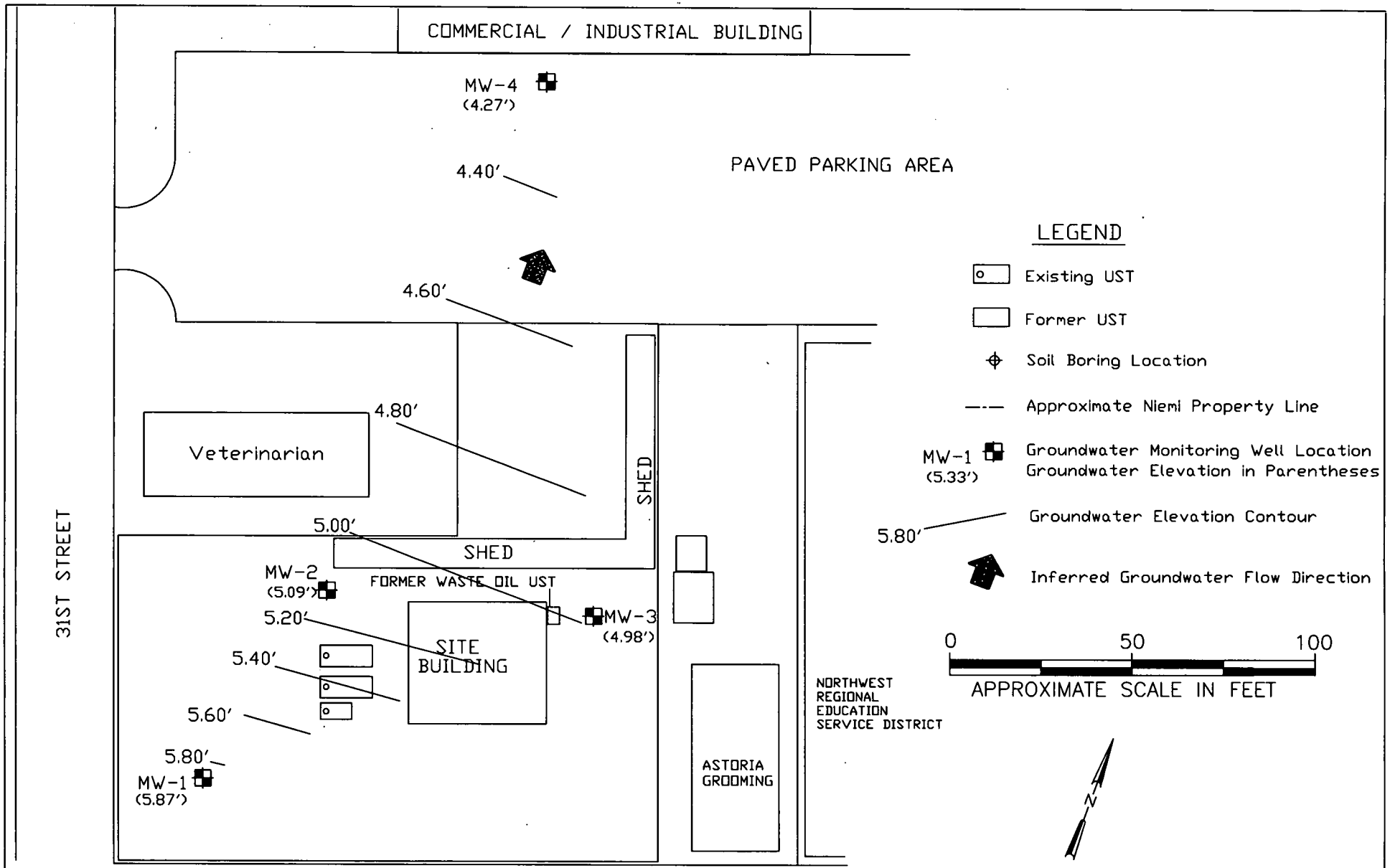


RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

SITE PLAN
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 2

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		12/11/07	Wells & Grab 040408

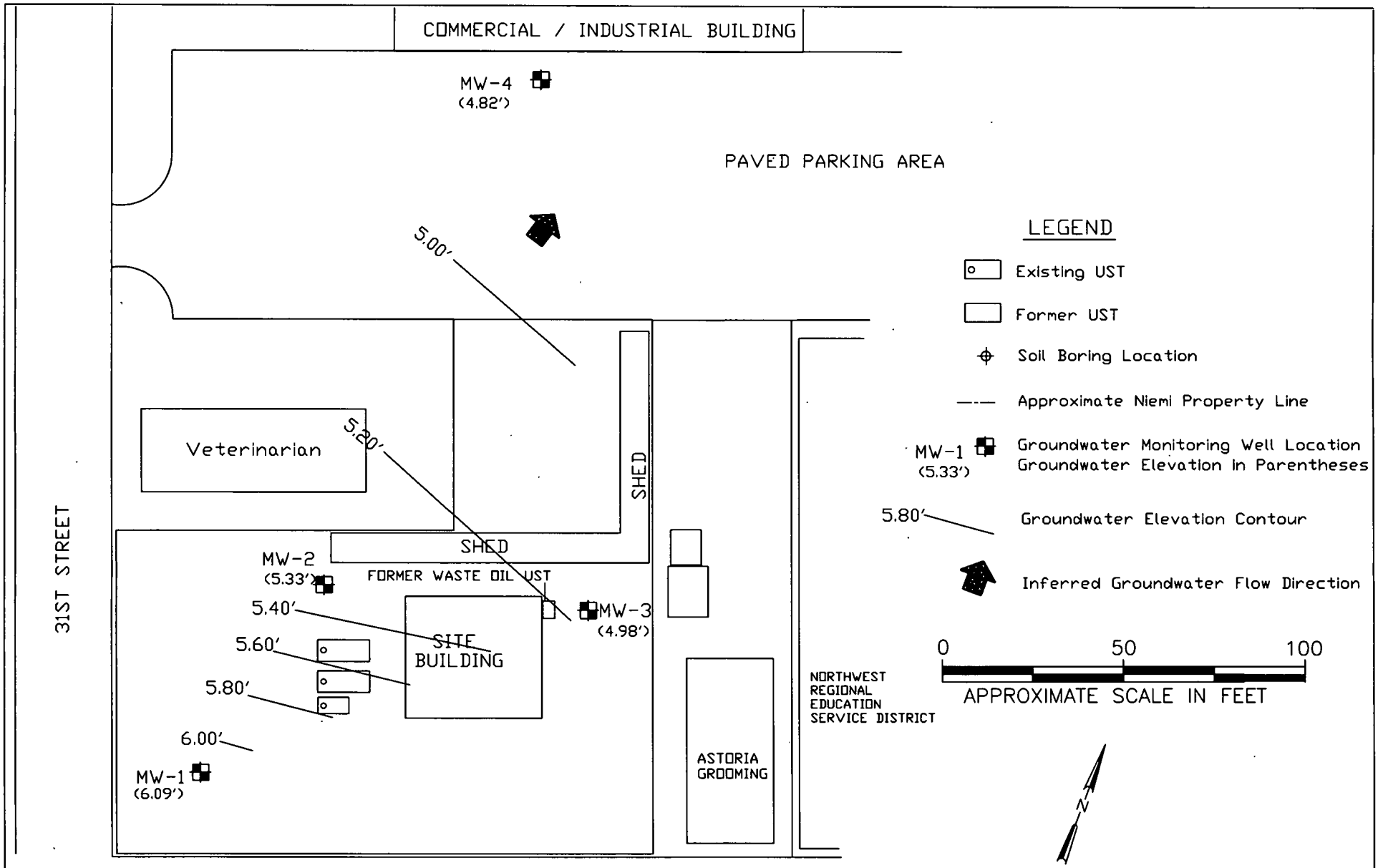


RSV ENGINEERING, INC.
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31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

GROUNDWATER FLOW MAP
NOVEMBER 1, 2007
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 3

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		12/12/07	Figure 3 - GW FLOW



RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

GROUNDWATER FLOW MAP
NOVEMBER 27, 2007
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

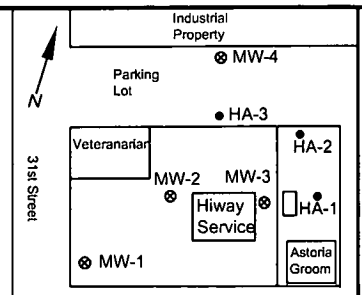
FIGURE 4

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		12/12/07	Figure 3 - GW FLOW

APPENDIX A

SOIL BORING AND MONITORING WELL CONSTRUCTION LOGS

RSV
ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101
Wilsonville, Oregon 97070
TEL (503) 694-6960 FAX (503) 694-6962



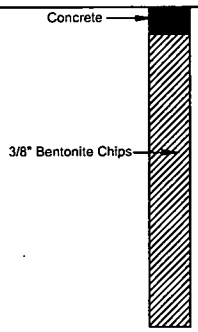
WELL/BORING NUMBER HA-1
Page 1 of 1

PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
LOCATION: 1308 West Marine Drive, Astoria, OR
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 10/29/07

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
										Concrete
		0							SP	SAND (SP); light brown, fine and medium grained, moist.
		0								
		0								
		0			5					
			▽							@6.5':wet soils observed.
										Total Boring Depth = 8'
					10					Temporary 2" diameter PVC well screen set in boring. Water purged until clear and groundwater sample collected.
					15					
					20					
					25					
					30					

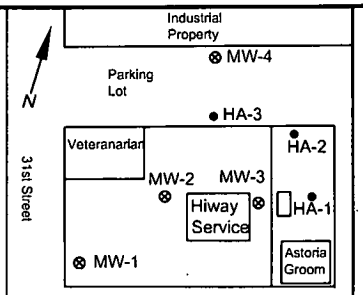
BOREHOLE ABANDONMENT DETAIL



DRILLING CONTRACTOR: Boart Longyear
DRILLING METHOD: Hand Auger
SAMPLING METHOD: Continuous Core
DRILLING START TIME: 2:30
DRILLING END TIME: 2:45

TIME	DATE	DTW

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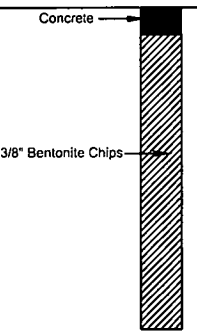
WELL/BORING NUMBER HA-2
Page 1 of 1

PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
LOCATION: 1308 West Marine Drive, Astoria, OR
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 10/29/07

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
										Grass and Top Soil
		0							SP	SAND (SP); light brown, fine and medium grained, moist.
		0								
		0								
		0			5					
			▽							@6.5': wet soils encountered.
										Total Boring Depth = 8'
					10					Temporary 2" diameter PVC well screen set in boring. Water purged until clear and groundwater sample collected.
					15					
					20					
					25					
					30					

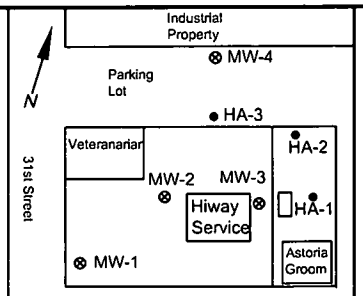
BOREHOLE ABANDONMENT DETAIL



DRILLING CONTRACTOR: Boart Longyear
DRILLING METHOD: Hand Auger
SAMPLING METHOD: Continuous Core
DRILLING START TIME: 3:25
DRILLING END TIME: 3:40

TIME	DATE	DTW

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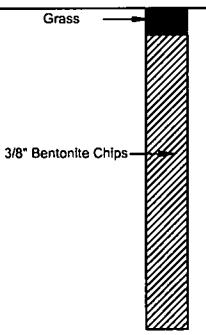
WELL/BORING NUMBER HA-3
Page 1 of 1

PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
LOCATION: 1308 West Marine Drive, Astoria, OR
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 10/30/07

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
											Grass and Top Soil
		0								SP	SAND (SP); light brown, fine and medium grained, moist.
		0									
		0									
		0			5						
			▽								@6.5':wet soils encountered.
											Total Boring Depth = 8'
					10						Temporary 2" diameter PVC well screen set in boring. Water purged until clear and groundwater sample collected.
					15						
					20						
					25						
					30						

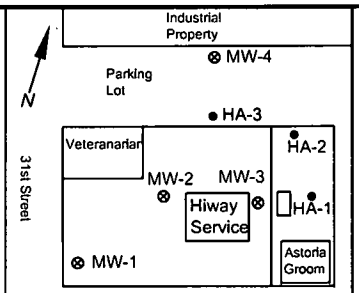
BOREHOLE ABANDONMENT DETAIL



DRILLING CONTRACTOR: Boart Longyear
DRILLING METHOD: Hand Auger
SAMPLING METHOD: Continuous Core
DRILLING START TIME: 9:40
DRILLING END TIME: 9:50

TIME	DATE	DTW

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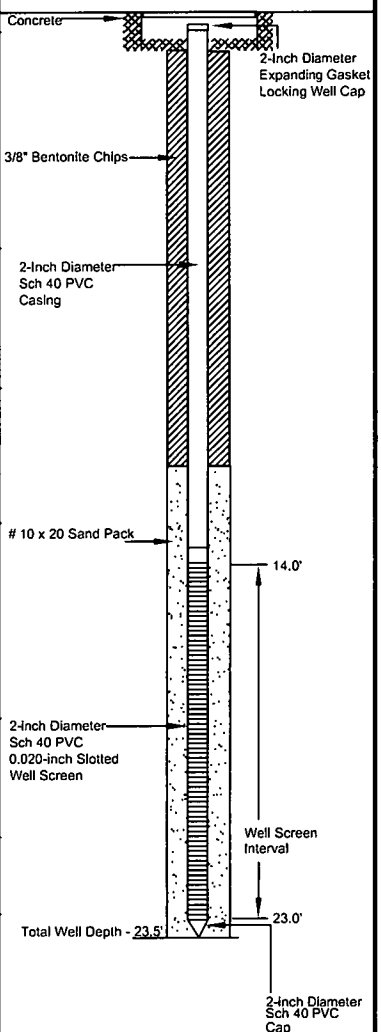
WELL/BORING NUMBER **MW-1**
Page 1 of 1

PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
LOCATION: 1308 West Marine Drive, Astoria, OR
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 10/30/07

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
										Asphalt and Base
		0							SM	SILTY SAND with Gravel (SM); brown, medium and fine grained, gravels angular and 2"-3" in size, occasional cobble, moist.
		0								
		0								
		0			5					
		0							SP	SAND (SP); gray, fine and medium grained, dry-moist.
		0								
		0								
		0			10				SM	SILTY SAND with Gravel (SM); As Above.
		0								
		0							SP	SAND (SP); brown, fine and medium grained, moist.
		0			15					
		0	▽							@ 17': gray, wet.
									GM/GC	SILT SANDY GRAVEL with CLAY (GM/GC); gray, gravels rounded and 1/2" to 3", occasional cobble, moist to wet
					20					
									SP/SM	SAND (SP/SM); gray, fine to medium grained, wet.
									GM/GC	SILT SANDY GRAVEL with CLAY (GM/GC); As Above.
					25					Total Boring Depth = 25'
					30					

BOREHOLE/WELL CONSTRUCTION DETAIL

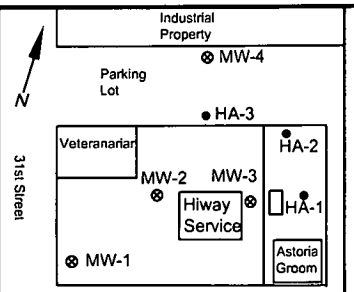


DRILLING CONTRACTOR: Boart Longyear
DRILLING METHOD: Sonic
SAMPLING METHOD: Continuous Core
DRILLING START TIME: 12:30
DRILLING END TIME: 1:45

START CARD: 196015
WELL I.D.: L89357
CASING ELEVATION: 21.58' msl

TIME	DATE	DTW
	11/1/07	15.71'
	11/27/07	15.49'

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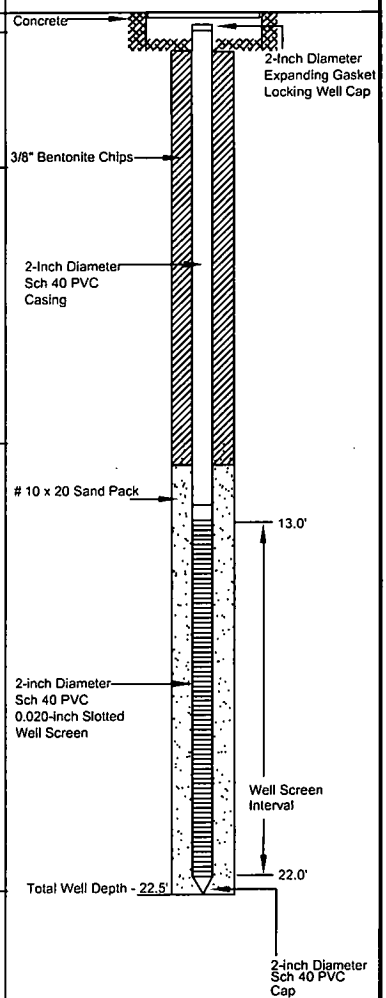
WELL/BORING NUMBER MW-2

PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
LOCATION: 1308 West Marine Drive, Astoria, OR
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 10/30/07

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
											Grass and Top Soil
		0								SP	SAND (SP)(Fill); brown, fine and medium grained, dry-moist.
		0									
		0									
		0			5					SM	SILTY SAND with Gravel (SM)(Fill); brown, medium and fine grained, gravels angular and 2"-3" in size, occasional cobble, moist.
		0									
		0									@ 8': black, glass and metal fragments.
		0			10					SP	SAND (SP); brown, fine and medium grained, moist.
		0									
		0									
		0			15						
		0	▽								@ 18': gray, wet.
					20						
										GM/GC	SILTY SANDY GRAVEL with CLAY (GM/GC); gray, fine, medium and coarse grained sand, gravels rounded and 1/2" to 3",wet
					25						Total Boring Depth = 23'
					30						

BOREHOLE/WELL CONSTRUCTION DETAIL

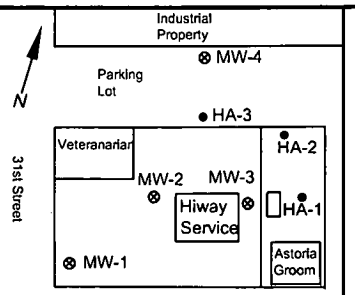


DRILLING CONTRACTOR: Boart Longyear
DRILLING METHOD: Sonic
SAMPLING METHOD: Continuous Core
DRILLING START TIME: 4:30
DRILLING END TIME: 6:00

START CARD: 196016
WELL I.D.: L89358
CASING ELEVATION: 21.97' msl

TIME	DATE	DTW
	11/1/07	16.88'
	11/27/07	15.64'

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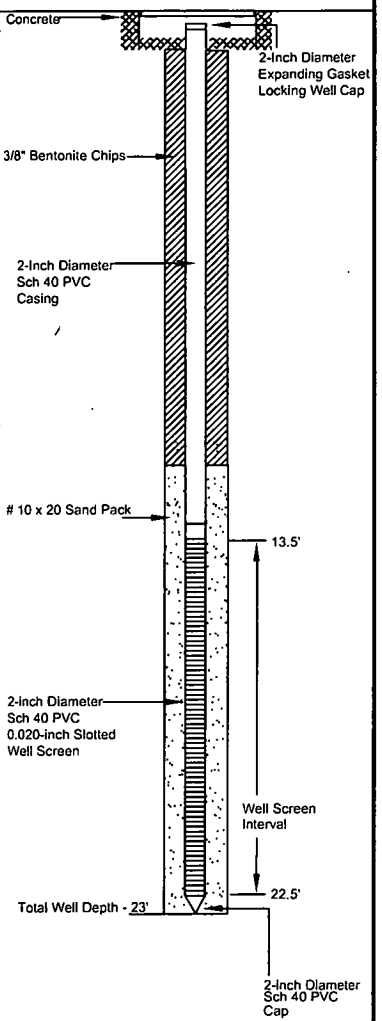
WELL/BORING NUMBER **MW-3**
Page 1 of 1

PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
LOCATION: 1308 West Marine Drive, Astoria, OR
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 10/31/07

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
											Grass and Top Soil
		0								GM/GC	SILTY CLAYEY GRAVEL with SAND (GM/GC)(Fill); light brown, fine, medium, and coarse grained sand, moist.
		0									
		0									
		0			5						
		0									
		0									
		0			10					SP	SAND (SP); brown, fine and medium grained, moist.
		0									
		0									
		0			15						
		0	▽								@ 18.5': gray, wet.
										GM/GC	SILTY CLAYEY GRAVEL with SAND (GM/GC); gray, fine, medium, and coarse grained sand, wet.
					20						
											Total Boring Depth = 24'
					25						
					30						

BOREHOLE/WELL CONSTRUCTION DETAIL

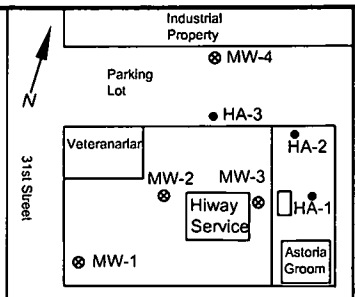


DRILLING CONTRACTOR: Boart Longyear
DRILLING METHOD: Sonic
SAMPLING METHOD: Continuous Core
DRILLING START TIME: 9:45
DRILLING END TIME: 11:15

START CARD: 196017
WELL I.D.: L89359
CASING ELEVATION: 22.20' msl

TIME	DATE	DTW
	11/1/07	17.22'
	11/27/07	17.04'

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WELL/BORING NUMBER MW-4

PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
LOCATION: 1308 West Marine Drive, Astoria, OR
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 10/30/07

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %
		0						
		0						
		0						
		0			5			
		0	▽					
					10			
					15			
					20			
					25			
					30			

STRATA | SOIL TYPE

DESCRIPTION
(USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)

Concrete

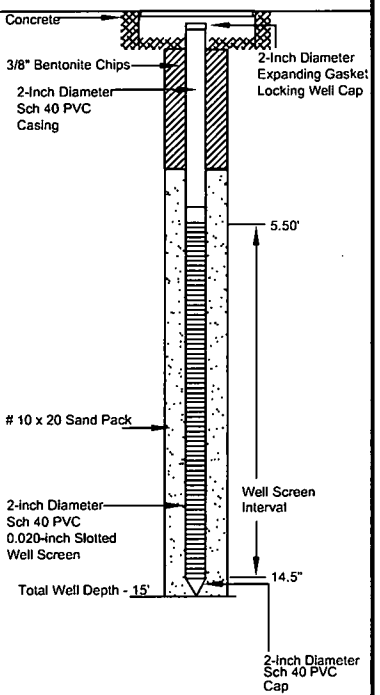
SP — SAND (SP); brown, medium and fine grained, moist.

@ 7': wet.

@ 9': gray

Total Boring Depth = 15'

BOREHOLE/WELL CONSTRUCTION DETAIL



DRILLING CONTRACTOR: Boart Longyear
DRILLING METHOD: Sonic
SAMPLING METHOD: Continuous Core
DRILLING START TIME: 9:10
DRILLING END TIME: 9:40

START CARD: 196014
WELL I.D.: L89356
CASING ELEVATION: 11.15' msl

TIME	DATE	DTW
	11/1/07	6.52'
	11/27/07	6.33'

APPENDIX B

LABORATORY DATA SHEETS AND CHAIN OF CUSTODY FORMS

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PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

November 15, 2007

Brad Berggren
RSV Engineering, Inc.
31960 SW Charbonneau Drive - Suite 101
Wilsonville, OR 97070

RE: Niemi Hiway Service

Enclosed are the results of analyses for samples received by the laboratory on 11/01/07 16:56. The following list is a summary of the Work Orders contained in this report, generated on 11/15/07 13:52.

If you have any questions concerning this report, please feel free to contact me.

Work Order	Project	ProjectNumber
PQK0030	Niemi Hiway Service	03-135

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.

Sarah Rockwell For Darrell Auvil, Project Manager

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BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	11/15/07 13:52

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
HA-1	PQK0030-01	Water	10/29/07 15:15	11/01/07 16:56
HA-2	PQK0030-02	Water	10/29/07 16:15	11/01/07 16:56
HA-3	PQK0030-03	Water	10/30/07 10:30	11/01/07 16:56
MW-3	PQK0030-04	Water	11/01/07 09:40	11/01/07 16:56
MW-2	PQK0030-05	Water	11/01/07 10:30	11/01/07 16:56
MW-1	PQK0030-06	Water	11/01/07 11:10	11/01/07 16:56
MW-4	PQK0030-07	Water	11/01/07 12:00	11/01/07 16:56

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Sarah Rockwell For Darrell Auvil, Project Manager

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BEAVERTON, OR 97008-7132
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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	11/15/07 13:52

Gasoline Hydrocarbons per NW TPH-Gx Method

TestAmerica - Portland, OR

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PQK0030-01 (HA-1)			**Water**			**Sampled: 10/29/07 15:15**				
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	-----	80.0	ug/l	1x	7110116	11/05/07 09:09	11/06/07 10:45	
Surrogate(s): 4-BFB			*98.3%*		*50 - 150 %*	"			"	
PQK0030-02 (HA-2)			**Water**			**Sampled: 10/29/07 16:15**				
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	-----	80.0	ug/l	1x	7110116	11/05/07 09:09	11/05/07 18:22	
Surrogate(s): 4-BFB			*101%*		*50 - 150 %*	"			"	
PQK0030-03 (HA-3)			**Water**			**Sampled: 10/30/07 10:30**				
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	-----	80.0	ug/l	1x	7110116	11/05/07 09:09	11/05/07 18:50	
Surrogate(s): 4-BFB			*98.3%*		*50 - 150 %*	"			"	
PQK0030-04 (MW-3)			**Water**			**Sampled: 11/01/07 09:40**				
Gasoline Range Hydrocarbons	NW TPH-Gx	**1350**	-----	80.0	ug/l	1x	7110116	11/05/07 09:09	11/05/07 19:17	
Surrogate(s): 4-BFB			*282%*		*50 - 150 %*	"			"	*ZX*
PQK0030-05 (MW-2)			**Water**			**Sampled: 11/01/07 10:30**				
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	-----	80.0	ug/l	1x	7110116	11/05/07 09:09	11/05/07 19:45	
Surrogate(s): 4-BFB			*98.6%*		*50 - 150 %*	"			"	
PQK0030-06 (MW-1)			**Water**			**Sampled: 11/01/07 11:10**				
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	-----	80.0	ug/l	1x	7110116	11/05/07 09:09	11/05/07 20:12	
Surrogate(s): 4-BFB			*98.4%*		*50 - 150 %*	"			"	
PQK0030-07 (MW-4)			**Water**			**Sampled: 11/01/07 12:00**				
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	-----	80.0	ug/l	1x	7110116	11/05/07 09:09	11/05/07 22:01	
Surrogate(s): 4-BFB			*97.8%*		*50 - 150 %*	"			"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.

Sarah Rockwell For Darrell Auvil, Project Manager

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BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	11/15/07 13:52

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method

TestAmerica - Portland, OR

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PQK0030-01 (HA-1)		**Water**			**Sampled: 10/29/07 15:15**					
Diesel Range Organics	NWTPH-Dx	ND	-----	0.238	mg/l	1x	7110172	11/06/07 19:00	11/07/07 08:34	
Heavy Oil Range Hydrocarbons	"	ND	-----	0.476	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane			*80.8%*		*50 - 150 %*	"			"	
PQK0030-02 (HA-2)		**Water**			**Sampled: 10/29/07 16:15**					
Diesel Range Organics	NWTPH-Dx	ND	-----	0.236	mg/l	1x	7110172	11/06/07 19:00	11/07/07 09:09	
Heavy Oil Range Hydrocarbons	"	ND	-----	0.472	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane			*90.8%*		*50 - 150 %*	"			"	
PQK0030-03 (HA-3)		**Water**			**Sampled: 10/30/07 10:30**					
Diesel Range Organics	NWTPH-Dx	ND	-----	0.245	mg/l	1x	7110172	11/06/07 19:00	11/07/07 09:38	
Heavy Oil Range Hydrocarbons	"	ND	-----	0.490	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane			*100%*		*50 - 150 %*	"			"	
PQK0030-04 (MW-3)		**Water**			**Sampled: 11/01/07 09:40**					
Diesel Range Organics	NWTPH-Dx	**0.522**	-----	0.238	mg/l	1x	7110172	11/06/07 19:00	11/07/07 10:08	Q10
Heavy Oil Range Hydrocarbons	"	ND	-----	0.476	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane			*105%*		*50 - 150 %*	"			"	
PQK0030-05 (MW-2)		**Water**			**Sampled: 11/01/07 10:30**					
Diesel Range Organics	NWTPH-Dx	ND	-----	0.240	mg/l	1x	7110172	11/06/07 19:00	11/07/07 10:36	
Heavy Oil Range Hydrocarbons	"	ND	-----	0.481	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane			*112%*		*50 - 150 %*	"			"	
PQK0030-06 (MW-1)		**Water**			**Sampled: 11/01/07 11:10**					
Diesel Range Organics	NWTPH-Dx	ND	-----	0.240	mg/l	1x	7110172	11/06/07 19:00	11/07/07 11:09	
Heavy Oil Range Hydrocarbons	"	ND	-----	0.481	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane			*104%*		*50 - 150 %*	"			"	
PQK0030-07 (MW-4)		**Water**			**Sampled: 11/01/07 12:00**					
Diesel Range Organics	NWTPH-Dx	ND	-----	0.240	mg/l	1x	7110172	11/06/07 19:00	11/07/07 11:43	
Heavy Oil Range Hydrocarbons	"	ND	-----	0.481	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane			*93.7%*		*50 - 150 %*	"			"	

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Sarah Rockwell For Darrell Auvil, Project Manager

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PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	11/15/07 13:52

Total Metals per EPA 200 Series Methods

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Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PQK0030-01 (HA-1)		**Water**			**Sampled: 10/29/07 15:15**					
Cadmium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110062	11/02/07 09:18	11/03/07 09:29	
Chromium	"	ND	-----	0.00100	"	"	"	"	11/05/07 18:18	
Lead	"	ND	-----	0.00100	"	"	"	"	11/03/07 09:29	
PQK0030-02 (HA-2)		**Water**			**Sampled: 10/29/07 16:15**					
Cadmium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110062	11/02/07 09:18	11/03/07 09:45	
Chromium	"	ND	-----	0.00100	"	"	"	"	11/05/07 18:33	
Lead	"	ND	-----	0.00100	"	"	"	"	11/03/07 09:45	
PQK0030-03 (HA-3)		**Water**			**Sampled: 10/30/07 10:30**					
Cadmium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110062	11/02/07 09:18	11/03/07 09:59	
Chromium	"	ND	-----	0.00100	"	"	"	"	11/05/07 18:48	
Lead	"	ND	-----	0.00100	"	"	"	"	11/03/07 09:59	
PQK0030-04 (MW-3)		**Water**			**Sampled: 11/01/07 09:40**					
Cadmium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110062	11/02/07 09:18	11/03/07 10:30	
Chromium	"	ND	-----	0.00100	"	"	"	"	11/05/07 19:17	
Lead	"	ND	-----	0.00100	"	"	"	"	11/03/07 10:30	
PQK0030-05 (MW-2)		**Water**			**Sampled: 11/01/07 10:30**					
Cadmium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110062	11/02/07 09:18	11/03/07 10:38	
Chromium	"	ND	-----	0.00100	"	"	"	"	11/05/07 19:24	
Lead	"	ND	-----	0.00100	"	"	"	"	11/03/07 10:38	
PQK0030-06 (MW-1)		**Water**			**Sampled: 11/01/07 11:10**					
Cadmium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110062	11/02/07 09:18	11/03/07 10:46	
Chromium	"	ND	-----	0.00100	"	"	"	"	11/05/07 19:32	
Lead	"	ND	-----	0.00100	"	"	"	"	11/03/07 10:46	
PQK0030-07 (MW-4)		**Water**			**Sampled: 11/01/07 12:00**					
Cadmium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110062	11/02/07 09:18	11/03/07 10:53	
Chromium	"	ND	-----	0.00100	"	"	"	"	11/05/07 19:39	
Lead	"	ND	-----	0.00100	"	"	"	"	11/03/07 10:53	

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	11/15/07 13:52

Dissolved Metals per EPA 200 Series Methods

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Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PQK0030-01 (HA-1)		**Water**			**Sampled: 10/29/07 15:15**					
Chromium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110103	11/05/07 07:40	11/05/07 18:28	
Lead	"	ND	-----	0.00100	"	"	"	"	"	
PQK0030-01RE1 (HA-1)		**Water**			**Sampled: 10/29/07 15:15**					
Cadmium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110206	11/07/07 07:34	11/08/07 22:53	
PQK0030-02 (HA-2)		**Water**			**Sampled: 10/29/07 16:15**					
Chromium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110103	11/05/07 07:40	11/05/07 18:38	
Lead	"	ND	-----	0.00100	"	"	"	"	"	
PQK0030-02RE1 (HA-2)		**Water**			**Sampled: 10/29/07 16:15**					
Cadmium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110206	11/07/07 07:34	11/08/07 23:00	
PQK0030-03 (HA-3)		**Water**			**Sampled: 10/30/07 10:30**					
Chromium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110103	11/05/07 07:40	11/05/07 18:48	
Lead	"	ND	-----	0.00100	"	"	"	"	"	
PQK0030-03RE1 (HA-3)		**Water**			**Sampled: 10/30/07 10:30**					
Cadmium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110206	11/07/07 07:34	11/08/07 23:07	
PQK0030-04 (MW-3)		**Water**			**Sampled: 11/01/07 09:40**					
Chromium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110103	11/05/07 07:40	11/05/07 19:07	
Lead	"	ND	-----	0.00100	"	"	"	"	"	
PQK0030-04RE1 (MW-3)		**Water**			**Sampled: 11/01/07 09:40**					
Cadmium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110206	11/07/07 07:34	11/08/07 23:31	
PQK0030-05 (MW-2)		**Water**			**Sampled: 11/01/07 10:30**					
Chromium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110103	11/05/07 07:40	11/05/07 19:12	
Lead	"	ND	-----	0.00100	"	"	"	"	"	

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31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	11/15/07 13:52

Dissolved Metals per EPA 200 Series Methods

TestAmerica - Portland, OR

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PQK0030-05RE1 (MW-2)		**Water**			**Sampled: 11/01/07 10:30**					
Cadmium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110206	11/07/07 07:34	11/08/07 23:45	
PQK0030-06 (MW-1)		**Water**			**Sampled: 11/01/07 11:10**					
Chromium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110103	11/05/07 07:40	11/05/07 19:17	
Lead	"	ND	-----	0.00100	"	"	"	"	"	
PQK0030-06RE1 (MW-1)		**Water**			**Sampled: 11/01/07 11:10**					
Cadmium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110206	11/07/07 07:34	11/08/07 23:52	
PQK0030-07 (MW-4)		**Water**			**Sampled: 11/01/07 12:00**					
Chromium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110103	11/05/07 07:40	11/05/07 19:22	
Lead	"	ND	-----	0.00100	"	"	"	"	"	
PQK0030-07RE1 (MW-4)		**Water**			**Sampled: 11/01/07 12:00**					
Cadmium	EPA 200.8	ND	-----	0.00100	mg/l	1x	7110206	11/07/07 07:34	11/08/07 23:59	

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31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	11/15/07 13:52

Volatile Organic Compounds per EPA Method 8260B

TestAmerica - Portland, OR

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PQK0030-01 (HA-1)		**Water**			**Sampled: 10/29/07 15:15**					
Benzene	EPA 8260B	ND	-----	1.00	ug/l	1x	7110223	11/07/07 12:16	11/07/07 17:15	
1,2-Dibromoethane	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dichloroethane	"	ND	-----	1.00	"	"	"	"	"	
Ethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	1.00	"	"	"	"	"	
Toluene	"	ND	-----	1.00	"	"	"	"	"	
o-Xylene	"	ND	-----	1.00	"	"	"	"	"	
m,p-Xylene	"	ND	-----	2.00	"	"	"	"	"	
Surrogate(s): *4-BFB*		*98.4%*			*80 - 120 %*	"			"	
1,2-DCA-d4		*105%*			*80 - 120 %*	"			"	
Dibromofluoromethane		*100%*			*80 - 120 %*	"			"	
Toluene-d8		*105%*			*80 - 120 %*	"			"	
PQK0030-02 (HA-2)		**Water**			**Sampled: 10/29/07 16:15**					
Benzene	EPA 8260B	ND	-----	1.00	ug/l	1x	7110223	11/07/07 12:16	11/07/07 17:42	
1,2-Dibromoethane	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dichloroethane	"	ND	-----	1.00	"	"	"	"	"	
Ethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	1.00	"	"	"	"	"	
Toluene	"	ND	-----	1.00	"	"	"	"	"	
o-Xylene	"	ND	-----	1.00	"	"	"	"	"	
m,p-Xylene	"	ND	-----	2.00	"	"	"	"	"	
Surrogate(s): *4-BFB*		*96.6%*			*80 - 120 %*	"			"	
1,2-DCA-d4		*104%*			*80 - 120 %*	"			"	
Dibromofluoromethane		*101%*			*80 - 120 %*	"			"	
Toluene-d8		*106%*			*80 - 120 %*	"			"	
PQK0030-03 (HA-3)		**Water**			**Sampled: 10/30/07 10:30**					
Benzene	EPA 8260B	ND	-----	1.00	ug/l	1x	7110223	11/07/07 12:16	11/07/07 18:10	
1,2-Dibromoethane	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dichloroethane	"	ND	-----	1.00	"	"	"	"	"	
Ethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	1.00	"	"	"	"	"	
Toluene	"	ND	-----	1.00	"	"	"	"	"	
o-Xylene	"	ND	-----	1.00	"	"	"	"	"	
m,p-Xylene	"	ND	-----	2.00	"	"	"	"	"	
Surrogate(s): *4-BFB*		*95.8%*			*80 - 120 %*	"			"	
1,2-DCA-d4		*107%*			*80 - 120 %*	"			"	
Dibromofluoromethane		*101%*			*80 - 120 %*	"			"	
Toluene-d8		*106%*			*80 - 120 %*	"			"	

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31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	11/15/07 13:52

Volatile Organic Compounds per EPA Method 8260B

TestAmerica - Portland, OR

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PQK0030-04 (MW-3)		**Water**			**Sampled: 11/01/07 09:40**					
Benzene	EPA 8260B	**31.9**	-----	1.00	ug/l	1x	7110223	11/07/07 12:16	11/07/07 18:37	
1,2-Dibromoethane	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dichloroethane	"	ND	-----	1.00	"	"	"	"	"	
Ethylbenzene	"	**19.6**	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	1.00	"	"	"	"	"	
Toluene	"	**2.59**	-----	1.00	"	"	"	"	"	
o-Xylene	"	ND	-----	1.00	"	"	"	"	"	
m,p-Xylene	"	**2.41**	-----	2.00	"	"	"	"	"	
Surrogate(s): *4-BFB*		*96.5%*			*80 - 120 %*	"			"	
1,2-DCA-d4		*106%*			*80 - 120 %*	"			"	
Dibromofluoromethane		*106%*			*80 - 120 %*	"			"	
Toluene-d8		*109%*			*80 - 120 %*	"			"	
PQK0030-05 (MW-2)		**Water**			**Sampled: 11/01/07 10:30**					
Benzene	EPA 8260B	ND	-----	1.00	ug/l	1x	7110223	11/07/07 12:16	11/07/07 19:04	
1,2-Dibromoethane	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dichloroethane	"	ND	-----	1.00	"	"	"	"	"	
Ethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	1.00	"	"	"	"	"	
Toluene	"	ND	-----	1.00	"	"	"	"	"	
o-Xylene	"	ND	-----	1.00	"	"	"	"	"	
m,p-Xylene	"	ND	-----	2.00	"	"	"	"	"	
Surrogate(s): *4-BFB*		*99.9%*			*80 - 120 %*	"			"	
1,2-DCA-d4		*109%*			*80 - 120 %*	"			"	
Dibromofluoromethane		*104%*			*80 - 120 %*	"			"	
Toluene-d8		*106%*			*80 - 120 %*	"			"	
PQK0030-06 (MW-1)		**Water**			**Sampled: 11/01/07 11:10**					
Benzene	EPA 8260B	ND	-----	1.00	ug/l	1x	7110223	11/07/07 12:16	11/07/07 19:32	
1,2-Dibromoethane	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dichloroethane	"	ND	-----	1.00	"	"	"	"	"	
Ethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	1.00	"	"	"	"	"	
Toluene	"	ND	-----	1.00	"	"	"	"	"	
o-Xylene	"	ND	-----	1.00	"	"	"	"	"	
m,p-Xylene	"	ND	-----	2.00	"	"	"	"	"	
Surrogate(s): *4-BFB*		*97.2%*			*80 - 120 %*	"			"	
1,2-DCA-d4		*108%*			*80 - 120 %*	"			"	
Dibromofluoromethane		*106%*			*80 - 120 %*	"			"	
Toluene-d8		*108%*			*80 - 120 %*	"			"	

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31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	11/15/07 13:52

Volatile Organic Compounds per EPA Method 8260B

TestAmerica - Portland, OR

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PQK0030-07 (MW-4)		**Water**			**Sampled: 11/01/07 12:00**					
Benzene	EPA 8260B	ND	-----	1.00	ug/l	1x	7110223	11/07/07 12:16	11/07/07 19:59	
1,2-Dibromoethane	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dichloroethane	"	ND	-----	1.00	"	"	"	"	"	
Ethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	1.00	"	"	"	"	"	
Toluene	"	ND	-----	1.00	"	"	"	"	"	
o-Xylene	"	ND	-----	1.00	"	"	"	"	"	
m,p-Xylene	"	ND	-----	2.00	"	"	"	"	"	
Surrogate(s): *4-BFB*			*89.9%*		*80 - 120 %*	"			"	
1,2-DCA-d4			*108%*		*80 - 120 %*	"			"	
Dibromofluoromethane			*104%*		*80 - 120 %*	"			"	
Toluene-d8			*107%*		*80 - 120 %*	"			"	

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Gasoline Hydrocarbons per NW TPH-Gx Method - Laboratory Quality Control Results

TestAmerica - Portland, OR

QC Batch: 7110116 **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (7110116-BLK1)								Extracted: 11/05/07 09:09						
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	---	80.0	ug/l	1x	--	--	--	--	--	--	11/05/07 12:51	
Surrogate(s): 4-BFB		*Recovery: 99.2%*			*Limits: 50-150%*	"							*11/05/07 12:51*	
LCS (7110116-BS2)								Extracted: 11/05/07 09:09						
Gasoline Range Hydrocarbons	NW TPH-Gx	439	---	80.0	ug/l	1x	--	500	87.7%	(70-130)	--	--	11/05/07 11:56	
Surrogate(s): 4-BFB		*Recovery: 103%*			*Limits: 50-150%*	"							*11/05/07 11:56*	
LCS Dup (7110116-BSD2)								Extracted: 11/05/07 09:09						
Gasoline Range Hydrocarbons	NW TPH-Gx	442	---	80.0	ug/l	1x	--	500	88.3%	(70-130)	0.712%	(35)	11/05/07 12:23	
Surrogate(s): 4-BFB		*Recovery: 104%*			*Limits: 50-150%*	"							*11/05/07 12:23*	
Duplicate (7110116-DUP1)						QC Source: PQK0030-06		Extracted: 11/05/07 09:09						
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	---	80.0	ug/l	1x	ND	--	--	--	NR	(35)	11/05/07 22:28	
Surrogate(s): 4-BFB		*Recovery: 98.5%*			*Limits: 50-150%*	"							*11/05/07 22:28*	
Duplicate (7110116-DUP2)						QC Source: PQK0037-01		Extracted: 11/05/07 09:09						
Gasoline Range Hydrocarbons	NW TPH-Gx	437	---	80.0	ug/l	1x	352	--	--	--	21.6%	(35)	11/05/07 22:56	
Surrogate(s): 4-BFB		*Recovery: 112%*			*Limits: 50-150%*	"							*11/05/07 22:56*	

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	11/15/07 13:52

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method - Laboratory Quality Control Results

TestAmerica - Portland, OR

QC Batch: 7110172 **Water Preparation Method: EPA 3510 Fuels**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (7110172-BLK1)								Extracted: 11/06/07 19:00						
Diesel Range Organics	NWTPH-Dx	ND	---	0.250	mg/l	1x	--	--	--	--	--	--	11/07/07 05:02	
Heavy Oil Range Hydrocarbons	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 101%*			*Limits: 50-150%*	"							*11/07/07 05:02*	
LCS (7110172-BS1)								Extracted: 11/06/07 19:00						
Diesel Range Organics	NWTPH-Dx	2.76	---	0.250	mg/l	1x	--	2.50	110%	(50-150)	--	--	11/07/07 05:38	
Heavy Oil Range Hydrocarbons	"	1.59	---	0.500	"	"	--	1.50	106%	"	--	--	"	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 102%*			*Limits: 50-150%*	"							*11/07/07 05:38*	
LCS Dup (7110172-BSD1)								Extracted: 11/06/07 19:00						
Diesel Range Organics	NWTPH-Dx	2.91	---	0.250	mg/l	1x	--	2.50	116%	(50-150)	5.15%	(50)	11/07/07 06:13	
Heavy Oil Range Hydrocarbons	"	1.70	---	0.500	"	"	--	1.50	113%	"	6.43%	"	"	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 108%*			*Limits: 50-150%*	"							*11/07/07 06:13*	

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Sarah Rockwell For Darrell Auvil, Project Manager

TestAmerica
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PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	11/15/07 13:52

Total Metals per EPA 200 Series Methods - Laboratory Quality Control Results

TestAmerica - Portland, OR

QC Batch: 7110062 **Water Preparation Method: EPA 200/3005**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (7110062-BLK1)								Extracted: 11/02/07 09:18						
Cadmium	EPA 200.8	ND	---	0.00100	mg/l	1x	--	--	--	--	--	--	11/03/07 08:53	
Chromium	"	ND	---	0.00100	"	"	--	--	--	--	--	--	11/05/07 17:56	
Lead	"	ND	---	0.00100	"	"	--	--	--	--	--	--	11/03/07 08:53	
LCS (7110062-BS1)								Extracted: 11/02/07 09:18						
Cadmium	EPA 200.8	0.0922	---	0.00100	mg/l	1x	--	0.100	92.2%	(85-115)	--	--	11/03/07 09:00	
Chromium	"	0.0957	---	0.00500	"	5x	--	"	95.7%	"	--	--	11/05/07 18:04	
Lead	"	0.0932	---	0.00100	"	1x	--	"	93.2%	"	--	--	11/03/07 09:00	
Duplicate (7110062-DUP1)					QC Source: PQK0030-01			Extracted: 11/02/07 09:18						
Cadmium	EPA 200.8	ND	---	0.00100	mg/l	1x	ND	--	--	--	NR	(20)	11/03/07 09:37	
Chromium	"	ND	---	0.00100	"	"	ND	--	--	--	8.70%	"	11/05/07 18:26	
Lead	"	ND	---	0.00100	"	"	ND	--	--	--	0.00%	"	11/03/07 09:37	
Matrix Spike (7110062-MS1)					QC Source: PQK0030-02			Extracted: 11/02/07 09:18						
Cadmium	EPA 200.8	0.0945	---	0.00100	mg/l	1x	ND	0.100	94.5%	(70-130)	--	--	11/03/07 09:52	
Chromium	"	0.0965	---	0.00100	"	"	ND	"	96.5%	(75-125)	--	--	11/05/07 18:41	
Lead	"	0.0934	---	0.00100	"	"	0.000300	"	93.1%	"	--	--	11/03/07 09:52	
Matrix Spike (7110062-MS2)					QC Source: PQK0030-03			Extracted: 11/02/07 09:18						
Cadmium	EPA 200.8	0.0957	---	0.00100	mg/l	1x	ND	0.100	95.7%	(70-130)	--	--	11/03/07 10:23	
Chromium	"	0.0954	---	0.00100	"	"	0.000630	"	94.8%	(75-125)	--	--	"	
Lead	"	0.0936	---	0.00100	"	"	0.000450	"	93.1%	"	--	--	"	

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	11/15/07 13:52

Dissolved Metals per EPA 200 Series Methods - Laboratory Quality Control Results

TestAmerica - Portland, OR

QC Batch: 7110103 **Water Preparation Method: EPA 200/3005 Diss**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (7110103-BLK1)								Extracted: 11/05/07 07:40						
Chromium	EPA 200.8	ND	---	0.00100	mg/l	1x	--	--	--	--	--	--	11/05/07 18:18	
Lead	"	ND	---	0.00100	"	"	--	--	--	--	--	--	"	
LCS (7110103-BS1)								Extracted: 11/05/07 07:40						
Chromium	EPA 200.8	0.0959	---	0.00111	mg/l	1x	--	0.111	86.4%	(85-115)	--	--	11/05/07 18:23	
Lead	"	0.0957	---	0.00111	"	"	--	"	86.1%	"	--	--	"	
Duplicate (7110103-DUP1)					QC Source: PQK0030-01			Extracted: 11/05/07 07:40						
Chromium	EPA 200.8	ND	---	0.00100	mg/l	1x	ND	--	--	--	NR	(20)	11/05/07 18:33	
Lead	"	ND	---	0.00100	"	"	ND	--	--	--	NR	"	"	
Matrix Spike (7110103-MS1)					QC Source: PQK0030-03			Extracted: 11/05/07 07:40						
Chromium	EPA 200.8	0.0961	---	0.00111	mg/l	1x	ND	0.111	86.5%	(70-130)	--	--	11/05/07 18:53	
Lead	"	0.0972	---	0.00111	"	"	0.0000670	"	87.4%	"	--	--	"	
Matrix Spike (7110103-MS2)					QC Source: PQK0030-02			Extracted: 11/05/07 07:40						
Chromium	EPA 200.8	0.0864	---	0.00111	mg/l	1x	ND	0.111	77.8%	(70-130)	--	--	11/05/07 18:43	
Lead	"	0.0866	---	0.00111	"	"	ND	"	78.0%	"	--	--	"	

QC Batch: 7110206 **Water Preparation Method: EPA 200/3005 Diss**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (7110206-BLK1)								Extracted: 11/07/07 07:34						
Cadmium	EPA 200.8	ND	---	0.00100	mg/l	1x	--	--	--	--	--	--	11/08/07 22:25	
LCS (7110206-BS1)								Extracted: 11/07/07 07:34						
Cadmium	EPA 200.8	0.0571	---	0.00111	mg/l	1x	--	0.0556	103%	(85-115)	--	--	11/08/07 22:32	
Duplicate (7110206-DUP1)					QC Source: PQJ0609-01RE1			Extracted: 11/07/07 07:34						
Cadmium	EPA 200.8	ND	---	0.00100	mg/l	1x	ND	--	--	--	NR	(20)	11/08/07 22:46	
Matrix Spike (7110206-MS1)					QC Source: PQK0030-04RE1			Extracted: 11/07/07 07:34						
Cadmium	EPA 200.8	0.0590	---	0.00111	mg/l	1x	ND	0.0556	106%	(70-130)	--	--	11/08/07 23:38	

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	11/15/07 13:52

Volatile Organic Compounds per EPA Method 8260B - Laboratory Quality Control Results

TestAmerica - Portland, OR

QC Batch: 7110223 **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (7110223-BLK1)								Extracted: 11/07/07 12:16						
Benzene	EPA 8260B	ND	---	1.00	ug/l	1x	--	--	--	--	--	--	11/07/07 15:26	
1,2-Dibromoethane	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
1,2-Dichloroethane	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
Ethylbenzene	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
Methyl tert-butyl ether	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
Toluene	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
o-Xylene	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
m,p-Xylene	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
Surrogate(s): 4-BFB		*Recovery: 95.0%*			*Limits: 80-120%*	"							*11/07/07 15:26*	
1,2-DCA-d4		*106%*			*80-120%*	"							"	
Dibromofluoromethane		*100%*			*80-120%*	"							"	
Toluene-d8		*105%*			*80-120%*	"							"	
LCS (7110223-BS1)								Extracted: 11/07/07 12:16						
Benzene	EPA 8260B	19.6	---	1.00	ug/l	1x	--	20.0	98.0%	(80-120)	--	--	11/07/07 13:37	
Toluene	"	19.4	---	1.00	"	"	--	"	97.2%	(80-124)	--	--	"	
Surrogate(s): 4-BFB		*Recovery: 100%*			*Limits: 80-120%*	"							*11/07/07 13:37*	
1,2-DCA-d4		*114%*			*80-120%*	"							"	
Dibromofluoromethane		*111%*			*80-120%*	"							"	
Toluene-d8		*112%*			*80-120%*	"							"	
Matrix Spike (7110223-MS1)							QC Source: PQK0060-01		Extracted: 11/07/07 12:16					
Benzene	EPA 8260B	89.8	---	1.00	ug/l	1x	67.5	20.0	111%	(80-124)	--	--	11/07/07 14:05	
Toluene	"	23.8	---	1.00	"	"	1.07	"	114%	(79.7-131)	--	--	"	
Surrogate(s): 4-BFB		*Recovery: 93.2%*			*Limits: 80-120%*	"							*11/07/07 14:05*	
1,2-DCA-d4		*110%*			*80-120%*	"							"	
Dibromofluoromethane		*110%*			*80-120%*	"							"	
Toluene-d8		*111%*			*80-120%*	"							"	
Matrix Spike Dup (7110223-MSD1)							QC Source: PQK0060-01		Extracted: 11/07/07 12:16					
Benzene	EPA 8260B	88.8	---	1.00	ug/l	1x	67.5	20.0	107%	(80-124)	1.03%	(25)	11/07/07 14:32	
Toluene	"	23.8	---	1.00	"	"	1.07	"	114%	(79.7-131)	0.0841%	"	"	
Surrogate(s): 4-BFB		*Recovery: 92.0%*			*Limits: 80-120%*	"							*11/07/07 14:32*	
1,2-DCA-d4		*104%*			*80-120%*	"							"	
Dibromofluoromethane		*110%*			*80-120%*	"							"	
Toluene-d8		*109%*			*80-120%*	"							"	

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	11/15/07 13:52

Notes and Definitions

Report Specific Notes:

Q10 - Hydrocarbon pattern most closely resembles a blend of heavy gas/light diesel range components.

ZX - Due to sample matrix effects, the surrogate recovery was outside the acceptance limits.

Laboratory Reporting Conventions:

DET - Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.

ND - Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).

NR/NA - Not Reported / Not Available

dry - Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight.

wet - Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis.

RPD - RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries).

MRL - METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.

MDL* - METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results.

Dil - Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.

Reporting Limits - Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.

Electronic Signature - Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy.* Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Sarah Rockwell For Darrell Auvil, Project Manager

TestAmerica
ANALYTICAL TESTING CORPORATION

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
[illegible] Internationl Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX [illegible]

CHAIN OF CUSTODY REPORT

Work Order #: [illegible]

CLIENT: ESU Engineering
REPORT TO: Brad Bergsten
ADDRESS: 31960 SW Charbonneau Drive #101
Wilsonville OR 97070
PHONE: ~~626~~ 694-6960 FAX: 694-6962

INVOICE TO: SAME
P.O. NUMBER:

PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
SAMPLED BY: Dan Bergraft

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: 10 STD | 7 | 5 | 4 | 3 | 2 | 1 | <1
Petroleum Hydrocarbon Analyses: 5 STD | 4 | 3 | 2 | 1 | <1
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE	REQUESTED ANALYSES: NWTPH-DX	NWTPH-GX	8260 VOCs	Total Cr, Pb	Dissolved Cr, Pb	MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	TA WO ID
1 HA-1	10/29/07 / 3:15		X	X	X	X	X	W	7		
2 HA-2	11 / 4:15		X	X	X	X	X	W	7		
3 HA-3	10/30/07 / 10:30		X	X	X	X	X	W	7		
4 MW-3	11/1/07 / 9:40		X	X	X	X	X	W	8		
5 MW-2	/ 10:30		X	X	X	X	X	W	8		
6 MW-1	/ 11:10		X	X	X	X	X	W	8		
7 MW-4	/ 12:00		X	X	X	X	X	W	8		
8											
9											

RELEASED BY: Dan Bergraft — DATE: 11/1/07 — RECEIVED BY: Jamie Kirkland — DATE: 11/1/07
PRINT NAME: [illegible] — FIRM: ESU Eng — TIME: 4:56 — PRINT NAME: Jamie Ireland — FIRM: TAP — TIME: 4:56

RELEASED BY: — DATE:
PRINT NAME: — FIRM: — TIME: — RECEIVED BY: — DATE:
PRINT NAME: — FIRM: — TIME:

ADDITIONAL REMARKS: VOCs to include ONLY: BTEX, EDB, EDC, and MTBE

TEMP: 6.8

COC REV 09/2004

PAGE OF

TestAmerica Sample Receipt Checklist

Received by: (section A) Date: 11/01/07 Time: 16:56 Initials: JL

Unpacked by: (section B) Date: 11/01/07 Initials: JL

Logged-in by: Date: 11/01/07 Initials: JL

Work Order No. PQK0030

Client: RSV Engineering

Project: Nicol Island

Cooler ID(s): _____

***ESI Clients (see Section C)

Cooler Temperature (IR): 6.8 °C (plastic) glass NA (oil/air samples, ESI client)

Temperature out of range:
- ___No Ice
- ___Ice Melted
- ___W/in 4 Hours
- ___Other: _____

A

Custody Seals: (#____)

Signature: Y N Dated: _____

X None

Container Type:
- 1 #Cooler(s)
- ____#Box(s)
- ____None (___#Other: _____)

Coolant Type:
- ____Gel Ice
- X Loose Ice
- ____None

Packing Material:
- ____Bubble Bags
- X Styrofoam Cubbies
- ____None (___Other: _____)

Received from:
- ____TA Courier
- ____Senvoy
- ____UPS
- ____Fed Ex
- X Client
- ____TDP
- ____DHL
- ____SDS
- ____Mid-Valley
- ____GS/TA
- ____GS/Senvoy
- ____Other: _____

B

Sample Status:

(If N circled, see NOD)

General:

Intact?	(Y)	N	
# Containers Match COC?	(Y)	N	none given
IDs Match COC?	(Y)	N	

For Analyses Requested:

Correct Type & Preservation?	(Y)	N
Adequate Volume?	(Y)	N
Within Hold Time?	(Y)	N

Volatiles:

VOAs Free of Headspace?	(Y)	N	NA
TB on COC? not provided	Y	(N)	NA

Metals:

HNO3 Preserved?	(Y)	N	NA

C

***ESI Clients Only:

Temperature Blank: _____ °C not provided

All preserved bottles checked Y N NA (voas/soils/all unp.)

All preserved accordingly? Y N (see NOD) NA (voas/soils/all unp.)

Was the Tracking paper keepable? YES NO

If circled NO, what is the Tracking Number? _____

UPS FED EX DHL OTHER: _____

Project Managers:

Comments: _____

PM Reviewed: _____ (Initial/Date)

APPENDIX C

ANALYTICAL RESULT TABLES FROM 2003 AND 2004 SITE INVESTIGATIONS

Table 3 : Soil Sampling Results -Metals
Highway Service 76 Station
Astoria, Oregon

			(mg/kg)		
Sample ID	**Depth (ft)**	**Date**	**Cadmium**	**Chromium**	**Lead**
GP-2	2-4	10/10/03	0.352	**44.1**	6.51
GP-2	17-19	10/10/03	0.030	7.23	2.26
GP-3	2-4	10/10/03	0.291	**40.6**	9.44
GP-3	17-19	10/10/03	0.39	9.81	2.49
GP-4	2-4	10/10/03	0.417	30.8	7.78
GP-4	15-17	10/10/03	0.031	7.58	2.07
Appendix A Risk Based Concentrations (RBCs)[1]					
Soil Ingestion, Dermal Contact and Inhalation		Occupational	NS	NS	750
		Construction Worker	450*	450*	750
		Excavation Worker	NS	NS	750
Volatilization to Outdoor Air		Occupational	NS	NS	NA
Vapor Intrusion to Buildings		Occupational	NS	NS	NA
Leaching to Groundwater		Occupational	8*	38*	30

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) RBCs provided in mg/kg
(3) NS = No Appendix A RBC provided by DEQ.
(4) NA = Pathway not applicable to the chemical of interest according to Appendix A.
(5) 450* From United States Environmental Protection Agency Region 9 Preliminary Remediation Goals, October 1, 2003. Leaching to Groundwater Pathway represents a DAF of 20.
(6) **44.1** Meets or exceeds one of more Appendix A RBC

Table 2
Soil Sampling Results-Hydrocarbon Identification and TPH
Highway Service 76 Station
Astoria, Oregon

			HCID			TPH mg/kg		
Sample ID	Depth(ft)	Date	Gasoline	Diesel	Oil	TPH-Gx	TPH-Dx	TPH-Oil
GP-1	2-4	10/10/03	ND	ND	ND	NA	NA	NA
GP-1	17-18	10/10/03	ND	ND	ND	NA	NA	NA
GP-2	2-4	10/10/03	ND	ND	ND	<6.2	<31	<130
GP-2	17-19	10/10/03	ND	ND	ND	<5.5	<28	<110
GP-3	2-4	10/10/03	ND	ND	ND	<6.2	<32	7.2
GP-3	17-19	10/10/03	ND	ND	ND	<5.6	11	85
GP-4	2-4	10/10/03	ND	ND	ND	<6.3	<31	9.6
GP-4	15-17	10/10/03	ND	ND	ND	<5.2	<26	<110
GP-5	2-4	10/10/03	ND	ND	ND	NA	NA	NA
GP-5	16-18	10/10/03	ND	ND	ND	NA	NA	NA
GP-6	2-4	10/10/03	ND	ND	ND	NA	NA	NA
Appendix A Risk Based Concentrations								
Soil Ingestion Dermal Contact and Inhalation	Occupational		NS	NS	NS	22,000	70,000	NS
	Construction Worker		NS	NS	NS	13,000	23,000	NS
	Excavation Worker		NS	NS	NS	---	---	NS
Volitilization to Outdoor Air	Occupational		NS	NS	NS	80,000	---	NS
Vapor Intrusion to Buildings	Occupational		NS	NS	NS	---	---	NS
Leaching to Groundwater	Occupational		NS	NS	NS	110	---	NS

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum -Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) RBCs provided in mg/kg
(3) NS = No Appendix A RBC provided by DEQ
(4) ND = Not Detected
(5) NA = not analyzed for
(6) **26** Meets or exceeds one or more Appendix A RBC.
(7) --- The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)

Table 4
Soil Sampling Results - PCBs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Depth (ft)	Date	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
GP-2	2-4	10/10/03	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10
GP-2	17-19	10/10/03	<0.098	<0.20	<0.098	<0.098	<0.098	<0.098	<0.098
GP-3	2-4	10/10/03	<0.099	<0.20	<0.099	<0.099	<0.099	<0.099	<0.099
GP-3	17-19	10/10/03	<0.099	<0.20	<0.099	<0.099	<0.099	<0.099	<0.099
GP-4	2-4	10/10/03	<0.099	<0.20	<0.099	<0.099	<0.099	<0.099	<0.099
GP-4	15-17	10/10/03	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10

Notes:

(1) Results reported in mg/kg
(2) The Generic Protective PCB concentration in Soil for the Industrial Land-Use Scenario is 7.5 mg/kg (DEQ Generic Remedies for Soils Contaminated with PCBs, December, 1997).

Table 5
Soil Sampling Results - PAHs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Depth (ft)	Date	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo (a) anthracene	Chrysene	Benzo (b) fluoranthene	Benzo (k) fluoranthene	Benzo (a) pyrene	Dibenzo (a,h) anthracene	Benzo (ghi) perylene	Indeno (1,2,3-cd) pyrene	2-Metylnaphatene	Dibenzofuran
GP-2	2-4	10/10/03	0.36	<5.0	<5.0	<5.0	0.54	<5.0	<5.0	<5.0	<5.0	0.29	<5.0	<5.0	<5.0	<5.0	0.15	<5.0	0.35	<5.0
GP-2	17-19	10/10/03	0.47	<5.0	<5.0	<5.0	0.22	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0.26	<5.0
GP-3	2-4	10/10/03	0.68	<5.1	<5.1	<5.1	0.40	<5.1	0.30	0.31	<5.1	0.26	<5.1	<5.1	<5.1	<5.1	0.22	<5.1	0.84	<5.1
GP-3	17-19	10/10/03	0.67	<5.0	<5.0	0.29	6.9	0.31	1.7	4.2	1.7	8.9	3.0	<5.0	1.6	2.1	4.6	0.67	1.7	0.28
GP-4	2-4	10/10/03	0.30	<5.0	<5.0	<5.0	0.56	<5.0	0.37	0.42	<5.0	0.26	<5.0	<5.0	<5.0	<5.0	0.22	0.23	<5.0	<5.0
GP-4	15-17	10/10/03	0.38	<4.9	<4.9	<4.9	0.21	<4.9	<4.9	0.15	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	0.18	<4.9	0.33	<4.9
GP-5	2-4	10/10/03	0.45	0.38	<5.0	<5.0	3.5	0.47	6.2	10	2.3	4.1	2.6	2.0	3.1	0.49	4.9	3.1	0.33	<5.0
GP-5	16-18	10/10/03	19	<5.1	1.3	1.3	6.7	0.30	3.3	11	1.1	2.4	<5.1	<5.1	<5.1	<5.1	2.2	0.91	2.8	0.91
Appendix A Risk Based Concentrations																				
Soil Ingestion, Dermal Contact Inhalation	Occupational		770,000	NS	41,000,000	35,000,000	NS	—	29,000,000	21,000,000	2,700	270,000	2,700	27,000	270	270	NS	2,700	NS	NS
	Construction Worker		710,000	NS	16,000,000	12,000,000	NS	90,000,000	8,900,000	6,700,000	21,000	2,100,000	21,000	210,000	2,100	2,100	NS	21,000	NS	NS
	Excavation Worker		20,000,000	NS	—	—	NS	—	—	—	590,000	59,000,000	590,000	5,900,000	59,000	59,000	NS	590,000	NS	NS
Volitilization to Outdoor Air	Occupational		—	NS	—	—	NS	—	—	—	—	—	—	—	—	—	NS	—	NS	NS
Vapor Intrusion to Buildings	Occupational		—	NS	—	—	NS	—	—	—	—	—	—	—	—	—	NS	—	NS	NS
Leaching to Groundwater	Occupational		15,000	NS	—	—	NS	—	—	—	—	—	—	—	—	—	NS	—	NS	NS

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003

(2) NS = No Appendix A RBC provided by DEQ

(3) — The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)

(4) Results and RBCs provided in µg/kg

Table 6
Soil Sampling Results-VOCs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Depth (ft)	Date	Benzene	Toulene	Ethylbenzene	Xylenes	Isopropylbenzene	N-propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Methyl-Tert-Buytl-Ether (MTBE)	1,2-dibromoethane (EDB)	1,2-dichloroethane (EDC)	Naphthalene	Methylene Chloride
GP-2	2-4	10/10/03	<6.3	<6.3	<6.3	<12.6	<26	<26	<26	<26	<6.3	<26	<6.3	<26	3.5
GP-2	17-19	10/10/03	<5.5	<5.5	<5.5	<11.0	<22	<22	<22	<22	<5.5	<22	<5.5	<22	2.5
GP-3	2-4	10/10/03	<6.2	<6.2	<6.2	<12.4	<25	<25	<25	<25	1.0	<25	<6.2	<25	4.1
GP-3	17-19	10/10/03	<5.6	<5.6	<5.6	<11.2	<23	<23	<23	<23	<5.6	<23	<5.6	<23	2.4
GP-4	2-4	10/10/03	<6.2	<6.2	<6.2	<12.4	<25	<25	<25	<25	<6.2	<25	<6.2	<25	3.0
GP-4	15-17	10/10/03	<5.2	<5.2	<5.2	<10.4	<21	<21	<21	<21	<5.2	<21	<5.2	<21	1.4
GP-5	2-4	10/10/03	<6.1	<6.1	<6.1	<12.2	<25	<25	<25	<25	<6.1	<25	<6.1	<25	1.6
GP-5	16-18	10/10/03	<6.8	<6.8	7.3	43.4	3.6	9.0	61	7.0	<6.8	<27	<6.8	1.6	22
Appendix A Risk Based Concentrations															
Soil Ingestion, Dermal Contact and Inhalation	Occupational		34,000	68,000,000	74,000,000	24,000,000	51,000,000	19,000,000	1,500,000	1,500,000	760,000	33	15,000	770,000	21,000*
	Construction Worker		340,000	39,000,000	28,000,000	19,000,000	24,000,000	9,300,000	1,400,000	1,400,000	9,000,000	250	180,000	710,000	
	Excavation Worker		9,400,000	---	---	---	---	---	40,000,000	40,000,000	---	7,100	5,000,000	20,000,000	
Volatilization to outdoor air	Occupational		48,000	---	---	---	---	---	790,000	---	720,000	1,700	14,000	---	
Vapor Intrusion to Buildings	Occupational		1,200	---	---	---	---	---	840,000	140,000	35,000	370	560	---	
Leaching to Groundwater	Occupational		52	180,000	---	100,000	---	---	55,000	12,000	300	0.59	7.4	15,000	

Notes:
(1) DEQ Risk Based Concentrations from Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) NS = No Appendix A RBC provided by DEQ
(3) ND = Not Detected
(4) NA = Not analyzed for
(5) **130** Meets or exceeds one or more Appendix A RBC
(6) --- The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)
(7) Results and RBCs provided in µg/kg
(8) 21,000* From United States Environmental Protection Agency Region 9 Preliminary Remediation Goals, October 1, 2003.

Table 7
Groundwater Sampling Results - Hydrocarbon Identification an TPH
Highway Service 76 Station
Astoria, Oregon

		HCID			TPH µg/L		
Sample ID	**Date**	**Gasoline**	**Diesel**	**Oil**	**Gx**	**Dx**	**Oil**
GP-1	10/10/03	D	ND	ND	86	NA	NA
GP-2	10/10/03	D	D	ND	39	3,200	110
Appendix A Risk Based Concentrations							
Volatilization to outdoor air	Occupational	NS	NS	NS	---	---	NS
Vapor Intrusion to Buildings	Occupational	NS	NS	NS	---	---	NS
Groundwater in Excavation	Construction and Excavation Worker	NS	NS	NS	12,000	---	NS

Notes:

(1) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A: Table of Risk-Based Concentrations (RBCs), September 22, 2003.

(2) RBCs provided in ug/L

(3) NS = No Appendix A RBC provided by DEQ

(4) ND = Not Detected

(5) NA = not analyzed for

(6) **61,000** Meets or exceeds one or more Appendix A RBC

(7) --- The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)

Table 8: Groundwater Sampling Results -Metals
Highway Service 76 Station
Astoria, Oregon

		(µg/L)		
Sample ID	**Date**	**Cadmium**	**Chromium**	**Lead**
GP-1	10/10/03	0.18	4.15	58.6
GP-2	10/10/03	0.07	1.13	5.4
Appendix A Risk Based Concentrations (RBCs)				
Volatilization to outdoor air	Occupational	NS	NS	N/A
Vapor Intrusion to Buildings	Occupational	NS	NS	N/A
Groundwater in Excavation	Construction and Excavation Worker	NS	NS	N/A

*From United States Environmental Protection Agency, Region 9 Preliminary Remediation Goals, October 1, 2003

Notes

(1) (1) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A: Table of Risk-Based Concentrations (RBCs), September 22, 2003.
(2) RBCs provided in ug/L
(3) NS = No Appendix A RBC provided by DEQ
(4) ND = Not Detected
(5) **60** Meets or exceeds one of more Appendix A RBC
(6) N/A = Pathway not applicable to the chemical of interest according to Appendix A

Table 9
Groundwater Sampling Results - PCBs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Date	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
GP-2	10/10/03	<0.20	<0.39	<0.20	<0.20	<0.20	<0.20	<0.20

Notes:

(1) Results reported in µg/L

Table 10
Groundwater Sampling Results - PAHs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Date	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo (a) anthracene	Chrysene	Benzo (b) fluoranthene	Benzo (k) fluoranthene	Benzo (a) pyrene	Dibenzo (a,h) anthracene	Benzo (ghi) perylene	Indeno (1,2,3-cd) pyrene	2-Methylnapthalene	Dibenzofuran
GP-2	10/10/03	0.039	0.0051	0.021	0.010	0.015	0.0023	0.010	0.022	0.0031	0.0059	0.0030	0.0028	<0.020	<0.020	0.0056	<0.020	0.031	<0.020
Appendix A Risk Based Concentrations																			
Volatilization to outdoor air	Occupational	—	NS	—	—	NS	—	—	—	—	—	—	—	—	—	NS	—	NS	NS
Vapor Intrusion Into Buildings	Occupational	—	NS	—	—	NS	—	—	—	—	—	—	—	—	—	NS	—	NS	NS
Groundwater in Excavation	Construction and Excavation	680	NS	—	—	NS	—	—	—	9.1	—	—	—	0.53	0.21	NS	2.9	NS	NS

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) NS = No Appendix A RBC provided by DEQ
(3) — The Groundwater RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)
(4) Results and RBCs provided in µg/L

Table 11
Groundwater Sampling Results-VOCs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Date	Benzene	Toulene	Ethylbenzene	Xylenes	Isopropylbenzene	N-propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Methyl-Tert-Buytl-Ether (MTBE)	1,2-dibromoethane (EDB)	1,2-dichloroethane (EDC)
GP-1	10/10/03	0.18	0.26	<0.50	0.45	<2.0	<2.0	<2.0	<2.0	<0.50	<2.0	<0.50
GP-2	10/10/03	<0.50	0.12	<0.50	<1.0	<2.0	<2.0	<2.0	<2.0	<0.50	<2.0	<0.50
Appendix A Risk-Based Concentrations												
Volatilization to outdoor air	Occupational	13,000	---	---	---	---	---	---	---	550,000	2,500	9,000
Vapor Intrusion Into Buildings	Occupational	2,700	---	---	---	---	---	51,000	38,000	280,000	1,800	3,600
Groundwater in Excavation	Construction and Excavation Worker	1,700	78,000	110,000	22,000	51,000	18,000	1,300	1,400	31,000	20	600

Notes:

(1) Sampling results provided in ug/L
(2) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A: Table of Risk-Based Concentrations (RBCs), September 22, 2003
(3) RBCs provided in ug/L
(4) **30,000** Meets or exceeds one or more Appendix A RBC
(5) --- The Groundwater RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)

Table 1
Soil Sampling Results-TPH
Highway Service 76 Station
Astoria, Oregon

			HCID			TPH mg/kg		
Sample ID	Depth(ft)	Date	Gasoline	Diesel	Oil	TPH-Gx	TPH-Dx	TPH-Oil
North BOT	6	10/18/99	ND	ND	ND	NA	<2,500	78,000
South BOT	6	10/18/99	ND	ND	ND	NA	<2,500	19,000
GP-1	2-4	10/10/03	ND	ND	ND	NA	NA	NA
GP-1	17-18	10/10/03	ND	ND	ND	NA	NA	NA
GP-2	2-4	10/10/03	ND	ND	ND	<6.2	<31	<130
GP-2	17-19	10/10/03	ND	ND	ND	<5.5	<28	<110
GP-3	2-4	10/10/03	ND	ND	ND	<6.2	<32	7.2
GP-3	17-19	10/10/03	ND	ND	ND	<5.6	11	85
GP-4	2-4	10/10/03	ND	ND	ND	<6.3	<31	9.6
GP-4	15-17	10/10/03	ND	ND	ND	<5.2	<26	<110
GP-5	2-4	10/10/03	ND	ND	ND	NA	NA	NA
GP-5	16-18	10/10/03	ND	ND	ND	NA	NA	NA
GP-6	2-4	10/10/03	ND	ND	ND	NA	NA	NA
B-7	0-4	9/28/04	NA	NA	NA	<4.9	<20	28J
B-7	13-15	9/28/04	NA	NA	NA	42	2,600	12,000
Appendix A Risk Based Concentrations								
Soil Ingestion Dermal Contact and Inhalation		Occupational	NS	NS	NS	22,000	70,000	21,000*
		Construction Worker	NS	NS	NS	13,000	23,000	9,200*
		Excavation Worker	NS	NS	NS	---	---	190,000*
Volitilization to Outdoor Air		Occupational	NS	NS	NS	80,000	---	---*
Vapor Intrusion to Buildings		Occupational	NS	NS	NS	---	---	---*
Leaching to Groundwater		Occupational	NS	NS	NS	110	---	---*

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum -Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003

(2) RBCs provided in mg/kg

(3) NS = No Appendix A RBC provided by DEQ

(4) ND = Not Detected

(5) NA = not analyzed for

(6) **26** Meets or exceeds one or more RBC.

