

file



# Oregon

Theodore R. Kulongoski, Governor

## Department of Environmental Quality

Northwest Region - East Side Office

1550 NW Eastman Parkway, Suite 290

Gresham, OR 97030

(503) 667-8414

Fax: (503) 674-5148

November 30, 2010

Robin Denburg  
4721 NE 31<sup>st</sup> Ave  
Portland, OR 97211

Re: Killingsworth Commercial Property  
UST Cleanup File No. 26-08-1529

Dear Mr. Denburg:

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 the Killingsworth Commercial Property located at 1505 NE Killingsworth in Portland, Oregon. The 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 subject to any conditions described below.

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

### **SITE HISTORY/BACKGROUND**

AMEC Earth & Environmental, Inc. (AMEC) conducted an environmental investigation of the Killingsworth Commercial Property (site) for the City of Portland (City). The City's investigation was done as part of a Brownfield redevelopment program.

The site is an approximately 0.14-acre parcel. A service station reportedly operated at this site from the 1940s until 1975. According to the AMEC *Phase II Environmental Site Assessment (ESA) Report* dated February 2008, two 1,000-gallon gasoline USTs and a waste oil UST were reportedly removed in 1975. The site has paved parking areas, and is currently occupied by a mobile home that was converted into a restaurant.

The surrounding properties are a mixture of residential and commercial usage. The site is at an elevation of 210 and 220 feet above mean sea level. The depth to groundwater is anticipated to be greater than 100 feet. The underlying shallow soils consist of silts and clays.

## **EXTENT OF CONTAMINATION DEFINED**

Northwest Geophysical Associates conducted a geophysical survey on January 11, 2008, to identify disturbed soils and potential ferromagnetic items that would indicate the presence or historic removal of USTs and associated piping. Three anomalies and two piping runs were detected as a result of the survey. To further investigate the anomalies, AMEC advanced six soil borings. Each boring was advanced to a depth of approximately 15 feet. Six soil samples were obtained near the bottom of each boring. Three of the samples were analyzed for petroleum hydrocarbons and associated constituents. Soil gas samples were obtained from each boring at a depth of approximately five feet. The soil samples contained background levels of metals, but did not contain detectable petroleum hydrocarbons or constituents. The soil gas sampling results reported detections of volatile organic compounds (VOCs) typically related to gasoline releases. All soil gas sample concentrations were below the applicable screening levels for vapor intrusion.

## **CURRENT AND FUTURE GROUNDWATER BENEFICIAL USE DETERMINATION**

The City provides water to the site and surrounding area. The water is primarily from the Bull Run Water System, which is located approximately 26 miles east of downtown Portland. Based on the overall depth to groundwater, the lack of detected soil contamination, and the use of municipal water; the tap water ingestion and inhalation pathways and the leaching to groundwater pathway are deemed incomplete in the locality of the contamination.

## **CURRENT AND FUTURE LAND USE DETERMINATION**

The site is zoned Storefront Commercial. The Storefront Commercial zone is intended to preserve and enhance older commercial areas that have a storefront character. The zone allows a range of retail, service and business uses, as well as residential development.

## **CONTAMINANTS OF INTEREST (COIs)**

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. If the source is gasoline, then 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, and lead. If diesel is present the contaminants of interest include polynuclear aromatic hydrocarbons (PAHs), and if heavy/waste oil is present contaminants may also include cadmium, chromium and polychlorinated biphenyls (PCB).

An initial evaluation was performed to determine if petroleum hydrocarbons were present in soils. Soils were analyzed for gasoline through heavy oil range hydrocarbons by Methods NWTPH-Gx and Dx. Soils were also analyzed for a full range of VOCs by EPA Method 8260B, for PAHs by EPA Method 8270C SIM, and for select total metals (cadmium, chromium, lead) by EPA Method 6020. Only low levels of metals consistent with background concentrations were detected in the soils. Soil gas samples were analyzed for a full range of VOCs by EPA Method TO-15.

### CONTAMINANTS OF POTENTIAL CONCERN

Below is a listing of the maximum soil gas sample VOC concentrations detected compared to the respective residential vapor intrusion risk based concentration (RBC) screening levels; in  $\mu\text{g}/\text{m}^3$ :

<u>Contaminant</u>	<u>Maximum detection</u>	<u>Vapor intrusion RBC</u>
1,2, 4 trimethylbenzene	8.3	1,500
1,3,5 trimethylbenzene	3.6	1,300
2,2,4 Trimethylpentane	2.0	NA
2-Propanol	29	NA
4-ethyltoluene	2.4	NA
Acetone	43	NA
Benzene	15	62
Carbon Disulfide	6.8	NA
Chloroform	2.4	21
Chloromethane	5.4	19,000
Cyclohexane	3.8	NA
Freon 12	2.9	NA
Ethanol	32,000	NA
Ethylbenzene	29	190
Heptane	3.2	NA
Isopropylbenzene	2.9	NA
Methylene Chloride	3.8	1,000
n-Hexane	3.2	NA
Propene	41	NA
Styrene	1.8	210,000
Tert-Butyl alcohol	1.3	NA
Toluene	1,300	1,000,000
Xylene total	173	21,000

The soil gas analysis showed the detectable concentrations of typical gasoline constituents, benzene, toluene, ethyl benzene, and xylene (BTEX), as well as other compounds, in the subsurface. Certain compounds such as ethanol may be found in gasoline or may be from other

sources such as household materials. Non-petroleum contaminants were also detected, such as methylene chloride and acetone, common laboratory contaminants. The source of the gasoline constituents and other contaminants is not known, but the detected VOC concentrations are below the most stringent risk based screening criteria; vapor intrusion into single family residences.

### **CONCEPTUAL SITE MODEL AND RISK-BASED DETERMINATION**

The current receptor scenario is occupational usage. Future receptors may include residential, as well as construction and excavation worker scenarios. No soils impacts were encountered; therefore, the pathway and receptor scenarios are limited to indoor and outdoor vapor intrusion for residential and occupational receptors. The soil gas sampling indicated no unacceptable vapor intrusion risk based on the most stringent criteria.

### **CONTAMINANTS OF CONCERN**

The investigation did not find contaminants exceeding a risk based screening level.

### **RISK MANAGEMENT**

Although no soil contamination was detected during the site investigation, soil gas sampling indicated the potential for some residual petroleum at the site. If evidence of petroleum contamination in soils is encountered during future site development, the soil is to be analyzed to determine the proper handling and disposal methods.

### **ECOLOGICAL RISK EVALUATION**

An ecological risk assessment is not required if contaminated soils are only present at a depth greater than 3 feet below ground surface, or, if present at a shallower depth, such soils cover an area no greater than 0.125 acre; surface water has not been affected by the release; contaminated groundwater does not and is not reasonably likely to discharge to surface waters or otherwise reach the surface in a manner that might result in contact with ecological receptors; and contaminated groundwater does not and is not reasonably likely to come into contact with aquatic sediments. No ecological risk assessment was warranted as contamination was not detected in soils and because the site is not located near a surface water receptor.

### **NFA DETERMINATION**

Contamination may be present at the Killingsworth Commercial site. However, based on the investigation results it appears that the contamination does not present an unacceptable risk to

human health, safety, welfare or the environment. DEQ's approval of file closure is based upon present conditions as described in documents in DEQ's files.

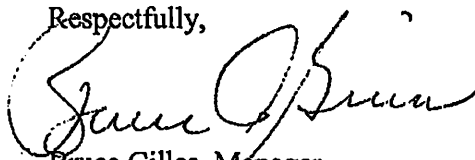
If the site is developed and contaminated soils are encountered, any sampling, management, and disposal of contaminated soil must be performed in accordance with DEQ regulations and policies.

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](http://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 Laurey Cook at (503) 667-8414 extension 55007.

Respectfully,



Bruce Gilles, Manager  
DEQ NWR UST Cleanup Section

cc: Jenn Bildersee, City of Portland Brownfields Coordinator  
Bureau of Environmental Services  
1120 SW Fifth Ave. Suite 1000  
Portland, Oregon 97204

# memo

**26-08-1529 Killingsworth Commercial property**

To: File  
From: lcook  
CC:  
Date: 11/4/2010  
Re: Killingsworth Commercial Property

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Comments: This site was investigated under a Brownfields Grant, by the City of Portland. The property sold, and the buyer submitted a Brownfield investigation report to DEQ. DEQ listed it as a LUST site because some detections of TPH and constituents were detected in soil gas samples, but not in soil. Apparently the City did not think it was a reportable release and the buyer thought the report indicated that it was clean property. It is unclear why the report was submitted to DEQ.

I contacted the City, and they said the grant funding ended. The buyer thought it was clean property. This is a low priority site with no viable RP. I discussed unassigning and backlogging it with my manager. The current owner indicated the property is "underwater" therefore it is difficult to spend more money on the property.

The site was a service station that reportedly operated from the 1940s until 1975. Two 1,000-gallon gasoline USTs and a waste oil UST were reportedly removed in 1975. The site is currently occupied by a mobile home that has been converted into a restaurant. In January 2008, AMEC collected soil and soil gas samples as part of a Phase II ESA for Portland BES. (DEQ didn't receive the ESA until December 2008). No soil contamination was detected, but a variety of VOCs were detected in soil gas, including benzene (15 ug/m<sup>3</sup>), 1,2,4-TMB (8.3 ug/m<sup>3</sup>), and xylenes (173 ug/m<sup>3</sup>). These are below DEQ's RBCs. The site can be closed but has not viable RP or Cost Recovery.

According to notes in the file, Clark Henry with former City of Portland Brownfield coordinator told the buyer that the City would handle the NFA. Mr. Henry no longer works for the City, and did not communicate with DEQ. A new coordinator was hired, but by that time the grant expired.

# memo

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## COOK Laurey

---

**From:** COOK Laurey  
**Sent:** Wednesday, October 27, 2010 2:18 PM  
**To:** 'robin@realtYROBIN.COM'  
**Subject:** contact information

Robin

The site is a UST cleanup site file number 26-08-1529. The subsurface investigation work was performed under a Brownfield grant. Some gasoline related constituents were detected in the soil gas samples. Since the time of the report, DEQ has developed a new guidance. The City did not report the detections to DEQ, apparently you submitted the report. It has now been logged in as a release. I have been assigned as project manager. I am attaching information regarding recovering costs. I will discuss the site with my manager Bruce Gilles.

<http://www.deq.state.or.us/lq/tanks/lust/costrecovery.htm>

<http://www.deq.state.or.us/lq/pubs/forms/tanks/USTCostRecoveryAgreement.pdf>

My contact information is:

Laurey Cook  
Oregon DEQ  
1550 NW Eastman Parkway, Suite 290  
Gresham Oregon 97030

5030-667-8414 extension 55007

to Robin  
from Laurey Cook  
Date: Oct 27, 2010

Open file for Killingsworth  
how much does it cost to  
close? \$100s - \$1000s?

Generally looking at a couple  
\$1000; likely more than a  
few hundred.

Robin thought since he  
sent in the report it was  
closed.

No it was backlogged

I will send Robin my contact  
info & talk with Bruce next  
week.

## **COOK Laurey**

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**From:** COOK Laurey  
**Sent:** Thursday, October 21, 2010 1:06 PM  
**To:** 'Jenn.Bildersee@portlandoregon.gov'  
**Subject:** Killingsworth Brownsfield

Jenn,

I obtained your name from Rebecca Wells-Albers in DEQ's Brownsfield program. I asked her who the City of Portland Brownsfield coordinator is. I have a Leaking Underground Storage Tank site located at 1505 NE Killingsworth. AMEC submitted a report to the City and it looks to be part of a Brownsfield project. I was assigned as DEQ project manager. Clark Henry was likely the City's contact, but apparently is no longer with the City, and there have been a number of personnel changes.

The Property owner, Robin Denburg, requested site closure awhile ago. The emails indicate that she thought the City made arrangements to cover DEQ's oversight costs. It looks like a pretty simple project that needs to be finished up. Do you know if the City was planning to pay for DEQ oversight under a brownfields grant?

Is there any information that I can provide that might help decide who was to pay for DEQ time so we can get this project closed out?

Thanks

Laurey Cook  
Oregon DEQ  
503 667-8414 extension 55007

**COOK Laurey**

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**From:** COOK Laurey  
**Sent:** Tuesday, July 27, 2010 1:08 PM  
**To:** 'Henry, Clark'  
**Cc:** 'O'Donovan, John'  
**Subject:** Killingsworth Commercial Property

I was recently assigned a site referred to as Killingsworth Commercial Property. AMEC did a Phase II at 1505 NE Killingsworth for BES and US EPA. I think it may be a Brownsfield site. The file talks about the City of Portland paying DEQ oversight costs. Anyone there familiar with the site, and is there money to cover DEQ oversight costs?

Laurey Cook  
Oregon DEQ  
503 667-8414 extension 55007

*John O'Donovan indicated Clark Henry  
no longer with the City.*

*emailed Chuck Harmon  
re: Brownsfield contact  
LLC  
8/30/2010*



# 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

January 5, 2009

ROBIN DENBURG  
4721 NE 31<sup>ST</sup> AVE  
PORTLAND OR 97211

RE: Killingsworth Commercial Property  
File No.: 26-08-1529

On December 30, 2008, a release was reported from an underground storage tank (UST) system at your facility located at 1505 NE Killingsworth Street in Portland, Oregon. As the responsible party for the facility, you are required to clean up the release according to OAR 340-122-0201 through 340-122-0360. These rules require cleaning up the soil, groundwater, surface water and any other media contaminated by petroleum to the appropriate standards or demonstrating that the contamination does not pose a risk to human health or the environment. We are looking forward to working with you to bring this site to closure.

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 that includes due dates for submittals 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 that 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, review 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.

Killingsworth, File #26-08-1529  
January 5, 2009  
Page 2

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 Land Quality Division 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,



Michael H. Korten Hof, Manager  
UST Cleanup and Compliance Section

Enclosures

# PortlandMaps

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1505 NE KILLINGSWORTH ST - VERNON - PORTLAND

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## Aerial Photo

2007 / '06 / '05 / '04 / '03 / '02 / '01    6" / 2' / 4' / 10' / 20'    Streets: [On](#) / [Off](#)    Lots: [On](#) / [Off](#)    Dot: [On](#) / [Off](#)



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City of Portland, Corporate GIS

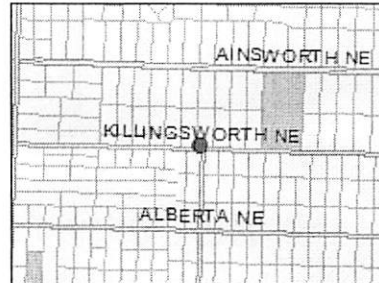
12/31/2008

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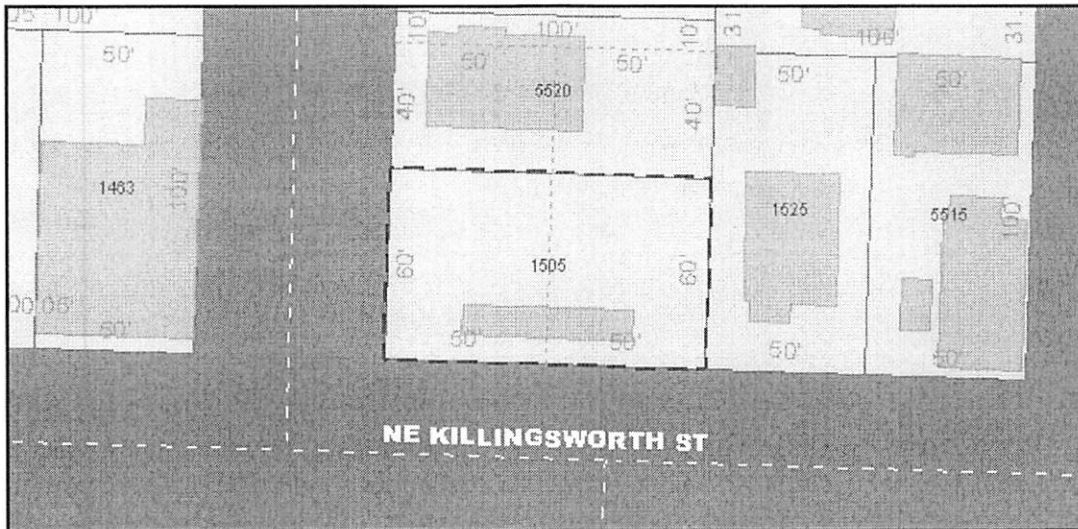
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## 1505 NE KILLINGSWORTH ST PORTLAND, OR 97211



Description	Restaurant
Size	528 square feet
Number of Bedrooms	
Bathrooms	

Property Map



Property Value (2008)	
Market Value	\$116,510.00
Assessed Value	\$23,740.00
Taxes (2008)	
Property Taxes	\$504.12
Total Taxes	\$504.12
Misc Info	
Year Built	1973
Foundation Type	
Interior Finish	
Roof Style	
Roof Cover Type	
Flooring Type	
Heating/AC Type	

City of Portland, Corporate GIS

Assessor Data Updated 12/22/2008

THE GIS APPLICATIONS ACCESSED THROUGH THIS WEB SITE PROVIDE A VISUAL DISPLAY OF DATA FOR YOUR CONVENIENCE. EVERY REASONABLE EFFORT HAS BEEN MADE TO ASSURE THE ACCURACY OF THE MAPS AND ASSOCIATED DATA. THE CITY OF PORTLAND MAKES NO WARRANTY, REPRESENTATION OR GUARANTEE AS TO THE CONTENT, SEQUENCE, ACCURACY, TIMELINESS OR COMPLETENESS OF ANY OF THE DATA PROVIDED HEREIN. THE USER OF THESE APPLICATIONS SHOULD NOT RELY ON THE DATA PROVIDED HEREIN FOR ANY REASON. THE CITY OF PORTLAND EXPLICITLY DISCLAIMS ANY REPRESENTATIONS AND WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE CITY OF PORTLAND SHALL ASSUME NO LIABILITY FOR ANY ERRORS, OMISSIONS, OR INACCURACIES IN THE INFORMATION PROVIDED REGARDLESS OF HOW CAUSED. THE CITY OF PORTLAND SHALL ASSUME NO LIABILITY FOR ANY DECISIONS MADE OR ACTIONS TAKEN OR NOT TAKEN BY THE USER OF THE APPLICATIONS IN RELIANCE UPON ANY INFORMATION OR DATA FURNISHED HEREUNDER. FOR UPDATED INFORMATION ABOUT THE MAP DATA ON PORTLANDMAPS PLEASE REFER TO CITY'S METADATA. FOR QUESTIONS ABOUT ASSESSMENT INFORMATION PLEASE CONTACT THE COUNTY ASSESSORS OFFICE IN YOUR COUNTY.

## DANA Kevin

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**From:** DANA Kevin  
**Sent:** Wednesday, December 31, 2008 1:16 PM  
**To:** 'Robin Denburg'  
**Cc:** DANA Kevin  
**Subject:** RE: no further action letter for 1505 NE Killingsworth

You don't need to do anything else now, but if the city doesn't cover the costs you'll need to sign a Cost Recovery Agreement, which I'll send along with the other information.

Have a Happy New Year! Kevin

-----Original Message-----

**From:** Robin Denburg [mailto:robin@realityrobin.com]  
**Sent:** Wednesday, December 31, 2008 11:47 AM  
**To:** DANA Kevin  
**Cc:** ORR Jim  
**Subject:** RE: no further action letter for 1505 NE Killingsworth

Hi Kevin:

I can understand the need to recoup the costs and I do believe the City had made arrangements to cover them. At least that's what I had been told at the time. I have an email telling me that Clark Henry was the contact back in the spring when this testing was done.

But if not then yes just let me know the costs involved.

My mailing address is 4721 NE 31st Ave, Portland Or 97211. If you want to email me as well that's just as good or even better.

Is there any other information you need me to track down at this point? Is there a formal application I need to fill out requesting the no further action letter?

Thank you so much for helping me work through this process of getting the NFA letter.

Robin Denburg

Quoting DANA Kevin <[DANA.Kevin@deq.state.or.us](mailto:DANA.Kevin@deq.state.or.us)>:

> Robin,  
>  
> I've received and downloaded your report. Thanks!  
>  
> DEQ is required by law to recover its costs in reviewing reports and  
> issuing No Further Action letters. Essentially, we charge by the  
> hour, like a law firm would do. In your case, it so happens that we  
> have an Intergovernmental Agreement (IGA) with the City of Portland's  
> Bureau of Environmental Services (BES) to review some of their project  
> work, so we're going to check with them to see if they were intending  
> their work at this site to be included under that. If not, then it  
> sounds like you may be on the hook for the charges. I can send you a  
> brief packet of information about the charges if that turns out to be the case.  
>  
> In the meantime, can you let me know your mailing address, so we'll



## DANA Kevin

---

**From:** DANA Kevin  
**Sent:** Wednesday, December 31, 2008 11:07 AM  
**To:** 'Robin Denburg'  
**Cc:** DANA Kevin; ORR Jim  
**Subject:** RE: no further action letter for 1505 NE Killingsworth

Robin,

I've received and downloaded your report. Thanks!

DEQ is required by law to recover its costs in reviewing reports and issuing No Further Action letters. Essentially, we charge by the hour, like a law firm would do. In your case, it so happens that we have an Intergovernmental Agreement (IGA) with the City of Portland's Bureau of Environmental Services (BES) to review some of their project work, so we're going to check with them to see if they were intending their work at this site to be included under that. If not, then it sounds like you may be on the hook for the charges. I can send you a brief packet of information about the charges if that turns out to be the case.

In the meantime, can you let me know your mailing address, so we'll know where to send the NFA letter when the time comes? :)

Thanks! Kevin

-----Original Message-----

**From:** Robin Denburg [mailto:robin@realityrobin.com]  
**Sent:** Tuesday, December 30, 2008 10:47 AM  
**To:** DANA Kevin  
**Subject:** no further action letter for 1505 NE Killingsworth

Hi Kevin:

Thanks for returning my call from Friday.

Attached is the phase II report for 1505 NE Killingsworth St in Portland 97211. My desire is to get a 'no further action' letter from DEQ. I recently purchased the property from Sherelle Littleton, who was the owner at the time the tests and Phase II report was generated.

I understand the letter may not be able to be produced in 2008 but I understand that there may be some new DEQ rules going into effect the first of the year. I know these tests were done for the state and national standards of this spring. I'm not at all familiar with the new rules, but I am hopeful that the rules that were in place at that time can be applied as you assess this property.

The company doing the testing was AMEC Earth and Environmental. I know they worked closely with Clark Henry at the City of Portland to ensure the process was done according to state and national standards.

I'm not sure how the process works from here, but please let me know what else I need to do. And do I need to fill out a formal application request for a no further action letter?

Thanks,  
Robin Denburg  
owner







## DANA Kevin

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**From:** DANA Kevin  
**Sent:** Tuesday, December 30, 2008 1:55 PM  
**To:** GREENBURG Michael J  
**Cc:** KORTENHOF Mike; DANA Kevin  
**Subject:** RE: no further action letter for 1505 NE Killingsworth

You're right, I read it wrong, it was BES and not PDC. I've actually worked with BES on some projects in the past so I'll take it from here. Thanks!

-----Original Message-----

**From:** GREENBURG Michael J  
**Sent:** Tuesday, December 30, 2008 1:44 PM  
**To:** DANA Kevin  
**Cc:** KORTENHOF Mike  
**Subject:** RE: no further action letter for 1505 NE Killingsworth

From what I can tell this is a City of Portland Bureau of Environmental Services project. My contacts at PDC were unaware of this project and do not appear to have any involvement. I'll talk to you about the site in person but from my current view this should be handled business as usual from your end.

-----Original Message-----

**From:** DANA Kevin  
**Sent:** Tuesday, December 30, 2008 11:51 AM  
**To:** GREENBURG Michael J  
**Cc:** DANA Kevin; KORTENHOF Mike  
**Subject:** FW: no further action letter for 1505 NE Killingsworth

Hello Mr. G. At the risk of crashing your mailbox, I thought I should forward this on to you.

I didn't know until I saw the report that the Phase II was conducted for Clark Henry at PDC. This is also troublesome because no release was reported to us (there is no LUST site at this address). Depending on the circumstances we might be inclined to rap AMEC on the knuckles for that.

If you can follow up with this and let Robin and I know how to proceed I'd appreciate it. Thanks!

Kevin

-----Original Message-----

**From:** Robin Denburg [mailto:robin@realtyrobin.com]  
**Sent:** Tuesday, December 30, 2008 10:47 AM  
**To:** DANA Kevin  
**Subject:** no further action letter for 1505 NE Killingsworth

Hi Kevin:

Thanks for returning my call from Friday.

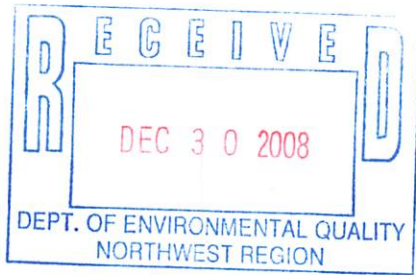
Attached is the phase II report for 1505 NE Killingsworth St in Portland 97211. My desire is to get a 'no further action' letter from DEQ. I recently purchased the property from











**PHASE II ENVIRONMENTAL SITE ASSESSMENT**

Killingsworth Commercial Property  
1505 NE Killingsworth Street  
Portland, Oregon

Submitted to:

City of Portland Bureau of Environmental Services  
1120 SW 5<sup>th</sup> Avenue, Room 1000  
Portland, Oregon 97204-1912

and

U.S. Environmental Protection Agency, Region 10  
805 SW Broadway, Suite 500  
Portland, Oregon 97205

Submitted by:

AMEC Earth & Environmental, Inc.  
7376 SW Durham Road  
Portland, Oregon 97224

7-61M-117120

February 2008



February 8, 2008

7-61M-117120

Mr. Clark Henry  
City of Portland Bureau of Environmental Services  
1120 SW 5<sup>th</sup> Avenue, Room 1000  
Portland, Oregon 97204-1912

Dear Mr. Henry:

**Re: Phase II Environmental Site Assessment  
Killingsworth Commercial Property  
1505 NE Killingsworth Street  
Portland, Oregon**

AMEC Earth & Environmental, Inc. (AMEC) is pleased to present this Phase II Environmental Site Assessment (ESA) for the above-referenced property in Portland, Oregon. The results of the ESA and recommendations are presented in the following report.

We appreciate the opportunity to serve you on this project. If you have any questions or desire further information, please feel free to contact undersigned at (503) 639-3400.

Sincerely,

**AMEC Earth & Environmental, Inc.**

A handwritten signature in black ink, appearing to read "Leonard C. Farr, Jr.", written in a cursive style.

Leonard C. Farr, Jr., R.G.  
Senior Associate/Geologist

Attachments

DS/sl

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Phase II Report.doc

## Table of Contents

	<u>Page</u>
1.0 INTRODUCTION.....	1
2.0 PROJECT BACKGROUND .....	1
2.1 Site Location and Description.....	1
2.2 Site Background.....	1
3.0 SUBSURFACE INVESTIGATION.....	2
3.1 Field Methodology.....	3
3.1.1 Preliminary Activities .....	3
3.1.2 Geophysical Survey.....	3
3.1.3 Drilling Investigation .....	4
3.2 Subsurface Conditions .....	5
3.3 Laboratory Testing .....	5
3.3.1 Soil Samples Analytical Results.....	6
3.3.2 Soil Gas Analytical Results.....	7
4.0 Conceptual Site Model.....	9
5.0 CONCLUSIONS AND RECOMMENDATIONS .....	12
REFERENCES.....	14
LIMITATIONS.....	15

## List of Tables

Table 1: Soil Analytical Testing Results.....	6
Table 2: Soil Gas Analytical Testing Results for VOCs.....	8
Table 3: Vapor Intrusion Calculations for VOCs .....	12

## List of Figures

Figure 1	Location Map
Figure 2	Site Plan
Figure 3	Geophysical Anomalies and Sampling Locations

## List of Appendices

Appendix A	Geophysical Survey Report
Appendix B	Boring Logs
Appendix C	Analytical Results and Chain-of-Custody Documentation

## **1.0 INTRODUCTION**

This report documents the results of a limited Phase II Environmental Site Assessment (ESA) conducted by AMEC Earth & Environmental, Inc. (AMEC) on behalf of City of Portland Bureau of Environmental Services (BES) and has been performed in accordance with the BES Work Order Number 841 dated December 18, 2007. This ESA has been completed for the approximately 0.14-acre property owned by Ms. Sherelle Littleton, located northeast of the intersection of NE Killingsworth Street and NE 15th Avenue in Portland, Oregon (Site). It is our understanding that BES is assisting the property owner in conducting a site assessment prior to sale and redevelopment of this brownfield property. The purpose of this Phase II ESA was explore for evidence of a release associated with former service station operations located on the Site.