(7) --- The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)

(8) 9,200* Site-Specific RBC calculated with conservative assumption regarding VPH and EPH distribution of TPH-Oil Fraction. No Appendix A RBC provided by DEQ

Table 2
Soil Sampling Results -Metals
Highway Service 76 Station
Astoria, Oregon

			(mg/kg)		
Sample ID	Depth (ft)	Date	Cadmium	Chromium	Lead
GP-2	2-4	10/10/03	0.352	**44.1**	6.51
GP-2	17-19	10/10/03	0.030	7.23	2.26
GP-3	2-4	10/10/03	0.291	**40.6**	9.44
GP-3	17-19	10/10/03	0.39	9.81	2.49
GP-4	2-4	10/10/03	0.417	30.8	7.78
GP-4	15-17	10/10/03	0.031	7.58	2.07
B-7	0-4	9/28/04	<0.003*	0.004J*	<0.02*
B-7	13-15	9/28/04	0.043	7.54	46.7
Appendix A Risk Based Concentrations (RBCs)[1]					
Soil Ingestion, Dermal Contact and Inhalation		Occupational	450*	450*	750
		Construction Worker	450*	450*	750
		Excavation Worker	450*	450*	750
Volatilization to Outdoor Air		Occupational	NS/NA	NS/NA	NA
Vapor Intrusion to Buildings		Occupational	NS/NA	NS/NA	NA
Leaching to Groundwater		Occupational	8*	38*	30

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003

(2) RBCs provided in mg/kg

(3) NS = No Appendix A RBC provided by DEQ.

(4) NA = Pathway not applicable to the chemical of interest according to Appendix A.

(5) 450* From United States Environmental Protection Agency Region 9 Preliminary Remediation Goals, October 1, 2003. Leaching to Groundwater Pathway represents a DAF of 20. No Appendix A PRG provided by DEQ.

(6) **44.1** Meets or exceeds one of more RBC

Table 3
Soil Sampling Results - Leachable Metals
Highway Service 76 Station
Astoria, Oregon

			(mg/L)		
Sample ID	Depth (ft)	Date	Cadmium	Chromium	Lead
B-7	0-4	9/28/04	<0.003	0.004J	<0.02
B-7	13-15	9/28/04	<0.003	<0.003	0.04J
DEQ Hazardous Substance Remedial Action Rules - Soil Cleanup Table					
Soil Cleanup Level			0.5	10	2

Notes:

(1) Soil Cleanup Level from DEQ Hazardous Substance Remedial Action Rules (OAR 340 -122), Oregon Soil Cleanup Table, July 27,2002)

(2) Soil Cleanup Levels provided in µg/L

Table 4
Soil Sampling Results-PAHs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Depth (ft)	Date	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo (a) anthracene	Chrysene	Benzo (b) fluoranthene	Benzo (k) fluoranthene	Benzo (a) pyrene	Dibenzo (a,h) anthracene	Benzo (g,h,i) perylene	Indeno (1,2,3-cd) pyrene	2-Metylnaphatene	Dibenzofuran
GP-2	2-4	10/10/03	0.36	<5.0	<5.0	<5.0	0.54	<5.0	<5.0	<5.0	<5.0	0.29	<5.0	<5.0	<5.0	<5.0	0.15	<5.0	0.35	<5.0
GP-2	17-19	10/10/03	0.47	<5.0	<5.0	<5.0	0.22	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0.26	<5.0
GP-3	2-4	10/10/03	0.68	<5.1	<5.1	<5.1	0.40	<5.1	0.30	0.31	<5.1	0.26	<5.1	<5.1	<5.1	<5.1	0.22	<5.1	0.84	<5.1
GP-3	17-19	10/10/03	0.67	<5.0	<5.0	0.29	6.9	0.31	1.7	4.2	1.7	8.9	3.0	<5.0	1.6	2.1	4.6	0.67	1.7	0.28
GP-4	2-4	10/10/03	0.30	<5.0	<5.0	<5.0	0.56	<5.0	0.37	0.42	<5.0	0.26	<5.0	<5.0	<5.0	<5.0	0.22	0.23	<5.0	<5.0
GP-4	15-17	10/10/03	0.38	<4.9	<4.9	<4.9	0.21	<4.9	<4.9	0.15	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	0.18	<4.9	0.33	<4.9
GP-5	2-4	10/10/03	0.45	0.38	<5.0	<5.0	3.5	0.47	6.2	10	2.3	4.1	2.6	2.0	3.1	0.49	4.9	3.1	0.33	<5.0
GP-5	16-18	10/10/03	19	<5.1	1.3	1.3	6.7	0.30	3.3	11	1.1	2.4	<5.1	<5.1	<5.1	<5.1	2.2	0.91	2.8	0.91
B-7	0-4	38258.00	0.91J	<3.3	<3.3	<3.3	0.58J	<3.3	0.78J	0.87J	0.22J	<3.3	<3.3	<3.3	0.41J	<3.3	0.74J	0.41J	<3.3	<3.3
B-7	13-15	38258.00	7.7	1.3J	0.85J	<2.8	2.8J	0.97J	2.0	4.6	1.5J	5.1J	1.9J	0.93J	2.3J	0.80J	100	9.7	12	<2.8
Appendix A Risk Based Concentrations																				
Soil Ingestion, Dermal Contact Inhalation	Occupational		770,000	NS	41,000,000	35,000,000	NS	—	29,000,000	21,000,000	2,700	270,000	2,700	27,000	270	270	NS	2,700	NS	NS
	Construction Worker		710,000	NS	16,000,000	12,000,000	NS	90,000,000	8,900,000	6,700,000	21,000	2,100,000	21,000	210,000	2,100	2,100	NS	21,000	NS	NS
	Excavation Worker		20,000,000	NS	—	—	NS	—	—	—	590,000	59,000,000	590,000	5,900,000	59,000	59,000	NS	590,000	NS	NS
Volitilization to Outdoor Air	Occupational		—	NS	—	—	NS	—	—	—	—	—	—	—	—	—	NS	—	NS	NS
Vapor Intrusion to Buildings	Occupational		—	NS	—	—	NS	—	—	—	—	—	—	—	—	—	NS	—	NS	NS
Leaching to Groundwater	Occupational		15,000	NS	—	—	NS	—	—	—	—	—	—	—	—	—	NS	—	NS	NS

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003

(2) NS = No Appendix A RBC provided by DEQ

(3) — The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)

(4) Results and RBCs provided in µg/kg

Table 5
Soil Sampling Results-VOCs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Depth (ft)	Date	Benzene	Toulene	Ethylbenzene	Xylenes	Isopropylbenzene	N-propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Methyl-Tert-Buyti-Ether (MTBE)	1,2-dibromoethane (EDB)	1,2-dichloroethane (EDC)	Naphthalene	Methylene Chloride
GP-2	2-4	10/10/03	<6.3	<6.3	<6.3	<12.6	<26	<26	<26	<26	<6.3	<26	<6.3	<26	3.5
GP-2	17-19	10/10/03	<5.5	<5.5	<5.5	<11.0	<22	<22	<22	<22	<5.5	<22	<5.5	<22	2.5
GP-3	2-4	10/10/03	<6.2	<6.2	<6.2	<12.4	<25	<25	<25	<25	1.0	<25	<6.2	<25	4.1
GP-3	17-19	10/10/03	<5.6	<5.6	<5.6	<11.2	<23	<23	<23	<23	<5.6	<23	<5.6	<23	2.4
GP-4	2-4	10/10/03	<6.2	<6.2	<6.2	<12.4	<25	<25	<25	<25	<6.2	<25	<6.2	<25	3.0
GP-4	15-17	10/10/03	<5.2	<5.2	<5.2	<10.4	<21	<21	<21	<21	<5.2	<21	<5.2	<21	1.4
GP-5	2-4	10/10/03	<6.1	<6.1	<6.1	<12.2	<25	<25	<25	<25	<6.1	<25	<6.1	<25	1.6
GP-5	16-18	10/10/03	<6.8	<6.8	7.3	43.4	3.6	9.0	61	7.0	<6.8	<27	<6.8	1.6	22
B-7	0-4	9/28/2004	<6.5	<6.5	<6.5	<6.5	<26	<26	<26	<26	<6.5	<26	<6.5	<26	NA
B-7	13-15	9/28/2004	<5.6	1.1J	14	59	2.8J	13J	25	28	<5.6	<23	<5.6	1.8J	NA
Appendix A Risk Based Concentrations															
Soil Ingestion, Dermal Contact and Inhalation		Occupational	34,000	68,000,000	74,000,000	24,000,000	51,000,000	19,000,000	1,500,000	1,500,000	760,000	33	15,000	770,000	21,000*
		Construction Worker	340,000	39,000,000	28,000,000	19,000,000	24,000,000	9,300,000	1,400,000	1,400,000	9,000,000	250	180,000	710,000	NS
		Excavation Worker	9,400,000	---	---	---	---	---	40,000,000	40,000,000	---	7,100	5,000,000	20,000,000	NS
Volatilization to outdoor air		Occupational	48,000	---	---	---	---	---	790,000	---	720,000	1,700	14,000	---	NS
Vapor Intrusion to Buildings		Occupational	1,200	---	---	---	---	---	840,000	140,000	35,000	370	560	---	NS
Leaching to Groundwater		Occupational	52	180,000	---	100,000	---	---	55,000	12,000	300	0.59	7.4	15,000	20*

Notes:
(1) DEQ Risk Based Concentrations from Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) NS = No Appendix A RBC provided by DEQ
(3) ND = Not Detected
(4) NA = Not analyzed for
(5) **22** Meets or exceeds one or more Appendix A RBC
(6) --- The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)
(7) Results and RBCs provided in µg/kg
(8) 21,000* From United States Environmental Protection Agency Region 9 Preliminary Remediation Goals, October 1, 2003.

Table 6
Groundwater Sampling Results - TPH
Highway Service 76 Station
Astoria, Oregon

		HCID			TPH µg/L		
Sample ID	**Date**	**Gasoline**	**Diesel**	**Oil**	**Gx**	**Dx**	**Oil**
GP-1	10/10/03	D	ND	ND	86	NA	NA
GP-2	10/10/03	D	D	ND	39	3,200	110
B-7	9/28/04	NA	NA	NA	2,400	2,800	5,100
B-8	10/13/04	NA	NA	NA	330	210J	190J
B-9	10/13/04	NA	NA	NA	120J	110J	86J
Appendix A Risk Based Concentrations							
Volatilization to outdoor air	Occupational	NS	NS	NS	---	---	---*
Vapor Intrusion to Buildings	Occupational	NS	NS	NS	---	---	---*
Groundwater in Excavation	Construction and Excavation Worker	NS	NS	NS	12,000	---	14,000*

Notes:

(1) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A: Table of Risk-Based Concentrations (RBCs), September 22, 2003.

(2) RBCs provided in ug/L

(3) NS = No Appendix A RBC provided by DEQ

(4) ND = Not Detected

(5) NA = not analyzed for

(6) **61,000** Meets or exceeds one or more Appendix A RBC

(7) --- The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)

(8) 14,000* Site-Specific RBC. No Appendix A RBC provided by DEQ

Table 7
Groundwater Sampling Results -Metals
Highway Service 76 Station
Astoria, Oregon

		(µg/L)		
Sample ID	**Date**	**Cadmium**	**Chromium**	**Lead**
GP-1	10/10/03	0.18	4.15	58.6
GP-2	10/10/03	0.07	1.13	5.4
B-7	9/28/04	0.04	0.34	0.268
B-8	10/13/04	0.04	0.06	0.23
B-9	10/13/04	0.02	0.19	0.09
Appendix A Risk Based Concentrations (RBCs)				
Volatilization to outdoor air	Occupational	NS	NS	N/A
Vapor Intrusion to Buildings	Occupational	NS	NS	N/A
Groundwater in Excavation	Construction and Excavation Worker	NS	NS	N/A

*From United States Environmental Protection Agency, Region 9 Preliminary Remediation Goals, October 1, 2003

Notes:

(1) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A:Table of Risk-Based Concentrations (RBCs), September 22, 2003.
(2) RBCs provided in ug/L
(3) NS = No Appendix A RBC provided by DEQ
(4) ND = Not Detected
(5) **60** Meets or exceeds one of more Appendix A RBC
(6) N/A = Pathway not applicable to the chemical of interest according to Appendix A

Table 8
Groundwater Sampling Results- PAHs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Date	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a) anthracene	Chrysene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Benzo(a)pyrene	Dibenzo(a,h) anthracene	Benzo(ghi) perylene	Indeno(1,2,3-cd) pyrene	2-Methyl napthalene	Dibenzofuran
GP-2	10/10/03	0.039	0.0051	0.021	0.010	0.015	0.0023	0.010	0.022	0.0031	0.0059	0.0030	0.0028	<0.020	<0.020	0.0056	<0.020	0.031	<0.020
B-7	09/28/04	1.3	<0.023	0.082	0.080	0.019J	0.015J	0.020J	0.13	0.014J	0.024	0.017J	0.0049J	0.012J	<0.023	0.054	0.014J	0.27	0.011J
B-8	10/13/04	0.12	0.0035J	0.014J	0.011J	0.013J	0.0056J	0.0075J	0.0091J	0.0084J	0.0064J	0.0071J	0.0076J	0.0079J	0.0095J	0.0098J	0.0092J	0.11	0.013J
B-9	10/13/04	0.088	<0.028	<0.028	0.0074J	0.0099J	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	0.083	<0.028
Appendix A Risk Based Concentrations																			
Volatilization to outdoor air	Occupational	---	NS	---	---	NS	---	---	---	---	---	---	---	---	---	NS	---	NS	NS
Vapor Intrusion Into Buildings	Occupational	---	NS	---	---	NS	---	---	---	---	---	---	---	---	---	NS	---	NS	NS
Groundwater in Excavation	Construction and Excavation	680	NS	---	---	NS	---	---	---	9.1	---	---	---	0.53	0.21	NS	2.9	NS	NS
Level II Screening Level Values																			
Suface Water	Aquatic	620	NS	520	3.9	6.3	13	6.16	NS	0.027	NS	NS	NS	0.014	NS	NS	NS	2.1	3.7
	Birds	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Mammals	284,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OAR 340-41 Table 20 or Table 33C Water Quality Criteria																			
Protection of Aquatic Life	Fresh Acute	2,300	NS	1,700	NS	NS	NS	3,980	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Fresh Chronic	620	NS	520	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Marine Acute	2,350	NS	970	NS	NS	NS	40	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Marine Chronic	NS	NS	710	NS	NS	NS	16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) NS = No Appendix A RBC provided by DEQ
(3) --- The Groundwater RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)
(4) Results and RBCs provided in µg/L

Table 9
Groundwater Sampling Results-VOCs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Date	Benzene	Toulene	Ethylbenzene	Xylenes	Isopropylbenzene	N-propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Methyl-Tert-Buytl-Ether (MTBE)	1,2-dibromoethane (EDB)	1,2-dichloroethane (EDC)	Naphthalene
GP-1	10/10/2003	0.18J	0.26J	<0.50	0.45J	<2.0	<2.0	<2.0	<2.0	<0.50	<2.0	<0.50	NA
GP-2	10/10/2003	<0.50	0.12J	<0.50	<1.0	<2.0	<2.0	<2.0	<2.0	<0.50	<2.0	<0.50	NA
B-7	9/28/2004	12	2.4	7.5	3.08	68	96	0.98J	0.47J	<0.50	<2.0	<0.50	1.9J
B-8	10/13/2004	53	0.32J	0.42J	0.87	5.1	6.6	0.40J	0.13J	2.2	<2.0	<0.50	NA
B-9	10/13/2004	38	0.36J	0.27J	0.58J	2.3	4.4	0.39J	<2.0	2.7	<2.0	<0.50	NA
Appendix A Risk-Based Concentrations													
Volatilization to outdoor air	Occupational	13,000	—	—	—	—	—	—	—	550,000	2,500	9,000	—
Vapor Intrusion Into Buildings	Occupational	2,700	—	—	—	—	—	51,000	38,000	280,000	1,800	3,600	—
Groundwater in Excavation	Construction and Excavation Worker	1,700	78,000	110,000	22,000	51,000	18,000	1,300	1,400	31,000	20	600	680
Level II Screening Level Values													
Suface Water	Aquatic	130	9.8	7.3	1.8	NS	NS	NS	NS	NS	NS	20,000	620
	Birds	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	125,000	NS
	Mammals	NS	104,000	NS	NS	NS	NS	NS	NS	NS	NS	200,000	284,000
OAR 340-41 Table 20 or Table 33C Water Quality Criteria													
Protection of Aquatic Life	Fresh Acute	5,300	17,500	32,000	NS	NS	NS	NS	NS	NS	NS	118,000	2,300
	Fresh Chronic	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	20,000	620
	Marine Acute	5,100	6,300	430	NS	NS	NS	NS	NS	NS	NS	113,000	2,350
	Marine Chronic	700	5,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes:

(1) Sampling results provided in ug/L
(2) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A: Table of Risk-Based Concentrations (RBCs), September 22, 2003
(3) RBCs provided in ug/L
(4) **30,000** Meets or exceeds one or more Appendix A RBC
(5) — The Groundwater RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)

RISK-BASED CORRECTIVE ACTION CLOSURE REPORT
HIWAY SERVICE 76 STATION
1308 MARINE DRIVE
ASTORIA, OREGON

DEQ File No. 04-99-1193

October 27, 2008

DEPT OF ENVIRONMENTAL QUALITY
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NORTHWEST REGION

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RISK-BASED CORRECTIVE ACTION CLOSURE REPORT
HIWAY SERVICE 76 STATION
1308 MARINE DRIVE
ASTORIA, OREGON

RSV Engineering, Inc. is submitting this Risk-Based Corrective Action Report on behalf of the Niemi Oil Company to document the completion of work performed at the Hiway Service 76 Service Station site located at 1308 Marine Drive in Astoria, Oregon. The report was prepared in conformance with RSV Engineering's quality assurance/quality control procedures to ensure that the report meets industry standards in terms of the methods used and the information presented. If you have any questions or comments concerning this report, please contact one of the individuals listed below.

Respectfully submitted,

RSV ENGINEERING INC.

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for:

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RISK-BASED CORRECTIVE ACTION CLOSURE REPORT
HIWAY SERVICE 76 STATION
1308 MARINE DRIVE
ASTORIA, OREGON

INTRODUCTION

This Risk-Based Corrective Action Closure Report summarizes the results of site investigation activities conducted by RSV Engineering, Inc. (RSV) at the Niemi Oil Company Hiway Service 76 Station located at 1308 Marine Drive in Astoria, Oregon (Figure 1).

Soil and groundwater investigations were conducted at the site to define the nature and extent of petroleum hydrocarbons associated with a release from a 550-gallon waste-oil tank decommissioned in 1999 (Figure 2). DEQ has listed the site as a Leaking Underground Storage Tank (LUST) site with File Number 04-99-1193.

In October 2007, four monitoring wells were installed and groundwater samples collected for analysis as requested by the Oregon Department of Environmental Quality (DEQ) in a September 23, 2005 letter responding to Niemi Oil Company's (Niemi) request for a "No Further Action" (NFA) determination for the site (Appendix A). Niemi's 2005 NFA request was based on the results of direct-push soil and groundwater investigations conducted at the site in 2003 and 2004. The soil and groundwater analytical results from site investigations were compared to Risk-Based Concentrations (RBCs) in accordance with Oregon Administrative Rule (OAR) 340-122-0244. The following investigation results formed the basis of the 2005 NFA request:

1) Contamination at the site is limited to petroleum-based constituents.
2) Petroleum-related hazardous constituents identified at the site are listed in the DEQ guidance Risk-Based Corrective Action for Petroleum Contaminated Sites, Appendix A Table of RBCs.
3) The site is zoned commercial and the current and future planned use of the site is as a gasoline and service station. The only RBC exceedances for applicable potential exposure pathways were ingestion, inhalation, and dermal contact for

oils impacted with TPH as heavy oil (TPH-Oil), and migration to groundwater from soils impacted with TPH-Oil and metals in the vicinity of the former location of the waste-oil UST. However, the soil exceeding the ingestion, inhalation, and dermal contact exposure pathway is present 6 ft or more below ground surface and deeper than the 3-ft depth considered applicable for occupational workers per DEQ guidance. No site development at depths greater than 6 ft is expected or planned in the future, so exposure to the impacted soils is unlikely.

4) Groundwater analytical results do not exceed DEQ Appendix A or site-specific TPH RBCs for applicable potential exposure pathways identified for the site (i.e., Volatilization to Outdoor Air, Vapor Intrusion into Buildings, or Groundwater in an Excavation for Occupational, Construction worker or Excavation worker pathways).

Despite the fact that RBCs for applicable exposure pathways have not been exceeded at the site, DEQ expressed concern in its September 23, 2005 letter that gasoline-range hydrocarbons detected in downgradient groundwater grab samples in October 2004 might indicate a release from the active UST fueling system. Therefore, DEQ asked Niemi to perform additional groundwater monitoring to further define the nature and extent of impacts at the site in accordance with OAR 340-122-0240.

Consistent with a DEQ-approved work plan, Niemi installed four requested groundwater monitoring wells and collected groundwater grab samples from the site and adjacent properties in October 2007 (Figure 2). The DEQ-approved groundwater monitoring was implemented to evaluate trends in groundwater elevation and quality, and to determine whether the site is eligible for closure without additional response actions.

With the completion of the September 2008 quarterly monitoring, four quarters of groundwater monitoring have been performed for the site. The results of the site investigation and groundwater monitoring do not indicate a release from the active UST fueling system. Although relatively low concentrations of gasoline-range hydrocarbons (i.e., below applicable RBCs) were detected in groundwater downgradient of the former

waste oil UST in October 2004, subsequent investigation results indicate that those concentrations have attenuated below reporting limits with time and are not indicative of an ongoing release.

The groundwater monitoring analytical data further indicate that petroleum hydrocarbons are limited to the vicinity of the former 550-gallon waste-oil UST cavity, and at concentrations below applicable RBCs. Consistent with the analytical results for all soil and groundwater samples collected during this and previous site investigations associated with the Hiway Service site, the detected concentrations do not exceed potentially applicable RBCs, and the site qualifies for closure under OAR 340-122-0244.

BACKGROUND

The Hiway Service site is an active 76 Service Station. Currently, three registered fuel product USTs are located at the site; two 4,000-gallon gasoline USTs and one 1,500-gallon gasoline UST.

On October 18, 1999, a 550-gallon waste-oil UST was removed from the site near the northeast corner of the station building (Figure 2). At that time, petroleum product odor and staining were noted in the soils from the waste-oil UST excavation. Two soil samples were collected from the bottom of the UST excavation from a depth of 6ft and analyzed for Total Petroleum Hydrocarbon–Hydrocarbon Identification (TPH-HCID), with both diesel and heavy oil detected in both samples. Follow-up analyses for TPH in the diesel and heavy oil ranges detected only heavy oil to a maximum concentration of 78,000 mg/kg. TPH in the diesel range was not detected in either sample. The soil contamination was reported to the DEQ on October 21, 1999.

Investigation Summary

The following sections describe the activities and results of site investigation activities. Site investigations including geophysical survey and soil and groundwater sampling and analysis were performed in 2003 and 2004. A groundwater investigation, including

installation of Monitoring Wells MW-1 through MW-4, was conducted in October 2007, with follow-up quarterly groundwater monitoring through September 2008.

On September 29, 2003 a magnetometer/ground penetrating radar (GPR) survey was performed by GeoPotential, Inc. of Gresham, Oregon to locate in-use and any unknown or previously abandoned underground storage tanks (USTs) beneath the site (Appendix B). The only USTs detected by the survey were the three active USTs, consistent with the number of tanks currently registered for the site. No other USTs were detected during the geophysical survey.

RSV conducted an initial soil and groundwater investigation at the site in October 2003, consisting of the completion of six direct-push borings, GP-1 through GP-6 (Appendix C). Laboratory analytical results indicated relatively low concentrations of petroleum related compounds in soil and groundwater beneath the site, primarily associated with the former waste oil UST (Appendix D). A Site Characterization Report was submitted to DEQ in February 2004, and in April 2004, DEQ requested additional site characterization work to better define the extent of petroleum hydrocarbons.

In October 2004, RSV completed three soil borings to further assess the extent of petroleum hydrocarbons associated with the former waste-oil UST. Boring B-7 was completed adjacent to the former location of the waste-oil UST, and Borings B-8 and B-9 were completed to the north and hydraulically downgradient of the former waste-oil UST area (Figure 2).

Analysis of samples collected from Soil Boring B-7 revealed detections of petroleum constituents in soil and groundwater consistent with a release from a waste-oil tank. Groundwater samples collected from Soil Borings B-8 and B-9, completed downgradient of the former waste-oil UST area, revealed below RBC concentrations of several petroleum-related compounds more typically associated with gasoline (RSV, 2005).

A conceptual site model was developed and potential occupational exposure routes were considered for employees and workers at the site based on the current and expected future

commercial use of the site. The potential pathways considered in the conceptual site model include: direct contact with soil, dermal absorption and inhalation of volatiles, inhalation of chemicals volatilized into outdoor air, inhalation of chemicals volatilized into buildings, and leaching to groundwater. Ingestion of groundwater was excluded as a potential pathway at the site, as described in the beneficial water determination presented later in this report.

The only RBC exceedances in soils for these potential occupational exposure pathways were for soils in or near the former waste-oil UST excavation. However, the soils with concentrations exceeding applicable RBCs were encountered below the depth that may present reasonable exposure scenarios for occupational workers (i.e. 3 ft below ground surface) (DEQ, 2003). Specifically, RBCs were exceeded for soil ingestion, inhalation, and dermal contact for employees and construction and excavation workers for TPH-Oil, and migration to groundwater from soils for TPH-Oil and metals near the former UST tank pit. Exposure to soil exceeding the ingestion, inhalation, and dermal contact exposure pathway for construction and excavation workers is not reasonably likely since the soil exceedances were from a depth of 6 feet or more, the current and planned future use of the site is as a gasoline and service station, and no site development activities are expected or planned in the future at depths that my encounter impacted soils.

RSV calculated site-specific soil and groundwater RBCs for TPH-Oil using DEQ's RBC computer spreadsheet (DEQ, 2003a). The calculation assumed that all of the TPH detected in soil samples at the site were within the range that yields the most conservative site-specific RBC (RSV, 2004). In its September 23, 2005 letter, DEQ presented TPH-Oil RBCs that DEQ had calculated using site specific TPH and constituent concentration data for soil samples collected from the former waste-oil UST area (Appendix A). As DEQ indicated in its letter, the site specific RBCs calculated by DEQ indicate that remaining heavy oil concentrations at the Hiway Service site are within the applicable cleanup standards.

With respect to leaching to groundwater RBC exceedances, ingestion and inhalation of groundwater is not considered an applicable exposure pathway at the site based on the results of the beneficial water use determination.

Groundwater Monitoring Wells MW-1 through MW-4 (Appendix C) were installed during October 2007 and groundwater samples collected for laboratory analysis. The groundwater analytical data indicate that petroleum hydrocarbons are limited to Monitoring Well MW-3 and the vicinity of the former 550-gallon waste-oil UST cavity, and at relatively low concentrations. Quarterly samples analyzed from MW-1, MW-2, MW-4, and the off-site grab samples did not detect petroleum constituents and confirm that contamination is confined to the immediate vicinity of the former 550-gallon waste oil UST. Furthermore, metals (cadmium, chromium, and lead) were not detected above reporting limits in any groundwater sample.

Groundwater monitoring was performed in January, May and September 2008, and together with the October 2007 groundwater sampling comprises four quarters of groundwater monitoring. Consistent with the analytical results for all soil and groundwater samples collected during site investigations and groundwater monitoring at the Hiway Service site, the detected concentrations do not exceed applicable occupational RBCs.

Data from the site investigations are presented in the appendices as follows:

- **Appendix A:** site specific TPH RBCs calculated by DEQ;
- **Appendix B:** geophysical survey results;
- **Appendix C:** boring logs and well construction details;
- **Appendix D:** analytical result tables from the 2003 and 2004 site investigations, including updated TPH RBCs as calculated by DEQ
- **Appendix E:** analytical result table from the October 2007 groundwater investigation; and
- **Appendix F:** groundwater flow maps.

Theses data were reported to DEQ in the following reports:

- *Site Characterization Report* - RSV Engineering, Inc. February, 2004.
- *Additional Site Characterization Report.* - RSV Engineering, Inc. May, 2005.
- *Additional Site Characterization Report.* - RSV Engineering, Inc. December, 2007.
- *First Quarter Groundwater Monitoring Report* - RSV Engineering, Inc. March 13, 2008.
- *Second Quarter Groundwater Monitoring Report* - RSV Engineering, Inc. July 14, 2008.

Physical Setting and Local Geology

The Hiway Service site is located approximately 550 ft south of the Columbia River. A bedrock high is located approximately one-half mile to the south of the site. Floodplain sediments in the vicinity of the Columbia River in this part of Astoria generally consist of primarily sands and gravels with minor amounts of clay. Underlying unconsolidated sediments in the area is the Astoria Formation, which is characterized by an upper sandstone unit of Miocene age, a middle shale unit, and a lower sandstone unit. Reportedly, depth to bedrock was encountered during geotechnical borings completed at an adjacent site south and across Marine Drive from the Hiway Service site indicated bedrock is encountered approximately 28 ft bgs.

Shallow soils in the vicinity of the site have been mapped as Walluski Silt Loam. The Walluski Silt Loam is typically moderately well drained and has a slow permeability. A typical profile consists of 14 inches of very dark grayish brown silt loam, 7 inches of dark brown silt loam, and 39 inches of dark yellowish brown, yellowish brown, and light brownish gray, mottled silty clay loam.

At the Hiway Service property, there is a sharp ground surface elevation difference of approximately 10 feet between the southern property boundary and northern portion of the property in the vicinity of Borings B-8 and B-9, due to a retaining wall behind the storage shed constructed on the north side of the station building (Figure 2). Fill material

was placed on the south side of the retaining wall to build up the property such that the Service Station could be constructed.

Shallow soils at the site vary and include sand (MW-2), silty sand (MW-1), and silty clayey gravel (MW-3). The proximity of Monitoring Wells MW-2 and MW-3 to the retaining wall, as well as glass and metal fragments observed from the depth of 8 ft in Boring MW-2, indicate the shallow soils in these borings are fill material.

Beneath the site fill, sand was encountered in Borings MW-2 and MW-3, and sand and silty sand in Boring MW-1, until silty clayey gravel was encountered in each of these borings at the depths of approximately 18 ft (MW-1), 22.5 ft (MW-2), and 19.5 ft (MW-3) below ground surface. The driller reported the gravel was relatively difficult drilling, and it was this gravel that had caused direct-push (i.e., Geoprobe) refusal in some borings during previous site investigations. In addition, where the water table was encountered within the clayey gravel, a water sample was not always obtained due to the low yield of the strata. Only sand was encountered in Boring MW-4, which was installed to a shallower depth at lower elevation than the onsite monitoring wells.

Groundwater was encountered at depths ranging from approximately 6.5 ft (MW-4) to 18.5 ft (MW-1, MW-2, and MW-3) below ground surface. This approximately 12-ft difference in depths to water is primarily attributable to ground surface elevation differences between the north and south side of the site retaining wall.

The direction of groundwater flow is predominantly towards the north-northwest (Appendix F). This groundwater flow direction was anticipated and is consistent with the topography of the site area and location of the Columbia River relative to the site.

CURRENT AND REASONABLY LIKELY FUTURE LAND USE

The City of Astoria Zoning Map for the Hiway Service property and surrounding area is presented in Appendix G. The site is located within Block 149, as shown on the map. Review of the zoning map indicates that Block 149 and all adjacent properties are located within an area with a zoning designation of C-3: General Commercial Zone.

The permitted uses of the C-3 zoning are also included in Appendix G. Review of the permitted uses indicates that in addition to commercial/occupational uses, multi-family dwellings (i.e., apartments, row houses, etc.), and single and multi-family dwellings located above or below commercial facilities on the first floor of the structure, are permitted uses for C-3 zoning.

Niemi intends to continue using the site as a retail service station, and does not currently have plans to sell or redevelop the Hiway Service property.

Information obtained from the City of Astoria Planning Department indicates that, although the City of Astoria Comprehensive Plan is being updated, the updates will not change the zoning from the current C-3 General Commercial designation for the Hiway Service site and surrounding properties.

In addition, considering that the City of Astoria is addressing ongoing landslide and slope stability issues for the residential zoned area on the opposite (south) side of Marine Drive from the site, a potential future developer would also likely have significant concern regarding the stability of property south of the site and the potential effect on a property redevelopment and/or future property value.

In conclusion, the current use of the Niemi Hiway Service property as a retail service station is expected to continue for the foreseeable future.

BENEFICIAL WATER USE DETERMINATION

DEQ has requested a beneficial water use determination for the Hiway Service site. The following sections provide a beneficial water use determination consistent with OAR 340-122-080(3)(f).

Locality of the Facility

Beneficial water use determinations are required for the "locality of the facility." DEQ defines the "locality of the facility" as "any point where a human or an ecological receptor contacts or is reasonably likely to come into contact with facility-related

hazardous substances." (OAR 350-122-115(34) However, the results of the site investigations indicate the following:

- The site investigation data indicate that petroleum hydrocarbons are limited to the vicinity of the former 550-gallon waste-oil UST cavity; petroleum concentrations in soil that exceed applicable RBCs are six feet below ground surface; and therefore below the depth considered to present reasonable exposure scenarios for occupational workers;
- Petroleum hydrocarbons associated with the Hiway Service site have not been detected in off-site groundwater samples collected at adjacent properties;
- Petroleum concentrations in groundwater are relatively low, and groundwater is not used as drinking water; and,
- DEQ has already acknowledged in their September 23, 2005 letter that petroleum concentrations in soil and groundwater samples collected at the site meet the proposed cleanup standards for the site.

In consideration of the definition of "locality of the site", site data indicate that there is no point where a human or ecological receptor is reasonably likely to come into contact with petroleum constituents in the former waste oil UST location at the Hiway Service site.

In addition, the site contamination is shallow contamination and will not migrate downward to a deeper zone or groundwater supply source. Nevertheless, for the purpose of completing the beneficial water use determination, Niemi will use the Hiway Service property boundary as the locality of the facility.

Current and Future Uses of Water

The site and surrounding area receives its water supply from the City of Astoria. The City of Astoria receives an abundant water supply from the Astoria Reservoir.

The site is located in Township 8 North, Range 9 West, Section 9. A search for water supply wells was conducted from the well log query database available from the Oregon

Department of Water Resources (ODWR). The ODWR database search included Township 8 North, Range 9 West, Sections 7 through 24. The Well Log Query Results for water supply wells in these sections are presented in Appendix H, along with the Water Well Report for each well identified as a water supply well.

Review of the Well Log Query Results identified twelve water supply wells within the search area; however, the Water Well Reports indicates that only four of the twelve logs are truly water supply wells. Of the remaining wells incorrectly identified as being water supply wells, three wells (CLAT_287, CLAT_292, and CLAT_2657) are cathodic protection for Northwest Natural Gas facilities and each of these logs is stamped as "Not a Water Well", and five wells (CLAT_51810 through CLAT_51814) are abandoned groundwater monitoring wells.

The four wells correctly identified as water supply wells are all domestic wells located in Sections 21 (CLAT_293 and CLAT_51153), 23 (CLAT_51030), and 24 (CLAT_294), and each well is located over 1.5 miles from the Hiway Service site. No industrial or irrigation wells were identified by the query.

Review of the Well Log Reports indicates that the domestic wells are cased to depths between 20 and 30 ft below ground surface, with total completed depths ranging from 140 to 240 ft below ground surface, indicating deeper water sources than the shallow water at the Hiway Service site. Furthermore, the Water Well Report indicates that usable water was not encountered in one of the domestic water supply wells (CLAT-294).

Each of the wells identified as domestic supply wells are located on the south side of Coxcomb Hill, where the water shed drains toward the south-southwest and to the Young's River and Young's Bay (Figure 1). This flow direction is the opposite of shallow water flow at the Hiway Service site, which is located on the north side of Coxcomb Hill, where the water shed drains in the opposite direction toward the north to the Columbia River.

In addition, the shallow site hydrogeology at the Hiway Service site is not conducive for a water supply well. Clayey gravel was encountered between approximately 18 feet and 22.5 feet below ground surface. The water table has been encountered within the clayey gravel during investigations conducted during the end of the dry season (i.e., October) when groundwater elevation is at its lowest, and groundwater samples were not always successfully obtained from this low-yielding stratum. During the wet season, groundwater levels in site monitoring wells were encountered at shallower elevations within the sand material; however, this shallow near-surface groundwater is not used for groundwater supply purposes.

There are no surface water bodies within the locality of the Hiway Service site. Shallow groundwater from the site ultimately flows to the nearest surface water body, the Columbia River, located approximately 550 ft north of the site. The river is not within the locality of the Hiway Service site, and no aquatic, recreational, or aesthetic uses of the river are therefore affected. As noted above, petroleum hydrocarbons associated with the Hiway Service site have not been detected in off-site groundwater samples collected downgradient of the property and are not expected to migrate beyond the property boundary at detectable levels in the future.

With regard to future water use, considering that the site and area are provided with a municipal water supply and the clayey gravel beneath the site does not readily yield water, future installation of a drinking water supply well in the site locality and surrounding area is not reasonably likely.

The results of the beneficial water use determination indicate that there are no current or reasonably likely future beneficial uses of shallow groundwater at the Hiway Service site.

QUARTERLY GROUNDWATER MONITORING METHODS

The scope of work for the September 2008 and previous groundwater-monitoring events is summarized below.

1. Measure the depths to groundwater in Monitoring Wells MW-1 through MW-4 to the nearest 0.01 foot and check the groundwater surface in the monitoring wells for free (floating) product.

2. Purge at least three well volumes of water from each well and collect temperature, pH, specific conductance, and ORP measurements.

3. Obtain groundwater samples from Monitoring Wells MW-1 through MW-4 for laboratory analysis of volatile organic compounds (VOCs) including benzene, ethylbenzene, toluene, xylenes, isopropylbenzene, n-propylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane and 1,2-dibromoethane by U.S. Environmental Protection Agency (EPA) Method 8260, and TPH in the gasoline, diesel and heavy-oil ranges using Methods NWTPH-Gx and NWTPH-Dx. In addition, as requested by DEQ in a February 1, 2008 electronic mail, the groundwater sample obtained from Monitoring Well MW-3 was further analyzed for polycyclic aromatic hydrocarbons (PAHs) per EPA Method 8270.

Depths to groundwater were measured using an electronic water level indicator with accuracy of 0.01 foot. The electronic water level indicator was decontaminated prior to use in each well. Groundwater elevations were calculated by subtracting the depths to groundwater from the top of casing elevations. Groundwater was checked for the presence of floating product using disposable polyethylene (PE) bailers. A new bailer and rope were used to for each well. A minimum of three (3) well volumes of water were purged from the monitoring wells using a peristaltic pump. Groundwater samples for TPH and PAH analysis were collected using a peristaltic pump, while samples for VOC analysis were collected using a disposable bailer. Purge water was contained on-site in a 55-gallon labeled drum.

QUARTERLY GROUNDWATER MONITORING RESULTS

Depth to Groundwater

The depths to groundwater and groundwater elevations for the most recent (September 2008) and previous quarterly groundwater monitoring events are summarized in Table 1. Groundwater elevations based on the September 11, 2008 measurements are shown in Figure 2. The following observations were made as part of depth-to-groundwater measurements.

- Depths to groundwater in monitoring wells ranged from 6.63 ft (MW-4) to 17.26 ft (MW-3) below the top of casing.
- Groundwater elevations ranged from 5.39 ft above mean sea level (MSL) (MW-1) to 4.52 ft MSL (MW-4).
- The direction of shallow groundwater flow beneath the site, based on the most recent quarterly groundwater elevation data from September 11, 2008 was toward the north-northwest. This groundwater flow direction is consistent with previously measured results, the topography of the site area, and the location of the Columbia River relative to the site.

Laboratory Analytical Results

Groundwater analytical data for the third quarter 2008 groundwater samples are summarized in Table 2. The laboratory report and chain-of-custody documentation are included in Appendix I.

As indicated in Table 2, petroleum hydrocarbons were not detected above reporting limits in groundwater samples from Monitoring Wells MW-1, MW-2, and MW-4. As with previous sampling results, the only sample with petroleum constituent detections above reporting limits is the sample from onsite Monitoring Well MW-3, located near the former waste-oil UST cavity. In Sample MW-3, TPH in the gasoline and diesel ranges were detected at concentrations of 1,090 µg/l and 1,950 µg/l, respectively. TPH in the heavy-oil range was not detected above reporting limits.

The only VOCs detected were concentrations of benzene (78.3 µg/l), ethylbenzene (4.19 µg/l), toluene (0.94 µg/l), isopropylbenzene (36.3 µg/l), and n-propylbenzene (72.4 µg/l). The only PAH detected was naphthalene at a concentration of 0.809 µg/l.

COMPARISON OF GROUNDWATER MONITORING ANALYTICAL RESULTS TO RISK-BASED CONCENTRATIONS

In Table 2, the groundwater analytical results are compared to applicable occupational RBCs associated with groundwater at the Hiway Service site. Review of the table indicates that petroleum concentrations detected in samples from Monitoring Well MW-3 do not exceed applicable occupational groundwater RBCs.

The current use of the Niemi Hiway Service property as a retail service station is expected to continue in the future. In addition, the petroleum concentrations detected in groundwater in the vicinity of the former waste oil tank are below applicable RBCs, of limited extent, and will likely attenuate with time. Although Niemi does not currently have plans to redevelop the site as a stand alone parcel, the C-3 General Commercial zoning does permit apartments and row houses. These permissible zoning uses are consistent with an urban residential receptor scenario under DEQ's Risk-based Decision Making Guidance. Review of Table 2 indicates that, even in the unlikely event the site were redeveloped in the future to include urban residential uses, the urban residential RBCs for volatilization to outdoor air or vapor intrusion into buildings are not exceeded.

SITE DATA SUMMARY

The following summarizes the results of site characterization work completed in 2003, 2004, and 2007, as well as the groundwater monitoring. The work was requested by DEQ to further characterize a petroleum product release from a 550-gallon waste-oil UST decommissioned in 1999, and to verify that a release from the active UST fueling system has not occurred.

- The source of contamination (i.e., the former 550-gallon waste-oil UST) at the Hiway Service site was removed in 1999 when 3 Kings Environmental, Inc. (3 Kings) decommissioned the UST.

- Based upon the observation of product odors and staining in soil exposed during the UST removal in 1999, two soil samples were collected from the bottom of the UST excavation at a depth of 6 ft. TPH as heavy oil was detected in both samples at concentrations of 19,000 mg/kg and 78,000 mg/kg, respectively.

- No spills or leaks from the remaining three active USTs or associated fueling system at the site have been detected during tightness testing by Niemi Oil. A geophysical survey confirmed that the only USTs on the station property are the three active registered USTs.

- Laboratory analytical results from site investigations and groundwater monitoring indicate that soil and groundwater in the vicinity of the former waste-oil UST have been impacted by relatively low concentrations of petroleum-related constituents.

- In general, sands, silty sands, and silty clayey gravel material were encountered in site investigations. Groundwater was observed during drilling in sands at depths ranging from approximately 6.5 ft to 18.5 ft (MW-1, MW-2, and MW-3) below ground surface. This approximately 12-ft difference in depths to water is primarily attributable to ground surface elevation differences between the north and south side of the site retaining wall.

- Groundwater flow maps are presented on Figure 3 and in Appendix F. The flow maps indicate that the direction of groundwater flow has consistently been towards the north-northwest. This groundwater flow direction was anticipated and is consistent with the topography of the site area and location of the Columbia River relative to the site.

- A conceptual site model was developed and potential exposure routes were considered for employees and workers at the site based on the current and expected future commercial use of the site and surrounding properties. The potential pathways associated with the conceptual site model include direct contact with soil, dermal absorption and inhalation of volatiles, inhalation of chemicals volatilized into outdoor air, inhalation of chemicals volatilized into buildings, and leaching to groundwater. Ingestion of groundwater was excluded as a potential pathway at the site since the site receives its water supply from the City of Astoria and no drinking water wells are present within a mile of the site. In addition, the well records available from the Oregon Department of Water Resources indicate that no drinking water wells are located within approximately one mile of the site.

- The only RBC exceedances for applicable exposure pathways were for soils in or near the former waste-oil UST excavation. RBCs were exceeded for soil ingestion, inhalation, and dermal contact for employees and construction and excavation workers for TPH-Oil, and migration to groundwater from soils for TPH-Oil and metals near the former UST tank pit. However, these soil samples exceeding applicable RBCs were collected from below a depth of 3 ft. Three feet is considered a reasonable exposure depth for occupational workers (DEQ, 2003). Exposure to soil exceeding the ingestion, inhalation, and dermal contact exposure pathway for construction and excavation workers is not reasonably likely since the soil exceedances were from a depth of 6 ft or more, the current and planned future use of the site is as a gasoline and service station, and no site development activities are expected or planned in the future.

- RSV calculated site-specific soil and groundwater RBCs for TPH-Oil using DEQ's RBC computer spreadsheet (DEQ, 2003a). The calculation assumed that all of the TPH detected in soil samples at the site were within the range that yields the most conservative site-specific RBC (RSV, 2004). In their September 23, 2005 letter, DEQ presented TPH-Oil RBCs that DEQ had calculated using site specific TPH and constituent concentration data for soil samples collected from

the former waste-oil UST area (Appendix A). As DEQ indicated in their letter, the site specific RBCs calculated by DEQ indicate that remaining heavy oil concentrations at the Hiway Service site are within the applicable cleanup standards.

- With respect to leaching to groundwater RBC exceedances, the results of the beneficial water use determination indicate ingestion and inhalation of groundwater is not an applicable exposure pathway at the site, and no petroleum constituents were detected in onsite or offsite groundwater samples at concentrations above applicable DEQ Appendix A or site-specific RBCs.

- The groundwater analytical results from the waste oil tank area (B-7) and downgradient groundwater samples (B-8 and B-9) collected in October 2004, indicate that relatively low concentrations (i.e., below applicable RBCs) of gasoline-range hydrocarbons were detected at that time. In general, the relatively low concentrations detected in 2004 declined substantially in the downgradient direction.

  The analytical results from the October 2007 investigation and subsequent quarterly monitoring indicate petroleum concentrations were not detected in onsite or offsite groundwater samples collected outside the vicinity of the former waste-oil UST, indicating the low-level gasoline-range petroleum hydrocarbons detected in downgradient groundwater samples in 2004 have attenuated.

- In summary, the site data do not indicate a release from the active UST fueling system, and petroleum hydrocarbons are currently only detected in the vicinity of the former waste-oil tank. Comparison of petroleum concentrations detected in soil and groundwater samples to applicable RBCs indicates that the RBCs are not exceeded by the relatively low concentrations of petroleum hydrocarbons associated with the Hiway Service site.

CONCLUSION

The groundwater monitoring was successful at demonstrating that the Niemi Hiway Service Station site meets the requirements for risk-based closure per OAR 340-122-0244. Based on this conclusion, RSV requests that DEQ issue a No Further Action (NFA) determination for the site.

Following receipt of the NFA, the monitoring wells will be decommissioned.

REFERENCES

Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites.
Oregon Department of Environmental Quality, September 22, 2003.

Site Characterization Report.
RSV Engineering, Inc. February, 2004.

Additional Site Characterization Report.
RSV Engineering, Inc. May, 2005.

Additional Site Characterization Report.
RSV Engineering, Inc. December, 2007.

Astoria Comprehensive Plan.
Sections 10:CP.005 to 10:CP.470, Astoria City Code.



TABLES

Table 1
Summary of Quarterly Groundwater Monitoring Elevation Data
Niemi Oil Company
Hiway Service 76 Station
Astoria, Oregon

Monitoring Well Number[1]	Casing Elevation (feet)	Date Measured	Depth to Water[2] (feet)	Water Table Elevation[3] (feet)
MW-1	21.58	11/01/07	15.71	5.87
		11/27/07	15.49	6.09
		01/31/08	13.98	7.60
		05/29/08	14.77	6.81
		09/11/08	16.19	5.39
MW-2	21.97	11/01/07	16.88	5.09
		11/27/07	16.64	5.33
		01/31/08	14.61	7.36
		05/29/08	15.80	6.17
		09/11/08	17.06	4.91
MW-3	22.20	11/01/07	17.22	4.98
		11/27/07	17.04	5.16
		01/31/08	15.04	7.16
		05/29/08	16.21	5.99
		09/11/08	17.26	4.94
MW-4	11.15	11/01/07	6.88	4.27
		11/27/07	6.33	4.82
		01/01/00	4.62	6.53
		05/29/08	5.63	5.52
		09/11/08	6.63	4.52

Notes:

[1]Approximate locations of monitoring wells are shown on Figure 2.

[2]Depth to water measured from the top-of-casing rim.

[3]Water table elevation calculated by subtracting measured depth to water from the top-of-casing elevatio
Casing rim elevations were surveyed by Coast Surveying Inc. of Warrenton, OR.

TABLE 2
SUMMARY of QUARTERLY GROUNDWATER MONITORING ANALYTICAL DATA for PETROLEUM HYDROCARBONS
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

Groundwater Sample ID	Sample Date	Gasoline-range Petroleum Hydrocarbons (Method NWTPH-Gx) (µg/l)	Diesel- and Heavy Oil-range Petroleum Hydrocarbons (Method NWTPH-Dx) (µg/l)		Volatile Organic Compounds (EPA Method 8260B) (µg/l)											Detected PAHs (EPA Method 8270) (µg/l)
			Diesel-range	Oil-range	Benzene	1,2, Dibromoethane	1,2, Dichloroethane	Ethylbenzene	Methyl tert-butyl ether	Toluene	Xylenes	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Isopropylbenzene	n-propylbenzene	Naphthalene
MW-1	11/1/2007	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	---	---	---	---	---
	1/31/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
	5/29/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
	9/11/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
MW-2	11/1/2007	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	---	---	---	---	---
	1/31/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
	5/29/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
	9/11/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
MW-3	11/1/2007	**1,350**	**522**	ND<476	**31.9**	ND<1	ND<1	**19.6**	ND<1	**2.59**	**2.41**	---	---	---	---	---
	1/31/2008	**885**	**989**	**615**	**2.24**	ND<1	ND<1	**2.34**	ND<1	ND<1	ND<2	ND<2	ND<1	**30**	**48.9**	**0.211**
	5/29/2008	**1,350**	**487**	ND<476	**100**	ND<1	ND<1	**1.93**	ND<1	**0.58**	ND<2	ND<2	ND<1	**41.6**	**84**	**0.525**
	9/11/2008	**1,090**	**1,950**	ND<476	**78.3**	ND<1	ND<1	**4.19**	ND<1	**0.94**	ND<2	ND<2	ND<1	**36.3**	**72.4**	**0.809**
MW-4	11/1/2007	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	---	---	---	---	---
	1/31/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
	5/29/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
	9/11/2008	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<2	ND<1	ND<2	ND<1	---
Urban Residential RBCs for Vapor Intrusion into Buildings		>S	>S	>S	340	87	460	>S	70,000	>S	59,000	4,300	3,200	>Csat	11,000	29,000
Urban Residential RBCs for Volatilization to Outdoor Air		>S	>S	>S	5,100	360	3,400	>S	410,000	>S	>S	>S	>S	>S	>S	>S
Occupational RBCs for Volatilization to Outdoor Air		>S	>S	>S	13,000	960	9,000	>S	1,100,0000	>S	>S	>S	>S	>S	>S	>S
Occupational RBCs for Vapor Intrusion into Buildings		>S	>S	>S	2,700	690	3,600	>S	560,000	>S	>S	51,000	38,000	>S	>S	>S
RBCs for Groundwater in Excavation for Construction and Excavation Workers		12,000	6,700*	21,000*	1,700	28	600	110,000	59,000	200,000	22,000	1,300	1,400	51,000	4,500	680

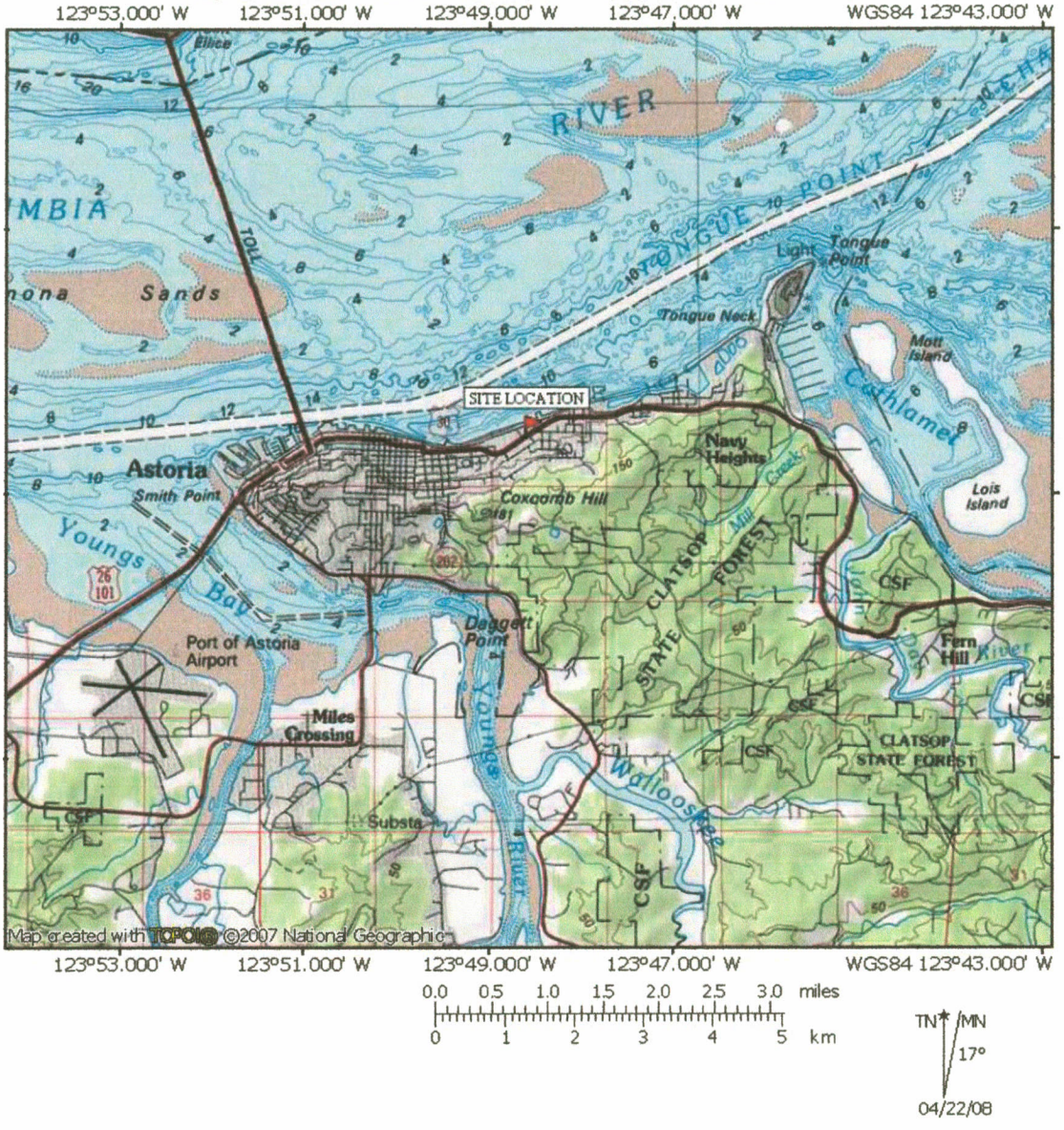
Notes:

mg/l - Milligrams per liter
µg/l - Micrograms per liter
ND - Not detected above reporting limits.
NV - No RBC value for this constituent.

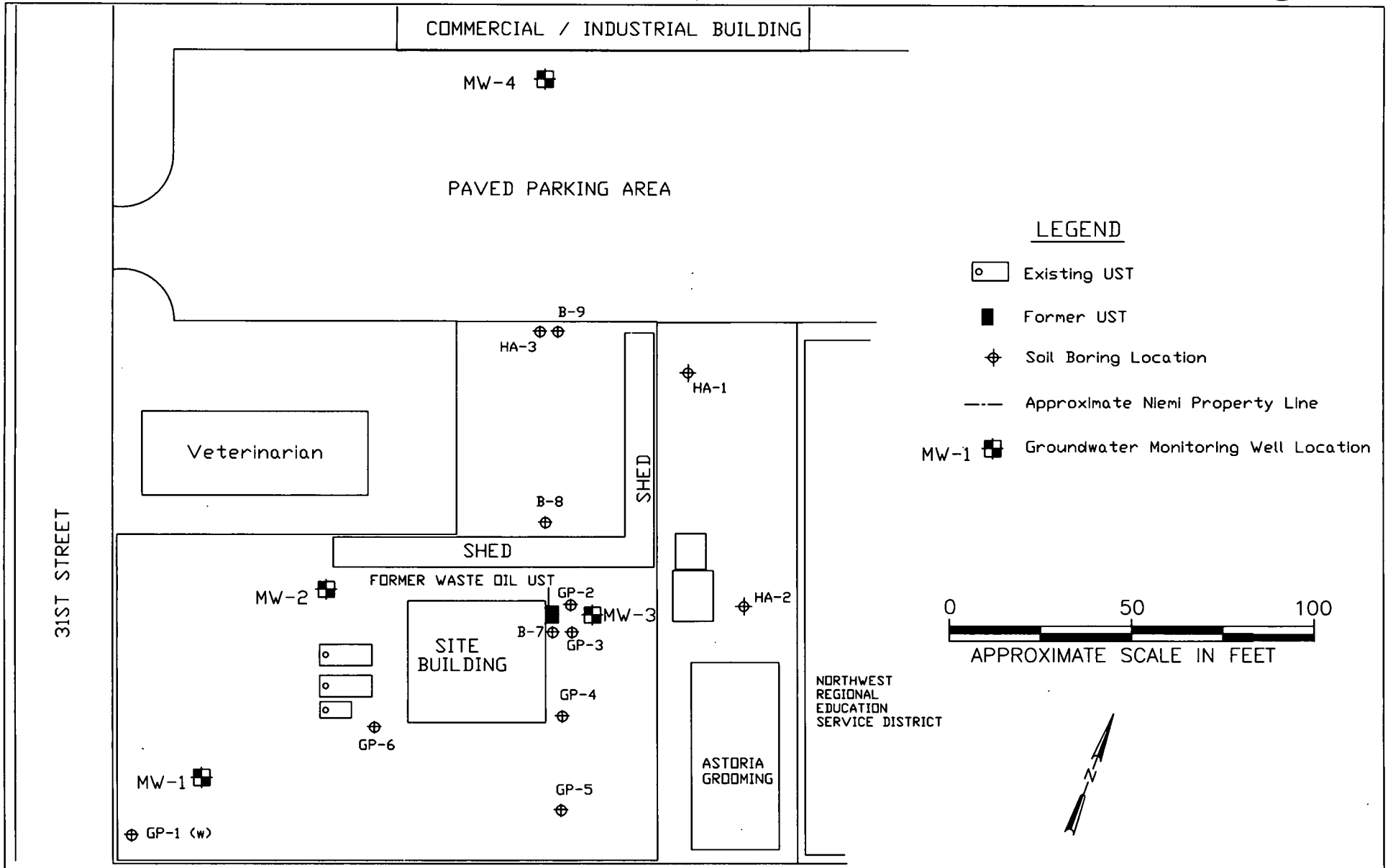
RBCs - Generic Risk-Based Concentrations per DEQ Risk-Based Decision Making for Petroleum Contaminated Sites, Appendix A.
>S Indicates that RBC exceeds solubility limit.
"---" Indicates sample not analyzed for this constituent.
"*" Indicates site-specific TPH RBC calcualted by DEQ.

FIGURES

Map Reference: USGS 7.5' Cape Disappointment Quadrangle



RSV ENGINEERING, INC. Engineers • Land Surveyors • Environmental Scientists 31960 SW CHARBONNEAU DRIVE, SUITE 101, WILSONVILLE, OREGON 97070 OFFICE: (503) 694-8960 FAX: (503) 694-8962	SITE LOCATION MAP Hiway Service 76 Service Station 1308 Marine Drive Astoria, Oregon	FIGURE 1

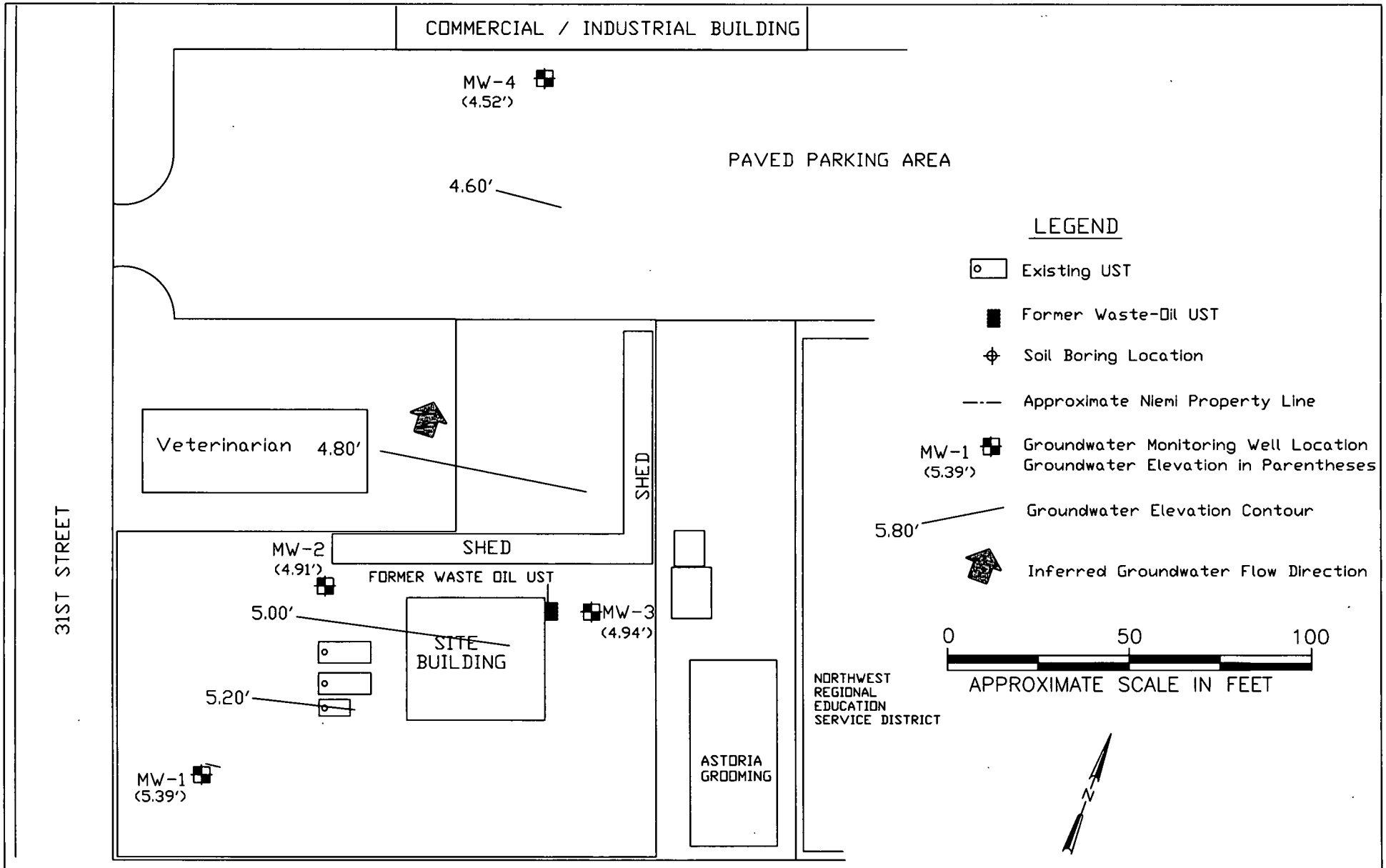


RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

SITE PLAN
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 2

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		12/11/07	Wells & Grab 040406



RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

GROUNDWATER FLOW MAP
September 11, 2008
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 3

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		10/15/08	Figure 3 - GW FLOW

APPENDIX A

SEPTEMBER 25, 2005 DEQ LETTER and SITE SPECIFIC TPH-OIL CALCULATIONS

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
Northwest Region Portland Office
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-4987
(503) 229-5263
FAX (503) 229-6945
TTY (503) 229-5471

23 September 2005

MR CARY BECHTOLT
NIEMI OIL CO
PO BOX 989
ASTORIA OR 97103

Re: Highway Service
File No. 04-99-1193

Dear Mr. Bechtolt:
The Department of Environmental Quality (DEQ) has completed its review of the report entitled, *Additional Site Characterization Report*, dated May 2005, regarding the underground storage tank (UST) cleanup at 3108 Marine Drive in Astoria, Oregon. In the report, no further action (NFA) was again requested. At this time, DEQ again cannot issue a NFA letter for the following reasons:

- Additional groundwater investigation performed indicates that gasoline {330 parts per billion (ppb)}, diesel (3,200 ppb), and other constituents (benzene 53 ppb), in addition to the heavy oil from the waste oil tank, are present in groundwater at higher levels than previously detected. In addition, the contamination is a greater distance from the area of concern than was known or anticipated (approximately 80 feet from the former waste oil tank location and approximately 120 feet from the fueling UST system). While the soil and groundwater data collected does meet the proposed cleanup standards for the site, it appears that a release has occurred from the UST system at the center portion of the property in addition to the waste oil UST. As a result, Oregon Administrative Rule 340-122-0240 requires that monitoring wells be installed when contamination has migrated beyond the immediate vicinity of a UST pit. DEQ requests that at least four monitoring wells be installed and that the full extent of petroleum contamination be determined. Some of the wells and investigation will need to evaluate the existing fueling UST system.

- In review of the site-specific oil data, DEQ agrees with implementing a value into the most conservative carbon range of DEQ's total petroleum hydrocarbons (TPH) risk spreadsheet. However, since TPH and constituent data was collected, DEQ will require that the evaluation be performed by inserting the actual TPH (78,000 ppm from north BOT sample) and constituent values into the spreadsheet. DEQ has completed this, which is attached for you to evaluate and implement into the risk-based determination. In lieu of the lack of constituent data from the North BOT soil sample, constituent data was installed from the next highest TPH value with constituent data (B-7, 13- 15 feet below ground surface). The information was also installed with the 12,000 ppm of heavy oil detected from B-7. The calculation indicates that remaining heavy oil concentrations are within the applicable cleanup standards.

- Please provide the Clackamas County zoning documentation from which your land use

determination was derived.

Please submit a work plan by **14 October 2005**, which proposes the next phase of investigation, monitoring wells installations, and groundwater monitoring. If you have any questions, please call me at (503) 229-5617.

Respectfully,

Robert A. Hood, Jr.
UST Cleanup Specialist

enclosures
cc: Craig Arola
RSV Engineering, Inc.
31960 SW Charbonneau Dr. Ste. 101
Wilsonville, OR 97070

Jeff Kray
Marten Law Group PLLC
1191 Second Avenue, Ste 2200
Seattle, WA 98101

(rah:RAH)

TPH Fraction Composition (Weight Fraction)

Fuel Fractions	Site-Specific Data			Generic Weight Fraction Data		
	Raw Data mg/kg (ppm)	Adjusted Data mg/kg (ppm)	Weight Fraction	Gasoline	Diesel	Mineral Oil
Aliphatic C5-C6			0.00E+00	2.06E-01	0.00E+00	0.00E+00
Aliphatic >C6-C8			0.00E+00	2.20E-01	0.00E+00	0.00E+00
Aliphatic >C8-C10			0.00E+00	9.00E-02	2.00E-02	1.00E-03
Aliphatic >C10-C12			0.00E+00	3.00E-02	7.00E-02	3.00E-03
Aliphatic >C12-C16			0.00E+00	0.00E+00	3.50E-01	1.60E-01
Aliphatic >C16-C21			0.00E+00	0.00E+00	3.40E-01	7.00E-01
Aliphatic >C21-C34			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aromatic >C8-C10		0	0.00E+00	9.02E-02	2.52E-03	1.00E-03
Aromatic >C10-C12		0	0.00E+00	2.25E-02	7.40E-03	1.00E-03
Aromatic >C12-C16			0.00E+00	0.00E+00	8.00E-02	7.00E-03
Aromatic >C16-C21			0.00E+00	0.00E+00	1.20E-01	8.00E-02
Aromatic >C21-C34	78000	78000	1.00E+00	0.00E+00	0.00E+00	4.50E-02
n-Hexane	0.0	0.0	0.00E+00	2.40E-02	0.00E+00	0.00E+00
Benzene	0.0	0.0	6.41E-08	2.50E-02	2.90E-04	0.00E+00
Toluene	0.0	0.0	1.28E-08	1.20E-01	1.80E-03	0.00E+00
Ethylbenzene	0.0	0.0	1.79E-07	2.00E-02	6.80E-04	0.00E+00
Total Xylenes	0.1	0.1	7.56E-07	1.10E-01	5.00E-03	0.00E+00
1,2,4-trimethylbenzene	0.0	0.0	3.21E-07	3.00E-02	0.00E+00	0.00E+00
1,3,5-trimethylbenzene	0.0	0.0	3.59E-07	9.80E-03	1.80E-03	0.00E+00
Naphthalene	0.0	0.0	2.31E-08	2.50E-03	2.60E-03	0.00E+00
Total	78000	78000	1.00	1.00	1.00	1.00

Use one of the following two options for site-specific TPH RBC calculations.

OPTION 1: Estimate TPH Fractions

(1) Enter TPH data (mg/kg or ppm) into the cell on the right. →
(2) Enter BTEX, TMB, and naphthalene data in the "Raw Data" column above.
(3) Use one of the buttons at the right to identify the predominant product.

Gasoline Estimate
Diesel Estimate

OR

OPTION 2: Use VPH and EPH Results

(1) Enter TPH fraction and constituent data in the "Raw Data" column above.
(2) Use one of the buttons at the right to identify the predominant product.

Gasoline Fractions
Non-Gas Fractions

For references, please refer to *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* (DEQ, 2003).

for 75,000 ppm

Fuel Fraction	RBCss					RBCss			RBCsv			RBCsv			RBCsv			RBCsv			RBCsv			RBCsv			RBCsv		
	Residential	Urban Residential	Occupational	Construction worker	Excavation Worker	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Conservation & Excavation Worker	Residential	Urban Residential	Occupational	Conservation & Excavation Worker	Residential	Urban Residential	Occupational
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/m³)	(ug/m³)	(ug/m³)	(ug/m³)	(ug/m³)	(ug/m³)	(ug/m³)
Aliphatic C5-C6	8.0E+00	8.0E+00	8.0E+00	8.0E+00	8.0E+00	8.0E+00	8.0E+00	8.0E+00	8.0E+00	8.0E+00	8.0E+00	0.0E+00	0.0E+00	0.0E+00	3.6E+04	3.6E+04	1.4E+05	1.0E+06	3.1E+06	7.4E+06	8.3E+04	8.3E+04	8.6E+05	3.1E+06	2.1E+04	2.1E+04	8.9E+04	2.1E+04	2.1E+04	8.9E+04
Aliphatic >C6-C8	0.0E+00	0.0E+00	4.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.3E+04	3.9E+04	1.6E+05	4.0E+04	1.7E+05	4.0E+05	8.6E+04	8.6E+04	4.5E+05	2.3E+06	7.1E+04	7.1E+04	3.0E+05	7.1E+04	7.1E+04	3.0E+05
Aliphatic >C8-C10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+03	1.4E+03	6.5E+03	4.0E+04	1.7E+04	4.0E+04	1.4E+03	1.4E+03	7.4E+03	2.2E+04	1.1E+03	1.1E+03	4.6E+03	1.1E+03	1.1E+03	4.6E+03
Aliphatic >C10-C12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.7E+04	2.7E+04	1.1E+05	4.0E+04	1.7E+04	4.0E+04	1.2E+04	1.2E+04	6.5E+04	2.2E+04	1.1E+03	1.1E+03	4.6E+03	1.1E+03	1.1E+03	4.6E+03
Aliphatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.3E+03	4.3E+03	1.8E+04	4.0E+04	1.7E+04	4.0E+04	2.0E+03	2.0E+03	1.0E+04	2.2E+04	1.1E+03	1.1E+03	4.6E+03	1.1E+03	1.1E+03	4.6E+03
Aliphatic >C16-C21	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.3E+04	7.3E+04	3.1E+05	4.0E+04	1.7E+04	4.0E+04	3.4E+03	3.4E+03	1.7E+04	2.2E+04	1.1E+03	1.1E+03	4.6E+03	1.1E+03	1.1E+03	4.6E+03
Aliphatic >C21-C34	8.0E+00	0.0E+00	8.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.3E+04	7.3E+04	3.1E+05	4.0E+04	1.7E+04	4.0E+04	3.4E+03	3.4E+03	1.7E+04	2.2E+04	1.1E+03	1.1E+03	4.6E+03	1.1E+03	1.1E+03	4.6E+03
Aromatic >C8-C10	8.0E+00	0.0E+00	8.0E+00	8.0E+00	8.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+03	3.4E+03	1.5E+04	1.1E+04	4.3E+04	1.1E+05	1.1E+04	1.1E+04	4.3E+04	7.7E+04	2.2E+02	2.2E+02	8.9E+02	2.2E+02	2.2E+02	8.9E+02
Aromatic >C10-C12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+03	3.4E+03	1.5E+04	1.1E+04	4.3E+04	1.1E+05	1.1E+04	1.1E+04	4.3E+04	7.7E+04	2.2E+02	2.2E+02	8.9E+02	2.2E+02	2.2E+02	8.9E+02
Aromatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+03	3.4E+03	1.5E+04	1.1E+04	4.3E+04	1.1E+05	1.1E+04	1.1E+04	4.3E+04	7.7E+04	2.2E+02	2.2E+02	8.9E+02	2.2E+02	2.2E+02	8.9E+02
Aromatic >C16-C21	8.0E+00	0.0E+00	8.0E+00	8.0E+00	8.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.0E+04	4.0E+04	1.7E+05	1.1E+04	4.3E+04	1.1E+05	1.1E+04	1.1E+04	4.3E+04	7.7E+04	2.2E+02	2.2E+02	8.9E+02	2.2E+02	2.2E+02	8.9E+02
Aromatic >C21-C34	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	4.8E-07	4.8E-07	2.2E-07	3.8E-07	3.8E-07	3.7E-08	1.0E-04	1.8E-04	2.1E-05	4.8E+03	4.8E+03	2.1E+04	1.1E+04	4.3E+04	1.1E+05	1.1E+04	1.1E+04	4.3E+04	7.7E+04	2.2E+02	2.2E+02	8.9E+02	2.2E+02	2.2E+02	8.9E+02
n-Hexane	8.0E+00	0.0E+00	8.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	8.0E+00	8.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.6E+02	3.6E+02	1.4E+03	6.1E+04	6.1E+04	7.4E+05	2.7E+03	2.7E+03	3.3E+04	3.2E+04	2.1E+02	2.1E+02	8.3E+02	2.1E+02	2.1E+02	8.3E+02
Benzene	9.0E-07	9.0E-07	5.1E-07	4.0E-07	2.5E-07	7.8E-06	7.8E-06	1.8E-06	2.0E-05	2.0E-05	1.7E-06	1.3E-04	1.3E-04	2.2E-05	5.4E+01	5.4E+01	1.6E+02	8.8E+03	2.9E+03	1.1E+04	1.9E+03	1.9E+03	1.3E+04	3.5E+03	3.1E+01	3.1E+01	1.3E+02	3.1E+01	3.1E+01	1.3E+02
Toluene	8.4E-06	8.4E-06	4.6E-06	3.2E-06	1.4E-06	9.7E-06	9.7E-06	2.3E-06	8.7E-06	8.7E-06	8.1E-06	4.6E-01	4.6E-01	1.2E-01	1.4E+03	1.4E+03	5.4E+03	1.1E+05	3.4E+04	1.3E+05	1.1E+04	1.1E+04	5.4E+04	1.3E+04	1.1E+03	1.1E+03	4.6E+03	1.1E+03	1.1E+03	4.6E+03
Ethylbenzene	7.8E-06	7.8E-06	8.7E-06	4.3E-06	2.7E-06	1.5E-07	1.5E-07	4.5E-08	1.5E-07	1.5E-07	1.3E-08	8.5E-01	8.5E-01	2.3E-01	1.2E+03	1.2E+03	5.1E+03	1.3E+05	4.0E+04	1.5E+05	1.3E+04	1.3E+04	6.4E+04	1.5E+04	1.1E+03	1.1E+03	4.6E+03	1.1E+03	1.1E+03	4.6E+03
Total Xylenes	1.9E-06	1.9E-06	8.8E-07	2.1E-07	1.7E-07	1.9E-06	1.9E-06	7.0E-08	1.7E-06	1.7E-06	1.4E-07	2.4E-02	2.4E-02	6.1E-03	2.1E+02	2.1E+02	9.2E+02	1.3E+05	4.0E+04	1.5E+05	1.3E+04	1.3E+04	6.4E+04	1.5E+04	1.1E+03	1.1E+03	4.6E+03	1.1E+03	1.1E+03	4.6E+03
1,2,4-trimethylbenzene	1.9E-06	1.9E-06	4.3E-06	1.8E-06	3.7E-07	1.3E-06	1.2E-06	2.9E-06	9.6E-06	9.6E-06	8.0E-07	4.9E-05	4.9E-05	1.3E-05	8.6E+01	8.6E+01	3.8E+02	1.3E+05	4.0E+04	1.5E+05	1.3E+04	1.3E+04	6.4E+04	1.5E+04	1.1E+03	1.1E+03	4.6E+03	1.1E+03	1.1E+03	4.6E+03
1,3,5-trimethylbenzene	1.2E-06	1.3E-06	3.0E-06	1.7E-06	9.9E-06	1.9E-06	1.9E-06	2.4E-06	1.3E-06	1.3E-06	1.1E-06	6.8E-05	6.8E-05	1.2E-05	1.2E+02	1.2E+02	5.2E+02	1.3E+05	4.0E+04	1.5E+05	1.3E+04	1.3E+04	6.4E+04	1.5E+04	1.1E+03	1.1E+03	4.6E+03	1.1E+03	1.1E+03	4.6E+03
Naphthalene	6.1E-07	4.7E-07	1.7E-07	1.1E-07	3.9E-08	5.7E-08	5.7E-08	1.4E-08	4.7E-08	4.7E-08	3.9E-08	3.6E-03	3.6E-03	9.0E-04	9.2E+01	6.2E+01	2.5E+02	1.4E+05	1.4E+05	5.9E+05	3.2E+03	3.0E+03	3.5E+04	6.8E+02	3.1E+00	3.1E+00	1.3E+01	3.1E+00	3.1E+00	1.3E+01
TPH RBC* ⟶	1,700	3,400	21,000	6,700	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	340	340	1,400	>S	>S	>S	>S	>S	>S	>S	32	32	130	>S	>S	>S
Generic Gasoline	720	3,500	22,000	13,000	>MAX	4,500	4,500	60,000	140	140	>MAX	39	79	110	100	100	400	>S	>S	>S	>S	>S	>S	>S	600	600	2,600	>S	>S	>S
Generic Diesel / Heating Oil	3,900	6,900	74,000	23,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	2,600	2,600	>MAX	88	84	330	>S	>S	>S	>S	>S	>S	>S	128	130	460	>S	>S	>S
Generic Mineral Insulating Oil	8,800	20,000	>MAX	40,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	280	280	1,100	>S	>S	>S	>S	>S	>S	>S	490	490	2,000	>S	>S	>S

TPH Fraction Composition (Weight Fraction)

Fuel Fractions	Site-Specific Data			Generic Weight Fraction Data		
	Raw Data mg/kg (ppm)	Adjusted Data mg/kg (ppm)	Weight Fraction	Gasoline	Diesel	Mineral Oil
Aliphatic C5-C6			0.00E+00	2.08E-01	0.00E+00	0.00E+00
Aliphatic >C6-C8			0.00E+00	2.20E-01	0.00E+00	0.00E+00
Aliphatic >C8-C10			0.00E+00	9.00E-02	2.00E-02	1.00E-03
Aliphatic >C10-C12			0.00E+00	3.00E-02	7.00E-02	3.00E-03
Aliphatic >C12-C16			0.00E+00	0.00E+00	3.50E-01	1.60E-01
Aliphatic >C16-C21			0.00E+00	0.00E+00	3.40E-01	7.00E-01
Aliphatic >C21-C34			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Aromatic >C8-C10		0	0.00E+00	9.02E-02	2.52E-03	1.00E-03
Aromatic >C10-C12		0	0.00E+00	2.25E-02	7.40E-03	1.00E-03
Aromatic >C12-C16			0.00E+00	0.00E+00	6.00E-02	7.00E-03
Aromatic >C16-C21			0.00E+00	0.00E+00	1.20E-01	8.00E-02
Aromatic >C21-C34	12000	12000	1.00E+00	0.00E+00	0.00E+00	4.60E-02
n-Hexane	0.0	0.0	0.00E+00	2.40E-02	0.00E+00	0.00E+00
Benzene	0.0	0.0	4.17E-07	2.50E-02	2.90E-04	0.00E+00
Toluene	0.0	0.0	8.33E-08	1.20E-01	1.80E-03	0.00E+00
Ethylbenzene	0.0	0.0	1.17E-06	2.00E-02	6.80E-04	0.00E+00
Total Xylenes	0.1	0.1	4.92E-06	1.10E-01	5.00E-03	0.00E+00
1,2,4-trimethylbenzene	0.0	0.0	2.08E-06	3.00E-02	0.00E+00	0.00E+00
1,3,5-trimethylbenzene	0.0	0.0	2.33E-06	9.80E-03	1.80E-03	0.00E+00
Naphthalene	0.0	0.0	1.50E-07	2.50E-03	2.60E-03	0.00E+00
Total	12000	12000	1.00	1.00	1.00	1.00

Use one of the following two options for site-specific TPH RBC calculations.