## **2.0 PROJECT BACKGROUND**

### **2.1 Site Location and Description**

The Site is a 0.14-acre parcel located at 1505 NE Killingsworth Street in the City of Portland, Multnomah County, Oregon. The approximate location of the Site is depicted on Figure 1. The property consists of Tax Lot 14600, located in the SW  $\frac{1}{4}$  of the SE  $\frac{1}{4}$  of Section 14, Township 1 North, Range 1 East of the Willamette Meridian. It is currently occupied by a 528-square foot mobile home that has been converted for use as a restaurant, and an associated asphalt-paved parking lot.

The Site is located in an area of mixed residential and commercial use. It is bounded to the north and east by residences, to the south by NE Killingsworth Street and facing storefronts and offices, and to the west by a convenience store and residences. The Site is situated on level terrain at an elevation between approximately 210 and 220 feet above mean sea level (msl). It is anticipated that groundwater is greater than 100 feet below the existing ground surface (bgs) in the Site vicinity. The current and historical Site configuration is depicted on Figure 2.

### **2.2 Site Background**

A brief description of the Site background is provided in this section. A more thorough discussion regarding Site background is available in a Phase I ESA prepared for the Site by Hahn and Associates, Inc. (Hahn) (Hahn, 2007).

On the basis of historical information included in the Phase I ESA (Hahn, 2007), the Site was occupied by two residences from approximately the early 1900s until the

1930s, and by an automotive service station from the 1940s until approximately 1975. The converted mobile home currently present on the Site was placed on the property in approximately the late 1980s or early 1990s, and has been used as a small restaurant since that time.

The adjacent and nearby surrounding properties have been predominantly used for residential purposes since the 1900s. In addition, small commercial storefronts have been located along NE Killingsworth Street since at least the 1920s, including several automotive service stations from the 1930s through the 1970s. A dry cleaning facility was located approximately 50 feet to the east of the Site in 1950.

Two 1,000-gallon capacity gasoline underground storage tanks (USTs) and a waste oil UST were removed from the Site in 1975, and the vacated automotive service station was demolished. On the basis of available records, soil sampling and analyses were not conducted during UST removal. Therefore, the abandoned UST facilities were identified as a recognized environmental condition (REC). The Phase I ESA (Hahn 2007) included recommendations to conduct: 1) a geophysical survey to identify potential remaining USTs, and 2) a subsurface investigation to evaluate whether soil and/or groundwater at the Site have been impacted by a release of petroleum products from the former UST system.

### **3.0 SUBSURFACE INVESTIGATION**

The Phase II ESA scope of work for a limited subsurface investigation was designed to evaluate the potential for adverse environmental impact to the Site from the former UST system, and to evaluate the potential for adverse environmental impact from adjacent properties.

It was anticipated that former use and storage of petroleum fuel hydrocarbons, used oils, and solvents may have resulted in impact to soils at the Site; however, the precise locations of all former USTs at the Site are not known. Phase partitioning theory indicates that liquid or aqueous hydrocarbons and solvents will sorb to soil particles and partition to groundwater and soil gas where they come into contact with these media. Impacted soil gas concentrations will then migrate through the interstitial pore space of the soil, moving from areas of high concentration to low concentration. Because of these properties, the collection and analysis of soil gas samples provides a useful method of Site characterization where the specific source location is not known. Groundwater beneath the Site is anticipated to be deep (greater than 100 feet); therefore, the subsurface investigation was limited to the collection of soil and soil gas samples.

## **3.1 Field Methodology**

### **3.1.1 Preliminary Activities**

On January 9, 2008, AMEC notified the Oregon Utility Notification Center of the intent to drill on the Site (Ticket Number 8004353) and requested marking of underground utilities. AMEC personnel performed a site reconnaissance to evaluate site access and logistics for the proposed field activities on January 11, 2008.

A Health and Safety Plan, as required by the Oregon Occupational Safety and Health Administration Safety (OR-OSHA), was prepared to describe field safety protocol for AMEC employees active on the job (AMEC, 2007).

A Quality Assurance Project Plan (QAPP) was prepared to outline procedures and protocols for the project (AMEC, 2008). The QAPP was submitted to U.S. Environmental Protection Agency (EPA) Region 10 in Portland, Oregon for review and comment. EPA approval of the QAPP was received on January 15, 2008.

### **3.1.2 Geophysical Survey**

Northwest Geophysical Associates (NGA) of Portland, Oregon was contracted by AMEC to conduct a geophysical survey and perform utility clearance services for the project. The geophysical instrumentation was selected on the basis of target physical properties to identify potential ferromagnetic items (e.g., USTs and piping) in the subsurface and to identify areas of disturbed soils that may indicate the location of former UST excavations. Proposed geophysical methods included electromagnetic (EM), magnetic (MAG), and ground penetrating radar (GPR) methods.

NGA conducted the geophysical survey on January 11, 2008. Geophysical data was collected and interpreted by NGA in accordance with industry standards. MAG data (using Geometrics G858 magnetometer/gradiometer) and GPR data (using Geophysical Survey Systems, Inc. SIR3000) were collected on a 2-meter grid spacing in accessible portions of the Site. Following field testing, it was determined that collection of frequency domain EM data (using Geonics EM-31 terrain conductivity meter) for the Site would not be useful because of signal interference from large quantities of surface metal in the vicinity (i.e., chain-link fence along northern and eastern property boundaries and aluminum-sided restaurant structure in southern portion of Site). A RadioDetection 4000 unit and a time domain EM pipe and cable locator (Fischer TW6 m-scope) were used to supplement the MAG and GPR data and to verify that proposed boring locations were clear of underground utilities. The area underlying the restaurant facility was not accessible to the geophysical instruments

used and remains a data gap. The geophysical survey report is provided in Appendix A.

The results of the geophysical survey were used to select locations for the exploratory soil/soil gas borings (Figure 3). One boring (B01) was placed in the eastern portion of the Site to assess a combined MAG and GPR anomaly (Anomaly C). This boring was also placed within a minor surface depression that may represent differential settling typically associated with incompletely compacted artificial fill materials and which was interpreted to potentially represent the location of a former UST. Two borings (B02 and B06) were placed in the central portion of the Site to assess parallel linear north-south trending MAG and GPR anomalies interpreted to represent existing subsurface metallic pipes. Two borings (B03 and B04) were placed in the south-central portion of the Site to assess a combined MAG and GPR anomaly (Anomaly B) that intersected with the north-south trending pipes. One boring (B05) was placed in the northwestern portion of the Site to assess a combined MAG and GPR anomaly (Anomaly A) that coincided with a vertically oriented 8-inch diameter metal pipe cut flush with the asphalt surface.

### 3.1.3 Drilling Investigation

On January 17, 2008, AMEC personnel performed field sampling activities at the Site. The investigation involved the collection of soil samples and soil gas samples from six locations. The approximate sampling locations are shown on Figure 3.

The subsurface investigation was conducted using a direct-push drilling method that minimizes disturbance to the Site. Direct-push drilling was performed by Pacific Soil and Water LLC, a licensed well driller in the State of Oregon. The direct-push sampling technique involves advancing a small diameter hollow rod into the subsurface using a percussion hammer. A track mounted AMS Power Probe 9500-VTR drilling rig was used to advance the borings and collect soil and soil gas samples.

One soil gas sample was collected at a depth of approximately 5 feet below the existing ground surface (bgs) from within each of the borings. To collect each soil gas sample, the 1.5-inch diameter sampling rod was driven to the target depth, the rod was withdrawn approximately 1-inch, and the expendable tip of the drilling rod was removed to allow soil gasses to enter the intake port on the lower end of the rod. The Geoprobe® Post-Run Tubing (PRT) system was used to attach ¼-inch diameter single-use Teflon® tubing to the intake port. A pneumatic pump was used to purge ambient air from the system. Subsequently, a 1-liter capacity Summa container under approximately 30 inches of mercury (in-Hg) vacuum was attached to the Teflon® tubing to collect a soil gas sample from the target depth. Gas flow was limited to 100

milliliters per minute (ml/min) using a separate dedicated flow controller for each sample. Sample collection was terminated when approximately 5 to 7 in-Hg vacuum remained within the Summa canister. Soil gas samples were labeled and transported under chain-of-custody procedures to the contract laboratory for chemical analysis.

Following soil gas sampling activities, the drilling/gas-sampling rod was removed, and the 2-inch diameter drilling/soil-sampling rod was inserted into the boring. Soil borings were advanced to approximately 15 feet bgs. Soil samples were collected continuously in 5-foot intervals from each boring and classified according to the Unified Soil Classification System (USCS). The soil samples were field screened for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID). An AMEC licensed geologist logged the character of the soil encountered in addition to other observations (e.g., visual staining, olfactory indications of impact, and headspace readings). A soil sample was collected from near the bottom of each boring and retained for potential analysis. Following the collection of soil samples, the borings were permanently backfilled with bentonite chips, hydrated during placement with potable water, then capped at the surface with cold-patch asphalt. Soil cuttings were placed into a 55-gallon capacity steel drum, labeled, and staged onsite.

### **3.2 Subsurface Conditions**

The soil throughout most of the Site is covered by asphalt paving approximately 3 inches in thickness. At boring B5, the surface covering of asphalt was underlain by a reinforced concrete slab approximately 4-inches thick. Subsurface conditions encountered during drilling were similar across the Site and consisted primarily of yellowish brown, firm, sandy clay to approximately 4 feet bgs, underlain by medium dense, dark brown, silty, fine to coarse-grained sand with subangular gravels to the maximum depth explored of 15 feet bgs. Indications of petroleum hydrocarbon or solvent impact were not observed during the drilling investigation. Boring logs noting the types of soils encountered, sampling depths, and PID field screening results are included in Appendix B.

### **3.3 Laboratory Testing**

Analytical testing of soil samples was subcontracted to Apex Laboratories (Apex) in Tigard, Oregon. Soil samples were placed in laboratory-supplied 4-ounce capacity glass jars, immediately capped and labeled, placed in an insulated cooler with ice, and transported to the laboratory following chain-of-custody procedures. Three soil samples were analyzed for gasoline range organics (GRO) by Department of Environmental Quality (DEQ) method NWTPH-Gx, diesel range organics (DRO) and heavy oil range organics by DEQ method NWTPH-Dx, and for VOCs by EPA method

8260B. Two soil samples were analyzed for polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8270C Selected Ion Mode (SIM), and for the metals cadmium, chromium, and lead by EPA 6000/7000 series methods.

Analytical testing of soil gas samples was subcontracted to Environmental Science Corp. (ESC) in Mt. Juliet, Tennessee. Soil gas samples were placed in laboratory-supplied 1-liter capacity Summa canisters, immediately labeled, and shipped via overnight delivery to the laboratory following chain-of-custody procedures. Six primary and one duplicate soil gas samples were analyzed for VOCs by EPA Compendium Method Toxic Organic 15 (TO-15).

### 3.3.1 Soil Samples Analytical Results

Analytical results for soil samples are summarized in Table 1 and discussed below.

**Table 1: Soil Analytical Testing Results**

Soil Analyte	DEQ RBCss Residential* (mg/kg)	DEQ RBCso Residential* (mg/kg)	DEQ RBCsi Residential* (mg/kg)	DEQ RBCsw Residential* (mg/kg)	B01-SS-14 (mgkg)	B03-SS-13 (mgkg)	B05-SS-14 (mgkg)
<b>GRO by NWTPH-Gx</b>							
Gasoline Range (C6-C10)	720	4,500	140	26	4.21 U	4.40 U	4.35 U
<b>TPH by NWTPH-Dx</b>							
DRO (C10-C22)	3,900	>MAX	>MAX	2,800	27.7 U	24.0 U	27.2 U
Oil Range (C22-C40)	9,800	>MAX	>MAX	>MAX	55.4 U	48.0 U	54.5 U
<b>Total Metals by 6000/7000</b>							
Cadmium	39	na	na	np	NA	1.26	1.31
Chromium	39 (a)	na	na	np	NA	8.3	10.8
Lead	400	na	na	np	NA	3.39	4.16
<b>PAHs by EPA 8270SIM</b>	various	various	various	various	ND	ND	ND
<b>VOCs by EPA 8260B</b>	various	various	various	various	ND	ND	ND

**Table 1 Notes:**

- PAHs = Polynuclear Aromatic Hydrocarbons
- VOCs = Volatile Organic Compounds
- DEQ = Oregon Department of Environmental Quality
- NWTPH = Northwest Method Total Petroleum Hydrocarbons
- GRO = gasoline range organics
- DRO = diesel range organics
- RBC = Risk Based Concentration
- RBCss = RBC for soil ingestion, dermal contact, and inhalation exposure pathways
- RBCso = RBC for volatilization to outdoor air exposure pathway
- RBCsi = RBC for vapor intrusion into buildings exposure pathway
- RBCsw = RBC for leaching to groundwater pathway
- \* = Prescribed Risk Level = 1.0E-06, Target Hazard Index = 1
- >MAX = Constituent RBC for this pathway is greater than 100,000 mg/kg.
- NA = not analyzed for this constituent

City of Portland Bureau of Environmental Services  
1505 NE Killingsworth Street Property  
Phase II Environmental Site Assessment

na = not applicable

np = leaching to groundwater RBCs not provided for these inorganic chemicals

(a) = screening criteria for Chromium (VI), analysis method for total Chromium

mg/kg = milligrams per kilogram

U = analyte not detected at concentration greater than indicated method detection limit

ND = used to indicate that no compounds within an analyte group were detected

A review of the analytical results indicates that VOCs, PAHs and petroleum hydrocarbons in the gasoline, diesel, and heavy oil ranges were not detected at concentrations greater than the laboratory method detection limit in the soil samples analyzed. Total cadmium, chromium, and lead were detected in the two soil samples analyzed at concentrations ranging from 1.26 milligrams per kilogram (mg/kg) to 10.8 mg/kg. For screening purposes, the reported concentrations were compared to the potentially applicable Oregon DEQ risk based concentrations (RBC) for soil (DEQ 2003). The screening criteria were developed on the basis of a risk level of 1E-6 for known or suspected carcinogenic compounds or a risk factor of 1 for non-carcinogens. The exposure pathway considered was residential soil ingestion, dermal contact, and inhalation (RBC<sub>ss</sub>). The detected metals constituents were not reported at concentrations greater than the soil ingestion, dermal contact and inhalation RBCs.

### 3.3.2 Soil Gas Analytical Results

Analytical results for soil gas samples are summarized in Table 2 and discussed below.

**Table 2: Soil Gas Analytical Testing Results for VOCs  
 Detected Constituents Only**

Soil Gas Analyte	CAS Registry Number	DEQ RBC Indoor Air ( $\mu\text{g}/\text{m}^3$ )	EPA Region 6 Ambient Air ( $\mu\text{g}/\text{m}^3$ )	B01-SG-05 ( $\mu\text{g}/\text{m}^3$ )	B02-SG-05 ( $\mu\text{g}/\text{m}^3$ )	B03-SG-05 ( $\mu\text{g}/\text{m}^3$ )	B04-SG-05 ( $\mu\text{g}/\text{m}^3$ )	B05-SG-05 ( $\mu\text{g}/\text{m}^3$ )	B05-SGd-05 ( $\mu\text{g}/\text{m}^3$ )	B06-SG-05 ( $\mu\text{g}/\text{m}^3$ )
1,2,4-Trimethylbenzene	95-63-6	6.2	6.3	5.4	<b>7.9</b>	<b>8.3</b>	5.4	3.9	2.4	<b>6.4</b>
1,3,5-Trimethylbenzene	108-67-8	6.2	6.2	2.6	<b>3.6</b>	3.4	2.0	2.0 U	2.0 U	2.3
2,2,4-Trimethylpentane (Isooctane)	540-84-1	na	na	1.9 U	2.0	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
2-Propanol (Isopropyl alcohol)	67-63-0	na	na	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U	29
4-Ethyltoluene	622-96-8	na	na	2.0 U	2.4	2.3	2.0 U	2.0 U	2.0 U	2.0 U
Acetone (2-Propanone)	67-64-1	na	3,300	18	<b>33</b>	31	40	43	21	29
Benzene	71-43-2	0.27	0.25	<b>5.1</b>	<b>7.3</b>	<b>15</b>	<b>10</b>	<b>6.1</b>	<b>4.2</b>	<b>5.7</b>
Carbon Disulfide	75-15-0	na	730	<b>6.8</b>	3.7	2.0	3.1	2.4	1.2 U	1.9
Chloroform (Trichloromethane)	67-66-3	0.089	0.084	1.9 U	1.9 U	<b>2.4</b>	1.9 U	1.9 U	1.9 U	1.9 U
Chloromethane (Methyl Chloride)	74-87-3	1.1	94	0.85	<b>5.4</b>	0.83 U	0.83 U	0.83 U	1.0	0.83 U
Cyclohexane	110-82-7	na	6,300	2.0	<b>3.8</b>	2.5	3.8	2.1	1.8	2.4
Dichlorodifluoromethane (Freon-12)	75-71-8	na	210	2.8	2.8	2.9	2.9	2.8	2.8	2.8
Ethanol (Ethyl alcohol)	64-17-5	na	na	<b>32,000</b>	4,900	510	300	70	34	68
Ethylbenzene	100-41-4	1,100	1,100	29	16	15	18	6.9	2.1	12
Heptane (n-Heptane)	142-82-5	na	na	1.6 U	2.3	2.2	2.5	1.6 U	1.6 U	3.2
Isopropylbenzene (Cumene)	98-82-8	400	400	2.9	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Methylene Chloride	75-09-2	na	4.1	1.4 U	1.4 U	1.4 U	<b>3.8</b>	1.4 U	1.4	2.1
n-Hexane	110-54-3	na	730	3.2	4.2	3.5	<b>5.6</b>	2.8	2.5	3.9
Propene (Propylene)	115-07-1	na	na	13	<b>41</b>	16	34	19	6.9	24
Styrene	100-42-5	1,100	1,100	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.8
tert-Butyl alcohol	75-65-0	na	na	1.2 U	1.3	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Toluene	108-88-3	5,100	5,200	14	15	<b>1,200</b>	640	1,300	110	200
Xylene (m,p)	1330-20-7	na	100	<b>130</b>	74	61	69	28	6.9	48
Xylene (o)	95-47-6	na	na	43	26	23	23	10	2.5	17
Xylenes – Total	1330-20-7 + 95-47-6	110	100	<b>173</b>	<b>100</b>	84	92	38	9.4	65

Table 2 Notes:

- VOCs = Volatile Organic Compounds
- DEQ = Oregon State Department of Environmental Quality
- RBC = Risk Based Concentration
- EPA = U.S. Environmental Protection Agency
- $\mu\text{g}/\text{m}^3$  = micrograms per cubic meter
- U = analyte not detected at concentration greater than method reporting limit
- Bold = constituent exceeds indoor air RBC

A review of the analytical results indicates that 13 to 18 VOCs were detected in each of the seven soil gas samples analyzed. For preliminary screening purposes, the detected concentrations were compared to the DEQ RBC for residential air (DEQ 2003) and the EPA Region 6 screening criteria for ambient air (EPA 2007). The screening criteria were developed on the basis of a risk level of 1E-6 for known or suspected carcinogenic compounds or a risk factor of 1 for non-carcinogens.

Five VOCs exceeded one or both of the preliminary screening criteria in one or more soil gas samples. Benzene exceeded the DEQ RBC of 0.27 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) and EPA screening criteria of 0.25  $\mu\text{g}/\text{m}^3$  in each of the seven samples analyzed. The greatest benzene concentration reported was 15  $\mu\text{g}/\text{m}^3$  (B03-SG-05). Total xylenes exceeded or equaled the DEQ RBC of 110  $\mu\text{g}/\text{m}^3$  and EPA screening criteria of 100  $\mu\text{g}/\text{m}^3$  in two samples (B01-SG-05 and B02-SG-05). The greatest total xylene concentration reported was 173  $\mu\text{g}/\text{m}^3$  (B01-SG-05). 1,2,4-trimethylbenzene (TMB) exceeded the DEQ RBC of 6.2  $\mu\text{g}/\text{m}^3$  and EPA screening criteria of 6.3  $\mu\text{g}/\text{m}^3$  in three samples (B02-SG-05, B03-SG-05, and B06-SG-05). The greatest total TMB concentration reported was 8.3  $\mu\text{g}/\text{m}^3$  (B03-SG-05). The soil gas sample obtained from boring B03 contained a chloroform concentration of 2.4  $\mu\text{g}/\text{m}^3$ , exceeding the DEQ RBC of 0.089  $\mu\text{g}/\text{m}^3$  and EPA screening criteria of 0.084  $\mu\text{g}/\text{m}^3$ . It should be noted that the laboratory method detection limit for chloroform of 1.9  $\mu\text{g}/\text{m}^3$  was greater than the DEQ and EPA screening criteria in the remaining six samples. The soil gas sample obtained from boring B02 contained a chloromethane concentration of 5.4  $\mu\text{g}/\text{m}^3$ , exceeding the DEQ RBC of 1.1  $\mu\text{g}/\text{m}^3$ , but not exceeding the EPA screening criteria of 94  $\mu\text{g}/\text{m}^3$ .

#### **4.0 Conceptual Site Model**

##### ***Residential Indoor Air – Preliminary Screening Criteria***

VOCs were detected in soil gas samples obtained from a depth of 5 feet bgs at the Site. The observed soil gas VOC concentrations are not anticipated to be of concern in non-enclosed areas due to constant exchange of air volume over the soil surface. However, it is anticipated that vapors containing concentrations of VOCs may migrate from soils and accumulate within potential future Site buildings. Because future use is undetermined and the Site is located adjacent to residential property, the potential receptors at the Site have been conservatively classified as residential and therefore residential indoor air screening criteria have been applied to evaluate the vapor intrusion pathway.

VOC concentrations were first compared to residential DEQ RBCs (DEQ, 2003). Because residential screening criteria for a broader range of constituents are available from USEPA Region 6 (USEPA, 2007), these values also were considered. In each case, the screening criteria were developed on the basis of a risk level of 1E-6 for known or suspected carcinogenic compounds or a risk factor of 1 for non-carcinogens. The screening method is considered conservative because it does not take into consideration dilution of soil gas vapors due to mixing within the air volume of potential buildings, and does not consider exchange of air through ventilation systems.

#### ***Conceptual Site Model - Soil vapor migration***

At the Site, it is anticipated that VOC concentrations in soil situated below or in close proximity to the Site provide the primary source of soil vapors of concern. The application of mass balance phase partitioning equations indicates that these VOC concentrations will sorb to soil particles (primarily to organic carbon) and partition to groundwater and soil gas where they come into contact and are not in equilibrium with these media. The VOC concentrations will be greatest at the source interface. At deeper soil depths, little advective air movement occurs and impacted soil vapor concentrations will migrate through the interstitial pore space of the soil primarily through the process of molecular diffusion, moving from areas of high concentration to low concentration. This concentration gradient may be directed upward, downward, or laterally from the source. As the contaminant diffuses away from the source through the soil pore space, the concentration will gradually decrease as a function of distance, physical properties of the lithologic material, and natural degradation of the compound through chemical and biologic processes. These processes are complex but can be estimated using an attenuation factor ( $\alpha$ ). Generic and broadly applicable alphas derived from empirical data have been published. These values are typically computed on the basis of conservative assumptions and may be appropriate for initial screening of a site.

#### ***Site Attenuation Factor***

At the Site, the properties of two distinct physical media will influence the alpha attenuation factor: the vadose zone (unsaturated) soil situated between the VOC source and the ground surface; and the building foundation configuration, typically comprised of concrete slabs for commercial structures, crawl spaces beneath residential structures, or less frequently basements for either commercial or residential structures. The appropriate attenuation factor can be estimated by considering each of these media separately and combining the resulting attenuation effects.

California EPA (CEPA) (CEPA, 2004) has published suggested attenuation factors to use for preliminary screening evaluations for a variety of typical site configurations. The most conservative scenario presented is for the basement foundation configuration, with a suggested alpha value of 0.01. Other scenarios for existing buildings range from residential slab-on-grade or crawl space foundations with alphas of 0.002, to commercial slab-on-grade foundations with an alpha of 0.001. Future construction scenarios generally anticipate greater attenuation as a result of increasingly stringent building codes, with alphas ranging from 0.0009 (residential, excepting basements) to 0.0004 (commercial).

At the Site, the observed vadose zone soils within 4 feet of the ground surface are comprised of low permeability silts and clays. The majority of soil at the Site is currently overlain by an approximately 3-inch thick layer of asphalt pavement. The existing structure at the Site is comprised of a converted mobile home configured with a crawl space foundation. It is anticipated that future Site development may include installation of concrete slab-on-grade commercial structures. It is therefore considered reasonable and conservative to estimate a Site alpha value ranging between 0.002 and 0.001. However, for comparison purposes, the suggested alpha value of 0.01 for the most conservative scenario (i.e., residential, basement foundation) has also been utilized to evaluate the soil gas results.

#### ***Site Attenuation Screening Evaluation***

A conservative alpha attenuation value of 0.01 was applied to each of the measured VOC concentrations in soil gas samples that exceed the DEQ or EPA ambient air screening criteria (Table 3). In each case, the resulting prediction for vapor intrusion VOC concentrations was less than the residential ambient air criteria. When a more-realistic Site alpha value of 0.002 was applied, the resulting prediction for vapor intrusion VOC concentrations was more than an order of magnitude less than the residential ambient air criteria for most constituents.

**Table 3: Vapor Intrusion Calculations for VOCs**  
**Soil Gas Concentrations Exceeding Ambient Air Screening Criteria**

Soil Gas Analyte	CAS Registry Number	DEQ RBC Indoor Air ( $\mu\text{g}/\text{m}^3$ )	EPA Region 6 Ambient Air ( $\mu\text{g}/\text{m}^3$ )	Greatest Measured Soil Gas Concentration ( $\mu\text{g}/\text{m}^3$ )	Predicted Vapor Intrusion Concentration alpha = 0.01 (residential, basement) ( $\mu\text{g}/\text{m}^3$ )	Predicted Vapor Intrusion Concentration alpha = 0.002 (residential slab-on-grade or crawl space) ( $\mu\text{g}/\text{m}^3$ )
1,2,4-Trimethylbenzene	95-63-6	6.2	6.3	8.3	0.083	0.017
Benzene	71-43-2	0.27	0.25	15	0.150	0.030
Chloroform (Trichloromethane)	67-66-3	0.089	0.084	2.4	0.024	0.004
Chloromethane (Methyl Chloride)	74-87-3	1.1	94	5.4	0.054	0.011
Xylene (m,p)	1330-20-7	na	100	130	1.300	0.260
Xylenes – Total	1330-20-7 + 95-47-6	110	100	173	1.730	0.346

**Table 3 Notes:**

CAS = Chemical Abstracts Service  
 VOCs = Volatile Organic Compounds  
 DEQ = Oregon State Department of Environmental Quality  
 RBC = Risk Based Concentration  
 EPA = U.S. Environmental Protection Agency  
 $\mu\text{g}/\text{m}^3$  = micrograms per cubic meter  
 na = not applicable

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

A limited Phase II ESA was conducted by AMEC including the advancement of six exploratory soil borings and associated soil and soil gas sampling. Sampling locations were selected in a biased manner, placed to evaluate several geophysical anomalies potentially representing the location of former USTs or associated piping.

VOCs, PAHs, and petroleum hydrocarbons in the gasoline, diesel, and heavy oil ranges were not detected in analyzed soil samples. The metals cadmium, chromium, and lead were not detected at concentrations greater than potentially applicable DEQ RBCs.

Some indications of impacts were observed in soil gas samples at the Site. The detected VOCs in soil gas are consistent with the presence of petroleum hydrocarbons and solvents in the subsurface. Five VOCs (benzene, xylenes, TMB, chloroform, and

City of Portland Bureau of Environmental Services  
1505 NE Killingsworth Street Property  
Phase II Environmental Site Assessment

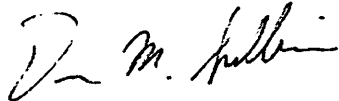
chloromethane) exceeded the conservative DEQ residential indoor air RBC and/or EPA Region 6 ambient air screening criteria in one or more soil gas samples.

A conservative alpha attenuation value of 0.01 was applied to each of the measured VOC concentrations in soil gas samples that exceeded the preliminary ambient air screening criteria. In each case, the resulting prediction for vapor intrusion VOC concentrations was less than the residential ambient air criteria. On the basis of the field observations, laboratory results, and vapor intrusion calculations, the observed impacts do not suggest gross contamination of the soils underlying the Site. Petroleum hydrocarbon and solvent compounds likely are present in the subsurface within or in close proximity to the Site, however, it does not appear that the measured VOC concentrations warrant further Site assessment or mitigation actions.