OPTION 1: Estimate TPH Fractions

(1) Enter TPH data (mg/kg or ppm) into the cell on the right. →
(2) Enter BTEX, TMB, and naphthalene data in the "Raw Data" column above.
(3) Use one of the buttons at the right to identify the predominant product.

Gasoline Estimate
Diesel Estimate

OR

OPTION 2: Use VPH and EPH Results

(1) Enter TPH fraction and constituent data in the "Raw Data" column above.
(2) Use one of the buttons at the right to identify the predominant product.

Gasoline Fractions
Non-Gas Fractions

For references, please refer to *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* (DEQ, 2003).

for 12,000 ppm

Fuel Fraction	RBCss					RBCss			RBCss			RBCss			RBCss			RBCss			RBCss			RBCss			RBCss Construction & Excavation Worker	RBCss		
	Residential	Urban Residential	Occupational	Construction Worker	Excavation Worker	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/m^3)	(ug/m^3)	(ug/m^3)
Aliphatic >C5-C8	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E+04	3.5E+04	7.4E+04	1.1E+05	1.1E+05	2.3E+05	8.3E+04	8.3E+04	8.8E+05	3.1E+06	2.1E+04	2.1E+04	8.3E+04
Aliphatic >C8-C9	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E+04	3.5E+04	7.4E+04	1.3E+06	1.3E+06	2.8E+06	5.6E+04	5.6E+04	5.9E+05	2.7E+06	2.1E+04	2.1E+04	8.3E+04
Aliphatic >C9 C18	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+03	1.4E+03	3.3E+03	4.0E+04	4.0E+04	1.0E+05	2.5E+04	2.5E+04	2.3E+05	1.0E+06	1.1E+03	1.1E+03	4.4E+03
Aliphatic >C10-C12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+03	1.4E+03	3.3E+03	2.7E+04	2.7E+04	6.1E+04	1.2E+04	1.2E+04	1.1E+05	4.7E+05	1.1E+03	1.1E+03	4.4E+03
Aliphatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.7E+03	3.7E+03	1.4E+04	8.2E+03	8.2E+03	2.6E+04	2.9E+03	2.9E+03	2.3E+04	1.2E+05	1.1E+03	1.1E+03	4.4E+03
Aliphatic >C16-C21	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.3E+04	7.3E+04	3.8E+05	4.4E+03	4.4E+03	1.0E+04	2.8E+02	2.8E+02	2.3E+03	1.2E+04	7.3E+03	7.3E+03	2.9E+04
Aliphatic >C21-C34	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.3E+04	7.3E+04	3.8E+05	2.2E+02	2.2E+02	8.8E+02	6.8E+00	6.8E+00	1.1E+02	6.0E+02	7.3E+03	7.3E+03	2.9E+04
Aromatic >C8-C10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+03	3.4E+03	1.3E+04	1.1E+05	1.1E+05	4.7E+05	3.7E+04	3.7E+04	4.9E+05	2.1E+06	2.7E+04	2.7E+04	8.8E+03
Aromatic >C10-C12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+03	3.4E+03	1.3E+04	2.4E+04	2.4E+04	6.7E+04	3.9E+04	3.9E+04	2.2E+05	1.0E+06	2.2E+04	2.2E+04	8.8E+03
Aromatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+03	3.4E+03	1.3E+04	5.0E+05	5.0E+05	1.0E+07	4.6E+05	4.6E+05	8.7E+06	3.8E+07	2.2E+04	2.2E+04	8.8E+03
Aromatic >C16-C21	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E+03	1.1E+03	7.3E+03	4.0E+06	4.0E+06	1.0E+07	6.4E+06	6.4E+06	1.1E+07	4.9E+07	1.1E+03	1.1E+03	4.4E+03
Aromatic >C21-C34	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.7E-07	3.9E-07	3.9E-07	3.7E-08	1.0E+04	1.0E+04	2.5E+05	1.1E+03	1.1E+03	4.4E+03	4.4E+07	4.4E+07	1.0E+08	1.0E+07	1.0E+07	1.0E+08	4.4E+08	1.1E+03	1.1E+03	4.4E+03
n Hexane	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.8E+02	3.8E+02	1.4E+03	8.1E+04	8.1E+04	2.4E+05	2.7E+03	2.7E+03	3.2E+04	1.4E+05	2.1E+02	2.1E+02	8.3E+02
Benzene	8.2E-04	8.2E-04	3.3E-04	2.0E-04	2.6E-04	8.1E-05	8.1E-05	3.2E-05	1.3E-04	1.3E-04	5.1E-05	6.5E-04	6.5E-04	2.1E-04	4.4E-01	4.4E+01	1.1E+02	1.3E+03	1.3E+03	1.1E+03	1.9E+04	1.9E+04	3.2E-05	1.4E+05	9.3E+01	9.3E+01	1.3E+02
Toluene	6.4E-01	6.4E-01	2.6E-01	1.4E-01	1.4E-01	7.7E-02	7.7E-02	3.0E-02	8.3E-01	8.3E-01	3.3E-01	1.9E-03	1.9E-03	6.8E-03	7.2E+02	7.2E+02	2.5E+03	1.4E+03	1.4E+03	1.3E+03	2.1E+05	2.1E+05	3.5E+06	1.5E+07	4.0E+02	4.0E+02	1.6E+03
Ethylbenzene	5.0E-01	5.0E-01	3.4E-01	2.8E-01	2.8E-01	5.4E-01	5.4E-01	0.0E+00	5.8E-01	5.8E-01	1.4E-01	1.9E-04	1.9E-04	1.4E-04	1.3E+03	1.3E+03	8.4E+03	6.8E+03	6.8E+03	3.8E+03	8.3E+03	8.3E+03	3.5E+04	1.5E+05	1.1E+03	1.1E+03	4.3E+03
Total Xylenes	1.1E-03	1.1E-03	4.4E-04	1.7E-04	1.7E-04	4.5E-05	4.5E-05	1.1E-05	3.7E-05	3.7E-05	3.1E-05	1.9E-05	1.9E-05	1.9E-05	2.1E+02	2.1E+02	8.2E+03	6.4E+03	6.4E+03	3.0E+03	6.0E+04	6.0E+04	1.1E+05	4.7E+05	2.2E+04	2.2E+04	4.2E+02
1 2 4 trimethylbenzene	7.4E-05	7.4E-05	2.8E-05	9.7E-06	4.6E-06	7.8E-06	7.8E-06	1.9E-06	8.3E-06	8.3E-06	3.2E-06	3.2E-04	3.2E-04	1.8E-06	1.3E+01	1.3E+01	4.9E+01	8.8E+04	8.8E+04	2.7E+05	1.4E+03	1.4E+03	8.1E+04	3.5E+05	1.3E+03	1.3E+03	2.9E+01
1 3 5-trimethylbenzene	6.3E-05	6.3E-05	2.3E-05	1.1E-05	3.9E-06	1.0E-04	1.0E-04	2.6E-06	6.4E-06	6.4E-06	7.0E-06	2.3E-04	2.3E-04	1.3E-06	1.7E+01	1.7E+01	4.9E+01	5.5E+04	5.5E+04	2.3E+05	3.2E+03	3.2E+03	2.9E+04	1.4E+05	6.9E+00	6.9E+00	2.9E-01
Naphthalene	3.9E-06	3.0E-06	1.1E-06	6.9E-07	2.7E-07	3.7E-07	3.7E-07	9.3E-08	3.1E-07	3.1E-07	2.5E-08	2.3E-05	2.3E-05	5.8E-08	6.7E+00	6.9E+00	2.8E+01	1.4E+03	1.4E+03	5.9E+03	3.0E+04	3.0E+04	3.5E+05	1.5E+06	3.1E+00	3.1E+00	1.3E-01
TPH RBC' ⟶	1,700	3 400	21 000	6 700	180 000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	110	110	440	>S	>S	>S	>S	>S	>S	>S	>S	>S	32	32	130
Generic Gasoline	720	1,800	22,000	13,000	>MAX	4,900	4 500	80 000	140	140	>MAX	39	79	160	100	100	400	>S	>S	>S	>S	>S	>S	12,800	630	630	2,600
Generic Diesel / Heating Oil	2 900	6,900	70,000	22,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	2,600	2,600	>MAX	99	99	350	>S	>S	>S	>S	>S	>S	>S	130	130	490
Generic Mineral Insulating Oil	9 800	20 000	>MAX	40,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	280	280	1,100	>S	>S	>S	>S	>S	>S	>S	490	490	2 000

B

APPENDIX B

GEOPHYSICAL SURVEY

GeoPotential

ENVIRONMENTAL & EXPLORATION GEOPHYSICS

437 N.E. LIBERTY AVE. GRESHAM, OR 97030 · PH (503) 665-7520 · FAX (503) 492-4404
E-MAIL GeoPotential@aol.com

SUMMARY REPORT

SUBSURFACE MAPPING SURVEY FOR UNDERGROUND STORAGE TANKS

HIGHWAY SERVICE (76 STATION)
3108MARINE DRIVE (HWY 30)
ASTORIA, OREGON

CLIENT:

RSV Engineering, Inc.
31960 SW Charbonneau Drive, Suite 101
Wilsonville, Oregon 97070

October 1, 2003

GeoPotential Project Number 4691

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SUMMARY

A geophysical survey was conducted at the Highway Service 76 Gas Station, located at 3108 Marine Drive in Astoria, Oregon (Figure 1) for the purpose of detecting possible underground storage tanks (USTs) at the site. A Magnetometer survey and a follow-up Ground Penetrating RADAR (GPR) survey were conducted to achieve the objectives of this project.

No USTs were detected with this survey, except for the active USTs, which were outlined.

INTRODUCTION

Subsurface mapping surveys are geophysical surveys utilizing geophysical data and methods to detect and locate natural and manmade subsurface features. The Geometrics G-858 Cesium magnetometer, used to obtain the magnetic data, is a geophysical tool specifically designed to detect buried ferriferous (iron-bearing) objects, including utilities, drums and USTs. Follow-up surveys using GPR are often used to help determine the source of the disturbances and the depth of burial of the objects causing them.

SURVEY OBJECTIVES

The first survey objective at this site was to locate and map the positions of possible USTs in the parking and dispensing areas of the Highway Service 76 Gas Station, located at 3108 Marine Drive in Astoria, Oregon. The second objective was to outline the active USTs.

SURVEY SITE

The survey site consisted of the asphalt-covered parking lot and dispensing bay of the gas station. The survey area was approximately 0.2 acres and not entirely accessible, because of several parked vehicles that could not be moved. The anomaly produced by a large metallic surface object like a vehicle can mask the anomaly produced by a small, buried metallic object. At this site, it is possible that a small buried object located within about 10 feet of the parked cars might be missed due to the significant anomaly produced by them. Surface features included a sign, the pump island and canopy, a propane tank, tires and car parts. Three fill ports and vents indicated the existence of USTs.

TIMING

Jeff Mann and Nikos Tzetos of GeoPotential conducted fieldwork on September 29, 2003. The report was written by Nikos Tzetos and emailed to RSV Engineering on October 1, 2003.

SURVEY EQUIPMENT

The following geophysical instruments were used to conduct the survey:

- GEOMETRICS G-858 CESIUM MAGNETOMETER (MAGNETIC SURVEY)
- MALA RAMAC GROUND PENETRATING RADAR SYSTEM with a 500 MHz ANTENNA (GPR SURVEY)
- AQUA -TRONICS A6 ELECTROMAGNETIC TRACER (EMA6 SURVEY)
- SCHONSTEDT GA52 MAGNETIC GRADIOMETER (GA52 SURVEY)

This equipment and the procedures used to meet the survey objectives of this project have been proven effective in detecting buried objects such as utilities and USTs.

The success of a GPR survey is greatly controlled by site conditions. Clayey soil and wet-soil conditions severely attenuate signal penetration even at different locations on the same site. USTs and utilities may be missed if they are deeper than the signal penetration, or if they are located under metallic debris or disturbed soils. Like all geophysical data, GPR data is ambiguous. Stones and cobbles produce reflections similar to USTs and utilities. Not all USTs produce the classic hyperbolic shaped reflections.

PROCEDURE

An orthogonal survey grid was established on the site using measuring wheels and tapes. The southwest corner of the survey area was used as the origin (0,0) for the survey grid.

Magnetic data were collected automatically at approximately 6-inch intervals along traverses orthogonal to the baselines. Traverses were 5 feet apart. Data were downloaded to a laptop computer and processed in the field. Contour maps were printed and used to locate suspect anomalies for further investigation with GPR, EMA6 and GA52 surveys.

Anomalies not appearing to be related to surface objects were located on the site using a measuring wheel. A follow up GPR survey was conducted across anomalies that could be caused by 3D objects like USTs, in an attempt to determine the shape and dimensions of the metallic objects causing them.

RESULTS

Figure 2 is a magnetic contour map produced by the magnetic survey, contoured at an interval of 500 nanoTesla (nT), an interval sufficient to detect underground utilities and USTs. The contour map is colored to visually enhance the anomalies in the magnetic field. Magnetic highs caused by ferriferous objects below the sensor are shown in red. Blues indicate magnetic lows, usually caused by surface objects located above the sensor.

Five Magnetic Anomalies, not attributed to surface features, were detected with this survey. They are marked MA A to E in Figure 2. Results were marked with paint. Figure 3 is an interpretation map of the survey.

MA A is interpreted to be caused by an electrical line related to the sign at the southwest corner of the property.

MA B is interpreted to be caused by an electrical line powering the same sign.

MA C is caused by the active UST fill ports and their product lines.

MA D is caused by a metallic sewer line.

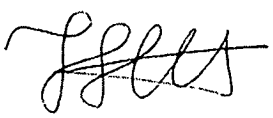
MA E is interpreted to be caused by remnants of an old building that existed at that location, according to a gas station employee.

The three active USTs were outlined using GPR. The southernmost UST was not detected with radar, because it was located beneath a reinforced slab. Its edges were inferred by its reported size, an EMA6 survey that detected a possible south edge and a GPR profile that showed a possible east edge.

LIMITATIONS

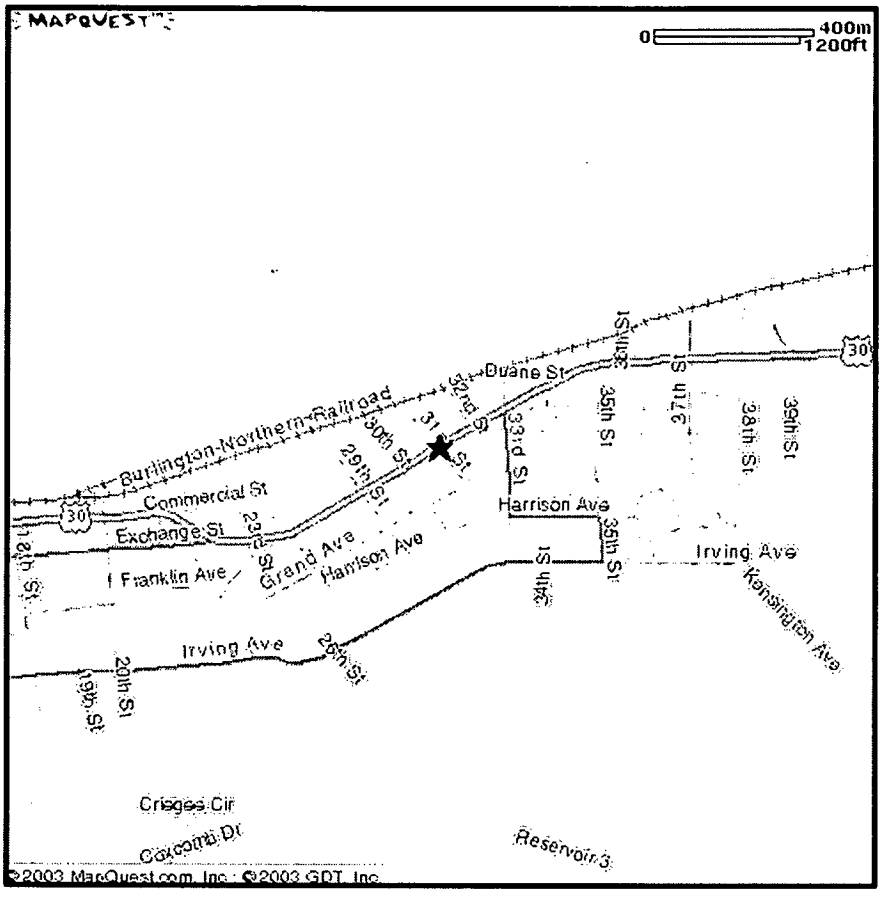
Geophysical surveys consist of interpreting geophysical responses from subsurface features. Since a variety of subsurface features can produce identical geophysical responses it is necessary to confirm the geophysical interpretation with intrusive investigations such as excavating or drilling. In addition, many subsurface features may produce no geophysical response. The use of this subsurface mapping survey is the sole responsibility of the client.

Ralph Soule
GeoPotential

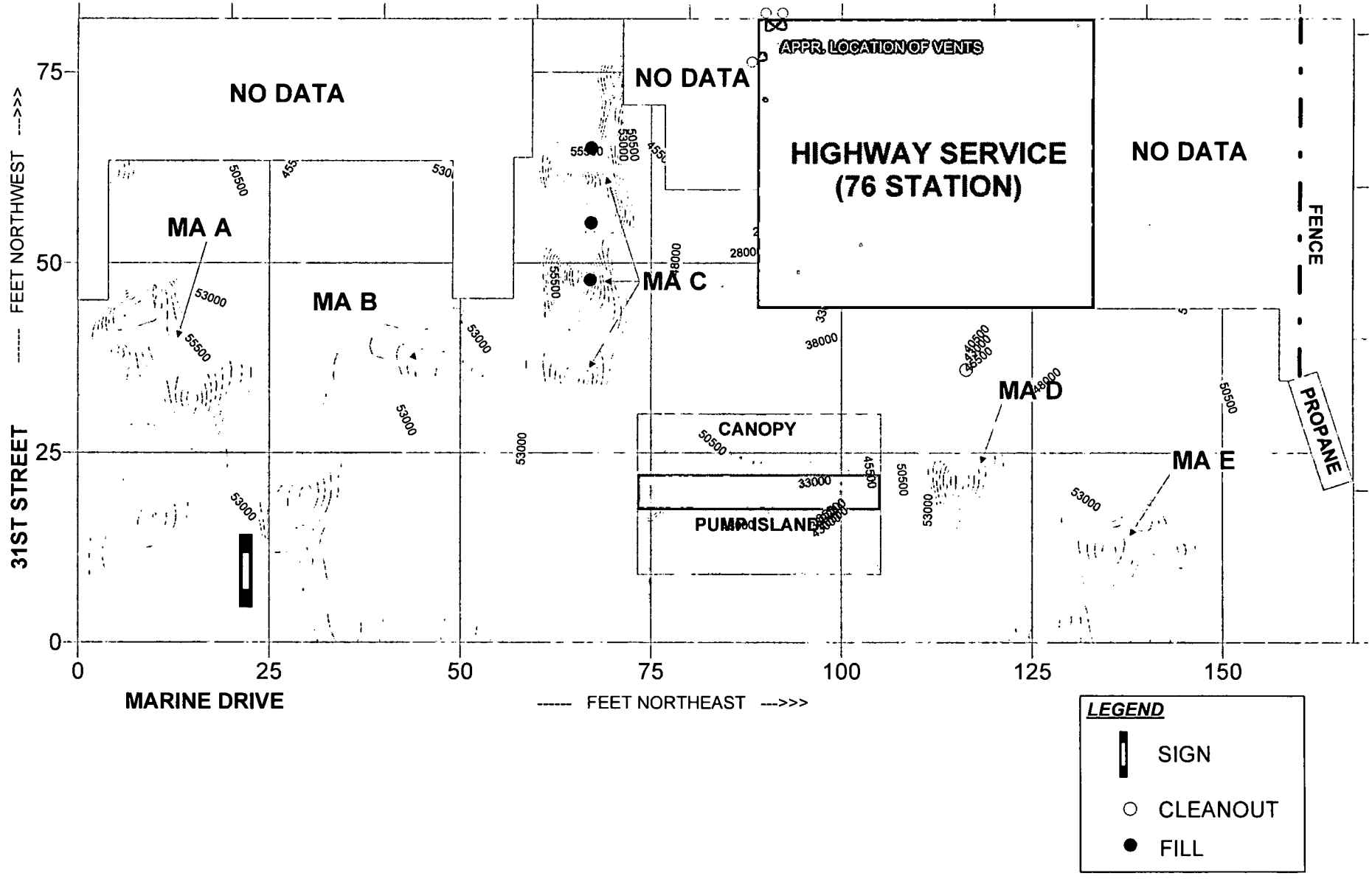


Nikos Tzetos
GeoPotential

October 1, 2003



GeoPotential ENVIRONMENTAL & EXPLORATION GEOPHYSICS 437 N.E. LIBERTY AVE. GRESHAM, OR 97030 - PH (503) 665-7520 - FAX (503) 492-4404 E-MAIL GeoPotential@aol.com	LOCATION: HIGHWAY SERVICE (76 STATION) 3108 Marine Drive Astoria, Oregon	FIGURE 1. LOCATION MAP
DATE: September 29, 2003 SUBSURFACE MAPPING SURVEY PROJECT NO 69137	CLIENT: RSV Engineering	



GeoPotential

ENVIRONMENTAL & EXPLORATION GEOPHYSICS

437 N.E. LIBERTY AVE. GRESHAM, OR 97030 · PH (503) 665-7520 · FAX (503) 492-4404

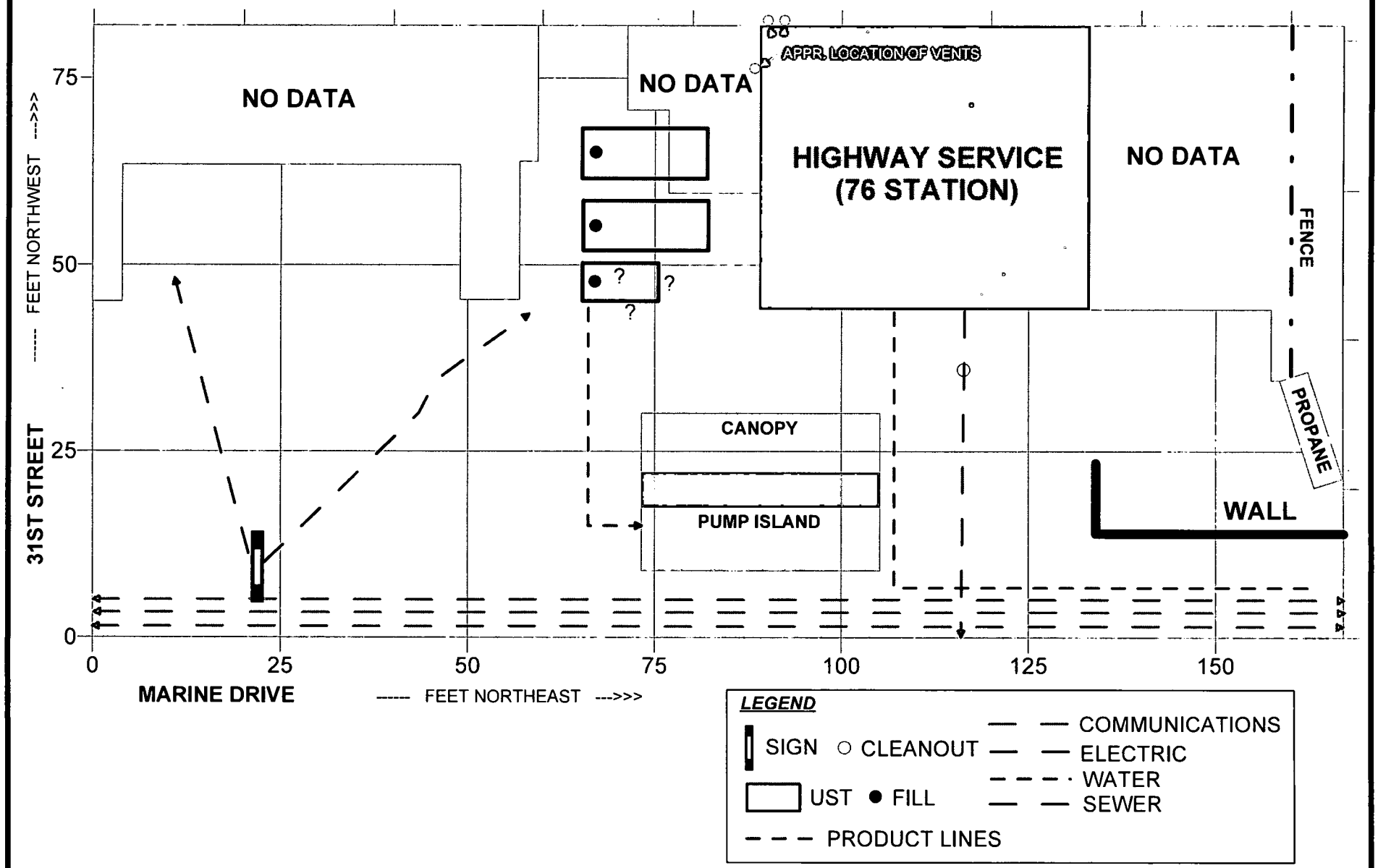
E-MAIL GeoPotential@aol.com

DATE: September 29, 2003 *SUBSURFACE MAPPING SURVEY* PROJECT NO: 4691373

LOCATION:
HIGHWAY SERVICE (76 STATION)
3108 Marine Drive
Astoria, Oregon

CLIENT: RSV Engineering

FIGURE 2.
MAGNETIC MAP
(C.I. = 500 nT)



GeoPotential

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LOCATION:
HIGHWAY SERVICE (76 STATION)
3108 Marine Drive
Astoria, Oregon

CLIENT: RSV Engineering

FIGURE 3.
INTERPRETATION MAP

APPENDIX A
MAGNETIC SURVEYS

The earth's magnetic field, measured in "nanoTeslas" (nT), behaves like a bar magnet, with the strongest magnetic field located at the poles, and the weakest field located near the equator. In the United States, the average field intensity varies widely, however, the average value is about 50,000 nT. Also, like the magnetic field around the bar magnet, the earth's magnetic field is inclined. This inclination varies between 60 and 75 degrees, generally depending upon the latitude of the measuring location. The earth's magnetic field varies constantly and, during sunspot activity, quite dramatically. A magnetometer is an electronic device that measures the intensity of the earth's magnetic field.

Naturally occurring geologic features and buried ferrous metal objects such as underground storage tanks, drums, ordnance, pipes and debris filled trenches produce both horizontal and vertical disturbances to the earth's local magnetic field. The objects causing these "anomalies" can be detected quickly and reliably using portable magnetometers.

The intensity of an anomaly is a function of the mass, size and depth of burial of the object. As a rule of thumb, single drums buried several feet below the surface produce anomalies of about 200 nT relative to the normal undisturbed background and can be detected at a horizontal distance of about 15 feet, while large caches of drums can produce anomalies of many thousands of nT and may be detectable 50 feet away.

Magnetometers generally measure horizontal variations in the local magnetic field. A magnetic gradiometer is a variant of the magnetometer that measures both the horizontal and the vertical magnetic field at each survey point. It consists of two identical sensors located vertically on a staff and having a fixed separation. The intensity of the magnetic field caused by a buried metal object varies inversely with the distance between the object and the sensor. The relative intensities measured simultaneously at each sensor are used to determine the relative depth of burial of an object.

Relative depth estimates of buried metal objects can be made using a single sensor. In general, for a given mass object, the deeper the object is buried, the lower the amplitude and the wider the anomaly. Shallowly buried objects produce higher amplitude anomalies with closely spaced contour lines.

Magnetic surveys can only detect **ferrous metal** objects and cannot be used to identify the buried object. Estimates of the total mass of a buried object are difficult due to the physical properties of the object and other factors. Interference caused by observed surface metal objects limits the accuracy of the survey. The anomalies produced by fences, power lines, cars and buildings can easily mask the anomaly caused by an underground target.

Magnetic surveys are cost effective. Using the standard "step and wait" magnetometer, data from approximately 1000 points can be obtained in one field day corresponding to between 1 acre and about 5 acres depending on site conditions and survey goals. More modern cesium magnetometers collect up to 10 readings per second continuously, thus the operator can proceed without stopping. Many modern magnetometers use an audible signal to call attention to anomalous data as it is obtained. At some sites metallic objects can be detected and marked in the field at the time of the survey.

The use of a second, automatically recording "base station" magnetometer is highly recommended due to temporal variations in the earth's magnetic field. These changes must be removed from the field data before an accurate interpretation can be made, particularly when searching for small-buried objects.

Magnetic data are most commonly presented in two contour maps. The TOTAL MAGNETIC FIELD CONTOUR MAP shows the horizontal magnetic field and, therefore, the areal extent of anomalies. The GRADIOMETER CONTOUR MAPS show the vertical magnetic field and indicate the relative depth of burial of the objects causing those anomalies. Color versions of these maps may be produced showing only the magnetic highs and lows.

APPENDIX - B
GROUND PENETRATING RADAR SURVEYS

Ground Penetrating Radar (GPR) uses high frequency radio waves directed into the ground to acquire information about the subsurface. The energy radiated into the ground is reflected back to the antenna by features having significantly different electrical properties to that of the surrounding material. The greater the contrast, the stronger the reflection. Typical reflectors include water table, bedrock, bedding, fractures, voids, contaminant plumes and man-made objects such as UST's and utilities. Data are digitally recorded or downloaded to a laptop computer for filtering and processing.

GPR can be a valuable tool to accurately locate both metallic and non-metallic UST's and utilities, buried drums and hazardous material even below reinforced concrete floors and slabs. GPR can delineate trenches and excavations and, under some conditions, it can be used to locate contaminant plumes. It has been used as an archaeological tool to look for buried artifacts. It can accurately profile fresh water lake bottoms either from a boat or from a frozen lake surface. GPR can locate voids below roads and runways. GPR has numerous engineering applications. It can be used in non-destructive testing of engineering material, for example, locating rebar in concrete structures and determining the thickness of concrete and other structural material.

GPR is often used in conjunction with magnetometer surveys. Magnetometer Surveys are very fast and large areas can be covered cost effectively. Often, magnetic anomalies can be marked in the field, then can be further investigated using ground penetrating radar.

Under some conditions, although a UST itself may not be clearly visible in a GPR record, the excavation or trench in which the UST is buried is evident. When combined with other complimentary data, such as magnetometer data, it is safe to assume that a GPR "trench" with no clear GPR UST reflection, combined with a large "tank-shaped" magnetic anomaly indicates the presence of a UST.

ADVANTAGES

GPR provides continuous records along traverses which, depending on the goal of the survey, may be interpreted in the field.

In clean, dry, sandy soil, reflections from targets as deep as 100 feet are possible.

At flat, open sites, for reconnaissance purposes, the antenna can be towed behind a vehicle at several mph.

Many GPR antennas are shielded and are unaffected by surface and overhead objects and power lines.

The resolution of data is very high particularly for high frequency antennas.

GPR can be used in conjunction with magnetic or EM surveys to accurately locate buried objects.

Even under adverse site conditions, shallow, man-made objects generally can be detected.

Fiberglass UST's can be detected using GPR.

LIMITATIONS

Subsurface objects can be detected but, in general, they cannot be identified. USTs and utilities have a characteristic reflection, however, large rocks and boulders have a similar reflection.

The reflection visible in a GPR record is very complex and may be caused by small changes in the electrical properties of the soil. The target in mind may not produce it.

Other methods may be necessary to aid in the interpretation of the data (use a magnetometer to detect a large metallic mass, then GPR to determine if the object is tank-like, or a utility locator to determine if there are feed lines and fill pipes leading to the object).

Penetration of the GPR signal is "site specific" and its depth of penetration at a particular site cannot be predicted ahead of time. Near surface conductive material, such as salty or contaminated ground water and wet, clay-rich soil, may attenuate the radar signal, limiting the effective depth of the survey to several feet.

Adequate contrast between the ground and the target is required to obtain reflections. UST's may be missed if they are badly corroded.

To determine the depth to an object without "ground truth", assumptions must be made regarding soil properties.

GPR may not be cost-effective for some projects. For a detailed survey mapping underground storage tanks and utilities, it may be necessary to collect data in orthogonal directions at 5-foot line spacing.

To acquire the highest quality data, proper coupling between the antenna and the ground surface is necessary. Poor data may be obtained at sites covered with tall grass and brush.

C

APPENDIX C

BORING LOGS AND WELL CONSTRUCTION DETAILS

RSV ENGINEERING, INC
11960 SW Charbonneau Drive, #101
Wilsonville, Oregon 97070
TEL (503) 694-6960
FAX (503) 694-6962

LOCATION MAP

SEE SITE PLAN

WELL/BORING NUMBER GP-1

Page 1 of 1

PROJECT NAME:Highway Service 76 Station
PROJECT NUMBER: 03-135
LOCATION: 3108 Marine Drive, Astoria, Oregon
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 9/10/03

SAMPLE INFORMATION									STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)	BOREHOLE/WELL CONSTRUCTION DETAIL
SAMPLE TYPE	BLOW COUNTS	PID (ppm)		First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %			
											Asphalt	
		0								ML	Sandy Silt (ML) light brown, fine sand, dense, dry	
GS					GP-1@ 2'-4'						@ 3': gray, with clay	
		0				5						
		0				10				SP	Sand (SM) brown, fine- medium grained, dry	
		0										
						15						
		0										
GS					GP-1@ 17'-18'						@ 18': gray, fine grained	
				▽								
						20				CL	Clay with gravel (CL-GC) dark gray, wet, hydrocarbon odor	
											@ 20': hard rock refusal	
						25						
						30						

DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe
SAMPLING METHOD: Geoprobe
DRILLING START TIME:9:35
DRILLING END TIME:10:10

WELL ID TAG: NA
WELL START CARD NO.: NA
RIM ELEVATION: NA
CASING ELEVATION: NA
DATUM: NA

TIME	DATE	DTW

RSV ENGINEERING, INC
1960 SW Charbonneau Drive, #101
Wilsonville, Oregon 97070
TEL (503) 694-6960
FAX (503) 694-6962

LOCATION MAP

SEE SITE PLAN

WELL/BORING NUMBER **GP-2**

PROJECT NAME:Highway Service 76 Station
PROJECT NUMBER: 03-135
LOCATION: 3108 Marine Drive, Astoria, Oregon
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 9/10/03

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE INTERVAL	REC %
GS		0		GP-2@ 2'-4'	5		
		0					
		0			10		
		0					
		0			15		
GS		0.4	▽	GP-2@ 17'-18'	20		
					25		
					30		

STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
		Asphalt
	GM	Silty Sandy Gravel (GM) light brown, angular, dry
	SP	Sand (SM) light gray, fine-medium grained, dry
		@ 19': gray, fine grained, wet
		Geoprobe water sampler screen pushed to 23'

BOREHOLE/WELL CONSTRUCTION DETAIL

DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe
SAMPLING METHOD: Geoprobe
DRILLING START TIME:1:15
DRILLING END TIME:1:45

WELL ID TAG: NA
WELL START CARD NO.: NA
RIM ELEVATION: NA
CASING ELEVATION: NA
DATUM: NA

TIME	DATE	DTW

RSV ENGINEERING, INC
21960 SW Charbonneau Drive, #101
Wilsonville, Oregon 97070
TEL (503) 694-6960
FAX (503) 694-6962

LOCATION MAP

SEE SITE PLAN

WELL/BORING NUMBER GP-3

Page 1 of 1

PROJECT NAME:Highway Service 76 Station
PROJECT NUMBER: 03-135
LOCATION: 3108 Marine Drive, Astoria, Oregon
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 9/10/03

SAMPLE INFORMATION									STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)	BOREHOLE/WELL CONSTRUCTION DETAIL
SAMPLE TYPE	BLOW COUNTS	PID (ppm)		First Water	LAB SAMPLE I.D.	DEPTH (ft) bgs	SAMPLE LOCATION	SAMPLE INTERVAL / REC %				
											Asphalt	
GS		0			GP-3@ 2'-4'					GM	Silty Sandy Gravel (GM) brown, angular, dry	
		0				5						
		0										
		0				10						
		0										
		0				15				SP	Sand (SM) light brown, fine-medium grained, dry	
GS		0		▽	GP-3@ 17'-18'						@ 19': gray, fine grained @ 19.5': wet	
						20						
						25						
						30						

DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe
SAMPLING METHOD: Geoprobe
DRILLING START TIME:2:10
DRILLING END TIME:2:35

WELL ID TAG: NA
WELL START CARD NO.: NA
RIM ELEVATION: NA
CASING ELEVATION: NA
DATUM: NA

TIME	DATE	DTW

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[redacted]1960 SW Charbonneau Drive, #101
Wilsonville, Oregon 97070
TEL (503) 694-6960
FAX (503) 694-6962

LOCATION MAP

SEE SITE PLAN

WELL/BORING NUMBER GP-4

PROJECT NAME:Highway Service 76 Station
PROJECT NUMBER: 03-135
LOCATION: 3108 Marine Drive, Astoria, Oregon
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 9/10/03

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH (ft bgs)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %
GS		0		GP-4@ 2-4'	5			
		0						
		0			10			
		0						
S		0		GP-4@ 15'-17'	15			
		0						
			▽		20			
					25			
					30			

STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
		Asphalt
	GM	Silty Sandy Gravel (GM) brown, angular, dry
	SP	Sand (SM) light brown, fine-medium grained, dry
		@ 19': gray, fine grained @ 19.5': wet Geoprobe sampler screen pushed to 23'. Pump tubing clogged with fine sand, no water sample

BOREHOLE/WELL CONSTRUCTION DETAIL



DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe
SAMPLING METHOD: Geoprobe
DRILLING START TIME:2:40
DRILLING END TIME:3:05

WELL ID TAG: NA
WELL START CARD NO.: NA
RIM ELEVATION: NA
CASING ELEVATION: NA
DATUM: NA

TIME	DATE	DTW

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31960 SW Charbonneau Drive, #101
Wilsonville, Oregon 97070
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FAX (503) 694-6962

LOCATION MAP

SEE SITE PLAN

WELL/BORING NUMBER GP-5

PROJECT NAME:Highway Service 76 Station
PROJECT NUMBER: 03-135
LOCATION: 3108 Marine Drive, Astoria, Oregon
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 9/10/03

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
											Asphalt
		0								GM	Silty Sandy Gravel (GM) brown, angular, dry
GS				GP-5@ 2'-4'							poor recovery, large gravels blocking tube
		0			5						
		0									
		0.5			10					CL	Silty Clay (CL) brown, moist, slight odor
		1.1									
GS		3.4		GP-5@ 16'-18'	15						
					20						Refusal encountered @ 20.5'
					25						
					30						

BOREHOLE/WELL CONSTRUCTION DETAIL

DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe
SAMPLING METHOD: Geoprobe
DRILLING START TIME:3:20
DRILLING END TIME:3:45

WELL ID TAG: NA
WELL START CARD NO.: NA
RIM ELEVATION: NA
CASING ELEVATION: NA
DATUM: NA

TIME	DATE	DTW

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1960 SW Charbonneau Drive, #101
Wilsonville, Oregon 97070
TEL (503) 694-6960
FAX (503) 694-6962

LOCATION MAP

SEE SITE PLAN

WELL/BORING NUMBER GP-6

PROJECT NAME:Highway Service 76 Station
PROJECT NUMBER: 03-135
LOCATION: 3108 Marine Drive, Astoria, Oregon
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 9/10/03

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH (ft) bgs	SAMPLE INTERVAL	REC %
GS		0		GP-6@ 2'-4'	5		
		0			10		
		0			15		
		0			20		
					25		
					30		

STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
		Asphalt
	GM	Silty Sandy Gravel (GM) brown, fine-medium sand, dry
		driller report refusal @12.5'

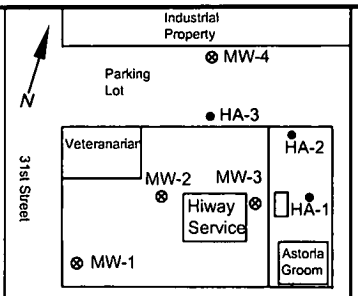
BOREHOLE/WELL CONSTRUCTION DETAIL

DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe
SAMPLING METHOD: Geoprobe
DRILLING START TIME:4:25
DRILLING END TIME:4:35

WELL ID TAG: NA
WELL START CARD NO.: NA
RIM ELEVATION: NA
CASING ELEVATION: NA
DATUM: NA

TIME	DATE	DTW

RSV ENGINEERING, INC.
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Wilsonville, Oregon 97070
TEL (503) 694-6960 FAX (503) 694-6962



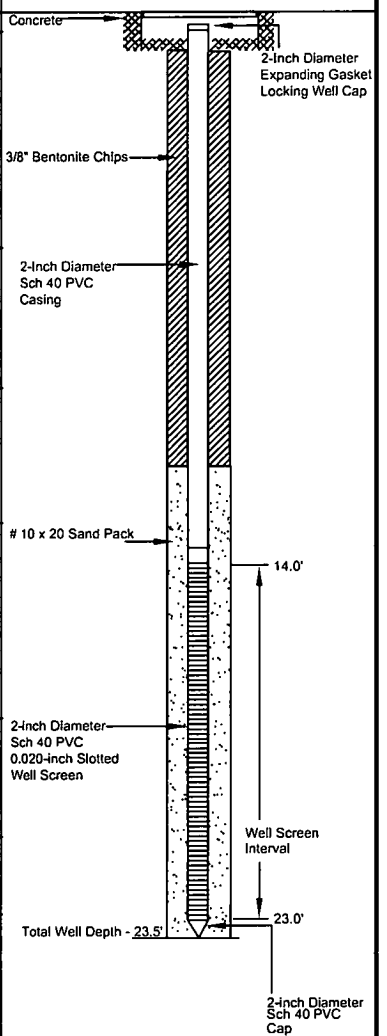
WELL/BORING NUMBER MW-1

PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
LOCATION: 1308 West Marine Drive, Astoria, OR
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 10/30/07

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
											Asphalt and Base
		0								SM	SILTY SAND with Gravel (SM); brown, medium and fine grained, gravels angular and 2"-3" in size, occasional cobble, moist.
		0									
		0									
		0			5						
		0								SP	SAND (SP); gray, fine and medium grained, dry-moist.
		0									
		0			10					SM	SILTY SAND with Gravel (SM); As Above.
		0									
		0								SP	SAND (SP); brown, fine and medium grained, moist.
		0			15						
		0	▽								@ 17': gray, wet.
										GM/GC	SILT SANDY GRAVEL with CLAY (GM/GC); gray, gravels rounded and 1/2" to 3", occasional cobble, moist to wet
					20						
										SP/SM	SAND (SP/SM); gray, fine to medium grained, wet.
										GM/GC	SILT SANDY GRAVEL with CLAY (GM/GC); As Above.
					25						Total Boring Depth = 25'
					30						

BOREHOLE/WELL CONSTRUCTION DETAIL

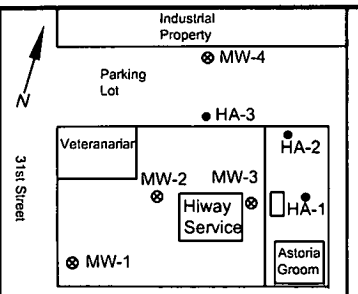


DRILLING CONTRACTOR: Boart Longyear
DRILLING METHOD: Sonic
SAMPLING METHOD: Continuous Core
DRILLING START TIME: 12:30
DRILLING END TIME: 1:45

START CARD: 196015
WELL I.D.: L89357
CASING ELEVATION: 21.58' msl

TIME	DATE	DTW
	11/1/07	15.71'
	11/27/07	15.49'

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TEL (503) 694-6960 FAX (503) 694-6962



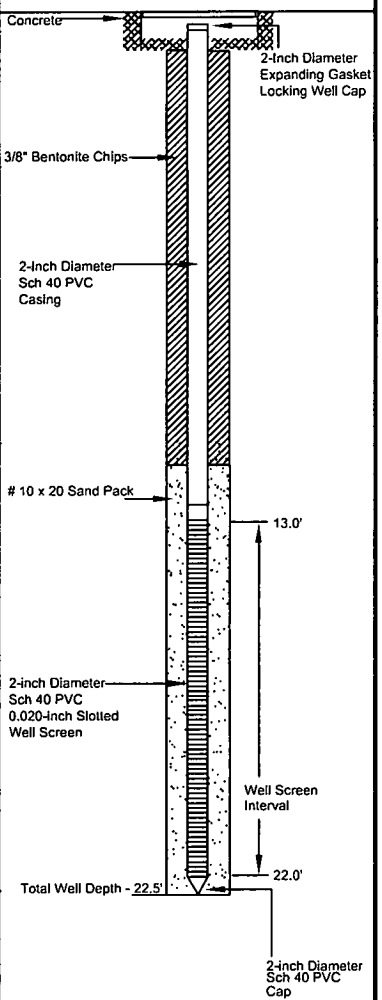
WELL/BORING NUMBER **MW-2**
Page 1 of 1

PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
LOCATION: 1308 West Marine Drive, Astoria, OR
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 10/30/07

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
											Grass and Top Soil
		0								SP	SAND (SP)(Fill); brown, fine and medium grained, dry-moist.
		0									
		0									
		0			5					SM	SILTY SAND with Gravel (SM)(Fill); brown, medium and fine grained, gravels angular and 2"-3" in size, occasional cobble, moist.
		0									
		0									@ 8': black, glass and metal fragments.
		0			10						
		0								SP	SAND (SP); brown, fine and medium grained, moist.
		0									
		0			15						
		0	▽								@ 18': gray, wet.
					20						
										GM/GC	SILTY SANDY GRAVEL with CLAY (GM/GC); gray, fine, medium and coarse grained sand, gravels rounded and 1/2" to 3",wet
											Total Boring Depth = 23'
					25						
					30						

BOREHOLE/WELL CONSTRUCTION DETAIL

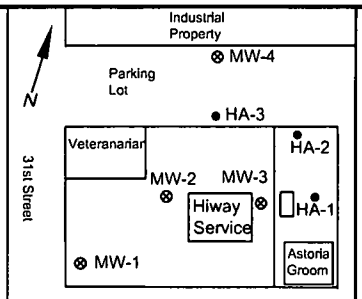


DRILLING CONTRACTOR: Boart Longyear
DRILLING METHOD: Sonic
SAMPLING METHOD: Continuous Core
DRILLING START TIME: 4:30
DRILLING END TIME: 6:00

START CARD: 196016
WELL I.D.: L89358
CASING ELEVATION: 21.97' msl

TIME	DATE	DTW
	11/1/07	16.88'
	11/27/07	15.64'

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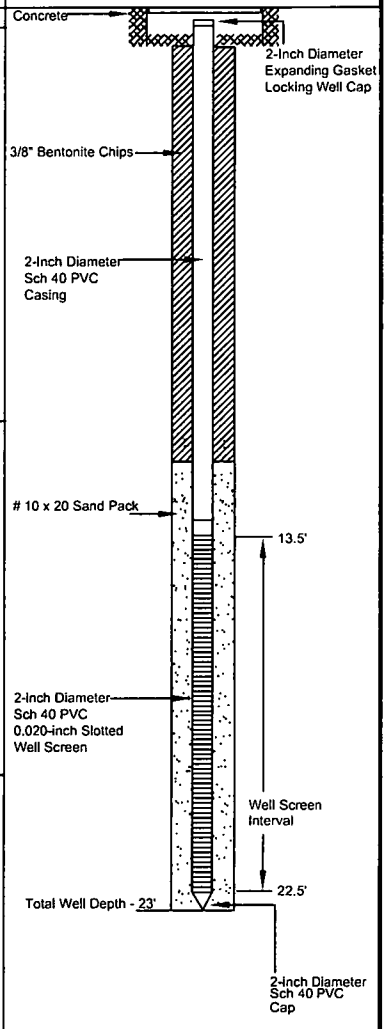
WELL/BORING NUMBER MW-3

PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
LOCATION: 1308 West Marine Drive, Astoria, OR
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 10/31/07

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
											Grass and Top Soil
		0								GM/GC	SILTY CLAYEY GRAVEL with SAND (GM/GC)(Fill); light brown, fine, medium, and coarse grained sand, moist.
		0									
		0									
		0			5						
		0									
		0									
		0			10						
		0								SP	SAND (SP); brown, fine and medium grained, moist.
		0									
		0			15						
		0	▽								@ 18.5': gray, wet.
					20					GM/GC	SILTY CLAYEY GRAVEL with SAND (GM/GC); gray, fine, medium, and coarse grained sand, wet.
											Total Boring Depth = 24'
					25						
					30						

BOREHOLE/WELL CONSTRUCTION DETAIL

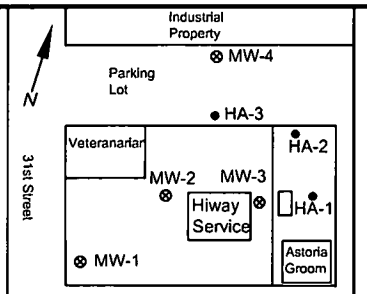


DRILLING CONTRACTOR: Boart Longyear
DRILLING METHOD: Sonic
SAMPLING METHOD: Continuous Core
DRILLING START TIME: 9:45
DRILLING END TIME: 11:15

START CARD: 196017
WELL I.D.: L89359
CASING ELEVATION: 22.20' msl

TIME	DATE	DTW
	11/1/07	17.22'
	11/27/07	17.04'

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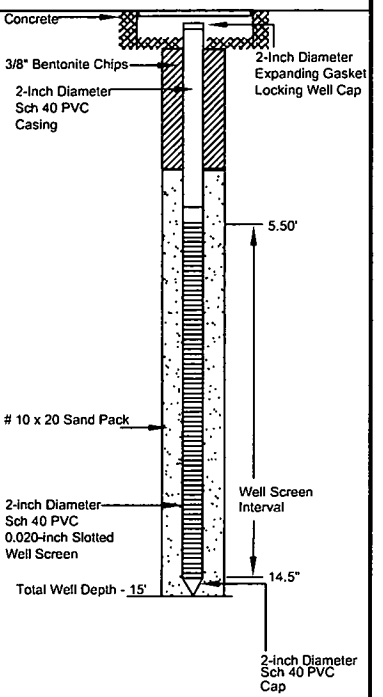
WELL/BORING NUMBER MW-4

PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
LOCATION: 1308 West Marine Drive, Astoria, OR
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 10/30/07

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
											Concrete
		0								SP	SAND (SP); brown, medium and fine grained, moist.
		0									
		0									
		0			5						
		0	▽								@ 7': wet.
											@ 9': gray
					10						
					15						Total Boring Depth = 15'
					20						
					25						
					30						

BOREHOLE/WELL CONSTRUCTION DETAIL

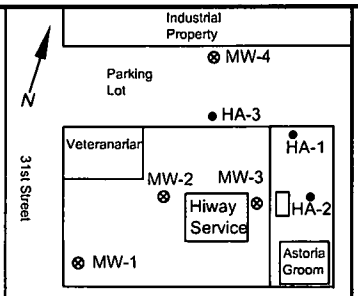


DRILLING CONTRACTOR: Boart Longyear
DRILLING METHOD: Sonic
SAMPLING METHOD: Continuous Core
DRILLING START TIME: 9:10
DRILLING END TIME: 9:40

START CARD: 196014
WELL I.D.: L89356
CASING ELEVATION: 11.15' msl

TIME	DATE	DTW
	11/1/07	6.52'
	11/27/07	6.33'

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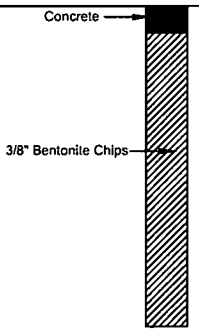
WELL/BORING NUMBER HA-1
Page 1 of 1

PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
LOCATION: 1308 West Marine Drive, Astoria, OR
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 10/29/07

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
											Concrete
		0								SP	SAND (SP); light brown, fine and medium grained, moist.
		0									
		0									
		0	▽		5						@6.5':wet soils observed.
											Total Boring Depth = 8'
					10						Temporary 2" diameter PVC well screen set in boring. Water purged until clear and groundwater sample collected.
					15						
					20						
					25						
					30						

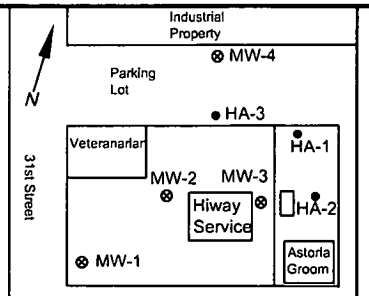
BOREHOLE ABANDONMENT DETAIL



DRILLING CONTRACTOR: Boart Longyear
DRILLING METHOD: Hand Auger
SAMPLING METHOD: Continuous Core
DRILLING START TIME: 2:30
DRILLING END TIME: 2:45

TIME	DATE	DTW

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WELL/BORING NUMBER HA-2
Page 1 of 1

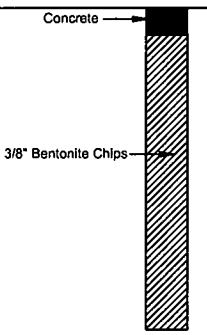
PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
LOCATION: 1308 West Marine Drive, Astoria, OR
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 10/29/07

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %
		0						
		0						
		0						
		0	▽		5			
					10			
					15			
					20			
					25			
					30			

STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
		Grass and Top Soil
	SP	SAND (SP); light brown, fine and medium grained, moist.
		@6.5':wet soils encountered.
		Total Boring Depth = 8'
		Temporary 2" diameter PVC well screen set in boring. Water purged until clear and groundwater sample collected.

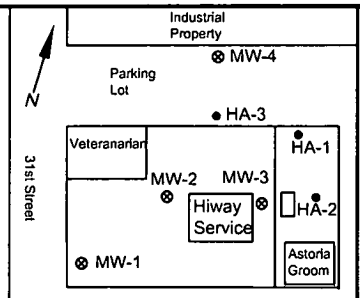
BOREHOLE ABANDONMENT DETAIL



DRILLING CONTRACTOR: Boart Longyear
DRILLING METHOD: Hand Auger
SAMPLING METHOD: Continuous Core
DRILLING START TIME: 3:25
DRILLING END TIME: 3:40

TIME	DATE	DTW

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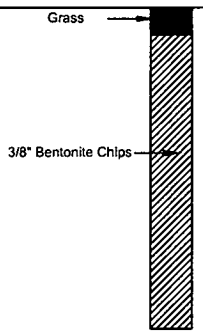
WELL/BORING NUMBER HA-3

PROJECT NAME: Niemi Hiway Service
PROJECT NUMBER: 03-135
LOCATION: 1308 West Marine Drive, Astoria, OR
LOGGED BY: Dan Becraft
REVIEWED BY: Brad Berggren
DATE: 10/30/07

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
											Grass and Top Soil
		0								SP	SAND (SP); light brown, fine and medium grained, moist.
		0									
		0									
		0			5						
			▽								@6.5':wet soils encountered.
											Total Boring Depth = 8'
					10						Temporary 2" diameter PVC well screen set in boring. Water purged until clear and groundwater sample collected.
					15						
					20						
					25						
					30						

BOREHOLE ABANDONMENT DETAIL



DRILLING CONTRACTOR: Boart Longyear
DRILLING METHOD: Hand Auger
SAMPLING METHOD: Continuous Core
DRILLING START TIME: 9:40
DRILLING END TIME: 9:50

TIME	DATE	DTW

APPENDIX D

ANALYTICAL RESULT TABLES FROM 2003 AND 2004 SITE INVESTIGATIONS

Table 1
Soil Sampling Results-TPH
Highway Service 76 Station
Astoria, Oregon

			HCID			TPH mg/kg		
Sample ID	Depth(ft)	Date	Gasoline	Diesel	Oil	TPH-Gx	TPH-Dx	TPH-Oil
North BOT	6	10/18/99	ND	ND	ND	NA	<2,500	78,000
South BOT	6	10/18/99	ND	ND	ND	NA	<2,500	19,000
GP-1	2-4	10/10/03	ND	ND	ND	NA	NA	NA
GP-1	17-18	10/10/03	ND	ND	ND	NA	NA	NA
GP-2	2-4	10/10/03	ND	ND	ND	<6.2	<31	<130
GP-2	17-19	10/10/03	ND	ND	ND	<5.5	<28	<110
GP-3	2-4	10/10/03	ND	ND	ND	<6.2	<32	7.2
GP-3	17-19	10/10/03	ND	ND	ND	<5.6	11	85
GP-4	2-4	10/10/03	ND	ND	ND	<6.3	<31	9.6
GP-4	15-17	10/10/03	ND	ND	ND	<5.2	<26	<110
GP-5	2-4	10/10/03	ND	ND	ND	NA	NA	NA
GP-5	16-18	10/10/03	ND	ND	ND	NA	NA	NA
GP-6	2-4	10/10/03	ND	ND	ND	NA	NA	NA
B-7	0-4	9/28/04	NA	NA	NA	<4.9	<20	28J
B-7	13-15	9/28/04	NA	NA	NA	42	2,600	12,000
Appendix A Risk Based Concentrations								
Soil Ingestion Dermal Contact and Inhalation	Occupational		NS	NS	NS	22,000	70,000	21,000*
	Construction Worker		NS	NS	NS	13,000	23,000	6,700*
	Excavation Worker		NS	NS	NS	>Csat	>Csat	190,000*
Volitilization to Outdoor Air	Occupational		NS	NS	NS	80,000	>Csat	>Csat*
Vapor Intrusion to Buildings	Occupational		NS	NS	NS	>Csat	>Csat	>Csat*
Leaching to Groundwater	Occupational		NS	NS	NS	110	>Csat	>Csat*

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum -Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) RBCs provided in mg/kg
(3) NS = No Appendix A RBC provided by DEQ
(4) ND = Not Detected
(5) NA = not analyzed for
(6) 12,000 Shaded concnetration indicate concnetration meets or exceeds one or more RBC.
(7) >Csat The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)
(8) * = Site-Specific RBC calculated by DEQ

Table 2
Soil Sampling Results -Metals
Highway Service 76 Station
Astoria, Oregon

			(mg/kg)		
Sample ID	Depth (ft)	Date	Cadmium	Chromium	Lead
GP-2	2-4	10/10/03	0.352	**44.1**	6.51
GP-2	17-19	10/10/03	0.030	7.23	2.26
GP-3	2-4	10/10/03	0.291	**40.6**	9.44
GP-3	17-19	10/10/03	0.39	9.81	2.49
GP-4	2-4	10/10/03	0.417	30.8	7.78
GP-4	15-17	10/10/03	0.031	7.58	2.07
B-7	0-4	9/28/04	<0.003*	0.004J*	<0.02*
B-7	13-15	9/28/04	0.043	7.54	46.7
Appendix A Risk Based Concentrations (RBCs)[1]					
Soil Ingestion, Dermal Contact and Inhalation		Occupational	450*	450*	750
		Construction Worker	450*	450*	750
		Excavation Worker	450*	450*	750
Volatilization to Outdoor Air		Occupational	---	---	---
Vapor Intrusion to Buildings		Occupational	---	---	---
Leaching to Groundwater		Occupational	8*	38*	30

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003

(2) RBCs provided in mg/kg

(3) --- DEQ assumes that it is not physically possible to exceed an unacceptable risk by this pathway.

(5) 450* From United States Environmental Protection Agency Region 9 Preliminary Remediation Goals, October 1, 2003. Leaching to Groundwater Pathway represents a DAF of 20. No Appendix A PRG provided by DEQ.

(6) **44.1** Meets or exceeds one of more RBC

Table 3
Soil Sampling Results - Leachable Metals
Highway Service 76 Station
Astoria, Oregon

			(mg/L)		
Sample ID	**Depth (ft)**	**Date**	**Cadmium**	**Chromium**	**Lead**
B-7	0-4	9/28/04	<0.003	0.004J	<0.02
B-7	13-15	9/28/04	<0.003	<0.003	0.04J
DEQ Hazardous Substance Remedial Action Rules - Soil Cleanup Table					
Soil Cleanup Level			0.5	10	2

Notes:

(1) Soil Cleanup Level from DEQ Hazardous Substance Remedial Action Rules (OAR 340 -122), Oregon Soil Cleanup Table, July 27,2002)

(2) Soil Cleanup Levels provided in µg/L

Table 4
Soil Sampling Results-PAHs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Depth (ft)	Date	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo (a) anthracene	Chrysene	Benzo (b) fluoranthene	Benzo (k) fluoranthene	Benzo (a) pyrene	Dibenzo (a,h) anthracene	Benzo (g,h,i) perylene	Indeno (1,2,3-cd) pyrene	2-Metylnaphatene	Dibenzofuran
GP-2	2-4	10/10/03	0.36	<5.0	<5.0	<5.0	0.54	<5.0	<5.0	<5.0	<5.0	0.29	<5.0	<5.0	<5.0	<5.0	0.15	<5.0	0.35	<5.0
GP-2	17-19	10/10/03	0.47	<5.0	<5.0	<5.0	0.22	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0.26	<5.0
GP-3	2-4	10/10/03	0.68	<5.1	<5.1	<5.1	0.40	<5.1	0.30	0.31	<5.1	0.26	<5.1	<5.1	<5.1	<5.1	0.22	<5.1	0.84	<5.1
GP-3	17-19	10/10/03	0.67	<5.0	<5.0	0.29	6.9	0.31	1.7	4.2	1.7	8.9	3.0	<5.0	1.6	2.1	4.6	0.67	1.7	0.28
GP-4	2-4	10/10/03	0.30	<5.0	<5.0	<5.0	0.56	<5.0	0.37	0.42	<5.0	0.26	<5.0	<5.0	<5.0	<5.0	0.22	0.23	<5.0	<5.0
GP-4	15-17	10/10/03	0.38	<4.9	<4.9	<4.9	0.21	<4.9	<4.9	0.15	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	0.18	<4.9	0.33	<4.9
GP-5	2-4	10/10/03	0.45	0.38	<5.0	<5.0	3.5	0.47	6.2	10	2.3	4.1	2.6	2.0	3.1	0.49	4.9	3.1	0.33	<5.0
GP-5	16-18	10/10/03	19	<5.1	1.3	1.3	6.7	0.30	3.3	11	1.1	2.4	<5.1	<5.1	<5.1	<5.1	2.2	0.91	2.8	0.91
B-7	0-4	38258.00	0.91J	<3.3	<3.3	<3.3	0.58J	<3.3	0.78J	0.87J	0.22J	<3.3	<3.3	<3.3	0.41J	<3.3	0.74J	0.41J	<3.3	<3.3
B-7	13-15	38258.00	7.7	1.3J	0.85J	<2.8	2.8J	0.97J	2.0	4.6	1.5J	5.1J	1.9J	0.93J	2.3J	0.80J	100	9.7	12	<2.8
Appendix A Risk Based Concentrations																				
Soil Ingestion, Dermal Contact Inhalation	Occupational		770,000	NS	41,000,000	35,000,000	NS	>Csat	29,000,000	21,000,000	2,700	270,000	2,700	27,000	270	270	NS	2,700	NS	NS
	Construction Worker		710,000	NS	16,000,000	12,000,000	NS	90,000,000	8,900,000	6,700,000	21,000	2,100,000	21,000	210,000	2,100	2,100	NS	21,000	NS	NS
	Excavation Worker		20,000,000	NS	>Csat	>Csat	NS	>Csat	>Csat	>Csat	590,000	59,000,000	590,000	5,900,000	59,000	59,000	NS	590,000	NS	NS
Volitilization to Outdoor Air	Occupational		—	NS	>Csat	>Csat	NS	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	NS	>Csat	NS	NS
Vapor Intrusion to Buildings	Occupational		—	NS	>Csat	>Csat	NS	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	NS	>Csat	NS	NS
Leaching to Groundwater	Occupational		15,000	NS	>Csat	>Csat	NS	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	NS	>Csat	NS	NS

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003

(2) NS = No Appendix A RBC provided by DEQ

(3) >Csat The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)

(4) Results and RBCs provided in µg/kg

Table 5
Soil Sampling Results-VOCs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Depth (ft)	Date	Benzene	Toulene	Ethylbenzene	Xylenes	Isopropylbenzene	N-propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Methyl-Tert-Buytl-Ether (MTBE)	1,2-dibromoethane (EDB)	1,2-dichloroethane (EDC)	Naphthalene	Methylene Chloride
GP-2	2-4	10/10/03	<6.3	<6.3	<6.3	<12.6	<26	<26	<26	<26	<6.3	<26	<6.3	<26	3.5
GP-2	17-19	10/10/03	<5.5	<5.5	<5.5	<11.0	<22	<22	<22	<22	<5.5	<22	<5.5	<22	2.5
GP-3	2-4	10/10/03	<6.2	<6.2	<6.2	<12.4	<25	<25	<25	<25	1.0	<25	<6.2	<25	4.1
GP-3	17-19	10/10/03	<5.6	<5.6	<5.6	<11.2	<23	<23	<23	<23	<5.6	<23	<5.6	<23	2.4
GP-4	2-4	10/10/03	<6.2	<6.2	<6.2	<12.4	<25	<25	<25	<25	<6.2	<25	<6.2	<25	3.0
GP-4	15-17	10/10/03	<5.2	<5.2	<5.2	<10.4	<21	<21	<21	<21	<5.2	<21	<5.2	<21	1.4
GP-5	2-4	10/10/03	<6.1	<6.1	<6.1	<12.2	<25	<25	<25	<25	<6.1	<25	<6.1	<25	1.6
GP-5	16-18	10/10/03	<6.8	<6.8	7.3	43.4	3.6	9.0	61	7.0	<6.8	<27	<6.8	1.6	22
B-7	0-4	9/28/2004	<6.5	<6.5	<6.5	<6.5	<26	<26	<26	<26	<6.5	<26	<6.5	<26	NA
B-7	13-15	9/28/2004	<5.6	1.1J	14	59	2.8J	13J	25	28	<5.6	<23	<5.6	1.8J	NA
Appendix A Risk Based Concentrations															
Soil Ingestion, Dermal Contact and Inhalation		Occupational	34,000	68,000,000	74,000,000	24,000,000	51,000,000	19,000,000	1,500,000	1,500,000	760,000	33	15,000	770,000	21,000*
		Construction Worker	340,000	39,000,000	28,000,000	19,000,000	24,000,000	9,300,000	1,400,000	1,400,000	9,000,000	250	180,000	710,000	NS
		Excavation Worker	9,400,000	>Csat	>Csat	>Csat	>Csat	>Csat	40,000,000	40,000,000	>Csat	7,100	5,000,000	20,000,000	NS
Volatilization to outdoor air		Occupational	48,000	>Csat	>Csat	>Csat	>Csat	>Csat	790,000	>Csat	720,000	1,700	14,000	>Csat	NS
Vapor Intrusion to Buildings		Occupational	1,200	>Csat	>Csat	>Csat	>Csat	>Csat	840,000	140,000	35,000	370	560	>Csat	NS
Leaching to Groundwater		Occupational	52	180,000	>Csat	100,000	>Csat	>Csat	55,000	12,000	300	0.59	7.4	15,000	20*

Notes:
(1) DEQ Risk Based Concentrations from Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) NS = No Appendix A RBC provided by DEQ
(3) ND = Not Detected
(4) NA = Not analyzed for
(5) 22 Meets or exceeds one or more Appendix A RBC
(6) >Csat The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)
(7) Results and RBCs provided in µg/kg
(8) 21,000* From United States Environmental Protection Agency Region 9 Preliminary Remediation Goals, October 1, 2003.

Table 6
Groundwater Sampling Results - TPH
Highway Service 76 Station
Astoria, Oregon

		HCID			TPH µg/L		
Sample ID	**Date**	**Gasoline**	**Diesel**	**Oil**	**Gx**	**Dx**	**Oil**
GP-1	10/10/03	D	ND	ND	86	NA	NA
GP-2	10/10/03	D	D	ND	39	3,200	110
B-7	9/28/04	NA	NA	NA	2,400	2,800	5,100
B-8	10/13/04	NA	NA	NA	330	210J	190J
B-9	10/13/04	NA	NA	NA	120J	110J	86J
Appendix A Risk Based Concentrations							
Volatilization to outdoor air	Occupational	NS	NS	NS	>S	>S	>S*
Vapor Intrusion to Buildings	Occupational	NS	NS	NS	>S	>S	>S*
Groundwater in Excavation	Construction and Excavation Worker	NS	NS	NS	12,000	>S	>S*

Notes:

(1) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A: Table of Risk-Based Concentrations (RBCs), September 22, 2003.

(2) RBCs provided in ug/L

(3) NS = No Appendix A RBC provided by DEQ

(4) ND = Not Detected

(5) NA = not analyzed for

(6) **61,000** Meets or exceeds one or more Appendix A RBC

(7) >S This groundwater RBC exceeds the solubility limit.

(8) * = Site-Specific RBC calculated by DEQ.

Table 7
Groundwater Sampling Results -Metals
Highway Service 76 Station
Astoria, Oregon

		(µg/L)		
Sample ID	**Date**	**Cadmium**	**Chromium**	**Lead**
GP-1	10/10/03	0.18	4.15	58.6
GP-2	10/10/03	0.07	1.13	5.4
B-7	9/28/04	0.04	0.34	0.268
B-8	10/13/04	0.04	0.06	0.23
B-9	10/13/04	0.02	0.19	0.09
Appendix A Risk Based Concentrations (RBCs)				
Volatilization to outdoor air	Occupational	---	---	---
Vapor Intrusion to Buildings	Occupational	---	---	---
Groundwater in Excavation	Construction and Excavation Worker	---	---	---
*From United States Environmental Protection Agency, Region 9 Preliminary Remediation Goals, October 1, 2003				

Notes:

(1) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A:Table of Risk-Based Concentrations (RBCs), September 22, 2003.
(2) RBCs provided in ug/L.
(3) --- DEQ assumes that it is not physically possible to exceed an unacceptable risk level by this pathway.

Table 8
Groundwater Sampling Results- PAHs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Date	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a) anthracene	Chrysene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Benzo(a)pyrene	Dibenzo(a,h) anthracene	Benzo(ghi) perylene	Indeno(1,2,3-cd) pyrene	2-Methyl napthalene	Dibenzofuran
GP-2	10/10/03	0.039	0.0051	0.021	0.010	0.015	0.0023	0.010	0.022	0.0031	0.0059	0.0030	0.0028	<0.020	<0.020	0.0056	<0.020	0.031	<0.020
B-7	09/28/04	1.3	<0.023	0.082	0.080	0.019J	0.015J	0.020J	0.13	0.014J	0.024	0.017J	0.0049J	0.012J	<0.023	0.054	0.014J	0.27	0.011J
B-8	10/13/04	0.12	0.0035J	0.014J	0.011J	0.013J	0.0056J	0.0075J	0.0091J	0.0084J	0.0064J	0.0071J	0.0076J	0.0079J	0.0095J	0.0098J	0.0092J	0.11	0.013J
B-9	10/13/04	0.088	<0.028	<0.028	0.0074J	0.0099J	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	0.083	<0.028
Appendix A Risk Based Concentrations																			
Volatilization to outdoor air	Occupational	>S	NS	>S	>S	NS	>S	>S	>S	>S	>S	>S	>S	>S	>S	NS	>S	NS	NS
Vapor Intrusion Into Buildings	Occupational	>S	NS	>S	>S	NS	>S	>S	>S	>S	>S	>S	>S	>S	>S	NS	>S	NS	NS
Groundwater in Excavation	Construction and Excavation	680	NS	>S	>S	NS	>S	>S	>S	9.1	>S	>S	>S	0.53	0.21	NS	2.9	NS	NS

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) NS = No Appendix A RBC provided by DEQ.
(3) >S = This groundwater RBC exceeds the solubility limit.
(4) Results and RBCs provided in µg/L.