We appreciate the opportunity to be of service to BES on this project. Please contact the undersigned if you have any questions or comments regarding this report.

Sincerely,

**AMEC Earth & Environmental, Inc.**



Dennis M. Sullivan, R.G.  
Geologist



Leonard C. Farr, Jr., R.G.  
Senior Associate/Geologist

## REFERENCES

AMEC Earth and Environmental, Inc. (AMEC), 2007. Site-Specific Health and Safety Plan, Phase II Environmental Site Assessment, Killingsworth Commercial Property, 1505 NE Killingsworth Street, Portland, Oregon. December 2007.

AMEC Earth and Environmental, Inc. (AMEC), 2008. Quality Assurance Project Plan, Killingsworth Commercial Property, 1505 NE Killingsworth Street, Portland, Oregon. January 2008.

California Environmental Protection Agency (CEPA), Department of Toxic Substances Control, 2004. Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air, Interim Final. December 15, 2004.

Hahn and Associates, Inc., 2007. A Phase I Environmental Site Assessment, Killingsworth Commercial Property, 1505 NE Killingsworth Street, Portland, Oregon. July 20, 2007.

Oregon Department of Environmental Quality (DEQ), 2003. Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites. September 22, 2003.

U.S. Environmental Protection Agency (EPA), 2002. OSWER Draft Guidance for Evaluation the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance). November 2002.

U.S. Environmental Protection Agency (EPA), 2007. EPA Region 6 Human Health Medium-Specific Screening Levels. December 2007.

## LIMITATIONS

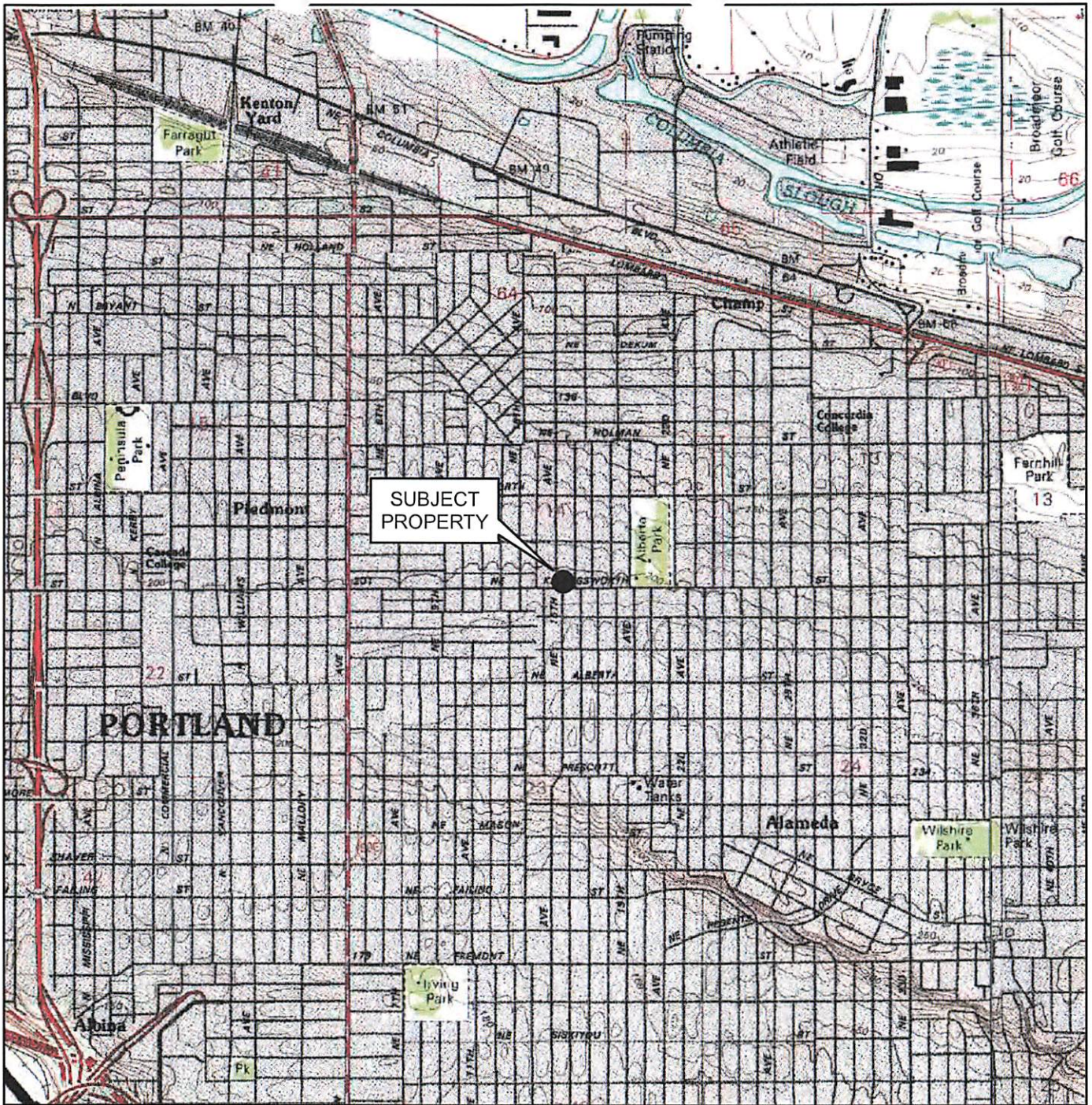
This report was prepared exclusively for City of Portland Bureau of Environmental Services (BES) by AMEC Earth & Environmental, Inc. (AMEC). The quality of information, conclusions and estimates contained herein is consistent with the level of effort involved in AMEC services and based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions and qualifications set forth in this report. This Phase II ESA Report is intended to be used by BES for the 0.14-Acre property located at 1505 NE Killingsworth Street, Portland, Oregon only, subject to the terms and conditions of its contract with AMEC. Any other use of, or reliance on, this report by any third party is at that party's sole risk.

AMEC services have been performed in accordance with the normal and reasonable standard of care exercised by similar professionals performing services under similar conditions and geographic locations. Except for our stated standard of care, no other warranties or guarantees are offered as part of AMEC's contracted services.

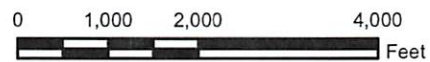
The purpose of an environmental site assessment is to reasonably evaluate the potential for adverse impact from past practices at a given property or neighboring properties. In performing an environmental site assessment, it is understood that a balance must be struck between a reasonable inquiry into the environmental issues and an exhaustive analysis of each conceivable issue of potential concern. The professional opinions in this report are based in part on the interpretation of data from discrete sampling locations that may not represent conditions at unsampled locations.

Finally, it should be noted that no subsurface exploration can be thorough enough to exclude the possible presence of hazardous materials or wastes at a given site. In cases where contaminants have not been discovered through exploration, this should not be construed as a guarantee that contaminants do not exist. At a given site, environmental conditions may exist that cannot be identified by visual observation. Where sample collection and testing have been performed, AMEC's professional opinions are based in part on the interpretation of data from discrete sampling locations that may not represent conditions at unsampled locations.

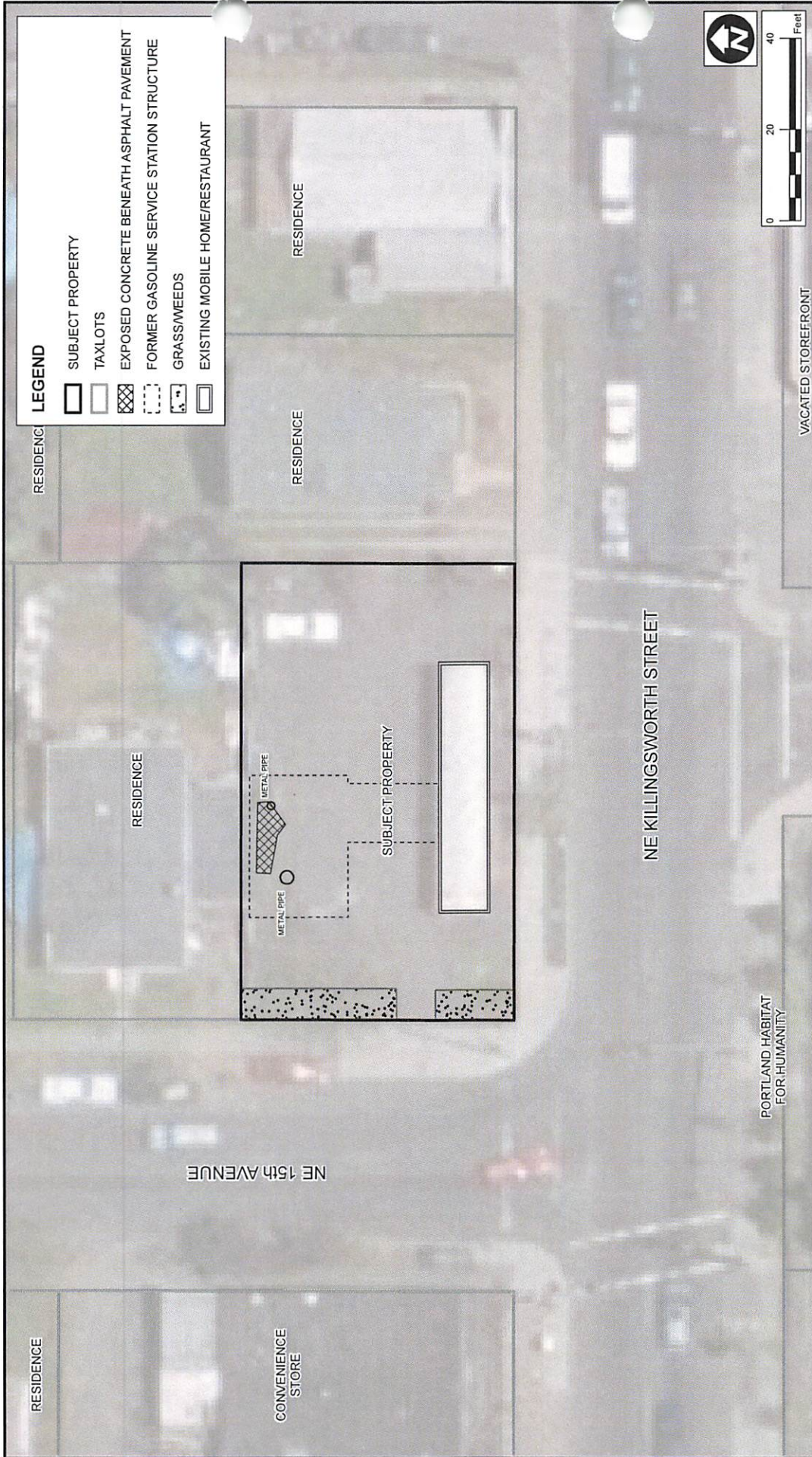
**FIGURES**



Base Map from <http://terraserver-usa.com/>



<p>AMEC Earth &amp; Environmental 7376 SW Durham Road Portland, OR, U.S.A. 97224</p>				<p>CLIENT: <b>CITY OF PORTLAND BUREAU OF ENVIRONMENTAL SERVICES</b></p>	
<p>PROJECT: <b>PHASE II ESA - 1505 NE KILLINGSWORTH</b></p>		<p>DWN BY: LR/PM</p>	<p>DATUM: NAD83</p>	<p>DATE: JANUARY 2008</p>	
<p>TITLE: <b>LOCATION MAP</b></p>		<p>CHKD BY: X</p>	<p>REV. NO.: X</p>	<p>PROJECT NO.: 7-61M-117120</p>	
		<p>PROJECTION: UTM ZONE 10N</p>	<p>SCALE: 1 inch equals 2,000 feet</p>	<p>FIGURE No.: <b>FIGURE 1</b></p>	









**LEGEND**

- SUBJECT PROPERTY
- TAXLOTS
- EXPOSED CONCRETE BENEATH ASPHALT PAVEMENT
- FORMER GASOLINE SERVICE STATION STRUCTURE
- GRASS/WEEDS
- EXISTING MOBILE HOME/RESTAURANT

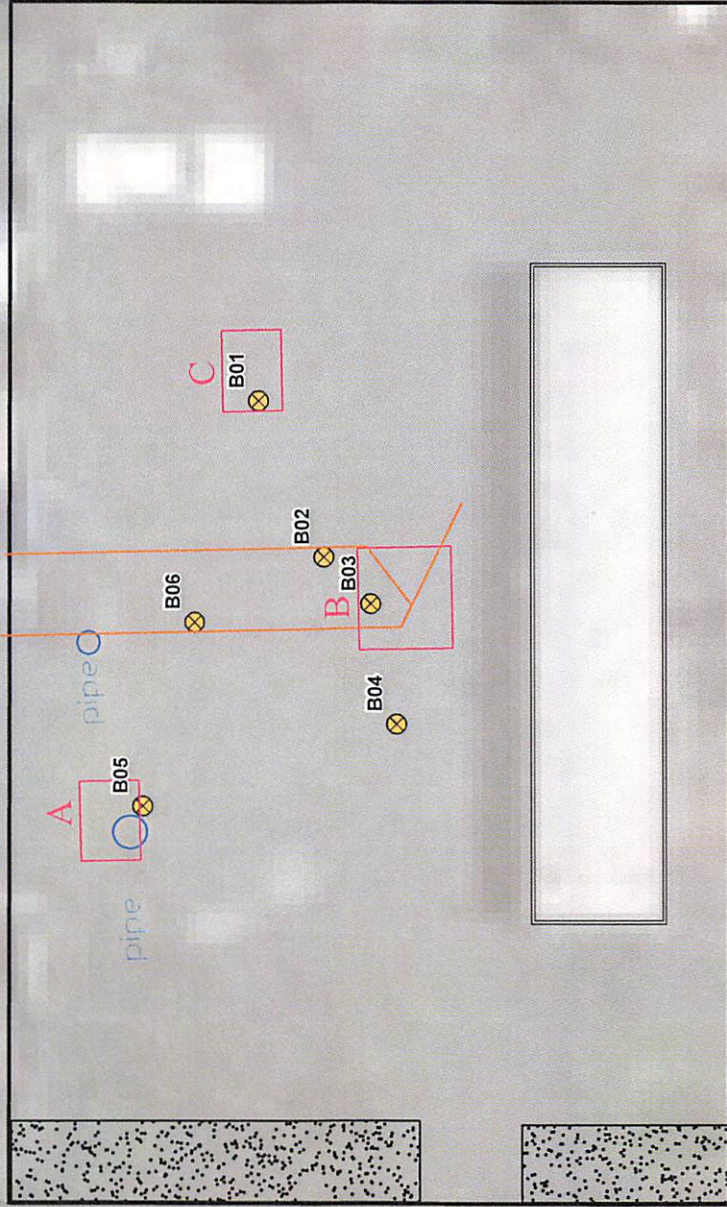
CLIENT LOGO CLIENT:		CITY OF PORTLAND BUREAU OF ENVIRONMENTAL SERVICES 		DATE: JANUARY 2008 PROJECT NO.: 7-61M-117120 REV. NO.: X FIGURE NO.: X FIGURE 2
OWNER: LRP/M: DS DRAWN BY: DS STATUS: NAD 83	PROJECT: PHASE II ESA - 1505 NE KILLINGSWORTH	TITLE: SITE PLAN		
PROJECTION: UTM ZONE 10N SCALE: 1 inch equals 20 feet	PORTLAND HABITAT FOR HUMANITY			
CLIENT LOGO CLIENT LOGO		AMEC Earth & Environmental 7376 SW Durham Road Portland, OR, U.S.A. 97224		
2002 Aerial Photograph from <a href="http://terraser-ver-usa.com">http://terraser-ver-usa.com</a> Site features are interpreted from aerial photographs and Hahn And Associates Phase I ESA Figure 2 (2007), all locations are approximate.		K:\1108011700117120\M3\AcView\Figure_2.mxd		


INCIDENCE

**LEGEND**

-  BORING LOCATION
-  GEOPHYSICAL ANOMALY
-  SUBJECT PROPERTY
-  TAXLOTS
-  GRASSWEEDS
-  EXISTING MOBILE HOME/RESTAURANT

RESIDENCE



CLIENT  CITY OF PORTLAND BUREAU OF ENVIRONMENTAL SERVICES    AMEC Earth & Environmental 7376 SW Durham Road Portland, OR, U.S.A. 97224	OWN BY LRP/PM DS	PROJECT PHASE II ESA - 1505 NE KILLINGSWORTH	DATE JANUARY 2008
	DRAWN BY DATUM NAD 83	PROJECTION UTM ZONE 10N	TITLE GEOPHYSICAL ANOMALIES AND SAMPLING LOCATIONS
CLIENT LOGO	SCALE 1 inch equals 10 feet	FIGURE NO. FIGURE 3	REV. NO. X

2002 Aerial Photograph from <http://terraserver-usa.com>  
 Site features are interpreted from aerial photographs and  
 Hahn And Associates Phase I ESA Figure 2 (2007), all  
 locations are approximate.



## **APPENDIX A**

### **Geophysical Survey Report**



Northwest  
Geophysical  
Associates, Inc.

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PO Box 1063, Corvallis, OR 97339-1063  
Phone: (541) 757-7231 FAX: (541) 757-7331  
www.nga.com • info@nga.com

January 14, 2008

Dennis Sullivan  
AMEC Earth & Environmental  
7376 SW Durham Road  
Portland, Oregon 97222

**Re:** *Geophysical Site Investigation  
1505 NE Killingsworth Street  
Portland, Oregon*

Dear Mr. Sullivan,

Northwest Geophysical Associates (NGA) conducted a geophysical site investigation at 1505 NE Killingsworth Street, Portland, Oregon on Friday, January 11, 2008. The objective of the geophysical investigation was to detect and delineate underground storage tanks (USTs), piping or other subsurface objects present in the subsurface, and to provide borehole hazard clearance for six proposed exploratory borehole locations (PEBL).

The geophysical investigation included an electromagnetic (EM) survey utilizing the Geonics EM31 terrain conductivity meter, a magnetic (MAG) survey utilizing a Geometrics G858G magnetometer/gradiometer, utility detection equipment and a ground penetrating radar (GPR). Basic principles of these techniques are described in Attachment A, *Geophysical Detection of Buried Objects*.

A site map with the geophysical interpretation is presented as Figure 1. The site is an asphalt covered parking lot at 1505 NE Killingsworth Street, Portland, Oregon.

## FIELD SURVEY

Geophysical field work was carried out on Friday, January 11, 2008, by two geophysicists from NGA.

### ***Survey Control***

A geophysical survey grid was established across the site using a surveyors tape. Grid spacing was 2 meters. NGA marked the grid, at 2 meter stations, using orange survey paint. NGA assigned the southwest corner of the site a coordinate of 0 east, 50 north. The survey grid was utilized for the MAG and GPR surveys. Geophysical anomalies and interpretations are expressed using these site coordinates.

A Trimble Pro XRS Differential Global Positioning System (DGPS) was used to survey the locations of the Geophysical survey grid, site utilities, geophysical anomalies, and selected site features.

All visible objects on the site that might contribute to interference, cultural anomalies, were mapped prior to the survey.

### ***Magnetic Data Acquisition***

The MAG survey was conducted using a Geometrics G858G cesium magnetometer/gradiometer. This instrument was run in the "continuous" sampling mode, recording the magnetic field at 0.2 second intervals (approximately 1.0 feet). Two magnetic sensors spaced 0.5 meters apart, one above the other, were used to obtain the vertical magnetic gradient. Line spacing for the MAG survey was 2 meters. Magnetic survey lines were run in a north-south alternating fashion, and are referred to as data lines on Figure 1.

### ***EM Data Acquisition***

EM data were acquired using a Geonics EM-31 terrain conductivity meter. Both quadrature-phase (conductivity) and in-phase data were recorded. This instrument was run in the "continuous" sampling mode, recording EM data at 0.2 second intervals (approximately 1.0 feet), along survey lines spaced 2 meters apart.

### ***GPR Data Acquisition***

Gridded GPR data were collected across the site. Line spacing for the GPR survey was 2 meters; lines were run along south to north, as well as west to east, transects. GPR survey line locations, referred to as data lines, are shown on Figure 1. Additional GPR data were collected over Anomalies A, B, and C which are described below. GPR data were acquired using a Geophysical Survey Systems, Inc. (GSSI) SIR3000 control unit and a 400 MHz antenna equipped with a survey wheel.

### ***Utility Location Survey and Borehole Clearances***

In addition to conducting a geophysical site investigation, NGA also provided a combined utility locate and borehole clearance survey. NGA used RadioDetection

equipment (RD 4000) and an alternate EM pipe and cable locator (Fischer TW6 m-scope) to perform a utility location survey. Upon conclusion of the site investigation and utility location survey, the AMEC Earth & Environmental representative selected 8 PEBLs. NGA inspected these locations with GPR, RadioDetection, and EM equipment in order to provide a borehole hazard clearance. Results of these clearances are described in the results and interpretation section below.

## DATA PROCESSING

Magnetic (MAG) data were gridded and contoured using the Geosoft Data Processing and Analysis software system. GPR data were analyzed with RADAN software from GSSI.

### ***Electromagnetic Data***

EM data collected at this site were not used for this interpretation as the presence of numerous above ground sources of EM noise (e.g. metallic sided restaurant) prevented collection of data which could be correlated to subsurface conditions.

### ***Magnetic Field Data***

Magnetic data were analyzed according to magnetic vertical gradient, the total magnetic field, and the magnetic analytic signal. The analytic signal provides a simplified signature and better resolution of the anomalous areas than unprocessed field data. A high in the analytic signal occurs directly over the magnetic source. The vertical gradient is measured by taking the difference in the magnetic field as measured by two sensors spaced 0.5 meters apart, one above the other. Anomalies will have both high and low values associated with them. MAG anomalies are summarized in the results and interpretation section below.

### ***Ground Penetrating Radar Data***

GPR data profiles were analyzed using GSSI's RADAN 6.5 radar processing software. GPR profiles were printed and inspected for reflections consistent with subsurface conditions indicative of the presence of USTs and piping as well as for reflections indicative of trenching.

## RESULTS AND INTERPRETATION

Interpretations of MAG and GPR data are represented on Figure 1 and summarized below. The anomaly designations A, B, and C refer to anomalies identified on Figure 1, *Geophysical Interpretation*.

Figure 1 details a number of sources of cultural interference on site including existing buildings and fences. We cannot rule out the presence of underground storage tanks (UST), pipes or other subsurface features in the immediate vicinity of, or extending under certain features, such as the building. In those areas, the geophysical response from a metallic line would likely be masked by the signal from the building.

### ***Anomaly A;***

Anomaly A is a magnetic anomaly approximately located at site coordinate 10E, 64N. The footprint of this anomaly occurred in an area of reinforced concrete (as noted on GPR records transecting this area), but exhibited a magnetic signature more consistent with a single source. A 5 inch diameter vertical pipe asphalted in place and left even with the ground surface was noted near the center of Anomaly A. It is NGA's interpretation that the magnetic anomaly noted at this location is likely related to this pipe. Inspection of the GPR data revealed reflections in the shallow subsurface indicating concrete reinforcement. No other GPR anomalies indicative of USTs or trenching were observed in this vicinity.

### ***Anomaly B;***

Anomaly B is a combined magnetic and GPR anomaly. Approximately located at site coordinate 14.5E, 56.5N, the magnetic footprint of the anomaly was broad in nature (several meters across). GPR profiles in the area displayed reflections interpreted to be unknown utilities also detected during the utility location survey. These utilities converge at the center of Anomaly B. The southern extent of the magnetic anomaly could not be defined and may extend under the existing building.

### ***Anomaly C;***

Approximately located at site coordinate 21.5E, 61N, Anomaly C is similar to Anomaly B in its character. A magnetic anomaly displaying a small footprint, Anomaly C did not have GPR reflectors consistent with USTs or trenching; however, the presence of standing water at the surface during the time of the survey limited the depth of GPR investigation.

***Utility Location Survey Results and Interpretation;***

Using a RD 4000 Radiodetection utility locator, NGA was able to identify two unknown utilities that transit the site, in parallel with each other, from the north to nearly the center of Anomaly B, where they converge or cross. These anomalies were marked with orange survey paint at the site, and are noted on Figure 1.

***Borehole Clearance Results and Interpretation;***

In addition to the RD 4000, NGA used GPR to perform investigations over 8 boring locations marked in white paint by the AMEC Earth & Environmental representative. AMEC Earth & Environmental requested a 'one call' utility locate prior to the geophysical site investigation. Though the 'one call' locate had not been completed at the time of the geophysical site investigation, the local natural gas utility (Northwest Natural) noted that no gas transmission lines transit the site, while sanitary sewer and water alignments were noted on Killingsworth and the nearby cross streets, off the site proper. Electric and communication utilities were noted above ground. Results of the borehole clearances are summarized below.

- PEBL 1 – A small GPR reflection was noted at the original location. NGA moved the PEBL several feet. No GPR anomalies or utilities were detected in the immediate vicinity of the new location.
- PEBLs 2 & 2alt – Centered on top of Anomaly B, PEBL 2 is not in an ideal location to avoid conflicts with geophysical anomalies and detected utilities. Personal communication with the AMEC Earth & Environmental representative revealed that the location is of interest for the boring program despite the noted conflicts. NGA cleared an alternate location several feet to the north.
- PEBL 3 – Located very near one of the detected utilities, NGA would advise moving this PEBL two to three feet to the west or five to six feet to the east in order to avoid this utility.
- PEBLs 4 & 5 – Located on either side of a detected utility, PEBLs 4 & 5 would be less likely to pose a boring hazard if moved to their immediate east and west respectively.
- PEBL 6 – Located very near the center of Anomaly C, PEBL 6 is otherwise in an area free of geophysical conflicts. NGA would advise moving the boring to an area away from the geophysical anomaly.
- PEBLs 7&8 – Located to the east and north of the pipe suspected to be the source of Anomaly A, PEBLs 7 & 8 are likely to encounter reinforced concrete. Though no utilities were detected in the immediate vicinity, NGA would advise moving both borings several feet to the south to avoid a conflict with Anomaly A.

NGA understands that the locations of PEBLs 1-8 were based on the AMEC Earth & Environmental site representative's wish to investigate the nature of the geophysical anomalies preliminarily identified at the site during the geophysical investigation. None the less, it is NGA's suggestion to move all borings away from detected utilities and geophysical anomalies in order to avoid potential hazards during boring activities.

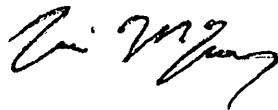
## CLOSURE

Geophysical surveys performed as part of this survey may or may not successfully detect or delineate any or all subsurface objects or features present. Locations, depths and scale of buried objects or subsurface features mapped as a result of this survey are a result of geophysical interpretation only, and should be considered as confirmed, actual, or accurate only where recovered by excavation or drilling.

Northwest Geophysical Associates, Inc. performed this work in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions. No warranty, express or implied, beyond exercise of reasonable care and professional diligence, is made. This report is intended for use only in accordance with the purposes of the study described within.

Thank you for the opportunity to work with AMEC Earth & Environmental. Please feel free to call if you have questions or need additional information.

Yours truly,  
Northwest Geophysical Associates, Inc.



Neil McKay  
Project Geophysicist

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PROJECT: 655

Attachments: Attachment A - *Geophysical Detection of Buried Objects*

**Geophysical Site Investigation  
1505 NE Killingsworth Street  
Portland, Oregon**

*Attachment A  
NGA Technical Note*

**Geophysical Detection of Buried Objects**



# Geophysical Services

Environmental • Groundwater • Geotechnical

TECHNICAL  
NOTE



**Ground Penetrating Radar**

## Geophysical Detection of Buried Objects



**Electromagnetics *EM31***



**Magnetics**



**Electromagnetics - *EM61-MK2***

COVER rev.4, JUNE 2006

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## GEOPHYSICAL DETECTION OF BURIED OBJECTS

Revision June 2006

### INTRODUCTION

Several geophysical techniques are used for locating buried objects such as underground storage tanks, pipes, utilities, drums and other debris. These techniques are used routinely, and are often recommended or required by state agencies, funding institutions and/or the EPA, particularly on sites where underground burial of steel drums or other debris may have occurred or where underground storage tanks are suspected.

Geophysics is generally used in the early reconnaissance phase of these investigations as a guide to sampling, excavation and/or placement of monitoring wells. In this paper we describe three of the most common geophysical techniques, electromagnetics (EM), magnetics (MAG) and ground penetrating radar (GPR).

### UTILITY OF GEOPHYSICS:

First, a few words about "geophysics" as used for environmental and geotechnical engineering applications. Surface geophysical techniques probe subsurface materials (soils and rock) using surface instruments. This is done by measuring physical signals which have interacted with the earth materials. These signals may be electrical, magnetic, acoustic (seismic) or electromagnetic.

Surface geophysics offers several advantages over other exploration techniques:

1) Surface geophysical methods are "*non-intrusive*" in that they do not disturb the ground surface, or stir up any contaminants which might be in the soil.

2) Geophysical methods *measure earth properties over a large volume*. Whereas drilling only samples the earth at the point of the borehole, the measured geophysical response is affected by earth materials several feet, or tens of feet, away from the instrument sensor. This allows broad areas to be effectively "screened" with a series of surface measurements.

3) Most geophysical equipment used in environmental and geotechnical applications *can be hand carried*. Geophysical surveys do not require vehicular access, but only a walking path, clear of brush and obstacles.

4) Geophysical surveys are relatively *inexpensive* and can be performed quickly.

### TYPICAL OBJECTIVES:

Geophysics may be used in either the reconnaissance mode, or in a detailed survey mode. In the reconnaissance mode, geophysics is used to "screen" large areas to determine the presence or absence of buried objects. In more detailed surveys, the location and extent of the object is mapped in greater detail. This facilitates the efficient excavation of tanks or debris, aids the effective placement of monitoring wells, or improves the design of a sampling program.

The techniques discussed here are also useful for objectives other than identifying buried objects. Electromagnetic induction (EM) is especially useful in mapping changes in soil (e.g. sand or gravel channels), mapping clay aquitards and mapping contaminant leachate plumes in groundwater. GPR can be used to map shallow stratigraphy or to map zones of disturbed soils.

## GEOPHYSICAL METHODS:

Three geophysical methods are commonly used in the search for buried objects: 1) electromagnetic induction (EM), 2) magnetics (MAG), and 3) ground penetrating radar (GPR). EM and magnetics are complementary methods, most effective in the reconnaissance mode but also useful for more detailed work. GPR is most effective for detailed work, but may also be used in reconnaissance surveys.

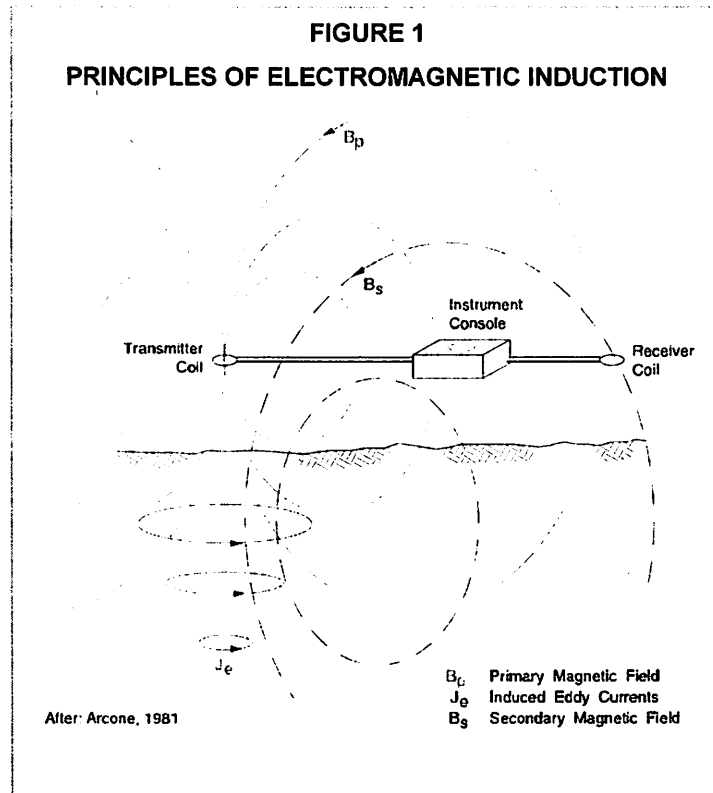
### **Electromagnetic Methods:**

The electromagnetic induction (EM) technique measures the electrical conductivity of the earth by inducing a time varying electric current in the earth. This is shown schematically in Figure 1. The EM technique was developed to measure natural soil conductivity to aid in identifying soil types and to measure rock conductivity in order to identify zones of conductive mineralization.

Man-made metallic objects are generally orders of magnitude more conductive than natural soils. Thus, the electric currents induced in the ground by EM instruments will be dramatically affected by the presence of any man-made metallic object. Examples include pipes, tanks, cables, concrete reinforcing steel, or steel drums. By looking for anomalous signals which cannot be attributed to natural soils, buried metallic objects can readily be identified.

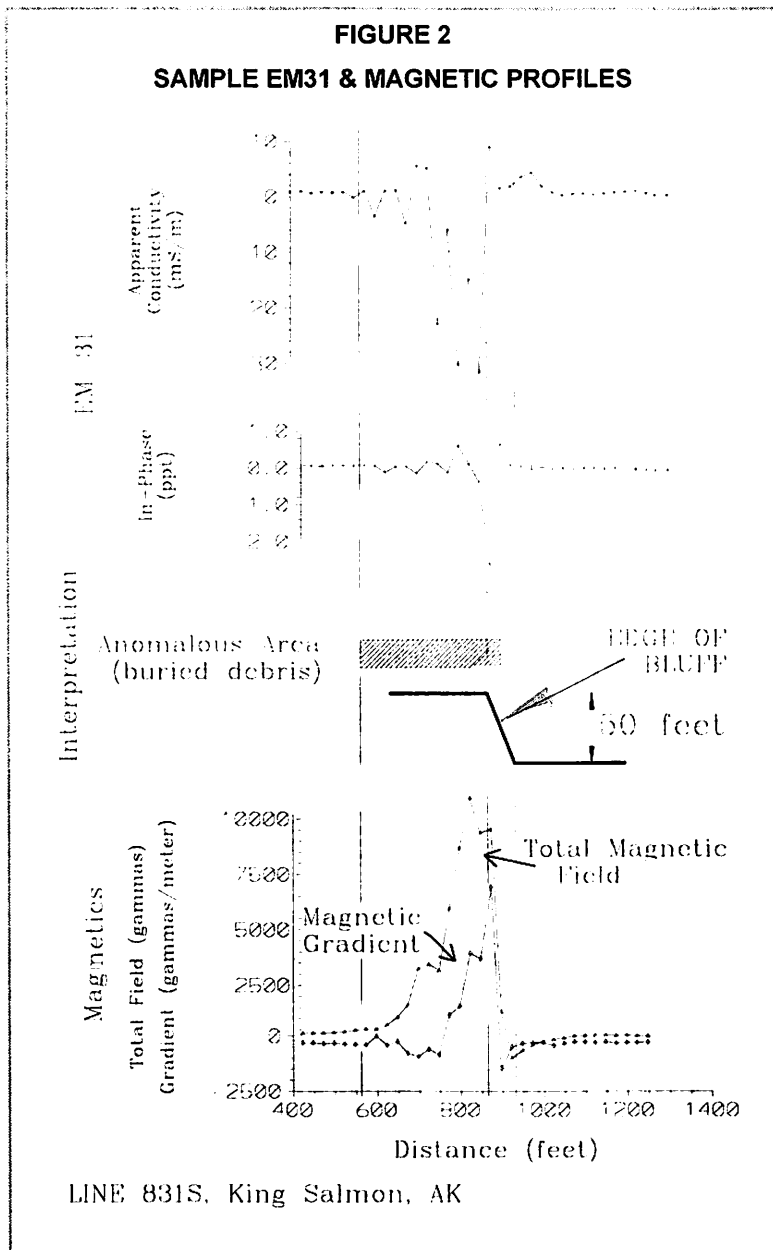
### **Frequency-domain EM – EM31**

Frequency domain EM systems transmit a sinusoidal waveform at a fixed frequency, or multiple frequencies. The resulting secondary magnetic field may be phase shifted, depending on the nature of the target. Both the in-phase component (in phase with the primary magnetic field) and the quadrature phase component (shifted 90° from the primary field) can be measured to provide the phase shift information.



The Geonics EM-31 is a common frequency domain EM instrument, often used for buried object detection. The upper left photo on the cover shows the EM-31 in a field situation. A transmitter coil is in one end of the boom and a receiver coil in the other end. Depth of investigation is generally 10-15 feet, but the EM-31 may detect large metal objects at a somewhat greater distance. The instrument can quickly cover a wide area, mapping anomalous areas (metallic object locations) as well as changes in the soil character.

Figure 2 shows some sample data over a disposal site where 55 gallon steel drums had been dumped on the edge of a bluff and then covered with soil, extending the bluff for tens of feet (cross hatched block in Figure 2). The noisy and/or negative "apparent" conductivity is a clear indicator of metallic objects. The EM-31 also records an "in-phase response" which aids in identifying metallic conductors. Data in Figure 2 indicate the zone of burial extends from 560 feet to 940 feet along the line of the profile.



slower rate than currents induced in the ground. Hence, metallic conductors can be easily identified.

The EM61-MK2 is a time domain metal detector manufactured by Geonics, Ltd., of Toronto, Canada. The EM61-MK2 instrument consists of two horizontal air cored coils, 1.0 meter by 0.5 meters in size. The bottom coil acts as a receiver and transmitter and the top coil as a receiver. The top coil is mounted 28 centimeters above the bottom coil. The instrument weighs about 75 lbs. and is pulled by one operator.

The Geonics EM61-MKII has 4 time gates, to measure the rate of decay of the signal, and two receiver coils, to measure the field gradient. The rate of decay is dependant on the size, shape, and orientation of the metallic object. Generally, they are used to estimate gross target parameters, but can be used for more detailed discrimination of targets, particularly in identifying unexploded ordnance (UXO) materials.

The two receiver coils are very helpful in the recognition of near surface objects from deeper objects. Since the amplitude of the response is highly dependent on the distance between the coil assembly and target, small near surface targets often produce a

response orders of magnitude larger than targets having greater size at deeper depths. This masking effect from the near surface materials is drastically reduced by processing output of the two coils, essentially subtracting the bottom coil data from the top coil data. This is referred to as the differential mode or the differential signal.

### Time-domain EM – EM61

Time-domain EM systems transmit a magnetic pulse, with a duration in the order of 10s of micro-seconds ( $\mu$ s). That magnetic pulse induces electric currents in the ground as well as in any metallic object which is buried (or on the surface) within its range of influence. Currents induced in metallic conductors decay at a much

Figure 3 shows some sample data over a 55 gallon steel drums partially buried, essentially flush with the surface of the ground. The response from the top and bottom coils is

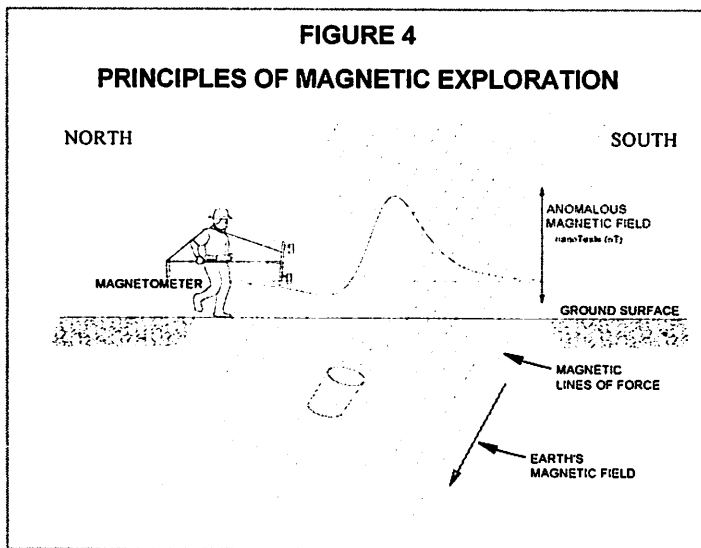
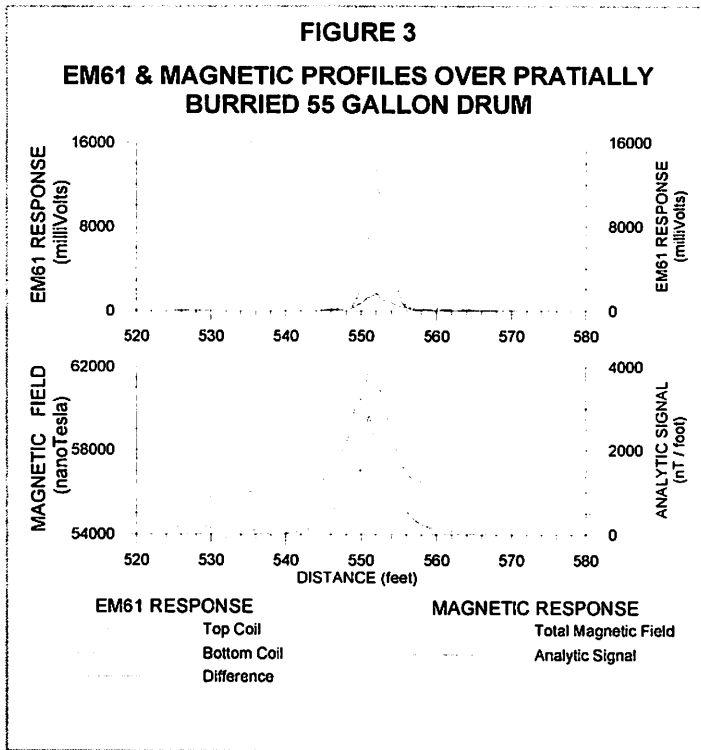
indicative of a substantial metallic presence. The relatively weak differential response is indicative of a shallow target.

**Magnetic Methods:**

Magnetic methods measure disturbances in the earth's natural magnetic field. These disturbances are caused by magnetic materials, either magnetic rocks, or man made objects containing iron or steel. This is shown schematically in Figure 4. Most soils have negligible magnetization (both induced and remanent). Thus, most magnetic disturbances from shallow sources can be attributed to iron or steel objects which have been placed there by man's activities.

Magnetometers used for buried object detection usually measure the gradient of the magnetic field. This is done by measuring the difference between the magnetic field at two sensors separated vertically by two or three feet. This configuration is more sensitive to nearby disturbances, and is less effected by disturbances caused by distant objects or shallow bedrock.

The upper right photo on the cover shows a magnetometer/gradiometer. This instrument can also cover wide areas quickly, providing complementary data to the EM. Figure 2 includes total magnetic field data and gradiometer data over the barrel disposal area. The large deviations in both total field and gradient are indicative of steel objects in close proximity.



### Ground Penetrating Radar:

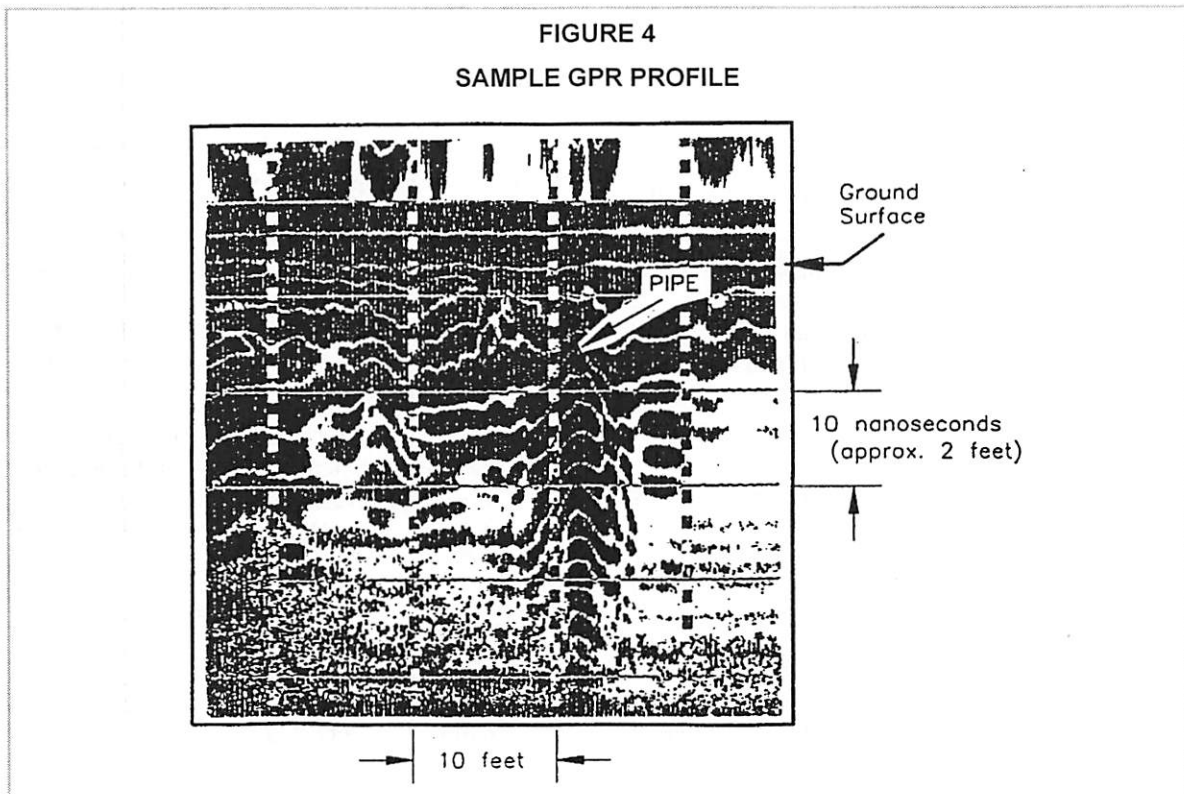
Ground penetrating radar (GPR), like other radar techniques, sends out an electromagnetic pulse (radio wave or microwave) which is reflected off a "target" and returns to the receiver. GPR operates at lower frequencies (80-500 MHz) than other radar to obtain better penetration in the earth materials. The antenna is pulled slowly along the ground surface to produce a continuous subsurface profile.

The lower photo on the cover shows a GPR unit in operation. The 500 MHz antenna shown is being pulled along the sidewalk. The control and recording unit, on the tailgate of the truck, is powered by a 12 volt automobile battery.

Figure 4 is an example GPR profile over a shallow pipe. The vertical scale is a time scale, giving the time for the radar pulse to travel down to the reflector and return to the receiver.

Knowing the pulse velocity in the soils, we can convert this to depth. The horizontal scale corresponds to distance along the surface. Fiducial time marks on the record are placed at ten foot intervals. The pipe reflector shown appears as a hyperbola on the record. The pipe produces a strong reflection with a characteristic ringing of the electronics, which appears as a dark band below the first arrival from the pipe.

GPR is a tool for looking at selected areas in detail. Its continuous subsurface profiles give a graphic portrayal of subsurface conditions, and often provide an excellent means of accurately locating pipes and tanks. However, the GPR depth of exploration is strongly dependent on soil conductivity and subsurface conditions. In dry, sandy soils useful data may be obtained from depths down to 15 feet, whereas in conductive clay soils, investigation depth is often limited to two or three feet.



## DISCUSSION:

As we have stressed, EM and magnetics are effective in screening large areas quickly to identify areas where buried objects may be present. Often these techniques can provide a rough estimate of the size and depth of the object causing the anomalous readings.

The choice of frequency domain EM (i.e. EM31) versus time-domain EM (i.e. EM61) depends on the objectives and the site. The EM61 is very effective at identifying small pieces of metal (e.g. unexploded ordnance), and offers some depth and discrimination capability. It is also less sensitive to cultural noise (e.g. buildings, vehicles, etc.) than the EM31. The EM61 can often resolve anomalies which are close together, where the EM31 could not. However, the EM61 requires a tight line spacing, typically 1 meter, to assure the area is covered. Also, the wheeled cart is difficult or impossible to operate on some sites (the EM61 can also be carried on a shoulder harness but is very awkward).

The EM31 is favored over the EM61 on more open sites where the objective is to locate underground tanks, drums, or collections of debris. The broader sphere of influence of the EM31 allows it to be run on a coarser line spacing, typically 5-20 feet depending on the target.

A major limitation of both EM and MAG is their sensitivity to "cultural noise". Buildings, fences, metallic surface debris, and vehicles all create cultural noise. The EM and magnetic instruments respond to any metallic objects, whether buried or in plain view above ground. Thus, areas within 20 to 40 feet of buildings, vehicles or pipelines will be masked by the strong response from those objects. EM and magnetics will not be able to definitively identify other buried objects within that masked zone.

GPR on the other hand is fairly immune to those forms of cultural noise. The radar signal is confined to a broad beam, spreading at roughly a 45° angle, beneath the antenna. Most antennas are well shielded with little upward

propagation of the pulse. Thus GPR can be run next to buildings, fences and parked vehicles. GPR may be run inside buildings and even over reinforced concrete.

Because the GPR beam is directional, it does not have the same utility as a reconnaissance tool as the EM and magnetics. Whereas the latter techniques would readily detect a large tank 10 or 20 feet off the survey line, GPR would not detect the tank unless the survey line passed directly over the tank.

## CONCLUSIONS

No geophysical technique should be used without some form of "ground truth" by drilling, excavation, or some other form of sampling. The geophysical signature of an underground storage tank may be very similar to that of a buried automobile. However, geophysics can eliminate random drilling or extensive excavation when searching for underground tank or other materials.

To conclude, EM, magnetic and GPR techniques are effective, complimentary techniques used in the detection and delineation of subsurface metallic objects. The choice of technique or techniques depends very much on both site conditions and the survey objective.

## FURTHER READING:

Benson, R.C., Glaccum, R.A., and Noel, M.R., 1982, Geophysical techniques for sensing buried wastes and waste migration: Report prepared by TECHNOS, Inc. for EPA, Advanced Monitoring Systems Division, Las Vegas, pp.235.

Evans, R.B., 1982, Currently available geophysical methods for use in hazardous waste site investigations: from Risk Assessment at Hazardous Waste Sites, ACS symposium series No.204, p.93-115.

French, R.B., Williams, T.R., and Foster, A.R., 1988, Geophysical surveys at a superfund site, Western Processing, Washington: Proc. of SAGEEP, March 1988, Golden, Colorado, p.747-753.

McNeill, J.D., 1990, Use of electro-magnetic methods for groundwater studies: in Geotechnical and Environmental Geophysics, ed.: S.H.Ward, SEG, IG#5, p.191:218.

Steeple, Don, 1991, Uses and Techniques of Environmental Geophysics: The Leading Edge, Vol.10, no.9, P.30-31.

Romig, Phillip, 1992, Engineering and Environmental Geophysics Get Top Billing at SAGEEP.: The Leading Edge Vol. 11, No. 11, P.36-37.

---

*DISCUSSION OF GEOPHYSICAL TECHNIQUES*

**GEOPHYSICAL DETECTION OF BURIED OBJECTS**

Northwest Geophysical Associates, Inc.

P.O. Box 1063

Corvallis, Oregon 97339

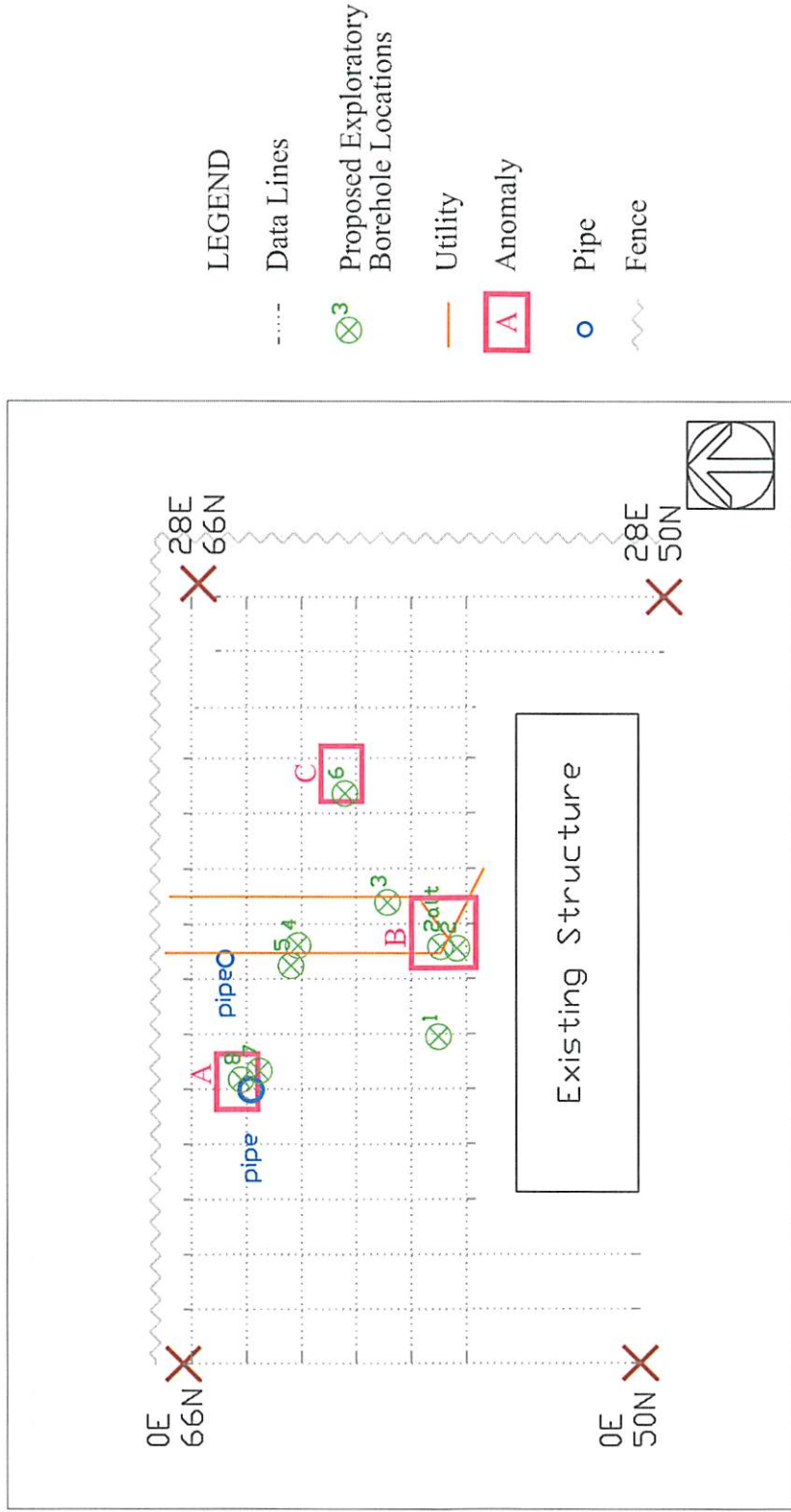
<http://www.nga.com>

phone: (541) 757-7231

Rowland B. French, PhD, R.G.

Senior Geophysicist

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LEGEND

- - - - Data Lines
- ⊗<sup>3</sup> Proposed Exploratory Borehole Locations
- Utility
- ⊠ Anomaly
- Pipe
- ~ Fence



FIGURE 1







Geophysical Interpretation

Geophysical Site Investigation  
 1505 NE Killingsworth Street  
 Portland, Oregon




## **APPENDIX B**

### **Boring Logs**

DEPTH (ft bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	VOLATILE READING (ppm)	GROUNDWATER	GW SCREENED INTERVAL	FIELD TESTING	TESTING AND LABORATORY DATA
0		CL	Asphalt (3-inch layer). Dark brown, sandy CLAY with some fine, subangular gravel, low plasticity; moist.		0.0				
5		SC	Dark brown, fine to coarse, clayey SAND with fine to coarse, subangular gravel; moist.		0.0				B01-SG-05
10					0.0				B01-SS-14
15			End of boring at 15 ft bgs.						