Table 9
Groundwater Sampling Results-VOCs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Date	Benzene	Toulene	Ethylbenzene	Xylenes	Isopropylbenzene	N-propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Methyl-Tert-Buytl-Ether (MTBE)	1,2-dibromoethane (EDB)	1,2-dichloroethane (EDC)	Naphthalene
GP-1	10/10/2003	0.18J	0.26J	<0.50	0.45J	<2.0	<2.0	<2.0	<2.0	<0.50	<2.0	<0.50	NA
GP-2	10/10/2003	<0.50	0.12J	<0.50	<1.0	<2.0	<2.0	<2.0	<2.0	<0.50	<2.0	<0.50	NA
B-7	9/28/2004	12	2.4	7.5	3.08	68	96	0.98J	0.47J	<0.50	<2.0	<0.50	1.9J
B-8	10/13/2004	53	0.32J	0.42J	0.87	5.1	6.6	0.40J	0.13J	2.2	<2.0	<0.50	NA
B-9	10/13/2004	38	0.36J	0.27J	0.58J	2.3	4.4	0.39J	<2.0	2.7	<2.0	<0.50	NA
Appendix A Risk-Based Concentrations													
Volatilization to outdoor air	Occupational	13,000	>S	>S	>S	>S	>S	>S	>S	550,000	2,500	9,000	>S
Vapor Intrusion Into Buildings	Occupational	2,700	>S	>S	>S	>S	>S	51,000	38,000	280,000	1,800	3,600	>S
Groundwater in Excavation	Construction and Excavation Worker	1,700	78,000	110,000	22,000	51,000	18,000	1,300	1,400	31,000	20	600	680

Notes:

(1) Sampling results provided in ug/L
(2) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A: Table of Risk-Based Concentrations (RBCs), September 22, 2003
(3) RBCs provided in ug/L
(4) **30,000** Meets or exceeds one or more Appendix A RBC
(5) >S This groundwater RBC exceeds the solubility limit.

APPENDIX E

ANALYTICAL RESULT TABLE FROM 2007 GROUNDWATER INVESTIGATION

TABLE 2
SUMMARY of GROUNDWATER ANALYTICAL DATA
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

Groundwater Sample ID	Sample Date	Gasoline-range Petroleum Hydrocarbons (Method NWTPH-Gx) (µg/l)	Diesel- and Heavy Oil-range Petroleum Hydrocarbons (Method NWTPH-Dx) (µg/l)		Volatile Organic Compounds (EPA Method 8260B) (µg/l)							Cadmium, Chromium & Lead (EPA Method 200.8) (µg/l)					
			Diesel-range	Oil-range	Benzene	1,2, Dibromoethane	1,2, Dichloroethane	Ethylbenzene	Methyl tert-butyl eth	Toluene	Xylenes	Total Cadmium	Dissolved Cadmium	Total Chromium	Dissolved Chromiur	Total Lead	Dissolved Lead
HA-1	10/29/07	ND<80	ND<238	ND<476	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
HA-2	10/29/07	ND<80	ND<236	ND<472	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
HA-3	10/30/07	ND<80	ND<245	ND<490	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
MW-1	11/1/07	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
MW-2	11/1/07	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
MW-3	11/1/07	**1,350**	**522**	ND<476	**31.9**	ND	ND	**19.6**	ND	**2.59**	**2.41**	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
MW-4	11/1/07	ND<80	ND<240	ND<481	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1	ND<2	ND<1	ND<1	ND<1	ND<1	ND<1	ND<1
Occupational RBCs for Volatilization to Outdoor Air		-	-	-	13,000	960	9,000	-	1,100,0000	-	-	NV	NV	NV	NV	NV	NV
Occupational RBCs for Vapor Intrusion into Buildings		-	-	-	2,700	690	3,600	-	560,000	-	-	NV	NV	NV	NV	NV	NV
RBCs for Groundwater in Excavation for Construction and Excavation Workers		12,000	9,700	18,000	1,700	28	600	110,000	59,000	200,000	22,000	NV	NV	NV	NV	NV	NV

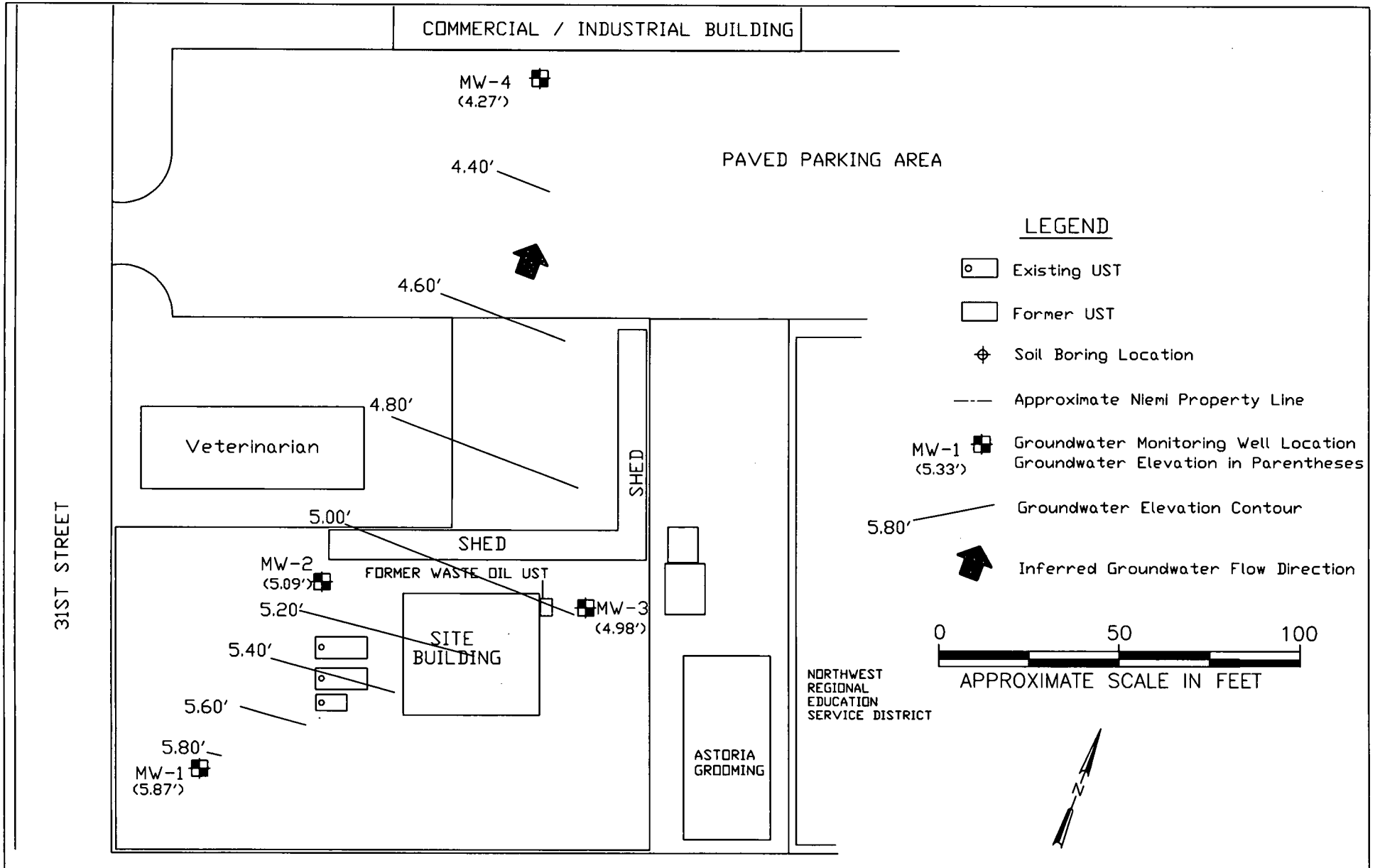
Notes:
mg/l - Milligrams per liter
µg/l - Micrograms per liter
ND - Not detected above reporting limits.
NV - No RBC value for this constituent.
"-" Indicates that RBC exceeds solubility limit.

RBCs - Generic Risk-Based Concentrations per DEQ Risk-Based Decision Making for Petroleum Contaminated Sites, Appendix A.

F

APPENDIX F

GROUNDWATER FLOW MAPS

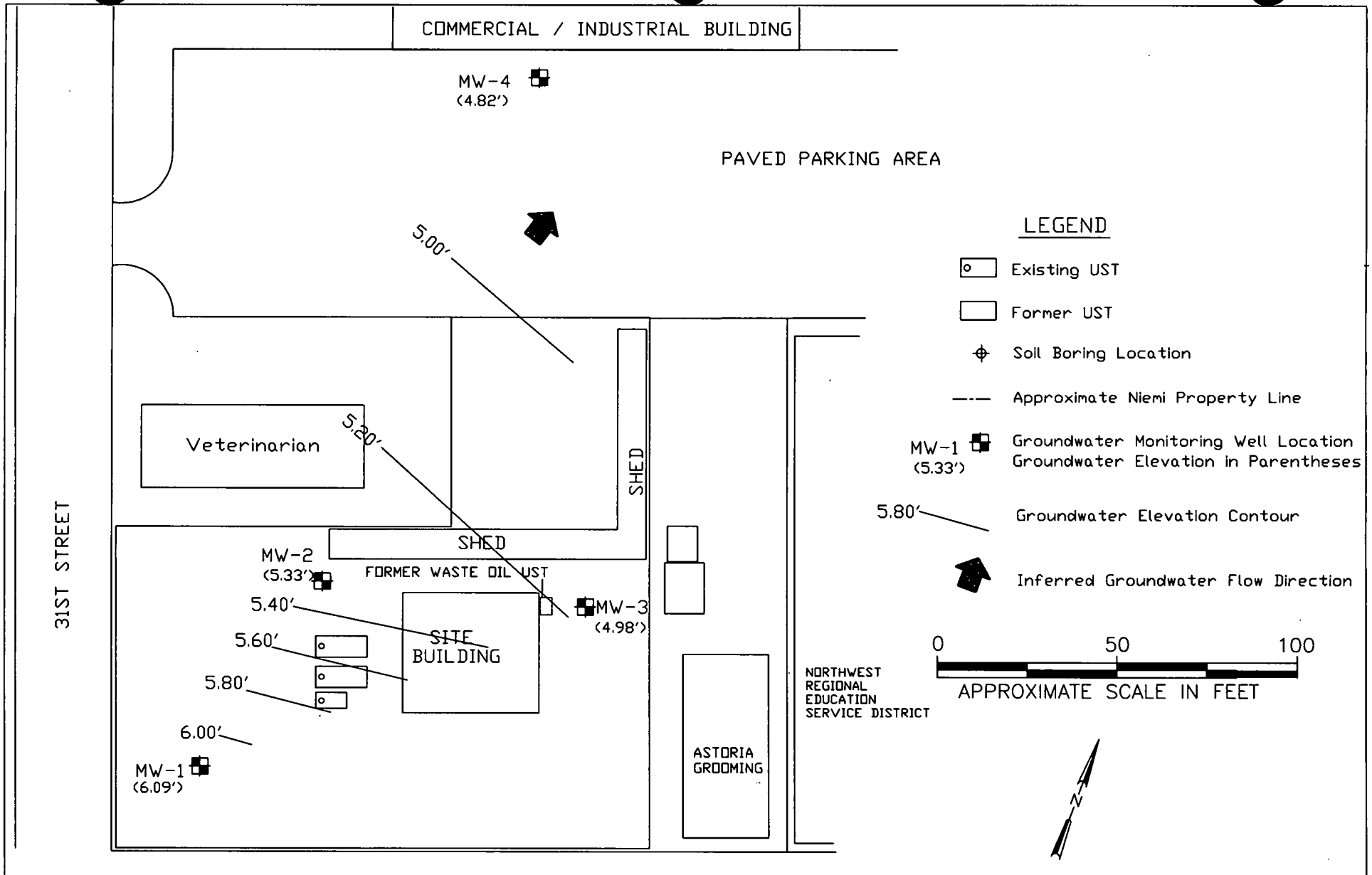


RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

GROUNDWATER FLOW MAP
NOVEMBER 1, 2007
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 3

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		12/12/07	Figure 3 - GW FLOW

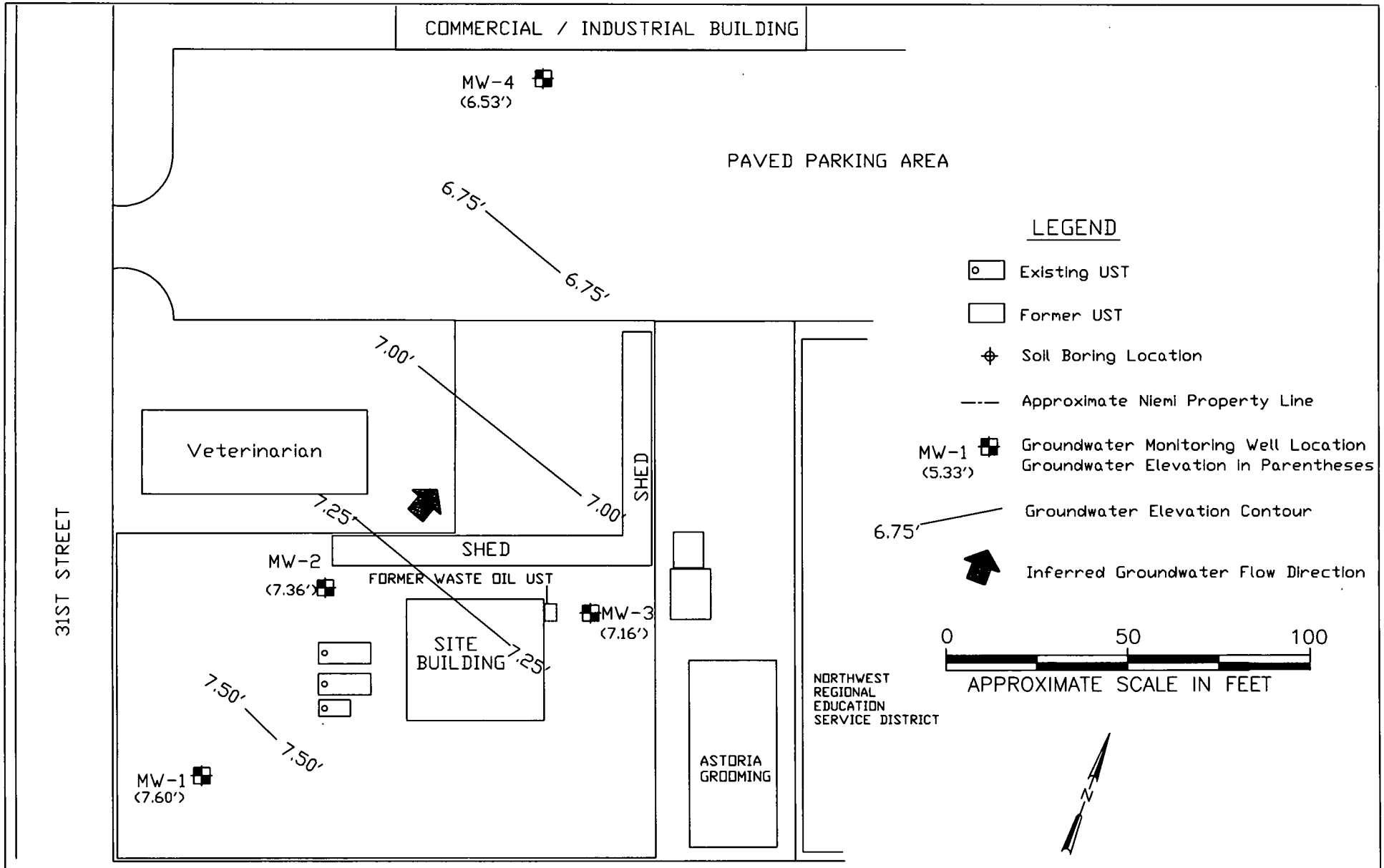


RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

GROUNDWATER FLOW MAP
NOVEMBER 27, 2007
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 4

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		12/12/07	Figure 3 - GW FLOW

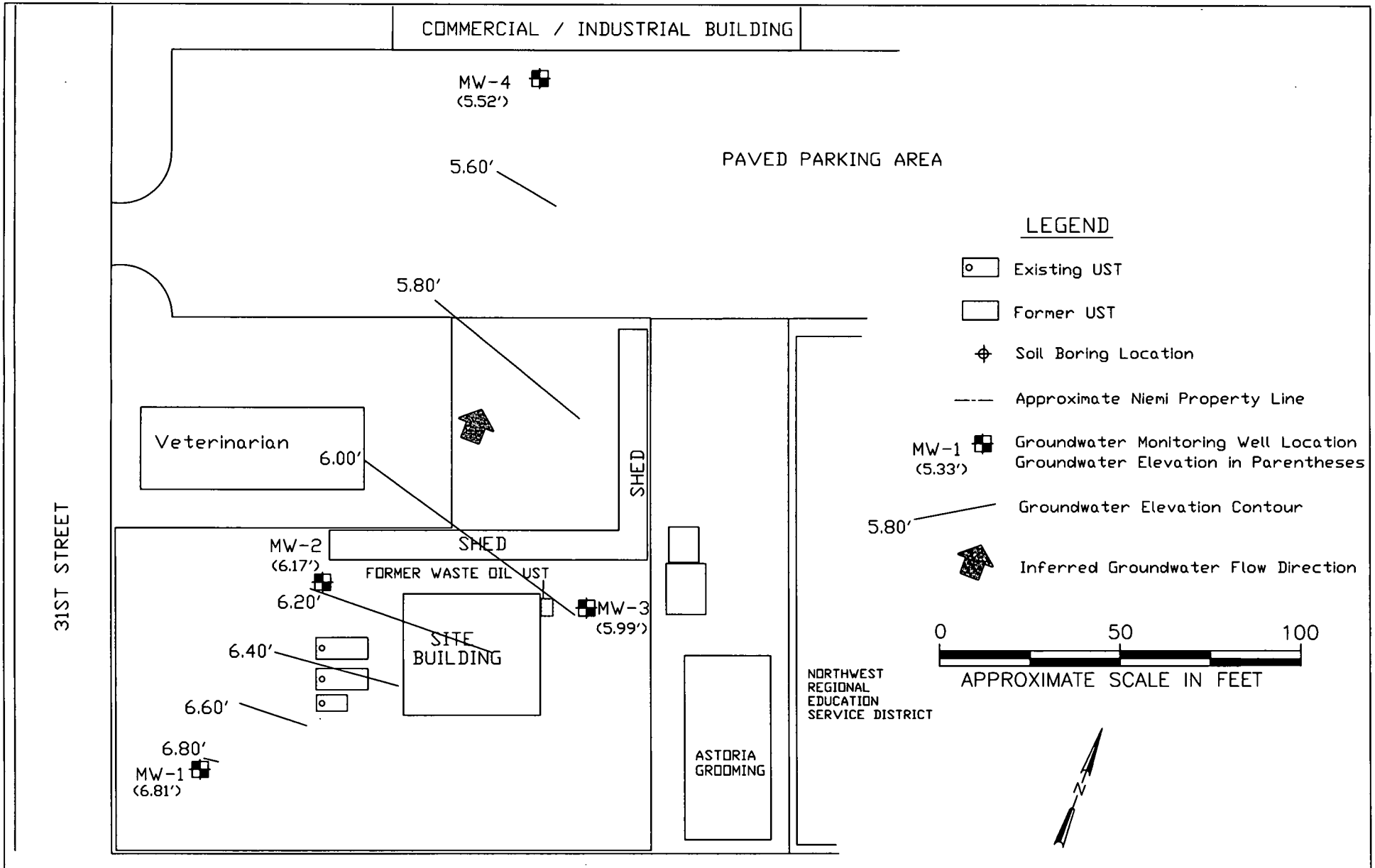


RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

GROUNDWATER FLOW MAP
January 31, 2008
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

FIGURE 3

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		12/12/07	Figure 3 - GW FLOW



RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

GROUNDWATER FLOW MAP
MAY 29, 2008
HIWAY SERVICE 76 STATION
ASTORIA, OREGON

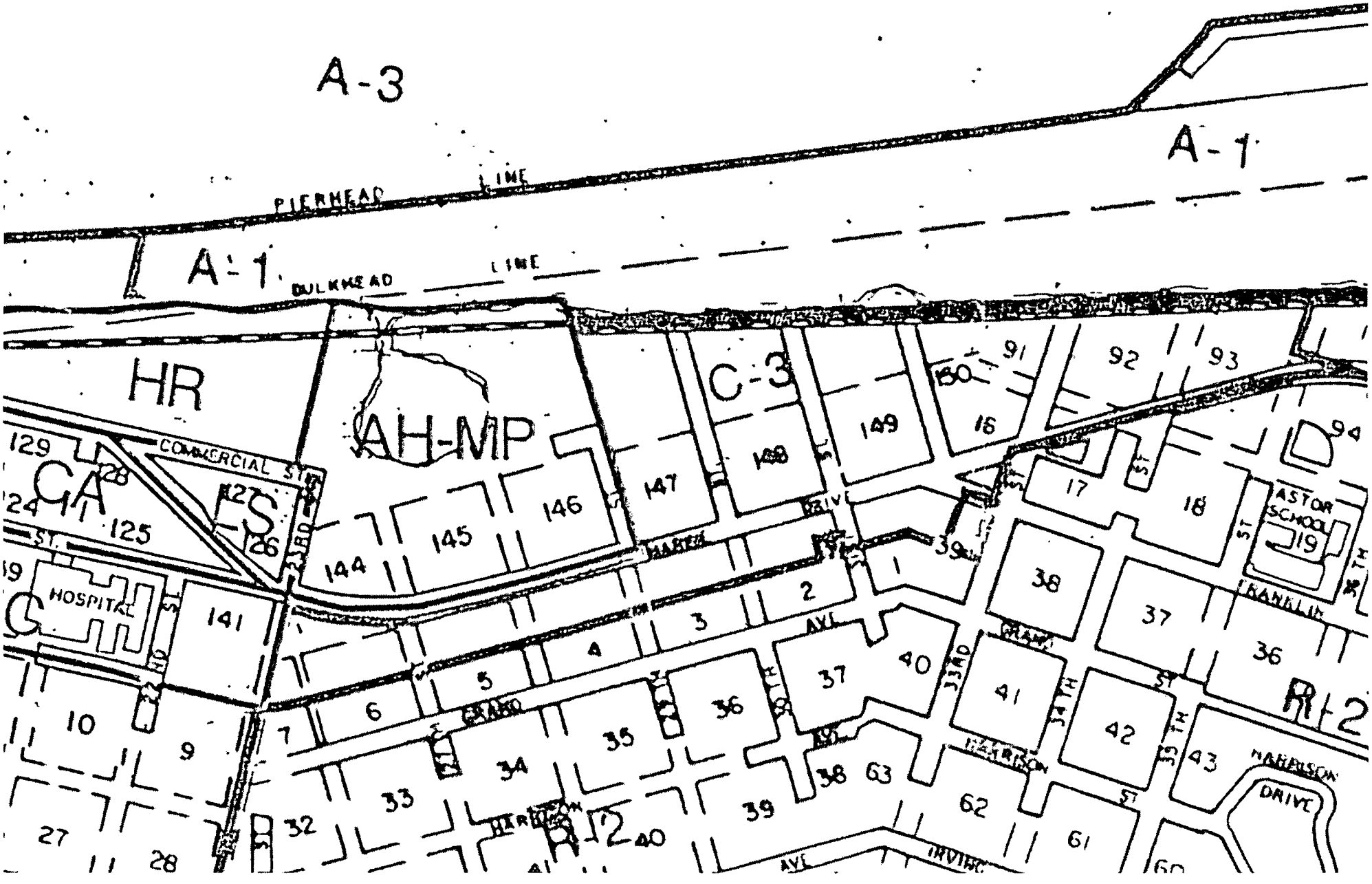
FIGURE 3

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
DEB		6/38/07	Figure 3 - GW FLOW

G

APPENDIX G

ZONING


A-3
A-1
PIERHEAD LINE
A-1
BULKHEAD LINE
HR
AH-MP
C-3
CA
CS
COMMERCIAL ST.
HOSPITAL
MARKET
GRAND
HARRISON
FRANKLIN
ASTOR SCHOOL
DRIVE
AVE.
ST.
R-2
129
125
126
144
145
146
147
148
149
150
141
1
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C-3: GENERAL COMMERCIAL ZONE

2.385. PURPOSE.

This zone is primarily for a wide range of commercial businesses, including most of those allowed in other commercial zones. Compared to the C-4 Zone, the C-3 Zone is more appropriate for uses requiring a high degree of accessibility to vehicular traffic, low intensity uses on large tracts of land, most repair services, and small warehousing and wholesaling operations. Unlike the C-4 Zone, there are maximum lot coverage, landscaping, and off-street parking requirements for all uses.

2.390. USES PERMITTED OUTRIGHT.

The following uses and their accessory uses are permitted in a C-3 Zone if the Community Development Director determines that the uses will not violate standards referred to in Sections 2.400 through 2.415, additional Development Code provisions, the Comprehensive Plan, and other City laws:

1. Business service establishment.
2. Commercial laundry or dry cleaning establishment.
3. Commercial or public off-street parking lot.
4. Communication service establishment.
5. Construction service establishment.
6. Eating and drinking establishment.
7. Educational service establishment.
8. Family day care center in single-family, two-family, or multi-family dwelling.
9. Home occupation in existing dwelling.
10. Motel, hotel, bed and breakfast, inn, or other tourist lodging facility and associated uses.
11. Multi-family dwelling.

12. Personal service establishment.

13. Professional service establishment.

14. Public or semi-public use.

15. Repair service establishment, not including automotive, heavy equipment, or other major repair services.

16. Residential facility.

17. Retail sales establishment.

18. Single-family and two-family dwelling, located above or below the first floor of new or existing structures, with commercial facilities on the first floor of the structure.

(Section 2.390(18) amended by Ordinance 00-08, 9-6-00)

19. Transportation service establishment.

20. Conference Center.

(Section 2.390(20) added by Ordinance 94-06, 6-6-94)

21. Indoor family entertainment or recreation establishment.

(Section 2.390(21) added by Ordinance 98-01, 1-5-98)

2.395. CONDITIONAL USES PERMITTED.

The following uses and their accessory uses are permitted in a C-3 Zone if the Planning Commission, after a public hearing, determines that the location and development plans comply with applicable standards referred to in Sections 2.400 through 2.415, additional Development Code provisions, the Comprehensive Plan, and other City laws:

1. Animal hospital or kennel.

2. Automotive sales or service establishment.

3. Day care center.

4. Gasoline service station.

5. Hospital.

6. *(Section 2.395(6) deleted by Ordinance 98-01, 1-5-98)*

7. Light Manufacturing.

8. Recycling establishment.

9. Repair service establishment not allowed as an Outright Use.

10. Temporary use meeting the requirements of Sections 3.240.

11. Wholesale trade or warehouse establishment.

2.400. LOT COVERAGE.

Buildings will not cover more than 90 percent of the lot area.

2.405. LANDSCAPED OPEN AREA.

A minimum of 10 percent of the total lot area will be maintained as a landscaped open area.

2.410. HEIGHT OF STRUCTURES.

No structure will exceed a height of 45 feet above grade.

2.415. OTHER APPLICABLE USE STANDARDS.

1. Landscaping shall meet the requirements of Sections 3.105 through 3.120.

2. When a commercial use in a C-3 Zone abuts a lot in a residential zone, there will be an attractively designed and maintained buffer of at least five (5) feet in width, which can be in the form of hedges, fencing, or walls.

3. Outdoor storage areas will be enclosed by appropriate vegetation, fencing, or walls. This requirement does not apply to outdoor retail sales areas.

4. Where feasible, joint access points and parking facilities for more than one use should be established. This standard does not apply to multi-family residential developments.

5. All uses will comply with access, parking, and loading standards in Article 7.

6. Conditional uses will meet the requirements in Article 11.

7. Signs will comply with requirements in Article 8.

8. All structures will have storm drainage facilities that are channeled into the public storm drainage system or a natural drainage system approved by the City Engineer. Developments affecting natural drainage shall be approved by the City Engineer.

9. Where new development is within 100 feet of a known landslide hazard, a site investigation report will be prepared by a registered geologist. Recommendations contained in the site report will be incorporated into the building plans.

10. For uses located within the Astor-East Urban Renewal District, refer to the Urban Renewal Plan for additional standards.

H

APPENDIX H

WATER SUPPLY WELL SEARCH RESULTS

Well Log Query Results

Township: 8 N, Range: 9 W, Sections: 7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24, Type of Log: W

Well Log	T-R-S/ QQ-Q	Taxlot	Street of Well	Owner	Company	Special Standards	Well Type	First Water	Completed Depth	Static Water Level	Yield	Completed Date	Received Date	Bonded Constructor	Startcard	Well Id #	New	Abandon	Deepen	Alteration	Conversion	Domestic	Irrigation	Community	Livestock	Industrial	Injection	Thermal	Dewatering	Piezometer
CLAT_287	8.00N-9.00W-7 -		W MARINE DR, ASTORIA		NORTHWEST NATURAL GAS CO., RECT 238 220 NW SECOND AVE PORTLAND OR 97209		W		0.00			05/09/1986	06/11/1986	HANSEN, JIM J HANSEN DRILLING CO. INC.			√														
CLAT_292	8.00N-9.00W-18 -		MARINE DR (TAYLOR AVE) & FRANKFERT		NORTHWEST NATURAL GAS CO. 220 NW SECOND AVE PORTLAND OR 97209		W		0.00			08/26/1985	09/05/1985	HANSEN, JIM J HANSEN DRILLING CO. INC.			√														
CLAT_293	8.00N-9.00W-21 -	900		MILIKEN, RON 1118 S HOLIDAY SEASIDE OR 97138			W		240.00	140.0	4.0	11/09/1987	12/30/1987	MCMULLEN, M MCMULLEN DRILLING			√					√									
CLAT_294	8.00N-9.00W-24 -			SPRAUGE, JAMES ASTORIA OR 97103			W		200.00		0.0	06/06/1972	07/03/1972	WILLIAMS, W T WILLIAMS WELL DRILLING CO.			√					√									
COLU_2657	8.00N-9.00W-10 -				N W NATURAL GAS CO. RECT 193 OR		W	0.00	400.00	0.0		09/20/1988	10/28/1988	HANSEN, JIM J			√														
CLAT_51030	8.00N-9.00W-23 NW-NW	1300	GRIMSTAD RD; JOHN DAY RIVER RD	GRAFF, NICK 121 SW WILLOW LANE ASTORIA OR 97103			W	130.00	140.00	3.0	10.0	04/26/2000	07/05/2000	MCMULLEN, ARTHUR D MCMULLEN DRILLING CORP.	126411	37007	√					√									
CLAT_51153	8.00N-9.00W-21 NE-NW	3000	92931 HWY 202	GOWING, KATHLEEN PO BOX 1239 ASTORIA OR 97103			W	97.00	185.00	82.0	5.0	06/04/2001	06/18/2001	EVEY, LARRY C LARRY EVEY WELL DRILLING	134374	43021	√					√									
CLAT_51810	8.00N-9.00W-7 NE-SW	2800	210 W MARINE DR, ASTORIA	DION, BRIAN 88786 BLUE HERRON RD GEARHART OR 97138		√	W	6.00	0.00	7.0		10/10/2003	10/23/2003	KNUTSON, BILL K & S ENVIRONMENTAL	42681	61721		√													
CLAT_51811	8.00N-9.00W-7 NE-SW	2800	210 W MARINE DR, ASTORIA	DION, BRIAN 88786 BLUE HERRON RD GEARHART OR 97138		√	W	6.00	0.00	7.0		10/10/2003	10/23/2003	KNUTSON, BILL K & S ENVIRONMENTAL	42682	54928		√													
CLAT_51812	8.00N-9.00W-7 NE-SW	2800	210 W MARINE DR, ASTORIA	DION, BRIAN 88786 BLUE HERRON RD GEARHART OR 97138		√	W	6.00	0.00	7.0		10/10/2003	10/23/2003	KNUTSON, BILL K & S ENVIRONMENTAL	42683	54937		√													

1 2

Report a problem with the web page or a well log
Download Data
Return to Well Log Query

Well Log Query Results

Township: 8 N, Range: 9 W, Sections: 7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24, Type of Log: W

Well Log	T-R-S/ QQ-Q	Taxlot	Street of Well	Owner	Company	Special Standards	Well Type	First Water	Completed Depth	Static Water Level	Yield	Completed Date	Received Date	Bonded Constructor	Startcard	Well Id #	New	Abandon	Deepen	Alteration	Conversion	Domestic	Irrigation	Community	Livestock	Industrial	Injection	Thermal	Dewatering	Piezometer
CLAT_51813	8.00N-9.00W-7 NE-SW	2800	210 W MARINE DR, ASTORIA	DION, BRIAN 88786 BLUE HERRON RD GEARHART OR 97138		√	W	6.00	0.00	7.0		10/10/2003	10/23/2003	KNUTSON, BILL K & S ENVIRONMENTAL	42684	61725		√												
CLAT_51814	8.00N-9.00W-7 NE-SW	2800	210 W MARINE DR, ASTORIA	DION, BRIAN 88786 BLUE HERRON RD GEARHART OR 97138		√	W	6.00	0.00	7.0		10/10/2003	10/23/2003	KNUTSON, BILL K & S ENVIRONMENTAL	42685	63023		√												

1 2

Report a problem with the web page or a well log
Download Data
Return to Well Log Query

RECEIVED

JUN 11 1986

WATER RESOURCES DEPT
SALEM, OREGON

CLAT 287

8N/9W-7 Monitoring 2

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

(1) OWNER:

Owner's Well Number:

Name Northwest Natural Gas Co. Rect. # 238

Address 220 N.W. Second Ave.

City Portland State Oregon Zip 97209

(2) TYPE OF WORK: Cathodic Protection

☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:

☐ Rotary Air ☒ Rotary Mud ☐ Cable ☐

NOT A WATER WELL

(4) PROPOSED USE:

☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☒ Other Groundbed

(5) BORE HOLE CONSTRUCTION:

Depth of Completed Well 0 ft.

Special Standards date of approval

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
4	0	20	cement	0	20	8 sks.
8 3/4	20	400	cccc			

How was seal placed? Method ☐ A ☐ B ☒ C ☐ D ☐ E

☐ Other

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	10	0	20	.250	☒	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:

☐ Perforations Method

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Pumping level	Drill stem at	Time
			1 hr

NOT A WATER WELL

Temperature of water Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata:

(9) LOCATION OF WELL by legal description:

County Clatsop Latitude ' " Longitude ' "

Township 8 n N or S, Range 9 w E or W, WM.

Section 7 ¼ ¼

Tax Lot Lot Block Subdivision

Street Address of Well (or nearest address) NWNG Service Center W. Marine Dr. Astoria

(10) STATIC WATER LEVEL:

ft. below land surface. Date

Artesian pressure lb. per square inch. Date

(11) WELL LOG:

Ground elevation

Material	From	To	WB?	SWL
Fill, concrete, rebar, asphalt	0	8		
Sandy clay & wood	8	26		
Clay & gravel	26	34		
Broken rock	34	40		
Broken rock & clay	40	65		
Mudstone	65	110		
Sandstone	110	115		
Sandy mudstone	115	140		
Shaly mudstone little sand mix	140	400		

NOT A WATER WELL

Date started May 7, 1986 Completed May 9, 1986

(unbonded) Water Well Constructor Certification:

I constructed this well in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

NOT A WATER WELL

Signed Date

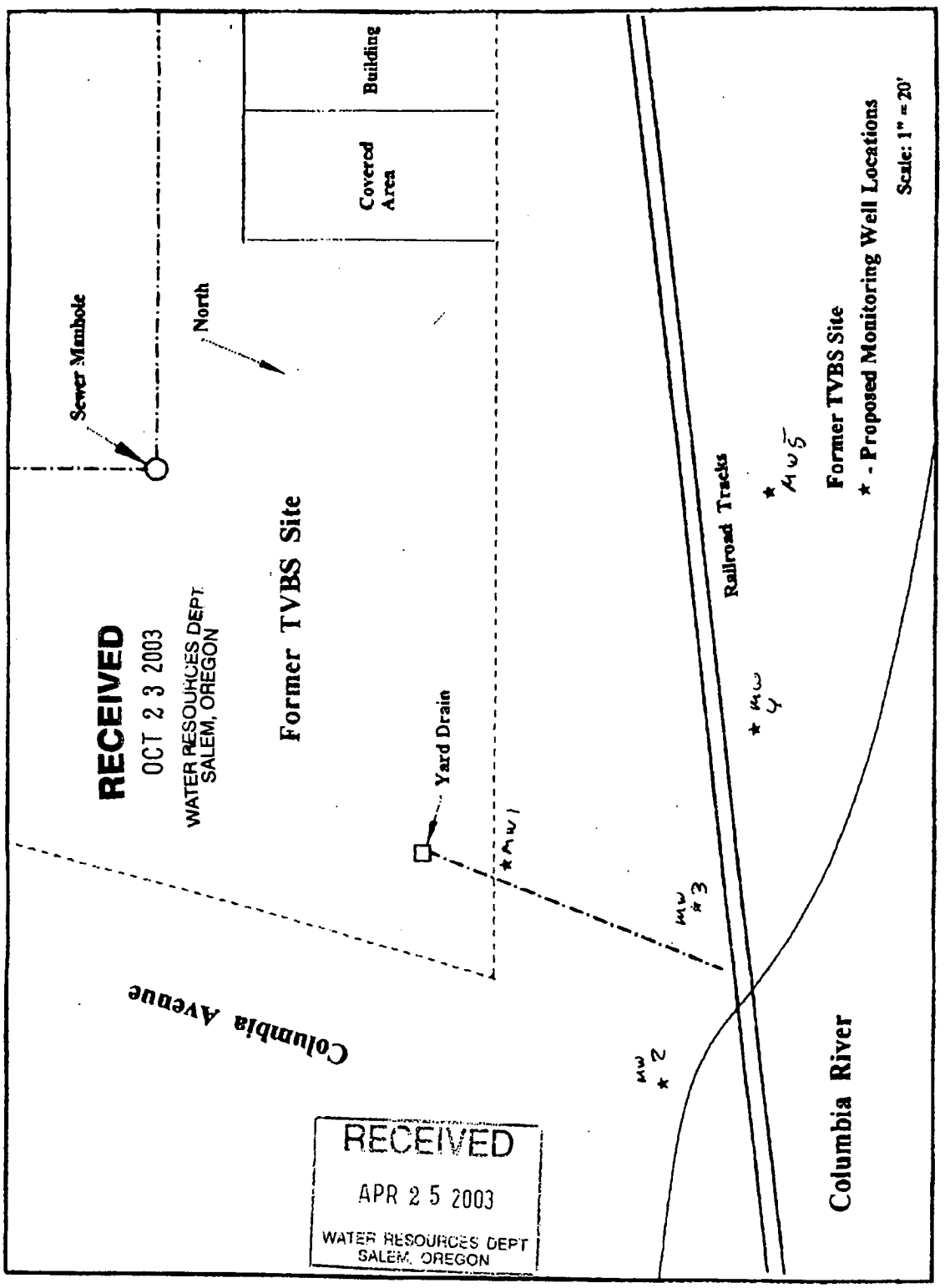
(bonded) Water Well Constructor Certification:

I accept responsibility for construction of this well and its compliance with all Oregon water well standards. This report is true to the best of my knowledge and belief.

Signed Jim J. Hansen Date May 12, 1986

Company Hansen Drilling Co. Inc. Co. Job No. Rect. #238

9809C 10/85



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SALEM, OREGON

CLAT 51814

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OAR 690-240-095)

Instructions for completing this report are on the last page of this form.

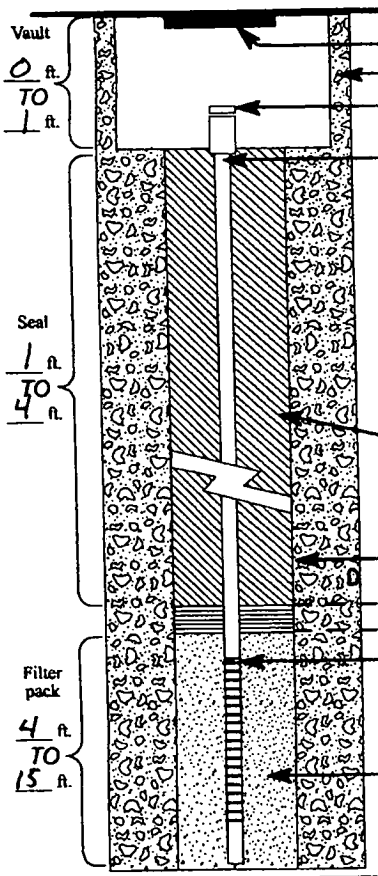
Well I.D. #: L 63023
Start Card #: 42685

(1) OWNER/PROJECT:
WELL NO. MW-5
Name Brian Dion
Address 88786 Blue Heron Rd.
City Cresbart State OR Zip 97138

(2) TYPE OF WORK:
☐ New construction ☐ Alteration (Repair/Recondition)
☐ Conversion ☐ Deepening ☒ Abandonment

(3) DRILLING METHOD:
☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger ☒ Other Push Probe

(4) BORE HOLE CONSTRUCTION:
Special Standards Yes ☒ No ☐ Depth of completed well 15 ft.



Casing diameter 0.75 in. material PVC
Welded ☐ Threaded ☒ Glued ☐
Liner diameter N/A in. material
Welded ☐ Threaded ☐ Glued ☐
Well Seal: Material Bentonite Amount 8 lbs
Grout Weight
Borehole diameter 2.125 in.
Screen material PVC w/ Mesh Screen
interval(s): From 5' To 15' From To
Slot size .010 in.
Filter Pack: Material Prepack Size 20/40 in.

(5) WELL TEST:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian
Permeability Yield GPM
Conductivity pH
Temperature of Water °F Depth artesian flow found ft.
Was water analysis done? ☐ Yes ☐ No
By whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks
Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description
Well Location: County Clatsop
Township 8N N Range 9W E Section 7
1. NE ¼ of SW ¼ of above section.
2. Either Street address of well location 210 W. Marine Dr. Astoria, OR
or Tax lot number of well location 2800
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:
7 Ft. below land surface Date 10/10/03
Artesian Pressure lb/sq in. Date

(8) WATER BEARING ZONES:
Depth at which water was first found

From	To	Est. Flow Rate	SWL
6'	15	1gpm	

(9) WELL LOG:
Ground elevation

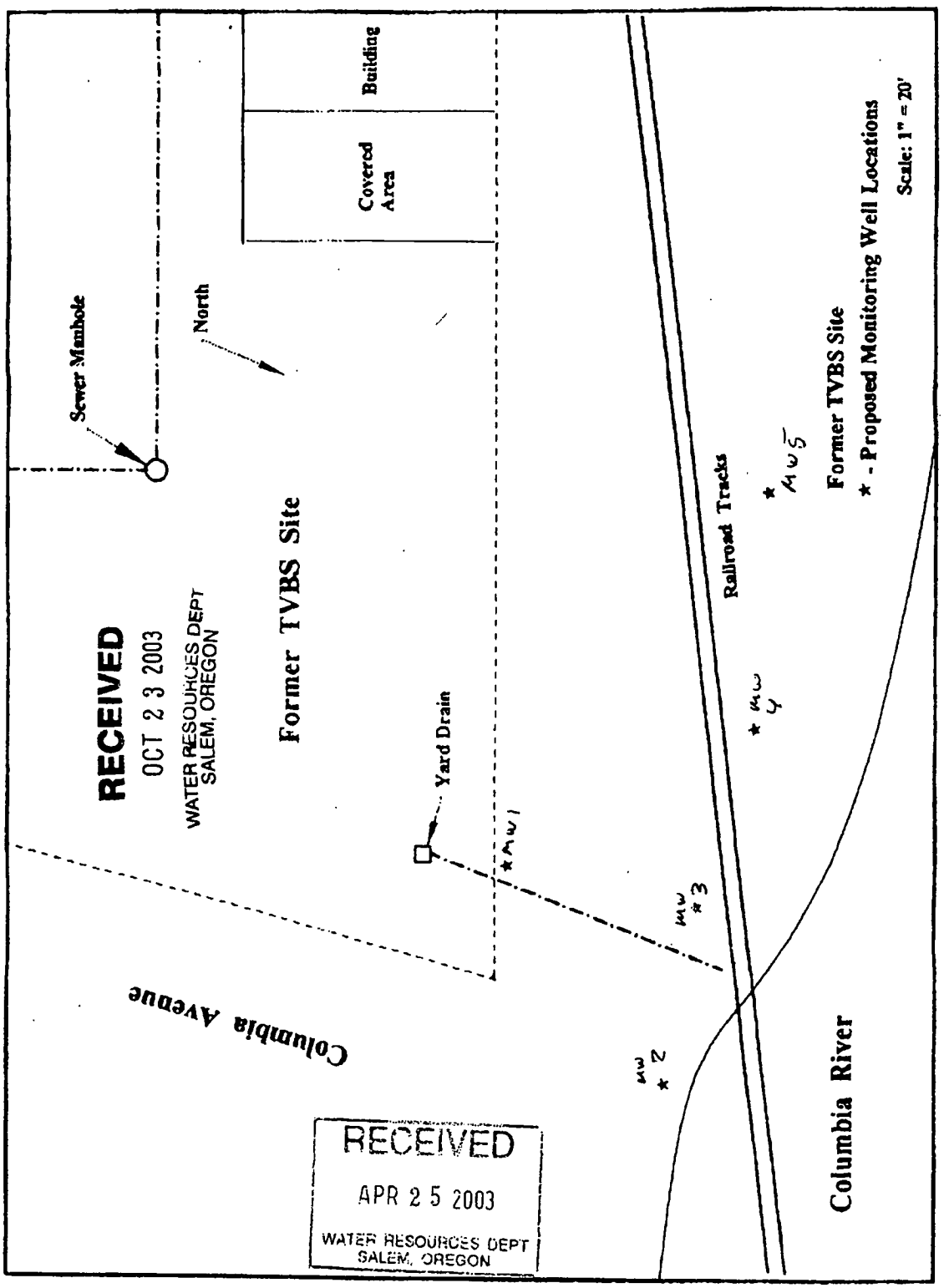
Material	From	To	SWL
Brown Sand	0	15'	7'
Well Abandoned by filling casing w/ 3/8" chip bentonite & removing monuments.			

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WATER RESOURCES DEPT
SALEM, OREGON

Date started 10/10/03 Completed 10/10/03

(unbonded) Monitor Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.
MWC Number 10149
Signed [signature] Date 10/21/03

(bonded) Monitor Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
MWC Number 10149
Signed [signature] Date 10/21/03



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SALEM, OREGON

CLAT 51813

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OAR 690-240-095)

Instructions for completing this report are on the last page of this form.

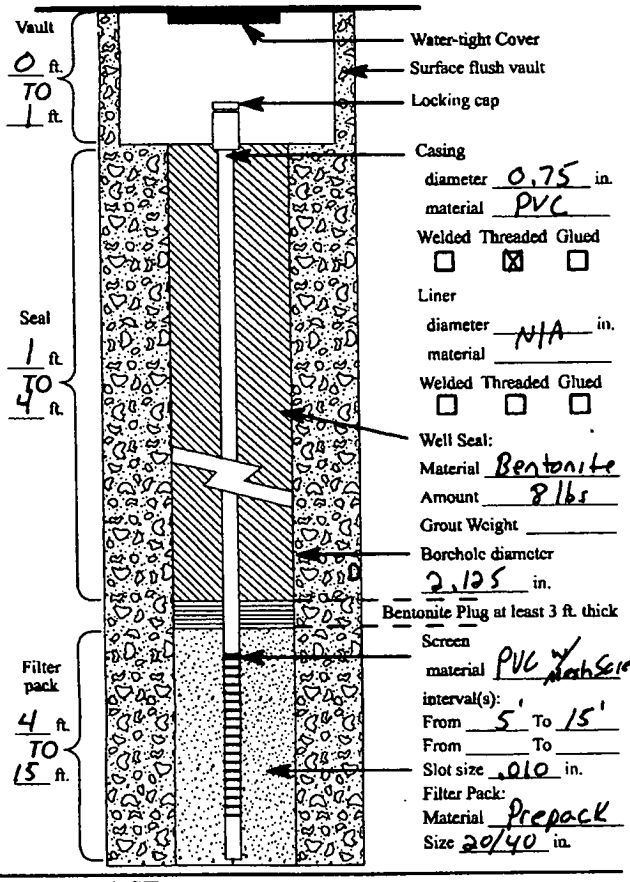
Well I.D. #: L 61725
Start Card #: 42684

(1) OWNER/PROJECT:
WELL NO. MW-4
Name Brian Dion
Address 88786 Blue Heron Rd.
City Gearhart State OR Zip 97138

(2) TYPE OF WORK:
☐ New construction ☐ Alteration (Repair/Recondition)
☐ Conversion ☐ Deepening ☒ Abandonment

(3) DRILLING METHOD:
☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger ☒ Other Push Probe

(4) BORE HOLE CONSTRUCTION:
Special Standards Yes ☒ No ☐ Depth of completed well 15 ft.



(5) WELL TEST:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian
Permeability _____ Yield _____ GPM
Conductivity _____ pH _____
Temperature of Water _____ °F Depth artesian flow found _____ ft.
Was water analysis done? ☐ Yes ☐ No
By whom? _____
Depth of strata to be analyzed. From _____ ft. to _____ ft.
Remarks _____
Name of supervising Geologist/Engineer _____

(6) LOCATION OF WELL By legal description
Well Location: County Clatsop
Township 8N N Range 9W E Section 7
1. NE ¼ of SW ¼ of above section.
2. Either Street address of well location 210 W. Marine Dr. Astoria, OR
or Tax lot number of well location 2800
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:
7 Ft. below land surface Date 10/10/03
Artesian Pressure _____ lb/sq in. Date _____

(8) WATER BEARING ZONES:
Depth at which water was first found _____

From	To	Est. Flow Rate	SWL
6'	15	1gpm	

(9) WELL LOG:
Ground elevation _____

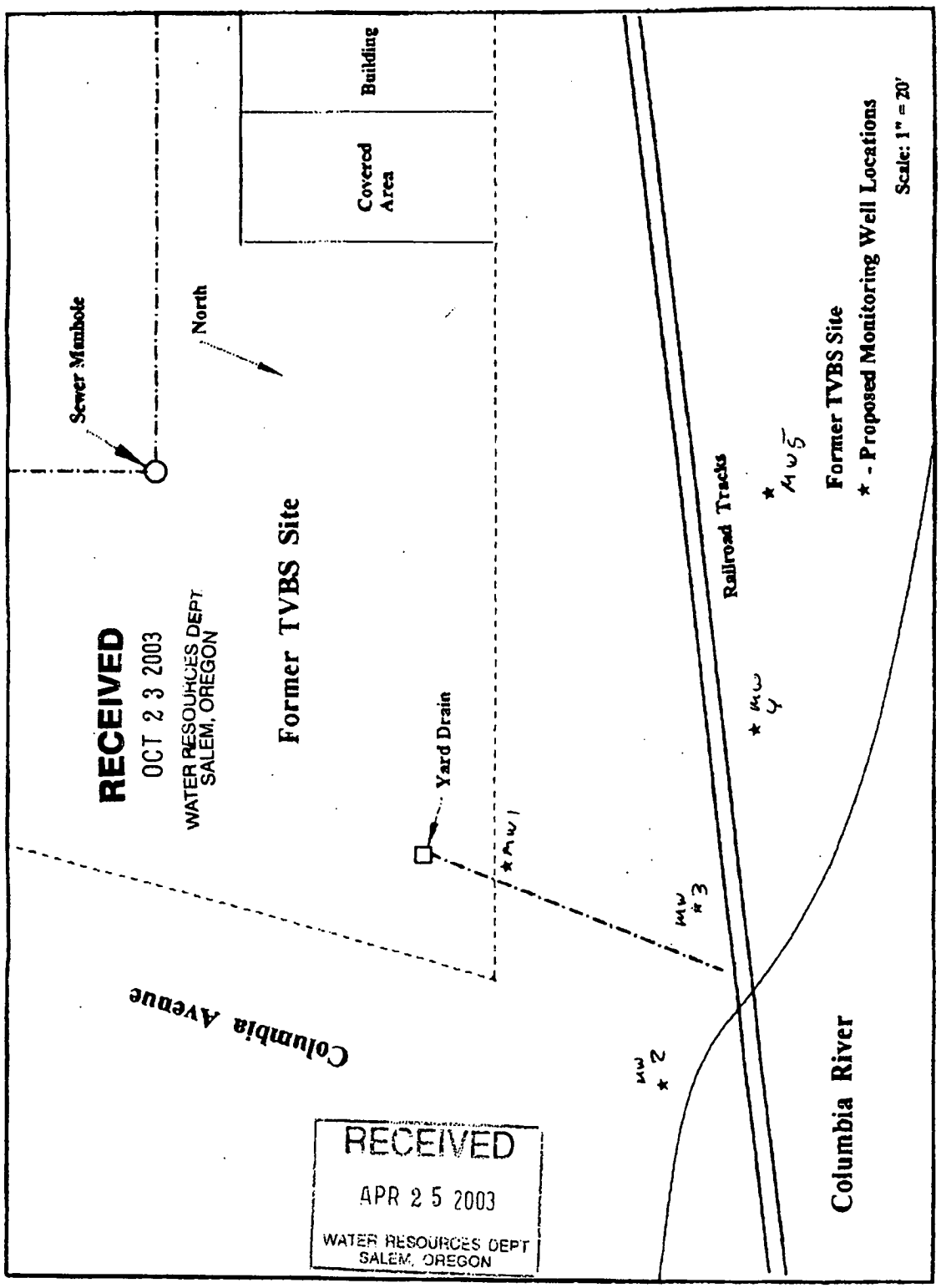
Material	From	To	SWL
Brown Sand	0	15'	7'
Well Abandoned by filling casing w/ 3/8" chip bentonite & removing monuments.			

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WATER RESOURCES DEPT
SALEM, OREGON

Date started 10/10/03 Completed 10/10/03

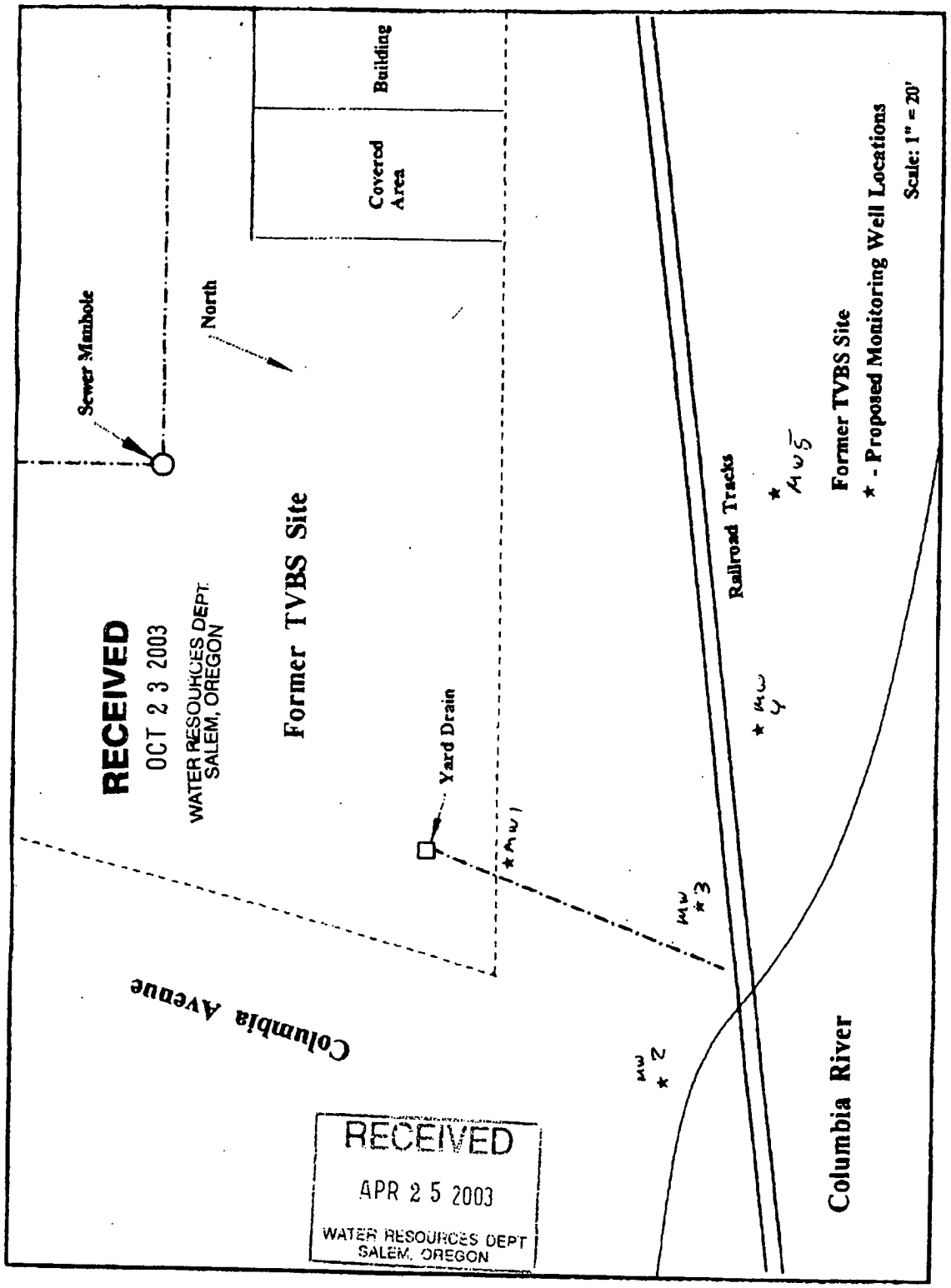
(unbonded) Monitor Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.
MWC Number 10149
Signed [signature] Date 10/21/03

(bonded) Monitor Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
MWC Number 10149
Signed [signature] Date 10/21/03



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SALEM, OREGON

CLAT 51810

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OAR 690-240-095)

Instructions for completing this report are on the last page of this form.

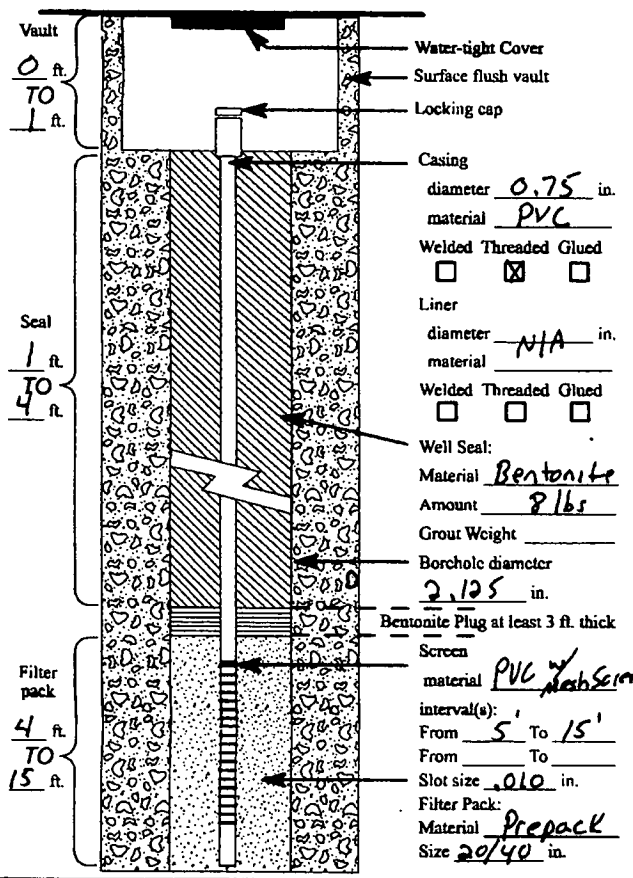
Well I.D. #: L 61721
Start Card #: 42681

(1) OWNER/PROJECT:
WELL NO. MW-1
Name Brian Dion
Address 88786 Blue Heron Rd.
City Gearhart State OR Zip 97138

(2) TYPE OF WORK:
☐ New construction ☐ Alteration (Repair/Recondition)
☐ Conversion ☐ Deepening ☒ Abandonment

(3) DRILLING METHOD:
☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger ☒ Other Push Probe

(4) BORE HOLE CONSTRUCTION:
Special Standards Yes ☒ No ☐ Depth of completed well 15 ft.



(5) WELL TEST:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian
Permeability Yield GPM
Conductivity pH
Temperature of Water °F Depth artesian flow found ft.
Was water analysis done? ☐ Yes ☐ No
By whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks
Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description
Well Location: County Clatsop
Township 8N N Range 9W E Section 7
1. NE ¼ of SW ¼ of above section.
2. Either Street address of well location 210 W. Marine Dr. Astoria, OR
or Tax lot number of well location 2800
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:
7 Ft. below land surface Date 10/10/03
Artesian Pressure lb/sq in. Date

(8) WATER BEARING ZONES:
Depth at which water was first found

From	To	Est. Flow Rate	SWL
6'	15	1gpm	

(9) WELL LOG:
Ground elevation

Material	From	To	SWL
Brown Sand	0	15'	7'
Well Abandoned by filling casing w/ 3/8" chip bentonite & removing monuments.			

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WATER RESOURCES DEPT.
SALEM, OREGON

Date started 10/10/03 Completed 10/10/03

(unbonded) Monitor Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.
Signed [signature] MWC Number 10149 Date 10/21/03

(bonded) Monitor Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
Signed [signature] MWC Number 10149 Date 10/21/03

CLAT 51811

STATE OF OREGON
MONITORING WELL REPORT

(as required by ORS 537.765 & OAR 690-240-095)
Instructions for completing this report are on the last page of this form.

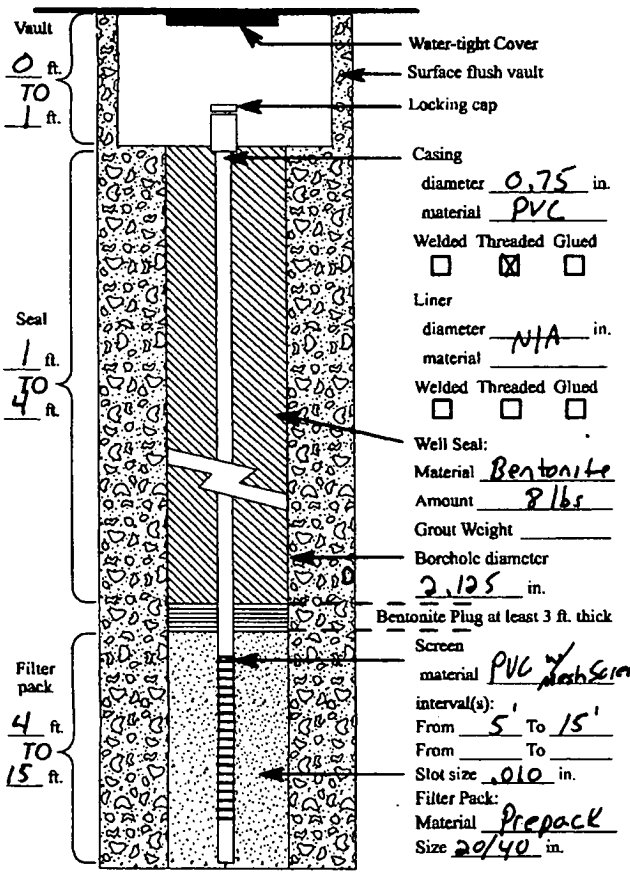
Well I.D. #: L 54928
Start Card #: 42682

(1) OWNER/PROJECT:
WELL NO. MW-2
Name Brian Dion
Address 88786 Blue Heron Rd.
City Cearhart Ice State OR Zip 97138

(2) TYPE OF WORK:
☐ New construction ☐ Alteration (Repair/Recondition)
☐ Conversion ☐ Deepening ☒ Abandonment

(3) DRILLING METHOD:
☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger ☒ Other Push Probe

(4) BORE HOLE CONSTRUCTION:
Special Standards Yes ☒ No ☐ Depth of completed well 15 ft.



(5) WELL TEST:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian
Permeability Yield GPM
Conductivity pH
Temperature of Water °F Depth artesian flow found ft.
Was water analysis done? ☐ Yes ☐ No
By whom?
Depth of strata to be analyzed. From ft. to ft.
Remarks
Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description
Well Location: County Clatsop
Township 8N N Range 9W E Section 7
1. NE ¼ of SW ¼ of above section.
2. Either Street address of well location 210 W. Marine Dr. Astoria, OR
or Tax lot number of well location 2800
3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:
7 Ft. below land surface Date 10/10/03
Artesian Pressure lb/sq in. Date

(8) WATER BEARING ZONES:
Depth at which water was first found

From	To	Est. Flow Rate	SWL
6'	15	1gpm	

(9) WELL LOG:
Ground elevation

Material	From	To	SWL
Brown Sand	0	15'	7'
Well Abandoned by filling casing w/ 3/8" chip bentonite & removing monuments.			

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OCT 23 2003
WATER RESOURCES DEPT.
SALEM, OREGON

Date started 10/10/03 Completed 10/10/03

(unbonded) Monitor Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.
Signed Bill Rust MWC Number 10149 Date 10/21/03

(bonded) Monitor Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
Signed Bill Rust MWC Number 10149 Date 10/21/03

REC CLAT
51163

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

WELL I.D. # 43041
START CARD # 134374

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER
Name Kathleen Gunning
Address PO Box 1239
City Astoria County Oregon Zip 97103

(2) TYPE OF WORK
(3) DRILL METHODS
(4) PROPOSED USE
(5) BORE HOLE CONSTRUCTION
Special Construction approved ☐ Yes ☒ No Depth of Completed well 185 ft.
Explosives used ☐ Yes ☒ No Type _____ Amount _____

Diameter	From	To	Material	From	To	Sacks or pounds
10	0	20	Bentonite	0	20	32
6	20	185				

How was seal placed: Method ☐A ☐B ☐C ☐D ☐E
Other Placed in Any 4 Predded
Backfill placed from _____ ft. to _____ ft. Material _____
Gravel placed from _____ ft. to _____ ft. Size of gravel _____

(6) CASING/LINER

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing	6	+2	95	250	X	☐	X	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner	4½	165	185	160	☐	X	☐	☐
					☐	☐	☐	☐

Drive shoe used ☐ Inside ☒ Outside ☐ None
Final location of shoe(s) 98

(7) PERFORATIONS/SCREENS
Perforations Method Drilled
Screens Type _____ Material _____

From	To	Slot size	Number	Diameter	Casing	Liner
165	185	—	240	5/8	☐	☒
					☐	☐
					☐	☐
					☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
Flowing ☐ Artesian
Pump ☐ Bailer ☒ Air ☐ Flowing Artesian
Yield gal/min | Drawdown | Drill stem at | Time
5 | 68 | 120 | 1 hr
Temperature of water 55 Depth Artesian Flow Found _____
Was a water analysis done? ☐ Yes By whom _____
Did any strata contain water not suitable for intended use? ☐ Too little ☐ Too salty ☐ Too hard ☐ Too much sand ☐ Other
Depth of strata _____

(9) LOCATION OF WELL by legal description:
County Clatsop Longitude _____
Township 8N N or S Range 9W E or W WM
Section 31 NE ¼ NW ¼
Tax Lot 3600 Lot _____ Block _____ Subdivision _____
Street Address of Well or nearest address 92931 Hwy 202

(10) STATIC WATER LEVEL:
83 ft. below land surface. Date 6-4-01
Artesian pressure _____ lb. per square inch Date _____

(11) WATER BEARING ZONES:
Depth at which water was first found 97

From	To	Estimated Flow Rate	SWL
97	98	1	98
151	185	5	83

(12) WELL LOG:
Ground Elevation _____

Material	From	To	SWL
Yellow clay	0	13	
Red Grey Sandstone	13	185	83

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WATER RESOURCES DEPT
SALEM, OREGON

Date started 6-1-01 Completed 6-4-01
(unbonded) Water Well Constructor Certification:
I certify that all work I performed on this construction, deepening, alteration or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number _____
Signed _____ Date _____
(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 1231
Signed Larry C Gray Date 6-4-01

ORIGINAL - WATER RESOURCES DEPARTMENT FIRST COPY - CONSTRUCTOR SECOND COPY - CUSTOMER

CLAT
51030

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

WELL I.D. # L 37007
START CARD # 126411

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number 2
Name NICK GRAFF
Address 121 SW WILLOW LN
City ASTORIA State OR Zip 97103

(2) TYPE OF WORK
[X] New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
[X] Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger
☐ Other

(4) PROPOSED USE:
[X] Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes [X] No Depth of Completed Well 140 ft.
Explosives used ☐ Yes ☐ No Type _____ Amount _____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10"	0	20	Bentonite	0	20	10 Sacks
6"	20	140				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
[X] Other POUR
Backfill placed from ____ ft. to ____ ft. Material _____
Gravel placed from ____ ft. to ____ ft. Size of gravel _____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+1	30	250	[X]	☐	[X]	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	4"	-10	140		☐	[X]	[X]	☐
					☐	☐	☐	☐

Final location of shoe(s) SD

(7) PERFORATIONS/SCREENS:
[X] Perforations Method DRILL HOLE
☐ Screens Type _____ Material _____

From	To	Slot size	Number	Diameter	Telescope size	Casing	Liner
100	140	1/2	1RT	4		☐	[X]
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer [X] Air ☐ Flowing Artesian
Yield gal/min | Drawdown | Drill stem at | Time
10 GPM | | 140 | 1 hr.

Temperature of water 52° Depth Artesian Flow Found _____
Was a water analysis done? ☐ Yes By whom _____
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____
Depth of strata: _____

(9) LOCATION OF WELL by legal description:
County CLATSOP Latitude _____ Longitude _____
Township 8N N or S Range 9W E or W WM
Section 23 NW 1/4 NW 1/4
Tax Lot 1300 Lot _____ Block _____ Subdivision _____
Street Address of Well (or nearest address) Grimstad Rd; John Day River Rd Astoria, OR 97103

(10) STATIC WATER LEVEL:
-3 ft. below land surface. Date 4/26/00
Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:
Depth at which water was first found 130

From	To	Estimated Flow Rate	SWL
130	133	10	-5

(12) WELL LOG:
Ground Elevation _____

Material	From	To	SWL
CLAY BROWN	0	5	-3
CLAY GRAY SILTY	5	12	
CLAY STONE LT GRAY	12	140	

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OCT 17 2000
WATER RESOURCES DEPT.
SALEM, OREGON

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JUL 07 2000
WATER RESOURCES DEPT.
SALEM, OREGON

Date started 4/24/00 Completed 4/26/00

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number _____
Signed _____ Date _____

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 1480
Signed [signature] Date 4/26/00

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STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

COLU 2657

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OCT 28 1988

8N/9W/10

(1) OWNER:

Well Number: WATER

Name N.W. Natural Gas Co. Rect. 193

Address 220 NW. Second Ave.

City Portland State Ore. Zip 97209

(2) TYPE OF WORK: Cathodic Protection

☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD

☐ Rotary Air ☒ Rotary Mud ☐ Cable

☐ Other

(4) PROPOSED USE:

☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☒ Other Ground bed

(5) BORE HOLE CONSTRUCTION:

Special Construction approval Yes ☐ No ☒ Depth of Completed Well 0 ft.

Explosives used Yes ☐ No ☒ Type _____ Amount _____

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
7 7/8"	0	20	cement	0	20	8 sks.
8 3/4"	20	400				

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E

☐ Other

Backfill placed from _____ ft. to _____ ft. Material _____

Gravel placed from _____ ft. to _____ ft. Size of gravel _____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	10"	0	20	.250	☒	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐

NOT A WATER WELL

Final location of shoe(s)

PERFORATIONS/SCREENS:

☐ Perforations Method

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

NOT A WATER WELL

Yield gal/min	Drawdown	Drill stem at	Time
			1 hr.

Temperature of water _____ Depth Artesian Flow Found _____

Was a water analysis done? ☐ Yes By whom _____

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other _____

Depth of strata: _____

(9) LOCATION OF WELL by legal description:

County XXXXXXX Clatsop Latitude _____ Longitude _____

Township 8 N N or S, Range 9W E or W, WM.

Section 10 ¼ ¼

Tax Lot _____ Lot _____ Block _____ Subdivision _____

Street Address of Well (or nearest address) Leif Erickson Dr

(10) STATIC WATER LEVEL:

_____ ft. below land surface. Date _____

Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:

NOT A WATER WELL

Depth at which water was first found _____

From	To	Estimated Flow Rate	SWL

(12) WELL LOG:

Ground elevation _____

Material	From	To	SWL
Brown clay	0	5	
Grey-blue clay	5	16	
Brown clay, little rock	16	23	
Grey shale, clay	23	390	
Grey rock	390	400	

NOT A WATER WELL

Date started Sept. 13,88 Completed Sept. 20,88

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

Signed Tim Jones WWC Number 1446

Date

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. all work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

Signed Jon J. Hansen WWC Number 841

Date 9-27-88

RECEIVED OCT 27 1988

WHITE COPIES - WATER RESOURCES DEPARTMENT YELLOW COPY - CONSTRUCTOR PINK COPY - CUSTOMER 9809C 10/86

NOTICE TO WATER WELL CONTRACTOR: The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

RECEIVED JUL 3 1972 STATE ENGINEER SALEM OREGON

WATER WELL REPORT
STATE OF OREGON

(Please type or print) (Do not write above this line)

CLAT 24

State Well No. 8N/9W-24 & 25

State Permit No. .....

(1) OWNER:
Name James Sprauge
Address Astoria Oregon

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

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

(5) CASING INSTALLED:
Threaded ☐ Welded ☒
6 " Diam. from 0 ft. to 30 ft. Gage 250
" Diam. from ..... ft. to ..... ft. Gage .....
" Diam. from ..... ft. to ..... ft. Gage .....

(6) PERFORATIONS:
Perforated? ☐ Yes ☒ No.
Type of perforator used
Size of perforations in. by in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.
Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " " "
" " " " "
Bailer test 0 gal./min. with 0 ft. drawdown after 0 hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION:
Well seal—Material used Cement
Well sealed from land surface to 22 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 4 sacks
Number of sacks of bentonite used in well seal ..... sacks
Brand name of bentonite .....
Number of pounds of bentonite per 100 gallons of water ..... lbs./100 gals.
Was a drive shoe used? ☒ Yes ☐ No Plugs ..... Size: location ..... ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

(10) LOCATION OF WELL:
County Clatsop Driller's well number .....
¼ ¼ Section 24 & 25 T. 8N R. 9W W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found No water ft.
Static level — ft. below land surface. Date 6-6-72
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 6
Depth drilled 200 ft. Depth of completed well 200 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. *Report each change in position of Static Water Level and indicate principal water-bearing strata.*

MATERIAL	From	To	SWL
Yellow Clay	0	26	
Blue Sandrock	26	200	
No water			
Well capped			

Work started 5-25 1972 Completed 6-6 1972
Date well drilling machine moved off of well 6-6 1972

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Delbert T. Mercier (Drilling Machine Operator) Date 6-29-, 1972
Drilling Machine Operator's License No. 575

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Williams Well Drilling Co (Person, firm or corporation) (Type or print)
Address Rt 1 Box 128 Toledo, WN
[Signed] W. T. Williams (Water Well Contractor)
Contractor's License No. 455 Date 6-13, 1972

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45658-119

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

RECEIVED
DEC 30 1987
WATER RESOURCES DEPT
SALEM, OREGON

CLAT 293

8N/9W-21

(1) OWNER:

Owner's Well Number

Name RON MILLER

Address 115 S HOLIDAY

City SEASIDE State ORE Zip 97138

(2) TYPE OF WORK:

☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:

☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Other

(4) PROPOSED USE:

☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:

Depth of Completed Well 240 ft.

Special Standards date of approval

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
10	0	25	CEMENT	0	30	10 SACKS
6	25	240				

How was seal placed? Method ☐ A ☐ B ☒ C ☐ D ☐ E

☐ Other

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6	+1	80	250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	4½	+1	240	160	☐	☒	☒	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:

NONE

☐ Perforations Method

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Pumping level	Drill stem at	Time
5	160	240	½ hr
A	160	240	1 hr

Temperature of water Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata:

(9) LOCATION OF WELL by legal description:

County CLATSOP Latitude ' " Longitude ' "

Township 8N N or S, Range 9W E or W, WM.

Section 21 ¼ ¼

Tax Lot 300 Lot Block Subdivision

Street Address of Well (or nearest address)

(10) STATIC WATER LEVEL:

140 ft. below land surface. Date 11-9-87

Artesian pressure lb. per square inch. Date

(11) WELL LOG:

Ground elevation

Material	From	To	WB?	SWL
BROWN SOIL	0	2		
BROWN CLAY	2	8		
YELLOW CLAY	8	15		
BROWN SAND & STONE	15	35		
TAN SAND STONE	35	60		
BROWN CLAY STONE	60	110		
GREY SAND STONE	110	220		
BROWN SAND STONE	220	230		160
GREY SANDSTONE	230	245		140

Date started 11-5-87 Completed 11-9-87

(unbonded) Water Well Constructor Certification:

I constructed this well in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

Signed Date

(bonded) Water Well Constructor Certification:

I accept responsibility for construction of this well and its compliance with all Oregon water well standards. This report is true to the best of my knowledge and belief.

Signed Date 11-10-87

Company MCMULLEN DRILLING Co. Job No.