BORING METHOD: Direct Push      ELEVATION REFERENCE: NA  
 BOREHOLE DIAMETER:  
 DRILL RIG: AMS Power Probe 9800 VTR      GROUND SURFACE ELEVATION: NA  
 CONTRACTOR: Pacific Soil & Water/Neil      START CARD/TAG ID: NA  
 LOGGED BY: D. Sullivan      DRILLING DATES: 01/17/2008 - 01/17/2008

REMARKS:

1505 Killingsworth  7-61M-117120	AMEC 7376 SW Durham Road Portland, Oregon USA 97224 Tel (503) 639-3400 Fax (503) 620-7892		<b>LOG OF BORING B01</b>  PAGE 1 OF 1
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DIRECT PUSH BORING 7-61M-117120.GPJ AMEC PORTLAND.GDT 1/31/08

DEPTH (ft bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	VOLATILE READING (ppm)	GROUNDWATER	GW SCREENED INTERVAL	FIELD TESTING	TESTING AND LABORATORY DATA
0		CL	Asphalt (3-inch layer). Dark yellowish brown, sandy CLAY, low to medium plasticity; wet.		0.0				
5		SM	Dark brown, fine to coarse, silty SAND with fine, subangular gravel; moist.		0.0				B02-SG-05
10		GC	Clayey GRAVEL with fine to coarse sand; moist.		0.0				B02-SS-13
15			End of boring at 15 ft bgs.						
20									
25									
30									

DIRECT PUSH BORING 7-61M-117120.GPJ AMEC PORTLAND.GDT 1/31/08

BORING METHOD: Direct Push	ELEVATION REFERENCE: NA	REMARKS: Note: Very little recovery from 5-10 ft bgs due to soil gas drive point blocking core.
BOREHOLE DIAMETER:		
DRILL RIG: AMS Power Probe 9500 VTR	GROUND SURFACE ELEVATION: NA	
CONTRACTOR: Pacific Soil & Water/Neil	START CARD/TAG ID: NA	
LOGGED BY: D. Sullivan	DRILLING DATES: 01/17/2008 - 01/17/2008	

1505 Killingsworth	AMEC 7376 SW Durham Road Portland, Oregon USA 97224 Tel (503) 639-3400 Fax (503) 620-7892		LOG OF BORING B02  PAGE 1 OF 1
7-61M-117120			

DIRECT PUSH BORING 7-61M-117120.GPJ AMEC PORTLAND.GDT 1/31/08

DEPTH (ft bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	VOLATILE READING (ppm)	GROUNDWATER	GW SCREENED INTERVAL	FIELD TESTING	TESTING AND LABORATORY DATA
0		CL	Asphalt (3-inch layer) Dark yellowish brown, sandy CLAY, low to medium plasticity; moist to wet.		0.0				
5		SM	Dark brown, fine to coarse, silty SAND with fine subangular gravel, some clay; moist.		0.0				B03-SG-05
10					0.0				
15			End of boring at 15 ft bgs.		0.0				B03-SS-13
20									
25									
30									

**BORING METHOD:** Direct Push                      **ELEVATION REFERENCE:** NA  
**BOREHOLE DIAMETER:**  
**DRILL RIG:** AMS Power Probe 9500 VTR            **GROUND SURFACE ELEVATION:** NA  
**CONTRACTOR:** Pacific Soil & Water/Neil        **START CARD/TAG ID:** NA  
**LOGGED BY:** D. Sullivan                              **DRILLING DATES:** 01/17/2008 - 01/17/2008

**REMARKS:**

**1505 Killingsworth**  
  
**7-61M-117120**

**AMEC**  
 7376 SW Durham Road  
 Portland, Oregon  
 USA 97224  
 Tel (503) 639-3400  
 Fax (503) 620-7892



**LOG OF BORING**  
**B03**  
  
 PAGE 1 OF 1

DEPTH (ft bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	VOLATILE READING (ppm)	GROUNDWATER	GW SCREENED INTERVAL	FIELD TESTING	TESTING AND LABORATORY DATA
0		CL	Asphalt (3-inch layer) Yellowish brown, sandy CLAY, low plasticity; moist.		0.0				
5		SM-GM	Fine to coarse, silty SAND and fine, subangular to subrounded GRAVEL mix; moist.		0.0				B04-SG-05
10					0.0				B04-SS-13
15			End of boring at 15 ft bgs.						

DIRECT PUSH BORING 7-61M-117120.GPJ AMEC PORTLAND.GDT 1/31/08

**BORING METHOD:** Direct Push      **ELEVATION REFERENCE:** NA  
**BOREHOLE DIAMETER:**  
**DRILL RIG:** AMS Power Probe 9500 VTR      **GROUND SURFACE ELEVATION:** NA  
**CONTRACTOR:** Pacific Soil & Water/Neil      **START CARD/TAG ID:** NA  
**LOGGED BY:** D. Sullivan      **DRILLING DATES:** 01/17/2008 - 01/17/2008

**REMARKS:**  
Note: Little recovery from 5-10 ft bgs due to soil gas drive point blocking core.

**1505 Killingsworth**  
  
**7-61M-117120**

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**LOG OF BORING**  
**B04**  
  
PAGE 1 OF 1

DIRECT PUSH BORING 7-61M-117120.GPJ AMEC PORTLAND.GDT 1/31/08

DEPTH (ft bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	VOLATILE READING (ppm)	GROUNDWATER	GW SCREENED INTERVAL	FIELD TESTING	TESTING AND LABORATORY DATA
0		CL	Asphalt (2-inch layer) Concrete (4-inch layer) Yellowish brown, sandy CLAY with fine, subangular gravel, low plasticity; moist.		0.0				
5		SM	Fine to coarse, silty SAND with fine, subangular gravel; moist.		0.0				B05-SG-05
10					0.0				B05-SS-14
15			End of boring at 15 ft bgs.						

**BORING METHOD:** Direct Push      **ELEVATION REFERENCE:** NA  
**BOREHOLE DIAMETER:**  
**DRILL RIG:** AMS Power Probe 9500 VTR      **GROUND SURFACE ELEVATION:** NA  
**CONTRACTOR:** Pacific Soil & Water/Neil      **START CARD/TAG ID:** NA  
**LOGGED BY:** D. Sullivan      **DRILLING DATES:** 01/17/2008 - 01/17/2008







**REMARKS:**

1505 Killingsworth  
 7-61M-117120

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**LOG OF BORING  
 B05**  
 PAGE 1 OF 1

DEPTH (ft bgs)	GRAPHIC LOG	USCS SYMBOL	SOIL DESCRIPTION	SAMPLE	VOLATILE READING (ppm)	GROUNDWATER	GW SCREENED INTERVAL	FIELD TESTING	TESTING AND LABORATORY DATA
0		CL	Asphalt (3-inch layer). Yellowish brown, sandy CLAY; moist.		0.0				
5		SM-SC	Fine to coarse, silty to clayey SAND with fine, subangular gravel; moist.		0.0				B06-SG-05
10					0.0				B06-SS-13
15			End of boring at 15 ft bgs.						
20									
25									
30									

DIRECT PUSH BORING 7-61M-117120.GPJ AMEC PORTLAND.GDT 1/31/08

BORING METHOD: Direct Push                      ELEVATION REFERENCE: NA  
BOREHOLE DIAMETER:  
DRILL RIG: AMS Power Probe 9500 VTR            GROUND SURFACE ELEVATION: NA  
CONTRACTOR: Pacific Soil & Water/Neil        START CARD/TAG ID: NA  
LOGGED BY: D. Sullivan                              DRILLING DATES: 01/17/2008 - 01/17/2008

REMARKS:

1505 Killingsworth  
7-61M-117120

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LOG OF BORING  
B06  
PAGE 1 OF 1



## **APPENDIX C**

### **Analytical Results and Chain-of-Custody Documentation**



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Dennis Sullivan  
AMEC Earth & Environmental - OR  
7376 SW Durham Road

Portland, OR 97224

Report Summary

Friday January 25, 2008

Report Number: L328391

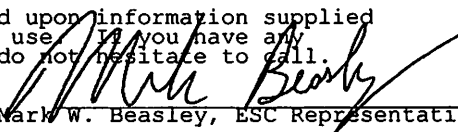
Samples Received: 01/19/08

Client Project: 761M-117-120

Description: 1515 Killingsworth

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

  
Mark W. Beasley, ESC Representative

**Laboratory Certification Numbers**

A2LA - 1461-01, AIHA - 09227, AL - 40660, CA - I-2327, CT - PH-0197, FL - E87487  
GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375, DW21704, ND - R-140  
NJ - TN002, SC - 84004, TN - 2006, VA - 00109, WV - 233  
AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910

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Est. 1970

**REPORT OF ANALYSIS**

January 25, 2008

Dennis Sullivan  
AMEC Earth & Environmental - OR  
7376 SW Durham Road  
Portland, OR 97224

Date Received : January 19, 2008  
Description : 1505 Killingsworth  
Sample ID : B01-SG-05 5 FT  
Collected By : Dennis Sullivan  
Collection Date : 01/17/08 09:42

ESC Sample # : L328391-01

Site ID :

Project # : 761M-117-120

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
<b>Volatile Organics</b>									
Acetone	67-64-1	58.1	2.50	5.90	7.4	18.	TO-15	01/21/08	2
Allyl chloride	107-05-1	76.53	0.400	1.30	< 0.40	< 1.3	TO-15	01/21/08	2
Benzene	71-43-2	78.1	0.400	1.30	1.6	5.1	TO-15	01/21/08	2
Benzyl Chloride	100-44-7	127	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
Bromodichloromethane	75-27-4	164	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Bromoform	75-25-2	253	1.20	12.0	< 1.2	< 12.	TO-15	01/21/08	2
Bromomethane	74-83-9	94.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,3-Butadiene	106-99-0	54.1	4.00	8.90	< 4.0	< 8.9	TO-15	01/21/08	2
tert-Butyl alcohol	75-65-0	74.12	0.400	1.20	< 0.40	< 1.2	TO-15	01/21/08	2
Carbon disulfide	75-15-0	76.1	0.400	1.20	2.2	6.8	TO-15	01/21/08	2
Carbon tetrachloride	56-23-5	154	0.400	2.50	< 0.40	< 2.5	TO-15	01/21/08	2
Chlorobenzene	108-90-7	113	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
Chloroethane	75-00-3	64.5	0.400	1.10	< 0.40	< 1.1	TO-15	01/21/08	2
Chloroform	67-66-3	119	0.400	1.90	< 0.40	< 1.9	TO-15	01/21/08	2
Chloromethane	74-87-3	50.5	0.400	0.830	0.41	0.85	TO-15	01/21/08	2
2-Chlorotoluene	95-49-8	126	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
Cyclohexane	110-82-7	84.2	0.400	1.40	0.57	2.0	TO-15	01/21/08	2
Dibromochloromethane	124-48-1	208	0.400	3.40	< 0.40	< 3.4	TO-15	01/21/08	2
1,2-Dibromoethane	106-93-4	188	0.400	3.10	< 0.40	< 3.1	TO-15	01/21/08	2
1,2-Dichlorobenzene	95-50-1	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,3-Dichlorobenzene	541-73-1	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,4-Dichlorobenzene	106-46-7	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,2-Dichloroethane	107-06-2	99	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,1-Dichloroethane	75-34-3	98	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,1-Dichloroethene	75-35-4	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
cis-1,2-Dichloroethene	156-59-2	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
trans-1,2-Dichloroethene	156-60-5	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,2-Dichloropropane	78-87-5	113	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
cis-1,3-Dichloropropene	10061-01	111	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
trans-1,3-Dichloropropene	10061-02	111	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
1,4-Dioxane	123-91-1	88.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
Ethanol	64-17-5	46.1	1260	2400	17000	32000	TO-15	01/22/08	2000
Ethylbenzene	100-41-4	106	0.400	1.70	6.8	29.	TO-15	01/21/08	2
4-Ethyltoluene	622-96-8	120	0.400	2.00	< 0.40	< 2.0	TO-15	01/21/08	2
Freon-11	75-69-4	137	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
Freon-12	75-71-8	121	0.400	2.00	0.57	2.8	TO-15	01/21/08	2
Freon-113	76-13-1	187	0.400	3.10	< 0.40	< 3.1	TO-15	01/21/08	2
Freon-114	76-14-2	171	0.400	2.80	< 0.40	< 2.8	TO-15	01/21/08	2
Heptane	142-82-5	100	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
Hexachloro-1,3-butadiene	87-68-3	261	1.26	13.0	< 1.3	< 13.	TO-15	01/21/08	2
n-Hexane	110-54-3	86.2	0.400	1.40	0.90	3.2	TO-15	01/21/08	2
Isopropylbenzene	98-82-8	120.2	0.400	2.00	0.60	2.9	TO-15	01/21/08	2
Methylene Chloride	75-09-2	84.9	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure

The reported analytical results relate only to the sample submitted.

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Reported: 01/24/08 14:34 Revised: 01/25/08 10:52



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

January 25, 2008

Dennis Sullivan  
AMEC Earth & Environmental - OR  
7376 SW Durham Road  
Portland, OR 97224

Date Received : January 19, 2008  
Description : 1505 Killingsworth  
Sample ID : B01-SG-05 5 FT  
Collected By : Dennis Sullivan  
Collection Date : 01/17/08 09:42

ESC Sample # : L328391-01

Site ID :

Project # : 761M-117-120

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Methyl Butyl Ketone	591-78-6	100	2.50	10.0	< 2.5	< 10.	TO-15	01/21/08	2
Methyl Ethyl Ketone	78-93-3	72.1	2.50	7.40	< 2.5	< 7.4	TO-15	01/21/08	2
Methyl Isobutyl Ketone	108-10-1	100.1	2.50	10.0	< 2.5	< 10.	TO-15	01/21/08	2
Methyl methacrylate	80-62-6	100.12	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
MTBE	1634-04-	88.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
Naphthalene	91-20-3	128	1.26	6.60	< 1.3	< 6.6	TO-15	01/21/08	2
2-Propanol	67-63-0	60.1	2.50	6.10	< 2.5	< 6.1	TO-15	01/21/08	2
Propene	115-07-1	42.1	0.800	1.40	7.5	13.	TO-15	01/21/08	2
Styrene	100-42-5	104	0.400	1.70	< 0.40	< 1.7	TO-15	01/21/08	2
1,1,2,2-Tetrachloroethane	79-34-5	168	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Tetrachloroethylene	127-18-4	166	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Tetrahydrofuran	109-99-9	72.1	0.400	1.20	< 0.40	< 1.2	TO-15	01/21/08	2
Toluene	108-88-3	92.1	0.400	1.50	3.6	14.	TO-15	01/21/08	2
1,2,4-Trichlorobenzene	120-82-1	181	1.26	9.30	< 1.3	< 9.3	TO-15	01/21/08	2
1,1,1-Trichloroethane	71-55-6	133	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
1,1,2-Trichloroethane	79-00-5	133	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
Trichloroethylene	79-01-6	131	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
1,2,4-Trimethylbenzene	95-63-6	120	0.400	2.00	1.1	5.4	TO-15	01/21/08	2
1,3,5-Trimethylbenzene	108-67-8	120	0.400	2.00	0.52	2.6	TO-15	01/21/08	2
2,2,4-Trimethylpentane	540-84-1	114.22	0.400	1.90	< 0.40	< 1.9	TO-15	01/21/08	2
Vinyl chloride	75-01-4	62.5	0.400	1.00	< 0.40	< 1.0	TO-15	01/21/08	2
Vinyl Bromide	593-60-2	106.95	0.400	1.70	< 0.40	< 1.7	TO-15	01/21/08	2
Vinyl acetate	108-05-4	86.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
m&p-Xylene	1330-20-	106	0.800	3.50	29.	130	TO-15	01/21/08	2
o-Xylene	95-47-6	106	0.400	1.70	9.9	43.	TO-15	01/21/08	2

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure

The reported analytical results relate only to the sample submitted.

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Reported: 01/24/08 14:34 Revised: 01/25/08 10:52



**ENVIRONMENTAL  
SCIENCE CORP.**

12065 Lebanon Rd.  
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Tax I.D. 62-0814289

Est. 1970

**REPORT OF ANALYSIS**

January 25, 2008

Dennis Sullivan  
AMEC Earth & Environmental - OR  
7376 SW Durham Road  
Portland, OR 97224

Date Received : January 19, 2008  
Description : 1505 Killingsworth

Sample ID : B02-SG-05 5 FT

Collected By : Dennis Sullivan  
Collection Date : 01/17/08 10:35

ESC Sample # : L328391-02

Site ID :

Project # : 761M-117-120

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
<b>Volatile Organics</b>									
Acetone	67-64-1	58.1	2.50	5.90	14.	33.	TO-15	01/21/08	2
Allyl chloride	107-05-1	76.53	0.400	1.30	< 0.40	< 1.3	TO-15	01/21/08	2
Benzene	71-43-2	78.1	0.400	1.30	2.3	7.3	TO-15	01/21/08	2
Benzyl Chloride	100-44-7	127	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
Bromodichloromethane	75-27-4	164	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Bromoform	75-25-2	253	1.20	12.0	< 1.2	< 12.	TO-15	01/21/08	2
Bromomethane	74-83-9	94.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,3-Butadiene	106-99-0	54.1	4.00	8.90	< 4.0	< 8.9	TO-15	01/21/08	2
tert-Butyl alcohol	75-65-0	74.12	0.400	1.20	0.42	1.3	TO-15	01/21/08	2
Carbon disulfide	75-15-0	76.1	0.400	1.20	1.2	3.7	TO-15	01/21/08	2
Carbon tetrachloride	56-23-5	154	0.400	2.50	< 0.40	< 2.5	TO-15	01/21/08	2
Chlorobenzene	108-90-7	113	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
Chloroethane	75-00-3	64.5	0.400	1.10	< 0.40	< 1.1	TO-15	01/21/08	2
Chloroform	67-66-3	119	0.400	1.90	< 0.40	< 1.9	TO-15	01/21/08	2
Chloromethane	74-87-3	50.5	0.400	0.830	2.6	5.4	TO-15	01/21/08	2
2-Chlorotoluene	95-49-8	126	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
Cyclohexane	110-82-7	84.2	0.400	1.40	1.1	3.8	TO-15	01/21/08	2
Dibromochloromethane	124-48-1	208	0.400	3.40	< 0.40	< 3.4	TO-15	01/21/08	2
1,2-Dibromoethane	106-93-4	188	0.400	3.10	< 0.40	< 3.1	TO-15	01/21/08	2
1,2-Dichlorobenzene	95-50-1	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,3-Dichlorobenzene	541-73-1	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,4-Dichlorobenzene	106-46-7	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,2-Dichloroethane	107-06-2	99	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,1-Dichloroethane	75-34-3	98	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,1-Dichloroethene	75-35-4	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
cis-1,2-Dichloroethene	156-59-2	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
trans-1,2-Dichloroethene	156-60-5	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,2-Dichloropropane	78-87-5	113	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
cis-1,3-Dichloropropene	10061-01	111	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
trans-1,3-Dichloropropene	10061-02	111	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
1,4-Dioxane	123-91-1	88.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
Ethanol	64-17-5	46.1	252.	480.	2600	4900	TO-15	01/22/08	400
Ethylbenzene	100-41-4	106	0.400	1.70	3.8	16.	TO-15	01/21/08	2
4-Ethyltoluene	622-96-8	120	0.400	2.00	0.49	2.4	TO-15	01/21/08	2
Freon-11	75-69-4	137	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
Freon-12	75-71-8	121	0.400	2.00	0.57	2.8	TO-15	01/21/08	2
Freon-113	76-13-1	187	0.400	3.10	< 0.40	< 3.1	TO-15	01/21/08	2
Freon-114	76-14-2	171	0.400	2.80	< 0.40	< 2.8	TO-15	01/21/08	2
Heptane	142-82-5	100	0.400	1.60	0.56	2.3	TO-15	01/21/08	2
Hexachloro-1,3-butadiene	87-68-3	261	1.26	13.0	< 1.3	< 13.	TO-15	01/21/08	2
n-Hexane	110-54-3	86.2	0.400	1.40	1.2	4.2	TO-15	01/21/08	2
Isopropylbenzene	98-82-8	120.2	0.400	2.00	< 0.40	< 2.0	TO-15	01/21/08	2
Methylene Chloride	75-09-2	84.9	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure

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Est. 1970

REPORT OF ANALYSIS

January 25, 2008

Dennis Sullivan  
AMEC Earth & Environmental - OR  
7376 SW Durham Road  
Portland, OR 97224

Date Received : January 19, 2008  
Description : 1505 Killingsworth  
Sample ID : B02-SG-05 5 FT  
Collected By : Dennis Sullivan  
Collection Date : 01/17/08 10:35

ESC Sample # : L328391-02

Site ID :

Project # : 761M-117-120

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Methyl Butyl Ketone	591-78-6	100	2.50	10.0	< 2.5	< 10.	TO-15	01/21/08	2
Methyl Ethyl Ketone	78-93-3	72.1	2.50	7.40	< 2.5	< 7.4	TO-15	01/21/08	2
Methyl Isobutyl Ketone	108-10-1	100.1	2.50	10.0	< 2.5	< 10.	TO-15	01/21/08	2
Methyl methacrylate	80-62-6	100.12	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
MTBE	1634-04-	88.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
Naphthalene	91-20-3	128	1.26	6.60	< 1.3	< 6.6	TO-15	01/21/08	2
2-Propanol	67-63-0	60.1	2.50	6.10	< 2.5	< 6.1	TO-15	01/21/08	2
Propene	115-07-1	42.1	0.800	1.40	24.	41.	TO-15	01/21/08	2
Styrene	100-42-5	104	0.400	1.70	< 0.40	< 1.7	TO-15	01/21/08	2
1,1,2,2-Tetrachloroethane	79-34-5	168	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Tetrachloroethylene	127-18-4	166	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Tetrahydrofuran	109-99-9	72.1	0.400	1.20	< 0.40	< 1.2	TO-15	01/21/08	2
Toluene	108-88-3	92.1	0.400	1.50	4.1	15.	TO-15	01/21/08	2
1,2,4-Trichlorobenzene	120-82-1	181	1.26	9.30	< 1.3	< 9.3	TO-15	01/21/08	2
1,1,1-Trichloroethane	71-55-6	133	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
1,1,2-Trichloroethane	79-00-5	133	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
Trichloroethylene	79-01-6	131	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
1,2,4-Trimethylbenzene	95-63-6	120	0.400	2.00	1.6	7.9	TO-15	01/21/08	2
1,3,5-Trimethylbenzene	108-67-8	120	0.400	2.00	0.73	3.6	TO-15	01/21/08	2
2,2,4-Trimethylpentane	540-84-1	114.22	0.400	1.90	0.43	2.0	TO-15	01/21/08	2
Vinyl chloride	75-01-4	62.5	0.400	1.00	< 0.40	< 1.0	TO-15	01/21/08	2
Vinyl Bromide	593-60-2	106.95	0.400	1.70	< 0.40	< 1.7	TO-15	01/21/08	2
Vinyl acetate	108-05-4	86.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
m&p-Xylene	1330-20-	106	0.800	3.50	17.	74.	TO-15	01/21/08	2
o-Xylene	95-47-6	106	0.400	1.70	6.1	26.	TO-15	01/21/08	2

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure

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**REPORT OF ANALYSIS**

January 25, 2008

Dennis Sullivan  
AMEC Earth & Environmental - OR  
7376 SW Durham Road  
Portland, OR 97224

Date Received : January 19, 2008  
Description : 1505 Killingsworth  
Sample ID : B03-SG-05 5 FT  
Collected By : Dennis Sullivan  
Collection Date : 01/17/08 11:20

ESC Sample # : L328391-03

Site ID :

Project # : 761M-117-120

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
<b>Volatile Organics</b>									
Acetone	67-64-1	58.1	2.50	5.90	13.	31.	TO-15	01/21/08	2
Allyl chloride	107-05-1	76.53	0.400	1.30	< 0.40	< 1.3	TO-15	01/21/08	2
Benzene	71-43-2	78.1	0.400	1.30	4.6	15.	TO-15	01/21/08	2
Benzyl Chloride	100-44-7	127	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
Bromodichloromethane	75-27-4	164	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Bromoform	75-25-2	253	1.20	12.0	< 1.2	< 12.	TO-15	01/21/08	2
Bromomethane	74-83-9	94.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,3-Butadiene	106-99-0	54.1	4.00	8.90	< 4.0	< 8.9	TO-15	01/21/08	2
tert-Butyl alcohol	75-65-0	74.12	0.400	1.20	< 0.40	< 1.2	TO-15	01/21/08	2
Carbon disulfide	75-15-0	76.1	0.400	1.20	0.65	2.0	TO-15	01/21/08	2
Carbon tetrachloride	56-23-5	154	0.400	2.50	< 0.40	< 2.5	TO-15	01/21/08	2
Chlorobenzene	108-90-7	113	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
Chloroethane	75-00-3	64.5	0.400	1.10	< 0.40	< 1.1	TO-15	01/21/08	2
Chloroform	67-66-3	119	0.400	1.90	0.49	2.4	TO-15	01/21/08	2
Chloromethane	74-87-3	50.5	0.400	0.830	< 0.40	< 0.83	TO-15	01/21/08	2
2-Chlorotoluene	95-49-8	126	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
Cyclohexane	110-82-7	84.2	0.400	1.40	0.74	2.5	TO-15	01/21/08	2
Dibromochloromethane	124-48-1	208	0.400	3.40	< 0.40	< 3.4	TO-15	01/21/08	2
1,2-Dibromoethane	106-93-4	188	0.400	3.10	< 0.40	< 3.1	TO-15	01/21/08	2
1,2-Dichlorobenzene	95-50-1	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,3-Dichlorobenzene	541-73-1	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,4-Dichlorobenzene	106-46-7	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,2-Dichloroethane	107-06-2	99	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,1-Dichloroethane	75-34-3	98	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,1-Dichloroethene	75-35-4	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
cis-1,2-Dichloroethene	156-59-2	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
trans-1,2-Dichloroethene	156-60-5	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,2-Dichloropropane	78-87-5	113	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
cis-1,3-Dichloropropene	10061-01	111	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
trans-1,3-Dichloropropene	10061-02	111	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
1,4-Dioxane	123-91-1	88.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
Ethanol	64-17-5	46.1	25.2	48.0	270	510	TO-15	01/22/08	40
Ethylbenzene	100-41-4	106	0.400	1.70	3.5	15.	TO-15	01/21/08	2
4-Ethyltoluene	622-96-8	120	0.400	2.00	0.46	2.3	TO-15	01/21/08	2
Freon-11	75-69-4	137	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
Freon-12	75-71-8	121	0.400	2.00	0.58	2.9	TO-15	01/21/08	2
Freon-113	76-13-1	187	0.400	3.10	< 0.40	< 3.1	TO-15	01/21/08	2
Freon-114	76-14-2	171	0.400	2.80	< 0.40	< 2.8	TO-15	01/21/08	2
Heptane	142-82-5	100	0.400	1.60	0.54	2.2	TO-15	01/21/08	2
Hexachloro-1,3-butadiene	87-68-3	261	1.26	13.0	< 1.3	< 13.	TO-15	01/21/08	2
n-Hexane	110-54-3	86.2	0.400	1.40	1.0	3.5	TO-15	01/21/08	2
Isopropylbenzene	98-82-8	120.2	0.400	2.00	< 0.40	< 2.0	TO-15	01/21/08	2
Methylene Chloride	75-09-2	84.9	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure

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REPORT OF ANALYSIS

January 25, 2008

Dennis Sullivan  
AMEC Earth & Environmental - OR  
7376 SW Durham Road  
Portland, OR 97224

Date Received : January 19, 2008  
Description : 1505 Killingsworth  
Sample ID : B03-SG-05 5 FT  
Collected By : Dennis Sullivan  
Collection Date : 01/17/08 11:20

ESC Sample # : L328391-03

Site ID :

Project # : 761M-117-120

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Methyl Butyl Ketone	591-78-6	100	2.50	10.0	< 2.5	< 10.	TO-15	01/21/08	2
Methyl Ethyl Ketone	78-93-3	72.1	2.50	7.40	< 2.5	< 7.4	TO-15	01/21/08	2
Methyl Isobutyl Ketone	108-10-1	100.1	2.50	10.0	< 2.5	< 10.	TO-15	01/21/08	2
Methyl methacrylate	80-62-6	100.12	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
MTBE	1634-04-	88.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
Naphthalene	91-20-3	128	1.26	6.60	< 1.3	< 6.6	TO-15	01/21/08	2
2-Propanol	67-63-0	60.1	2.50	6.10	< 2.5	< 6.1	TO-15	01/21/08	2
Propene	115-07-1	42.1	0.800	1.40	9.2	16.	TO-15	01/21/08	2
Styrene	100-42-5	104	0.400	1.70	< 0.40	< 1.7	TO-15	01/21/08	2
1,1,2,2-Tetrachloroethane	79-34-5	168	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Tetrachloroethylene	127-18-4	166	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Tetrahydrofuran	109-99-9	72.1	0.400	1.20	< 0.40	< 1.2	TO-15	01/21/08	2
Toluene	108-88-3	92.1	8.00	30.0	310	1200	TO-15	01/22/08	40
1,2,4-Trichlorobenzene	120-82-1	181	1.26	9.30	< 1.3	< 9.3	TO-15	01/21/08	2
1,1,1-Trichloroethane	71-55-6	133	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
1,1,2-Trichloroethane	79-00-5	133	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
Trichloroethylene	79-01-6	131	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
1,2,4-Trimethylbenzene	95-63-6	120	0.400	2.00	1.7	8.3	TO-15	01/21/08	2
1,3,5-Trimethylbenzene	108-67-8	120	0.400	2.00	0.69	3.4	TO-15	01/21/08	2
2,2,4-Trimethylpentane	540-84-1	114.22	0.400	1.90	< 0.40	< 1.9	TO-15	01/21/08	2
Vinyl chloride	75-01-4	62.5	0.400	1.00	< 0.40	< 1.0	TO-15	01/21/08	2
Vinyl Bromide	593-60-2	106.95	0.400	1.70	< 0.40	< 1.7	TO-15	01/21/08	2
Vinyl acetate	108-05-4	86.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
m&p-Xylene	1330-20-	106	0.800	3.50	14.	61.	TO-15	01/21/08	2
o-Xylene	95-47-6	106	0.400	1.70	5.3	23.	TO-15	01/21/08	2

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure

The reported analytical results relate only to the sample submitted.