9809C 10/85

APPENDIX I

LABORATORY ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION – SEPTEMBER 11, 2008

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210
ORELAP#: OR100021

September 29, 2008

Brad Berggren
RSV Engineering, Inc.
31960 SW Charbonneau Drive - Suite 101
Wilsonville, OR 97070

RE: Niemi Hiway Service

Enclosed are the results of analyses for samples received by the laboratory on 09/11/08 18:40. The following list is a summary of the Work Orders contained in this report, generated on 09/29/08 15:39.

If you have any questions concerning this report, please feel free to contact me.

Work Order	Project	ProjectNumber
PRI0439	Niemi Hiway Service	03-135

TestAmerica Portland

Christina Woodcock For Darrell Auvil, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.

RECEIVED

JUN 11 1986

WATER RESOURCES DEPT
SALEM, OREGON

CLAT 287

8N/9W-7
Monitoring 2

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

(1) OWNER:

Owner's Well Number:

Name Northwest Natural Gas Co. Rect. # 238

Address 220 N.W. Second Ave.

City Portland State Oregon Zip 97209

(2) TYPE OF WORK: Cathodic Protection

☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:

☐ Rotary Air ☒ Rotary Mud ☐ Cable ☐

NOT A WATER WELL

(4) PROPOSED USE:

☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☒ Other Groundbed

(5) BORE HOLE CONSTRUCTION:

Depth of Completed Well 0 ft.

Special Standards date of approval

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
4	0	20	cement	0	20	8 sks.
8 3/4	20	400	cccc			

How was seal placed? Method ☐ A ☐ B ☒ C ☐ D ☐ E

☐ Other

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	10	0	20	.250	☒	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:

☐ Perforations Method

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

NOT A WATER WELL

Yield gal/min	Pumping level	Drill stem at	Time
			1 hr

Temperature of water Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata:

(9) LOCATION OF WELL by legal description:

County Clatsop Latitude ' " Longitude ' "

Township 8 n N or S, Range 9 W E or W, WM.

Section 7 ¼ ¼

Tax Lot Lot Block Subdivision

Street Address of Well (or nearest address) NWNG Service Center W. Marine Dr. Astoria

(10) STATIC WATER LEVEL:

ft. below land surface. Date

Artesian pressure lb. per square inch. Date

(11) WELL LOG:

Ground elevation

Material	From	To	WB?	SWL
Fill, concrete, rebar, asphalt	0	8		
Sandy clay & wood	8	26		
Clay & gravel	26	34		
Broken rock	34	40		
Broken rock & clay	40	65		
Mudstone	65	110		
Sandstone	110	115		
Sandy mudstone	115	140		
Shaly mudstone little sand mix	140	400		

NOT A WATER WELL

Date started May 7, 1986 Completed May 9, 1986

(unbonded) Water Well Constructor Certification:

I constructed this well in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

Signed Date

(bonded) Water Well Constructor Certification:

I accept responsibility for construction of this well and its compliance with all Oregon water well standards. This report is true to the best of my knowledge and belief.

Signed John J Hansen Date May 12, 1986

Company Hansen Drilling Co. Inc. Co. Job No. Rect. #238

9809C 10/85

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

RECEIVED
SEP 05 1985
WATER RESOURCES DEPT
SALEM, OREGON

CLAT
292

PLEASE TYPE or PRINT IN INK

8N/9W-18
(for official use only)

(1) OWNER:
Name Northwest Natural Gas
Address 220 NW. Secound Ave.
City POrtland State Oregon

(2) TYPE OF WORK (check): Groundbed Cathodic Protection
New Well XX Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☐ Driven ☐
Rotary Mud XX Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (Check): Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Thermal ☐ Injection ☐ Livestock ☐ Domestic Supply ☐ Other: ☐ Dewatering ☐ Reinjection ☐ Monitoring XX Grounding ☐ Test ☐

NOT A WATER WELL

(5) CASING INSTALLED: Steel XX Threaded ☐ Plastic ☐ Welded ☐
10 " Diam. from 0 ft. to 20 ft. Gauge .250
" Diam. from ft. to ft. Gauge

LINER INSTALLED: Steel ☐ Threaded ☐ Plastic ☐ Welded ☐
" Diam. from ft. to ft. Gauge

(6) PERFORATIONS: Perforated? ☐ Yes ☐ No
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☐ Yes ☐ No
Manufacturer's Name
Type Model
Diam. Slot Size Set from ft. to ft.
Diam. Slot Size Set from ft. to ft.

NOT A WATER WELL

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☐ No If yes, by whom?
gal./min. with ft. drawdown after hrs.
Air test gal./min. with drill stem at ft. hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION: Special standards: Yes ☐ No ☐
Well seal—Material used Cement
Well sealed from land surface to 20 ft.
Diameter of well bore to bottom of seal 14 in.
Diameter of well bore below seal 8 3/4 in.
Amount of sealing material 8 sacks XX pounds ☐
How was cement grout placed? Pumped

NOT A WATER WELL

Was pump installed? Type HP Depth
Was a drive shoe used? ☐ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☐ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☐ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL by legal description:
County Clatsop ¼ ¼ of Section 18 of
Township T 8 W (Township is North or South), Range R 9 W (Range is East or West), WM.
Tax Lot Lot Block Subdivision
MAILING ADDRESS OF WELL (or nearest address) On Marine Dr. (Taylor Ave) & Frankfert St.
Astoria

NOT A WATER WELL

(11) WATER LEVEL of COMPLETED WELL:
Depth at which water was first found ft.
Static level ft. below land surface. Date
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing
Depth drilled 350 ft. Depth of completed well 08 ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Base rock for road	0	3	
Clay brown	3	15	
Sand wood & little gravel	15	31	
Gravel sand & wood	31	40	
Clay	40	50	
Mudstone layers mostly clay	50	190	
Shale & mudstone mixed little clay layers	190	350	

NOT A WATER WELL

Date work started 8-22-85 /completed 8-26-85
Date well drilling machine moved off of well 8-26-85 19

(unbonded) Water Well Constructor Certification (if applicable):
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Date , 19

(bonded) Water Well Constructor Certification:
Bond # 68-0130-19384-82-1 Issued by: UFS&G (Surety Company Name)
On behalf of Hansen Drilling CO. Inc. Jim Hansen (type or print name of Water Well Constructor)

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
(Signed) Jim Hanson (Water Well Constructor)
(Dated) August 28, 1985

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP*46866-690

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	09/29/08 15:39

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	PRI0439-01	Water	09/11/08 07:10	09/11/08 18:40
MW-2	PRI0439-02	Water	09/11/08 08:15	09/11/08 18:40
MW-3	PRI0439-03	Water	09/11/08 09:00	09/11/08 18:40
MW-4	PRI0439-04	Water	09/11/08 06:30	09/11/08 18:40

TestAmerica Portland

Christina M. Woodcock

Christina Woodcock For Darrell Auvil, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	09/29/08 15:39

Gasoline Hydrocarbons per NW TPH-Gx Method

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PRI0439-01 (MW-1)			**Water**			**Sampled: 09/11/08 07:10**				
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	-----	80.0	ug/l	1x	8090444	09/12/08 10:09	09/12/08 20:37	
Surrogate(s): 4-BFB				*91.5%*		*50 - 150 %*	"		"	
PRI0439-02 (MW-2)			**Water**			**Sampled: 09/11/08 08:15**				
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	-----	80.0	ug/l	1x	8090444	09/12/08 10:09	09/12/08 21:05	
Surrogate(s): 4-BFB				*88.7%*		*50 - 150 %*	"		"	
PRI0439-03 (MW-3)			**Water**			**Sampled: 09/11/08 09:00**				
Gasoline Range Hydrocarbons	NW TPH-Gx	**1090**	-----	80.0	ug/l	1x	8090444	09/12/08 10:09	09/13/08 00:17	
Surrogate(s): 4-BFB				*275%*		*50 - 150 %*	"		"	*ZX*
PRI0439-04 (MW-4)			**Water**			**Sampled: 09/11/08 06:30**				
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	-----	80.0	ug/l	1x	8090444	09/12/08 10:09	09/13/08 00:44	
Surrogate(s): 4-BFB				*94.3%*		*50 - 150 %*	"		"	

TestAmerica Portland

Christina M. Woodcock

Christina Woodcock For Darrell Auvil, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	09/29/08 15:39

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PRI0439-01 (MW-1)				**Water**			**Sampled: 09/11/08 07:10**			
Diesel Range Organics	NWTPH-Dx	ND	-----	0.238	mg/l	1x	8090539	09/16/08 13:10	09/16/08 16:55	
Heavy Oil Range Hydrocarbons	"	ND	-----	0.476	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane				*73.2%*		*50 - 150 %*	"			"
PRI0439-02 (MW-2)				**Water**			**Sampled: 09/11/08 08:15**			
Diesel Range Organics	NWTPH-Dx	ND	-----	0.238	mg/l	1x	8090539	09/16/08 13:10	09/16/08 17:16	
Heavy Oil Range Hydrocarbons	"	ND	-----	0.476	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane				*82.1%*		*50 - 150 %*	"			"
PRI0439-03 (MW-3)				**Water**			**Sampled: 09/11/08 09:00**			
Diesel Range Organics	NWTPH-Dx	**1.95**	-----	0.238	mg/l	1x	8090539	09/16/08 13:10	09/16/08 17:36	**Q9**
Heavy Oil Range Hydrocarbons	"	ND	-----	0.476	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane				*86.6%*		*50 - 150 %*	"			"
PRI0439-04 (MW-4)				**Water**			**Sampled: 09/11/08 06:30**			
Diesel Range Organics	NWTPH-Dx	ND	-----	0.238	mg/l	1x	8090539	09/16/08 13:10	09/16/08 17:56	
Heavy Oil Range Hydrocarbons	"	ND	-----	0.476	"	"	"	"	"	
Surrogate(s): 1-Chlorooctadecane				*84.1%*		*50 - 150 %*	"			"

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Christina Woodcock For Darrell Auvil, Project Manager

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PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	09/29/08 15:39

Selected Volatile Organic Compounds (Including BTEX) per EPA Method 8260B

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PR10439-01 (MW-1)				**Water**			**Sampled: 09/11/08 07:10**			
1,2-Dibromoethane	EPA 8260B	ND	-----	0.500	ug/l	1x	8090593	09/17/08 09:00	09/17/08 15:06	
1,2-Dichloroethane	"	ND	-----	0.500	"	"	"	"	"	
Benzene	"	ND	-----	0.200	"	"	"	"	"	
Toluene	"	ND	-----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	2.00	"	"	"	"	"	
Naphthalene	"	ND	-----	2.00	"	"	"	"	"	
1,2,4-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
1,3,5-Trimethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Isopropylbenzene	"	ND	-----	2.00	"	"	"	"	"	
n-Propylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Surrogate(s):	*4-BFB*			*97.8%*		*80 - 120 %*	"			"
	1,2-DCA-d4			*95.3%*		*80 - 120 %*	"			"
	Dibromofluoromethane			*97.0%*		*80 - 120 %*	"			"
	Toluene-d8			*102%*		*80 - 120 %*	"			"
PR10439-02 (MW-2)				**Water**			**Sampled: 09/11/08 08:15**			
1,2-Dibromoethane	EPA 8260B	ND	-----	0.500	ug/l	1x	8090593	09/17/08 09:00	09/17/08 15:33	
1,2-Dichloroethane	"	ND	-----	0.500	"	"	"	"	"	
Benzene	"	ND	-----	0.200	"	"	"	"	"	
Toluene	"	ND	-----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	2.00	"	"	"	"	"	
Naphthalene	"	ND	-----	2.00	"	"	"	"	"	
1,2,4-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
1,3,5-Trimethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Isopropylbenzene	"	ND	-----	2.00	"	"	"	"	"	
n-Propylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Surrogate(s):	*4-BFB*			*95.6%*		*80 - 120 %*	"			"
	1,2-DCA-d4			*89.7%*		*80 - 120 %*	"			"
	Dibromofluoromethane			*93.6%*		*80 - 120 %*	"			"
	Toluene-d8			*98.8%*		*80 - 120 %*	"			"

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	09/29/08 15:39

Selected Volatile Organic Compounds (Including BTEX) per EPA Method 8260B

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PRI0439-03 (MW-3)			Water			Sampled: 09/11/08 09:00				
1,2-Dibromoethane	EPA 8260B	ND	-----	0.500	ug/l	1x	8090593	09/17/08 09:00	09/17/08 16:00	
1,2-Dichloroethane	"	ND	-----	0.500	"	"	"	"	"	
Benzene	"	**78.3**	-----	0.200	"	"	"	"	"	
Toluene	"	**0.940**	-----	0.500	"	"	"	"	"	
Ethylbenzene	"	**4.19**	-----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	2.00	"	"	"	"	"	
Naphthalene	"	ND	-----	2.00	"	"	"	"	"	
1,2,4-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
1,3,5-Trimethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Isopropylbenzene	"	**36.3**	-----	2.00	"	"	"	"	"	
n-Propylbenzene	"	**72.4**	-----	0.500	"	"	"	"	"	
Surrogate(s):	*4-BFB*			*98.0%*		*80 - 120 %*	"			"
	1,2-DCA-d4			*89.2%*		*80 - 120 %*	"			"
	Dibromofluoromethane			*89.9%*		*80 - 120 %*	"			"
	Toluene-d8			*98.3%*		*80 - 120 %*	"			"
PRI0439-04RE1 (MW-4)			Water			Sampled: 09/11/08 06:30				
1,2-Dibromoethane	EPA 8260B	ND	-----	0.500	ug/l	1x	8090757	09/22/08 10:00	09/22/08 20:27	
1,2-Dichloroethane	"	ND	-----	0.500	"	"	"	"	"	
Benzene	"	ND	-----	0.200	"	"	"	"	"	
Toluene	"	ND	-----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	-----	1.00	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	2.00	"	"	"	"	"	
Naphthalene	"	ND	-----	2.00	"	"	"	"	"	
1,2,4-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
1,3,5-Trimethylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Isopropylbenzene	"	ND	-----	2.00	"	"	"	"	"	
n-Propylbenzene	"	ND	-----	0.500	"	"	"	"	"	
Surrogate(s):	*4-BFB*			*87.8%*		*80 - 120 %*	"			"
	1,2-DCA-d4			*111%*		*80 - 120 %*	"			"
	Dibromofluoromethane			*101%*		*80 - 120 %*	"			"
	Toluene-d8			*101%*		*80 - 120 %*	"			"

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31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	09/29/08 15:39

Polynuclear Aromatic Compounds per EPA 8270M-SIM

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PR10439-03 (MW-3)			**Water**			**Sampled: 09/11/08 09:00**				
Acenaphthene	EPA 8270m	ND	-----	0.0952	ug/l	1x	8090559	09/16/08 15:20	09/19/08 23:03	
Acenaphthylene	"	ND	-----	0.0952	"	"	"	"	"	
Anthracene	"	ND	-----	0.0952	"	"	"	"	"	
Benzo (a) anthracene	"	ND	-----	0.0952	"	"	"	"	"	
Benzo (a) pyrene	"	ND	-----	0.0952	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	-----	0.0952	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	-----	0.0952	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	-----	0.0952	"	"	"	"	"	
Chrysene	"	ND	-----	0.0952	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	-----	0.190	"	"	"	"	"	
Fluoranthene	"	ND	-----	0.0952	"	"	"	"	"	
Fluorene	"	ND	-----	0.0952	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	-----	0.0952	"	"	"	"	"	
Naphthalene	"	**0.809**	-----	0.0952	"	"	"	"	"	
Phenanthrene	"	ND	-----	0.0952	"	"	"	"	"	
Pyrene	"	ND	-----	0.0952	"	"	"	"	"	
Surrogate(s): Fluorene-d10				*79.1%*		*25 - 125 %*	"			"
Pyrene-d10				*80.3%*		*23 - 150 %*	"			"
Benzo (a) pyrene-d12				*62.1%*		*10 - 125 %*	"			"

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31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	09/29/08 15:39

Gasoline Hydrocarbons per NW TPH-Gx Method - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8090444 **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8090444-BLK1)								Extracted: 09/12/08 10:09						
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	---	80.0	ug/l	1x	--	--	--	--	--	--	09/12/08 15:34	
Surrogate(s): 4-BFB		*Recovery: 88.6%*			*Limits: 50-150%*	"							*09/12/08 15:34*	
LCS (8090444-BS2)								Extracted: 09/12/08 10:09						
Gasoline Range Hydrocarbons	NW TPH-Gx	469	---	80.0	ug/l	1x	--	500	93.7%	(70-130)	--	--	09/12/08 18:20	
Surrogate(s): 4-BFB		*Recovery: 100%*			*Limits: 50-150%*	"							*09/12/08 18:20*	
LCS Dup (8090444-BSD2)								Extracted: 09/12/08 10:09						
Gasoline Range Hydrocarbons	NW TPH-Gx	479	---	80.0	ug/l	1x	--	500	95.9%	(70-130)	2.30%	(35)	09/12/08 18:48	
Surrogate(s): 4-BFB		*Recovery: 103%*			*Limits: 50-150%*	"							*09/12/08 18:48*	
Duplicate (8090444-DUP1)						QC Source: PRI0432-01		Extracted: 09/12/08 10:09						
Gasoline Range Hydrocarbons	NW TPH-Gx	16300	---	800	ug/l	10x	17200	--	--	--	5.33%	(35)	09/12/08 11:50	
Surrogate(s): 4-BFB		*Recovery: 148%*			*Limits: 50-150%*	*1x*							*09/12/08 11:50*	
Duplicate (8090444-DUP2)						QC Source: PRI0444-01		Extracted: 09/12/08 10:09						
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	---	80.0	ug/l	1x	ND	--	--	--	NR	(35)	09/12/08 19:43	
Surrogate(s): 4-BFB		*Recovery: 93.5%*			*Limits: 50-150%*	"							*09/12/08 19:43*	

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	09/29/08 15:39

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8090539 **Water Preparation Method: EPA 3510 Fuels**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8090539-BLK1)								Extracted: 09/16/08 13:10						
Diesel Range Organics	NWTPH-Dx	ND	---	0.250	mg/l	1x	--	--	--	--	--	--	09/16/08 15:34	
Heavy Oil Range Hydrocarbons	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 77.4%*			*Limits: 50-150%*	"							*09/16/08 15:34*	
LCS (8090539-BS1)								Extracted: 09/16/08 13:10						
Diesel Range Organics	NWTPH-Dx	2.43	---	0.250	mg/l	1x	--	2.50	97.1%	(50-150)	--	--	09/16/08 15:54	
Heavy Oil Range Hydrocarbons	"	1.63	---	0.500	"	"	--	1.50	108%	"	--	--	"	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 91.3%*			*Limits: 50-150%*	"							*09/16/08 15:54*	
LCS Dup (8090539-BSD1)								Extracted: 09/16/08 13:10						
Diesel Range Organics	NWTPH-Dx	2.31	---	0.250	mg/l	1x	--	2.50	92.6%	(50-150)	4.76%	(35)	09/16/08 16:15	
Heavy Oil Range Hydrocarbons	"	1.52	---	0.500	"	"	--	1.50	102%	"	6.60%	"	"	
Surrogate(s): 1-Chlorooctadecane		*Recovery: 86.7%*			*Limits: 50-150%*	"							*09/16/08 16:15*	

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31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	09/29/08 15:39

Selected Volatile Organic Compounds (Including BTEX) per EPA Method 8260B - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8090593 **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8090593-BLK1)								Extracted: 09/17/08 09:00						
1,2-Dibromoethane	EPA 8260B	ND	---	0.500	ug/l	1x	--	--	--	--	--	--	09/17/08 11:57	
1,2-Dichloroethane	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Benzene	"	ND	---	0.200	"	"	--	--	--	--	--	--	"	
Toluene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Ethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Xylenes (total)	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
Methyl tert-butyl ether	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
Naphthalene	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
1,2,4-Trimethylbenzene	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
1,3,5-Trimethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Isopropylbenzene	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
n-Propylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Surrogate(s): 4-BFB		*Recovery: 91.1%*			*Limits: 80-120%*	"							*09/17/08 11:57*	
1,2-DCA-d4		*87.7%*			*80-120%*	"							"	
Dibromofluoromethane		*89.9%*			*80-120%*	"							"	
Toluene-d8		*96.5%*			*80-120%*	"							"	
LCS (8090593-BS1)								Extracted: 09/17/08 09:00						
1,2-Dibromoethane	EPA 8260B	19.9	---	0.500	ug/l	1x	--	20.0	99.6%	(80-140)	--	--	09/17/08 10:18	
1,2-Dichloroethane	"	18.5	---	0.500	"	"	--	"	92.6%	(75-135)	--	--	"	
Benzene	"	20.7	---	0.200	"	"	--	"	103%	(80-120)	--	--	"	
Toluene	"	19.8	---	0.500	"	"	--	"	99.2%	(80-125)	--	--	"	
Ethylbenzene	"	19.5	---	0.500	"	"	--	"	97.7%	(80-130)	--	--	"	
Xylenes (total)	"	59.9	---	1.00	"	"	--	60.0	99.8%	"	--	--	"	
Methyl tert-butyl ether	"	19.0	---	2.00	"	"	--	20.0	95.1%	(80-135)	--	--	"	
Naphthalene	"	21.0	---	2.00	"	"	--	"	105%	(60-150)	--	--	"	
1,2,4-Trimethylbenzene	"	20.4	---	1.00	"	"	--	"	102%	(75-125)	--	--	"	
1,3,5-Trimethylbenzene	"	19.2	---	0.500	"	"	--	"	95.9%	(75-135)	--	--	"	
Isopropylbenzene	"	19.5	---	2.00	"	"	--	"	97.6%	(80-140)	--	--	"	
n-Propylbenzene	"	20.4	---	0.500	"	"	--	"	102%	(80-130)	--	--	"	
Surrogate(s): 4-BFB		*Recovery: 98.1%*			*Limits: 80-120%*	"							*09/17/08 10:18*	
1,2-DCA-d4		*87.3%*			*80-120%*	"							"	
Dibromofluoromethane		*91.8%*			*80-120%*	"							"	
Toluene-d8		*99.0%*			*80-120%*	"							"	

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31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	09/29/08 15:39

Selected Volatile Organic Compounds (Including BTEX) per EPA Method 8260B - Laboratory Quality Control Results

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QC Batch: 8090593 **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
LCS Dup (8090593-BSD1)							Extracted: 09/17/08 09:00							
1,2-Dibromoethane	EPA 8260B	19.5	---	0.500	ug/l	1x	--	20.0	97.5%	(80-140)	2.13%	(25)	09/17/08 11:00	
1,2-Dichloroethane	"	18.1	---	0.500	"	"	--	"	90.4%	(75-135)	2.41%	"	"	
Benzene	"	20.2	---	0.200	"	"	--	"	101%	(80-120)	2.30%	"	"	
Toluene	"	19.6	---	0.500	"	"	--	"	98.2%	(80-125)	1.11%	"	"	
Ethylbenzene	"	19.2	---	0.500	"	"	--	"	96.1%	(80-130)	1.65%	"	"	
Xylenes (total)	"	58.3	---	1.00	"	"	--	60.0	97.2%	"	2.61%	"	"	
Methyl tert-butyl ether	"	18.6	---	2.00	"	"	--	20.0	92.9%	(80-135)	2.34%	"	"	
Naphthalene	"	20.2	---	2.00	"	"	--	"	101%	(60-150)	3.49%	"	"	
1,2,4-Trimethylbenzene	"	19.7	---	1.00	"	"	--	"	98.4%	(75-125)	3.59%	"	"	
1,3,5-Trimethylbenzene	"	18.7	---	0.500	"	"	--	"	93.6%	(75-135)	2.37%	"	"	
Isopropylbenzene	"	19.0	---	2.00	"	"	--	"	95.0%	(80-140)	2.65%	"	"	
n-Propylbenzene	"	19.9	---	0.500	"	"	--	"	99.4%	(80-130)	2.58%	"	"	
Surrogate(s):	*4-BFB*	*Recovery:*	*97.2%*		*Limits:*	*80-120%*	"						*09/17/08 11:00*	
	1,2-DCA-d4		*86.6%*			*80-120%*	"						"	
	Dibromofluoromethane		*92.4%*			*80-120%*	"						"	
	Toluene-d8		*99.0%*			*80-120%*	"						"	

QC Batch: 8090757 **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8090757-BLK1)							Extracted: 09/22/08 10:00							
1,2-Dibromoethane	EPA 8260B	ND	---	0.500	ug/l	1x	--	--	--	--	--	--	09/22/08 12:00	
1,2-Dichloroethane	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Benzene	"	ND	---	0.200	"	"	--	--	--	--	--	--	"	
Toluene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Ethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Xylenes (total)	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
Methyl tert-butyl ether	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
Naphthalene	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
1,2,4-Trimethylbenzene	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
1,3,5-Trimethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Isopropylbenzene	"	ND	---	2.00	"	"	--	--	--	--	--	--	"	
n-Propylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Surrogate(s):	*4-BFB*	*Recovery:*	*88.6%*		*Limits:*	*80-120%*	"						*09/22/08 12:00*	
	1,2-DCA-d4		*108%*			*80-120%*	"						"	
	Dibromofluoromethane		*101%*			*80-120%*	"						"	
	Toluene-d8		*99.6%*			*80-120%*	"						"	

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Christina Woodcock For Darrell Auvil, Project Manager

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ph: (503) 906.9200 fax: (503) 906.9210

RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	09/29/08 15:39

Selected Volatile Organic Compounds (Including BTEX) per EPA Method 8260B - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 8090757 **Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
LCS (8090757-BS1)									Extracted: 09/22/08 10:00					
1,2-Dibromoethane	EPA 8260B	19.7	---	0.500	ug/l	1x	--	20.0	98.4%	(80-140)	--	--	09/22/08 10:37	
1,2-Dichloroethane	"	21.0	---	0.500	"	"	--	"	105%	(75-135)	--	--	"	
Benzene	"	19.6	---	0.200	"	"	--	"	98.0%	(80-120)	--	--	"	
Toluene	"	19.2	---	0.500	"	"	--	"	96.1%	(80-125)	--	--	"	
Ethylbenzene	"	16.4	---	0.500	"	"	--	"	81.8%	(80-130)	--	--	"	
Xylenes (total)	"	49.6	---	1.00	"	"	--	60.0	82.7%	"	--	--	"	
Methyl tert-butyl ether	"	20.4	---	2.00	"	"	--	20.0	102%	(80-135)	--	--	"	
Naphthalene	"	17.2	---	2.00	"	"	--	"	86.2%	(60-150)	--	--	"	
1,2,4-Trimethylbenzene	"	16.6	---	1.00	"	"	--	"	83.1%	(75-125)	--	--	"	
1,3,5-Trimethylbenzene	"	16.8	---	0.500	"	"	--	"	84.0%	(75-135)	--	--	"	
Isopropylbenzene	"	16.3	---	2.00	"	"	--	"	81.5%	(80-140)	--	--	"	
n-Propylbenzene	"	16.8	---	0.500	"	"	--	"	84.1%	(80-130)	--	--	"	
Surrogate(s):	*4-BFB*	*Recovery:*	*89.6%*		*Limits:*	*80-120%*	"						*09/22/08 10:37*	
	1,2-DCA-d4		*109%*			*80-120%*	"						"	
	Dibromofluoromethane		*103%*			*80-120%*	"						"	
	Toluene-d8		*103%*			*80-120%*	"						"	
LCS Dup (8090757-BSD1)									Extracted: 09/22/08 10:00					
1,2-Dibromoethane	EPA 8260B	20.0	---	0.500	ug/l	1x	--	20.0	99.8%	(80-140)	1.46%	(25)	09/22/08 11:05	
1,2-Dichloroethane	"	20.9	---	0.500	"	"	--	"	105%	(75-135)	0.524%	"	"	
Benzene	"	19.1	---	0.200	"	"	--	"	95.4%	(80-120)	2.69%	"	"	
Toluene	"	18.9	---	0.500	"	"	--	"	94.6%	(80-125)	1.57%	"	"	
Ethylbenzene	"	16.2	---	0.500	"	"	--	"	81.0%	(80-130)	0.921%	"	"	
Xylenes (total)	"	48.8	---	1.00	"	"	--	60.0	81.4%	"	1.54%	"	"	
Methyl tert-butyl ether	"	20.7	---	2.00	"	"	--	20.0	104%	(80-135)	1.41%	"	"	
Naphthalene	"	19.3	---	2.00	"	"	--	"	96.3%	(60-150)	11.1%	"	"	
1,2,4-Trimethylbenzene	"	16.5	---	1.00	"	"	--	"	82.4%	(75-125)	0.785%	"	"	
1,3,5-Trimethylbenzene	"	16.4	---	0.500	"	"	--	"	82.0%	(75-135)	2.47%	"	"	
Isopropylbenzene	"	16.0	---	2.00	"	"	--	"	80.0%	(80-140)	1.80%	"	"	
n-Propylbenzene	"	16.6	---	0.500	"	"	--	"	82.9%	(80-130)	1.44%	"	"	
Surrogate(s):	*4-BFB*	*Recovery:*	*89.4%*		*Limits:*	*80-120%*	"						*09/22/08 11:05*	
	1,2-DCA-d4		*109%*			*80-120%*	"						"	
	Dibromofluoromethane		*103%*			*80-120%*	"						"	
	Toluene-d8		*102%*			*80-120%*	"						"	

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	09/29/08 15:39

Polynuclear Aromatic Compounds per EPA 8270M-SIM - Laboratory Quality Control Results

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QC Batch: 8090559 **Water Preparation Method: 3520B Liq-Liq**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8090559-BLK1)								Extracted: 09/16/08 15:20						
Acenaphthene	EPA 8270m	ND	---	0.100	ug/l	1x	--	--	--	--	--	--	09/19/08 21:29	
Acenaphthylene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Anthracene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (a) anthracene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (a) pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (b) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (ghi) perylene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (k) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Chrysene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Dibenzo (a,h) anthracene	"	ND	---	0.200	"	"	--	--	--	--	--	--	"	
Fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Fluorene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Indeno (1,2,3-cd) pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Naphthalene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Phenanthrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Surrogate(s):	*Fluorene-d10*	*Recovery:*	*85.1%*		*Limits:*	*25-125%*	"						*09/19/08 21:29*	
	Pyrene-d10		*86.9%*			*23-150%*	"						"	
	Benzo (a) pyrene-d12		*83.8%*			*10-125%*	"						"	
LCS (8090559-BS1)								Extracted: 09/16/08 15:20						
Acenaphthene	EPA 8270m	2.28	---	0.100	ug/l	1x	--	2.50	91.3%	(26-135)	--	--	09/19/08 22:01	
Benzo (a) pyrene	"	1.97	---	0.100	"	"	--	"	78.9%	(38-137)	--	--	"	
Pyrene	"	1.90	---	0.100	"	"	--	"	76.0%	(33-133)	--	--	"	
Surrogate(s):	*Fluorene-d10*	*Recovery:*	*93.2%*		*Limits:*	*25-125%*	"						*09/19/08 22:01*	
	Pyrene-d10		*76.7%*			*23-150%*	"						"	
	Benzo (a) pyrene-d12		*82.8%*			*10-125%*	"						"	
LCS Dup (8090559-BSD1)								Extracted: 09/16/08 15:20						
Acenaphthene	EPA 8270m	2.34	---	0.100	ug/l	1x	--	2.50	93.8%	(26-135)	2.66%	(60)	09/19/08 22:32	
Benzo (a) pyrene	"	1.99	---	0.100	"	"	--	"	79.7%	(38-137)	1.08%	"	"	
Pyrene	"	1.95	---	0.100	"	"	--	"	78.0%	(33-133)	2.53%	"	"	
Surrogate(s):	*Fluorene-d10*	*Recovery:*	*104%*		*Limits:*	*25-125%*	"						*09/19/08 22:32*	
	Pyrene-d10		*82.0%*			*23-150%*	"						"	
	Benzo (a) pyrene-d12		*85.4%*			*10-125%*	"						"	

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RSV Engineering, Inc.	Project Name:	**Niemi Hiway Service**	
31960 SW Charbonneau Drive - Suite 101	Project Number:	03-135	Report Created:
Wilsonville, OR 97070	Project Manager:	Brad Berggren	09/29/08 15:39

Notes and Definitions

Report Specific Notes:

Q9 - Hydrocarbon pattern most closely resembles weathered diesel.

ZX - Due to sample matrix effects, the surrogate recovery was outside the acceptance limits.

Laboratory Reporting Conventions:

DET - Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.

ND - Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).

NR/NA - Not Reported / Not Available

dry - Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight.

wet - Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis.

RPD - RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries).

MRL - METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.

MDL* - METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results.

Dil - Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.

Reporting Limits - Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.

Electronic Signature - Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy.* Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #: PRI0439

CLIENT: RSV Engineering Inc.

REPORT TO: Brad Berggren

ADDRESS: 31960 SW Charbonneau Dr. #101
Wilsonville, OR 97070

PHONE: 694-6962 FAX: 694-6962

INVOICE TO: SAME

P.O. NUMBER:

PROJECT NAME: Niemi Hiway Service

PROJECT NUMBER: 03-135

SAMPLED BY: Dan Beccraft

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: [10] STD. [7] [5] [4] [3] [2] [1] [<1]

Petroleum Hydrocarbon Analyses: [5] STD. [4] [3] [2] [1] [<1]

[OTHER] Specify:

* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE	REQUESTED ANALYSES: VOCs 8260	PAHs 8270	TPH-GX	TPH-DX	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	MW-1	9/11/08 / 7:10 AM		X		X	X	W	5		
2	MW-2	" / 8:15 AM		X		X	X	W	5		
3	MW-3	" / 9:00 AM		X	X	X	X	W	7		
4	MW-4	" / 6:30 AM		X		X	X	W	5		
5											
6											
7											
8											
9											
10											

RELEASED BY:		DATE: 9/11/08	RECEIVED BY:		DATE: 9/11/08
PRINT NAME: Daniel Beccraft	FIRM: RSV	TIME: 1840	PRINT NAME: Peggy Sieffried	FIRM: TAP	TIME: 1840
RELEASED BY:		DATE:	RECEIVED BY:		DATE:
PRINT NAME:	FIRM:	TIME:	PRINT NAME:	FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP: 4°C

PAGE OF

TAL-1000(0408)

TestAmerica Sample Receipt Checklist

Cooler ID(s): 007

Received by: *(section A)* Date: 9/12/16 Time: 1600 Initials: [illegible]

Unpacked by: *(section B)* Date: 9/12/16 Initials: [illegible]

Logged-in by: Date: 9/12/16 initials: JL

Work Order No. PRI0439

Client: RSV Engineering

Project: Niemi Hiway Service

***ESI Clients *(see Section C)*

Temperature out of range:

___Not enough Ice
___*No Ice*
___*Ice Melted*
___*W/in 4 Hours*
___*Other:*

Digi #1

Digi #2

Cooler Temperature (IR): 1.6 °C plastic (glass) NA *(oil/air samples, ESI client)*

Temperature Blank: _____ °C

A

Custody Seals: (#____)

Signature: Y N Dated:_____

X None

Container Type:

1 #Cooler(s)

___#Box(s)

___None (___#Other:_____)

Coolant Type:

___Gel Ice

X Loose Ice

___None

Packing Material:

X Bubble Bags

X Styrofoam Cubbies

___Peanuts

___None (___Other:_____)

Received from:

___TA Courier
___Senvoy
___UPS
___Fed Ex
X Client
___TDP
___DHL
___SDS
___Mid-Valley
___GS/TA
___GS/Senvoy
___Other:

_____

B

Sample Status:
(If N circled, see NOD)

General:

Intact?	(Y)	N	
# Containers Match COC?	(Y)	N	none given
IDs Match COC?	(Y)	N	

For Analyses Requested:

Cyanide Checked?	Y	N	(NA)
Correct Type & Preservation?	(Y)	N	
Adequate Volume?	(Y)	N	
Within Hold Time?	(Y)	N	

Volatiles/ Oil Quality:

VOAs/ Syringes free of Headspace?	(Y)	N	NA
TB on COC? not provided	Y	N	NA

Metals:

HNO3 Preserved?	Y	N	(NA)
Dissolved Metals Filtered?	Y	N	(NA)

C

***ESI Clients Only:

Temperature Blank: _____ °C not provided Digi: # 1 #2

All preserved bottles checked Y N NA *(voas/soils/all unp.)*

All preserved accordingly? Y N *(see NOD)* NA *(voas/soils/all unp.)*

FED EX/ UPS: Was the tracking paper keepable? YES NO

If circled NO, what is the Tracking number? _____

FED EX Goldstreak UPS DHL Other: _____

Project Managers:

Comments: _____

PM Reviewed: _____ *(Initial/Date)*

RSV
ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists

ADDITIONAL SITE CHARACTERIZATION REPORT
HIGHWAY SERVICE 76 STATION
3108 MARINE DRIVE
ASTORIA, OREGON

MAY, 2005

Prepared For:

Niemi Oil Company, Inc.
Etu, Inc.
P.O. Box 989
Astoria, Oregon 97103

Prepared By:

RSV Engineering, Inc.
31960 SW Charbonneau Drive, Suite 101
Wilsonville, Oregon 97070
(503) 694.6960

RSV Project No. 03-135

ADDITIONAL SITE CHARACTERIZATION REPORT
HIGHWAY SERVICE 76 STATION
3108 MARINE DRIVE
ASTORIA, OREGON

MAY, 2005

04-99-1193

Prepared For:

Niemi Oil Company, Inc.
Etu, Inc.
P.O. Box 989
Astoria, Oregon 97103

Prepared By:

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31960 SW Charbonneau Drive, Suite 101
Wilsonville, Oregon 97070
(503) 694.6960

RSV Project No. 03-135

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NORTHWEST REGION

RSV ENGINEERING, INC.

NIEMI OIL COMPANY
SITE CHRACTERIZATION REPORT
HIGHWAY SERVICE 76 STATION
3108 MARINE DRIVE
ASTORIA, OREGON

RSV Engineering, Inc. is submitting this Additional Site Characterization Report to the Niemi Oil Company and Etu, Inc. to document work performed at the Highway Service 76 Service Station site located at 3108 Marine Drive in Astoria, Oregon. The report was prepared in conformance with RSV Engineering's quality assurance/quality control procedures to ensure that the report meets industry standards in terms of the methods used and the information presented. If you have any questions or comments concerning this report, please contact one of the individuals listed below.

Respectfully submitted,
RSV ENGINEERING INC.

Craig C. Arola,
Project Hydrogeologist

Brad J. Berggren, P.E., R.G.
Vice President

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FIGURES

Figure 1 Site Location
Figure 2 Area Map
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APPENDICES

Appendix A Boring Logs

Appendix B Laboratory Data Sheets and Chain of Custody Forms

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Appendix D Site Specific RBC Calculation Details

NIEMI OIL COMPANY
ADDITIONAL SITE CHARACTERIZATION REPORT
HIGHWAY SERVICE 76 SERVICE STATION
3108 MARINE DRIVE
ASTORIA, OREGON

INTRODUCTION

This report summarizes the results of the additional site characterization activities RSV Engineering, Inc. (RSV) conducted in September and October 2004 at the Niemi Oil Company Highway Service 76 Station, as requested by the Oregon Department of Environmental Quality (DEQ) . The site characterization activities consisted of collection and analysis of soil and groundwater samples from one (1) soil boring drilled on the Highway Service property and two (2) soil borings drilled on the property adjacent and to the north of the Highway Service site in October, 2004.

The Highway Service 76 Station is located at 3108 Marine Drive in Astoria, Clatsop County, Oregon, in the southwest quarter of the northwest quarter of Section 9, Township 8 North, Range 9 West. The location of the site is shown in Figure 1. The property is owned by Etu, Inc., and operated as a 76 gasoline and service station and convenience store by Niemi Oil Company. Considering the data collected at the site, the site is a candidate for closure using Risk-Based Concentrations ("RBCs") in accordance with Oregon Administrative Rule (OAR) 340-122-0244 for the following reasons:

1) Contamination at the site is limited to petroleum based constituents.

2) Petroleum related hazardous constituents identified at the site are listed in the DEQ Appendix A Table of RBCs.

3) The site is zoned commercial and the current and future planned use of the site is as a gasoline and service station. The only exceedances for petroleum related compounds of applicable exposure pathways identified were ingestion, inhalation, and dermal contact of soils impacted with TPH-Oil and migration to groundwater from soils impacted with TPH-Oil and metals near the former UST tank pit. The soil exceeding the ingestion, inhalation, and dermal contact exposure pathway is at a depth of 6 feet or below; greater than the 3 foot recommended depth to

consider for occupational workers as described in the DEQ Risk-Based Decision Making for the Remediation of Petroleum Contaminated Sites guidance. The current and planned future use of the site is as a gasoline and service station. No site development is expected or planned in the future, and exposure to the impacted soils is unlikely.

4) Groundwater samples did not reveal exceedances of DEQ Appendix A RBCs for applicable exposure pathways identified for the site (i.e., Volatilization to Outdoor Air, Vapor Intrusion into Buildings, or Groundwater in an Excavation for Occupational, Construction worker or Excavation worker pathways).

These grounds for closure are addressed in further detail below.

BACKGROUND

In an April, 2004 DEQ letter to Niemi Oil, DEQ requested additional site characterization based on its review of the ***Site Characterization Report*** Niemi Oil submitted in February, 2004. In a May, 2004 meeting with Niemi Oil representatives to discuss the April, 2004 DEQ letter, DEQ requested additional site characterization on the northern half of the site. On June 2, 2004, DEQ also requested one (1) additional soil boring be advanced between former Soil Borings GP-3 and GP-4 on the site, to better characterize the residual soil contamination in the immediate vicinity of the former waste oil UST. Niemi Oil submitted a Scope of Work for the additional site characterization activities to DEQ on August 19, 2004. The Scope of Work was approved by Mr. Rob Hood of DEQ on September 13, 2004.

Site History

Soil impacts were first discovered at the site in October 1999, when one 550-gallon used oil underground storage tank (UST) was removed from the site. A release of used oil from the UST was reported to the Oregon Department of Environmental Quality (DEQ) on October 21, 1999. The Oregon Department of Environmental Quality (DEQ) has listed the site as a Leaking Underground Storage Tank (LUST) site, File Number 04-99-1193. An initial site characterization was performed in 2003 to evaluate impacts to soil and groundwater from the used oil UST release at the site.

The Highway Service site is an active 76 Service Station. The site is located on the northeast intersection of Marine Drive (Hwy 30) and 31st Street in a commercial area of Astoria, near the Columbia River. The elevation of the site is approximately 25 ft above mean sea level (MSL).

Three (3) underground storage tanks (USTs) are currently located at the site, including two (2) 4,000-gallon gasoline USTs, and one (1) 1,500-gallon gasoline UST. Tank tightness testing of the current USTs located at the site has not indicated any leaks or releases.

Physical Setting and Geology

The Highway Service site is located approximately 550 ft south of the Columbia River. A bedrock high is located approximately one-half mile to the south of the site. Floodplain sediments in the vicinity of the Columbia River in this part of Astoria generally consist of primarily sands and gravels with minor amounts of clay. Underlying unconsolidated sediments in the area is the Astoria Formation, which is characterized by an upper sandstone unit of Miocene age, a middle shale unit, and a lower sandstone unit.

Shallow soils in the vicinity of the site have been mapped as Walluski Silt Loam. The Walluski Silt Loam is typically moderately well drained and has a slow permeability. A typical profile consists of 14 inches of very dark grayish brown silt loam, 7 inches of dark brown silt loam, and 39 inches of dark yellowish brown, yellowish brown, and light brownish gray, mottled silty clay loam.

Shallow soils encountered during previous site characterization activities consisted of silty and sandy gravels to depths of approximately 12 to 15 ft below ground surface (bgs). Underlying the gravely soils were fine to medium sands and clays to depths of approximately 20 ft bgs. Bedrock comprised of siltstone underlies the unconsolidated sediment south of the site, at a depth of approximately 30 ft bgs. Depth to bedrock on the site is greater than 20 ft bgs.

Hydrogeology

During the initial site characterization activities completed in 2003, groundwater was encountered at a depth of 19.5 ft bgs at the site. The direction of shallow groundwater flow beneath the site is inferred to be generally toward the Columbia River, located approximately 250 feet north of the site. Groundwater was encountered by the City of Astoria during drilling of the wells to the south of the Highway Service Site above the elevation where groundwater was encountered at the Highway Service site, indicating groundwater flow beneath the site is north toward the Columbia River.

Previous Work

In October 18, 1999, one 550-gallon used oil underground storage tank (UST) was removed from the site. Product odor and staining were noted in soils in the excavation tank pit. Two soil samples were collected from the bottom of the excavation at a depth of 6 ft, and laboratory analyzed for Total Petroleum Hydrocarbon-Hydrocarbon Identification (TPH-HCID), and subsequently for TPH as diesel and heavy oil. TPH as heavy oil was detected in both samples at concentrations of 19,000 mg/kg and 78,000 mg/kg, respectively. TPH as diesel was not detected in either sample. The release from the 550-gallon used oil UST was reported to the Oregon Department of Environmental Quality (DEQ) on October 21, 1999.

RSV conducted an initial soil and groundwater investigation at the site in October, 2003. Results of laboratory analyses revealed relatively low concentrations of petroleum related compounds in soil and groundwater beneath the site. The detected constituents in soil and groundwater samples were below DEQ Generic Risk Based Concentrations for the applicable potential exposure pathways identified for the site. A Site Characterization Report was submitted to DEQ in February, 2004. In April, 2004, DEQ requested additional site characterization work to further define the extent of petroleum related impacts. During a May 18, 2004 meeting with DEQ, it was agreed that the additional site characterization would consist of soil borings advanced on the northern portion of the Highway Service property to further evaluate potential downgradient impacts to groundwater. On June 2, 2004, DEQ also requested one (1) additional boring be advanced between previously advanced Soil Borings GP-3 and GP-4 to further

characterize the residual soil contamination in the immediate vicinity of the former waste oil UST.

CURRENT SITE CONDITIONS

The Highway Service 76 Station site is located on the northeast corner of Marine Drive and 31st Street in a commercial area of Astoria. The site is currently zoned commercial (C3). Properties to the south across Marine Drive, and to the east, west, and north of the site are also zoned C3. Commercial zoning extends north to the shoreline of the Columbia River. To the north of the site is a relatively small unpaved parking lot, north of which is industrial property that extends to the Columbia River. The commercial/industrial property contains various buildings, machinery, and debris. Property zoned Single Family Residential (R2) is located further to the south of the site along a bluff at an approximate elevation of 100 to 250 ft MSL. According to the City of Astoria City Planner, no changes to current zoning in the area are planned.

Site features are shown on Figure 2. The southern half of the property serves as the service station with gently sloping terrain toward the northwest and is paved with asphalt. A strip between the USTs and the northern portion of the property is unpaved. The northern portion of the property is grass covered and houses a small storage shed. An abrupt change in elevation of approximately 12 ft occurs between the northern and southern portions of the site. This abrupt change in elevation occurs immediately behind (i.e., north of) the service station building. The elevation of the northern part of the site is lower than the southern portion of the site.

Overhead utilities servicing the site include electric and telephone. Underground utilities servicing the site include natural gas, water, and sanitary sewer. As summarized in RSV's ***Initial Site Characterization Report*** no drinking water wells are located at the site. In addition, a review of available well logs from the Oregon Department of Water Resources from within approximately one mile of the site did not reveal any drinking water or other water supply wells.

As part of work related to a commercial development site slope stability evaluation, one (1) groundwater monitoring well-LT-1P was installed on the property located across Highway 30 (Marine Drive) immediately south of Highway Service Site. The location of this well is identified by the City of Astoria as the Hauke property. The well log for Well LT-1P is included in Appendix C. The approximate current surface elevation of the well is 41 ft above MSL (mean sea level). The well log for Well LT-1P indicates that the well was originally screened from 14 to 19 ft bgs (approximate elevation of 27 to 22 ft MSL). However, since installation of the well, placement of surface fill on the Hauke property has been conducted. To keep the well accessible, an additional section of riser casing was added to the well, and the top of casing elevation was raised. A log for an adjacent boring, LT-1, completed as an inclinometer to monitor earth movement on the Hauke property, indicated bedrock was encountered at a depth of 31 ft bgs (approximate elevation of 10 ft MSL). The bedrock consisted of weathered siltstone and mudstone.

The surface elevation on the southern (service station) part of the Highway Service site is approximately 25 ft above mean sea level (MSL), based on a review of the USGS Astoria, Oregon topographic map. The surface elevation of the northern part of the Highway Service site is approximately 12 ft MSL. The elevation of groundwater on the Hauke property was measured at approximately 24 ft MSL (depth to groundwater of 17 ft bgs). The elevation of groundwater on the southern part of the Highway Service site is approximately 6 ft MSL, and the elevation of groundwater on the northern part of the Highway Service site is approximately 5 ft MSL. These approximate elevations of observed groundwater are consistent with the expected flow of groundwater toward the north.

SITE INVESTIGATION SCOPE OF WORK AND METHODS

One (1) Soil Boring (B-7) was advanced near former Soil Borings GP-3 and GP-4 (Figure 2) and two (2) soil borings (B-8 and B-9) were advanced on the northern portion of the site, as requested by DEQ to supplement existing investigation data. Borings B-7, B-8, and B-9 were advanced to depths of 20 ft, 14 ft, and 14 ft bgs, respectively. Due to overhead utility constraints, the boring near the former UST was advanced using conventional percussion probe/direct push drilling techniques. On September 28, 2004,

an employee of the Highway Service Station confirmed the location of the former UST removed in October 1999 as being west and slightly north of the previously advanced Soil Boring GP-3. A surface patch was also observed which indicated the location of the former UST. The location of Boring B-7 was adjusted to be adjacent to the former UST (Figure 2), rather than between previously advanced Soil Borings B-3 and B-4, as described in the approved Scope of Work. A phone message for Mr. Rob Hood of DEQ was left on September 28, 2004 informing him on the change in boring location. Soil samples were collected continuously from Soil Boring B-7 using 1.25-inch diameter by 4-ft length plastic sampling tubes. The sampling tubes were driven into the borehole inside 1.25-inch diameter by 4-ft length steel sampling rods. New plastic sleeves were used for each sample. Other equipment entering the borehole was decontaminated prior to each use.

The two (2) soil borings on the northern portion of the Highway Service property (B-8 and B-9) were advanced using conventional hollow-stem auger drilling techniques. Soil samples were collected using a 2-inch diameter by 2-ft length steel split spoon sampler advanced using a 140-lb hammer with a standard 40-inch drop.

Soil samples were collected continuously from ground surface to the total depth explored in Soil Boring B-7 and to a depth of 4 ft below the interred water table in Soil Borings B-8 and B-9, and screened in the field for the presence of petroleum hydrocarbons and organic vapors using a photoionization detector (PID). The PID yields a semi-quantitative headspace analysis of the concentration of volatile organic compounds (VOCs) in the samples that have ionization potentials equal to or less than 10.6 electron volts (eV). The PID was calibrated prior to field activities according to manufacturer's instructions, using a 101 parts per million (ppm) isobutylene span gas and air (zero gas), and checked periodically for proper response. It is useful to note that the PID does not allow for a differentiation of individual VOCs, and has a useful detection limit of approximately 0.1 ppm for select VOC constituents. The samples were visually classified in the field by an RSV geologist in general accordance with ASTM Method D-2488-93. The soil samples were described with respect to soil types, grain size distribution, color (or discoloration), odor, moisture content, consistency, and photoionizable constituent content, as

appropriate. Soil boring forms are included as Appendix A. Soil samples were collected from each sampling interval for in-field screening using a photoionization detector (PID). The collected samples were placed in plastic reclosable bags prior to field screening.

Two soil samples from the boring advanced near the former used oil UST (B-7) were selected for laboratory analyses based upon visual field screening and PID measurements. Consistent with the approved Scope of Work, no soil samples for Soil Borings B-8 and B-9 were submitted for laboratory analyses. The soil samples were submitted for laboratory analysis of total petroleum hydrocarbons (TPH) by Northwest Method NWTPH-Dx and Northwest Method NWTPH-Gx, petroleum related VOCs per EPA Method 8260, polycyclic aromatic hydrocarbons (PAHs) per EPA Method 8270, total metals (cadmium, chromium, and lead) by EPA Method 200.8, and toxicity characteristic leaching procedure (leachable metals) per EPA Method 6010.

Groundwater samples were also collected from each of the three boreholes, using a disposable polyethylene (PE) bailer. After completion of the soil borings, PVC screen and riser was inserted into the borehole. The screen was set such that it intersected the inferred water table. Sand filter pack was placed around the screen. A one (1)-inch diameter, 0.010 slot size PVC screen was placed in Boring B-7. A two (2)–inch diameter, 0.010-inch slot size PVC screen was placed in each of Soil Borings B-8 and B-9. Each temporary sampling point was developed by pumping and purging until the purge water appeared clear. Approximately 3 gallons, 15 gallons, and 20 gallons of water were removed from Soil Borings B-7, B-8, and B-9, respectively. After development, groundwater in the temporary sampling points was allowed to equilibrate approximately 24 hours prior to sampling. Groundwater samples were submitted for laboratory analysis of TPH by Northwest Method NWTPH-Dx and Northwest Method NWTPH-Gx, petroleum related VOCs per EPA Method 8260, polycyclic aromatic hydrocarbons (PAHs) per EPA Method 8270, and dissolved metals (cadmium, chromium, and lead) by EPA Method 200.8. Samples submitted for dissolved metals were field filtered using a 0.45 μm filter.

After collection of water samples, the temporary sampling points were abandoned by removal of the well screen and riser, and filling the borehole with ¾-inch bentonite pellets to ground surface.

Soil and groundwater samples were placed in containers provided by the project laboratory and shipped using appropriate preservative and chain-of-custody documentation within allowable holding times, to the project laboratory. The chain-of-custody forms that accompanied the samples to the laboratory are included in Appendix B. Water and soil generated during sampling of the soil borings, including equipment decontamination water, was placed in a labeled 55-gallon drum(s) and stored on site, pending disposal at an appropriate facility.

Quantitative chemical analyses of the collected soil and groundwater samples were performed by Columbia Analytical Services of Kelso, Washington.

EXPOSURE PATHWAYS SUMMARY

The Highway Service site is currently an operating retail gasoline filling and service station, and convenience store. A site conceptual model, based on DEQ's revised September 22, 2003 Risk-Based Decision Making For the Remediation of Petroleum-Contaminated Sites guidance, was provided in the February, 2004 ***Initial Site Characterization Report***. The following potential exposure routes were identified for employees and workers at the site, and were selected considering the current and expected future commercial use of the site and surrounding properties: direct contact with soil, dermal absorption and inhalation of volatiles, inhalation of chemicals volatilized into on-site buildings, inhalation of chemicals volatilized into buildings, and leaching to groundwater.

Ingestion of groundwater is not a current or reasonably likely exposure pathway and therefore was excluded as a potential pathway at the site.

SITE-SPECIFIC TPH-OIL RISK-BASED CONCENTRATION CALCULATION

Since TPH-Oil was detected in soil and groundwater samples at the site, and no Appendix A risk-based concentrations (RBCs) as listed in DEQ's revised September 22,

2003 Risk-Based Decision Making For the Remediation of Petroleum-Contaminated Sites guidance, have been promulgated for TPH-Oil by DEQ, site-specific soil and groundwater RBCs were calculated. Site-specific RBCs can be calculated using laboratory analysis of site soil samples for volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH), or assuming that all of the TPH is within the range that yields the lowest (i.e., most conservative) site-specific RBCs for the site. In lieu of the collection of site-specific VPH and EPH data from the site, the TPH-Oil site-specific RBCs were calculated using DEQ's RBC computer spreadsheet (DEQ, 2003a), assuming that all of the TPH detected in soil samples at the site was within the range that yields the most conservative site-specific RBC. Calculation results are attached as Appendix D. The site-specific TPH-Oil RBCs for soil and groundwater are included in Tables 2 and 6.

RESULTS

Site Geology and Hydrogeology

In general, silty fine to medium grained sand was encountered to depths of up to 20 feet below ground surface (bgs). These soils are generally consistent with those encountered during previous investigations at the site.

Groundwater samples were collected from all three (3) soil borings. Groundwater was encountered at a depth of 16 ft bgs in Soil Boring B-7, and at an approximate depth of 7 ft bgs in Soil Borings B-8 and B-9. A slight hydrocarbon odor was observed in the 13 to 15 ft depth range in Soil Boring B-7, as well as from the groundwater sample collected from Soil Boring B-7 (located adjacent to the former UST pit). Petroleum odors were not observed in soil or groundwater samples collected from the two (2) other borings.

Soil Sampling Results

The results of field screening using the PID indicated the presence of relatively low concentrations of volatile organic vapors in samples collected from Borings B-7 (4 ppm at a depth of 13 to 15 ft) and B-8 (3 ppm at a depth of 8 ft). Other samples collected for PID screening yielded no response (0 ppm).

Total Petroleum Hydrocarbons (TPH)

Two (2) soil samples, 0 to 4 ft and 13 to 15 ft were collected from Soil Boring B-7 and laboratory analyzed for TPH-Gx, TPH-Dx, and TPH-Oil. TPH results are summarized in Table 1. TPH-Gx was not detected in the 0 to 4 ft depth sample, but was detected at a concentration of 42 mg/kg in the 13 to 15 ft depth sample. TPH-Dx was not detected in the 0 to 4 ft depth, but was detected in 13 to 15 ft depth sample at a concentration of 2,600 mg/ kg. TPH-Oil was detected in both the 0 to 4 ft depth and the 13 to 15 ft depth samples at concentrations of 28 mg/kg and 12,000 mg/kg, respectively. The detected TPH-Gx and TPH-Dx soil concentrations are below DEQ's Generic Risk-Based Concentrations (RBCs) for the applicable potential exposure pathways identified for the site (i.e., Soil Ingestion, Dermal Contact, and Inhalation for occupational, construction, and excavation workers; Volatilization to Outdoor Air for occupational workers; Vapor Intrusion to Buildings for occupational workers, and Leaching to Groundwater for occupational settings). The concentrations of TPH-Oil detected in the samples collected during tank decommissioning activities in 1999 (North-BOT and South-BOT) exceeded the site-specific TPH-Oil RBC for Soil Ingestion, Dermal Contact, and Inhalation for an Occupational and Construction Worker. In addition, the soil sample from Soil Boring B-7 (13 to 15 ft depth) exceeds the site-specific RBC for TPH-oil for Soil Ingestion, Dermal Contact, and Inhalation for a Construction Worker. However, these samples were collected from below a depth considered a reasonable exposure depth for occupational worker pathways (e.g., 0 to 3 ft), as described in the September 22, 2003 ***DEQ Risk-Based Decision Making For Petroleum-Contaminated Sites*** guidance document. With respect to the potential soil ingestion, dermal contact, and inhalation for a construction worker pathway, no development work is expected to be performed requiring soil excavation in the vicinity of the former used oil UST at the site. Therefore exposure to these impacted soils is unlikely. The detected concentrations of TPH-Oil did not exceed any of the other site-specific soil RBCs (i.e., volatilization to outdoor air, vapor intrusion into buildings, or leaching to groundwater for the occupational, construction worker, or excavation worker scenarios).

Metals

Two (2) soil samples, 0 to 4 ft and 13 to 15 ft, were collected from Soil Boring B-7 and laboratory analyzed for total and leachable metals (cadmium, chromium, and lead). A summary of metals sampling results are provided in Tables 2 and 3. Total Cadmium was detected in both of the samples at concentrations of 0.336 mg/kg (0 to 4 ft depth) and 0.043 mg/kg (13 to 15 ft depth). Total Chromium was detected in the samples at concentrations of 35.7 mg/kg (0 to 4 ft depth) and 7.54 mg/kg (13 to 15 ft depth). Total Lead was detected in the samples at concentrations of 9.16 mg/kg (2 to 4 ft depth) and 46.7 mg/kg (13 to 15 ft depth). These metals are naturally occurring in soil and the concentrations detected are not unusual relative to typically ranges for soil (DEQ, 1994; EPA, 2002), except possibly lead in the sample from the 13 to 15 ft depth. The concentrations of lead detected in the 13 to 15 ft depth sample exceeded the Appendix A Occupational RBC for Leaching to Groundwater. The concentrations of lead detected were not above the other applicable exposure pathways identified for the site (i.e., occupational, construction worker, or excavation worker Appendix A RBCs for Soil Ingestion and Dermal Contact)

Since no DEQ Appendix A RBCs have been promulgated in Oregon for cadmium or chromium, the concentrations of these constituents in soil were compared to the EPA Region 9 Preliminary Remediation Goals (PRGs). Concentrations of cadmium and chromium detected in the samples were not above the Region 9 PRGs for the Direct Contact with soils or the Migration to Groundwater pathways.

With respect to leachable metals, leachable cadmium was not detected in the soil samples collected from Soil Boring B-7 (0 to 4 ft depths, and 13 to 15 ft depths). Leachable chromium was detected in the 0 to 4 ft depth sample at a concentration of 0.004 mg/L, but was not detected in the 13 to 15 ft sample. Leachable lead was detected in the 13 to 15 ft sample at a concentration of 0.04 mg/L, but was not detected in the 0 to 4 ft depth sample. No Appendix A RBCs have been promulgated for leachable cadmium, chromium, or lead. However, soil cleanup levels for leachable metals are listed in Oregon Administrative Rules (OAR) 340-122 and associated Oregon Soil Cleanup Table. These rules are commonly known as the DEQ Hazardous Substance Remedial Action Rules.

The detected concentrations of leachable metals (i.e., chromium and lead) were below their respective Oregon Soil Cleanup Table values.

Polycyclic Aromatic Hydrocarbons (PAHs)

Soil samples were collected for analysis of PAHs from Soil Boring B-7 (0 to 4 ft and 13 to 15 ft).. A summary of PAH sampling results are included on the attached Table 4. The following PAHs were detected in the samples: naphthalene, acenaphthylene, acenaphthene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenzo(a,h)anthracene, benzo(ghi)perylene, indeno(1,2,3-cd)pyrene, and 2-methylnaphthalene at relatively low concentrations ranging from 0.22 µg/kg (benzo(a)anthracene in 0 to 4 ft depth sample) to 100 µg/kg (benzo(g,h,i)perylene in 13 to 15 ft sample). None of these petroleum constituents were detected above the RBCs for applicable potential exposure pathways identified for the site (i.e., occupational, construction worker, or excavation worker Appendix A RBCs for Soil Ingestion, Dermal Contact, and Inhalation; Volatilization to Outdoor Air; Vapor Intrusion to Buildings; or Leaching to Groundwater).

Volatile Organic Compounds (VOCs)

Soil samples were collected for analysis of VOCs from Soil Boring B-7 (0 to 4 ft depth and 13 to 15 ft depth). A summary of VOC sampling results are provided in Table 5. No VOCs were detected in the 0 to 4 ft sample. The following VOCs were detected in the 13 to 15 ft sample: ethylbenzene, toluene, xylenes, isopropylbenzene, n-propylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and naphthalene at concentrations ranging from 1.1µg/kg (toluene) to 59 µg/kg (total xylenes). None of the VOCs were detected above the applicable potential exposure pathways identified for the site (i.e., occupational, construction worker, or excavation worker Appendix A RBCs for Soil Ingestion, Dermal Contact, and Inhalation; Volatilization to Outdoor Air; Vapor Intrusion to Buildings; or Leaching to Groundwater).

Soil Sampling Summary

The only exceedances for petroleum related compounds of applicable exposure pathways identified were ingestion, inhalation, and dermal contact for employees and construction and excavation workers of soils impacted with TPH-Oil and migration to groundwater from soils impacted with TPH-Oil and metals near the former UST tank pit. However, these samples were collected from below a depth considered a reasonable exposure depth for occupational worker pathways (e.g., 0 to 3 ft), as described in the September 22, 2003 ***DEQ Risk-Based Decision Making For Petroleum-Contaminated Sites*** guidance document. Since the soil exceeding the ingestion, inhalation, and dermal contact exposure pathway for construction and excavation workers is at depth of 6 ft or below, the impacts are limited to a relatively small area beneath and adjacent to the former UST tank pit, the current and planned future use of the site is as a gasoline and service station, and no site development activities are expected or planned in the future, exposure to these impacted soils is unlikely. With respect to leaching to groundwater RBC exceedances, ingestion and inhalation of groundwater is not considered an applicable exposure pathway at the site, and no compounds were detected in groundwater above the potentially applicable DEQ Appendix A or site-specific RBCs.

Groundwater Sampling Results

Total Petroleum Hydrocarbons (TPH)

Groundwater samples for TPH-Gx, TPH-Dx, and TPH-Oil were collected from Soil Borings B-7, B-8, and B-9. TPH groundwater analytical results are summarized in Table 6. In general TPH concentrations decreased with distance downgradient from the former UST as expected. TPH-Gx was detected at a concentration of 2,400 µg/L, 330 µg/L, and 120 µg/L in the groundwater samples from Soil Boring B-7, B-8, and B-9, respectively. TPH-Dx was detected at concentrations of 2,800 µg/L, 210 µg/L, and 110 µg/L in the samples collected from Soil Borings B-7, B-8, and B-9 respectively. TPH-Oil was detected at concentrations of 5,100 µg/L, 190 µg/L, and 86 µg/L in the samples collected from Soil Borings B-7, B-8, and B-9, respectively The detected constituents did not exceed the Appendix A or site-specific RBCs for the applicable potential exposure pathways identified for the site (i.e., Volatilization to Outdoor Air, Vapor Intrusion to

buildings, or Groundwater in an Excavation for occupational, construction worker, or excavation worker scenarios).

Metals

Groundwater samples were collected from Soil Borings B-7, B-8 and B-9 for analysis of dissolved metals (cadmium, chromium, and lead). A summary of groundwater metals sampling results is provided in Table 7. Cadmium, chromium, and lead were detected at concentrations of 0.04 µg/L, 0.34 µg/L, and 0.268 µg/L, respectively in the sample from Soil Boring B-7. Cadmium, chromium, and lead were not detected in the samples collected from Soil Borings B-8 and B-9.

The only potential groundwater pathway for lead that a RBC has been listed is for Ingestion and Inhalation of Tap Water, which is not considered an applicable pathway for the site. According to DEQ Appendix A notes, Volatilization to Outdoor Air, Vapor Intrusion to Buildings, and Groundwater in an Excavation are not applicable pathways for lead and no DEQ Appendix A RBCs have been listed for these pathways. Similarly, no DEQ Appendix A RBCs have been promulgated for cadmium or chromium for Volatilization to Outdoor Air, Vapor Intrusion to Buildings, or Groundwater in an Excavation.

Since no DEQ Appendix A RBCs have been promulgated in Oregon for cadmium or chromium, EPA Region 9 PRGs were considered for comparison of groundwater sample results. The only Region 9 PRG is for Direct Contact with Tap Water, which is not considered an exposure pathway for the site. However, the concentrations of cadmium and chromium detected in groundwater do not exceed the Region 9 PRG for Direct Contact with Tap Water.

PAHs

Groundwater samples were collected from Soil Borings B-7, B-8, and B-9 for analysis of PAHs. A summary of PAH sampling results is provided in Table 8. In general PAH concentrations decreased with distance downgradient from the former UST as expected. The following PAHs were detected in the samples: naphthalene, acenaphthylene, acenaphthene, dibenzofuran, fluorene, phenanthrene, anthracene, fluoranthene, pyrene,

benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene and 2-methylnaphthalene at concentrations ranging from 0.0035 µg/L (benzo(k)fluoranthene in B-8) to 1.3 µg/L (naphthalene in B-7). The detected concentrations did not exceed the Appendix A RBCs for the applicable potential exposure pathways identified for the site (i.e., Volatilization to Outdoor Air, Vapor Intrusion to Buildings, or Groundwater in an Excavation for occupational, construction worker, or excavation worker pathways).

Volatile Organic Compounds (VOCs)

Groundwater samples were collected from Soil Borings B-7, B-8 and B-9 for analysis of VOCs. A summary of VOC analytical results is provided in Table 9. The following VOCs were detected in the sample collected from Soil Borings B-7, B-8, and B-9: benzene; toluene; ethylbenzene; xylenes; isopropylbenzene; n-propylbenzene; 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene; and naphthalene at concentrations ranging from 0.47 µg/L (1,3,5-Trimethylbenzene) to 96 µg/L (propylbenzene). In addition, MTBE was detected in the samples collected from Soil Borings B-8 and B-9 at concentrations ranging from 2.2 µg/L to 2.7 µg/L, respectively. The detected concentrations did not exceed the Appendix A RBCs for the applicable potential exposure pathways identified for the site (i.e., Volatilization to Outdoor Air, Vapor Intrusion to Buildings, or Groundwater in an Excavation for occupational, construction worker, or excavation worker pathways).

Groundwater Sampling Summary

Petroleum related constituents were detected in the groundwater samples collected from the site. In general, concentrations declined substantially in the downgradient direction away from the former UST tank pit. Over a distance of approximately 30 ft from the former UST location, concentrations of petroleum related constituents generally decreased by one (1) to two (2) orders of magnitude. However, in the groundwater sample collected from the most downgradient location along the northern property boundary (Soil Boring B-9), several petroleum related constituents were detected. None of the detected compounds in any of the groundwater samples exceeded the applicable DEQ Appendix RBCs identified for the site (i.e., volatilization to outdoor air, vapor

intrusion into buildings, and groundwater in an excavation). In addition, none of the petroleum related constituents detected in groundwater samples from most downgradient sampling location (i.e., Soil Boring B-9, nearest to the Columbia River) were at levels exceeding DEQ Level II Ecological Risk Assessment Screening Level Values (DEQ, 2001) and OAR 340-41 Table 20 or Table 33C Water Quality Criteria. Further north and downgradient of the site is a small paved parking lot (extending approximately 20 ft in the northerly direction), further north of which is industrial property that contains various buildings, machinery, and debris. Directly north and downgradient of the paved parking lot is a building, which extends approximately 30 ft north toward the river. Considering the distance from the Highway Service site (approximately 50 ft) that a downgradient boring could be located on industrial property, that this industrial property may contain additional source areas of petroleum related constituents, and that this industrial property extends north of the site to the Columbia River, downgradient definition of the extent of groundwater impacts from the site may not be possible. In addition, it is also expected that the relatively low concentrations of petroleum related constituents detected in groundwater samples downgradient of the former UST will naturally attenuate over time.

SUMMARY AND RECOMMENDATIONS

Summary

The September and October, 2004 soil and groundwater characterization work was performed, as requested by DEQ, to further characterize a petroleum product release reported in October, 1999 from a 550-gallon used oil UST. The UST was removed from the site at that time. The soil and groundwater data from this investigation is included in Tables 1 through 8 of this report. The following provides a summary of the investigation activities at the Site.

- The source of contamination (i.e., the former waste oil UST) at the Site was removed in 1999 when 3 Kings Environmental, Inc. (3 Kings) removed the UST.

- Based upon the detection of product odors and staining in soil exposed during the UST removal in 1999, two soil samples were collected from the bottom of the

excavation at a depth of 6 ft. TPH as heavy oil was detected in both samples at concentrations of 19,000 mg/kg and 78,000 mg/kg, respectively.

- No spills or leaks from the remaining three (3) USTs at the site have been reported or detected during recent tightness testing by Niemi Oil.

- Field screening and laboratory chemical analyses from sampling conducted in October 2003, and September and October 2004 indicated that soil and groundwater at the Highway Service site have been impacted by relatively low concentrations of petroleum related constituents. Petroleum impacted soils are limited to a relatively small area beneath and adjacent to the former UST tank pit. Concentrations of petroleum related constituents in groundwater generally declined substantially (i.e., up to 2 orders of magnitude) in the downgradient direction (i.e., to the north) away from the former UST tank pit.

- The only soil-related exceedances for petroleum related compounds of applicable exposure pathways identified were ingestion, inhalation, and dermal contact for employees and construction and excavation workers, impacted with TPH-Oil and migration to groundwater from soils impacted with TPH-Oil and metals near the former UST tank pit.

  However, these samples were collected from below a depth considered a reasonable exposure depth for occupational worker pathways (e.g., 0 to 3 ft), as described in the September 22, 2003 ***DEQ Risk-Based Decision Making For Petroleum-Contaminated Sites*** guidance document. Exposure to these impacted soils is unlikely since the soil exceeding the ingestion, inhalation, and dermal contact exposure pathway for construction and excavation workers is at depth of 6 ft or below, the current and planned future use of the site is as a gasoline and service station, and no site development activities are expected or planned in the future,.

  With respect to leaching to groundwater RBC exceedances, ingestion and inhalation of groundwater is not considered an applicable exposure pathway at the

site, and no compounds were detected in groundwater above the potentially applicable DEQ Appendix A or site-specific RBCs.

- As mentioned above, petroleum related constituents were detected in the groundwater samples collected from the site. In general, the relatively low concentrations declined substantially in the downgradient direction away from the former UST tank pit. Over a distance of approximately 30 ft from the former UST location, concentrations of petroleum related constituents generally decreased by one (1) to two (2) orders of magnitude. However, in the groundwater sample collected from the most downgradient location along the northern property boundary (Soil Boring B-9), several petroleum related constituents were detected at low part per billion (ppb) levels. None of the detected compounds in any of the groundwater samples exceeded the applicable DEQ Appendix RBCs identified for the site (i.e., volatilization to outdoor air, vapor intrusion into buildings, and groundwater in an excavation).

  Adjacent to the northern and downgradient boundary of the site is a relatively narrow paved parking lot (extending approximately 20 ft in the northerly direction). North of the narrow parking lot is industrial property that contains various buildings, machinery, and debris. Directly north and downgradient of the paved parking lot is a building, which extends approximately 30 ft north toward the river. The river is located approximately 500 ft north of the building. Land north of the Highway Service site is zoned commercial to the Columbia River shoreline. No changes to the zoning between the site and Columbia River are planned. Considering the distance from the Highway Service site (approximately 50 ft) that a downgradient boring could be located on industrial property, additional off-site source areas of petroleum related constituents may be encountered. In addition, it is also expected that the relatively low concentrations of petroleum related constituents detected in groundwater samples downgradient of the former UST will naturally attenuate further with time.

- No petroleum related constituents detected in groundwater samples collected from the most downgradient sampling location (i.e., Soil Boring B-9 located

closest to the Columbia River) exceeded DEQ Level II Ecological Risk Assessment Screening Level Values or OAR 340-41 Table 20 or Table 33C Water Quality Criteria.

Recommendations

RSV recommends that DEQ consider the Highway Service site for closure using Risk-Based Concentrations (OAR 340-122-0244) considering the following:

1) Contamination at the site is limited to petroleum based constituents.
2) Petroleum related hazardous constituents identified at the site are listed in the DEQ Appendix A Table of RBCs.
3) The site is zoned commercial and the current and future planned use of the site is as a gasoline and service station. The only exceedances for petroleum related compounds of applicable exposure pathways identified were ingestion, inhalation, and dermal contact of soils impacted with TPH-Oil and migration to groundwater from soils impacted with TPH-Oil and metals near the former UST tank pit. The soil exceeding the ingestion, inhalation, and dermal contact exposure pathway is at a depth of 6 feet or below; greater than the 3 foot recommended depth to consider for occupational workers as described in the DEQ Risk-Based Decision Making for the Remediation of Petroleum Contaminated Sites guidance. The current and planned future use of the site is as a gasoline and service station. No site development is expected or planned in the future, and exposure to the impacted soils is unlikely.
4) Groundwater samples did not reveal exceedances of DEQ Appendix A RBCs for applicable exposure pathways identified for the site (i.e., Volatilization to Outdoor Air, Vapor Intrusion into Buildings, or Groundwater in an Excavation for Occupational, Construction worker or Excavation worker pathways).

For these reasons, Niemi Oil requests that DEQ proceed to close this site.

REFERENCES

Level II Screening Level Values, Guidance for Ecological Risk Asessment. Oregon Department of Environmental Quality, December, 2001.

Region 9 Preliminary Remediation Goals (PRGs). United States Environmental Protection Agency, October 1, 2003.

Region 9 Preliminary Remediation Goals (PRGs) User's Guide. United States Environmental Protection Agency, October 1, 2002.

Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites. Oregon Department of Environmental Quality, September 22, 2003.

Calculating RBCs for Total Petroleum Hydrocarbons (Microsoft Excel® Spreadsheet). Oregon Department of Environmental Quality, September 22, 2003.

Soil Cleanup Manual. Oregon Department of Environmental Quality, April, 1994.

Soil Survey of Clatsop County, Oregon. United States Department of Agriculture, Soil Conservation Service, February, 1988.

Table 1
Soil Sampling Results-TPH
Highway Service 76 Station
Astoria, Oregon

			HCID			TPH mg/kg		
Sample ID	Depth(ft)	Date	Gasoline	Diesel	Oil	TPH-Gx	TPH-Dx	TPH-Oil
North BOT	6	10/18/99	ND	ND	ND	NA	<2,500	78,000
South BOT	6	10/18/99	ND	ND	ND	NA	<2,500	19,000
GP-1	2-4	10/10/03	ND	ND	ND	NA	NA	NA
GP-1	17-18	10/10/03	ND	ND	ND	NA	NA	NA
GP-2	2-4	10/10/03	ND	ND	ND	<6.2	<31	<130
GP-2	17-19	10/10/03	ND	ND	ND	<5.5	<28	<110
GP-3	2-4	10/10/03	ND	ND	ND	<6.2	<32	7.2
GP-3	17-19	10/10/03	ND	ND	ND	<5.6	11	85
GP-4	2-4	10/10/03	ND	ND	ND	<6.3	<31	9.6
GP-4	15-17	10/10/03	ND	ND	ND	<5.2	<26	<110
GP-5	2-4	10/10/03	ND	ND	ND	NA	NA	NA
GP-5	16-18	10/10/03	ND	ND	ND	NA	NA	NA
GP-6	2-4	10/10/03	ND	ND	ND	NA	NA	NA
B-7	0-4	9/28/04	NA	NA	NA	<4.9	<20	28J
B-7	13-15	9/28/04	NA	NA	NA	42	2,600	12,000
Appendix A Risk Based Concentrations								
Soil Ingestion Dermal Contact and Inhalation		Occupational	NS	NS	NS	22,000	70,000	21,000*
		Construction Worker	NS	NS	NS	13,000	23,000	6,700*
		Excavation Worker	NS	NS	NS	---	---	190,000*
Volitilization to Outdoor Air		Occupational	NS	NS	NS	80,000	---	---*
Vapor Intrusion to Buildings		Occupational	NS	NS	NS	---	---	---*
Leaching to Groundwater		Occupational	NS	NS	NS	110	---	---*

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum -Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) RBCs provided in mg/kg
(3) NS = No Appendix A RBC provided by DEQ
(4) ND = Not Detected
(5) NA = not analyzed for
(6) **26** Meets or exceeds one or more RBC.
(7) --- The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)
(8) 9,200* Site-Specific RBC calculated with conservative assumption regarding VPH and EPH distribution of TPH-Oil Fraction. No Appendix A RBC provided by DEQ

Table 2
Soil Sampling Results -Metals
Highway Service 76 Station
Astoria, Oregon

			(mg/kg)		
Sample ID	Depth (ft)	Date	Cadmium	Chromium	Lead
GP-2	2-4	10/10/03	0.352	[redacted]	6.51
GP-2	17-19	10/10/03	0.030	7.23	2.26
GP-3	2-4	10/10/03	0.291	[redacted]	9.44
GP-3	17-19	10/10/03	0.39	9.81	2.49
GP-4	2-4	10/10/03	0.417	30.8	7.78
GP-4	15-17	10/10/03	0.031	7.58	2.07
B-7	0-4	9/28/04	<0.003*	0.004J*	<0.02*
B-7	13-15	9/28/04	0.043	7.54	[redacted]
Appendix A Risk Based Concentrations (RBCs)[1]					
Soil Ingestion, Dermal Contact and Inhalation	Occupational		450*	450*	750
	Construction Worker		450*	450*	750
	Excavation Worker		450*	450*	750
Volatilization to Outdoor Air	Occupational		NS/NA	NS/NA	NA
Vapor Intrusion to Buildings	Occupational		NS/NA	NS/NA	NA
Leaching to Groundwater	Occupational		8*	38*	30

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) RBCs provided in mg/kg
(3) NS = No Appendix A RBC provided by DEQ.
(4) NA = Pathway not applicable to the chemical of interest according to Appendix A.
(5) 450* From United States Environmental Protection Agency Region 9 Preliminary Remediation Goals, October 1, 2003. Leaching to Groundwater Pathway represents a DAF of 20. No Appendix A PRG provided by DEQ.
(6) [redacted] Meets or exceeds one of more RBC

Table 3
Soil Sampling Results - Leachable Metals
Highway Service 76 Station
Astoria, Oregon

			(mg/L)		
Sample ID	**Depth (ft)**	**Date**	**Cadmium**	**Chromium**	**Lead**
B-7	0-4	9/28/04	<0.003	0.004J	<0.02
B-7	13-15	9/28/04	<0.003	<0.003	0.04J
DEQ Hazardous Substance Remedial Action Rules - Soil Cleanup Table					
Soil Cleanup Level			0.5	10	2

Notes:

(1) Soil Cleanup Level from DEQ Hazardous Substance Remedial Action Rules (OAR 340 -122), Oregon Soil Cleanup Table, July 27,2002)

(2) Soil Cleanup Levels provided in mg/L

Table 4
Soil Sampling Results-PAHs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Depth (ft)	Date	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo (a) anthracene	Chrysene	Benzo (b) fluoranthene	Benzo (k) fluoranthene	Benzo (e) pyrene	Dibenzo (a,h) anthracene	Benzo (g,h,i) perylene	Indeno (1,2,3-cd) pyrene	2-Metylnaphatene	Dibenzofuran
GP-2	2-4	10/10/03	0.36	<5.0	<5.0	<5.0	0.54	<5.0	<5.0	<5.0	<5.0	0.29	<5.0	<5.0	<5.0	<5.0	0.15	<5.0	0.35	<5.0
GP-2	17-19	10/10/03	0.47	<5.0	<5.0	<5.0	0.22	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0.26	<5.0
GP-3	2-4	10/10/03	0.68	<5.1	<5.1	<5.1	0.40	<5.1	0.30	0.31	<5.1	0.26	<5.1	<5.1	<5.1	<5.1	0.22	<5.1	0.84	<5.1
GP-3	17-19	10/10/03	0.67	<5.0	<5.0	0.29	6.9	0.31	1.7	4.2	1.7	8.9	3.0	<5.0	1.6	2.1	4.6	0.67	1.7	0.28
GP-4	2-4	10/10/03	0.30	<5.0	<5.0	<5.0	0.56	<5.0	0.37	0.42	<5.0	0.26	<5.0	<5.0	<5.0	<5.0	0.22	0.23	<5.0	<5.0
GP-4	15-17	10/10/03	0.38	<4.9	<4.9	<4.9	0.21	<4.9	<4.9	0.15	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	0.18	<4.9	0.33	<4.9
GP-5	2-4	10/10/03	0.45	0.38	<5.0	<5.0	3.5	0.47	6.2	10	2.3	4.1	2.6	2.0	3.1	0.49	4.9	3.1	0.33	<5.0
GP-5	16-18	10/10/03	19	<5.1	1.3	1.3	6.7	0.30	3.3	11	1.1	2.4	<5.1	<5.1	<5.1	<5.1	2.2	0.91	2.8	0.91
B-7	0-4	38258.00	0.91J	<3.3	<3.3	<3.3	0.58J	<3.3	0.78J	0.87J	0.22J	<3.3	<3.3	<3.3	0.41J	<3.3	0.74J	0.41J	<3.3	<3.3
B-7	13-15	38258.00	7.7	1.3J	0.85J	<2.8	2.8J	0.97J	2.0	4.6	1.5J	5.1J	1.9J	0.93J	2.3J	0.80J	100	9.7	12	<2.8
Appendix A Risk Based Concentrations																				
Soil Ingestion, Dermal Contact Inhalation		Occupational	770,000	NS	41,000,000	35,000,000	NS	---	29,000,000	21,000,000	2,700	270,000	2,700	27,000	270	270	NS	2,700	NS	NS
		Construction Worker	710,000	NS	16,000,000	12,000,000	NS	90,000,000	8,900,000	6,700,000	21,000	2,100,000	21,000	210,000	2,100	2,100	NS	21,000	NS	NS
		Excavation Worker	20,000,000	NS	---	---	NS	---	---	---	590,000	59,000,000	590,000	5,900,000	59,000	59,000	NS	590,000	NS	NS
Volitilization to Outdoor Air		Occupational	---	NS	---	---	NS	---	---	---	---	---	---	---	---	---	NS	---	NS	NS
Vapor Intrusion to Buildings		Occupational	---	NS	---	---	NS	---	---	---	---	---	---	---	---	---	NS	---	NS	NS
Leaching to Groundwater		Occupational	15,000	NS	---	---	NS	---	---	---	---	---	---	---	---	---	NS	---	NS	NS

Notes:

(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) NS = No Appendix A RBC provided by DEQ
(3) --- The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)
(4) Results and RBCs provided in µg/kg

Table 5
Soil Sampling Results-VOCs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Depth (ft)	Date	Benzene	Toulene	Ethylbenzene	Xylenes	Isopropylbenzene	N-propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Methyl-Tert-Buytl-Ether (MTBE)	1,2-dibromoethane (EDB)	1,2-dichloroethane (EDC)	Naphthalene	Methylene Chloride
GP-2	2-4	10/10/03	<6.3	<6.3	<6.3	<12.6	<26	<26	<26	<26	<6.3	<26	<6.3	<26	3.5
GP-2	17-19	10/10/03	<5.5	<5.5	<5.5	<11.0	<22	<22	<22	<22	<5.5	<22	<5.5	<22	2.5
GP-3	2-4	10/10/03	<6.2	<6.2	<6.2	<12.4	<25	<25	<25	<25	1.0	<25	<6.2	<25	4.1
GP-3	17-19	10/10/03	<5.6	<5.6	<5.6	<11.2	<23	<23	<23	<23	<5.6	<23	<5.6	<23	2.4
GP-4	2-4	10/10/03	<6.2	<6.2	<6.2	<12.4	<25	<25	<25	<25	<6.2	<25	<6.2	<25	3.0
GP-4	15-17	10/10/03	<5.2	<5.2	<5.2	<10.4	<21	<21	<21	<21	<5.2	<21	<5.2	<21	1.4
GP-5	2-4	10/10/03	<6.1	<6.1	<6.1	<12.2	<25	<25	<25	<25	<6.1	<25	<6.1	<25	1.6
GP-5	16-18	10/10/03	<6.8	<6.8	7.3	43.4	3.6	9.0	61	7.0	<6.8	<27	<6.8	1.6	22
B-7	0-4	9/28/2004	<6.5	<6.5	<6.5	<6.5	<26	<26	<26	<26	<6.5	<26	<6.5	<26	NA
B-7	13-15	9/28/2004	<5.6	1.1J	14	59	2.8J	13J	25	28	<5.6	<23	<5.6	1.8J	NA
Appendix A Risk Based Concentrations															
Soil Ingestion, Dermal Contact and Inhalation	Occupational		34,000	68,000,000	74,000,000	24,000,000	51,000,000	19,000,000	1,500,000	1,500,000	760,000	33	15,000	770,000	21,000*
	Construction Worker		340,000	39,000,000	28,000,000	19,000,000	24,000,000	9,300,000	1,400,000	1,400,000	9,000,000	250	180,000	710,000	NS
	Excavation Worker		9,400,000	—	—	—	—	—	40,000,000	40,000,000	—	7,100	5,000,000	20,000,000	NS
Volatilization to outdoor air	Occupational		48,000	—	—	—	—	—	790,000	—	720,000	1,700	14,000	—	NS
Vapor Intrusion to Buildings	Occupational		1,200	—	—	—	—	—	840,000	140,000	35,000	370	560	—	NS
Leaching to Groundwater	Occupational		52	180,000	—	100,000	—	—	55,000	12,000	300	0.59	7.4	15,000	20*

Notes:
(1) DEQ Risk Based Concentrations from Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) NS = No Appendix A RBC provided by DEQ
(3) ND = Not Detected
(4) NA = Not analyzed for
(5) **22** Meets or exceeds one or more Appendix A RBC
(6) — The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)
(7) Results and RBCs provided in µg/kg
(8) 21,000* From United States Environmental Protection Agency Region 9 Preliminary Remediation Goals, October 1, 2003.

Table 6
Groundwater Sampling Results - TPH
Highway Service 76 Station
Astoria, Oregon

		HCID			TPH µg/L		
Sample ID	**Date**	**Gasoline**	**Diesel**	**Oil**	**Gx**	**Dx**	**Oil**
GP-1	10/10/03	D	ND	ND	86	NA	NA
GP-2	10/10/03	D	D	ND	39	3,200	110
B-7	9/28/04	NA	NA	NA	2,400	2,800	5,100
B-8	10/13/04	NA	NA	NA	330	210J	190J
B-9	10/13/04	NA	NA	NA	120J	110J	86J
Appendix A Risk Based Concentrations							
Volatilization to outdoor air	Occupational	NS	NS	NS	---	---	---*
Vapor Intrusion to Buildings	Occupational	NS	NS	NS	---	---	---*
Groundwater in Excavation	Construction and Excavation Worker	NS	NS	NS	12,000	9700 ---	14,000*

Notes:

(1) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A: Table of Risk-Based Concentrations (RBCs), September 22, 2003.

(2) RBCs provided in ug/L

(3) NS = No Appendix A RBC provided by DEQ

(4) ND = Not Detected

(5) NA = not analyzed for

(6) **61,000** Meets or exceeds one or more Appendix A RBC

(7) --- The Soil RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)

(8) 14,000* Site-Specific RBC. No Appendix A RBC provided by DEQ

Table 7
Groundwater Sampling Results -Metals
Highway Service 76 Station
Astoria, Oregon

		(µg/L)		
Sample ID	**Date**	**Cadmium**	**Chromium**	**Lead**
GP-1	10/10/03	0.18	4.15	58.6
GP-2	10/10/03	0.07	1.13	5.4
B-7	9/28/04	0.04	0.34	0.268
B-8	10/13/04	0.04	0.06	0.23
B-9	10/13/04	0.02	0.19	0.09
Appendix A Risk Based Concentrations (RBCs)				
Volatilization to outdoor air	Occupational	NS	NS	N/A
Vapor Intrusion to Buildings	Occupational	NS	NS	N/A
Groundwater in Excavation	Construction and Excavation Worker	NS	NS	N/A

*From United States Environmental Protection Agency, Region 9 Preliminary Remediation Goals, October 1, 2003

Notes:

(1) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A:Table of Risk-Based Concentrations (RBCs), September 22, 2003.
(2) RBCs provided in ug/L
(3) NS = No Appendix A RBC provided by DEQ
(4) ND = Not Detected
(5) **60** Meets or exceeds one of more Appendix A RBC
(6) N/A = Pathway not applicable to the chemical of interest according to Appendix A

Table 8
Groundwater Sampling Results- PAHs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Date	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a) anthracene	Chrysene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Benzo(a)pyrene	Dibenzo(a,h) anthracene	Benzo(ghi) perylene	Indeno(1,2,3-cd) pyrene	2-Methyl napthalene	Dibenzofuran
GP-2	10/10/03	0.039	0.0051	0.021	0.010	0.015	0.0023	0.010	0.022	0.0031	0.0059	0.0030	0.0028	<0.020	<0.020	0.0056	<0.020	0.031	<0.020
B-7	09/28/04	1.3	<0.023	0.082	0.080	0.019J	0.015J	0.020J	0.13	0.014J	0.024	0.017J	0.0049J	0.012J	<0.023	0.054	0.014J	0.27	0.011J
B-8	10/13/04	0.12	0.0035J	0.014J	0.011J	0.013J	0.0056J	0.0075J	0.0091J	0.0084J	0.0064J	0.0071J	0.0076J	0.0079J	0.0095J	0.0098J	0.0092J	0.11	0.013J
B-9	10/13/04	0.088	<0.028	<0.028	0.0074J	0.0099J	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028	0.083	<0.028
Appendix A Risk Based Concentrations																			
Volatilization to outdoor air	Occupational	---	NS	---	---	NS	---	---	---	---	---	---	---	---	---	NS	---	NS	NS
Vapor Intrusion Into Buildings	Occupational	---	NS	---	---	NS	---	---	---	---	---	---	---	---	---	NS	---	NS	NS
Groundwater in Excavation	Construction and Excavation	680	NS	---	---	NS	---	---	---	9.1	---	---	---	0.53	0.21	NS	2.9	NS	NS
Level II Screening Level Values																			
Suface Water	Aquatic	620	NS	520	3.9	6.3	13	6.16	NS	0.027	NS	NS	NS	0.014	NS	NS	NS	2.1	3.7
	Birds	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Mammals	284,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
OAR 340-41 Table 20 or Table 33C Water Quality Criteria																			
Protection of Aquatic Life	Fresh Acute	2,300	NS	1,700	NS	NS	NS	3,980	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Fresh Chronic	620	NS	520	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Marine Acute	2,350	NS	970	NS	NS	NS	40	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Marine Chronic	NS	NS	710	NS	NS	NS	16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes:

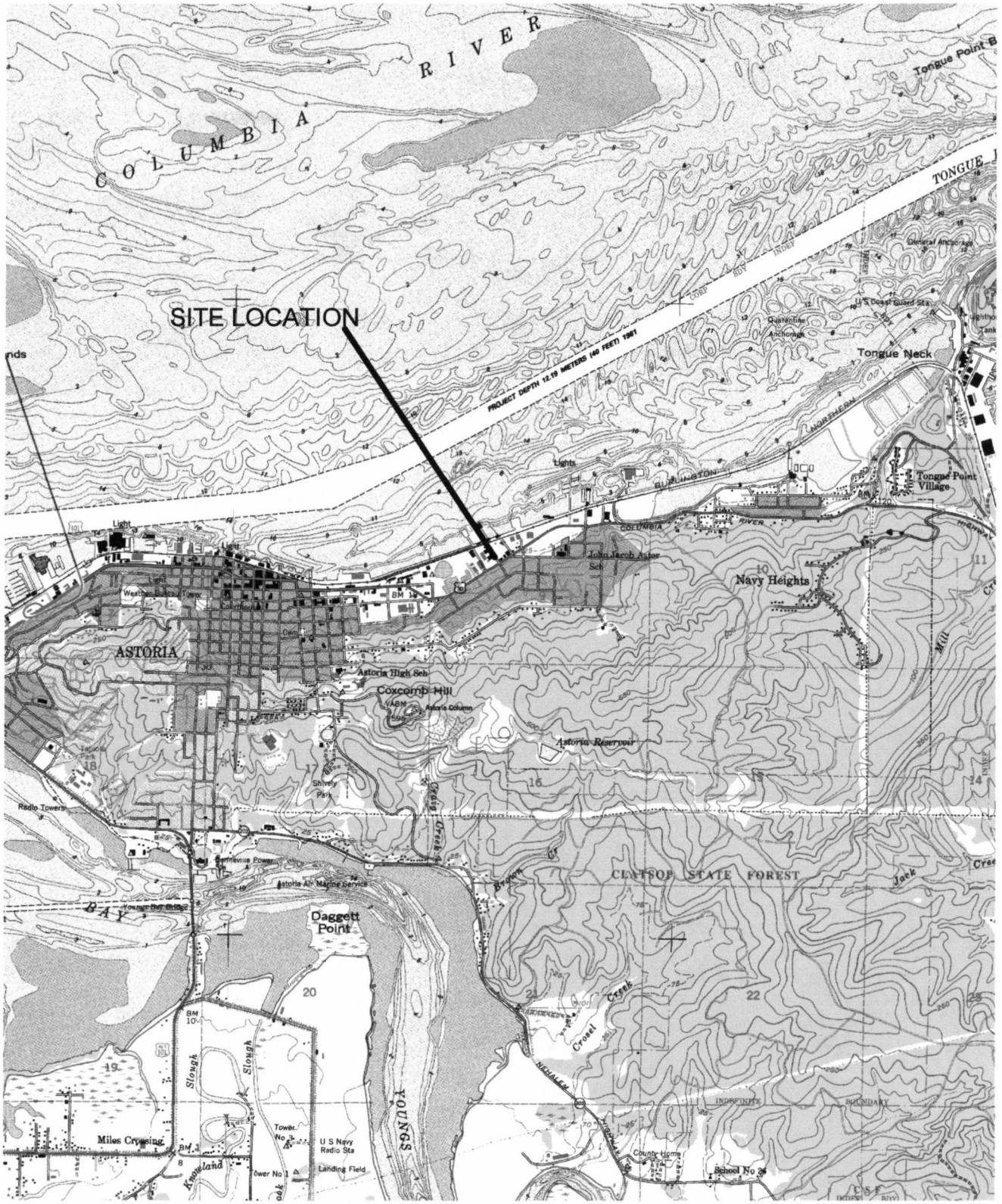
(1) DEQ Risk Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated Sites, Appendix A: Table of Risk Based Concentrations (RBCs), September 22, 2003
(2) NS = No Appendix A RBC provided by DEQ
(3) --- The Groundwater RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)
(4) Results and RBCs provided in µg/L

Table 9
Groundwater Sampling Results-VOCs
Highway Service 76 Station
Astoria, Oregon

Sample ID	Date	Benzene	Toulene	Ethylbenzene	Xylenes	Isopropylbenzene	N-propylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Methyl-Tert-Butyl-Ether (MTBE)	1,2-dibromoethane (EDB)	1,2-dichloroethane (EDC)	Naphthalene
GP-1	10/10/2003	0.18J	0.26J	<0.50	0.45J	<2.0	<2.0	<2.0	<2.0	<0.50	<2.0	<0.50	NA
GP-2	10/10/2003	<0.50	0.12J	<0.50	<1.0	<2.0	<2.0	<2.0	<2.0	<0.50	<2.0	<0.50	NA
B-7	9/28/2004	12	2.4	7.5	3.08	68	96	0.98J	0.47J	<0.50	<2.0	<0.50	1.9J
B-8	10/13/2004	53	0.32J	0.42J	0.87	5.1	6.6	0.40J	0.13J	2.2	<2.0	<0.50	NA
B-9	10/13/2004	38	0.36J	0.27J	0.58J	2.3	4.4	0.39J	<2.0	2.7	<2.0	<0.50	NA
Appendix A Risk-Based Concentrations													
Volatilization to outdoor air	Occupational	13,000	---	---	---	---	---	---	---	550,000	2,500	9,000	---
Vapor Intrusion Into Buildings	Occupational	2,700	---	---	---	---	---	51,000	38,000	280,000	1,800	3,600	---
Groundwater in Excavation	Construction and Excavation Worker	1,700	78,000	110,000	22,000	51,000	18,000	1,300	1,400	31,000	20	600	680
Level II Screening Level Values													
Suface Water	Aquatic	130	9.8	7.3	1.8	NS	NS	NS	NS	NS	NS	20,000	620
	Birds	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	125,000	NS
	Mammals	NS	104,000	NS	NS	NS	NS	NS	NS	NS	NS	200,000	284,000
OAR 340-41 Table 20 or Table 33C Water Quality Criteria													
Protection of Aquatic Life	Fresh Acute	5,300	17,500	32,000	NS	NS	NS	NS	NS	NS	NS	118,000	2,300
	Fresh Chronic	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	20,000	620
	Marine Acute	5,100	6,300	430	NS	NS	NS	NS	NS	NS	NS	113,000	2,350
	Marine Chronic	700	5,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

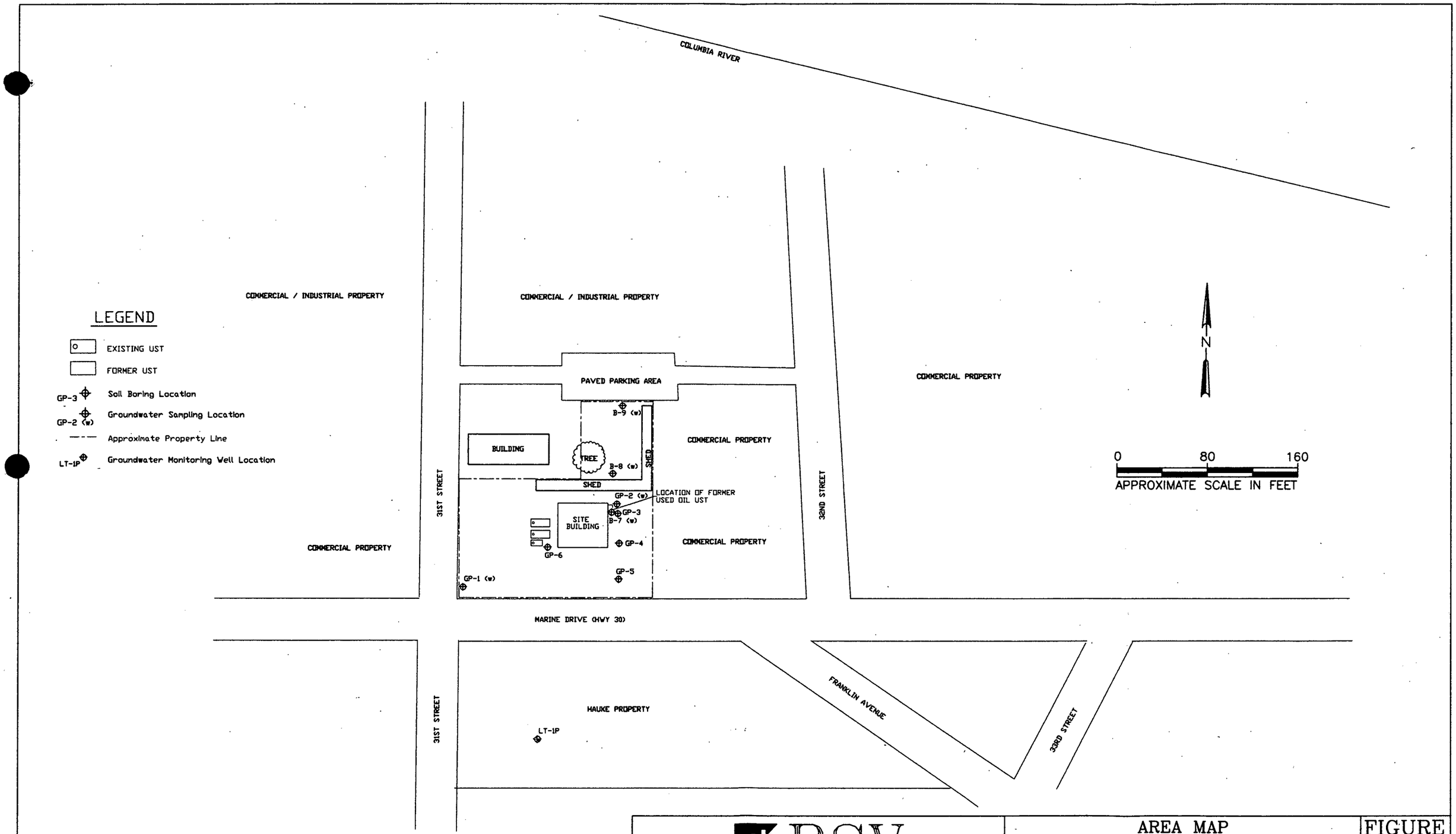
Notes:

(1) Sampling results provided in ug/L
(2) DEQ Risk-Based Concentrations from Risk-Based Decision making for the Remediation of Petroleum-Contaminated sites, Appendix A: Table of Risk-Based Concentrations (RBCs), September 22, 2003
(3) RBCs provided in ug/L
(4) **30,000** Meets or exceeds one or more Appendix A RBC
(5) --- The Groundwater RBC exceeds the limit of three-phase equilibria partioning, or is greater than the maximum amount that would be present if all initial air space is filled with petroleum product (Appendix A Footnotes)



Adapted from the USGS Astoria, Oregon-Washington 1:24,000 topographic map, 1949, Photorevised 1984

RSV ENGINEERING, INC.	SITE LOCATION MAP NIEMI OIL - HIGHWAY SERVICE ASTORIA, OREGON				FIGURE 1
DRAWN	CHECKED	APPROVED	DATE	DRAWING NO.	
CCA			11/6/03	03-135-01	

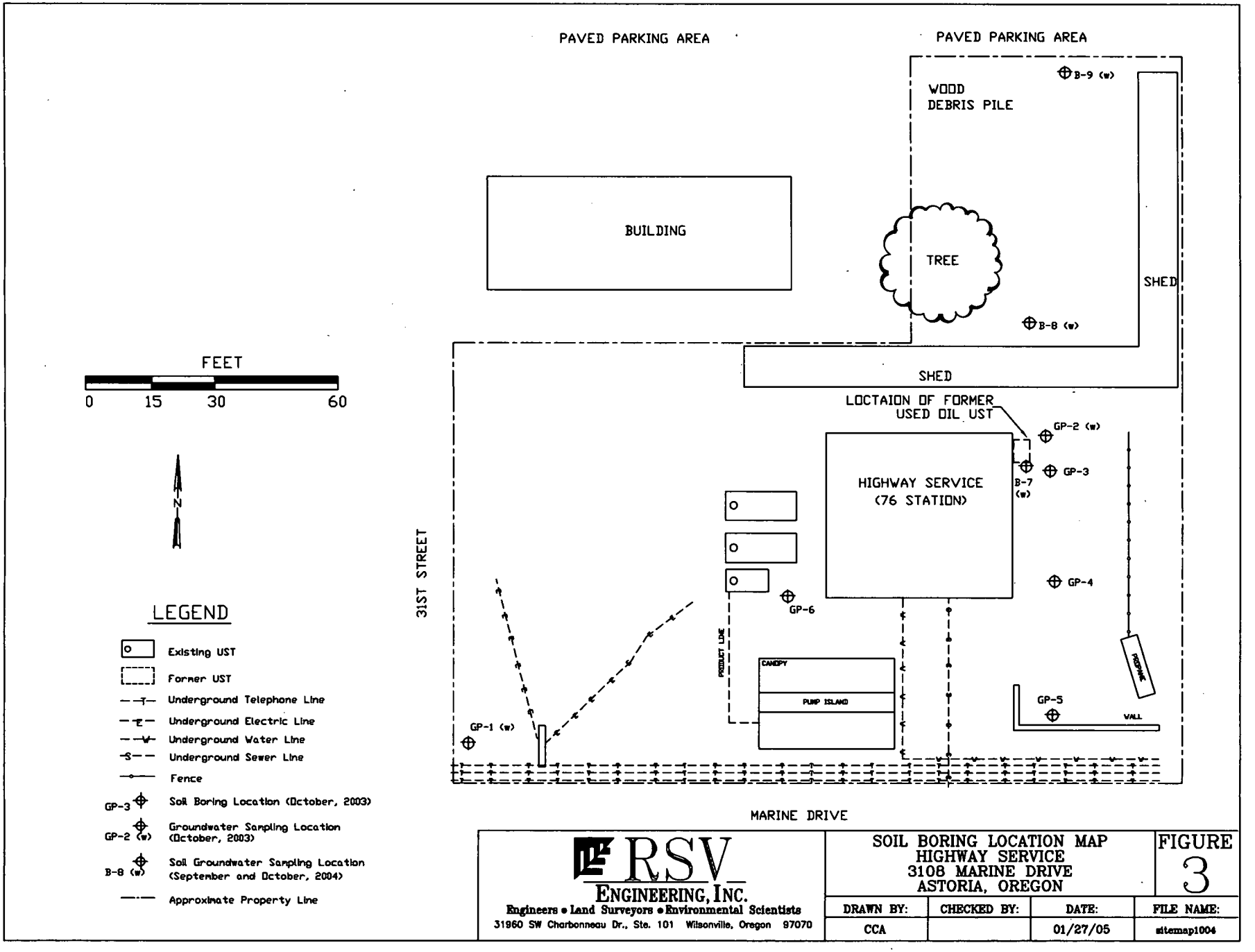


RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

AREA MAP
HIGHWAY SERVICE
3108 MARINE DRIVE
ASTORIA, OREGON

FIGURE 2

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
CCA		01/28/05	areamap0105



RSV ENGINEERING, INC.
Engineers • Land Surveyors • Environmental Scientists
31960 SW Charbonneau Dr., Ste. 101 Wilsonville, Oregon 97070

SOIL BORING LOCATION MAP
HIGHWAY SERVICE
3108 MARINE DRIVE
ASTORIA, OREGON

FIGURE 3

DRAWN BY:	CHECKED BY:	DATE:	FILE NAME:
CCA		01/27/05	sitemap1004

RSV ENGINEERING, INC
31960 SW Charbonneau Drive, #101
Wilsonville, Oregon 97070
TEL (503) 694-6960
FAX (503) 694-6962

LOCATION MAP

SEE SITE PLAN

WELL/BORING NUMBER **B-7**

PROJECT NAME:Highway Service 76 Station
PROJECT NUMBER: 03-135
LOCATION: 3108 Marine Drive, Astoria, Oregon
LOGGED BY: Craig Arola
REVIEWED BY:
DATE: 9/28/04

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION & INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)	BOREHOLE/WELL CONSTRUCTION DETAIL
										Asphalt	
GS		0		B-7@ 0'-4'					SM	Silty Sand with trace clay, tan-brown, decreasing clay content with depth	
		0			5					Same as above, increasing sand content with depth, gray-tan	
		0									
		0			10					gray silty sand, slight odor 12 to 13 ft	
		0									
		4		B-7@ 13-15'							
			▽		15					Same as above, saturated at 16 ft	
					20					End of Boring, 20 ft	
					25						
					30						

DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe
SAMPLING METHOD: Geoprobe
DRILLING START TIME:4:25
DRILLING END TIME:4:35

WELL ID TAG: NA
WELL START CARD NO.: NA
RIM ELEVATION: NA
CASING ELEVATION: NA
DATUM: NA

TIME	DATE	DTW

RSV ENGINEERING, INC
31960 SW Charbonneau Drive, #101
Wilsonville, Oregon 97070
TEL (503) 694-6960
FAX (503) 694-6962

LOCATION MAP

SEE SITE PLAN

WELL/BORING NUMBER **B-8**

PROJECT NAME:Highway Service 76 Station
PROJECT NUMBER: 03-135
LOCATION: 3108 Marine Drive, Astoria, Oregon
LOGGED BY: Craig Arola
REVIEWED BY:
DATE: 10/12/04

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION & INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)
										0-4" Brown-black sandy silt topsoil, small roots
	30,27,22	0							SM	0.4" - 1.5 ft Tan f-m sand, trace silt, single grained dry to moist, poorly sorted, no odor
	10,9,10								SM	1.5 to 3 ft Same as above, slightly siltier, no odor, trace gravel, angular to subangular, up to 3/8" diameter
	8,12,10	0							SM	3 to 4.5 ft Same as above, inc. moisture content with depth, sand finer with depth
	6,6,5				5				SM	4.5 to 6 ft Same as above, inc. moisture content with depth
	3,6,9	0	▽						SM	6 to 7 ft same as above, saturated at 7 ft 7 to 7.5 ft Brown to dark brown silty sand saturated, slight odor from 7 to 7.2 ft
		3							SM	7.5 to 9 ft Brown to dark brown silty sand as above, saturated, no odor
		0			10				SM	blind drill to 14 ft, cuttings silty sand
		0								End of boring, 14 ft set 2-inch sch. 40 PVC screen from 14 to 4 ft bgs riser from 4 ft bgs to 1 ft above ground surface
					15					
					20					
					25					
					30					

BOREHOLE/WELL CONSTRUCTION DETAIL

DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe
SAMPLING METHOD: Geoprobe
DRILLING START TIME:4:25
DRILLING END TIME:4:35

WELL ID TAG: NA
WELL START CARD NO.: NA
RIM ELEVATION: NA
CASING ELEVATION: NA
DATUM: NA

TIME	DATE	DTW

RSV ENGINEERING, INC
31960 SW Charbonneau Drive, #101
Wilsonville, Oregon 97070
TEL (503) 694-6960
FAX (503) 694-6962

LOCATION MAP

SEE SITE PLAN

WELL/BORING NUMBER **B-9**

PROJECT NAME:Highway Service 76 Station
PROJECT NUMBER: 03-135
LOCATION: 3108 Marine Drive, Astoria, Oregon
LOGGED BY: Craig Arola
REVIEWED BY:
DATE: 10/12/04

SAMPLE INFORMATION

SAMPLE TYPE	BLOW COUNTS	PID (ppm)	First Water	LAB SAMPLE I.D.	DEPTH bgs (ft)	SAMPLE LOCATION	SAMPLE INTERVAL	REC %	STRATA	SOIL TYPE	DESCRIPTION (USCS Classification, Depth Interval, Color, Grain Size, Plasticity, Shapes, Mineral Size, Density or Consistency, Moisture, Odor, Geological Interpretation)	BOREHOLE/WELL CONSTRUCTION DETAIL
											0-6" Dark brown sandy silt topsoil, small roots	
	11,21,24	0								SM	6" - 1.5 ft Tan-brown f-m silty sand, trace clay	
	6,7,7									SM	1.5 to 3 ft Same as above, no clay, slightly coarser than above	
	9,10,10	0								SM	3 to 4.5 ft Same as above	
	4,4,5				5					SM	4.5 to 6 ft Same as above, inc. moisture content with depth	
	5,4,6	0	▽							SM	6 to 7.3 ft same as above, saturated at 6.5 ft sharp contact with below 7.3 to 7.5 ft gray sand f-m, saturated	
	5,7,5	0								SM	7.5 to 9 ft Same os 7.3 to 7.5 ft above saturated saturated, no odor	
					10					SM	blind drill to 14 ft, cuttings silty sand	
					15						End of boring, 14 ft set 2-inch sch. 40 PVC screen from 14 to 4 ft bgs riser from 4 ft bgs to 1 ft above ground surface	
					20							
					25							
					30							

DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe
SAMPLING METHOD: Geoprobe
DRILLING START TIME:4:25
DRILLING END TIME:4:35

WELL ID TAG: NA
WELL START CARD NO.: NA
RIM ELEVATION: NA
CASING ELEVATION: NA
DATUM: NA

TIME	DATE	DTW

1317 South 13th Avenue P.O. Box 479 Kelso, Washington 98626 (360) 577-7222 ph (360) 636-1068 fax

Columbia Analytical Services INC.
An Employee - Owned Company

November 10, 2004 Service Request No: K2408133

Craig Arola
RSV Engineering Inc.
31960 SW Charbonneau Drive
Suite 201
Wilsonville, OR 97070

RE: Highway Service / 03-135

Dear Craig:

Enclosed are the revised pages for the sample(s) submitted to our laboratory on October 14, 2004. For your reference, these analyses have been assigned our service request number K2408133.

The additional analysts you requested have been added to the 8260 report pages.

Please call if you have any questions. My extension is 3280.

Respectfully submitted,

Columbia Analytical Services, Inc.

Les Kennedy
Project Chemist

LK/jeb

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
B	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.
*	The duplicate analysis not within control limits. See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a chromatographic interference.
X	See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: 10/13/2004
Date Received: 10/14/2004

Volatile Organics by GC/MS

Sample Name: B-8
Lab Code: K2408133-001

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/27/04	10/27/04	KWG0416940	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/27/04	10/27/04	KWG0416940	
Benzene	**53**		0.50	0.11	1	10/27/04	10/27/04	KWG0416940	
Toluene	**0.32**	J	0.50	0.098	1	10/27/04	10/27/04	KWG0416940	
Ethylbenzene	**0.42**	J	0.50	0.13	1	10/27/04	10/27/04	KWG0416940	
m,p-Xylenes	**0.72**		0.50	0.22	1	10/27/04	10/27/04	KWG0416940	
o-Xylene	**0.15**	J	0.50	0.079	1	10/27/04	10/27/04	KWG0416940	
Isopropylbenzene	**5.1**		2.0	0.068	1	10/27/04	10/27/04	KWG0416940	
n-Propylbenzene	**6.6**		2.0	0.098	1	10/27/04	10/27/04	KWG0416940	
1,3,5-Trimethylbenzene	**0.13**	J	2.0	0.13	1	10/27/04	10/27/04	KWG0416940	
1,2,4-Trimethylbenzene	**0.40**	J	2.0	0.15	1	10/27/04	10/27/04	KWG0416940	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Toluene-d8	91	86-114	10/27/04	Acceptable
Dibromofluoromethane	103	85-115	10/27/04	Acceptable
4-Bromofluorobenzene	96	72-115	10/27/04	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: 10/13/2004
Date Received: 10/14/2004

Volatile Organics by GC/MS

Sample Name: B-9
Lab Code: K2408133-002

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/27/04	10/27/04	KWG0416867	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/27/04	10/27/04	KWG0416867	
Benzene	**38**		0.50	0.11	1	10/27/04	10/27/04	KWG0416867	
Toluene	**0.36**	J	0.50	0.098	1	10/27/04	10/27/04	KWG0416867	
Ethylbenzene	**0.27**	J	0.50	0.13	1	10/27/04	10/27/04	KWG0416867	
m,p-Xylenes	**0.46**	J	0.50	0.22	1	10/27/04	10/27/04	KWG0416867	
o-Xylene	**0.12**	J	0.50	0.079	1	10/27/04	10/27/04	KWG0416867	
Isopropylbenzene	**2.3**		2.0	0.068	1	10/27/04	10/27/04	KWG0416867	
n-Propylbenzene	**4.4**		2.0	0.098	1	10/27/04	10/27/04	KWG0416867	
1,3,5-Trimethylbenzene	ND	U	2.0	0.13	1	10/27/04	10/27/04	KWG0416867	
1,2,4-Trimethylbenzene	**0.39**	J	2.0	0.15	1	10/27/04	10/27/04	KWG0416867	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Toluene-d8	90	86-114	10/27/04	Acceptable
Dibromofluoromethane	103	85-115	10/27/04	Acceptable
4-Bromofluorobenzene	92	72-115	10/27/04	Acceptable

Comments:

00032

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: 10/13/2004
Date Received: 10/14/2004

Volatile Organics by GC/MS

Sample Name: B-20
Lab Code: K2408133-003

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/27/04	10/27/04	KWG0416864	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/27/04	10/27/04	KWG0416864	
Benzene	**54**		0.50	0.11	1	10/27/04	10/27/04	KWG0416864	
Toluene	**0.31**	J	0.50	0.098	1	10/27/04	10/27/04	KWG0416864	
Ethylbenzene	**0.46**	J	0.50	0.13	1	10/27/04	10/27/04	KWG0416864	
m,p-Xylenes	**0.72**		0.50	0.22	1	10/27/04	10/27/04	KWG0416864	
o-Xylene	**0.16**	J	0.50	0.079	1	10/27/04	10/27/04	KWG0416864	
Isopropylbenzene	**5.3**		2.0	0.068	1	10/27/04	10/27/04	KWG0416864	
n-Propylbenzene	**7.4**		2.0	0.098	1	10/27/04	10/27/04	KWG0416864	
1,3,5-Trimethylbenzene	**0.14**	J	2.0	0.13	1	10/27/04	10/27/04	KWG0416864	
1,2,4-Trimethylbenzene	**0.41**	J	2.0	0.15	1	10/27/04	10/27/04	KWG0416864	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Toluene-d8	89	86-114	10/27/04	Acceptable
Dibromofluoromethane	101	85-115	10/27/04	Acceptable
4-Bromofluorobenzene	96	72-115	10/27/04	Acceptable

Comments:

00033

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: NA
Date Received: NA

Volatile Organics by GC/MS

Sample Name: Method Blank
Lab Code: KWG0416864-4

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/26/04	10/26/04	KWG0416864	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/26/04	10/26/04	KWG0416864	
Benzene	ND	U	0.50	0.11	1	10/26/04	10/26/04	KWG0416864	
Toluene	ND	U	0.50	0.098	1	10/26/04	10/26/04	KWG0416864	
Ethylbenzene	ND	U	0.50	0.13	1	10/26/04	10/26/04	KWG0416864	
m,p-Xylenes	ND	U	0.50	0.22	1	10/26/04	10/26/04	KWG0416864	
o-Xylene	ND	U	0.50	0.079	1	10/26/04	10/26/04	KWG0416864	
Isopropylbenzene	ND	U	2.0	0.068	1	10/26/04	10/26/04	KWG0416864	
n-Propylbenzene	ND	U	2.0	0.098	1	10/26/04	10/26/04	KWG0416864	
1,3,5-Trimethylbenzene	ND	U	2.0	0.13	1	10/26/04	10/26/04	KWG0416864	
1,2,4-Trimethylbenzene	ND	U	2.0	0.15	1	10/26/04	10/26/04	KWG0416864	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Toluene-d8	97	86-114	10/26/04	Acceptable
Dibromofluoromethane	112	85-115	10/26/04	Acceptable
4-Bromofluorobenzene	93	72-115	10/26/04	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: NA
Date Received: NA

Volatile Organics by GC/MS

Sample Name: Method Blank
Lab Code: KWG0416867-4

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/27/04	10/27/04	KWG0416867	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/27/04	10/27/04	KWG0416867	
Benzene	ND	U	0.50	0.11	1	10/27/04	10/27/04	KWG0416867	
Toluene	ND	U	0.50	0.098	1	10/27/04	10/27/04	KWG0416867	
Ethylbenzene	ND	U	0.50	0.13	1	10/27/04	10/27/04	KWG0416867	
m,p-Xylenes	ND	U	0.50	0.22	1	10/27/04	10/27/04	KWG0416867	
o-Xylene	ND	U	0.50	0.079	1	10/27/04	10/27/04	KWG0416867	
Isopropylbenzene	ND	U	2.0	0.068	1	10/27/04	10/27/04	KWG0416867	
n-Propylbenzene	ND	U	2.0	0.098	1	10/27/04	10/27/04	KWG0416867	
1,3,5-Trimethylbenzene	ND	U	2.0	0.13	1	10/27/04	10/27/04	KWG0416867	
1,2,4-Trimethylbenzene	ND	U	2.0	0.15	1	10/27/04	10/27/04	KWG0416867	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Toluene-d8	92	86-114	10/27/04	Acceptable
Dibromofluoromethane	105	85-115	10/27/04	Acceptable
4-Bromofluorobenzene	89	72-115	10/27/04	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: NA
Date Received: NA

Volatile Organics by GC/MS

Sample Name: Method Blank
Lab Code: KWG0416940-4

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/27/04	10/27/04	KWG0416940	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/27/04	10/27/04	KWG0416940	
Benzene	ND	U	0.50	0.11	1	10/27/04	10/27/04	KWG0416940	
Toluene	ND	U	0.50	0.098	1	10/27/04	10/27/04	KWG0416940	
Ethylbenzene	ND	U	0.50	0.13	1	10/27/04	10/27/04	KWG0416940	
m,p-Xylenes	ND	U	0.50	0.22	1	10/27/04	10/27/04	KWG0416940	
o-Xylene	ND	U	0.50	0.079	1	10/27/04	10/27/04	KWG0416940	
Isopropylbenzene	ND	U	2.0	0.068	1	10/27/04	10/27/04	KWG0416940	
n-Propylbenzene	ND	U	2.0	0.098	1	10/27/04	10/27/04	KWG0416940	
1,3,5-Trimethylbenzene	ND	U	2.0	0.13	1	10/27/04	10/27/04	KWG0416940	
1,2,4-Trimethylbenzene	ND	U	2.0	0.15	1	10/27/04	10/27/04	KWG0416940	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Toluene-d8	93	86-114	10/27/04	Acceptable
Dibromofluoromethane	105	85-115	10/27/04	Acceptable
4-Bromofluorobenzene	92	72-115	10/27/04	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133

Surrogate Recovery Summary
Volatile Organics by GC/MS

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
B-8	K2408133-001	91	103	96
B-9	K2408133-002	90	103	92
B-20	K2408133-003	89	101	96
Method Blank	KWG0416864-4	97	112	93
Method Blank	KWG0416867-4	92	105	89
Method Blank	KWG0416940-4	93	105	92
Batch QC	K2408178-011	92	106	92
Batch QCMS	KWG0416867-1	101	111	103
Batch QCDMS	KWG0416867-2	99	108	105
Lab Control Sample	KWG0416864-3	104	111	113
Lab Control Sample	KWG0416867-3	99	105	105
Lab Control Sample	KWG0416940-3	99	105	102

Surrogate Recovery Control Limits (%)

Sur1 = Toluene-d8	86-114
Sur2 = Dibromofluoromethane	85-115
Sur3 = 4-Bromofluorobenzene	72-115

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/27/2004
Date Analyzed: 10/27/2004

Matrix Spike/Duplicate Matrix Spike Summary
Volatile Organics by GC/MS

Sample Name: Batch QC
Lab Code: K2408178-011

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low
Extraction Lot: KWG0416867

Analyte Name	Sample Result	Batch QCMS KWG0416867-1 Matrix Spike			Batch QCDMS KWG0416867-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Expected	%Rec	Result	Expected	%Rec			
1,2-Dibromoethane (EDB)	ND	10.6	10.0	106	10.4	10.0	104	71-127	2	30
1,2-Dichloroethane (EDC)	ND	11.1	10.0	111	10.7	10.0	107	72-128	3	30
Benzene	ND	10.2	10.0	102	9.65	10.0	97	81-130	5	30
Toluene	0.44	10.0	10.0	96	9.51	10.0	91	76-130	5	30
Ethylbenzene	ND	11.1	10.0	111	10.8	10.0	108	80-135	3	30
m,p-Xylenes	ND	22.2	20.0	111	21.7	20.0	108	81-135	2	30
o-Xylene	ND	10.9	10.0	109	10.6	10.0	106	80-137	3	30
Isopropylbenzene	ND	10.2	10.0	102	10.0	10.0	100	70-135	2	30
n-Propylbenzene	ND	11.0	10.0	110	10.8	10.0	108	74-143	2	30
1,3,5-Trimethylbenzene	ND	11.9	10.0	119	11.7	10.0	117	75-142	2	30
1,2,4-Trimethylbenzene	ND	12.0	10.0	120	11.8	10.0	118	76-147	1	30

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/26/2004
Date Analyzed: 10/26/2004

Lab Control Spike Summary
Volatile Organics by GC/MS

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0416864

Analyte Name	Lab Control Sample KWG0416864-3 Lab Control Spike Result	Expected	%Rec	%Rec Limits
1,2-Dibromoethane (EDB)	11.1	10.0	111	78-121
1,2-Dichloroethane (EDC)	11.1	10.0	111	76-125
Benzene	9.58	10.0	96	87-122
Toluene	9.32	10.0	93	84-120
Ethylbenzene	11.0	10.0	110	89-124
m,p-Xylenes	22.6	20.0	113	89-126
o-Xylene	10.9	10.0	109	86-129
Isopropylbenzene	10.2	10.0	102	76-127
n-Propylbenzene	10.8	10.0	108	83-134
1,3,5-Trimethylbenzene	11.9	10.0	119	85-131
1,2,4-Trimethylbenzene	11.9	10.0	119	86-138

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00039

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/27/2004
Date Analyzed: 10/27/2004

Lab Control Spike Summary
Volatile Organics by GC/MS

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0416867

	Lab Control Sample KWG0416867-3 Lab Control Spike			
Analyte Name	**Result**	**Expected**	**%Rec**	**%Rec Limits**
1,2-Dibromoethane (EDB)	10.7	10.0	107	78-121
1,2-Dichloroethane (EDC)	10.7	10.0	107	76-125
Benzene	9.21	10.0	92	87-122
Toluene	9.01	10.0	90	84-120
Ethylbenzene	10.4	10.0	104	89-124
m,p-Xylenes	20.8	20.0	104	89-126
o-Xylene	10.2	10.0	102	86-129
Isopropylbenzene	9.43	10.0	94	76-127
n-Propylbenzene	10.3	10.0	103	83-134
1,3,5-Trimethylbenzene	11.3	10.0	113	85-131
1,2,4-Trimethylbenzene	11.5	10.0	115	86-138

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00040

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/27/2004
Date Analyzed: 10/27/2004

Lab Control Spike Summary
Volatile Organics by GC/MS

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0416940

	Lab Control Sample KWG0416940-3 Lab Control Spike			
Analyte Name	**Result**	**Expected**	**%Rec**	**%Rec Limits**
1,2-Dibromoethane (EDB)	9.84	10.0	98	78-121
1,2-Dichloroethane (EDC)	10.3	10.0	103	76-125
Benzene	8.91	10.0	89	87-122
Toluene	8.79	10.0	88	84-120
Ethylbenzene	10.0	10.0	100	89-124
m,p-Xylenes	20.4	20.0	102	89-126
o-Xylene	9.69	10.0	97	86-129
Isopropylbenzene	9.28	10.0	93	76-127
n-Propylbenzene	10.3	10.0	103	83-134
1,3,5-Trimethylbenzene	11.1	10.0	111	85-131
1,2,4-Trimethylbenzene	11.3	10.0	113	86-138

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00041

1317 South 13th Avenue P.O. Box 479 Kelso, Washington 98626 (360) 577-7222 ph (360) 636-1068 fax

Columbia Analytical Services INC.
An Employee - Owned Company

October 26, 2004 Service Request No: K2407643

Craig Arola
RSV Engineering Inc.
31960 SW Charbonneau Drive
Suite 201
Wilsonville, OR 97070

RE: Highway Service / 03-135

Dear Craig:

Enclosed are the results of the sample(s) submitted to our laboratory on September 30, 2004. For your reference, these analyses have been assigned our service request number K2407643.

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAC standards except as noted in the case narrative report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3280.

Respectfully submitted,

Columbia Analytical Services, Inc.

Les Kennedy
Project Chemist

LK/jeb

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
B	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.
*	The duplicate analysis not within control limits. See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a chromatographic interference.
X	See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

Case Narrative

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	RSV Engineering	**Service Request No.:**	K2407643
Project:	Highway Service / 03-135	**Date Received:**	9/30/04
Sample Matrix:	Soil / Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), and Laboratory Control Sample (LCS).

Sample Receipt

Two soil and four water samples were received for analysis at Columbia Analytical Services on 9/30/04 in good condition. Some minor discrepancies between the COC and the bottle labels were noted on the cooler receipt and preservation form. These differences were worked out between the laboratory and RSV Engineering. The samples were stored in a refrigerator at 4°CC upon receipt at the laboratory.

Diesel Range Organics by EPA Method 8015B

Elevated Method Reporting Limits:
Sample B-7 13-15ft required dilution due to the presence of elevated levels of Diesel Range Organics and Residual Range Organics. The reporting limits are adjusted to reflect the dilution.

Gasoline Range Organics by EPA Method 8015B

Relative Percent Difference (RPD) Exceptions:
The RPD criterion for the replicate analysis of Gasoline Range Organics in sample B-7 was outside control criteria. The RPD in the replicate Laboratory Control Sample was acceptable, which indicates the analytical batch was in control. No further corrective action was taken.

Volatile Organic Compounds by EPA Method 8260B

Initial Calibration (ICAL) Exceptions:
The primary evaluation criterion was exceeded for o-Xylene in ICAL ID CAL3744. In accordance with CAS standard operating procedures, the alternative evaluation specified in the EPA method was performed using the mean Relative Standard Deviation (RSD) of all analytes in the calibration. The result of the mean RSD calculation was 10.9%. The calibration meets the alternative evaluation criteria. Note that CAS/Kelso policy does not allow the use of averaging if any analyte in the ICAL exceeds 30% RSD.

Polynuclear Aromatic Hydrocarbons by EPA Method 8270C

Initial Calibration (ICAL) Exceptions:
The primary evaluation criterion was exceeded for Fluorene-d10 in ICAL ID CAL3848. In accordance with CAS standard operating procedures, the alternative evaluation specified in the EPA method was performed using the mean Relative Standard Deviation (RSD) of all analytes in the calibration. The result of the mean RSD calculation was 6.3%. The calibration meets the alternative evaluation criteria. Note that CAS/Kelso policy does not allow the use of averaging if any analyte in the ICAL exceeds 30% RSD.

No additional anomalies associated with the analysis of this batch were observed.

Approved by _____ **Date** 10/26/04

Chain of Custody Documentation

CHAIN OF CUSTODY

Columbia Analytical Services, Inc.
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1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222x07 • FAX (360) 636-1068

SR#: K24[illegible]643

PAGE 1 OF 1 COC #

PROJECT NAME	Highway Service
PROJECT NUMBER	03-135
PROJECT MANAGER	Craig Arola
COMPANY/ADDRESS	RJV Engineering, Inc.
	31960 SW Charbonneau Dr, Ste 101
CITY/STATE/ZIP	Wilsonville, OR 97070
E-MAIL ADDRESS	rjvcca@verizon.net
PHONE #	503-694-6960
FAX #	503-694-6962
SAMPLER'S SIGNATURE	

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	REMARKS
B-7 0-4ft	9-28			S	3	Total and Leachable
B-7 13-15ft	9-28			S	3	Total and Leach-ble
B-7	9-29			W	9	Dissolved
B-20	9-29			W	9	Dissolved
*						

Semivolatile Organics by GC/MS 625 ☐ 8270 ☐ 8270LL ☐
Volatile Organics 624 ☐ 8260 ☐
Hydrocarbons (*see below) Gas ☐ Diesel ☐ Oil ☐
☐ Fuel Fingerprint (F/O)
☐ NW-HCID Screen
Oil & Grease/TRPH 1664-HEM ☐ 1664 SGT ☐
PCB's Aroclors ☐ Congeners ☐
Pesticides/Herbicides 608 ☐ 8081A ☐ 8141A ☐ 8151A ☐
Chlorophenolics 8151M Tri ☐ Tetra ☐ PCP ☐
PAHs 8310 ☐ SIM ☐
Metals, Total or Dissolved (See list below)
Cyanide ☐ Hex-Chrom ☐
pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle)
NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3
TOX 9020 ☐ AOX 1650 ☐ 506 ☐
8021 ☐ BTEX ☐

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required
___ II. Report Dup., MS, MSD as required
___ III. Data Validation Report (includes all raw data)
___ IV. CLP Deliverable Report
___ V. EDD

INVOICE INFORMATION

P.O. # 03-135
Bill To:

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard (10-15 working days)
___ Provide FAX Results
Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca (Cd) Co (Cr) Cu Fe (Pb) Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca (Cd) Co (Cr) Cu Fe (Pb) Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI (NORTHWEST) OTHER: (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

Dissolved metals samples field filtered. Analyze dissolved metals by EPA method 6010 or 6020.
Analyze following VOCs: BTEX, EDB, EDC, MTBE

Analyze
* Two Trips 9/30/04

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: G.A.	Signature: [illegible]	Signature: [illegible]	Signature: [illegible]
Printed Name: Craig Arola	Printed Name: [illegible]	Printed Name: [illegible]	Printed Name:
Date/Time: 9-30-04 11:35	Date/Time: 9/30/04 11:05	Date/Time: 9/30/04 12:45	Date/Time: 9/20/04
Firm:	Firm: CTS	Firm: CTS	Firm:

Columbia Analytical Services Inc.
Cooler Receipt and Preservation Form

PC 685

Project/Client RSV Work Order K240 7643

Cooler received on 9/30/07 and opened on 9/30/07 by AP

1. Were custody seals on outside of coolers? — C Y (N)
   If yes, how many and where? _____
2. Were custody seals intact? ~~Y~~ N
3. Were signature and date present on the custody seals? ~~Y~~ N
4. Is the shipper's airbill available and filed? If no, record airbill number: N/A ~~Y~~ N
5. COC#

Temperature of cooler(s) upon receipt: (°C)	0.1			
Temperature Blank: (°C)	4.1			

Were samples hand delivered on the same day as collection? ~~Y~~ N

6. Were custody papers properly filled out (ink, signed, etc.)? (Y) N
7. Type of packing material present MOSS, STYRO, BUBBLE
8. **Did all bottles arrive in good condition (unbroken)?** (Y) N
9. Were all bottle labels complete (i.e analysis, preservation, etc.)? Y (N)
10. Did all bottle labels and tags agree with custody papers? Y (N)
11. **Were the correct types of bottles used for the tests indicated?** (Y) N
12. Were all of the preserved bottles received at the lab with the appropriate pH? (Y) N
13. Were VOA vials checked for absence of air bubbles, and if present, noted below? (Y) N
14. Did the bottles originate from CAS/K or a branch laboratory? (Y) N
15. **Are CWA Microbiology samples received with >1/2 the 24hr. hold time remaining from collection?** ~~Y~~ N
16. Was C12/Res negative? Y N

Explain any discrepancies: RECEIVED ONLY VOAS FOR B-20. RECEIVED 2 TRIPS NOT ON COC.
RECEIVED 1 AMBER OF UNKNOWN ORIGIN.

RESOLUTION: Analyze B-20 for 8260 only.

Samples that required preservation or received out of temperature:

Sample ID	Reagent	Volume	Lot Number	Bottle Type	Rec'd out of Temperature	Initials

00008

Total Solids

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643

Total Solids

Prep Method: NONE
Analysis Method: 160.3M
Test Notes:

Units: PERCENT
Basis: Wet

Sample Name	Lab Code	Date Collected	Date Received	Date Analyzed	Result	Result Notes
B-7 0-4ft	K2407643-001	09/28/2004	09/30/2004	10/05/2004	77.0	
B-7 13-15ft	K2407643-002	09/28/2004	09/30/2004	10/05/2004	89.6	

00010

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2407643
Project:	Highway Service/03-135	**Date Collected:**	09/28/2004
Sample Matrix:	Soil	**Date Received:**	09/30/2004
		Date Analyzed:	10/05/2004

Duplicate Sample Summary
Total Solids

Prep Method:	NONE	**Units:**	PERCENT
Analysis Method:	160.3M	**Basis:**	Wet
Test Notes:			

Sample Name	Lab Code	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
B-7 0-4ft	K2407643-001	77.0	77.4	77.2	<1	

00011

Metals

METALS

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: RSV Engineering, Inc.

Service Request: K2407643

Project No.: 03-135

Project Name: Highway Service

Sample No.	Lab Sample ID.
Batch QCD	K2407473-001D
Batch QCS	K2407473-001S
B-7 0-4ft	K2407643-001
B-7 13-15ft	K2407643-002
Method Blank	K2407643-MB

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES

If yes-were raw data generated before application of background corrections? Yes/No NO

Comments:

Signature: _____ Date: 10/25/04

METALS
-1-
INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: 03-135
Project Name: Highway Service
Matrix: SOIL

Service Request: K2407643
Date Collected: 09/28/04
Date Received: 09/30/04
Units: mg/kg
Basis: Dry

Sample Name: B-7 0-4ft
Lab Code: K2407643-001

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	200.8	0.107	0.015	10	10/07/04	10/18/04	0.336		
Chromium	200.8	0.43	0.09	10	10/07/04	10/18/04	35.7		
Lead	200.8	0.11	0.04	10	10/07/04	10/18/04	9.16		

Solids: 77.0

Comments:

METALS
-1-
INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: 03-135
Project Name: Highway Service
Matrix: SOIL

Service Request: K2407643
Date Collected: 09/28/04
Date Received: 09/30/04
Units: mg/kg
Basis: Dry

Sample Name: B-7 13-15ft
Lab Code: K2407643-002

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	200.8	0.056	0.008	5	10/07/04	10/18/04	0.043	B	
Chromium	200.8	0.22	0.04	5	10/07/04	10/18/04	7.54		
Lead	200.8	0.06	0.02	5	10/07/04	10/18/04	46.7		

Solids: 89.6

Comments:

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: 03-135
Project Name: Highway Service
Matrix: SOIL

Service Request: K2407643
Date Collected: NA
Date Received: NA
Units: mg/kg
Basis: Dry

Sample Name: Method Blank
Lab Code: K2407643-MB

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	200.8	0.050	0.007	5	10/07/04	10/18/04	0.007	U	
Chromium	200.8	0.20	0.04	5	10/07/04	10/18/04	0.12	B	
Lead	200.8	0.05	0.02	5	10/07/04	10/18/04	0.02	U	

Solids: 100.0

Comments:

METALS

- 5a -

SPIKE SAMPLE RECOVERY

Client: RSV Engineering, Inc.
Project No.: 03-135
Project Name: Highway Service
Matrix: SEDIMENT

Service Request: K2407643
Units: mg/kg
Basis: Dry
% Solids: 64.9

Sample Name: Batch QCS
Lab Code: K2407473-001S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Cadmium	70 - 130	11.5		0.311		11.0	102		200.8
Chromium	70 - 130	65.4		26.5		44.0	88		200.8
Lead	70 - 130	187		80.3		110	97		200.8

An empty field in the Control Limit column indicates the control limit is not applicable.

METALS
-6-
DUPLICATES

Client: RSV Engineering, Inc.
Project No.: 03-135
Project Name: Highway Service
Matrix: SEDIMENT

Service Request: K2407643
Units: mg/kg
Basis: Dry
% Solids: 64.9

Sample Name: Batch QCD
Lab Code: K2407473-001D

Analyte	Control Limit(%)	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Cadmium	30	0.311		0.280		10		200.8
Chromium	30	26.5		20.3		26		200.8
Lead	30	80.3		69.0		15		200.8

An empty field in the Control Limit column indicates the control limit is not applicable.

TCLP METALS

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: RSV Engineering, Inc. Service Request: K2407643

Project No.: 03-135

Project Name: Highway Service

Sample No.	Lab Sample ID.
B-7 0-4ft	K2407643-001
B-7 0-4ftD	K2407643-001D
B-7 0-4ftD	K2407643-001S
B-7 13-15ft	K2407643-002
Method Blank	K2407643-MB

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES

If yes-were raw data generated before application of background corrections? Yes/No NO

Comments: _____

Signature: _____ Date: 12/29/04

TCLP METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: 03-135
Project Name: Highway Service
Matrix: TCLP

Service Request: K2407643
Date Collected: 09/28/04
Date Received: 09/30/04
Units: mg/L
Basis: NA

Sample Name: B-7 0-4ft
Lab Code: K2407643-001

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	6010B	0.010	0.003	1	10/14/04	10/21/04	0.003	U	
Chromium	6010B	0.010	0.003	1	10/14/04	10/21/04	0.004	B	
Lead	6010B	0.05	0.02	1	10/14/04	10/21/04	0.02	U	

% Solids: 0.0

Comments:

00020

TCLP METALS
-1-
INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: 03-135
Project Name: Highway Service
Matrix: TCLP

Service Request: K2407643
Date Collected: 09/28/04
Date Received: 09/30/04
Units: MG/L
Basis: NA

Sample Name: B-7 13-15ft
Lab Code: K2407643-002

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	6010B	0.010	0.003	1	10/14/04	10/21/04	0.003	U	
Chromium	6010B	0.010	0.003	1	10/14/04	10/21/04	0.003	U	
Lead	6010B	0.05	0.02	1	10/14/04	10/21/04	0.04	B	

% Solids: 0.0

Comments:

TCLP METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: 03-135
Project Name: Highway Service
Matrix: TCLP

Service Request: K2407643
Date Collected: NA
Date Received: NA
Units: mg/L
Basis: NA

Sample Name: Method Blank
Lab Code: K2407643-MB

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	6010B	0.010	0.003	1	10/14/04	10/21/04	0.003	U	
Chromium	6010B	0.010	0.003	1	10/14/04	10/21/04	0.003	U	
Lead	6010B	0.05	0.02	1	10/14/04	10/21/04	0.02	U	

% Solids: 0.0

Comments:

00022

TCLP METALS

-5a-

SPIKE SAMPLE RECOVERY

Client: RSV Engineering, Inc.
Project No.: 03-135
Project Name: Highway Service
Matrix: TCLP

Service Request: K2407643
Units: mg/L
Basis: NA
% Solids: 0.0

Sample Name: B-7 0-4ftD
Lab Code: K2407643-001S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Cadmium	75 - 125	0.926		0.003	U	1.000	93		6010B
Chromium	75 - 125	4.820		0.004	B	5.000	96		6010B
Lead	75 - 125	4.72		0.02	U	5.00	94		6010B

An empty field in the Control Limit column indicates the control limit is not applicable.

TCLP METALS
-6-
DUPLICATES

Client: RSV Engineering, Inc.
Project No.: 03-135
Project Name: Highway Service
Matrix: TCLP

Service Request: K2407643
Units: mg/L
Basis: NA
% Solids: 0.0

Sample Name: B-7 0-4ftD
Lab Code: K2407643-001D

Analyte	Control Limit(%)	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Cadmium		0.003	U	0.003	U			6010B
Chromium		0.004	B	0.003	U	200.0		6010B
Lead		0.02	U	0.02	U			6010B

An empty field in the Control Limit column indicates the control limit is not applicable.

DISSOLVED METALS

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: RSV Engineering, Inc.

Service Request: K2407643

Project No.:

Project Name: Highway Service

Sample No.	Lab Sample ID.
B-7	K2407643-003 DISS
B-7D	K2407643-003D DISS
B-7S	K2407643-003S DISS
Method Blank	K2407643-MB

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES

If yes-were raw data generated before application of background corrections? Yes/No NO

Comments:

Signature: [signature]

Date: 10/25/04

DISSOLVED METALS
-1-
INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: NA
Project Name: Highway Service
Matrix: WATER

Service Request: K2407643
Date Collected: 09/29/04
Date Received: 09/30/04
Units: µG/L
Basis: NA

Sample Name: B-7
Lab Code: K2407643-003 DISS

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	200.8	0.02	0.02	1	10/07/04	10/18/04	0.04		
Chromium	200.8	0.20	0.02	1	10/07/04	10/18/04	0.34		
Lead	200.8	0.020	0.009	1	10/07/04	10/18/04	0.268		

Solids: 0.0

Comments:

00026

DISSOLVED METALS
-1-
INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: NA
Project Name: Highway Service
Matrix: WATER

Service Request: K2407643
Date Collected:
Date Received:
Units: µG/L
Basis: NA

Sample Name: Method Blank
Lab Code: K2407643-MB

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	200.8	0.02	0.02	1	10/07/04	10/18/04	0.02	U	
Chromium	200.8	0.20	0.02	1	10/07/04	10/18/04	0.02	U	
Lead	200.8	0.020	0.009	1	10/07/04	10/18/04	0.009	U	

% Solids: 0.0

Comments:

00027

DISSOLVED METALS
- 5a -
SPIKE SAMPLE RECOVERY

Client: RSV Engineering, Inc.
Project No.:
Project Name: Highway Service
Matrix: WATER

Service Request: K2407643
Units: µg/L
Basis: NA
% Solids: 0.0

Sample Name: B-7S
Lab Code: K2407643-003S DISS

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Cadmium	70 - 130	19.9		0.04		20.0	99		200.8
Chromium	70 - 130	21.7		0.34		20.0	107		200.8
Lead	70 - 130	21.2		0.268		20.0	105		200.8

An empty field in the Control Limit column indicates the control limit is not applicable.

00028

DISSOLVED METALS

-6-

DUPLICATES

Client: RSV Engineering, Inc.
Project No.:
Project Name: Highway Service
Matrix: WATER

Service Request: K2407643
Units: µg/L
Basis: NA
% Solids: 0.0

Sample Name:B-7D
Lab Code: K2407643-003D DISS

Analyte	Control Limit(%)	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Cadmium		0.04		0.03		14		200.8
Chromium		0.34		0.38		10		200.8
Lead	20	0.268		0.250		7		200.8

An empty field in the Control Limit column indicates the control limit is not applicable.