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Tax I.D. 62-0814289

Est. 1970

**REPORT OF ANALYSIS**

January 25, 2008

Dennis Sullivan  
AMEC Earth & Environmental - OR  
7376 SW Durham Road  
Portland, OR 97224

Date Received : January 19, 2008  
Description : 1505 Killingsworth

Sample ID : B04-SG-05 5 FT

Collected By : Dennis Sullivan  
Collection Date : 01/17/08 12:05

ESC Sample # : L328391-04

Site ID :

Project # : 761M-117-120

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
<b>Volatile Organics</b>									
Acetone	67-64-1	58.1	2.50	5.90	17.	40.	TO-15	01/21/08	2
Allyl chloride	107-05-1	76.53	0.400	1.30	< 0.40	< 1.3	TO-15	01/21/08	2
Benzene	71-43-2	78.1	0.400	1.30	3.2	10.	TO-15	01/21/08	2
Benzyl Chloride	100-44-7	127	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
Bromodichloromethane	75-27-4	164	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Bromoform	75-25-2	253	1.20	12.0	< 1.2	< 12.	TO-15	01/21/08	2
Bromomethane	74-83-9	94.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,3-Butadiene	106-99-0	54.1	4.00	8.90	< 4.0	< 8.9	TO-15	01/21/08	2
tert-Butyl alcohol	75-65-0	74.12	0.400	1.20	< 0.40	< 1.2	TO-15	01/21/08	2
Carbon disulfide	75-15-0	76.1	0.400	1.20	0.98	3.1	TO-15	01/21/08	2
Carbon tetrachloride	56-23-5	154	0.400	2.50	< 0.40	< 2.5	TO-15	01/21/08	2
Chlorobenzene	108-90-7	113	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
Chloroethane	75-00-3	64.5	0.400	1.10	< 0.40	< 1.1	TO-15	01/21/08	2
Chloroform	67-66-3	119	0.400	1.90	< 0.40	< 1.9	TO-15	01/21/08	2
Chloromethane	74-87-3	50.5	0.400	0.830	< 0.40	< 0.83	TO-15	01/21/08	2
2-Chlorotoluene	95-49-8	126	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
Cyclohexane	110-82-7	84.2	0.400	1.40	1.1	3.8	TO-15	01/21/08	2
Dibromochloromethane	124-48-1	208	0.400	3.40	< 0.40	< 3.4	TO-15	01/21/08	2
1,2-Dibromoethane	106-93-4	188	0.400	3.10	< 0.40	< 3.1	TO-15	01/21/08	2
1,2-Dichlorobenzene	95-50-1	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,3-Dichlorobenzene	541-73-1	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,4-Dichlorobenzene	106-46-7	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,2-Dichloroethane	107-06-2	99	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,1-Dichloroethane	75-34-3	98	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,1-Dichloroethene	75-35-4	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
cis-1,2-Dichloroethene	156-59-2	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
trans-1,2-Dichloroethene	156-60-5	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,2-Dichloropropane	78-87-5	113	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
cis-1,3-Dichloropropene	10061-01	111	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
trans-1,3-Dichloropropene	10061-02	111	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
1,4-Dioxane	123-91-1	88.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
Ethanol	64-17-5	46.1	12.6	24.0	160	300	TO-15	01/22/08	20
Ethylbenzene	100-41-4	106	0.400	1.70	4.2	18.	TO-15	01/21/08	2
4-Ethyltoluene	622-96-8	120	0.400	2.00	< 0.40	< 2.0	TO-15	01/21/08	2
Freon-11	75-69-4	137	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
Freon-12	75-71-8	121	0.400	2.00	0.58	2.9	TO-15	01/21/08	2
Freon-113	76-13-1	187	0.400	3.10	< 0.40	< 3.1	TO-15	01/21/08	2
Freon-114	76-14-2	171	0.400	2.80	< 0.40	< 2.8	TO-15	01/21/08	2
Heptane	142-82-5	100	0.400	1.60	0.61	2.5	TO-15	01/21/08	2
Hexachloro-1,3-butadiene	87-68-3	261	1.26	13.0	< 1.3	< 13.	TO-15	01/21/08	2
n-Hexane	110-54-3	86.2	0.400	1.40	1.6	5.6	TO-15	01/21/08	2
Isopropylbenzene	98-82-8	120.2	0.400	2.00	< 0.40	< 2.0	TO-15	01/21/08	2
Methylene Chloride	75-09-2	84.9	0.400	1.40	1.1	3.8	TO-15	01/21/08	2

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure

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REPORT OF ANALYSIS

January 25, 2008

Dennis Sullivan  
AMEC Earth & Environmental - OR  
7376 SW Durham Road  
Portland, OR 97224

Date Received : January 19, 2008  
Description : 1505 Killingsworth  
Sample ID : B04-SG-05 5 FT  
Collected By : Dennis Sullivan  
Collection Date : 01/17/08 12:05

ESC Sample # : L328391-04

Site ID :

Project # : 761M-117-120

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Methyl Butyl Ketone	591-78-6	100	2.50	10.0	< 2.5	< 10.	TO-15	01/21/08	2
Methyl Ethyl Ketone	78-93-3	72.1	2.50	7.40	< 2.5	< 7.4	TO-15	01/21/08	2
Methyl Isobutyl Ketone	108-10-1	100.1	2.50	10.0	< 2.5	< 10.	TO-15	01/21/08	2
Methyl methacrylate	80-62-6	100.12	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
MTBE	1634-04-	88.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
Naphthalene	91-20-3	128	1.26	6.60	< 1.3	< 6.6	TO-15	01/21/08	2
2-Propanol	67-63-0	60.1	2.50	6.10	< 2.5	< 6.1	TO-15	01/21/08	2
Propene	115-07-1	42.1	0.800	1.40	20.	34.	TO-15	01/21/08	2
Styrene	100-42-5	104	0.400	1.70	< 0.40	< 1.7	TO-15	01/21/08	2
1,1,2,2-Tetrachloroethane	79-34-5	168	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Tetrachloroethylene	127-18-4	166	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Tetrahydrofuran	109-99-9	72.1	0.400	1.20	< 0.40	< 1.2	TO-15	01/21/08	2
Toluene	108-88-3	92.1	4.00	15.0	170	640	TO-15	01/22/08	20
1,2,4-Trichlorobenzene	120-82-1	181	1.26	9.30	< 1.3	< 9.3	TO-15	01/21/08	2
1,1,1-Trichloroethane	71-55-6	133	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
1,1,2-Trichloroethane	79-00-5	133	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
Trichloroethylene	79-01-6	131	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
1,2,4-Trimethylbenzene	95-63-6	120	0.400	2.00	1.1	5.4	TO-15	01/21/08	2
1,3,5-Trimethylbenzene	108-67-8	120	0.400	2.00	0.41	2.0	TO-15	01/21/08	2
2,2,4-Trimethylpentane	540-84-1	114.22	0.400	1.90	< 0.40	< 1.9	TO-15	01/21/08	2
Vinyl chloride	75-01-4	62.5	0.400	1.00	< 0.40	< 1.0	TO-15	01/21/08	2
Vinyl Bromide	593-60-2	106.95	0.400	1.70	< 0.40	< 1.7	TO-15	01/21/08	2
Vinyl acetate	108-05-4	86.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
m&p-Xylene	1330-20-	106	0.800	3.50	16.	69.	TO-15	01/21/08	2
o-Xylene	95-47-6	106	0.400	1.70	5.4	23.	TO-15	01/21/08	2

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure

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Est. 1970

REPORT OF ANALYSIS

January 25, 2008

Dennis Sullivan  
AMEC Earth & Environmental - OR  
7376 SW Durham Road  
Portland, OR 97224

Date Received : January 19, 2008  
Description : 1505 Killingsworth  
Sample ID : B05-SG-05 5 FT  
Collected By : Dennis Sullivan  
Collection Date : 01/17/08 12:55

ESC Sample # : L328391-05

Site ID :

Project # : 761M-117-120

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Volatile Organics									
Acetone	67-64-1	58.1	2.50	5.90	18.	43.	TO-15	01/21/08	2
Allyl chloride	107-05-1	76.53	0.400	1.30	< 0.40	< 1.3	TO-15	01/21/08	2
Benzene	71-43-2	78.1	0.400	1.30	1.9	6.1	TO-15	01/21/08	2
Benzyl Chloride	100-44-7	127	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
Bromodichloromethane	75-27-4	164	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Bromoform	75-25-2	253	1.20	12.0	< 1.2	< 12.	TO-15	01/21/08	2
Bromomethane	74-83-9	94.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,3-Butadiene	106-99-0	54.1	4.00	8.90	< 4.0	< 8.9	TO-15	01/21/08	2
tert-Butyl alcohol	75-65-0	74.12	0.400	1.20	< 0.40	< 1.2	TO-15	01/21/08	2
Carbon disulfide	75-15-0	76.1	0.400	1.20	0.77	2.4	TO-15	01/21/08	2
Carbon tetrachloride	56-23-5	154	0.400	2.50	< 0.40	< 2.5	TO-15	01/21/08	2
Chlorobenzene	108-90-7	113	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
Chloroethane	75-00-3	64.5	0.400	1.10	< 0.40	< 1.1	TO-15	01/21/08	2
Chloroform	67-66-3	119	0.400	1.90	< 0.40	< 1.9	TO-15	01/21/08	2
Chloromethane	74-87-3	50.5	0.400	0.830	< 0.40	< 0.83	TO-15	01/21/08	2
2-Chlorotoluene	95-49-8	126	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
Cyclohexane	110-82-7	84.2	0.400	1.40	0.62	2.1	TO-15	01/21/08	2
Dibromochloromethane	124-48-1	208	0.400	3.40	< 0.40	< 3.4	TO-15	01/21/08	2
1,2-Dibromoethane	106-93-4	188	0.400	3.10	< 0.40	< 3.1	TO-15	01/21/08	2
1,2-Dichlorobenzene	95-50-1	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,3-Dichlorobenzene	541-73-1	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,4-Dichlorobenzene	106-46-7	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,2-Dichloroethane	107-06-2	99	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,1-Dichloroethane	75-34-3	98	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,1-Dichloroethene	75-35-4	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
cis-1,2-Dichloroethene	156-59-2	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
trans-1,2-Dichloroethene	156-60-5	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,2-Dichloropropane	78-87-5	113	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
cis-1,3-Dichloropropene	10061-01	111	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
trans-1,3-Dichloropropene	10061-02	111	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
1,4-Dioxane	123-91-1	88.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
Ethanol	64-17-5	46.1	1.26	2.40	37.	70.	TO-15	01/21/08	2
Ethylbenzene	100-41-4	106	0.400	1.70	1.6	6.9	TO-15	01/21/08	2
4-Ethyltoluene	622-96-8	120	0.400	2.00	< 0.40	< 2.0	TO-15	01/21/08	2
Freon-11	75-69-4	137	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
Freon-12	75-71-8	121	0.400	2.00	0.57	2.8	TO-15	01/21/08	2
Freon-113	76-13-1	187	0.400	3.10	< 0.40	< 3.1	TO-15	01/21/08	2
Freon-114	76-14-2	171	0.400	2.80	< 0.40	< 2.8	TO-15	01/21/08	2
Heptane	142-82-5	100	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
Hexachloro-1,3-butadiene	87-68-3	261	1.26	13.0	< 1.3	< 13.	TO-15	01/21/08	2
n-Hexane	110-54-3	86.2	0.400	1.40	0.80	2.8	TO-15	01/21/08	2
Isopropylbenzene	98-82-8	120.2	0.400	2.00	< 0.40	< 2.0	TO-15	01/21/08	2
Methylene Chloride	75-09-2	84.9	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure

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REPORT OF ANALYSIS

January 25, 2008

Dennis Sullivan  
AMEC Earth & Environmental - OR  
7376 SW Durham Road  
Portland, OR 97224

Date Received : January 19, 2008  
Description : 1505 Killingsworth  
Sample ID : B05-SG-05 5 FT  
Collected By : Dennis Sullivan  
Collection Date : 01/17/08 12:55

ESC Sample # : L328391-05

Site ID :

Project # : 761M-117-120

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Methyl Butyl Ketone	591-78-6	100	2.50	10.0	< 2.5	< 10.	TO-15	01/21/08	2
Methyl Ethyl Ketone	78-93-3	72.1	2.50	7.40	< 2.5	< 7.4	TO-15	01/21/08	2
Methyl Isobutyl Ketone	108-10-1	100.1	2.50	10.0	< 2.5	< 10.	TO-15	01/21/08	2
Methyl methacrylate	80-62-6	100.12	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
MTBE	1634-04-	88.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
Naphthalene	91-20-3	128	1.26	6.60	< 1.3	< 6.6	TO-15	01/21/08	2
2-Propanol	67-63-0	60.1	2.50	6.10	< 2.5	< 6.1	TO-15	01/21/08	2
Propene	115-07-1	42.1	0.800	1.40	11.	19.	TO-15	01/21/08	2
Styrene	100-42-5	104	0.400	1.70	< 0.40	< 1.7	TO-15	01/21/08	2
1,1,2,2-Tetrachloroethane	79-34-5	168	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Tetrachloroethylene	127-18-4	166	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Tetrahydrofuran	109-99-9	72.1	0.400	1.20	< 0.40	< 1.2	TO-15	01/21/08	2
Toluene	108-88-3	92.1	8.00	30.0	340	1300	TO-15	01/22/08	40
1,2,4-Trichlorobenzene	120-82-1	181	1.26	9.30	< 1.3	< 9.3	TO-15	01/21/08	2
1,1,1-Trichloroethane	71-55-6	133	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
1,1,2-Trichloroethane	79-00-5	133	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
Trichloroethylene	79-01-6	131	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
1,2,4-Trimethylbenzene	95-63-6	120	0.400	2.00	0.80	3.9	TO-15	01/21/08	2
1,3,5-Trimethylbenzene	108-67-8	120	0.400	2.00	< 0.40	< 2.0	TO-15	01/21/08	2
2,2,4-Trimethylpentane	540-84-1	114.22	0.400	1.90	< 0.40	< 1.9	TO-15	01/21/08	2
Vinyl chloride	75-01-4	62.5	0.400	1.00	< 0.40	< 1.0	TO-15	01/21/08	2
Vinyl Bromide	593-60-2	106.95	0.400	1.70	< 0.40	< 1.7	TO-15	01/21/08	2
Vinyl acetate	108-05-4	86.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
m&p-Xylene	1330-20-	106	0.800	3.50	6.4	28.	TO-15	01/21/08	2
o-Xylene	95-47-6	106	0.400	1.70	2.3	10.	TO-15	01/21/08	2

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure

The reported analytical results relate only to the sample submitted.

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Tax I.D. 62-0814289

Est. 1970

**REPORT OF ANALYSIS**

January 25, 2008

Dennis Sullivan  
AMEC Earth & Environmental - OR  
7376 SW Durham Road  
Portland, OR 97224

Date Received : January 19, 2008  
Description : 1505 Killingsworth

Sample ID : B05-SGD-05 5 FT

Collected By : Dennis Sullivan  
Collection Date : 01/17/08 12:55

ESC Sample # : L328391-06

Site ID :

Project # : 761M-117-120

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
<b>Volatile Organics</b>									
Acetone	67-64-1	58.1	2.50	5.90	8.8	21.	TO-15	01/21/08	2
Allyl chloride	107-05-1	76.53	0.400	1.30	< 0.40	< 1.3	TO-15	01/21/08	2
Benzene	71-43-2	78.1	0.400	1.30	1.3	4.2	TO-15	01/21/08	2
Benzyl Chloride	100-44-7	127	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
Bromodichloromethane	75-27-4	164	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Bromoform	75-25-2	253	1.20	12.0	< 1.2	< 12.	TO-15	01/21/08	2
Bromomethane	74-83-9	94.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,3-Butadiene	106-99-0	54.1	4.00	8.90	< 4.0	< 8.9	TO-15	01/21/08	2
tert-Butyl alcohol	75-65-0	74.12	0.400	1.20	< 0.40	< 1.2	TO-15	01/21/08	2
Carbon disulfide	75-15-0	76.1	0.400	1.20	< 0.40	< 1.2	TO-15	01/21/08	2
Carbon tetrachloride	56-23-5	154	0.400	2.50	< 0.40	< 2.5	TO-15	01/21/08	2
Chlorobenzene	108-90-7	113	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
Chloroethane	75-00-3	64.5	0.400	1.10	< 0.40	< 1.1	TO-15	01/21/08	2
Chloroform	67-66-3	119	0.400	1.90	< 0.40	< 1.9	TO-15	01/21/08	2
Chloromethane	74-87-3	50.5	0.400	0.830	0.49	1.0	TO-15	01/21/08	2
2-Chlorotoluene	95-49-8	126	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
Cyclohexane	110-82-7	84.2	0.400	1.40	0.52	1.8	TO-15	01/21/08	2
Dibromochloromethane	124-48-1	208	0.400	3.40	< 0.40	< 3.4	TO-15	01/21/08	2
1,2-Dibromoethane	106-93-4	188	0.400	3.10	< 0.40	< 3.1	TO-15	01/21/08	2
1,2-Dichlorobenzene	95-50-1	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,3-Dichlorobenzene	541-73-1	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,4-Dichlorobenzene	106-46-7	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,2-Dichloroethane	107-06-2	99	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,1-Dichloroethane	75-34-3	98	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,1-Dichloroethene	75-35-4	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
cis-1,2-Dichloroethene	156-59-2	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
trans-1,2-Dichloroethene	156-60-5	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,2-Dichloropropane	78-87-5	113	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
cis-1,3-Dichloropropene	10061-01	111	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
trans-1,3-Dichloropropene	10061-02	111	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
1,4-Dioxane	123-91-1	88.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
Ethanol	64-17-5	46.1	1.26	2.40	18.	34.	TO-15	01/21/08	2
Ethylbenzene	100-41-4	106	0.400	1.70	0.48	2.1	TO-15	01/21/08	2
4-Ethyltoluene	622-96-8	120	0.400	2.00	< 0.40	< 2.0	TO-15	01/21/08	2
Freon-11	75-69-4	137	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
Freon-12	75-71-8	121	0.400	2.00	0.57	2.8	TO-15	01/21/08	2
Freon-113	76-13-1	187	0.400	3.10	< 0.40	< 3.1	TO-15	01/21/08	2
Freon-114	76-14-2	171	0.400	2.80	< 0.40	< 2.8	TO-15	01/21/08	2
Heptane	142-82-5	100	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
Hexachloro-1,3-butadiene	87-68-3	261	1.26	13.0	< 1.3	< 13.	TO-15	01/21/08	2
n-Hexane	110-54-3	86.2	0.400	1.40	0.72	2.5	TO-15	01/21/08	2
Isopropylbenzene	98-82-8	120.2	0.400	2.00	< 0.40	< 2.0	TO-15	01/21/08	2
Methylene Chloride	75-09-2	84.9	0.400	1.40	0.41	1.4	TO-15	01/21/08	2

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure

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REPORT OF ANALYSIS

January 25, 2008

Dennis Sullivan  
AMEC Earth & Environmental - OR  
7376 SW Durham Road  
Portland, OR 97224

Date Received : January 19, 2008  
Description : 1505 Killingsworth  
Sample ID : B05-SGD-05 5 FT  
Collected By : Dennis Sullivan  
Collection Date : 01/17/08 12:55

ESC Sample # : L328391-06

Site ID :

Project # : 761M-117-120

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Methyl Butyl Ketone	591-78-6	100	2.50	10.0	< 2.5	< 10.	TO-15	01/21/08	2
Methyl Ethyl Ketone	78-93-3	72.1	2.50	7.40	< 2.5	< 7.4	TO-15	01/21/08	2
Methyl Isobutyl Ketone	108-10-1	100.1	2.50	10.0	< 2.5	< 10.	TO-15	01/21/08	2
Methyl methacrylate	80-62-6	100.12	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
MTBE	1634-04-	88.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
Naphthalene	91-20-3	128	1.26	6.60	< 1.3	< 6.6	TO-15	01/21/08	2
2-Propanol	67-63-0	60.1	2.50	6.10	< 2.5	< 6.1	TO-15	01/21/08	2
Propene	115-07-1	42.1	0.800	1.40	4.0	6.9	TO-15	01/21/08	2
Styrene	100-42-5	104	0.400	1.70	< 0.40	< 1.7	TO-15	01/21/08	2
1,1,2,2-Tetrachloroethane	79-34-5	168	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Tetrachloroethylene	127-18-4	166	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Tetrahydrofuran	109-99-9	72.1	0.400	1.20	< 0.40	< 1.2	TO-15	01/21/08	2
Toluene	108-88-3	92.1	0.400	1.50	30.	110	TO-15	01/21/08	2
1,2,4-Trichlorobenzene	120-82-1	181	1.26	9.30	< 1.3	< 9.3	TO-15	01/21/08	2
1,1,1-Trichloroethane	71-55-6	133	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
1,1,2-Trichloroethane	79-00-5	133	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
Trichloroethylene	79-01-6	131	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
1,2,4-Trimethylbenzene	95-63-6	120	0.400	2.00	0.48	2.4	TO-15	01/21/08	2
1,3,5-Trimethylbenzene	108-67-8	120	0.400	2.00	< 0.40	< 2.0	TO-15	01/21/08	2
2,2,4-Trimethylpentane	540-84-1	114.22	0.400	1.90	< 0.40	< 1.9	TO-15	01/21/08	2
Vinyl chloride	75-01-4	62.5	0.400	1.00	< 0.40	< 1.0	TO-15	01/21/08	2
Vinyl Bromide	593-60-2	106.95	0.400	1.70	< 0.40	< 1.7	TO-15	01/21/08	2
Vinyl acetate	108-05-4	86.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
m&p-Xylene	1330-20-	106	0.800	3.50	1.6	6.9	TO-15	01/21/08	2
o-Xylene	95-47-6	106	0.400	1.70	0.58	2.5	TO-15	01/21/08	2

RDL1 = ppbv , RDL2 = ug/m3

Note:

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**REPORT OF ANALYSIS**

Dennis Sullivan  
AMEC Earth & Environmental - OR  
7376 SW Durham Road  
Portland, OR 97224

January 25, 2008

Date Received : January 19, 2008  
Description : 1505 Killingsworth  
Sample ID : B06-SG-05 5 FT  
Collected By : Dennis Sullivan  
Collection Date : 01/17/08 13:45

ESC Sample # : L328391-07

Site ID :

Project # : 761M-117-120

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
<b>Volatile Organics</b>									
Acetone	67-64-1	58.1	2.50	5.90	12.	29.	TO-15	01/21/08	2
Allyl chloride	107-05-1	76.53	0.400	1.30	< 0.40	< 1.3	TO-15	01/21/08	2
Benzene	71-43-2	78.1	0.400	1.30	1.8	5.7	TO-15	01/21/08	2
Benzyl Chloride	100-44-7	127	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
Bromodichloromethane	75-27-4	164	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Bromoform	75-25-2	253	1.20	12.0	< 1.2	< 12.	TO-15	01/21/08	2
Bromomethane	74-83-9	94.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,3-Butadiene	106-99-0	54.1	4.00	8.90	< 4.0	< 8.9	TO-15	01/21/08	2
tert-Butyl alcohol	75-65-0	74.12	0.400	1.20	< 0.40	< 1.2	TO-15	01/21/08	2
Carbon disulfide	75-15-0	76.1	0.400	1.20	0.62	1.9	TO-15	01/21/08	2
Carbon tetrachloride	56-23-5	154	0.400	2.50	< 0.40	< 2.5	TO-15	01/21/08	2
Chlorobenzene	108-90-7	113	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
Chloroethane	75-00-3	64.5	0.400	1.10	< 0.40	< 1.1	TO-15	01/21/08	2
Chloroform	67-66-3	119	0.400	1.90	< 0.40	< 1.9	TO-15	01/21/08	2
Chloromethane	74-87-3	50.5	0.400	0.830	< 0.40	< 0.83	TO-15	01/21/08	2
2-Chlorotoluene	95-49-8	126	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
Cyclohexane	110-82-7	84.2	0.400	1.40	0.71	2.4	TO-15	01/21/08	2
Dibromochloromethane	124-48-1	208	0.400	3.40	< 0.40	< 3.4	TO-15	01/21/08	2
1,2-Dibromoethane	106-93-4	188	0.400	3.10	< 0.40	< 3.1	TO-15	01/21/08	2
1,2-Dichlorobenzene	95-50-1	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,3-Dichlorobenzene	541-73-1	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,4-Dichlorobenzene	106-46-7	147	0.400	2.40	< 0.40	< 2.4	TO-15	01/21/08	2
1,2-Dichloroethane	107-06-2	99	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,1-Dichloroethane	75-34-3	98	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,1-Dichloroethene	75-35-4	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
cis-1,2-Dichloroethene	156-59-2	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
trans-1,2-Dichloroethene	156-60-5	96.9	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
1,2-Dichloropropane	78-87-5	113	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
cis-1,3-Dichloropropene	10061-01	111	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
trans-1,3-Dichloropropene	10061-02	111	0.400	1.80	< 0.40	< 1.8	TO-15	01/21/08	2
1,4-Dioxane	123-91-1	88.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
Ethanol	64-17-5	46.1	1.26	2.40	36.	68.	TO-15	01/21/08	2
Ethylbenzene	100-41-4	106	0.400	1.70	2.7	12.	TO-15	01/21/08	2
4-Ethyltoluene	622-96-8	120	0.400	2.00	< 0.40	< 2.0	TO-15	01/21/08	2
Freon-11	75-69-4	137	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
Freon-12	75-71-8	121	0.400	2.00	0.57	2.8	TO-15	01/21/08	2
Freon-113	76-13-1	187	0.400	3.10	< 0.40	< 3.1	TO-15	01/21/08	2
Freon-114	76-14-2	171	0.400	2.80	< 0.40	< 2.8	TO-15	01/21/08	2
Heptane	142-82-5	100	0.400	1.60	0.79	3.2	TO-15	01/21/08	2
Hexachloro-1,3-butadiene	87-68-3	261	1.26	13.0	< 1.3	< 13.	TO-15	01/21/08	2
n-Hexane	110-54-3	86.2	0.400	1.40	1.1	3.9	TO-15	01/21/08	2
Isopropylbenzene	98-82-8	120.2	0.400	2.00	< 0.40	< 2.0	TO-15	01/21/08	2
Methylene Chloride	75-09-2	84.9	0.400	1.40	0.60	2.1	TO-15	01/21/08	2

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure

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REPORT OF ANALYSIS

Dennis Sullivan  
AMEC Earth & Environmental - OR  
7376 SW Durham Road  
Portland, OR 97224

January 25, 2008

Date Received : January 19, 2008  
Description : 1505 Killingsworth  
Sample ID : B06-SG-05 5 FT  
Collected By : Dennis Sullivan  
Collection Date : 01/17/08 13:45

ESC Sample # : L328391-07  
Site ID :  
Project # : 761M-117-120

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Methyl Butyl Ketone	591-78-6	100	2.50	10.0	< 2.5	< 10.	TO-15	01/21/08	2
Methyl Ethyl Ketone	78-93-3	72.1	2.50	7.40	< 2.5	< 7.4	TO-15	01/21/08	2
Methyl Isobutyl Ketone	108-10-1	100.1	2.50	10.0	< 2.5	< 10.	TO-15	01/21/08	2
Methyl methacrylate	80-62-6	100.12	0.400	1.60	< 0.40	< 1.6	TO-15	01/21/08	2
MTBE	1634-04-	88.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
Naphthalene	91-20-3	128	1.26	6.60	< 1.3	< 6.6	TO-15	01/21/08	2
2-Propanol	67-63-0	60.1	2.50	6.10	12.	29.	TO-15	01/21/08	2
Propene	115-07-1	42.1	0.800	1.40	14.	24.	TO-15	01/21/08	2
Styrene	100-42-5	104	0.400	1.70	0.42	1.8	TO-15	01/21/08	2
1,1,2,2-Tetrachloroethane	79-34-5	168	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Tetrachloroethylene	127-18-4	166	0.400	2.70	< 0.40	< 2.7	TO-15	01/21/08	2
Tetrahydrofuran	109-99-9	72.1	0.400	1.20	< 0.40	< 1.2	TO-15	01/21/08	2
Toluene	108-88-3	92.1	1.60	6.00	54.	200	TO-15	01/22/08	8
1,2,4-Trichlorobenzene	120-82-1	181	1.26	9.30	< 1.3	< 9.3	TO-15	01/21/08	2
1,1,1-Trichloroethane	71-55-6	133	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
1,1,2-Trichloroethane	79-00-5	133	0.400	2.20	< 0.40	< 2.2	TO-15	01/21/08	2
Trichloroethylene	79-01-6	131	0.400	2.10	< 0.40	< 2.1	TO-15	01/21/08	2
1,2,4-Trimethylbenzene	95-63-6	120	0.400	2.00	1.3	6.4	TO-15	01/21/08	2
1,3,5-Trimethylbenzene	108-67-8	120	0.400	2.00	0.47	2.3	TO-15	01/21/08	2
2,2,4-Trimethylpentane	540-84-1	114.22	0.400	1.90	< 0.40	< 1.9	TO-15	01/21/08	2
Vinyl chloride	75-01-4	62.5	0.400	1.00	< 0.40	< 1.0	TO-15	01/21/08	2
Vinyl Bromide	593-60-2	106.95	0.400	1.70	< 0.40	< 1.7	TO-15	01/21/08	2
Vinyl acetate	108-05-4	86.1	0.400	1.40	< 0.40	< 1.4	TO-15	01/21/08	2
m&p-Xylene	1330-20-	106	0.800	3.50	11.	48.	TO-15	01/21/08	2
o-Xylene	95-47-6	106	0.400	1.70	3.9	17.	TO-15	01/21/08	2

RDL1 = ppbv , RDL2 = ug/m3

Note:

Units are based on (STP) - Standard Temperature and Pressure

The reported analytical results relate only to the sample submitted.