Volatile Organic Compounds
EPA Method 8260B

Analytical Results

Client:	RSV Engineering, Inc.	**Service Request:**	K2408133
Project:	Highway Service/03-135	**Date Collected:**	10/13/2004
Sample Matrix:	Water	**Date Received:**	10/14/2004

Volatile Organics by GC/MS

Sample Name:	B-8	**Units:**	ug/L
Lab Code:	K2408133-001	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/27/04	10/27/04	KWG0416940	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/27/04	10/27/04	KWG0416940	
Benzene	**53**		0.50	0.11	1	10/27/04	10/27/04	KWG0416940	
Toluene	**0.32**	J	0.50	0.098	1	10/27/04	10/27/04	KWG0416940	
Ethylbenzene	**0.42**	J	0.50	0.13	1	10/27/04	10/27/04	KWG0416940	
m,p-Xylenes	**0.72**		0.50	0.22	1	10/27/04	10/27/04	KWG0416940	
o-Xylene	**0.15**	J	0.50	0.079	1	10/27/04	10/27/04	KWG0416940	
Isopropylbenzene	**5.1**		2.0	0.068	1	10/27/04	10/27/04	KWG0416940	
n-Propylbenzene	**6.6**		2.0	0.098	1	10/27/04	10/27/04	KWG0416940	
1,3,5-Trimethylbenzene	**0.13**	J	2.0	0.13	1	10/27/04	10/27/04	KWG0416940	
1,2,4-Trimethylbenzene	**0.40**	J	2.0	0.15	1	10/27/04	10/27/04	KWG0416940	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Toluene-d8	91	86-114	10/27/04	Acceptable
Dibromofluoromethane	103	85-115	10/27/04	Acceptable
4-Bromofluorobenzene	96	72-115	10/27/04	Acceptable

Comments:

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: 10/13/2004
Date Received: 10/14/2004

Volatile Organics by GC/MS

Sample Name: B-9
Lab Code: K2408133-002

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/27/04	10/27/04	KWG0416867	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/27/04	10/27/04	KWG0416867	
Benzene	**38**		0.50	0.11	1	10/27/04	10/27/04	KWG0416867	
Toluene	**0.36**	J	0.50	0.098	1	10/27/04	10/27/04	KWG0416867	
Ethylbenzene	**0.27**	J	0.50	0.13	1	10/27/04	10/27/04	KWG0416867	
m,p-Xylenes	**0.46**	J	0.50	0.22	1	10/27/04	10/27/04	KWG0416867	
o-Xylene	**0.12**	J	0.50	0.079	1	10/27/04	10/27/04	KWG0416867	
Isopropylbenzene	**2.3**		2.0	0.068	1	10/27/04	10/27/04	KWG0416867	
n-Propylbenzene	**4.4**		2.0	0.098	1	10/27/04	10/27/04	KWG0416867	
1,3,5-Trimethylbenzene	ND	U	2.0	0.13	1	10/27/04	10/27/04	KWG0416867	
1,2,4-Trimethylbenzene	**0.39**	J	2.0	0.15	1	10/27/04	10/27/04	KWG0416867	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Toluene-d8	90	86-114	10/27/04	Acceptable
Dibromofluoromethane	103	85-115	10/27/04	Acceptable
4-Bromofluorobenzene	92	72-115	10/27/04	Acceptable

Comments:

00032

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Collected: 09/29/2004
Date Received: 09/30/2004

Volatile Organic Compounds

Sample Name: B-7
Lab Code: K2407643-003

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Methyl tert-Butyl Ether	ND	U	0.50	0.074	1	10/12/04	10/12/04	KWG0415903	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/12/04	10/12/04	KWG0415903	
Benzene	**12**		0.50	0.11	1	10/12/04	10/12/04	KWG0415903	
Toluene	**2.4**		0.50	0.098	1	10/12/04	10/12/04	KWG0415903	
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/12/04	10/12/04	KWG0415903	
Ethylbenzene	**7.5**		0.50	0.13	1	10/12/04	10/12/04	KWG0415903	
m,p-Xylenes	**2.4**		0.50	0.22	1	10/12/04	10/12/04	KWG0415903	
o-Xylene	**0.68**		0.50	0.079	1	10/12/04	10/12/04	KWG0415903	
Isopropylbenzene	**68**	D	20	0.68	10	10/09/04	10/09/04	KWG0415662	
n-Propylbenzene	**96**	D	20	0.98	10	10/09/04	10/09/04	KWG0415662	
1,3,5-Trimethylbenzene	**0.47**	J	2.0	0.13	1	10/12/04	10/12/04	KWG0415903	
1,2,4-Trimethylbenzene	**0.98**	J	2.0	0.15	1	10/12/04	10/12/04	KWG0415903	
Naphthalene	**1.9**	J	2.0	0.29	1	10/12/04	10/12/04	KWG0415903	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	107	85-115	10/12/04	Acceptable
Toluene-d8	98	86-114	10/12/04	Acceptable
4-Bromofluorobenzene	99	72-115	10/12/04	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Collected: 09/29/2004
Date Received: 09/30/2004

Volatile Organic Compounds

Sample Name: B-20
Lab Code: K2407643-004

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Methyl tert-Butyl Ether	ND	U	0.50	0.074	1	10/12/04	10/12/04	KWG0415903	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/12/04	10/12/04	KWG0415903	
Benzene	**13**		0.50	0.11	1	10/12/04	10/12/04	KWG0415903	
Toluene	**2.6**		0.50	0.098	1	10/12/04	10/12/04	KWG0415903	
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/12/04	10/12/04	KWG0415903	
Ethylbenzene	**8.0**		0.50	0.13	1	10/12/04	10/12/04	KWG0415903	
m,p-Xylenes	**2.7**		0.50	0.22	1	10/12/04	10/12/04	KWG0415903	
o-Xylene	**0.79**		0.50	0.079	1	10/12/04	10/12/04	KWG0415903	
Isopropylbenzene	**71**	D	20	0.68	10	10/12/04	10/12/04	KWG0415903	
n-Propylbenzene	**100**	D	20	0.98	10	10/12/04	10/12/04	KWG0415903	
1,3,5-Trimethylbenzene	**0.51**	J	2.0	0.13	1	10/12/04	10/12/04	KWG0415903	
1,2,4-Trimethylbenzene	**1.0**	J	2.0	0.15	1	10/12/04	10/12/04	KWG0415903	
[illegible]phthalene	**2.0**	J	2.0	0.29	1	10/12/04	10/12/04	KWG0415903	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	106	85-115	10/12/04	Acceptable
Toluene-d8	97	86-114	10/12/04	Acceptable
4-Bromofluorobenzene	101	72-115	10/12/04	Acceptable

[illegible]mments:

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG0415662-4

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Methyl tert-Butyl Ether	ND	U	0.50	0.074	1	10/09/04	10/09/04	KWG0415662	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/09/04	10/09/04	KWG0415662	
Benzene	ND	U	0.50	0.11	1	10/09/04	10/09/04	KWG0415662	
Toluene	ND	U	0.50	0.098	1	10/09/04	10/09/04	KWG0415662	
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/09/04	10/09/04	KWG0415662	
Ethylbenzene	ND	U	0.50	0.13	1	10/09/04	10/09/04	KWG0415662	
m,p-Xylenes	ND	U	0.50	0.22	1	10/09/04	10/09/04	KWG0415662	
o-Xylene	ND	U	0.50	0.079	1	10/09/04	10/09/04	KWG0415662	
Isopropylbenzene	ND	U	2.0	0.068	1	10/09/04	10/09/04	KWG0415662	
n-Propylbenzene	ND	U	2.0	0.098	1	10/09/04	10/09/04	KWG0415662	
1,3,5-Trimethylbenzene	ND	U	2.0	0.13	1	10/09/04	10/09/04	KWG0415662	
1,2,4-Trimethylbenzene	ND	U	2.0	0.15	1	10/09/04	10/09/04	KWG0415662	
ohthalene	ND	U	2.0	0.29	1	10/09/04	10/09/04	KWG0415662	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	87	85-115	10/09/04	Acceptable
Toluene-d8	90	86-114	10/09/04	Acceptable
4-Bromofluorobenzene	80	72-115	10/09/04	Acceptable

mments:

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG0415903-4

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Methyl tert-Butyl Ether	ND	U	0.50	0.074	1	10/11/04	10/11/04	KWG0415903	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/11/04	10/11/04	KWG0415903	
Benzene	ND	U	0.50	0.11	1	10/11/04	10/11/04	KWG0415903	
Toluene	ND	U	0.50	0.098	1	10/11/04	10/11/04	KWG0415903	
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/11/04	10/11/04	KWG0415903	
Ethylbenzene	ND	U	0.50	0.13	1	10/11/04	10/11/04	KWG0415903	
m,p-Xylenes	ND	U	0.50	0.22	1	10/11/04	10/11/04	KWG0415903	
o-Xylene	ND	U	0.50	0.079	1	10/11/04	10/11/04	KWG0415903	
Isopropylbenzene	ND	U	2.0	0.068	1	10/11/04	10/11/04	KWG0415903	
n-Propylbenzene	ND	U	2.0	0.098	1	10/11/04	10/11/04	KWG0415903	
1,3,5-Trimethylbenzene	ND	U	2.0	0.13	1	10/11/04	10/11/04	KWG0415903	
1,2,4-Trimethylbenzene	ND	U	2.0	0.15	1	10/11/04	10/11/04	KWG0415903	
Naphthalene	**0.91**	J	2.0	0.29	1	10/11/04	10/11/04	KWG0415903	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	107	85-115	10/11/04	Acceptable
Toluene-d8	93	86-114	10/11/04	Acceptable
4-Bromofluorobenzene	95	72-115	10/11/04	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643
Date Collected: 09/28/2004
Date Received: 09/30/2004

Volatile Organic Compounds

Sample Name: B-7 0-4ft
Lab Code: K2407643-001

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Methyl tert-Butyl Ether	ND	U	6.5	0.84	1	10/12/04	10/12/04	KWG0415723	
1,2-Dichloroethane (EDC)	ND	U	6.5	0.88	1	10/12/04	10/12/04	KWG0415723	
Benzene	ND	U	6.5	1.1	1	10/12/04	10/12/04	KWG0415723	
Toluene	ND	U	6.5	1.1	1	10/12/04	10/12/04	KWG0415723	
1,2-Dibromoethane (EDB)	ND	U	26	1.1	1	10/12/04	10/12/04	KWG0415723	
Ethylbenzene	ND	U	6.5	0.75	1	10/12/04	10/12/04	KWG0415723	
m,p-Xylenes	ND	U	6.5	2.0	1	10/12/04	10/12/04	KWG0415723	
o-Xylene	ND	U	6.5	0.90	1	10/12/04	10/12/04	KWG0415723	
Isopropylbenzene	ND	U	26	0.89	1	10/12/04	10/12/04	KWG0415723	
n-Propylbenzene	ND	U	26	0.94	1	10/12/04	10/12/04	KWG0415723	
1,3,5-Trimethylbenzene	ND	U	26	1.1	1	10/12/04	10/12/04	KWG0415723	
1,2,4-Trimethylbenzene	ND	U	26	1.1	1	10/12/04	10/12/04	KWG0415723	
Naphthalene	ND	U	26	1.2	1	10/12/04	10/12/04	KWG0415723	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	91	81-120	10/12/04	Acceptable
Toluene-d8	92	77-131	10/12/04	Acceptable
4-Bromofluorobenzene	100	74-116	10/12/04	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643
Date Collected: 09/28/2004
Date Received: 09/30/2004

Volatile Organic Compounds

Sample Name: B-7 13-15ft
Lab Code: K2407643-002

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Methyl tert-Butyl Ether	ND	U	5.6	0.72	1	10/12/04	10/12/04	KWG0415723	
1,2-Dichloroethane (EDC)	ND	U	5.6	0.75	1	10/12/04	10/12/04	KWG0415723	
Benzene	ND	U	5.6	0.89	1	10/12/04	10/12/04	KWG0415723	
Toluene	**1.1**	J	5.6	0.94	1	10/12/04	10/12/04	KWG0415723	
1,2-Dibromoethane (EDB)	ND	U	23	0.89	1	10/12/04	10/12/04	KWG0415723	
Ethylbenzene	**14**		5.6	0.64	1	10/12/04	10/12/04	KWG0415723	
m,p-Xylenes	**28**		5.6	1.7	1	10/12/04	10/12/04	KWG0415723	
o-Xylene	**31**		5.6	0.78	1	10/12/04	10/12/04	KWG0415723	
Isopropylbenzene	**2.8**	J	23	0.76	1	10/12/04	10/12/04	KWG0415723	
n-Propylbenzene	**13**	J	23	0.81	1	10/12/04	10/12/04	KWG0415723	
1,3,5-Trimethylbenzene	**28**		23	0.92	1	10/12/04	10/12/04	KWG0415723	
1,2,4-Trimethylbenzene	**25**		23	0.92	1	10/12/04	10/12/04	KWG0415723	
Naphthalene	**1.8**	J	23	1.0	1	10/12/04	10/12/04	KWG0415723	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	90	81-120	10/12/04	Acceptable
Toluene-d8	92	77-131	10/12/04	Acceptable
4-Bromofluorobenzene	99	74-116	10/12/04	Acceptable

Comments:

00036

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG0415723-3

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Methyl tert-Butyl Ether	ND	U	5.0	0.64	1	10/12/04	10/12/04	KWG0415723	
1,2-Dichloroethane (EDC)	ND	U	5.0	0.67	1	10/12/04	10/12/04	KWG0415723	
Benzene	ND	U	5.0	0.79	1	10/12/04	10/12/04	KWG0415723	
Toluene	ND	U	5.0	0.84	1	10/12/04	10/12/04	KWG0415723	
1,2-Dibromoethane (EDB)	ND	U	20	0.79	1	10/12/04	10/12/04	KWG0415723	
Ethylbenzene	ND	U	5.0	0.57	1	10/12/04	10/12/04	KWG0415723	
m,p-Xylenes	ND	U	5.0	1.5	1	10/12/04	10/12/04	KWG0415723	
o-Xylene	ND	U	5.0	0.69	1	10/12/04	10/12/04	KWG0415723	
Isopropylbenzene	ND	U	20	0.68	1	10/12/04	10/12/04	KWG0415723	
n-Propylbenzene	ND	U	20	0.72	1	10/12/04	10/12/04	KWG0415723	
1,3,5-Trimethylbenzene	ND	U	20	0.82	1	10/12/04	10/12/04	KWG0415723	
1,2,4-Trimethylbenzene	ND	U	20	0.82	1	10/12/04	10/12/04	KWG0415723	
ophthalene	ND	U	20	0.89	1	10/12/04	10/12/04	KWG0415723	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	89	81-120	10/12/04	Acceptable
Toluene-d8	96	77-131	10/12/04	Acceptable
4-Bromofluorobenzene	95	74-116	10/12/04	Acceptable

mments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643

Surrogate Recovery Summary
Volatile Organic Compounds

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
B-7	K2407643-003	107	98	99
B-20	K2407643-004	106	97	101
Method Blank	KWG0415662-4	87	90	80
Method Blank	KWG0415903-4	107	93	95
Batch QC	K2407879-006	86	88	76
Batch QCMS	KWG0415662-1	90	94	87
Batch QCDMS	KWG0415662-2	90	95	84
Lab Control Sample	KWG0415662-3	95	98	90
Lab Control Sample	KWG0415903-3	111	101	106

Surrogate Recovery Control Limits (%)

Sur1 =	Dibromofluoromethane	85-115
Sur2 =	Toluene-d8	86-114
Sur3 =	4-Bromofluorobenzene	72-115

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643

Surrogate Recovery Summary
Volatile Organic Compounds

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
B-7 0-4ft	K2407643-001	91	92	100
B-7 13-15ft	K2407643-002	90	92	99
Method Blank	KWG0415723-3	89	96	95
Batch QC	K2407941-013	96	95	100
Batch QCMS	KWG0415723-4	96	97	104
Batch QCDMS	KWG0415723-5	86	94	100
Lab Control Sample	KWG0415723-1	84	96	102

Surrogate Recovery Control Limits (%)

Sur1 =	Dibromofluoromethane	81-120
Sur2 =	Toluene-d8	77-131
Sur3 =	4-Bromofluorobenzene	74-116

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Extracted: 10/09/2004
Date Analyzed: 10/09/2004

Matrix Spike/Duplicate Matrix Spike Summary
Volatile Organic Compounds

Sample Name: Batch QC
Lab Code: K2407879-006

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low
Extraction Lot: KWG0415662

Analyte Name	Sample Result	Batch QCMS KWG0415662-1 Matrix Spike			Batch QCDMS KWG0415662-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Expected	%Rec	Result	Expected	%Rec			
Methyl tert-Butyl Ether	ND	11.0	10.0	110	9.88	10.0	99	65-119	11	30
1,2-Dichloroethane (EDC)	ND	9.31	10.0	93	8.96	10.0	90	72-128	4	30
Benzene	ND	10.7	10.0	107	10.6	10.0	106	81-130	1	30
Toluene	ND	10.5	10.0	105	10.4	10.0	104	76-130	1	30
1,2-Dibromoethane (EDB)	ND	10.4	10.0	104	9.52	10.0	95	71-127	9	30
Ethylbenzene	ND	11.8	10.0	118	11.4	10.0	114	80-135	3	30
m,p-Xylenes	ND	23.3	20.0	117	23.2	20.0	116	81-135	1	30
o-Xylene	ND	11.8	10.0	118	11.6	10.0	116	80-137	1	30
Isopropylbenzene	ND	10.4	10.0	104	10.4	10.0	104	70-135	1	30
[redacted]opylbenzene	ND	10.7	10.0	107	11.3	10.0	113	74-143	5	30
1,3,5-Trimethylbenzene	ND	13.3	10.0	133	12.7	10.0	127	75-142	5	30
1,2,4-Trimethylbenzene	ND	13.9	10.0	139	12.5	10.0	125	76-147	10	30
Naphthalene	ND	12.8	10.0	128	10.3	10.0	103	54-160	22	30

Results flagged with an asterisk (*) indicate values outside control criteria.
[redacted] flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00040

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Sediment

Service Request: K2407643
Date Extracted: 10/12/2004
Date Analyzed: 10/12/2004

Matrix Spike/Duplicate Matrix Spike Summary
Volatile Organic Compounds

Sample Name: Batch QC
Lab Code: K2407941-013

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry

Level: Low
Extraction Lot: KWG0415723

Analyte Name	Sample Result	Batch QCMS KWG0415723-4 Matrix Spike			Batch QCDMS KWG0415723-5 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Expected	%Rec	Result	Expected	%Rec			
Methyl tert-Butyl Ether	ND	72.1	107	67	70.9	109	65	37-132	2	40
1,2-Dichloroethane (EDC)	ND	57.5	107	54	58.8	109	54	34-134	2	40
Benzene	ND	61.6	107	57	59.4	109	54	45-129	4	40
Toluene	ND	55.3	107	51	52.0	109	48	31-136	6	40
1,2-Dibromoethane (EDB)	ND	41.1	107	38	49.0	109	45	22-132	18	40
Ethylbenzene	ND	46.8	107	44	46.7	109	43	15-138	0	40
m,p-Xylenes	ND	90.3	215	42	89.7	219	41	15-138	1	40
o-Xylene	ND	41.9	107	39	44.5	109	41	12-143	6	40
Isopropylbenzene	ND	36.4	107	34	33.1	109	30	10-129	9	40
[illegible]opylbenzene	ND	36.6	107	34	33.7	109	31	10-145	8	40
1,3,5-Trimethylbenzene	ND	33.8	107	31	33.6	109	31	10-143	0	40
1,2,4-Trimethylbenzene	ND	31.6	107	29	33.6	109	31	10-147	6	40
Naphthalene	ND	17.2	107	16	21.1	109	19	10-131	20	40

Results flagged with an asterisk (*) indicate values outside control criteria.
[illegible] flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00041

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Extracted: 10/09/2004
Date Analyzed: 10/09/2004

Lab Control Spike Summary
Volatile Organic Compounds

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0415662

Analyte Name	Lab Control Sample KWG0415662-3 Lab Control Spike Result	Expected	%Rec	%Rec Limits
Methyl tert-Butyl Ether	7.70	10.0	77	67-117
1,2-Dichloroethane (EDC)	8.94	10.0	89	76-125
Benzene	9.73	10.0	97	87-122
Toluene	10.0	10.0	100	84-120
1,2-Dibromoethane (EDB)	9.07	10.0	91	78-121
Ethylbenzene	11.0	10.0	110	89-124
m,p-Xylenes	23.0	20.0	115	89-126
o-Xylene	11.7	10.0	117	86-129
Isopropylbenzene	10.5	10.0	105	76-127
n-Propylbenzene	10.8	10.0	108	83-134
1,3,5-Trimethylbenzene	10.9	10.0	109	85-131
[redacted]-Trimethylbenzene	10.6	10.0	106	86-138
Naphthalene	8.43	10.0	84	64-145

[redacted] flagged with an asterisk (*) indicate values outside control criteria.
[redacted] recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00042

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Extracted: 10/11/2004
Date Analyzed: 10/11/2004

Lab Control Spike Summary
Volatile Organic Compounds

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0415903

Analyte Name	Lab Control Sample KWG0415903-3 Lab Control Spike Result	Expected	%Rec	%Rec Limits
Methyl tert-Butyl Ether	11.0	10.0	110	67-117
1,2-Dichloroethane (EDC)	10.5	10.0	105	76-125
Benzene	9.06	10.0	91	87-122
Toluene	8.62	10.0	86	84-120
1,2-Dibromoethane (EDB)	10.4	10.0	104	78-121
Ethylbenzene	10.1	10.0	101	89-124
m,p-Xylenes	20.1	20.0	101	89-126
o-Xylene	10.0	10.0	100	86-129
Isopropylbenzene	9.29	10.0	93	76-127
n-Propylbenzene	9.49	10.0	95	83-134
1,3,5-Trimethylbenzene	10.5	10.0	105	85-131
1,2,4-Trimethylbenzene	10.0	10.0	100	86-138
Naphthalene	8.30	10.0	83	64-145

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643
Date Extracted: 10/12/2004
Date Analyzed: 10/12/2004

Lab Control Spike Summary
Volatile Organic Compounds

Extraction Method: EPA 5030A
Analysis Method: 8260B

Units: ug/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG0415723

Analyte Name	Lab Control Sample KWG0415723-1 Lab Control Spike Result	Expected	%Rec	%Rec Limits
Methyl tert-Butyl Ether	44.0	50.0	88	59-124
1,2-Dichloroethane (EDC)	41.2	50.0	82	63-129
Benzene	43.0	50.0	86	78-124
Toluene	43.3	50.0	87	75-128
1,2-Dibromoethane (EDB)	42.4	50.0	85	76-120
Ethylbenzene	45.2	50.0	90	75-126
m,p-Xylenes	94.2	100	94	76-131
o-Xylene	46.9	50.0	94	76-128
Isopropylbenzene	40.9	50.0	82	62-125
n-Propylbenzene	43.7	50.0	87	70-131
1,3,5-Trimethylbenzene	44.9	50.0	90	74-132
[illegible]-Trimethylbenzene	44.9	50.0	90	76-137
Naphthalene	45.4	50.0	91	69-134

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

NWTPH-Gx

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Collected: 09/29/2004
Date Received: 09/30/2004

Gasoline Range Organics

Sample Name: B-7
Lab Code: K2407643-003

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: NWTPH-Gx

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics-NWTPH	2400	Z	250	12	1	10/07/04	10/07/04	KWG0415286	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Difluorobenzene	97	50-150	10/07/04	Acceptable

Comments:

00046

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Collected: NA
Date Received: NA

Gasoline Range Organics

Sample Name: Method Blank
Lab Code: KWG0415286-3

Extraction Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics-NWTPH	ND	U	250	12	1	10/06/04	10/06/04	KWG0415286	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Difluorobenzene	97	50-150	10/06/04	Acceptable

Comments:

00047

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	RSV Engineering, Inc.	**Service Request:**	K2407643
Project:	Highway Service/03-135	**Date Collected:**	09/28/2004
Sample Matrix:	Soil	**Date Received:**	09/30/2004

Gasoline Range Organics

Sample Name:	B-7 0-4ft	**Units:**	mg/Kg
Lab Code:	K2407643-001	**Basis:**	Dry
Extraction Method:	EPA 5035/5030B	**Level:**	Med
Analysis Method:	NWTPH-Gx		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics-NWTPH	ND	U	4.9	1.3	1	10/11/04	10/11/04	KWG0415623	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
4-Bromofluorobenzene	89	50-150	10/11/04	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643
Date Collected: 09/28/2004
Date Received: 09/30/2004

Gasoline Range Organics

Sample Name: B-7 13-15ft
Lab Code: K2407643-002

Extraction Method: EPA 5035/5030B
Analysis Method: NWTPH-Gx

Units: mg/Kg
Basis: Dry
Level: Med

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics-NWTPH	42	Z	4.6	1.2	1	10/11/04	10/11/04	KWG0415623	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
4-Bromofluorobenzene	99	50-150	10/11/04	Acceptable

Comments:

00049

Analytical Results

Client:	RSV Engineering, Inc.	**Service Request:**	K2407643
Project:	Highway Service/03-135	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA

Gasoline Range Organics

Sample Name:	Method Blank	**Units:**	mg/Kg
Lab Code:	KWG0415623-4	**Basis:**	Dry
Extraction Method:	EPA 5035/5030B	**Level:**	Med
Analysis Method:	NWTPH-Gx		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics-NWTPH	**1.8**	J	5.0	1.0	1	10/11/04	10/11/04	KWG0415623	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
4-Bromofluorobenzene	90	50-150	10/11/04	Acceptable

Comments:

00050

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643

Surrogate Recovery Summary
Gasoline Range Organics

Extraction Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1
B-7	K2407643-003	97
B-7DUP	KWG0415286-4	97
Method Blank	KWG0415286-3	97
Lab Control Sample	KWG0415286-1	101
Duplicate Lab Control Sample	KWG0415286-2	102

Surrogate Recovery Control Limits (%)

Sur1 = 1,4-Difluorobenzene 50-150

Values flagged with an asterisk (*) indicate values outside control criteria.
Values flagged with a pound (#) indicate the control criteria is not applicable.

00051

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643

Surrogate Recovery Summary
Gasoline Range Organics

Extraction Method: EPA 5035/5030B
Analysis Method: NWTPH-Gx

Units: PERCENT
Level: Med

Sample Name	Lab Code	Sur1
B-7 0-4ft	K2407643-001	89
B-7 13-15ft	K2407643-002	99
B-7 0-4ftDUP	KWG0415623-1	90
Method Blank	KWG0415623-4	90
Lab Control Sample	KWG0415623-3	108

Surrogate Recovery Control Limits (%)

Sur1 = 4-Bromofluorobenzene 50-150

Values flagged with an asterisk (*) indicate values outside control criteria.
Values flagged with a pound (#) indicate the control criteria is not applicable.

00052

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Extracted: 10/07/2004
Date Analyzed: 10/07/2004

Duplicate Sample Summary
Gasoline Range Organics

Sample Name: B-7
Lab Code: K2407643-003

Extraction Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: ug/L
Basis: NA

Level: Low
Extraction Lot: KWG0415286

Analyte Name	MRL	MDL	Sample Result	B-7DUP KWG0415286-4 Duplicate Sample Result	Average	Relative Percent Difference	RPD Limit
Gasoline Range Organics-NWTPH	250	12	2400	3400	2900	32 *	30

Results flagged with an asterisk (*) indicate values outside control criteria.
[redacted] flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00053

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2407643
Project:	Highway Service/03-135	**Date Extracted:**	10/11/2004
Sample Matrix:	Soil	**Date Analyzed:**	10/11/2004

Duplicate Sample Summary
Gasoline Range Organics

Sample Name:	B-7 0-4ft	**Units:**	mg/Kg
Lab Code:	K2407643-001	**Basis:**	Dry
Extraction Method:	EPA 5035/5030B	**Level:**	Med
Analysis Method:	NWTPH-Gx	**Extraction Lot:**	KWG0415623

Analyte Name	MRL	MDL	Sample Result	B-7 0-4ftDUP KWG0415623-1 Duplicate Sample Result	Average	Relative Percent Difference	RPD Limit
Gasoline Range Organics-NWTPH	4.6	1.3	ND	ND	ND	-	40

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00054

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Extracted: 10/06/2004
Date Analyzed: 10/06/2004

Lab Control Spike/Duplicate Lab Control Spike Summary
Gasoline Range Organics

Extraction Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0415286

Analyte Name	Lab Control Sample KWG0415286-1 Lab Control Spike Result	Expected	%Rec	Duplicate Lab Control Sample KWG0415286-2 Duplicate Lab Control Spike Result	Expected	%Rec	%Rec Limits	RPD	RPD Limit
Gasoline Range Organics-NWTPH	483	500	97	479	500	96	73-124	1	30

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00055

QA/QC Report

Client:	RSV Engineering, Inc.	**Service Request:**	K2407643
Project:	Highway Service/03-135	**Date Extracted:**	10/11/2004
Sample Matrix:	Soil	**Date Analyzed:**	10/11/2004

Lab Control Spike Summary
Gasoline Range Organics

Extraction Method:	EPA 5035/5030B	**Units:**	mg/Kg
Analysis Method:	NWTPH-Gx	**Basis:**	Dry
		Level:	Med
		Extraction Lot:	KWG0415623

	Lab Control Sample KWG0415623-3 Lab Control Spike			
Analyte Name	**Result**	**Expected**	**%Rec**	**%Rec Limits**
Gasoline Range Organics-NWTPH	91.8	100	92	78-128

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Diesel & Residual Range Organics

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Collected: 09/29/2004
Date Received: 09/30/2004

Diesel and Residual Range Organics

Sample Name: B-7
Lab Code: K2407643-003

Units: ug/L
Basis: NA

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	2800	Y	270	38	1	10/04/04	10/05/04	KWG0415093	
Residual Range Organics (RRO)	5100	O	530	57	1	10/04/04	10/05/04	KWG0415093	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	80	50-150	10/05/04	Acceptable
n-Triacontane	106	50-150	10/05/04	Acceptable

Comments:

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Collected: NA
Date Received: NA

Diesel and Residual Range Organics

Sample Name: Method Blank
Lab Code: KWG0415093-5

Units: ug/L
Basis: NA

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND	U	250	36	1	10/04/04	10/05/04	KWG0415093	
Residual Range Organics (RRO)	ND	U	500	54	1	10/04/04	10/05/04	KWG0415093	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	89	50-150	10/05/04	Acceptable
n-Triacontane	93	50-150	10/05/04	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643
Date Collected: 09/28/2004
Date Received: 09/30/2004

Diesel and Residual Range Organics

Sample Name: B-7 0-4ft
Lab Code: K2407643-001

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: mg/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND	U	20	11	1	10/08/04	10/11/04	KWG0415479	
Residual Range Organics (RRO)	**28**	J	77	7.1	1	10/08/04	10/11/04	KWG0415479	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	78	50-150	10/11/04	Acceptable
n-Triacontane	77	50-150	10/11/04	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643
Date Collected: 09/28/2004
Date Received: 09/30/2004

Diesel and Residual Range Organics

Sample Name: B-7 13-15ft
Lab Code: K2407643-002

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: mg/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	2600	DH	180	99	10	10/08/04	10/12/04	KWG0415479	
Residual Range Organics (RRO)	12000	DO	700	65	10	10/08/04	10/12/04	KWG0415479	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	107	50-150	10/11/04	Acceptable
n-Triacontane	106	50-150	10/11/04	Acceptable

Comments:

00061

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Sediment

Service Request: K2407643
Date Collected: NA
Date Received: NA

Diesel and Residual Range Organics

Sample Name: Method Blank
Lab Code: KWG0415479-6

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND	U	25	15	1	10/08/04	10/11/04	KWG0415479	
Residual Range Organics (RRO)	ND	U	100	9.2	1	10/08/04	10/11/04	KWG0415479	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	102	50-150	10/11/04	Acceptable
n-Triacontane	105	50-150	10/11/04	Acceptable

Comments:

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643

Surrogate Recovery Summary
Diesel and Residual Range Organics

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2
B-7	K2407643-003	80	106
Batch QCDUP	KWG0415093-1	84	86
Method Blank	KWG0415093-5	89	93
Batch QC	K2407720-015	84	87
Lab Control Sample	KWG0415093-3	102	107
Duplicate Lab Control Sample	KWG0415093-4	85	87

Surrogate Recovery Control Limits (%)

Sur1 =	o-Terphenyl	50-150
Sur2 =	n-Triacontane	50-150

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

00063

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643

Surrogate Recovery Summary
Diesel and Residual Range Organics

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2
B-7 0-4ft	K2407643-001	78	77
B-7 13-15ft	K2407643-002	107	106
Batch QCDUP	KWG0415479-1	99	102
Method Blank	KWG0415479-6	102	105
Batch QC	K2407635-001	101	103
Lab Control Sample	KWG0415479-5	96	96

Surrogate Recovery Control Limits (%)

Sur1 =	o-Terphenyl	50-150
Sur2 =	n-Triacontane	50-150

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

00064

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Extracted: 10/04/2004
Date Analyzed: 10/05/2004

Duplicate Sample Summary
Diesel and Residual Range Organics

Sample Name: Batch QC
Lab Code: K2407720-015

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA

Level: Low
Extraction Lot: KWG0415093

Analyte Name	MRL	MDL	Sample Result	Batch QCDUP KWG0415093-1 Duplicate Sample Result	Average	Relative Percent Difference	RPD Limit
Diesel Range Organics (DRO)	270	38	ND	ND	ND	-	30
Residual Range Organics (RRO)	530	57	ND	ND	ND	-	30

Results flagged with an asterisk (*) indicate values outside control criteria.
R[redacted] flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00065

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Sediment

Service Request: K2407643
Date Extracted: 10/08/2004
Date Analyzed: 10/11/2004

Duplicate Sample Summary
Diesel and Residual Range Organics

Sample Name: Batch QC
Lab Code: K2407635-001

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: mg/Kg
Basis: Dry

Level: Low
Extraction Lot: KWG0415479

Analyte Name	MRL	MDL	Sample Result	Batch QCDUP KWG0415479-1 Duplicate Sample Result	Duplicate Sample Average	Relative Percent Difference	RPD Limit
Diesel Range Organics (DRO)	14	12	140	150	150	1	40
Residual Range Organics (RRO)	54	7.4	230	230	230	3	40

Results flagged with an asterisk (*) indicate values outside control criteria.
[redacted] flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00066

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Extracted: 10/04/2004
Date Analyzed: 10/05/2004

Lab Control Spike/Duplicate Lab Control Spike Summary
Diesel and Residual Range Organics

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0415093

Analyte Name	Lab Control Sample KWG0415093-3 Lab Control Spike Result	Expected	%Rec	Duplicate Lab Control Sample KWG0415093-4 Duplicate Lab Control Spike Result	Expected	%Rec	%Rec Limits	RPD	RPD Limit
Diesel Range Organics (DRO)	1620	1600	101	1430	1600	89	71-146	13	30
Residual Range Organics (RRO)	762	800	95	666	800	83	53-143	13	30

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00067

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Sediment

Service Request: K2407643
Date Extracted: 10/08/2004
Date Analyzed: 10/11/2004

Lab Control Spike Summary
Diesel and Residual Range Organics

Extraction Method: EPA 3550B
Analysis Method: NWTPH-Dx

Units: mg/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG0415479

	Lab Control Sample KWG0415479-5 Lab Control Spike			
Analyte Name	**Result**	**Expected**	**%Rec**	**%Rec Limits**
Diesel Range Organics (DRO)	662	640	103	74-150
Residual Range Organics (RRO)	313	320	98	53-143

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00068

Polynuclear Aromatic Hydrocarbons
Method 8270C SIM

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Collected: 09/29/2004
Date Received: 09/30/2004

Polynuclear Aromatic Hydrocarbons

Sample Name: B-7
Lab Code: K2407643-003

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**1.3**		0.023	0.0054	1	10/06/04	10/10/04	KWG0415264	
2-Methylnaphthalene	**0.27**		0.023	0.0045	1	10/06/04	10/10/04	KWG0415264	
Acenaphthylene	ND	U	0.023	0.0035	1	10/06/04	10/10/04	KWG0415264	
Acenaphthene	**0.082**		0.023	0.0047	1	10/06/04	10/10/04	KWG0415264	
Dibenzofuran	**0.011**	J	0.023	0.0049	1	10/06/04	10/10/04	KWG0415264	
Fluorene	**0.080**		0.023	0.0057	1	10/06/04	10/10/04	KWG0415264	
Phenanthrene	**0.019**	J	0.023	0.0043	1	10/06/04	10/10/04	KWG0415264	
Anthracene	**0.015**	J	0.023	0.0044	1	10/06/04	10/10/04	KWG0415264	
Fluoranthene	**0.020**	J	0.023	0.0047	1	10/06/04	10/10/04	KWG0415264	
Pyrene	**0.13**		0.023	0.0042	1	10/06/04	10/10/04	KWG0415264	
Benz(a)anthracene	**0.014**	J	0.023	0.0045	1	10/06/04	10/10/04	KWG0415264	
Chrysene	**0.024**		0.023	0.0040	1	10/06/04	10/10/04	KWG0415264	
B[illegible](b)fluoranthene	**0.017**	J	0.023	0.0054	1	10/06/04	10/10/04	KWG0415264	
Benzo(k)fluoranthene	**0.0049**	J	0.023	0.0046	1	10/06/04	10/10/04	KWG0415264	
Benzo(a)pyrene	**0.012**	J	0.023	0.0046	1	10/06/04	10/10/04	KWG0415264	
Indeno(1,2,3-cd)pyrene	**0.014**	J	0.023	0.0043	1	10/06/04	10/10/04	KWG0415264	
Dibenz(a,h)anthracene	ND	U	0.023	0.0074	1	10/06/04	10/10/04	KWG0415264	
Benzo(g,h,i)perylene	**0.054**		0.023	0.0046	1	10/06/04	10/10/04	KWG0415264	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	70	37-107	10/10/04	Acceptable
Fluoranthene-d10	78	18-137	10/10/04	Acceptable
Terphenyl-d14	93	18-153	10/10/04	Acceptable

Co[illegible]nts:

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Collected: NA
Date Received: NA

Polynuclear Aromatic Hydrocarbons

Sample Name: Method Blank
Lab Code: KWG0415264-3

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	ND	U	0.020	0.0048	1	10/06/04	10/10/04	KWG0415264	
2-Methylnaphthalene	ND	U	0.020	0.0040	1	10/06/04	10/10/04	KWG0415264	
Acenaphthylene	ND	U	0.020	0.0031	1	10/06/04	10/10/04	KWG0415264	
Acenaphthene	ND	U	0.020	0.0042	1	10/06/04	10/10/04	KWG0415264	
Dibenzofuran	ND	U	0.020	0.0044	1	10/06/04	10/10/04	KWG0415264	
Fluorene	ND	U	0.020	0.0051	1	10/06/04	10/10/04	KWG0415264	
Phenanthrene	ND	U	0.020	0.0038	1	10/06/04	10/10/04	KWG0415264	
Anthracene	ND	U	0.020	0.0039	1	10/06/04	10/10/04	KWG0415264	
Fluoranthene	ND	U	0.020	0.0042	1	10/06/04	10/10/04	KWG0415264	
Pyrene	ND	U	0.020	0.0037	1	10/06/04	10/10/04	KWG0415264	
Benz(a)anthracene	ND	U	0.020	0.0040	1	10/06/04	10/10/04	KWG0415264	
Chrysene	ND	U	0.020	0.0036	1	10/06/04	10/10/04	KWG0415264	
B[illegible](b)fluoranthene	ND	U	0.020	0.0048	1	10/06/04	10/10/04	KWG0415264	
Benzo(k)fluoranthene	ND	U	0.020	0.0041	1	10/06/04	10/10/04	KWG0415264	
Benzo(a)pyrene	ND	U	0.020	0.0041	1	10/06/04	10/10/04	KWG0415264	
Indeno(1,2,3-cd)pyrene	ND	U	0.020	0.0038	1	10/06/04	10/10/04	KWG0415264	
Dibenz(a,h)anthracene	ND	U	0.020	0.0066	1	10/06/04	10/10/04	KWG0415264	
Benzo(g,h,i)perylene	ND	U	0.020	0.0041	1	10/06/04	10/10/04	KWG0415264	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	60	37-107	10/10/04	Acceptable
Fluoranthene-d10	68	18-137	10/10/04	Acceptable
Terphenyl-d14	82	18-153	10/10/04	Acceptable

Co[illegible]nts:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643
Date Collected: 09/28/2004
Date Received: 09/30/2004

Polynuclear Aromatic Hydrocarbons

Sample Name: B-7 0-4ft
Lab Code: K2407643-001

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**0.91**	J	3.3	0.45	1	10/06/04	10/18/04	KWG0415260	
2-Methylnaphthalene	ND	U	3.3	0.45	1	10/06/04	10/18/04	KWG0415260	
Acenaphthylene	ND	U	3.3	0.29	1	10/06/04	10/18/04	KWG0415260	
Acenaphthene	ND	U	3.3	0.21	1	10/06/04	10/18/04	KWG0415260	
Fluorene	ND	U	3.3	0.25	1	10/06/04	10/18/04	KWG0415260	
Dibenzofuran	ND	U	3.3	0.23	1	10/06/04	10/18/04	KWG0415260	
Phenanthrene	**0.58**	J	3.3	0.43	1	10/06/04	10/18/04	KWG0415260	
Anthracene	ND	U	3.3	0.29	1	10/06/04	10/18/04	KWG0415260	
Fluoranthene	**0.78**	J	3.3	0.45	1	10/06/04	10/18/04	KWG0415260	
Pyrene	**0.87**	J	3.3	0.47	1	10/06/04	10/18/04	KWG0415260	
Benzo(b)fluoranthene	ND	U	3.3	0.63	1	10/06/04	10/18/04	KWG0415260	
Benzo(k)fluoranthene	ND	U	3.3	0.43	1	10/06/04	10/18/04	KWG0415260	
B[illegible]anthracene	**0.22**	J	3.3	0.21	1	10/06/04	10/18/04	KWG0415260	
Chrysene	ND	U	3.3	0.54	1	10/06/04	10/18/04	KWG0415260	
Benzo(a)pyrene	**0.41**	J	3.3	0.29	1	10/06/04	10/18/04	KWG0415260	
Indeno(1,2,3-cd)pyrene	**0.41**	J	3.3	0.32	1	10/06/04	10/18/04	KWG0415260	
Dibenz(a,h)anthracene	ND	U	3.3	0.34	1	10/06/04	10/18/04	KWG0415260	
Benzo(g,h,i)perylene	**0.74**	J	3.3	0.30	1	10/06/04	10/18/04	KWG0415260	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	59	27-110	10/18/04	Acceptable
Fluoranthene-d10	73	34-122	10/18/04	Acceptable
Terphenyl-d14	81	50-132	10/18/04	Acceptable

Comments:

00072

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643
Date Collected: 09/28/2004
Date Received: 09/30/2004

Polynuclear Aromatic Hydrocarbons

Sample Name: B-7 13-15ft
Lab Code: K2407643-002

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**7.7**		2.8	0.38	1	10/06/04	10/19/04	KWG0415260	
2-Methylnaphthalene	**12**		2.8	0.38	1	10/06/04	10/19/04	KWG0415260	
Acenaphthylene	**1.3**	J	2.8	0.25	1	10/06/04	10/19/04	KWG0415260	
Acenaphthene	**0.85**	J	2.8	0.18	1	10/06/04	10/19/04	KWG0415260	
Fluorene	ND	U	2.8	0.22	1	10/06/04	10/19/04	KWG0415260	
Dibenzofuran	ND	U	2.8	0.19	1	10/06/04	10/19/04	KWG0415260	
Phenanthrene	**2.8**		2.8	0.37	1	10/06/04	10/19/04	KWG0415260	
Anthracene	**0.97**	J	2.8	0.25	1	10/06/04	10/19/04	KWG0415260	
Fluoranthene	**2.0**	J	2.8	0.38	1	10/06/04	10/19/04	KWG0415260	
Pyrene	**4.6**		2.8	0.41	1	10/06/04	10/19/04	KWG0415260	
Benzo(b)fluoranthene	**1.9**	J	2.8	0.54	1	10/06/04	10/19/04	KWG0415260	
Benzo(k)fluoranthene	**0.93**	J	2.8	0.37	1	10/06/04	10/19/04	KWG0415260	
B[illegible]a)anthracene	**1.5**	J	2.8	0.18	1	10/06/04	10/19/04	KWG0415260	
Chrysene	**5.1**		2.8	0.46	1	10/06/04	10/19/04	KWG0415260	
Benzo(a)pyrene	**2.3**	J	2.8	0.25	1	10/06/04	10/19/04	KWG0415260	
Indeno(1,2,3-cd)pyrene	**9.7**		2.8	0.27	1	10/06/04	10/19/04	KWG0415260	
Dibenz(a,h)anthracene	**0.80**	J	2.8	0.30	1	10/06/04	10/19/04	KWG0415260	
Benzo(g,h,i)perylene	**100**		2.8	0.26	1	10/06/04	10/19/04	KWG0415260	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	59	27-110	10/19/04	Acceptable
Fluoranthene-d10	74	34-122	10/19/04	Acceptable
Terphenyl-d14	74	50-132	10/19/04	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643
Date Collected: NA
Date Received: NA

Polynuclear Aromatic Hydrocarbons

Sample Name: Method Blank
Lab Code: KWG0415260-5

Units: ug/Kg
Basis: Dry

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**0.62**	J	2.5	0.34	1	10/06/04	10/18/04	KWG0415260	
2-Methylnaphthalene	ND	U	2.5	0.34	1	10/06/04	10/18/04	KWG0415260	
Acenaphthylene	ND	U	2.5	0.22	1	10/06/04	10/18/04	KWG0415260	
Acenaphthene	ND	U	2.5	0.16	1	10/06/04	10/18/04	KWG0415260	
Fluorene	ND	U	2.5	0.19	1	10/06/04	10/18/04	KWG0415260	
Dibenzofuran	ND	U	2.5	0.17	1	10/06/04	10/18/04	KWG0415260	
Phenanthrene	**0.42**	J	2.5	0.33	1	10/06/04	10/18/04	KWG0415260	
Anthracene	ND	U	2.5	0.22	1	10/06/04	10/18/04	KWG0415260	
Fluoranthene	**0.38**	J	2.5	0.34	1	10/06/04	10/18/04	KWG0415260	
Pyrene	ND	U	2.5	0.36	1	10/06/04	10/18/04	KWG0415260	
Benzo(b)fluoranthene	ND	U	2.5	0.48	1	10/06/04	10/18/04	KWG0415260	
Benzo(k)fluoranthene	ND	U	2.5	0.33	1	10/06/04	10/18/04	KWG0415260	
B[illegible]anthracene	ND	U	2.5	0.16	1	10/06/04	10/18/04	KWG0415260	
Chrysene	ND	U	2.5	0.41	1	10/06/04	10/18/04	KWG0415260	
Benzo(a)pyrene	ND	U	2.5	0.22	1	10/06/04	10/18/04	KWG0415260	
Indeno(1,2,3-cd)pyrene	ND	U	2.5	0.24	1	10/06/04	10/18/04	KWG0415260	
Dibenz(a,h)anthracene	ND	U	2.5	0.26	1	10/06/04	10/18/04	KWG0415260	
Benzo(g,h,i)perylene	ND	U	2.5	0.23	1	10/06/04	10/18/04	KWG0415260	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	43	27-110	10/18/04	Acceptable
Fluoranthene-d10	71	34-122	10/18/04	Acceptable
Terphenyl-d14	82	50-132	10/18/04	Acceptable

Co[illegible]nts:

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
B-7	K2407643-003	70	78	93
Method Blank	KWG0415264-3	60	68	82
Lab Control Sample	KWG0415264-1	62	67	74
Duplicate Lab Control Sample	KWG0415264-2	65	75	72

Surrogate Recovery Control Limits (%)

Sur1 = Fluorene-d10	37-107
Sur2 = Fluoranthene-d10	18-137
Sur3 = Terphenyl-d14	18-153

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

00075

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
B-7 0-4ft	K2407643-001	59	73	81
B-7 13-15ft	K2407643-002	59	74	74
Method Blank	KWG0415260-5	43	71	82
Batch QC	K2407696-002	57	71	81
Batch QCMS	KWG0415260-1	55	72	76
Batch QCDMS	KWG0415260-2	60	74	80
Lab Control Sample	KWG0415260-3	62	73	77
Duplicate Lab Control Sample	KWG0415260-4	63	75	80

Surrogate Recovery Control Limits (%)

Sur1 =	Fluorene-d10	27-110
Sur2 =	Fluoranthene-d10	34-122
Sur3 =	Terphenyl-d14	50-132

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

00076

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643
Date Extracted: 10/06/2004
Date Analyzed: 10/18/2004

Matrix Spike/Duplicate Matrix Spike Summary
Polynuclear Aromatic Hydrocarbons

Sample Name: Batch QC
Lab Code: K2407696-002

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry

Level: Low
Extraction Lot: KWG0415260

Analyte Name	Sample Result	Batch QCMS KWG0415260-1 Matrix Spike			Batch QCDMS KWG0415260-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Expected	%Rec	Result	Expected	%Rec			
Naphthalene	1.7	200	257	77	198	257	76	22-101	1	40
2-Methylnaphthalene	1.2	241	257	93	247	257	95	27-106	2	40
Acenaphthylene	10	214	257	79	215	257	80	36-113	1	40
Acenaphthene	0.44	207	257	80	208	257	81	32-114	1	40
Fluorene	0.50	213	257	83	213	257	82	39-118	0	40
Dibenzofuran	0.53	209	257	81	212	257	82	33-110	2	40
Phenanthrene	14	215	257	78	220	257	80	29-130	2	40
Anthracene	8.1	221	257	83	222	257	83	38-133	1	40
Fluoranthene	72	264	257	74	266	257	75	30-143	1	40
Pyrene	65	240	257	68	243	257	69	28-143	1	40
Benzo(b)fluoranthene	34	223	257	73	230	257	76	26-144	3	40
Benzo(k)fluoranthene	30	240	257	82	243	257	83	29-136	1	40
Benz(a)anthracene	23	208	257	72	213	257	74	24-149	3	40
Chrysene	31	234	257	79	240	257	81	38-133	3	40
Benzo(a)pyrene	28	220	257	75	226	257	77	30-146	3	40
Indeno(1,2,3-cd)pyrene	28	210	257	71	219	257	74	24-147	4	40
Dibenz(a,h)anthracene	2.8	192	257	73	195	257	74	33-136	2	40
Benzo(g,h,i)perylene	35	231	257	76	242	257	80	23-142	4	40

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00077

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2407643
Date Extracted: 10/06/2004
Date Analyzed: 10/10/2004

Lab Control Spike/Duplicate Lab Control Spike Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0415264

Analyte Name	Lab Control Sample KWG0415264-1 Lab Control Spike Result	Expected	%Rec	Duplicate Lab Control Sample KWG0415264-2 Duplicate Lab Control Spike Result	Expected	%Rec	%Rec Limits	RPD	RPD Limit
Naphthalene	2.00	2.50	80	1.98	2.50	79	44-101	1	30
2-Methylnaphthalene	2.08	2.50	83	2.28	2.50	91	36-106	9	30
Acenaphthylene	2.01	2.50	80	1.74	2.50	70	49-114	14	30
Acenaphthene	2.07	2.50	83	2.06	2.50	83	48-107	0	30
Dibenzofuran	2.13	2.50	85	2.13	2.50	85	40-115	0	30
Fluorene	2.13	2.50	85	2.09	2.50	84	55-111	2	30
Phenanthrene	2.14	2.50	85	2.15	2.50	86	56-108	1	30
Anthracene	2.12	2.50	85	2.20	2.50	88	42-117	4	30
Fluoranthene	2.23	2.50	89	2.24	2.50	90	61-123	1	30
Pyrene	2.37	2.50	95	2.36	2.50	95	53-123	0	30
B[illegible]a)anthracene	2.12	2.50	85	2.06	2.50	82	53-123	3	30
C[illegible]ene	2.25	2.50	90	2.22	2.50	89	57-118	1	30
Benzo(b)fluoranthene	2.20	2.50	88	2.24	2.50	89	57-132	2	30
Benzo(k)fluoranthene	2.35	2.50	94	2.31	2.50	92	54-126	2	30
Benzo(a)pyrene	2.17	2.50	87	2.19	2.50	88	38-142	1	30
Indeno(1,2,3-cd)pyrene	2.15	2.50	86	2.17	2.50	87	49-139	1	30
Dibenz(a,h)anthracene	2.09	2.50	84	2.11	2.50	84	47-138	1	30
Benzo(g,h,i)perylene	2.26	2.50	90	2.29	2.50	92	50-125	1	30

Res[illegible]agged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00078

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Soil

Service Request: K2407643
Date Extracted: 10/06/2004
Date Analyzed: 10/18/2004

Lab Control Spike/Duplicate Lab Control Spike Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3541
Analysis Method: 8270C SIM

Units: ug/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG0415260

Analyte Name	Lab Control Sample KWG0415260-3 Lab Control Spike Result	Expected	%Rec	Duplicate Lab Control Sample KWG0415260-4 Duplicate Lab Control Spike Result	Expected	%Rec	%Rec Limits	RPD	RPD Limit
Naphthalene	382	500	76	390	500	78	43-102	2	40
2-Methylnaphthalene	480	500	96	496	500	99	44-105	3	40
Acenaphthylene	399	500	80	410	500	82	51-107	3	40
Acenaphthene	397	500	79	405	500	81	50-105	2	40
Fluorene	411	500	82	417	500	83	54-108	2	40
Dibenzofuran	402	500	80	412	500	82	50-106	3	40
Phenanthrene	419	500	84	415	500	83	58-106	1	40
Anthracene	413	500	83	421	500	84	61-113	2	40
Fluoranthene	451	500	90	459	500	92	63-117	2	40
Pyrene	427	500	85	433	500	87	59-121	1	40
Be[redacted](b)fluoranthene	392	500	78	420	500	84	58-126	7	40
Be[redacted](k)fluoranthene	429	500	86	439	500	88	61-122	2	40
Benz(a)anthracene	387	500	77	393	500	79	57-120	2	40
Chrysene	428	500	86	441	500	88	64-116	3	40
Benzo(a)pyrene	405	500	81	409	500	82	58-128	1	40
Indeno(1,2,3-cd)pyrene	382	500	76	387	500	77	46-133	1	40
Dibenz(a,h)anthracene	378	500	76	384	500	77	50-128	2	40
Benzo(g,h,i)perylene	419	500	84	427	500	85	52-125	2	40

Res[redacted]gged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00079

1317 South 13th Avenue P.O. Box 479 Kelso, Washington 98626 (360) 577-7222 ph (360) 636-1068 fax

Columbia Analytical Services INC.
An Employee - Owned Company

November 5, 2004 Service Request No: K2408133

Craig Arola
RSV Engineering Inc.
31960 SW Charbonneau Drive
Suite 201
Wilsonville, OR 97070

RE: Highway Service / 03-135

Dear Craig:

Enclosed are the results of the sample(s) submitted to our laboratory on October 14, 2004. For your reference, these analyses have been assigned our service request number K2408133.

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAC standards except as noted in the case narrative report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3280.

Respectfully submitted,

Columbia Analytical Services, Inc.

Les Kennedy
Project Chemist

LK/jeb

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
[redacted]	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
B	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.
*	The duplicate analysis not within control limits. See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a chromatographic interference.
X	See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
[redacted]	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

Case Narrative

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	RSV Engineering	**Service Request No.:**	K2408133
Project:	Highway Service / 03-135	**Date Received:**	10/14/04
Sample Matrix:	Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), and Laboratory Control Sample (LCS).

Sample Receipt

Three water samples were received for analysis at Columbia Analytical Services on 10/14/04 in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Total Metals

No anomalies associated with the analysis of this batch were observed.

Diesel Range Organics by EPA Method 8015B

No anomalies associated with the analysis of this batch were observed.

Gasoline Range Organics by EPA Method 8015B

No anomalies associated with the analysis of this batch were observed.

Volatile Organic Compounds by EPA Method 8260B

No anomalies associated with the analysis of this batch were observed.

Polynuclear Aromatic Hydrocarbons by EPA Method 8270C

Sample Notes and Discussion
Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD). A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD for these samples.

Initial Calibration (ICAL) Exceptions:
The primary evaluation criterion was exceeded for Fluorene-d10 in ICAL ID CAL3848. In accordance with CAS standard operating procedures, the alternative evaluation specified in the EPA method was performed using the mean Relative Standard Deviation (RSD) of all analytes in the calibration. The result of the mean RSD calculation was 6.3%. The calibration meets the alternative evaluation criteria. Note that CAS/Kelso policy does not allow the use of averaging if any analyte in the ICAL exceeds 30% RSD.

Approved by _____ **Date** 11/4/04

Chain of Custody Documentation

CHAIN OF CUSTODY

Columbia Analytical Services INC.
An Employee - Owned Company

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222x07 • FAX (360) 636-1068

SR#: 624081535 PAGE 1 OF 1 COC# [redacted]

PROJECT NAME	Highway Service
PROJECT NUMBER	03-135
PROJECT MANAGER	Craig Arola
COMPANY/ADDRESS	RSV Engineering, Inc. 31960 SW Charbonneau Dr, Stelo1
CITY/STATE/ZIP	Wilsonville, OR 97070
E-MAIL ADDRESS	rsvcca@verizon.net
PHONE # 503-694-6960	FAX# 503-694-6962
SAMPLER'S SIGNATURE	

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625 ☐ 8270 ☐ 8270LL ☐	Volatile Organics 624 ☐ 8260 ☐	Hydrocarbons (*see below) Gas A ☐ Diesel A ☐ Oil A ☐	8021 ☐ BTEX ☐ ☐ Fuel Fingerprint (FIQ) ☐ NW-HCID Screen	Oil & Grease/TRPH 1664 SGT ☐ 1664 HEM ☐	PCB's Aroclors ☐ Congeners ☐	Pesticides/Herbicides 608 ☐ 8081A ☐ 8141A ☐ 8151A ☐	Chlorophenolics - 8151M Tri ☐ Tetra ☐ PCP ☐	PAHS 8310 ☐ SIM A ☐	Metals, Total or Dissolved (See list below)	Cyanide ☐	Hex-Chrom ☐	pH, Cond, Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020 ☐ AOX 1650 ☐ 506 ☐	REMARKS
B-8	10-13-04	11:15		W	9			X	X						X	X					
B-9	10-13-04	11:35		W	9			X	X						X	X					
B-20	10-13-04			W	3			X													

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

___ III. Data Validation Report (includes all raw data)

___ IV. CLP Deliverable Report

___ V. EDD

INVOICE INFORMATION

P.O. # _____

Bill To: _____

TURNAROUND REQUIREMENTS

____ 24 hr. ____ 48 hr.

____ 5 Day

X Standard (10-15 working days)

X Provide FAX Results

_____ Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca (Cd) Co (Cr) Cu Fe (Pb) Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI (NORTHWEST) OTHER:_____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

For VOC analysis, only analyze BTEX, EDC, EDB, and MTBE

For dissolved metals, use EPA Method 6010

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [redacted]	Signature: [redacted]	Signature: [redacted]	Signature: [redacted]
Printed Name: Craig Arola	Printed Name: [redacted]	Printed Name: [redacted]	Printed Name: [redacted]
Date/Time: 10-14-04	Date/Time: 10/14/04 1030	Date/Time: 10 Hour 1.0	Date/Time: [redacted]
Firm: RSV	Firm: CAS	Firm: [redacted]	Firm: [redacted]

RCOC #1 06/03

Columbia Analytical Services Inc. PC _____

Cooler Receipt and Preservation Form

Project/Client RSV. Eng. Work Order K240 8133

Cooler received on 10/14/04 and opened on 10/14/04 by [illegible]

1.	Were custody seals on outside of coolers?					(Y) N
	If yes, how many and where?					
2.	Were custody seals intact?					(Y) N
3.	Were signature and date present on the custody seals?					(Y) N
4.	Is the shipper's airbill available and filed? If no, record airbill number:					Y N
5.	COC#					
	Temperature of cooler(s) upon receipt: (°C)	2.1				
	Temperature Blank: (°C)	1.7				
	Were samples hand delivered on the same day as collection?					Y N
6.	Were custody papers properly filled out (ink, signed, etc.)?					(Y) N
7.	Type of packing material present ICE, styrofoam					
8.	**Did all bottles arrive in good condition (unbroken)?**					(Y) N
9.	Were all bottle labels complete (i.e analysis, preservation, etc.)?					(Y) N
10.	Did all bottle labels and tags agree with custody papers?					(Y) N
11.	**Were the correct types of bottles used for the tests indicated?**					(Y) N
12.	Were all of the preserved bottles received at the lab with the appropriate pH?					(Y) N
13.	Were VOA vials checked for absence of air bubbles, and if present, noted below?					(Y) N
14.	Did the bottles originate from CAS/K or a branch laboratory?					Y (N)
15.	**Are CWA Microbiology samples received with >1/2 the 24hr. hold time remaining from collection?**					Y N
16.	Was C12/Res negative?					Y N

Explain any discrepancies: _____

RESOLUTION: _____

Samples that required preservation or received out of temperature:

Sample ID	Reagent	Volume	Lot Number	Bottle Type	Rec'd out of Temperature	Initials

00008

Metals

METALS

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: RSV Engineering, Inc.

Service Request: K2408133

Project No.: 03-135

Project Name: Highway Service

Sample No.	Lab Sample ID.
B-8	K2408133-001
B-8D	K2408133-001D
B-8S	K2408133-001S
B-9	K2408133-002
Method Blank	K2408133-MB

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES

If yes-were raw data generated before application of background corrections? Yes/No NO

Comments: _____

Signature: _____ Date: 11/2/04

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: 03-135
Project Name: Highway Service
Matrix: WATER

Service Request: K2408133
Date Collected: 10/13/04
Date Received: 10/14/04
Units: µG/L
Basis: NA

Sample Name: B-8
Lab Code: K2408133-001

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	6010B	5.0	5.0	1	10/29/04	11/1/04	5.0	U	
Chromium	6010B	5.0	3.0	1	10/29/04	11/1/04	3.0	U	
Lead	6010B	50	30	1	10/29/04	11/1/04	30	U	

% Solids: 0.0

Comments:

00011

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: 03-135
Project Name: Highway Service
Matrix: WATER

Service Request: K2408133
Date Collected: 10/13/04
Date Received: 10/14/04
Units: µG/L
Basis: NA

Sample Name: B-9
Lab Code: K2408133-002

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	6010B	5.0	5.0	1	10/29/04	11/1/04	5.0	U	
Chromium	6010B	5.0	3.0	1	10/29/04	11/1/04	3.0	U	
Lead	6010B	50	30	1	10/29/04	11/1/04	30	U	

% Solids: 0.0

Comments:

00012

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: RSV Engineering, Inc.
Project No.: 03-135
Project Name: Highway Service
Matrix: WATER

Service Request: K2408133
Date Collected:
Date Received:
Units: µG/L
Basis: NA

Sample Name: Method Blank
Lab Code: K2408133-MB

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	6010B	5.0	5.0	1	10/29/04	11/1/04	5.0	U	
Chromium	6010B	5.0	3.0	1	10/29/04	11/1/04	3.0	U	
Lead	6010B	50	30	1	10/29/04	11/1/04	30	U	

% Solids: 0.0

Comments:

METALS
- 5a -
SPIKE SAMPLE RECOVERY

Client: RSV Engineering, Inc.
Project No.: 03-135
Project Name: Highway Service
Matrix: WATER

Service Request: K2408133
Units: µg/L
Basis: NA
% Solids: 0.0

Sample Name: B-8S
Lab Code: K2408133-001S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Cadmium	69 - 135	46.3		5.0	U	50.0	93		6010B
Chromium	85 - 121	187		3.0	U	200	94		6010B
Lead	75 - 125	469		30.0	U	500	94		6010B

An empty field in the Control Limit column indicates the control limit is not applicable.

METALS
-6-
DUPLICATES

Client: RSV Engineering, Inc.
Project No.: 03-135
Project Name: Highway Service
Matrix: WATER

Service Request: K2408133
Units: µg/L
Basis: NA
% Solids: 0.0

Sample Name: B-8D
Lab Code: K2408133-001D

Analyte	Control Limit(%)	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Cadmium		5.0	U	5.0	U			6010B
Chromium		3.0	U	3.0	U			6010B
Lead		30	U	30	U			6010B

An empty field in the Control Limit column indicates the control limit is not applicable.

Diesel & Residual Range Organics

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: 10/13/2004
Date Received: 10/14/2004

Diesel and Residual Range Organics

Sample Name: B-8
Lab Code: K2408133-001

Units: ug/L
Basis: NA

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	210	J	270	38	1	10/15/04	10/16/04	KWG0416006	
Residual Range Organics (RRO)	190	J	530	57	1	10/15/04	10/16/04	KWG0416006	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	92	50-150	10/16/04	Acceptable
n-Triacontane	94	50-150	10/16/04	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: 10/13/2004
Date Received: 10/14/2004

Diesel and Residual Range Organics

Sample Name: B-9
Lab Code: K2408133-002

Units: ug/L
Basis: NA

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	110	J	300	43	1	10/15/04	10/16/04	KWG0416006	
Residual Range Organics (RRO)	86	J	590	64	1	10/15/04	10/16/04	KWG0416006	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	88	50-150	10/16/04	Acceptable
n-Triacontane	92	50-150	10/16/04	Acceptable

Comments:

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: NA
Date Received: NA

Diesel and Residual Range Organics

Sample Name: Method Blank
Lab Code: KWG0416006-4

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Diesel Range Organics (DRO)	ND	U	250	36	1	10/15/04	10/16/04	KWG0416006	
Residual Range Organics (RRO)	ND	U	500	54	1	10/15/04	10/16/04	KWG0416006	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
o-Terphenyl	85	50-150	10/16/04	Acceptable
n-Triacontane	88	50-150	10/16/04	Acceptable

Comments:

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133

Surrogate Recovery Summary
Diesel and Residual Range Organics

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2
B-8	K2408133-001	92	94
B-9	K2408133-002	88	92
Batch QCDUP	KWG0416006-2	78	81
Method Blank	KWG0416006-4	85	88
Batch QC	K2408087-017	80	84
Lab Control Sample	KWG0416006-3	87	89

Surrogate Recovery Control Limits (%)

Sur1 = o-Terphenyl	50-150
Sur2 = n-Triacontane	50-150

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/15/2004
Date Analyzed: 10/16/2004

Duplicate Sample Summary
Diesel and Residual Range Organics

Sample Name: Batch QC
Lab Code: K2408087-017

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA

Level: Low
Extraction Lot: KWG0416006

Analyte Name	MRL	MDL	Sample Result	Batch QCDUP KWG0416006-2 Duplicate Sample Result	Average	Relative Percent Difference	RPD Limit
Diesel Range Organics (DRO)	250	36	ND	ND	ND	-	30
Residual Range Organics (RRO)	500	54	ND	ND	ND	-	30

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/15/2004
Date Analyzed: 10/16/2004

Lab Control Spike Summary
Diesel and Residual Range Organics

Extraction Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0416006

Analyte Name	Lab Control Sample KWG0416006-3 Lab Control Spike Result	Expected	%Rec	%Rec Limits
Diesel Range Organics (DRO)	1480	1600	93	71-146
Residual Range Organics (RRO)	696	800	87	53-143

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00022

Gasoline Range Organics

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: 10/13/2004
Date Received: 10/14/2004

Gasoline Range Organics

Sample Name: B-8
Lab Code: K2408133-001

Extraction Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics-NWTPH	330	Z	250	12	1	10/22/04	10/22/04	KWG0416437	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Difluorobenzene	93	50-150	10/22/04	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: 10/13/2004
Date Received: 10/14/2004

Gasoline Range Organics

Sample Name: B-9
Lab Code: K2408133-002

Extraction Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics-NWTPH	120	J	250	12	1	10/22/04	10/22/04	KWG0416437	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Difluorobenzene	93	50-150	10/22/04	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: NA
Date Received: NA

Gasoline Range Organics

Sample Name: Method Blank
Lab Code: KWG0416437-4

Extraction Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Gasoline Range Organics-NWTPH	ND	U	250	12	1	10/22/04	10/22/04	KWG0416437	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Difluorobenzene	96	50-150	10/22/04	Acceptable

Comments:

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133

Surrogate Recovery Summary
Gasoline Range Organics

Extraction Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1
B-8	K2408133-001	93
B-9	K2408133-002	93
Batch QCDUP	KWG0416437-2	93
Method Blank	KWG0416437-4	96
Batch QC	K2408225-001	94
Lab Control Sample	KWG0416437-3	99

Surrogate Recovery Control Limits (%)

Sur1 = 1,4-Difluorobenzene	50-150

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/22/2004
Date Analyzed: 10/22/2004

Duplicate Sample Summary
Gasoline Range Organics

Sample Name: Batch QC
Lab Code: K2408225-001

Extraction Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: ug/L
Basis: NA

Level: Low
Extraction Lot: KWG0416437

Analyte Name	MRL	MDL	Sample Result	Batch QCDUP KWG0416437-2 Duplicate Sample Result	Average	Relative Percent Difference	RPD Limit
Gasoline Range Organics-NWTPH	250	12	ND	ND	ND	-	30

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00028

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/22/2004
Date Analyzed: 10/22/2004

Lab Control Spike Summary
Gasoline Range Organics

Extraction Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0416437

Analyte Name	Lab Control Sample KWG0416437-3 Lab Control Spike Result	Expected	%Rec	%Rec Limits
Gasoline Range Organics-NWTPH	498	500	100	73-124

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00029

Volatile Organic Compounds
EPA Method 8260B

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: 10/13/2004
Date Received: 10/14/2004

Volatile Organic Compounds

Sample Name: B-8
Lab Code: K2408133-001

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Methyl tert-Butyl Ether	**2.2**		0.50	0.074	1	10/27/04	10/27/04	KWG0416940	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/27/04	10/27/04	KWG0416940	
Benzene	**53**		0.50	0.11	1	10/27/04	10/27/04	KWG0416940	
Toluene	**0.32**	J	0.50	0.098	1	10/27/04	10/27/04	KWG0416940	
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/27/04	10/27/04	KWG0416940	
Ethylbenzene	**0.42**	J	0.50	0.13	1	10/27/04	10/27/04	KWG0416940	
m,p-Xylenes	**0.72**		0.50	0.22	1	10/27/04	10/27/04	KWG0416940	
o-Xylene	**0.15**	J	0.50	0.079	1	10/27/04	10/27/04	KWG0416940	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	103	85-115	10/27/04	Acceptable
Toluene-d8	91	86-114	10/27/04	Acceptable
4-Bromofluorobenzene	96	72-115	10/27/04	Acceptable

Comments:

00031

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: 10/13/2004
Date Received: 10/14/2004

Volatile Organic Compounds

Sample Name: B-9
Lab Code: K2408133-002

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Methyl tert-Butyl Ether	**2.7**		0.50	0.074	1	10/27/04	10/27/04	KWG0416867	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/27/04	10/27/04	KWG0416867	
Benzene	**38**		0.50	0.11	1	10/27/04	10/27/04	KWG0416867	
Toluene	**0.36**	J	0.50	0.098	1	10/27/04	10/27/04	KWG0416867	
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/27/04	10/27/04	KWG0416867	
Ethylbenzene	**0.27**	J	0.50	0.13	1	10/27/04	10/27/04	KWG0416867	
m,p-Xylenes	**0.46**	J	0.50	0.22	1	10/27/04	10/27/04	KWG0416867	
o-Xylene	**0.12**	J	0.50	0.079	1	10/27/04	10/27/04	KWG0416867	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	103	85-115	10/27/04	Acceptable
Toluene-d8	90	86-114	10/27/04	Acceptable
4-Bromofluorobenzene	92	72-115	10/27/04	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: 10/13/2004
Date Received: 10/14/2004

Volatile Organic Compounds

Sample Name: B-20
Lab Code: K2408133-003

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Methyl tert-Butyl Ether	**2.3**		0.50	0.074	1	10/27/04	10/27/04	KWG0416864	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/27/04	10/27/04	KWG0416864	
Benzene	**54**		0.50	0.11	1	10/27/04	10/27/04	KWG0416864	
Toluene	**0.31**	J	0.50	0.098	1	10/27/04	10/27/04	KWG0416864	
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/27/04	10/27/04	KWG0416864	
Ethylbenzene	**0.46**	J	0.50	0.13	1	10/27/04	10/27/04	KWG0416864	
m,p-Xylenes	**0.72**		0.50	0.22	1	10/27/04	10/27/04	KWG0416864	
o-Xylene	**0.16**	J	0.50	0.079	1	10/27/04	10/27/04	KWG0416864	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	101	85-115	10/27/04	Acceptable
Toluene-d8	89	86-114	10/27/04	Acceptable
4-Bromofluorobenzene	96	72-115	10/27/04	Acceptable

Comments:

00033

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG0416864-4

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Methyl tert-Butyl Ether	ND	U	0.50	0.074	1	10/26/04	10/26/04	KWG0416864	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/26/04	10/26/04	KWG0416864	
Benzene	ND	U	0.50	0.11	1	10/26/04	10/26/04	KWG0416864	
Toluene	ND	U	0.50	0.098	1	10/26/04	10/26/04	KWG0416864	
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/26/04	10/26/04	KWG0416864	
Ethylbenzene	ND	U	0.50	0.13	1	10/26/04	10/26/04	KWG0416864	
m,p-Xylenes	ND	U	0.50	0.22	1	10/26/04	10/26/04	KWG0416864	
o-Xylene	ND	U	0.50	0.079	1	10/26/04	10/26/04	KWG0416864	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	112	85-115	10/26/04	Acceptable
Toluene-d8	97	86-114	10/26/04	Acceptable
4-Bromofluorobenzene	93	72-115	10/26/04	Acceptable

Comments:

00034

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG0416867-4

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Methyl tert-Butyl Ether	ND	U	0.50	0.074	1	10/27/04	10/27/04	KWG0416867	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/27/04	10/27/04	KWG0416867	
Benzene	ND	U	0.50	0.11	1	10/27/04	10/27/04	KWG0416867	
Toluene	ND	U	0.50	0.098	1	10/27/04	10/27/04	KWG0416867	
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/27/04	10/27/04	KWG0416867	
Ethylbenzene	ND	U	0.50	0.13	1	10/27/04	10/27/04	KWG0416867	
m,p-Xylenes	ND	U	0.50	0.22	1	10/27/04	10/27/04	KWG0416867	
o-Xylene	ND	U	0.50	0.079	1	10/27/04	10/27/04	KWG0416867	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	105	85-115	10/27/04	Acceptable
Toluene-d8	92	86-114	10/27/04	Acceptable
4-Bromofluorobenzene	89	72-115	10/27/04	Acceptable

Comments:

00035

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG0416940-4

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Methyl tert-Butyl Ether	ND	U	0.50	0.074	1	10/27/04	10/27/04	KWG0416940	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.12	1	10/27/04	10/27/04	KWG0416940	
Benzene	ND	U	0.50	0.11	1	10/27/04	10/27/04	KWG0416940	
Toluene	ND	U	0.50	0.098	1	10/27/04	10/27/04	KWG0416940	
1,2-Dibromoethane (EDB)	ND	U	2.0	0.073	1	10/27/04	10/27/04	KWG0416940	
Ethylbenzene	ND	U	0.50	0.13	1	10/27/04	10/27/04	KWG0416940	
m,p-Xylenes	ND	U	0.50	0.22	1	10/27/04	10/27/04	KWG0416940	
o-Xylene	ND	U	0.50	0.079	1	10/27/04	10/27/04	KWG0416940	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	105	85-115	10/27/04	Acceptable
Toluene-d8	93	86-114	10/27/04	Acceptable
4-Bromofluorobenzene	92	72-115	10/27/04	Acceptable

Comments:

00036

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133

Surrogate Recovery Summary
Volatile Organic Compounds

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
B-8	K2408133-001	103	91	96
B-9	K2408133-002	103	90	92
B-20	K2408133-003	101	89	96
Method Blank	KWG0416864-4	112	97	93
Method Blank	KWG0416867-4	105	92	89
Method Blank	KWG0416940-4	105	93	92
Batch QC	K2408178-011	106	92	92
Batch QCMS	KWG0416867-1	111	101	103
Batch QCDMS	KWG0416867-2	108	99	105
Lab Control Sample	KWG0416864-3	111	104	113
Lab Control Sample	KWG0416867-3	105	99	105
Lab Control Sample	KWG0416940-3	105	99	102

Surrogate Recovery Control Limits (%)

Sur1 =	Dibromofluoromethane	85-115
Sur2 =	Toluene-d8	86-114
Sur3 =	4-Bromofluorobenzene	72-115

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

00037

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/27/2004
Date Analyzed: 10/27/2004

Matrix Spike/Duplicate Matrix Spike Summary
Volatile Organic Compounds

Sample Name: Batch QC
Lab Code: K2408178-011

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low
Extraction Lot: KWG0416867

Analyte Name	Sample Result	Batch QCMS KWG0416867-1 Matrix Spike			Batch QCDMS KWG0416867-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Expected	%Rec	Result	Expected	%Rec			
Methyl tert-Butyl Ether	ND	10.3	10.0	103	10.1	10.0	101	65-119	2	30
1,2-Dichloroethane (EDC)	ND	11.1	10.0	111	10.7	10.0	107	72-128	3	30
Benzene	ND	10.2	10.0	102	9.65	10.0	97	81-130	5	30
Toluene	0.44	10.0	10.0	96	9.51	10.0	91	76-130	5	30
1,2-Dibromoethane (EDB)	ND	10.6	10.0	106	10.4	10.0	104	71-127	2	30
Ethylbenzene	ND	11.1	10.0	111	10.8	10.0	108	80-135	3	30
m,p-Xylenes	ND	22.2	20.0	111	21.7	20.0	108	81-135	2	30
o-Xylene	ND	10.9	10.0	109	10.6	10.0	106	80-137	3	30

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00038

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/26/2004
Date Analyzed: 10/26/2004

Lab Control Spike Summary
Volatile Organic Compounds

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0416864

	Lab Control Sample KWG0416864-3 Lab Control Spike			
Analyte Name	**Result**	**Expected**	**%Rec**	**%Rec Limits**
Methyl tert-Butyl Ether	10.4	10.0	104	67-117
1,2-Dichloroethane (EDC)	11.1	10.0	111	76-125
Benzene	9.58	10.0	96	87-122
Toluene	9.32	10.0	93	84-120
1,2-Dibromoethane (EDB)	11.1	10.0	111	78-121
Ethylbenzene	11.0	10.0	110	89-124
m,p-Xylenes	22.6	20.0	113	89-126
o-Xylene	10.9	10.0	109	86-129

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00039

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/27/2004
Date Analyzed: 10/27/2004

Lab Control Spike Summary
Volatile Organic Compounds

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0416867

	Lab Control Sample KWG0416867-3 Lab Control Spike			
Analyte Name	**Result**	**Expected**	**%Rec**	**%Rec Limits**
Methyl tert-Butyl Ether	10.5	10.0	105	67-117
1,2-Dichloroethane (EDC)	10.7	10.0	107	76-125
Benzene	9.21	10.0	92	87-122
Toluene	9.01	10.0	90	84-120
1,2-Dibromoethane (EDB)	10.7	10.0	107	78-121
Ethylbenzene	10.4	10.0	104	89-124
m,p-Xylenes	20.8	20.0	104	89-126
o-Xylene	10.2	10.0	102	86-129

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/27/2004
Date Analyzed: 10/27/2004

Lab Control Spike Summary
Volatile Organic Compounds

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0416940

	Lab Control Sample KWG0416940-3 Lab Control Spike			
Analyte Name	**Result**	**Expected**	**%Rec**	**%Rec Limits**
Methyl tert-Butyl Ether	9.83	10.0	98	67-117
1,2-Dichloroethane (EDC)	10.3	10.0	103	76-125
Benzene	8.91	10.0	89	87-122
Toluene	8.79	10.0	88	84-120
1,2-Dibromoethane (EDB)	9.84	10.0	98	78-121
Ethylbenzene	10.0	10.0	100	89-124
m,p-Xylenes	20.4	20.0	102	89-126
o-Xylene	9.69	10.0	97	86-129

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00041

Polynuclear Aromatic Hydrocarbons
EPA Method 8270C

Organic Analysis:
Polynuclear Aromatic Hydrocarbons

Summary Package

Sample and QC Results

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Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133

Cover Page - Organic Analysis Data Package
Polynuclear Aromatic Hydrocarbons

Sample Name	Lab Code	Date Collected	Date Received
B-8	K2408133-001	10/13/2004	10/14/2004
B-9	K2408133-002	10/13/2004	10/14/2004

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 case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: Carl Dogan

Date: 10/29/04 Title: SVM Supervisor

00044

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: 10/13/2004
Date Received: 10/14/2004

Polynuclear Aromatic Hydrocarbons

Sample Name: B-8
Lab Code: K2408133-001

Units: ug/L
Basis: NA

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	0.12		0.022	0.0053	1	10/19/04	10/21/04	KWG0416206	
2-Methylnaphthalene	0.11		0.022	0.0044	1	10/19/04	10/21/04	KWG0416206	
Acenaphthylene	0.0035	J	0.022	0.0034	1	10/19/04	10/21/04	KWG0416206	
Acenaphthene	0.014	J	0.022	0.0046	1	10/19/04	10/21/04	KWG0416206	
Dibenzofuran	0.013	J	0.022	0.0048	1	10/19/04	10/21/04	KWG0416206	
Fluorene	0.011	J	0.022	0.0056	1	10/19/04	10/21/04	KWG0416206	
Phenanthrene	0.013	J	0.022	0.0042	1	10/19/04	10/21/04	KWG0416206	
Anthracene	0.0056	J	0.022	0.0043	1	10/19/04	10/21/04	KWG0416206	
Fluoranthene	0.0075	J	0.022	0.0046	1	10/19/04	10/21/04	KWG0416206	
Pyrene	0.0091	J	0.022	0.0041	1	10/19/04	10/21/04	KWG0416206	
Benz(a)anthracene	0.0084	J	0.022	0.0044	1	10/19/04	10/21/04	KWG0416206	
Chrysene	0.0064	J	0.022	0.0040	1	10/19/04	10/21/04	KWG0416206	
[illegible]o(b)fluoranthene	0.0071	J	0.022	0.0053	1	10/19/04	10/21/04	KWG0416206	
B[illegible]o(k)fluoranthene	0.0076	J	0.022	0.0045	1	10/19/04	10/21/04	KWG0416206	
Benzo(a)pyrene	0.0079	J	0.022	0.0045	1	10/19/04	10/21/04	KWG0416206	
Indeno(1,2,3-cd)pyrene	0.0092	J	0.022	0.0042	1	10/19/04	10/21/04	KWG0416206	
Dibenz(a,h)anthracene	0.0095	J	0.022	0.0072	1	10/19/04	10/21/04	KWG0416206	
Benzo(g,h,i)perylene	0.0098	J	0.022	0.0045	1	10/19/04	10/21/04	KWG0416206	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	59	37-107	10/21/04	Acceptable
Fluoranthene-d10	71	18-137	10/21/04	Acceptable
Terphenyl-d14	79	18-153	10/21/04	Acceptable

Co[illegible]nts:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: 10/13/2004
Date Received: 10/14/2004

Polynuclear Aromatic Hydrocarbons

Sample Name: B-9
Lab Code: K2408133-002

Units: ug/L
Basis: NA

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**0.088**		0.028	0.0065	1	10/19/04	10/21/04	KWG0416206	
2-Methylnaphthalene	**0.083**		0.028	0.0055	1	10/19/04	10/21/04	KWG0416206	
Acenaphthylene	ND	U	0.028	0.0042	1	10/19/04	10/21/04	KWG0416206	
Acenaphthene	ND	U	0.028	0.0057	1	10/19/04	10/21/04	KWG0416206	
Dibenzofuran	ND	U	0.028	0.0060	1	10/19/04	10/21/04	KWG0416206	
Fluorene	**0.0074**	J	0.028	0.0069	1	10/19/04	10/21/04	KWG0416206	
Phenanthrene	**0.0099**	J	0.028	0.0052	1	10/19/04	10/21/04	KWG0416206	
Anthracene	ND	U	0.028	0.0053	1	10/19/04	10/21/04	KWG0416206	
Fluoranthene	ND	U	0.028	0.0057	1	10/19/04	10/21/04	KWG0416206	
Pyrene	ND	U	0.028	0.0050	1	10/19/04	10/21/04	KWG0416206	
Benz(a)anthracene	ND	U	0.028	0.0055	1	10/19/04	10/21/04	KWG0416206	
Chrysene	ND	U	0.028	0.0049	1	10/19/04	10/21/04	KWG0416206	
B[redacted](b)fluoranthene	ND	U	0.028	0.0065	1	10/19/04	10/21/04	KWG0416206	
Benzo(k)fluoranthene	ND	U	0.028	0.0056	1	10/19/04	10/21/04	KWG0416206	
Benzo(a)pyrene	ND	U	0.028	0.0056	1	10/19/04	10/21/04	KWG0416206	
Indeno(1,2,3-cd)pyrene	ND	U	0.028	0.0052	1	10/19/04	10/21/04	KWG0416206	
Dibenz(a,h)anthracene	ND	U	0.028	0.0090	1	10/19/04	10/21/04	KWG0416206	
Benzo(g,h,i)perylene	ND	U	0.028	0.0056	1	10/19/04	10/21/04	KWG0416206	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	53	37-107	10/21/04	Acceptable
Fluoranthene-d10	65	18-137	10/21/04	Acceptable
Terphenyl-d14	69	18-153	10/21/04	Acceptable

Co[redacted]nts:

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: NA
Date Received: NA

Polynuclear Aromatic Hydrocarbons

Sample Name: Method Blank
Lab Code: KWG0416206-3

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	ND	U	0.020	0.0048	1	10/19/04	10/21/04	KWG0416206	
2-Methylnaphthalene	ND	U	0.020	0.0040	1	10/19/04	10/21/04	KWG0416206	
Acenaphthylene	ND	U	0.020	0.0031	1	10/19/04	10/21/04	KWG0416206	
Acenaphthene	ND	U	0.020	0.0042	1	10/19/04	10/21/04	KWG0416206	
Dibenzofuran	ND	U	0.020	0.0044	1	10/19/04	10/21/04	KWG0416206	
Fluorene	ND	U	0.020	0.0051	1	10/19/04	10/21/04	KWG0416206	
Phenanthrene	ND	U	0.020	0.0038	1	10/19/04	10/21/04	KWG0416206	
Anthracene	ND	U	0.020	0.0039	1	10/19/04	10/21/04	KWG0416206	
Fluoranthene	ND	U	0.020	0.0042	1	10/19/04	10/21/04	KWG0416206	
Pyrene	ND	U	0.020	0.0037	1	10/19/04	10/21/04	KWG0416206	
Benz(a)anthracene	ND	U	0.020	0.0040	1	10/19/04	10/21/04	KWG0416206	
Chrysene	ND	U	0.020	0.0036	1	10/19/04	10/21/04	KWG0416206	
B[redacted]o(b)fluoranthene	ND	U	0.020	0.0048	1	10/19/04	10/21/04	KWG0416206	
B[redacted]o(k)fluoranthene	ND	U	0.020	0.0041	1	10/19/04	10/21/04	KWG0416206	
Benzo(a)pyrene	ND	U	0.020	0.0041	1	10/19/04	10/21/04	KWG0416206	
Indeno(1,2,3-cd)pyrene	ND	U	0.020	0.0038	1	10/19/04	10/21/04	KWG0416206	
Dibenz(a,h)anthracene	ND	U	0.020	0.0066	1	10/19/04	10/21/04	KWG0416206	
Benzo(g,h,i)perylene	ND	U	0.020	0.0041	1	10/19/04	10/21/04	KWG0416206	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	58	37-107	10/21/04	Acceptable
Fluoranthene-d10	70	18-137	10/21/04	Acceptable
Terphenyl-d14	69	18-153	10/21/04	Acceptable

Co[redacted]ts:

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
B-8	K2408133-001	59	71	79
B-9	K2408133-002	53	65	69
Method Blank	KWG0416206-3	58	70	69
Lab Control Sample	KWG0416206-1	51	60	54
Duplicate Lab Control Sample	KWG0416206-2	49	56	56

Surrogate Recovery Control Limits (%)

Sur1 =	Fluorene-d10	37-107
Sur2 =	Fluoranthene-d10	18-137
Sur3 =	Terphenyl-d14	18-153

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Date Analyzed: 10/21/2004
Time Analyzed: 08:36

Internal Standard Area and RT Summary
Polynuclear Aromatic Hydrocarbons

File ID: J:\MS11\DATA\102104\1021F002.D
Instrument ID: MS11
Analysis Method: 8270C SIM

Lab Code: KWG0416476-2
Analysis Lot: KWG0416476

		Naphthalene-d8		Acenaphthene-d10		Phenanthrene-d10	
		Area	RT	Area	RT	Area	RT
	Results ==>	323,987	4.40	184,835	5.82	293,183	7.02
	Upper Limit ==>	647,974	4.90	369,670	6.32	586,366	7.52
	Lower Limit ==>	161,994	3.90	92,418	5.32	146,592	6.52
	ICAL Result ==>	455,249	4.44	256,794	5.85	403,977	7.05
Associated Analyses							
Method Blank	KWG0416206-3	226,687	4.40	176,743	5.82	279,529	7.02
B-8	K2408133-001	317,537	4.40	173,734	5.82	273,845	7.02
B-9	K2408133-002	314,362	4.40	181,854	5.82	280,835	7.02

Results flagged with an asterisk (*) indicate values outside control criteria.