This report shall not be reproduced, except in full, without the written approval from ESC.

Reported: 01/24/08 14:34 Revised: 01/25/08 10:53

Attachment A  
List of Analytes with QC Qualifiers

Sample #	Analyte	Qualifier
L328391-01	Ethanol	J4
L328391-02	Ethanol	J4
L328391-03	Ethanol	J4
L328391-04	Ethanol	J4

Attachment B  
Explanation of QC Qualifier Codes

Qualifier	Meaning
J4	The associated batch QC was outside the established quality control range for accuracy.

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable unless qualified as 'R' (Rejected).

Definitions

- Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.
- Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Difference.
- Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromatography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.
- TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

Summary of Remarks For Samples Printed  
01/25/08 at 10:53:52

TSR Signing Reports: 134  
R5 - Desired TAT

Sample: L328391-01 Account: AMECPOR Received: 01/19/08 09:00 Due Date: 01/25/08 00:00 RPT Date: 01/24/08 14:34  
Sample: L328391-02 Account: AMECPOR Received: 01/19/08 09:00 Due Date: 01/25/08 00:00 RPT Date: 01/24/08 14:34  
Sample: L328391-03 Account: AMECPOR Received: 01/19/08 09:00 Due Date: 01/25/08 00:00 RPT Date: 01/24/08 14:34  
Sample: L328391-04 Account: AMECPOR Received: 01/19/08 09:00 Due Date: 01/25/08 00:00 RPT Date: 01/24/08 14:34  
Sample: L328391-05 Account: AMECPOR Received: 01/19/08 09:00 Due Date: 01/25/08 00:00 RPT Date: 01/24/08 14:34  
Sample: L328391-06 Account: AMECPOR Received: 01/19/08 09:00 Due Date: 01/25/08 00:00 RPT Date: 01/24/08 14:34  
Sample: L328391-07 Account: AMECPOR Received: 01/19/08 09:00 Due Date: 01/25/08 00:00 RPT Date: 01/24/08 14:34



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Dennis Sullivan  
7376 SW Durham Road  
Portland, OR 97224

Quality Assurance Report  
Level II  
L328391

January 25, 2008

Analyte	Result	Laboratory Blank Units	Date Analyzed	Batch
1,1,1-Trichloroethane	< .2	ppb	01/21/08 10:45	WG341026
1,1,2,2-Tetrachloroethane	< .2	ppb	01/21/08 10:45	WG341026
1,1,2-Trichloroethane	< .2	ppb	01/21/08 10:45	WG341026
1,1-Dichloroethane	< .2	ppb	01/21/08 10:45	WG341026
1,1-Dichloroethene	< .2	ppb	01/21/08 10:45	WG341026
1,2,4-Trichlorobenzene	< .63	ppb	01/21/08 10:45	WG341026
1,2,4-Trimethylbenzene	< .2	ppb	01/21/08 10:45	WG341026
1,2-Dibromoethane	< .2	ppb	01/21/08 10:45	WG341026
1,2-Dichlorobenzene	< .2	ppb	01/21/08 10:45	WG341026
1,2-Dichloroethane	< .2	ppb	01/21/08 10:45	WG341026
1,2-Dichloropropane	< .2	ppb	01/21/08 10:45	WG341026
1,3,5-Trimethylbenzene	< .2	ppb	01/21/08 10:45	WG341026
1,3-Butadiene	< .2	ppb	01/21/08 10:45	WG341026
1,3-Dichlorobenzene	< .2	ppb	01/21/08 10:45	WG341026
1,4-Dichlorobenzene	< .2	ppb	01/21/08 10:45	WG341026
1,4-Dioxane	< .2	ppb	01/21/08 10:45	WG341026
2,2,4-Trimethylpentane	< .2	ppb	01/21/08 10:45	WG341026
Methyl Ethyl Ketone	< 1.25	ppb	01/21/08 10:45	WG341026
2-Chlorotoluene	< .2	ppb	01/21/08 10:45	WG341026
2-Propanol	< 1.25	ppb	01/21/08 10:45	WG341026
4-Ethyltoluene	< .2	ppb	01/21/08 10:45	WG341026
Methyl Isobutyl Ketone	< 1.25	ppb	01/21/08 10:45	WG341026
Acetone	< 1.25	ppb	01/21/08 10:45	WG341026
Allyl chloride	< .2	ppb	01/21/08 10:45	WG341026
Benzene	< .2	ppb	01/21/08 10:45	WG341026
Benzyl Chloride	< .2	ppb	01/21/08 10:45	WG341026
Bromodichloromethane	< .2	ppb	01/21/08 10:45	WG341026
Bromoform	< .6	ppb	01/21/08 10:45	WG341026
Bromomethane	< .2	ppb	01/21/08 10:45	WG341026
Carbon disulfide	< .2	ppb	01/21/08 10:45	WG341026
Carbon tetrachloride	< .2	ppb	01/21/08 10:45	WG341026
Chlorobenzene	< .2	ppb	01/21/08 10:45	WG341026
Dibromochloromethane	< .2	ppb	01/21/08 10:45	WG341026
Chloroethane	< .2	ppb	01/21/08 10:45	WG341026
Chloroform	< .2	ppb	01/21/08 10:45	WG341026
Chloromethane	< .2	ppb	01/21/08 10:45	WG341026
cis-1,2-Dichloroethene	< .2	ppb	01/21/08 10:45	WG341026
cis-1,3-Dichloropropene	< .2	ppb	01/21/08 10:45	WG341026
Cyclohexane	< .2	ppb	01/21/08 10:45	WG341026
Ethanol	< .63	ppb	01/21/08 10:45	WG341026
Ethylbenzene	< .2	ppb	01/21/08 10:45	WG341026
Freon-11	< .2	ppb	01/21/08 10:45	WG341026
Freon-113	< .2	ppb	01/21/08 10:45	WG341026
Freon-114	< .2	ppb	01/21/08 10:45	WG341026
Freon-12	< .2	ppb	01/21/08 10:45	WG341026
Heptane	< .2	ppb	01/21/08 10:45	WG341026
Hexachloro-1,3-butadiene	< .63	ppb	01/21/08 10:45	WG341026
Isopropylbenzene	< .2	ppb	01/21/08 10:45	WG341026
m&p-Xylene	< .4	ppb	01/21/08 10:45	WG341026
Methyl Butyl Ketone	< 1.25	ppb	01/21/08 10:45	WG341026
Methyl methacrylate	< .2	ppb	01/21/08 10:45	WG341026
MTBE	< .2	ppb	01/21/08 10:45	WG341026
Methylene Chloride	< .2	ppb	01/21/08 10:45	WG341026
n-Hexane	< .2	ppb	01/21/08 10:45	WG341026
Naphthalene	< .63	ppb	01/21/08 10:45	WG341026
o-Xylene	< .2	ppb	01/21/08 10:45	WG341026
Propene	< .4	ppb	01/21/08 10:45	WG341026
Styrene	< .2	ppb	01/21/08 10:45	WG341026
tert-Butyl alcohol	< .2	ppb	01/21/08 10:45	WG341026
Tetrachloroethylene	< .2	ppb	01/21/08 10:45	WG341026



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Quality Assurance Report  
Level II  
L328391

January 25, 2008

Tetrahydrofuran < .2 ppb 01/21/08 10:45 WG341026

Analyte	Result	Laboratory Blank		Date Analyzed	Batch
		Units			
Toluene	< .2	ppb		01/21/08 10:45	WG341026
trans-1,2-Dichloroethene	< .2	ppb		01/21/08 10:45	WG341026
trans-1,3-Dichloropropene	< .2	ppb		01/21/08 10:45	WG341026
Trichloroethylene	< .2	ppb		01/21/08 10:45	WG341026
Vinyl acetate	< .2	ppb		01/21/08 10:45	WG341026
Vinyl Bromide	< .2	ppb		01/21/08 10:45	WG341026
Vinyl chloride	< .2	ppb		01/21/08 10:45	WG341026
Ethanol	< .63	ppb		01/22/08 15:18	WG341195
Toluene	< .2	ppb		01/22/08 15:18	WG341195

Analyte	Laboratory Control		Sample Result	% Rec	Limit	Batch
	Units	Known Val				
1,1,1-Trichloroethane	ppb	5	5.13	103.	70-130	WG341026
1,1,2,2-Tetrachloroethane	ppb	5	5.25	105.	70-130	WG341026
1,1,2-Trichloroethane	ppb	5	4.79	95.9	70-130	WG341026
1,1-Dichloroethane	ppb	5	4.97	99.5	70-130	WG341026
1,1-Dichloroethene	ppb	5	5.02	100.	70-130	WG341026
1,2,4-Trichlorobenzene	ppb	5	5.78	116.	70-130	WG341026
1,2,4-Trimethylbenzene	ppb	5	5.59	112.	70-130	WG341026
1,2-Dibromoethane	ppb	5	4.94	98.8	70-130	WG341026
1,2-Dichlorobenzene	ppb	5	5.66	113.	70-130	WG341026
1,2-Dichloroethane	ppb	5	4.65	93.1	70-130	WG341026
1,2-Dichloropropane	ppb	5	4.56	91.3	70-130	WG341026
1,3,5-Trimethylbenzene	ppb	5	5.58	112.	70-130	WG341026
1,3-Butadiene	ppb	5	4.55	91.0	70-130	WG341026
1,3-Dichlorobenzene	ppb	5	5.72	114.	70-130	WG341026
1,4-Dichlorobenzene	ppb	5	5.10	102.	70-130	WG341026
1,4-Dioxane	ppb	5	4.96	99.2	70-130	WG341026
2,2,4-Trimethylpentane	ppb	5	4.86	97.3	70-130	WG341026
Methyl Ethyl Ketone	ppb	5	5.52	110.	70-130	WG341026
2-Chlorotoluene	ppb	5	5.36	107.	70-130	WG341026
2-Propanol	ppb	5	5.03	101.	70-130	WG341026
4-Ethyltoluene	ppb	5	5.53	111.	70-130	WG341026
Methyl Isobutyl Ketone	ppb	5	4.81	96.2	70-130	WG341026
Acetone	ppb	5	6.04	121.	70-130	WG341026
Allyl chloride	ppb	5	4.70	94.0	70-130	WG341026
Benzene	ppb	5	4.60	91.9	70-130	WG341026
Benzyl Chloride	ppb	5	6.22	124.	70-130	WG341026
Bromodichloromethane	ppb	5	4.71	94.2	70-130	WG341026
Bromoform	ppb	5	5.37	107.	70-130	WG341026
Bromomethane	ppb	5	5.26	105.	70-130	WG341026
Carbon disulfide	ppb	5	5.31	106.	70-130	WG341026
Carbon tetrachloride	ppb	5	5.20	104.	70-130	WG341026
Chlorobenzene	ppb	5	4.93	98.7	70-130	WG341026
Dibromochloromethane	ppb	5	4.95	98.9	70-130	WG341026
Chloroethane	ppb	5	5.14	103.	70-130	WG341026
Chloroform	ppb	5	5.14	103.	70-130	WG341026
Chloromethane	ppb	5	4.76	95.1	70-130	WG341026
cis-1,2-Dichloroethene	ppb	5	5.14	103.	70-130	WG341026
cis-1,3-Dichloropropene	ppb	5	4.74	94.7	70-130	WG341026
Cyclohexane	ppb	5	4.78	95.7	70-130	WG341026
Ethanol	ppb	5	5.75	115.	70-130	WG341026
Ethylbenzene	ppb	5	5.21	104.	70-130	WG341026
Freon-11	ppb	5	5.28	106.	70-130	WG341026
Freon-113	ppb	5	5.40	108.	70-130	WG341026
Freon-114	ppb	5	5.15	103.	70-130	WG341026
Freon-12	ppb	5	5.10	102.	70-130	WG341026



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Quality Assurance Report  
Level II  
L328391

January 25, 2008

Analyte	Units	Laboratory Control Known Val	Sample Result	% Rec	Limit	Batch
Heptane	ppb	5	4.28	85.5	70-130	WG341026
Hexachloro-1,3-butadiene	ppb	5	5.61	112.	70-130	WG341026
Isopropylbenzene	ppb	5	5.32	106.	70-130	WG341026
m&p-Xylene	ppb	10	10.6	106.	70-130	WG341026
Methyl Butyl Ketone	ppb	5	4.95	99.0	70-130	WG341026
Methyl methacrylate	ppb	5	4.68	93.7	70-130	WG341026
MTBE	ppb	5	5.52	110.	70-130	WG341026
Methylene Chloride	ppb	5	4.68	93.5	70-130	WG341026
n-Hexane	ppb	5	4.80	96.0	70-130	WG341026
Naphthalene	ppb	5	6.11	122.	70-130	WG341026
o-Xylene	ppb	5	5.24	105.	70-130	WG341026
Propene	ppb	5	4.45	89.1	70-130	WG341026
Styrene	ppb	5	5.09	102.	70-130	WG341026
tert-Butyl alcohol	ppb	5	5.24	105.	70-130	WG341026
Tetrachloroethylene	ppb	5	4.80	96.1	70-130	WG341026
Tetrahydrofuran	ppb	5	5.28	106.	70-130	WG341026
Toluene	ppb	5	4.79	95.8	70-130	WG341026
trans-1,2-Dichloroethene	ppb	5	4.99	99.9	70-130	WG341026
trans-1,3-Dichloropropene	ppb	5	4.95	99.1	70-130	WG341026
Trichloroethylene	ppb	5	4.50	90.0	70-130	WG341026
Vinyl acetate	ppb	5	5.24	105.	70-130	WG341026
Vinyl Bromide	ppb	5	5.33	107.	70-130	WG341026
Vinyl chloride	ppb	5	4.87	97.5	70-130	WG341026
Ethanol	ppb	5	6.21	124.	70-130	WG341195
Toluene	ppb	5	4.98	99.7	70-130	WG341195

Analyte	Units	Laboratory Control			Sample Duplicate RPD	Limit	%Rec	Batch
		LCSD	Res	Ref Res				
1,1,1-Trichloroethane	ppb	5.17	5.13	0.773	25	103	WG341026	
1,1,2,2-Tetrachloroethane	ppb	5.13	5.25	2.27	25	103	WG341026	
1,1,2-Trichloroethane	ppb	4.72	4.79	1.50	25	94	WG341026	
1,1-Dichloroethane	ppb	5.00	4.97	0.574	25	100	WG341026	
1,1-Dichloroethene	ppb	5.05	5.02	0.490	25	101	WG341026	
1,2,4-Trichlorobenzene	ppb	5.67	5.78	2.04	25	113	WG341026	
1,2,4-Trimethylbenzene	ppb	5.51	5.59	1.48	25	110	WG341026	
1,2-Dibromoethane	ppb	4.86	4.94	1.67	25	97	WG341026	
1,2-Dichlorobenzene	ppb	5.55	5.66	1.99	25	111	WG341026	
1,2-Dichloroethane	ppb	4.54	4.65	2.57	25	91	WG341026	
1,2-Dichloropropane	ppb	4.48	4.56	1.90	25	90	WG341026	
1,3,5-Trimethylbenzene	ppb	5.51	5.58	1.26	25	110	WG341026	
1,3-Butadiene	ppb	4.56	4.55	0.232	25	91	WG341026	
1,3-Dichlorobenzene	ppb	5.65	5.72	1.15	25	113	WG341026	
1,4-Dichlorobenzene	ppb	5.76	5.10	12.1	25	115	WG341026	
1,4-Dioxane	ppb	4.95	4.96	0.228	25	99	WG341026	
2,2,4-Trimethylpentane	ppb	4.88	4.86	0.328	25	98	WG341026	
Methyl Ethyl Ketone	ppb	5.48	5.52	0.787	25	110	WG341026	
2-Chlorotoluene	ppb	5.24	5.36	2.30	25	105	WG341026	
2-Propanol	ppb	5.13	5.03	2.08	25	103	WG341026	
4-Ethyltoluene	ppb	5.40	5.53	2.41	25	108	WG341026	
Methyl Isobutyl Ketone	ppb	4.59	4.81	4.72	25	92	WG341026	
Acetone	ppb	6.03	6.04	0.192	25	121	WG341026	
Allyl chloride	ppb	4.69	4.70	0.169	25	94	WG341026	
Benzene	ppb	4.55	4.60	1.06	25	91	WG341026	
Benzyl Chloride	ppb	6.10	6.22	2.07	25	122	WG341026	
Bromodichloromethane	ppb	4.63	4.71	1.71	25	93	WG341026	
Bromoform	ppb	5.32	5.37	0.969	25	106	WG341026	
Bromomethane	ppb	5.32	5.26	1.13	25	106	WG341026	
Carbon disulfide	ppb	5.37	5.31	1.23	25	107	WG341026	



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January 25, 2008

Carbon tetrachloride ppb 5.23 5.20 0.570 25 105 WG341026

Analyte	Laboratory Control		Sample		Duplicate		Limit	%Rec	Batch
	Units	LCSD	Res	Ref	Res	RPD			
Chlorobenzene	ppb	4.86	4.93	1.43	25	97	WG341026		
Dibromochloromethane	ppb	4.89	4.95	1.18	25	98	WG341026		
Chloroethane	ppb	5.14	5.14	0.0611	25	103	WG341026		
Chloroform	ppb	5.17	5.14	0.584	25	103	WG341026		
Chloromethane	ppb	4.83	4.76	1.49	25	97	WG341026		
cis-1,2-Dichloroethene	ppb	5.12	5.14	0.399	25	102	WG341026		
cis-1,3-Dichloropropene	ppb	4.64	4.74	2.11	25	93	WG341026		
Cyclohexane	ppb	4.83	4.78	1.04	25	97	WG341026		
Ethanol	ppb	5.82	5.75	1.22	25	116	WG341026		
Ethylbenzene	ppb	5.12	5.21	1.80	25	102	WG341026		
Freon-11	ppb	5.28	5.28	0.0388	25	106	WG341026		
Freon-113	ppb	5.44	5.40	0.771	25	109	WG341026		
Freon-114	ppb	5.25	5.15	1.88	25	105	WG341026		
Freon-12	ppb	5.13	5.10	0.611	25	103	WG341026		
Heptane	ppb	4.19	4.28	2.03	25	84	WG341026		
Hexachloro-1,3-butadiene	ppb	5.52	5.61	1.50	25	110	WG341026		
Isopropylbenzene	ppb	5.26	5.32	1.16	25	105	WG341026		
m&p-Xylene	ppb	10.4	10.6	1.44	25	104	WG341026		
Methyl Butyl Ketone	ppb	4.71	4.95	4.99	25	94	WG341026		
Methyl methacrylate	ppb	4.49	4.68	4.23	25	90	WG341026		
MTBE	ppb	5.53	5.52	0.154	25	111	WG341026		
Methylene Chloride	ppb	4.69	4.68	0.345	25	94	WG341026		
n-Hexane	ppb	4.85	4.80	0.900	25	97	WG341026		
Naphthalene	ppb	5.98	6.11	2.11	25	120	WG341026		
o-Xylene	ppb	5.15	5.24	1.80	25	103	WG341026		
Propene	ppb	4.48	4.45	0.572	25	90	WG341026		
Styrene	ppb	5.01	5.09	1.72	25	100	WG341026		
tert-Butyl alcohol	ppb	5.56	5.24	5.98	25	111	WG341026		
Tetrachloroethylene	ppb	4.78	4.80	0.392	25	96	WG341026		
Tetrahydrofuran	ppb	5.25	5.28	0.701	25	105	WG341026		
Toluene	ppb	4.77	4.79	0.433	25	95	WG341026		
trans-1,2-Dichloroethene	ppb	5.03	4.99	0.677	25	101	WG341026		
trans-1,3-Dichloropropene	ppb	4.86	4.95	1.90	25	97	WG341026		
Trichloroethylene	ppb	4.44	4.50	1.30	25	89	WG341026		
Vinyl acetate	ppb	5.22	5.24	0.458	25	104	WG341026		
Vinyl Bromide	ppb	5.40	5.33	1.33	25	108	WG341026		
Vinyl chloride	ppb	4.91	4.87	0.717	25	98	WG341026		
Ethanol	ppb	7.43	6.21	17.8	25	149	WG341195		
Toluene	ppb	4.97	4.98	0.384	25	99	WG341195		

Batch number /Run number / Sample number cross reference

WG341026: R349906: L328391-01 02 03 04 05 06 07  
WG341195: R350037: L328391-01 02 03 04 05 07

\* \* Calculations are performed prior to rounding of reported values .



ENVIRONMENTAL  
SCIENCE CORP.

12065 Lebanon Rd.  
Mt. Juliet, TN 37122  
(615) 758-5858  
1-800-767-5859  
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

AMEC Earth & Environmental - OR  
Dennis Sullivan  
7376 SW Durham Road  
Portland, OR 97224

Quality Assurance Report  
Level II  
L328391

January 25, 2008

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.

**AMEC Earth & Environmental - OR**  
 7376 SW Durham Road  
 Portland, OR 97224

Report to: **Dennis Sullivan**  
 Project: **1505**  
 Description: **1515 Killingsworth**  
 Phone: (503) 639-3400  
 FAX: (503) 620-7892  
 Collected by (print): **DENNIS SULLIVAN**  
 Collected by (signature): *[Signature]*

Email: **dennis.sullivan@amec.com**  
 City/State Collected: **Portland, OR**  
 Lab Project #: **117-120**  
**761M -#6**  
 AMECPOR-KILLINGSW  
 P.O.#:

**Rush? (Lab MUST Be Notified)**  
 \_\_\_ Same Day ..... 200%  
 \_\_\_ Next Day ..... 100%  
 \_\_\_ Two Day ..... 50%  
 \_\_\_ Three Day ..... 25%

Immediately Packed on Ice N  Y \_\_\_

Sample ID	Comp/Grab	Matrix*	Depth	Date Results Needed		No. of Cntrs	Remarks/Contaminant	Sample # (lab only)
				Email? ___ No ___ Yes	FAX? ___ No ___ Yes			
B01-SG-05		Air	5'	11/17/08	0942	1		132839101
B02-SG-05		Air	5'	11/17/08	1035	1		-02
B03-SG-05		Air	5'	11/17/08	1120	1		-03
B04-SG-05		Air	5'	11/17/08	1205	1		04
B05-SG-05		Air	5'	11/17/08	1255	1		-05
B05-SG-05		Air	5'	11/17/08	1255	1		-06
B06-SG-05		Air	5'	11/17/08	1345	1		-07

TO-15 Summa

Analysis/Container/Preservative

Chain of Custody  
 Page 1 of 1

Prepared by: **ENVIRONMENTAL SCIENCE CORP.**  
 12065 Lebanon Road  
 Mt. Juliet, TN 37122  
 Phone (800) 767-5859  
 FAX (615) 758-5859

Accrual: **AMECPOR** (lab use only)  
 Template/Region: **T47959/P232132**  
 Cooler #: **1110**  
 Shipped Via: **FedEX 2nd Day**

\*Matrix: **SS - Soil** GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other

Remarks: **NORMAL TAT**

pH **7.1** Temp **35°F**  
 Flow **BP = 1024 hPa**

Relinquished by (Signature): *[Signature]* Received by (Signature): *[Signature]*  
 Date: **11/18/08** Time: **0900**  
 Relinquished by (Signature): *[Signature]* Received by (Signature): *[Signature]*  
 Date: **11/19/08** Time: **0900**  
 Relinquished by (Signature): *[Signature]* Received by (Signature): *[Signature]*  
 Date: **11/19/08** Time: **0900**

Samples returned via:  UPS  FedEX  Courier  
 Bottles Received: **7-SUMMA**  
 Date: **11/19/08** Time: **0900**

Condition: (lab use only) Y  N   
 COC Seal Intact: Y  N   
 pH Checked: NCF

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Monday, February 4, 2008

Dennis Sullivan  
Amec Earth and Environmental, Inc  
7376 SW Durham Road  
Portland, OR 97224

RE: 1505 Killingsworth / 761M-117120

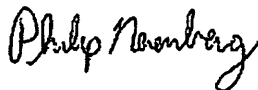
Enclosed are the results of analyses for samples received by the laboratory on 1/18/2008 at 11:25:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

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

Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BO1-SS-14	A801157-01	Soil	01/17/08 10:00	01/18/08 11:25
BO3-SS-13	A801157-03	Soil	01/17/08 11:40	01/18/08 11:25
BO5-SS-14	A801157-05	Soil	01/17/08 13:20	01/18/08 11:25

Apex Laboratories



Philip Nerenberg, Lab Director

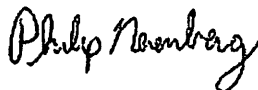
*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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## ANALYTICAL SAMPLE RESULTS

### Diesel Range (C10-C22) and Oil Range (C22-C40) Hydrocarbons by NWTPH-Dx

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>BO1-SS-14 (A801157-01)</b>			<b>Matrix: Soil</b>					
Diesel Range Organics	ND	---	27.7	mg/kg dry	1	01/18/08 18:01	NWTPH-Dx	
Oil Range Organics	ND	---	55.4	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>		<i>Recovery: 94 %</i>		<i>Limits: 50-150 %</i>		"	"	"
<b>BO3-SS-13 (A801157-03)</b>			<b>Matrix: Soil</b>					
Diesel Range Organics	ND	---	24.0	mg/kg dry	1	01/18/08 18:20	NWTPH-Dx	
Oil Range Organics	ND	---	48.0	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>		<i>Recovery: 84 %</i>		<i>Limits: 50-150 %</i>		"	"	"
<b>BO5-SS-14 (A801157-05)</b>			<b>Matrix: Soil</b>					
Diesel Range Organics	ND	---	27.2	mg/kg dry	1	01/18/08 18:39	NWTPH-Dx	
Oil Range Organics	ND	---	54.5	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>		<i>Recovery: 87 %</i>		<i>Limits: 50-150 %</i>		"	"	"



Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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## ANALYTICAL SAMPLE RESULTS