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Date Analyzed: 10/21/2004
Time Analyzed: 08:36

Internal Standard Area and RT Summary
Polynuclear Aromatic Hydrocarbons

File ID: J:\MS11\DATA\102104\1021F002.D
Instrument ID: MS11
Analysis Method: 8270C SIM

Lab Code: KWG0416476-2
Analysis Lot: KWG0416476

		Chrysene-d12		Perylene-d12	
		Area	RT	Area	RT
	Results ==>	251,220	9.41	247,331	12.04
	Upper Limit ==>	502,440	9.91	494,662	12.54
	Lower Limit ==>	125,610	8.91	123,666	11.54
	ICAL Result ==>	318,209	9.43	286,433	12.06
Associated Analyses					
Method Blank	KWG0416206-3	221,166	9.40	214,216	12.02
B-8	K2408133-001	215,567	9.40	205,762	12.02
B-9	K2408133-002	220,953	9.40	209,662	12.02

Results flagged with an asterisk (*) indicate values outside control criteria.

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Date Analyzed: 10/22/2004
Time Analyzed: 20:38

Internal Standard Area and RT Summary
Polynuclear Aromatic Hydrocarbons

File ID: J:\MS11\DATA\102204\1022F031.D
Instrument ID: MS11
Analysis Method: 8270C SIM

Lab Code: KWG0416576-2
Analysis Lot: KWG0416576

		Naphthalene-d8		Acenaphthene-d10		Phenanthrene-d10	
		Area	RT	Area	RT	Area	RT
Results ==>		237,151	4.40	189,579	5.82	301,998	7.01
Upper Limit ==>		474,302	4.90	379,158	6.32	603,996	7.51
Lower Limit ==>		118,576	3.90	94,790	5.32	150,999	6.51
ICAL Result ==>		455,249	4.44	256,794	5.85	403,977	7.05
Associated Analyses							
Lab Control Sample	KWG0416206-1	321,781	4.39	265,927	5.81	440,653	7.01
Duplicate Lab Control Sample	KWG0416206-2	302,979	4.39	250,047	5.81	421,265	7.01

Results flagged with an asterisk (*) indicate values outside control criteria.

00051

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Date Analyzed: 10/22/2004
Time Analyzed: 20:38

Internal Standard Area and RT Summary
Polynuclear Aromatic Hydrocarbons

File ID: J:\MS11\DATA\102204\1022F031.D
Instrument ID: MS11
Analysis Method: 8270C SIM

Lab Code: KWG0416576-2
Analysis Lot: KWG0416576

		Chrysene-d12		Perylene-d12	
		Area	RT	Area	RT
	Results ==>	262,126	9.39	254,813	12.00
	Upper Limit ==>	524,252	9.89	509,626	12.50
	Lower Limit ==>	131,063	8.89	127,407	11.50
	ICAL Result ==>	318,209	9.43	286,433	12.06
Associated Analyses					
Lab Control Sample	KWG0416206-1	394,051	9.39	386,546	11.99
Duplicate Lab Control Sample	KWG0416206-2	361,447	9.39	353,336	12.00

Results flagged with an asterisk (*) indicate values outside control criteria.

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/19/2004
Date Analyzed: 10/23/2004

Lab Control Spike/Duplicate Lab Control Spike Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0416206

Analyte Name	Lab Control Sample KWG0416206-1 Lab Control Spike Result	Expected	%Rec	Duplicate Lab Control Sample KWG0416206-2 Duplicate Lab Control Spike Result	Expected	%Rec	%Rec Limits	RPD	RPD Limit
Naphthalene	1.81	2.50	72	1.79	2.50	72	44-101	1	30
2-Methylnaphthalene	2.44	2.50	98	2.37	2.50	95	36-106	3	30
Acenaphthylene	1.86	2.50	74	1.75	2.50	70	49-114	6	30
Acenaphthene	1.87	2.50	75	1.83	2.50	73	48-107	2	30
Dibenzofuran	1.92	2.50	77	1.90	2.50	76	40-115	1	30
Fluorene	1.93	2.50	77	1.93	2.50	77	55-111	0	30
Phenanthrene	1.75	2.50	70	1.83	2.50	73	56-108	4	30
Anthracene	1.82	2.50	73	1.97	2.50	79	42-117	8	30
Fluoranthene	1.99	2.50	80	2.09	2.50	84	61-123	5	30
Pyrene	1.79	2.50	72	1.94	2.50	78	53-123	8	30
B[illegible]a)anthracene	1.78	2.50	71	1.97	2.50	79	53-123	10	30
C[illegible]ene	1.86	2.50	74	2.04	2.50	81	57-118	9	30
Benzo(b)fluoranthene	1.77	2.50	71	2.00	2.50	80	57-132	13	30
Benzo(k)fluoranthene	1.81	2.50	72	1.93	2.50	77	54-126	7	30
Benzo(a)pyrene	1.78	2.50	71	2.00	2.50	80	38-142	12	30
Indeno(1,2,3-cd)pyrene	1.83	2.50	73	2.04	2.50	82	49-139	11	30
Dibenz(a,h)anthracene	1.73	2.50	69	1.92	2.50	77	47-138	11	30
Benzo(g,h,i)perylene	1.81	2.50	73	2.00	2.50	80	50-125	10	30

Res[illegible]agged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/19/2004
Date Analyzed: 10/21/2004
Time Analyzed: 15:19

Method Blank Summary
Polynuclear Aromatic Hydrocarbons

Sample Name: Method Blank
Lab Code: KWG0416206-3

File ID: J:\MS11\DATA\102104\1021F017.D
Instrument ID: MS11

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

Level: Low
Extraction Lot: KWG0416206

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
B-8	K2408133-001	J:\MS11\DATA\102104\1021F024.D	10/21/04	18:26
B-9	K2408133-002	J:\MS11\DATA\102104\1021F025.D	10/21/04	18:53
Lab Control Sample	KWG0416206-1	J:\MS11\DATA\102204\1022F053.D	10/23/04	06:24
Duplicate Lab Control Sample	KWG0416206-2	J:\MS11\DATA\102204\1022F054.D	10/23/04	06:50

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133

Lab Control Sample/Duplicate Lab Control Sample Summary
Polynuclear Aromatic Hydrocarbons

Sample Name:	Lab Control Sample	**Sample Name:**	Duplicate Lab Control Sample
Lab Code:	KWG0416206-1	**Lab Code:**	KWG0416206-2
File ID:	J:\MS11\DATA\102204\1022F053.D	**File ID:**	J:\MS11\DATA\102204\1022F054.D
Instrument ID:	MS11	**Instrument ID:**	MS11
Date Extracted:	10/19/2004	**Date Extracted:**	10/19/2004
Date Analyzed:	10/23/2004	**Date Analyzed:**	10/23/2004
Time Analyzed:	06:24	**Time Analyzed:**	06:50

Extraction Method:	EPA 3535	**Level:**	Low
Analysis Method:	8270C SIM	**Extraction Lot:**	KWG0416206

These Lab Control Samples apply to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG0416206-3	J:\MS11\DATA\102104\1021F017.D	10/21/04	15:19
B-8	K2408133-001	J:\MS11\DATA\102104\1021F024.D	10/21/04	18:26
B-9	K2408133-002	J:\MS11\DATA\102104\1021F025.D	10/21/04	18:53

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Date Analyzed: 10/21/2004
Time Analyzed: 08:16

Tune Summary
Polynuclear Aromatic Hydrocarbons

File ID: J:\MS11\DATA\102104\1021F001.D
Instrument ID: MS11
Column:

Analysis Method: 8270C SIM
Analysis Lot: KWG0416476

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	50.3	653632	PASS
68	69	0	2	0.0	0	PASS
69	198	0	100	53.7	698496	PASS
70	69	0	2	0.0	0	PASS
127	198	10	80	54.2	704576	PASS
197	198	0	2	0.0	0	PASS
198	442	30	100	49.6	1300480	PASS
199	198	5	9	6.9	89944	PASS
275	198	10	60	35.4	460672	PASS
365	442	1	50	2.4	62256	PASS
441	443	0	100	76.0	390464	PASS
442	442	100	100	100.0	2620416	PASS
443	442	15	24	19.6	513792	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG0416476-2	J:\MS11\DATA\102104\1021F002.D	10/21/2004	08:36	
Method Blank	KWG0416206-3	J:\MS11\DATA\102104\1021F017.D	10/21/2004	15:19	
B-8	K2408133-001	J:\MS11\DATA\102104\1021F024.D	10/21/2004	18:26	
B-9	K2408133-002	J:\MS11\DATA\102104\1021F025.D	10/21/2004	18:53	

Results flagged with an asterisk (*) indicate the analysis performed outside specified tune window

00056

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Date Analyzed: 10/22/2004
Time Analyzed: 20:11

Tune Summary
Polynuclear Aromatic Hydrocarbons

File ID: J:\MS11\DATA\102204\1022F030.D
Instrument ID: MS11
Column:

Analysis Method: 8270C SIM
Analysis Lot: KWG0416576

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	42.3	468480	PASS
68	69	0	2	0.0	0	PASS
69	198	0	100	45.1	499520	PASS
70	69	0	2	0.0	0	PASS
127	198	10	80	50.9	562944	PASS
197	198	0	2	0.0	0	PASS
198	442	30	100	44.9	1106944	PASS
199	198	5	9	6.6	72648	PASS
275	198	10	60	37.7	417664	PASS
365	442	1	50	2.3	56344	PASS
441	443	0	100	75.1	372096	PASS
442	442	100	100	100.0	2463744	PASS
443	442	15	24	20.1	495552	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG0416576-2	J:\MS11\DATA\102204\1022F031.D	10/22/2004	20:38	
Lab Control Sample	KWG0416206-1	J:\MS11\DATA\102204\1022F053.D	10/23/2004	06:24	
Duplicate Lab Control Sample	KWG0416206-2	J:\MS11\DATA\102204\1022F054.D	10/23/2004	06:50	

Results flagged with an asterisk (*) indicate the analysis performed outside specified tune window

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Calibration Date: 09/24/2004

Initial Calibration Summary
Polynuclear Aromatic Hydrocarbons

Calibration ID: CAL3848
Instrument ID: MS11

Column: MS

Level ID	File ID	Level ID	File ID
A	J:\MS11\DATA\092404\0924F015.D	F	J:\MS11\DATA\092404\0924F020.D
B	J:\MS11\DATA\092404\0924F016.D	G	J:\MS11\DATA\092404\0924F021.D
C	J:\MS11\DATA\092404\0924F017.D	H	J:\MS11\DATA\092404\0924F022.D
D	J:\MS11\DATA\092404\0924F018.D	I	J:\MS11\DATA\092404\0924F023.D
E	J:\MS11\DATA\092404\0924F019.D	J	J:\MS11\DATA\092404\0924F024.D

Analyte Name	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF
Naphthalene	A	2.0	1.32	B	4.0	1.23	C	8.0	1.67	D	20	1.21	E	100	1.20
	F	200	1.21	G	400	1.23	H	1000	1.17	I	1600	1.14	J	2000	1.12
2-Methylnaphthalene	A	2.0	0.914	B	4.0	0.854	C	8.0	0.937	D	20	0.857	E	100	0.844
	F	200	0.844	G	400	0.859	H	1000	0.813	I	1600	0.779	J	2000	0.754
Acenaphthylene	A	2.0	2.34	B	4.0	2.23	C	8.0	2.39	D	20	2.30	E	100	2.29
	F	200	2.30	G	400	2.29	H	1000	2.17	I	1600	2.04	J	2000	2.00
Acenaphthene	A	2.0	1.40	B	4.0	1.33	C	8.0	1.49	D	20	1.38	E	100	1.36
	F	200	1.35	G	400	1.36	H	1000	1.29	I	1600	1.24	J	2000	1.22
Dibenzofuran	A	2.0	1.91	B	4.0	1.86	C	8.0	2.04	D	20	1.86	E	100	1.89
	F	200	1.89	G	400	1.89	H	1000	1.80	I	1600	1.69	J	2000	1.66
Fluorene	A	2.0	1.61	B	4.0	1.55	C	8.0	1.65	D	20	1.55	E	100	1.57
	F	200	1.63	G	400	1.61	H	1000	1.51	I	1600	1.44	J	2000	1.41
Phenanthrene	A	2.0	1.52	B	4.0	1.45	C	8.0	1.38	D	20	1.37	E	100	1.41
	F	200	1.41	G	400	1.34	H	1000	1.31	I	1600	1.31	J	2000	1.18
Anthracene	A	2.0	1.44	B	4.0	1.39	C	8.0	1.37	D	20	1.36	E	100	1.38
	F	200	1.47	G	400	1.44	H	1000	1.35	I	1600	1.27	J	2000	1.21
Fluoranthene	A	2.0	1.30	B	4.0	1.35	C	8.0	1.36	D	20	1.38	E	100	1.39
	F	200	1.44	G	400	1.42	H	1000	1.36	I	1600	1.35	J	2000	1.22
Pyrene	A	2.0	1.94	B	4.0	1.87	C	8.0	1.92	D	20	1.79	E	100	1.90
	F	200	1.82	G	400	1.84	H	1000	1.68	I	1600	1.53	J	2000	1.49
Benz(a)anthracene	A	2.0	1.87	B	4.0	1.68	C	8.0	1.72	D	20	1.53	E	100	1.49
	F	200	1.55	G	400	1.49	H	1000	1.43	I	1600	1.44	J	2000	1.42
Chrysene	A	2.0	1.54	B	4.0	1.46	C	8.0	1.51	D	20	1.50	E	100	1.49
	F	200	1.48	G	400	1.50	H	1000	1.41	I	1600	1.39	J	2000	1.35
Benzo(b)fluoranthene	A	2.0	1.64	B	4.0	1.60	C	8.0	1.77	D	20	1.54	E	100	1.64
	F	200	1.58	G	400	1.68	H	1000	1.62	I	1600	1.62	J	2000	1.67
Benzo(k)fluoranthene	A	2.0	1.64	B	4.0	1.54	C	8.0	1.78	D	20	1.64	E	100	1.59
	F	200	1.68	G	400	1.61	H	1000	1.59	I	1600	1.58	J	2000	1.50

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Calibration Date: 09/24/2004

Initial Calibration Summary
Polynuclear Aromatic Hydrocarbons

Calibration ID: CAL3848
Instrument ID: MS11

Column: MS

Analyte Name	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF
Benzo(a)pyrene	A	2.0	1.40	B	4.0	1.43	C	8.0	1.51	D	20	1.44	E	100	1.49
	F	200	1.52	G	400	1.53	H	1000	1.49	I	1600	1.48	J	2000	1.47
Indeno(1,2,3-cd)pyrene	A	2.0	1.23	B	4.0	1.17	C	8.0	1.27	D	20	1.21	E	100	1.25
	F	200	1.30	G	400	1.34	H	1000	1.35	I	1600	1.34	J	2000	1.35
Dibenz(a,h)anthracene	A	2.0	1.29	B	4.0	1.19	C	8.0	1.34	D	20	1.25	E	100	1.30
	F	200	1.36	G	400	1.41	H	1000	1.39	I	1600	1.38	J	2000	1.38
Benzo(g,h,i)perylene	A	2.0	1.53	B	4.0	1.42	C	8.0	1.48	D	20	1.42	E	100	1.41
	F	200	1.45	G	400	1.48	H	1000	1.46	I	1600	1.43	J	2000	1.42
Fluorene-d10	A	2.0	1.78	B	4.0	1.68	C	8.0	1.42	D	20	1.31	E	100	1.27
	F	200	1.27	G	400	1.29	H	1000	1.21	I	1600	1.17	J	2000	1.14
Fluoranthene-d10	A	2.0	1.13	B	4.0	1.24	C	8.0	1.15	D	20	1.14	E	100	1.18
	F	200	1.30	G	400	1.23	H	1000	1.21	I	1600	1.17	J	2000	1.06
Terphenyl-d14	A	2.0	1.09	B	4.0	1.10	C	8.0	1.15	D	20	1.03	E	100	1.06
	F	200	1.06	G	400	1.04	H	1000	1.01	I	1600	0.951	J	2000	0.943

Results flagged with an asterisk (*) indicate values outside control criteria.
† SPCC Compound ‡ CCC Compound

00059

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Calibration Date: 09/24/2004

Initial Calibration Summary
Polynuclear Aromatic Hydrocarbons

Calibration ID: CAL3848
Instrument ID: MS11

Column: MS

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
Naphthalene	MS	AverageRF	% RSD	12.7		≤ 15	1.25		0.01
2-Methylnaphthalene	MS	AverageRF	% RSD	6.5		≤ 15	0.846		0.01
Acenaphthylene	MS	AverageRF	% RSD	5.7		≤ 15	2.23		0.01
Acenaphthene	MS	AverageRF	% RSD	5.9		≤ 15	1.34		0.01
Dibenzofuran	MS	AverageRF	% RSD	5.9		≤ 15	1.85		0.01
Fluorene	MS	AverageRF	% RSD	5.0		≤ 15	1.55		0.01
Phenanthrene	MS	AverageRF	% RSD	6.9		≤ 15	1.37		0.01
Anthracene	MS	AverageRF	% RSD	5.8		≤ 15	1.37		0.01
Fluoranthene	MS	AverageRF	% RSD	4.5		≤ 15	1.36		0.01
Pyrene	MS	AverageRF	% RSD	8.9		≤ 15	1.78		0.01
Benz(a)anthracene	MS	AverageRF	% RSD	9.5		≤ 15	1.56		0.01
Chrysene	MS	AverageRF	% RSD	4.1		≤ 15	1.46		0.01
Benzo(b)fluoranthene	MS	AverageRF	% RSD	3.9		≤ 15	1.64		0.01
Benzo(k)fluoranthene	MS	AverageRF	% RSD	4.7		≤ 15	1.61		0.01
Benzo(a)pyrene	MS	AverageRF	% RSD	2.9		≤ 15	1.48		0.01
Indeno(1,2,3-cd)pyrene	MS	AverageRF	% RSD	5.1		≤ 15	1.28		0.01
[illegible]nz(a,h)anthracene	MS	AverageRF	% RSD	5.2		≤ 15	1.33		0.01
[illegible]o(g,h,i)perylene	MS	AverageRF	% RSD	2.7		≤ 15	1.45		0.01
Fluorene-d10	SURR	AverageRF	% RSD	15.8	*	≤ 15	1.35		0.01
Fluoranthene-d10	SURR	AverageRF	% RSD	5.7		≤ 15	1.18		0.01
Terphenyl-d14	SURR	AverageRF	% RSD	6.1		≤ 15	1.04		0.01

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

00060

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Calibration Date: 09/24/2004
Date Analyzed: 09/24/2004

Second Source Calibration Verification
Polynuclear Aromatic Hydrocarbons

Calibration Type: Internal Standard
Analysis Method: 8270C SIM

Calibration ID: CAL3848
Units: ng/ml

File ID: J:\MS11\DATA\092404\0924F025.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
Naphthalene	400	360	1.25	1.12	-10	NA	± 20 %	AverageRF
2-Methylnaphthalene	400	360	0.846	0.761	-10	NA	± 20 %	AverageRF
Acenaphthylene	400	380	2.23	2.14	-4	NA	± 20 %	AverageRF
Acenaphthene	400	370	1.34	1.23	-8	NA	± 20 %	AverageRF
Dibenzofuran	400	390	1.85	1.79	-3	NA	± 20 %	AverageRF
Fluorene	400	370	1.55	1.43	-8	NA	± 20 %	AverageRF
Phenanthrene	400	370	1.37	1.27	-7	NA	± 20 %	AverageRF
Anthracene	400	400	1.37	1.35	-1	NA	± 20 %	AverageRF
Fluoranthene	400	380	1.36	1.28	-6	NA	± 20 %	AverageRF
Pyrene	400	380	1.78	1.69	-5	NA	± 20 %	AverageRF
Benz(a)anthracene	400	360	1.56	1.40	-11	NA	± 20 %	AverageRF
Chrysene	400	370	1.46	1.37	-7	NA	± 20 %	AverageRF
Benzo(b)fluoranthene	400	380	1.64	1.57	-4	NA	± 20 %	AverageRF
Benzo(k)fluoranthene	400	380	1.61	1.53	-5	NA	± 20 %	AverageRF
[redacted](a)pyrene	400	380	1.48	1.41	-5	NA	± 20 %	AverageRF
In[redacted](1,2,3-cd)pyrene	400	390	1.28	1.24	-3	NA	± 20 %	AverageRF
Dibenz(a,h)anthracene	400	380	1.33	1.28	-4	NA	± 20 %	AverageRF
Benzo(g,h,i)perylene	400	370	1.45	1.35	-7	NA	± 20 %	AverageRF

[redacted] flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

00061

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Date Analyzed: 10/21/2004

Continuing Calibration Verification Summary
Polynuclear Aromatic Hydrocarbons

Calibration Type: Internal Standard
Analysis Method: 8270C SIM

Calibration Date: 09/24/2004
Calibration ID: CAL3848
Analysis Lot: KWG0416476
Units: ng/ml

File ID: J:\MS11\DATA\102104\1021F002.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Naphthalene	400	360	0.01	1.25	1.11	-11	NA	± 20 %	AverageRF
2-Methylnaphthalene	400	350	0.01	0.846	0.749	-11	NA	± 20 %	AverageRF
Acenaphthylene	400	380	0.01	2.23	2.12	-5	NA	± 20 %	AverageRF
Acenaphthene	400	370	0.01	1.34	1.24	-7	NA	± 20 %	AverageRF
Dibenzofuran	400	380	0.01	1.85	1.75	-5	NA	± 20 %	AverageRF
Fluorene	400	370	0.01	1.55	1.42	-8	NA	± 20 %	AverageRF
Phenanthrene	400	370	0.01	1.37	1.25	-8	NA	± 20 %	AverageRF
Anthracene	400	380	0.01	1.37	1.28	-6	NA	± 20 %	AverageRF
Fluoranthene	400	400	0.01	1.36	1.37	1	NA	± 20 %	AverageRF
Pyrene	400	370	0.01	1.78	1.63	-9	NA	± 20 %	AverageRF
Benz(a)anthracene	400	360	0.01	1.56	1.40	-10	NA	± 20 %	AverageRF
Chrysene	400	380	0.01	1.46	1.38	-6	NA	± 20 %	AverageRF
Benzo(b)fluoranthene	400	350	0.01	1.64	1.45	-11	NA	± 20 %	AverageRF
B[redacted](k)fluoranthene	400	370	0.01	1.61	1.49	-8	NA	± 20 %	AverageRF
Benzo(a)pyrene	400	360	0.01	1.48	1.32	-11	NA	± 20 %	AverageRF
Indeno(1,2,3-cd)pyrene	400	360	0.01	1.28	1.16	-9	NA	± 20 %	AverageRF
Dibenz(a,h)anthracene	400	340	0.01	1.33	1.12	-16	NA	± 20 %	AverageRF
Benzo(g,h,i)perylene	400	360	0.01	1.45	1.29	-11	NA	± 20 %	AverageRF
Fluorene-d10	400	360	0.01	1.35	1.22	-10	NA	± 20 %	AverageRF
Fluoranthene-d10	400	420	0.01	1.18	1.24	5	NA	± 20 %	AverageRF
Terphenyl-d14	400	380	0.01	1.04	0.996	-5	NA	± 20 %	AverageRF

Res[redacted]agged with an asterisk (*) indicate values outside control criteria.
† SPCC Compound ‡ CCC Compound

00062

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Date Analyzed: 10/22/2004

Continuing Calibration Verification Summary
Polynuclear Aromatic Hydrocarbons

Calibration Type: Internal Standard
Analysis Method: 8270C SIM

Calibration Date: 09/24/2004
Calibration ID: CAL3848
Analysis Lot: KWG0416576
Units: ng/ml

File ID: J:\MS11\DATA\102204\1022F031.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Naphthalene	400	360	0.01	1.25	1.13	-10	NA	± 20 %	AverageRF
2-Methylnaphthalene	400	460	0.01	0.846	0.968	14	NA	± 20 %	AverageRF
Acenaphthylene	400	370	0.01	2.23	2.09	-7	NA	± 20 %	AverageRF
Acenaphthene	400	370	0.01	1.34	1.24	-8	NA	± 20 %	AverageRF
Dibenzofuran	400	380	0.01	1.85	1.76	-5	NA	± 20 %	AverageRF
Fluorene	400	370	0.01	1.55	1.45	-7	NA	± 20 %	AverageRF
Phenanthrene	400	360	0.01	1.37	1.23	-10	NA	± 20 %	AverageRF
Anthracene	400	380	0.01	1.37	1.31	-4	NA	± 20 %	AverageRF
Fluoranthene	400	400	0.01	1.36	1.36	0	NA	± 20 %	AverageRF
Pyrene	400	360	0.01	1.78	1.59	-11	NA	± 20 %	AverageRF
Benz(a)anthracene	400	360	0.01	1.56	1.39	-11	NA	± 20 %	AverageRF
Chrysene	400	370	0.01	1.46	1.36	-7	NA	± 20 %	AverageRF
Be[redacted](b)fluoranthene	400	370	0.01	1.64	1.49	-9	NA	± 20 %	AverageRF
Be[redacted](k)fluoranthene	400	350	0.01	1.61	1.43	-11	NA	± 20 %	AverageRF
Benzo(a)pyrene	400	350	0.01	1.48	1.31	-11	NA	± 20 %	AverageRF
Indeno(1,2,3-cd)pyrene	400	360	0.01	1.28	1.15	-10	NA	± 20 %	AverageRF
Dibenz(a,h)anthracene	400	340	0.01	1.33	1.13	-15	NA	± 20 %	AverageRF
Benzo(g,h,i)perylene	400	360	0.01	1.45	1.29	-11	NA	± 20 %	AverageRF
Fluorene-d10	400	370	0.01	1.35	1.25	-7	NA	± 20 %	AverageRF
Fluoranthene-d10	400	440	0.01	1.18	1.30	10	NA	± 20 %	AverageRF
Terphenyl-d14	400	380	0.01	1.04	0.996	-5	NA	± 20 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133

Analysis Run Log
Polynuclear Aromatic Hydrocarbons

Analysis Method: 8270C SIM

Analysis Lot: KWG0416476
Instrument ID: MS11

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
1021F001.D	GC/MS Tuning - Decafluorotriphenyl	KWG0416476-1	10/21/2004	08:16		10/21/2004	08:28
1021F002.D	Continuing Calibration Verification	KWG0416476-2	10/21/2004	08:36		10/21/2004	08:56
1021F003.D	ZZZZZZ	ZZZZZZ	10/21/2004	09:03		10/21/2004	09:23
1021F004.D	ZZZZZZ	ZZZZZZ	10/21/2004	09:30		10/21/2004	09:50
1021F005.D	ZZZZZZ	ZZZZZZ	10/21/2004	09:57		10/21/2004	10:17
1021F006.D	ZZZZZZ	ZZZZZZ	10/21/2004	10:23		10/21/2004	10:43
1021F007.D	ZZZZZZ	ZZZZZZ	10/21/2004	10:50		10/21/2004	11:10
1021F008.D	ZZZZZZ	ZZZZZZ	10/21/2004	11:17		10/21/2004	11:37
1021F009.D	ZZZZZZ	ZZZZZZ	10/21/2004	11:44		10/21/2004	12:04
1021F010.D	ZZZZZZ	ZZZZZZ	10/21/2004	12:10		10/21/2004	12:30
1021F011.D	ZZZZZZ	ZZZZZZ	10/21/2004	12:37		10/21/2004	12:57
1021F012.D	ZZZZZZ	ZZZZZZ	10/21/2004	13:04		10/21/2004	13:24
1021F013.D	ZZZZZZ	ZZZZZZ	10/21/2004	13:31		10/21/2004	13:51
1021F014.D	ZZZZZZ	ZZZZZZ	10/21/2004	13:58		10/21/2004	14:18
1021F015.D	ZZZZZZ	ZZZZZZ	10/21/2004	14:25		10/21/2004	14:45
1021F016.D	ZZZZZZ	ZZZZZZ	10/21/2004	14:52		10/21/2004	15:12
1021F017.D	Method Blank	KWG0416206-3	10/21/2004	15:19		10/21/2004	15:39
1021F018.D	ZZZZZZ	ZZZZZZ	10/21/2004	15:46		10/21/2004	16:06
1021F019.D	ZZZZZZ	ZZZZZZ	10/21/2004	16:13		10/21/2004	16:33
1021F020.D	ZZZZZZ	ZZZZZZ	10/21/2004	16:39		10/21/2004	16:59
1021F021.D	ZZZZZZ	ZZZZZZ	10/21/2004	17:06		10/21/2004	17:26
1021F022.D	ZZZZZZ	ZZZZZZ	10/21/2004	17:33		10/21/2004	17:53
1021F023.D	ZZZZZZ	ZZZZZZ	10/21/2004	18:00		10/21/2004	18:20
1021F024.D	B-8	K2408133-001	10/21/2004	18:26		10/21/2004	18:46
1021F025.D	B-9	K2408133-002	10/21/2004	18:53		10/21/2004	19:13
1021F026.D	ZZZZZZ	ZZZZZZ	10/21/2004	19:20		10/21/2004	19:40
1021F027.D	ZZZZZZ	ZZZZZZ	10/21/2004	19:46		10/21/2004	20:06

Results flagged with an asterisk (*) indicate the holding time was exceeded for the analysis

00064

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/19/2004

Extraction Prep Log
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

Extraction Lot: KWG0416206
Level: Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
B-8	K2408133-001	10/13/04	10/14/04	920ml	5ml	NA	
B-9	K2408133-002	10/13/04	10/14/04	740ml	5ml	NA	
Method Blank	KWG0416206-3	NA	NA	1050ml	5ml	NA	
Lab Control Sample	KWG0416206-1	NA	NA	1000ml	5ml	NA	
Duplicate Lab Control Sample	KWG0416206-2	NA	NA	1000ml	5ml	NA	

Results flagged with an asterisk (*) indicate the holding time was exceeded for the analysis

00066

Organic Analysis:
Polynuclear Aromatic Hydrocarbons

Validation Package

00067

Organic Analysis:
Polynuclear Aromatic Hydrocarbons

Validation Package

QC Reports

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
B-8	K2408133-001	59	71	79
B-9	K2408133-002	53	65	69
Method Blank	KWG0416206-3	58	70	69
Lab Control Sample	KWG0416206-1	51	60	54
Duplicate Lab Control Sample	KWG0416206-2	49	56	56

Surrogate Recovery Control Limits (%)

Sur1 = Fluorene-d10	37-107
Sur2 = Fluoranthene-d10	18-137
Sur3 = Terphenyl-d14	18-153

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Date Analyzed: 10/21/2004
Time Analyzed: 08:36

Internal Standard Area and RT Summary
Polynuclear Aromatic Hydrocarbons

File ID: J:\MS11\DATA\102104\1021F002.D
Instrument ID: MS11
Analysis Method: 8270C SIM

Lab Code: KWG0416476-2
Analysis Lot: KWG0416476

		Naphthalene-d8		Acenaphthene-d10		Phenanthrene-d10	
		Area	RT	Area	RT	Area	RT
	Results ==>	323,987	4.40	184,835	5.82	293,183	7.02
	Upper Limit ==>	647,974	4.90	369,670	6.32	586,366	7.52
	Lower Limit ==>	161,994	3.90	92,418	5.32	146,592	6.52
	ICAL Result ==>	455,249	4.44	256,794	5.85	403,977	7.05
Associated Analyses							
Method Blank	KWG0416206-3	226,687	4.40	176,743	5.82	279,529	7.02
B-8	K2408133-001	317,537	4.40	173,734	5.82	273,845	7.02
B-9	K2408133-002	314,362	4.40	181,854	5.82	280,835	7.02

Results flagged with an asterisk (*) indicate values outside control criteria.

00070

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Date Analyzed: 10/21/2004
Time Analyzed: 08:36

Internal Standard Area and RT Summary
Polynuclear Aromatic Hydrocarbons

File ID: J:\MS11\DATA\102104\1021F002.D
Instrument ID: MS11
Analysis Method: 8270C SIM

Lab Code: KWG0416476-2
Analysis Lot: KWG0416476

		Chrysene-d12		Perylene-d12	
		Area	**RT**	**Area**	**RT**
	Results ==>	251,220	9.41	247,331	12.04
	Upper Limit ==>	502,440	9.91	494,662	12.54
	Lower Limit ==>	125,610	8.91	123,666	11.54
	ICAL Result ==>	318,209	9.43	286,433	12.06
Associated Analyses					
Method Blank	KWG0416206-3	221,166	9.40	214,216	12.02
B-8	K2408133-001	215,567	9.40	205,762	12.02
B-9	K2408133-002	220,953	9.40	209,662	12.02

Results flagged with an asterisk (*) indicate values outside control criteria.

00071

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Date Analyzed: 10/22/2004
Time Analyzed: 20:38

Internal Standard Area and RT Summary
Polynuclear Aromatic Hydrocarbons

File ID: J:\MS11\DATA\102204\1022F031.D
Instrument ID: MS11
Analysis Method: 8270C SIM

Lab Code: KWG0416576-2
Analysis Lot: KWG0416576

		Naphthalene-d8		Acenaphthene-d10		Phenanthrene-d10	
		Area	**RT**	**Area**	**RT**	**Area**	**RT**
Results ==>		237,151	4.40	189,579	5.82	301,998	7.01
Upper Limit ==>		474,302	4.90	379,158	6.32	603,996	7.51
Lower Limit ==>		118,576	3.90	94,790	5.32	150,999	6.51
ICAL Result ==>		455,249	4.44	256,794	5.85	403,977	7.05
Associated Analyses							
Lab Control Sample	KWG0416206-1	321,781	4.39	265,927	5.81	440,653	7.01
Duplicate Lab Control Sample	KWG0416206-2	302,979	4.39	250,047	5.81	421,265	7.01

Results flagged with an asterisk (*) indicate values outside control criteria.

00072

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135

Service Request: K2408133
Date Analyzed: 10/22/2004
Time Analyzed: 20:38

Internal Standard Area and RT Summary
Polynuclear Aromatic Hydrocarbons

File ID: J:\MS11\DATA\102204\1022F031.D
Instrument ID: MS11
Analysis Method: 8270C SIM

Lab Code: KWG0416576-2
Analysis Lot: KWG0416576

		Chrysene-d12		Perylene-d12	
		Area	**RT**	**Area**	**RT**
Results ==>		262,126	9.39	254,813	12.00
Upper Limit ==>		524,252	9.89	509,626	12.50
Lower Limit ==>		131,063	8.89	127,407	11.50
ICAL Result ==>		318,209	9.43	286,433	12.06
Associated Analyses					
Lab Control Sample	KWG0416206-1	394,051	9.39	386,546	11.99
Duplicate Lab Control Sample	KWG0416206-2	361,447	9.39	353,336	12.00

Results flagged with an asterisk (*) indicate values outside control criteria.

00073

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/19/2004
Date Analyzed: 10/23/2004

Lab Control Spike/Duplicate Lab Control Spike Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0416206

Analyte Name	Lab Control Sample KWG0416206-1 Lab Control Spike			Duplicate Lab Control Sample KWG0416206-2 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Expected	%Rec	Result	Expected	%Rec			
Naphthalene	1.81	2.50	72	1.79	2.50	72	44-101	1	30
2-Methylnaphthalene	2.44	2.50	98	2.37	2.50	95	36-106	3	30
Acenaphthylene	1.86	2.50	74	1.75	2.50	70	49-114	6	30
Acenaphthene	1.87	2.50	75	1.83	2.50	73	48-107	2	30
Dibenzofuran	1.92	2.50	77	1.90	2.50	76	40-115	1	30
Fluorene	1.93	2.50	77	1.93	2.50	77	55-111	0	30
Phenanthrene	1.75	2.50	70	1.83	2.50	73	56-108	4	30
Anthracene	1.82	2.50	73	1.97	2.50	79	42-117	8	30
Fluoranthene	1.99	2.50	80	2.09	2.50	84	61-123	5	30
Pyrene	1.79	2.50	72	1.94	2.50	78	53-123	8	30
Benzo(a)anthracene	1.78	2.50	71	1.97	2.50	79	53-123	10	30
Chrysene	1.86	2.50	74	2.04	2.50	81	57-118	9	30
Benzo(b)fluoranthene	1.77	2.50	71	2.00	2.50	80	57-132	13	30
Benzo(k)fluoranthene	1.81	2.50	72	1.93	2.50	77	54-126	7	30
Benzo(a)pyrene	1.78	2.50	71	2.00	2.50	80	38-142	12	30
Indeno(1,2,3-cd)pyrene	1.83	2.50	73	2.04	2.50	82	49-139	11	30
Dibenz(a,h)anthracene	1.73	2.50	69	1.92	2.50	77	47-138	11	30
Benzo(g,h,i)perylene	1.81	2.50	73	2.00	2.50	80	50-125	10	30

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Extracted: 10/19/2004
Date Analyzed: 10/21/2004
Time Analyzed: 15:19

Method Blank Summary
Polynuclear Aromatic Hydrocarbons

Sample Name: Method Blank
Lab Code: KWG0416206-3

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

File ID: J:\MS11\DATA\102104\1021F017.D
Instrument ID: MS11

Level: Low
Extraction Lot: KWG0416206

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
B-8	K2408133-001	J:\MS11\DATA\102104\1021F024.D	10/21/04	18:26
B-9	K2408133-002	J:\MS11\DATA\102104\1021F025.D	10/21/04	18:53
Lab Control Sample	KWG0416206-1	J:\MS11\DATA\102204\1022F053.D	10/23/04	06:24
Duplicate Lab Control Sample	KWG0416206-2	J:\MS11\DATA\102204\1022F054.D	10/23/04	06:50

00075

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133

Lab Control Sample/Duplicate Lab Control Sample Summary
Polynuclear Aromatic Hydrocarbons

Sample Name:	Lab Control Sample	**Sample Name:**	Duplicate Lab Control Sample
Lab Code:	KWG0416206-1	**Lab Code:**	KWG0416206-2
File ID:	J:\MS11\DATA\102204\1022F053.D	**File ID:**	J:\MS11\DATA\102204\1022F054.D
Instrument ID:	MS11	**Instrument ID:**	MS11
Date Extracted:	10/19/2004	**Date Extracted:**	10/19/2004
Date Analyzed:	10/23/2004	**Date Analyzed:**	10/23/2004
Time Analyzed:	06:24	**Time Analyzed:**	06:50

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

Level: Low
Extraction Lot: KWG0416206

These Lab Control Samples apply to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG0416206-3	J:\MS11\DATA\102104\1021F017.D	10/21/04	15:19
B-8	K2408133-001	J:\MS11\DATA\102104\1021F024.D	10/21/04	18:26
B-9	K2408133-002	J:\MS11\DATA\102104\1021F025.D	10/21/04	18:53

00076

Organic Analysis:
Polynuclear Aromatic Hydrocarbons

Validation Package

Raw Data

00077

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: RSV Engineering, Inc.
Project: Highway Service/03-135
Sample Matrix: Water

Service Request: K2408133
Date Collected: 10/13/2004
Date Received: 10/14/2004

Polynuclear Aromatic Hydrocarbons

Sample Name: B-8
Lab Code: K2408133-001

Extraction Method: EPA 3535
Analysis Method: 8270C SIM

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	0.12		0.022	0.0053	1	10/19/04	10/21/04	KWG0416206	
2-Methylnaphthalene	0.11		0.022	0.0044	1	10/19/04	10/21/04	KWG0416206	
Acenaphthylene	0.0035	J	0.022	0.0034	1	10/19/04	10/21/04	KWG0416206	
Acenaphthene	0.014	J	0.022	0.0046	1	10/19/04	10/21/04	KWG0416206	
Dibenzofuran	0.013	J	0.022	0.0048	1	10/19/04	10/21/04	KWG0416206	
Fluorene	0.011	J	0.022	0.0056	1	10/19/04	10/21/04	KWG0416206	
Phenanthrene	0.013	J	0.022	0.0042	1	10/19/04	10/21/04	KWG0416206	
Anthracene	0.0056	J	0.022	0.0043	1	10/19/04	10/21/04	KWG0416206	
Fluoranthene	0.0075	J	0.022	0.0046	1	10/19/04	10/21/04	KWG0416206	
Pyrene	0.0091	J	0.022	0.0041	1	10/19/04	10/21/04	KWG0416206	
Benz(a)anthracene	0.0084	J	0.022	0.0044	1	10/19/04	10/21/04	KWG0416206	
Chrysene	0.0064	J	0.022	0.0040	1	10/19/04	10/21/04	KWG0416206	
B[illegible](b)fluoranthene	0.0071	J	0.022	0.0053	1	10/19/04	10/21/04	KWG0416206	
Benzo(k)fluoranthene	0.0076	J	0.022	0.0045	1	10/19/04	10/21/04	KWG0416206	
Benzo(a)pyrene	0.0079	J	0.022	0.0045	1	10/19/04	10/21/04	KWG0416206	
Indeno(1,2,3-cd)pyrene	0.0092	J	0.022	0.0042	1	10/19/04	10/21/04	KWG0416206	
Dibenz(a,h)anthracene	0.0095	J	0.022	0.0072	1	10/19/04	10/21/04	KWG0416206	
Benzo(g,h,i)perylene	0.0098	J	0.022	0.0045	1	10/19/04	10/21/04	KWG0416206	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	59	37-107	10/21/04	Acceptable
Fluoranthene-d10	71	18-137	10/21/04	Acceptable
Terphenyl-d14	79	18-153	10/21/04	Acceptable

Co[illegible]nts:

00078

CLAT 51717

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OAR 690-240-095)

Instructions for completing this report are on the last page of this form.

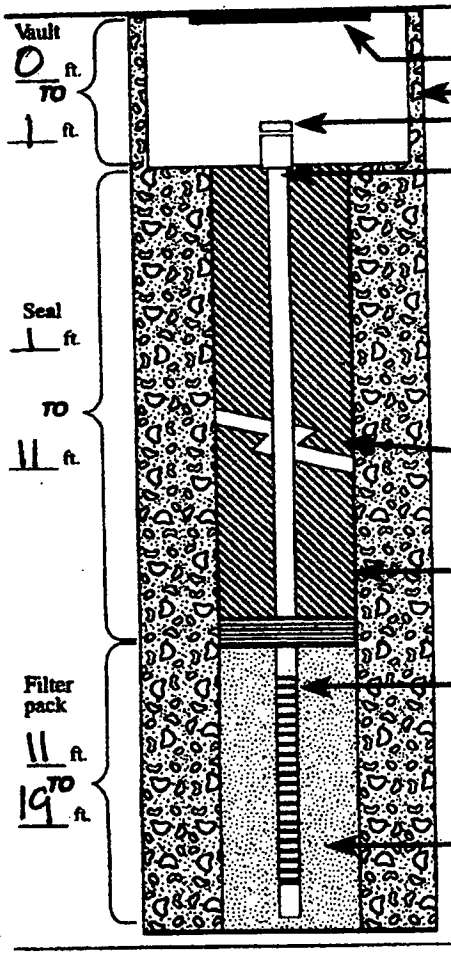
Well ID# L 58862
Start Card # 156682

(1) OWNER/PROJECT WELL NO. LTP-1
Name City of Astoria
Address 1095 Duane
City Astoria State OR Zip 97103

(2) TYPE OF WORK
[X] New construction [ ] Alteration (Repair/Recondition)
[ ] Conversion [ ] Deepening [ ] Abandonment

(3) DRILLING METHOD
[ ] Rotary Air [ ] Rotary Mud [ ] Cable
[X] Hollow Stem Auger [ ] Other Piezometers

(4) BORE HOLE CONSTRUCTION:
Special Standards Yes [ ] No [X] Depth of Completed Well 19 ft.



(5) WELL TESTS:
[ ] Pump [ ] Bailer [ ] Air [ ] Flowing Artesian
Permeability Yield GPM
Conductivity PH
Temperature of water 54 °F/C Depth artesian flow found ft.
Was water analysis done? [ ] Yes [X] No
By whom?
Depth of strata to be analyzed From ft. to ft.
Remarks:

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description:
County Clatsop Latitude Longitude
Township 8 (N or S) Range 9 (E or W) Section 9
1/4 of 1/4 of above section.
Street address of well location
3300 Marine Dr
Tax lot number of well location ROW
ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:
Not Observed ft. below land surface Date
Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES:
Depth at which water was first found

From	To	Est. Flow Rate	SWL
	Not Observed		

(9) WELL LOG:
Ground Elevation

Material	From	To	SWL
19 ft Clay Silt	0	19	

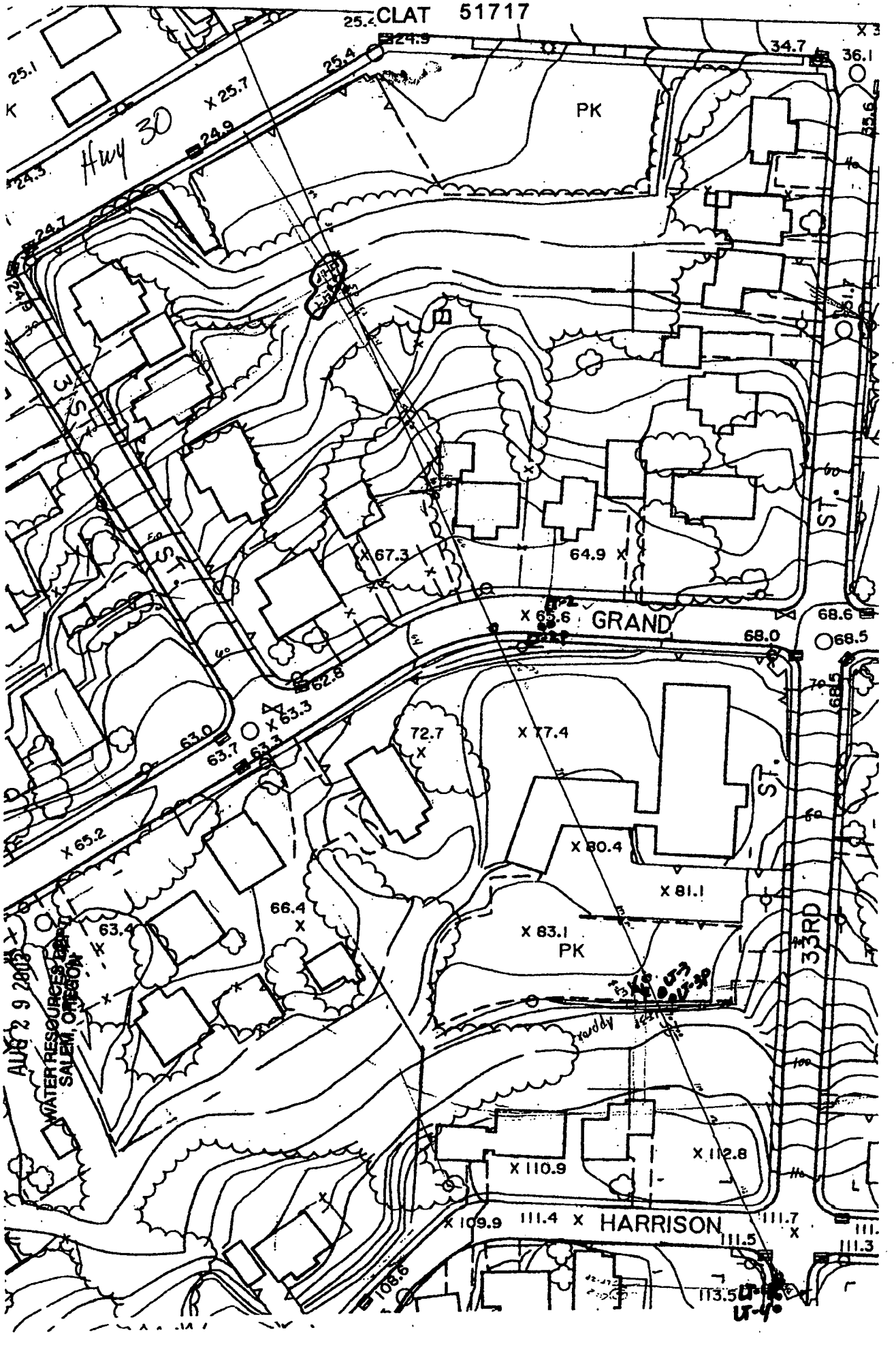
RECEIVED
AUG 29 2003
WATER RESOURCES DEPT.
SALEM, OREGON

Date started 8/11/03 Completed 8/13/03

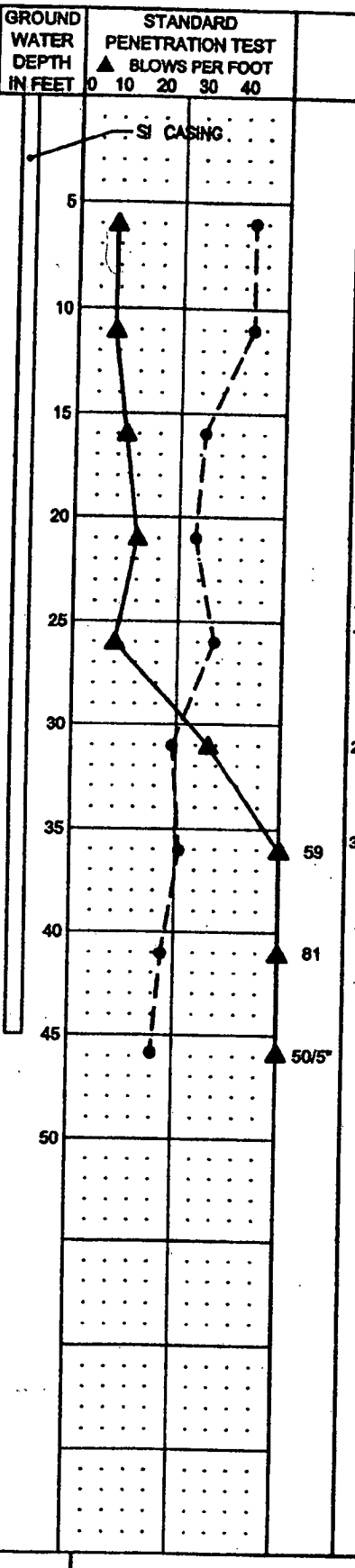
(unbonded) Monitor Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
Signed [signature] MWC Number 10033 Date 8/28/03

(bonded) Monitor Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
Signed [signature] MWC Number 10011 Date 8/28/03

ORIGINAL COPY – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER


CLAT 51717
Hwy 30
PK
GRAND
ST.
33RD
HARRISON
X 25.7
24.9
25.4
24.7
34.7
36.1
X 67.3
64.9 X
X 65.6
68.0
68.6
68.5
62.8
63.0
63.7
63.3
X 63.3
72.7
X 77.4
X 65.2
X 80.4
X 81.1
66.4
63.4
X 83.1
PK
X 110.9
X 112.8
X 109.9
111.4 X
111.7
111.5
111.3
108.6
113.5
RECEIVED
AUG 29 2003
WATER RESOURCES DEPT.
SALEM, OREGON

ELEV.	DEPTH IN FEET	MATERIAL DESCRIPTION SURFACE ELEV. (FT.) 26 MSL (approx.)	SAMPLES NO.	SAMPLES S.P.T.
		SOFT to MEDIUM STIFF, brown to gray slightly clayey to clayey SILT; numerous gravel-sized mudstone fragments	1	9
			2	9
12	14	STIFF to VERY STIFF, gray, clayey SILT; scattered sand to gravel-sized mudstone fragments (DECOMPOSED MUDSTONE)	3	12
			4	15
			5	10
-5	31	EXTREMELY SOFT ROCK (R0) to VERY SOFT ROCK (R1), gray, slightly weathered SILTSTONE/MUDSTONE (ASTORIA FORMATION)	6	33
			7	59
			8	81
-20½	46½	Bottom of Boring: 46½ feet	9	50/5"



LEGEND

- 2" S.P.T. SAMPLE
- * SAMPLE NOT RECOVERED
- U P 3" THIN WALL SAMPLE
- PITCHER SAMPLE
- IMPERVIOUS SEAL
- WATER LEVEL
- PIEZOMETER TIP
- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT
- WATER CONTENT IN PERCENT

NOTES

1. MATERIAL DESCRIPTIONS AND INTERFACES ARE INTERPRETIVE AND ACTUAL CHANGES MAY BE GRADUAL.
2. WATER LEVEL IS FOR DATE SHOWN AND MAY VARY WITH TIME OF YEAR.
3. 2¾-IN. DIA. SLOPE INCLINOMETER CASING INSTALLED, 0 TO 45 FT.

1650\BORING LOGS

DRILLER: Geo-Tech Explorations
DATE START: 8/11/03 FINISH: 8/12/03
DRILLING TECHNIQUE: Mud Rotary with 4⅞-inch Tricone Bit

LANDSLIDE TECHNOLOGY
10250 S.W. Greenburg Road, Suite 111
Portland, Oregon 97223

SUMMARY BORING LOG LT-1 (1 of 2)

UPPERTOWN EARTH MOVEMENT
ASTORIA, OREGON

AUG 2003
PROJ. 1550
FIG. 4

Fuel Fraction	RBCss					RBCso			RBCsl			RBCsw			RBCiw			RBCwo			RBCwl			RBCwa	RBCsll		
	Residential	Urban Residential	Occupational	Construction Worker	Excavation Worker	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Construction & Excavation Worker	Residential	Urban Residential	Occupational
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/m^3)	(ug/m^3)	(ug/m^3)
Aliphatic C5-C6	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E+04	3.5E+04	1.4E+05	1.8E+06	1.9E+06	7.4E+06	8.3E+04	8.3E+04	9.9E+05	3.1E+06	2.1E+04	2.1E+04	8.3E+04
Aliphatic >C5-C8	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E+04	3.5E+04	1.4E+05	1.2E+06	1.2E+06	4.9E+06	8.5E+04	8.5E+04	8.5E+05	2.2E+06	2.1E+04	2.1E+04	8.3E+04
Aliphatic >C8-C10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+03	1.4E+03	5.5E+03	4.0E+04	4.0E+04	1.6E+05	1.6E+03	1.8E+03	2.2E+04	2.0E+04	1.1E+03	1.1E+03	4.4E+03
Aliphatic >C10-C12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+03	1.4E+03	5.5E+03	2.7E+04	2.7E+04	1.1E+05	1.2E+03	1.2E+03	1.4E+04	8.7E+03	1.1E+03	1.1E+03	4.4E+03
Aliphatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.7E+03	3.7E+03	1.5E+04	6.2E+03	6.2E+03	2.5E+04	2.8E+02	2.8E+02	3.3E+03	1.2E+03	1.1E+03	1.1E+03	4.4E+03
Aliphatic >C16-C21	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.3E+04	7.3E+04	2.9E+05	4.4E+03	4.4E+03	1.8E+04	2.0E+02	2.0E+02	2.9E+03	1.8E+03	7.3E+03	7.3E+03	2.9E+04
Aliphatic >C21-C34	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.3E+04	7.3E+04	2.9E+05	2.2E+02	2.2E+02	8.6E+02	9.6E+00	9.6E+00	1.1E+02	6.0E+02	7.3E+03	7.3E+03	2.9E+04
Aromatic >C8-C10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	4.0E-01	1.0E+00	1.0E+00	4.1E-01	1.0E+00	1.0E+00	1.1E-01	1.0E+00	1.0E+00	8.1E-01	3.4E+02	3.4E+02	1.3E+03	1.1E+06	1.1E+06	4.2E+06	5.7E+04	5.7E+04	6.9E+05	2.7E+04	2.2E+02	2.2E+02	8.6E+02
Aromatic >C10-C12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+02	3.4E+02	1.3E+03	2.4E+06	2.4E+06	9.7E+06	1.9E+05	1.9E+05	2.2E+06	2.4E+04	2.2E+02	2.2E+02	8.6E+02
Aromatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+02	3.4E+02	1.3E+03	4.0E+06	4.0E+06	1.6E+07	4.8E+05	4.8E+05	5.7E+06	2.0E+04	2.2E+02	2.2E+02	8.6E+02
Aromatic >C16-C21	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.6E+02	1.6E+02	7.3E+02	4.0E+06	4.0E+06	1.6E+07	9.4E+05	9.4E+05	1.1E+07	9.5E+03	1.1E+02	1.1E+02	4.4E+02
Aromatic >C21-C34	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E+03	1.1E+03	4.4E+03	4.4E+07	4.4E+07	1.8E+08	1.6E+07	1.6E+07	2.1E+08	6.5E+03	1.1E+02	1.1E+02	4.4E+02
n-Hexane	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E+02	3.5E+02	1.4E+03	6.1E+04	6.1E+04	2.4E+05	2.7E+03	2.7E+03	3.3E+04	3.2E+04	2.1E+02	2.1E+02	8.3E+02
Benzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.4E+01	4.4E+01	1.8E+02	2.6E+05	2.6E+05	1.1E+06	1.0E+04	1.0E+04	2.3E+05	5.6E+03	3.1E+01	3.1E+01	1.3E+02
Toluene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.2E+02	7.2E+02	2.9E+03	3.4E+06	3.4E+06	1.3E+07	2.1E+05	2.1E+05	2.5E+06	7.8E+04	4.0E+02	4.0E+02	1.6E+03
Ethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.3E+03	1.3E+03	5.4E+03	9.0E+06	9.0E+06	3.6E+07	5.3E+05	5.3E+05	6.4E+06	1.1E+05	1.1E+03	1.1E+03	4.2E+03
Total Xylenes	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.1E+02	2.1E+02	8.2E+02	9.4E+05	9.4E+05	3.8E+06	8.0E+04	8.0E+04	7.1E+05	2.2E+04	1.1E+02	1.1E+02	4.2E+02
1,2,4-trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.2E+01	1.2E+01	4.9E+01	6.6E+04	6.6E+04	2.7E+05	4.3E+03	4.3E+03	5.1E+04	1.3E+03	6.2E+00	6.2E+00	2.5E+01
1,3,5-trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.2E+01	1.2E+01	4.9E+01	5.5E+04	5.5E+04	2.2E+05	3.2E+03	3.2E+03	3.9E+04	1.4E+03	6.2E+00	6.2E+00	2.5E+01
Naphthalene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.2E+00	6.2E+00	2.5E+01	1.4E+05	1.4E+05	5.5E+05	3.0E+04	3.0E+04	3.5E+05	6.6E+02	3.1E+00	3.1E+00	1.3E+01
TPH RBC* ⟶	1,100	2,200	24,000	10,000	>MAX	7,000	7,000	>MAX	400	400	>MAX	160	180	>MAX	340	340	1,300	>S	>S	>S	57,000	57,000	>S	27,000	220	220	880
Generic Gasoline	720	1,500	22,000	13,000	>MAX	4,500	4,500	93,000	140	140	>MAX	26	26	110	100	100	400	>S	>S	>S	>S	>S	>S	12,000	650	650	2,600
Generic Diesel / Heating Oil	3,900	6,300	70,000	23,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	2,800	2,800	>MAX	88	88	350	>S	>S	>S	>S	>S	>S	>S	120	120	490
Generic Mineral Insulating Oil	9,800	20,000	>MAX	40,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	290	290	1,100	>S	>S	>S	>S	>S	>S	>S	490	490	2,000

Fuel Fraction	RBCss					RBCso			RBCsl			RBCsv			RBCiv			RBCwo			RBCwl			RBCwe	RBCair		
	Residential	Urban Residential	Occupational	Construction Worker	Excavation Worker	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Construction & Excavation Worker	Residential	Urban Residential	Occupational
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/m³)	(ug/m³)	(ug/m³)
Aliphatic C5-C8	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.6E+04	3.5E+04	1.4E+05	1.9E+06	1.9E+06	7.4E+06	8.3E+04	8.3E+04	9.9E+05	3.1E+05	2.1E+04	2.1E+04	8.3E+04
Aliphatic >C8-C8	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	8.6E+04	3.5E+04	1.4E+05	1.2E+06	1.2E+06	4.9E+06	5.5E+04	5.5E+04	6.5E+05	2.2E+05	2.1E+04	2.1E+04	8.3E+04
Aliphatic >C8-C10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+03	1.4E+03	5.5E+03	4.0E+04	4.0E+04	1.6E+05	1.8E+03	1.8E+03	2.2E+04	2.0E+04	1.1E+03	1.1E+03	4.4E+03
Aliphatic >C10-C12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+03	1.4E+03	5.5E+03	2.7E+04	2.7E+04	1.1E+05	1.2E+03	1.2E+03	1.4E+04	6.7E+03	1.1E+03	1.1E+03	4.4E+03
Aliphatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.7E+03	3.7E+03	1.5E+04	6.2E+03	6.2E+03	2.5E+04	2.8E+02	2.8E+02	3.3E+03	1.2E+03	1.1E+03	1.1E+03	4.4E+03
Aliphatic >C16-C21	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.3E+04	7.3E+04	2.9E+05	4.4E+03	4.4E+03	1.8E+04	2.0E+02	2.0E+02	2.3E+03	1.6E+03	7.3E+03	7.3E+03	2.9E+04
Aliphatic >C21-C34	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.3E+04	7.3E+04	2.9E+05	2.2E+02	2.2E+02	8.8E+02	9.6E+00	9.6E+00	1.1E+02	6.0E+02	7.3E+03	7.3E+03	2.9E+04
Aromatic >C8-C10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+02	3.4E+02	1.3E+03	1.1E+06	1.1E+06	4.2E+06	5.7E+04	5.7E+04	6.9E+05	2.7E+04	2.2E+02	2.2E+02	8.8E+02
Aromatic >C10-C12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+02	3.4E+02	1.3E+03	2.4E+06	2.4E+06	9.7E+06	1.6E+05	1.9E+05	2.2E+06	2.4E+04	2.2E+02	2.2E+02	8.8E+02
Aromatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+02	3.4E+02	1.3E+03	4.0E+06	4.0E+06	1.6E+07	4.8E+05	4.8E+05	5.7E+06	2.0E+04	2.2E+02	2.2E+02	8.8E+02
Aromatic >C16-C21	1.0E+00	1.0E+00	1.0E+00	1.0E+00	5.2E-01	8.8E-04	8.8E-04	2.2E-04	7.2E-04	7.2E-04	8.0E-05	8.0E-02	8.0E-02	1.5E-02	1.8E+02	1.8E+02	7.3E+02	4.0E+06	4.0E+06	1.6E+07	9.4E+05	9.4E+05	1.1E+07	9.5E+03	1.1E+02	1.1E+02	4.4E+02
Aromatic >C21-C34	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E+03	1.1E+03	4.4E+03	4.4E+07	4.4E+07	1.8E+08	1.6E+07	1.8E+07	2.1E+08	5.5E+03	1.1E+02	1.1E+02	4.4E+02
n-Hexane	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.6E+02	3.6E+02	1.4E+03	6.1E+04	6.1E+04	2.4E+05	2.7E+03	2.7E+03	3.3E+04	3.2E+04	2.1E+02	2.1E+02	8.3E+02
Benzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.4E+01	4.4E+01	1.8E+02	2.8E+05	2.8E+05	1.1E+06	1.9E+04	1.9E+04	2.3E+05	5.5E+03	3.1E+01	3.1E+01	1.3E+02
Toluene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.2E+02	7.2E+02	2.9E+03	3.4E+06	3.4E+06	1.3E+07	2.1E+05	2.1E+05	2.5E+06	7.8E+04	4.0E+02	4.0E+02	1.6E+03
Ethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.3E+03	1.3E+03	5.4E+03	9.0E+06	9.0E+06	3.6E+07	5.3E+05	5.3E+05	6.4E+06	1.1E+05	1.1E+03	1.1E+03	4.2E+03
Total Xylenes	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.1E+02	2.1E+02	8.2E+02	9.4E+05	9.4E+05	3.8E+06	6.0E+04	6.0E+04	7.1E+05	2.2E+04	1.1E+02	1.1E+02	4.2E+02
1,2,4-trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.2E+01	1.2E+01	4.9E+01	6.6E+04	6.6E+04	2.7E+05	4.3E+03	4.3E+03	5.1E+04	1.3E+03	6.2E+00	6.2E+00	2.5E+01
1,3,5-trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.2E+01	1.2E+01	4.9E+01	5.5E+04	5.5E+04	2.2E+05	3.2E+03	3.2E+03	3.9E+04	1.4E+03	6.2E+00	6.2E+00	2.5E+01
Naphthalene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.2E+00	6.2E+00	2.5E+01	1.4E+05	1.4E+05	5.5E+05	3.0E+04	3.0E+04	3.5E+05	8.8E+02	3.1E+00	3.1E+00	1.3E+01
TPH RBC →	2,100	4,300	30,000	9,200	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	160	160	730	>S	>S	>S	>S	>S	>S	>S	110	110	440
Generic Gasoline	720	1,500	22,000	13,000	>MAX	4,500	4,500	80,000	140	140	>MAX	26	26	110	100	100	400	>S	>S	>S	>S	>S	>S	>S	12,000	650	650	2,600
Generic Diesel / Heating Oil	3,900	8,300	70,000	23,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	2,600	2,600	>MAX	88	88	350	>S	>S	>S	>S	>S	>S	>S	120	120	490
Generic Mineral Insulating Oil	9,600	20,000	>MAX	40,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	290	290	1,100	>S	>S	>S	>S	>S	>S	>S	490	490	2,000

Fuel Fraction	RBCss					RBCso			RBCsl			RBCsw			RBCiv			RBCwo			RBCwl			RBCws	RBCas		
	Residential	Urban Residential	Occupational	Construction Worker	Excavation Worker	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Residential	Urban Residential	Occupational	Construction & Excavation Worker	Residential	Urban Residential	Occupational
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/m³)	(ug/m³)	(ug/m³)
Aliphatic C5-C6	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E+04	3.5E+04	1.4E+05	1.9E+06	1.9E+06	7.4E+06	8.3E+04	8.3E+04	9.9E+05	3.1E+06	2.1E+04	2.1E+04	8.5E+04
Aliphatic >C6-C8	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E+04	3.5E+04	1.4E+05	1.2E+06	1.2E+06	4.9E+06	5.5E+04	5.5E+04	6.5E+05	2.2E+06	2.1E+04	2.1E+04	8.5E+04
Aliphatic >C8-C10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+03	1.4E+03	5.5E+03	4.0E+04	4.0E+04	1.6E+05	1.8E+03	1.8E+03	2.2E+04	2.0E+04	1.1E+03	1.1E+03	4.4E+03
Aliphatic >C10-C12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+03	1.4E+03	5.5E+03	2.7E+04	2.7E+04	1.1E+05	1.2E+03	1.2E+03	1.4E+04	6.7E+03	1.1E+03	1.1E+03	4.4E+03
Aliphatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.7E+03	3.7E+03	1.5E+04	6.2E+03	6.2E+03	2.5E+04	2.8E+02	2.8E+02	3.3E+03	1.2E+03	1.1E+03	1.1E+03	4.4E+03
Aliphatic >C16-C21	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.3E+04	7.3E+04	2.9E+05	4.4E+03	4.4E+03	1.8E+04	2.0E+02	2.0E+02	2.3E+03	1.6E+03	7.3E+03	7.3E+03	2.9E+04
Aliphatic >C21-C34	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.3E+04	7.3E+04	2.9E+05	2.2E+02	2.2E+02	8.8E+02	9.8E+00	9.8E+00	1.1E+02	6.0E+02	7.3E+03	7.3E+03	2.9E+04
Aromatic >C8-C10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+02	3.4E+02	1.3E+03	1.1E+06	1.1E+06	4.2E+06	5.7E+04	5.7E+04	6.8E+05	2.7E+04	2.2E+02	2.2E+02	8.8E+02
Aromatic >C10-C12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+02	3.4E+02	1.3E+03	2.4E+06	2.4E+06	9.7E+06	1.9E+05	1.9E+05	2.2E+06	2.4E+04	2.2E+02	2.2E+02	8.8E+02
Aromatic >C12-C16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+02	3.4E+02	1.3E+03	4.0E+06	4.0E+06	1.6E+07	4.8E+05	4.8E+05	5.7E+06	2.0E+04	2.2E+02	2.2E+02	8.8E+02
Aromatic >C16-C21	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E+03	1.1E+03	4.4E+03	4.4E+07	4.4E+07	1.8E+08	1.8E+07	1.8E+07	2.1E+08	8.5E+03	1.1E+02	1.1E+02	4.4E+02
Aromatic >C21-C34	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	4.6E-07	4.6E-07	1.2E-07	3.8E-07	3.8E-07	3.2E-08	1.0E-04	1.0E-04	2.6E-05	1.1E+03	1.1E+03	4.4E+03	4.4E+07	4.4E+07	1.8E+08	1.8E+07	1.8E+07	2.1E+08	8.5E+03	1.1E+02	1.1E+02	4.4E+02
n-Hexane	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E+02	3.5E+02	1.4E+03	6.1E+04	6.1E+04	2.4E+05	2.7E+03	2.7E+03	3.3E+04	3.2E+04	2.1E+02	2.1E+02	8.3E+02
Benzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.4E+01	4.4E+01	1.8E+02	2.8E+05	2.8E+05	1.1E+06	1.9E+04	1.9E+04	2.3E+05	5.5E+03	3.1E+01	3.1E+01	1.3E+02
Toluene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.2E+02	7.2E+02	2.9E+03	3.4E+06	3.4E+06	1.3E+07	2.1E+05	2.1E+05	2.5E+06	7.6E+04	4.0E+02	4.0E+02	1.6E+03
Ethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.3E+03	1.3E+03	5.4E+03	9.0E+06	9.0E+06	3.6E+07	6.3E+05	5.3E+05	6.4E+06	1.1E+05	1.1E+03	1.1E+03	4.2E+03
Total Xylenes	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.1E+02	2.1E+02	8.2E+02	9.4E+05	9.4E+05	3.8E+06	8.0E+04	8.0E+04	7.1E+05	2.2E+04	1.1E+02	1.1E+02	4.2E+02
1,2,4-trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.2E+01	1.2E+01	4.9E+01	8.6E+04	8.6E+04	2.7E+05	4.3E+03	4.3E+03	5.1E+04	1.3E+03	6.2E+00	6.2E+00	2.5E+01
1,3,5-trimethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.2E+01	1.2E+01	4.9E+01	5.5E+04	5.5E+04	2.2E+05	3.2E+03	3.2E+03	3.9E+04	1.4E+03	6.2E+00	6.2E+00	2.5E+01
Naphthalene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.2E+00	6.2E+00	2.5E+01	1.4E+05	1.4E+05	5.5E+05	3.0E+04	3.0E+04	3.5E+05	8.8E+02	3.1E+00	3.1E+00	1.3E+01
TPH RBC* ⟶	1,700	3,400	21,000	6,700	190,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	1,100	1,100	4,400	>S	>S	>S	>S	>S	>S	>S	110	110	440
Generic Gasoline	720	1,500	22,000	13,000	>MAX	4,500	4,500	60,000	140	140	>MAX	26	26	110	100	100	400	>S	>S	>S	>S	>S	>S	>S	650	650	2,600
Generic Diesel / Heating Oil	3,900	6,300	70,000	23,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	2,600	2,600	>MAX	88	88	350	>S	>S	>S	>S	>S	>S	>S	120	120	490
Generic Mineral Insulating Oil	9,800	20,000	>MAX	40,000	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	>MAX	290	290	1,100	>S	>S	>S	>S	>S	>S	>S	490	490	2,000