### Gasoline Range (C6-C10) Hydrocarbons by NWTPH-Gx

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>BO1-SS-14 (A801157-01) Matrix: Soil</b>								
Gasoline Range Organics	ND	---	4.21	mg/kg dry	50	01/21/08 11:54	NWTPH-Gx	
Surrogate: 4-Bromofluorobenzene (Sur)			Recovery: 103 %	Limits: 50-150 %	1	"	"	
1,4-Difluorobenzene (Sur)			89 %	Limits: 50-150 %	"	"	"	
<b>BO3-SS-13 (A801157-03) Matrix: Soil</b>								
Gasoline Range Organics	ND	---	4.40	mg/kg dry	50	01/21/08 12:53	NWTPH-Gx	
Surrogate: 4-Bromofluorobenzene (Sur)			Recovery: 105 %	Limits: 50-150 %	1	"	"	
1,4-Difluorobenzene (Sur)			89 %	Limits: 50-150 %	"	"	"	
<b>BO5-SS-14 (A801157-05) Matrix: Soil</b>								
Gasoline Range Organics	ND	---	4.35	mg/kg dry	50	01/21/08 13:23	NWTPH-Gx	
Surrogate: 4-Bromofluorobenzene (Sur)			Recovery: 103 %	Limits: 50-150 %	1	"	"	
1,4-Difluorobenzene (Sur)			88 %	Limits: 50-150 %	"	"	"	



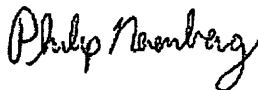
Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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## ANALYTICAL SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>BO1-SS-14 (A801157-01)</b>			<b>Matrix: Soil</b>					
Acetone	ND	---	1050	ug/kg dry	50	01/21/08 11:54	EPA 8260B	
Benzene	ND	---	13.2	"	"	"	"	
Bromobenzene	ND	---	26.3	"	"	"	"	
Bromochloromethane	ND	---	26.3	"	"	"	"	
Bromodichloromethane	ND	---	26.3	"	"	"	"	
Bromoform	ND	---	52.7	"	"	"	"	
Bromomethane	ND	---	527	"	"	"	"	
2-Butanone (MEK)	ND	---	527	"	"	"	"	
n-Butylbenzene	ND	---	26.3	"	"	"	"	
sec-Butylbenzene	ND	---	26.3	"	"	"	"	
tert-Butylbenzene	ND	---	26.3	"	"	"	"	
Carbon tetrachloride	ND	---	26.3	"	"	"	"	
Chlorobenzene	ND	---	26.3	"	"	"	"	
Chloroethane	ND	---	527	"	"	"	"	
Chloroform	ND	---	263	"	"	"	"	
Chloromethane	ND	---	263	"	"	"	"	
2-Chlorotoluene	ND	---	26.3	"	"	"	"	
4-Chlorotoluene	ND	---	26.3	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	---	105	"	"	"	"	
Dibromochloromethane	ND	---	52.7	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	---	26.3	"	"	"	"	
Dibromomethane	ND	---	26.3	"	"	"	"	
1,2-Dichlorobenzene	ND	---	26.3	"	"	"	"	
1,3-Dichlorobenzene	ND	---	26.3	"	"	"	"	
1,4-Dichlorobenzene	ND	---	26.3	"	"	"	"	
Dichlorodifluoromethane	ND	---	52.7	"	"	"	"	
1,1-Dichloroethane	ND	---	26.3	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	26.3	"	"	"	"	
1,1-Dichloroethene	ND	---	26.3	"	"	"	"	
cis-1,2-Dichloroethene	ND	---	26.3	"	"	"	"	
trans-1,2-Dichloroethene	ND	---	26.3	"	"	"	"	
1,2-Dichloropropane	ND	---	26.3	"	"	"	"	
1,3-Dichloropropane	ND	---	26.3	"	"	"	"	
2,2-Dichloropropane	ND	---	52.7	"	"	"	"	

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Philip Nerenberg, Lab Director

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Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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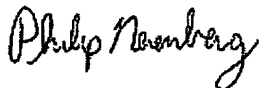
## ANALYTICAL SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>BO1-SS-14 (A801157-01)</b>			<b>Matrix: Soil</b>					
1,1-Dichloropropene	ND	---	26.3	ug/kg dry	50	"	EPA 8260B	
cis-1,3-Dichloropropene	ND	---	26.3	"	"	"	"	
trans-1,3-Dichloropropene	ND	---	52.7	"	"	"	"	
Ethylbenzene	ND	---	26.3	"	"	"	"	
Hexachlorobutadiene	ND	---	105	"	"	"	"	
2-Hexanone	ND	---	527	"	"	"	"	
Isopropylbenzene	ND	---	26.3	"	"	"	"	
4-Isopropyltoluene	ND	---	26.3	"	"	"	"	
4-Methyl-2-pentanone (MiBK)	ND	---	527	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	---	52.7	"	"	"	"	
Methylene chloride	ND	---	263	"	"	"	"	
Naphthalene	ND	---	263	"	"	"	"	
n-Propylbenzene	ND	---	26.3	"	"	"	"	
Styrene	ND	---	26.3	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	---	52.7	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	---	26.3	"	"	"	"	
Tetrachloroethene (PCE)	ND	---	26.3	"	"	"	"	
Toluene	ND	---	105	"	"	"	"	
1,2,3-Trichlorobenzene	ND	---	105	"	"	"	"	
1,2,4-Trichlorobenzene	ND	---	105	"	"	"	"	
1,1,1-Trichloroethane	ND	---	52.7	"	"	"	"	
1,1,2-Trichloroethane	ND	---	26.3	"	"	"	"	
Trichloroethene (TCE)	ND	---	26.3	"	"	"	"	
Trichlorofluoromethane	ND	---	263	"	"	"	"	
1,2,3-Trichloropropane	ND	---	26.3	"	"	"	"	
1,2,4-Trimethylbenzene	ND	---	52.7	"	"	"	"	
1,3,5-Trimethylbenzene	ND	---	52.7	"	"	"	"	
Vinyl chloride	ND	---	26.3	"	"	"	"	
m,p-Xylene	ND	---	52.7	"	"	"	"	
o-Xylene	ND	---	26.3	"	"	"	"	
<i>Surrogate: Dibromofluoromethane (Surr)</i>			<i>Recovery: 101 %</i>	<i>Limits: 70-130 %</i>	<i>1</i>	"	"	
<i>1,4-Difluorobenzene (Surr)</i>			<i>104 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>Toluene-d8 (Surr)</i>			<i>95 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>4-Bromofluorobenzene (Surr)</i>			<i>100 %</i>	<i>Limits: 70-130 %</i>	"	"	"	

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Philip Nerenberg, Lab Director

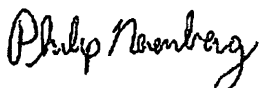
Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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## ANALYTICAL SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>BO3-SS-13 (A801157-03)</b>			<b>Matrix: Soil</b>					
Acetone	ND	---	1100	ug/kg dry	50	01/21/08 12:53	EPA 8260B	
Benzene	ND	---	13.7	"	"	"	"	
Bromobenzene	ND	---	27.5	"	"	"	"	
Bromochloromethane	ND	---	27.5	"	"	"	"	
Bromodichloromethane	ND	---	27.5	"	"	"	"	
Bromoform	ND	---	54.9	"	"	"	"	
Bromomethane	ND	---	549	"	"	"	"	
2-Butanone (MEK)	ND	---	549	"	"	"	"	
n-Butylbenzene	ND	---	27.5	"	"	"	"	
sec-Butylbenzene	ND	---	27.5	"	"	"	"	
tert-Butylbenzene	ND	---	27.5	"	"	"	"	
Carbon tetrachloride	ND	---	27.5	"	"	"	"	
Chlorobenzene	ND	---	27.5	"	"	"	"	
Chloroethane	ND	---	549	"	"	"	"	
Chloroform	ND	---	275	"	"	"	"	
Chloromethane	ND	---	275	"	"	"	"	
2-Chlorotoluene	ND	---	27.5	"	"	"	"	
4-Chlorotoluene	ND	---	27.5	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	---	110	"	"	"	"	
Dibromochloromethane	ND	---	54.9	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	---	27.5	"	"	"	"	
Dibromomethane	ND	---	27.5	"	"	"	"	
1,2-Dichlorobenzene	ND	---	27.5	"	"	"	"	
1,3-Dichlorobenzene	ND	---	27.5	"	"	"	"	
1,4-Dichlorobenzene	ND	---	27.5	"	"	"	"	
Dichlorodifluoromethane	ND	---	54.9	"	"	"	"	
1,1-Dichloroethane	ND	---	27.5	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	27.5	"	"	"	"	
1,1-Dichloroethene	ND	---	27.5	"	"	"	"	
cis-1,2-Dichloroethene	ND	---	27.5	"	"	"	"	
trans-1,2-Dichloroethene	ND	---	27.5	"	"	"	"	
1,2-Dichloropropane	ND	---	27.5	"	"	"	"	
1,3-Dichloropropane	ND	---	27.5	"	"	"	"	
2,2-Dichloropropane	ND	---	54.9	"	"	"	"	

Apex Laboratories



Philip Nerenberg, Lab Director

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Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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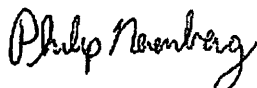
## ANALYTICAL SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>BO3-SS-13 (A801157-03)</b>			<b>Matrix: Soil</b>					
1,1-Dichloropropene	ND	---	27.5	ug/kg dry	50	"	EPA 8260B	
cis-1,3-Dichloropropene	ND	---	27.5	"	"	"	"	
trans-1,3-Dichloropropene	ND	---	54.9	"	"	"	"	
Ethylbenzene	ND	---	27.5	"	"	"	"	
Hexachlorobutadiene	ND	---	110	"	"	"	"	
2-Hexanone	ND	---	549	"	"	"	"	
Isopropylbenzene	ND	---	27.5	"	"	"	"	
4-Isopropyltoluene	ND	---	27.5	"	"	"	"	
4-Methyl-2-pentanone (MiBK)	ND	---	549	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	---	54.9	"	"	"	"	
Methylene chloride	ND	---	275	"	"	"	"	
Naphthalene	ND	---	275	"	"	"	"	
n-Propylbenzene	ND	---	27.5	"	"	"	"	
Styrene	ND	---	27.5	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	---	54.9	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	---	27.5	"	"	"	"	
Tetrachloroethene (PCE)	ND	---	27.5	"	"	"	"	
Toluene	ND	---	110	"	"	"	"	
1,2,3-Trichlorobenzene	ND	---	110	"	"	"	"	
1,2,4-Trichlorobenzene	ND	---	110	"	"	"	"	
1,1,1-Trichloroethane	ND	---	54.9	"	"	"	"	
1,1,2-Trichloroethane	ND	---	27.5	"	"	"	"	
Trichloroethene (TCE)	ND	---	27.5	"	"	"	"	
Trichlorofluoromethane	ND	---	275	"	"	"	"	
1,2,3-Trichloropropane	ND	---	27.5	"	"	"	"	
1,2,4-Trimethylbenzene	ND	---	54.9	"	"	"	"	
1,3,5-Trimethylbenzene	ND	---	54.9	"	"	"	"	
Vinyl chloride	ND	---	27.5	"	"	"	"	
m,p-Xylene	ND	---	54.9	"	"	"	"	
o-Xylene	ND	---	27.5	"	"	"	"	
<i>Surrogate: Dibromofluoromethane (Surr)</i>			<i>Recovery: 103 %</i>	<i>Limits: 70-130 %</i>	1	"	"	
<i>1,4-Difluorobenzene (Surr)</i>			<i>104 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>Toluene-d8 (Surr)</i>			<i>97 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>4-Bromofluorobenzene (Surr)</i>			<i>100 %</i>	<i>Limits: 70-130 %</i>	"	"	"	

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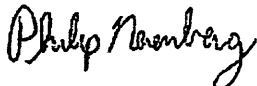
Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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## ANALYTICAL SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>BO5-SS-14 (A801157-05)</b>			<b>Matrix: Soil</b>					
Acetone	ND	---	1090	ug/kg dry	50	01/21/08 13:23	EPA 8260B	
Benzene	ND	---	13.6	"	"	"	"	
Bromobenzene	ND	---	27.2	"	"	"	"	
Bromochloromethane	ND	---	27.2	"	"	"	"	
Bromodichloromethane	ND	---	27.2	"	"	"	"	
Bromoform	ND	---	54.3	"	"	"	"	
Bromomethane	ND	---	543	"	"	"	"	
2-Butanone (MEK)	ND	---	543	"	"	"	"	
n-Butylbenzene	ND	---	27.2	"	"	"	"	
sec-Butylbenzene	ND	---	27.2	"	"	"	"	
tert-Butylbenzene	ND	---	27.2	"	"	"	"	
Carbon tetrachloride	ND	---	27.2	"	"	"	"	
Chlorobenzene	ND	---	27.2	"	"	"	"	
Chloroethane	ND	---	543	"	"	"	"	
Chloroform	ND	---	272	"	"	"	"	
Chloromethane	ND	---	272	"	"	"	"	
2-Chlorotoluene	ND	---	27.2	"	"	"	"	
4-Chlorotoluene	ND	---	27.2	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	---	109	"	"	"	"	
Dibromochloromethane	ND	---	54.3	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	---	27.2	"	"	"	"	
Dibromomethane	ND	---	27.2	"	"	"	"	
1,2-Dichlorobenzene	ND	---	27.2	"	"	"	"	
1,3-Dichlorobenzene	ND	---	27.2	"	"	"	"	
1,4-Dichlorobenzene	ND	---	27.2	"	"	"	"	
Dichlorodifluoromethane	ND	---	54.3	"	"	"	"	
1,1-Dichloroethane	ND	---	27.2	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	27.2	"	"	"	"	
1,1-Dichloroethene	ND	---	27.2	"	"	"	"	
cis-1,2-Dichloroethene	ND	---	27.2	"	"	"	"	
trans-1,2-Dichloroethene	ND	---	27.2	"	"	"	"	
1,2-Dichloropropane	ND	---	27.2	"	"	"	"	
1,3-Dichloropropane	ND	---	27.2	"	"	"	"	
2,2-Dichloropropane	ND	---	54.3	"	"	"	"	

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## ANALYTICAL SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>BO5-SS-14 (A801157-05)</b>								
<b>Matrix: Soil</b>								
1,1-Dichloropropene	ND	---	27.2	ug/kg dry	50	"	EPA 8260B	
cis-1,3-Dichloropropene	ND	---	27.2	"	"	"	"	
trans-1,3-Dichloropropene	ND	---	54.3	"	"	"	"	
Ethylbenzene	ND	---	27.2	"	"	"	"	
Hexachlorobutadiene	ND	---	109	"	"	"	"	
2-Hexanone	ND	---	543	"	"	"	"	
Isopropylbenzene	ND	---	27.2	"	"	"	"	
4-Isopropyltoluene	ND	---	27.2	"	"	"	"	
4-Methyl-2-pentanone (MiBK)	ND	---	543	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	---	54.3	"	"	"	"	
Methylene chloride	ND	---	272	"	"	"	"	
Naphthalene	ND	---	272	"	"	"	"	
n-Propylbenzene	ND	---	27.2	"	"	"	"	
Styrene	ND	---	27.2	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	---	54.3	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	---	27.2	"	"	"	"	
Tetrachloroethene (PCE)	ND	---	27.2	"	"	"	"	
Toluene	ND	---	109	"	"	"	"	
1,2,3-Trichlorobenzene	ND	---	109	"	"	"	"	
1,2,4-Trichlorobenzene	ND	---	109	"	"	"	"	
1,1,1-Trichloroethane	ND	---	54.3	"	"	"	"	
1,1,2-Trichloroethane	ND	---	27.2	"	"	"	"	
Trichloroethene (TCE)	ND	---	27.2	"	"	"	"	
Trichlorofluoromethane	ND	---	272	"	"	"	"	
1,2,3-Trichloropropane	ND	---	27.2	"	"	"	"	
1,2,4-Trimethylbenzene	ND	---	54.3	"	"	"	"	
1,3,5-Trimethylbenzene	ND	---	54.3	"	"	"	"	
Vinyl chloride	ND	---	27.2	"	"	"	"	
m,p-Xylene	ND	---	54.3	"	"	"	"	
o-Xylene	ND	---	27.2	"	"	"	"	
<i>Surrogate: Dibromofluoromethane (Surr)</i>			<i>Recovery: 100 %</i>	<i>Limits: 70-130 %</i>	1	"	"	
<i>1,4-Difluorobenzene (Surr)</i>			<i>105 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>Toluene-d8 (Surr)</i>			<i>95 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>4-Bromofluorobenzene (Surr)</i>			<i>100 %</i>	<i>Limits: 70-130 %</i>	"	"	"	

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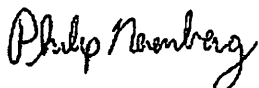
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## ANALYTICAL SAMPLE RESULTS

### PAH by EPA 8270C SIM

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>BO3-SS-13 (A801157-03)</b>			<b>Matrix: Soil</b>					
Acenaphthene	ND	---	41.9	ug/kg dry	1	01/22/08 18:50	EPA 8270 SIM	
Acenaphthylene	ND	---	41.9	"	"	"	"	
Anthracene	ND	---	41.9	"	"	"	"	
Benz(a)anthracene	ND	---	41.9	"	"	"	"	
Benzo(a)pyrene	ND	---	41.9	"	"	"	"	
Benzo(b)fluoranthene	ND	---	41.9	"	"	"	"	
Benzo(k)fluoranthene	ND	---	41.9	"	"	"	"	
Benzo(g,h,i)perylene	ND	---	41.9	"	"	"	"	
Chrysene	ND	---	41.9	"	"	"	"	
Dibenz(a,h)anthracene	ND	---	41.9	"	"	"	"	
Fluoranthene	ND	---	41.9	"	"	"	"	
Fluorene	ND	---	41.9	"	"	"	"	
Indeno(1,2,3-cd)pyrene	ND	---	41.9	"	"	"	"	
Naphthalene	ND	---	41.9	"	"	"	"	
Phenanthrene	ND	---	41.9	"	"	"	"	
Pyrene	ND	---	41.9	"	"	"	"	
<i>Surrogate: Nitrobenzene-d5 (Surr)</i>			<i>Recovery: 88 %</i>	<i>Limits: 35-120 %</i>	"	"	"	
<i>2-Fluorobiphenyl (Surr)</i>			<i>88 %</i>	<i>Limits: 45-120 %</i>	"	"	"	
<i>p-Terphenyl-d14 (Surr)</i>			<i>86 %</i>	<i>Limits: 30-120 %</i>	"	"	"	



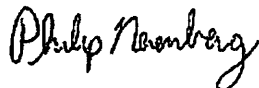
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## ANALYTICAL SAMPLE RESULTS

### PAH by EPA 8270C SIM

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>BO5-SS-14 (A801157-05)</b>			<b>Matrix: Soil</b>					
Acenaphthene	ND	---	39.2	ug/kg dry	1	01/22/08 19:14	EPA 8270 SIM	
Acenaphthylene	ND	---	39.2	"	"	"	"	
Anthracene	ND	---	39.2	"	"	"	"	
Benz(a)anthracene	ND	---	39.2	"	"	"	"	
Benzo(a)pyrene	ND	---	39.2	"	"	"	"	
Benzo(b)fluoranthene	ND	---	39.2	"	"	"	"	
Benzo(k)fluoranthene	ND	---	39.2	"	"	"	"	
Benzo(g,h,i)perylene	ND	---	39.2	"	"	"	"	
Chrysene	ND	---	39.2	"	"	"	"	
Dibenz(a,h)anthracene	ND	---	39.2	"	"	"	"	
Fluoranthene	ND	---	39.2	"	"	"	"	
Fluorene	ND	---	39.2	"	"	"	"	
Indeno(1,2,3-cd)pyrene	ND	---	39.2	"	"	"	"	
Naphthalene	ND	---	39.2	"	"	"	"	
Phenanthrene	ND	---	39.2	"	"	"	"	
Pyrene	ND	---	39.2	"	"	"	"	
<i>Surrogate: Nitrobenzene-d5 (Surr)</i>			<i>Recovery: 98 %</i>	<i>Limits: 35-120 %</i>	"	"	"	
<i>2-Fluorobiphenyl (Surr)</i>			<i>100 %</i>	<i>Limits: 45-120 %</i>	"	"	"	
<i>p-Terphenyl-d14 (Surr)</i>			<i>95 %</i>	<i>Limits: 30-120 %</i>	"	"	"	

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## ANALYTICAL SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>BO3-SS-13 (A801157-03)</b>			<b>Matrix: Soil</b>					
Cadmium	1.26	---	1.20	mg/kg dry	10	02/01/08 17:10	EPA 6020	
Chromium	8.30	---	2.41	"	"	"	"	
Lead	3.39	---	1.20	"	"	"	"	
<b>BO5-SS-14 (A801157-05)</b>			<b>Matrix: Soil</b>					
Cadmium	1.31	---	1.10	mg/kg dry	10	02/01/08 17:13	EPA 6020	
Chromium	10.8	---	2.21	"	"	"	"	
Lead	4.16	---	1.10	"	"	"	"	

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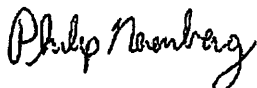
Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight by D2216

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>BO1-SS-14 (A801157-01)</b>			<b>Matrix: Soil</b>					
% Solids	91.9	---	1.00	% by Weight	1	01/19/08 13:11	D2216	
<b>BO3-SS-13 (A801157-03)</b>			<b>Matrix: Soil</b>					
% Solids	88.5	---	1.00	% by Weight	1	01/19/08 13:11	D2216	
<b>BO5-SS-14 (A801157-05)</b>			<b>Matrix: Soil</b>					
% Solids	89.1	---	1.00	% by Weight	1	01/19/08 13:11	D2216	

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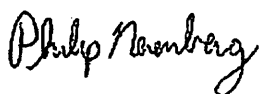
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## QUALITY CONTROL (QC) SAMPLE RESULTS

### Diesel Range (C10-C22) and Oil Range (C22-C40) Hydrocarbons by NWTPH-Dx

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 8010162 - EPA 3546 (Fuels)</b>						<b>Soil</b>						
<b>Blank (8010162-BLK1)</b>						<b>Analyzed: 01/18/08 13:08</b>						
Diesel Range Organics	ND	---	20.0	mg/kg wet	1	---	---	---	---	---	---	
Oil Range Organics	ND	---	40.0	"	"	---	---	---	---	---	---	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 107 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<b>LCS (8010162-BS1)</b>						<b>Analyzed: 01/18/08 12:48</b>						
Diesel Range Organics	87.6	---	20.0	mg/kg wet	1	83.3	---	105	75-125%	---	---	
Oil Range Organics	80.5	---	40.0	"	"	83.3	---	97	75-125%	---	---	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 96 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						

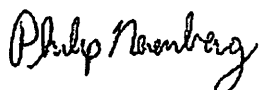


Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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### QUALITY CONTROL (QC) SAMPLE RESULTS

#### Gasoline Range (C6-C10) Hydrocarbons by NWTPH-Gx

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 8010169 - EPA 5035-Mod (w/o Field Pres.)</b>						<b>Soil</b>						
<b>Blank (8010169-BLK1)</b>						<b>Analyzed: 01/21/08 11:24</b>						
Gasoline Range Organics	ND	---	4.00	mg/kg wet	50	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			Recovery: 103 %	Limits: 50-150 %			Dilution: 1x					
1,4-Difluorobenzene (Sur)			88 %	50-150 %			"					
<b>LCS (8010169-BS2)</b>						<b>Analyzed: 01/21/08 10:54</b>						
Gasoline Range Organics	22.8	---	4.00	mg/kg wet	50	25.0	---	91	70-130%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			Recovery: 97 %	Limits: 50-150 %			Dilution: 1x					
1,4-Difluorobenzene (Sur)			90 %	50-150 %			"					
<b>Duplicate (8010169-DUP1)</b>						<b>Source: A801157-01 Analyzed: 01/21/08 12:23</b>						
Gasoline Range Organics	ND	---	4.25	mg/kg dry	50	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			Recovery: 103 %	Limits: 50-150 %			Dilution: 1x					
1,4-Difluorobenzene (Sur)			89 %	50-150 %			"					



Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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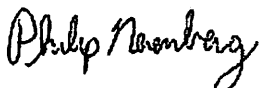
## QUALITY CONTROL (QC) SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 8010169 - EPA 5035-Mod (w/o Field Pres.)</b>						<b>Soil</b>						
<b>Blank (8010169-BLK1)</b>						<b>Analyzed: 01/21/08 11:24</b>						
Acetone	ND	---	1000	ug/kg wet	50	---	---	---	---	---	---	---
Benzene	ND	---	12.5	"	"	---	---	---	---	---	---	---
Bromobenzene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Bromochloromethane	ND	---	25.0	"	"	---	---	---	---	---	---	---
Bromodichloromethane	ND	---	25.0	"	"	---	---	---	---	---	---	---
Bromoform	ND	---	50.0	"	"	---	---	---	---	---	---	---
Bromomethane	ND	---	500	"	"	---	---	---	---	---	---	---
2-Butanone (MEK)	ND	---	500	"	"	---	---	---	---	---	---	---
n-Butylbenzene	ND	---	25.0	"	"	---	---	---	---	---	---	---
sec-Butylbenzene	ND	---	25.0	"	"	---	---	---	---	---	---	---
tert-Butylbenzene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Carbon tetrachloride	ND	---	25.0	"	"	---	---	---	---	---	---	---
Chlorobenzene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Chloroethane	ND	---	500	"	"	---	---	---	---	---	---	---
Chloroform	ND	---	250	"	"	---	---	---	---	---	---	---
Chloromethane	ND	---	250	"	"	---	---	---	---	---	---	---
2-Chlorotoluene	ND	---	25.0	"	"	---	---	---	---	---	---	---
4-Chlorotoluene	ND	---	25.0	"	"	---	---	---	---	---	---	---
1,2-Dibromo-3-chloropropane	ND	---	100	"	"	---	---	---	---	---	---	---
Dibromochloromethane	ND	---	50.0	"	"	---	---	---	---	---	---	---
1,2-Dibromoethane (EDB)	ND	---	25.0	"	"	---	---	---	---	---	---	---
Dibromomethane	ND	---	25.0	"	"	---	---	---	---	---	---	---
1,2-Dichlorobenzene	ND	---	25.0	"	"	---	---	---	---	---	---	---
1,3-Dichlorobenzene	ND	---	25.0	"	"	---	---	---	---	---	---	---
1,4-Dichlorobenzene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Dichlorodifluoromethane	ND	---	50.0	"	"	---	---	---	---	---	---	---
1,1-Dichloroethane	ND	---	25.0	"	"	---	---	---	---	---	---	---
1,2-Dichloroethane (EDC)	ND	---	25.0	"	"	---	---	---	---	---	---	---
1,1-Dichloroethene	ND	---	25.0	"	"	---	---	---	---	---	---	---
cis-1,2-Dichloroethene	ND	---	25.0	"	"	---	---	---	---	---	---	---
trans-1,2-Dichloroethene	ND	---	25.0	"	"	---	---	---	---	---	---	---
1,2-Dichloropropane	ND	---	25.0	"	"	---	---	---	---	---	---	---
1,3-Dichloropropane	ND	---	25.0	"	"	---	---	---	---	---	---	---
2,2-Dichloropropane	ND	---	50.0	"	"	---	---	---	---	---	---	---
1,1-Dichloropropene	ND	---	25.0	"	"	---	---	---	---	---	---	---

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Philip Nerenberg, Lab Director

Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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## QUALITY CONTROL (QC) SAMPLE RESULTS

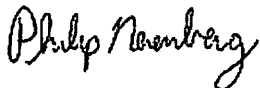
### Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 8010169 - EPA 5035-Mod (w/o Field Pres.)</b>						<b>Soil</b>						
<b>Blank (8010169-BLK1)</b>						<b>Analyzed: 01/21/08 11:24</b>						
cis-1,3-Dichloropropene	ND	---	25.0	ug/kg wet	"	---	---	---	---	---	---	---
trans-1,3-Dichloropropene	ND	---	50.0	"	"	---	---	---	---	---	---	---
Ethylbenzene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Hexachlorobutadiene	ND	---	100	"	"	---	---	---	---	---	---	---
2-Hexanone	ND	---	500	"	"	---	---	---	---	---	---	---
Isopropylbenzene	ND	---	25.0	"	"	---	---	---	---	---	---	---
4-Isopropyltoluene	ND	---	25.0	"	"	---	---	---	---	---	---	---
4-Methyl-2-pentanone (MiBK)	ND	---	500	"	"	---	---	---	---	---	---	---
Methyl tert-butyl ether (MTBE)	ND	---	50.0	"	"	---	---	---	---	---	---	---
Methylene chloride	ND	---	250	"	"	---	---	---	---	---	---	---
Naphthalene	ND	---	250	"	"	---	---	---	---	---	---	---
n-Propylbenzene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Styrene	ND	---	25.0	"	"	---	---	---	---	---	---	---
1,1,1,2-Tetrachloroethane	ND	---	50.0	"	"	---	---	---	---	---	---	---
1,1,2,2-Tetrachloroethane	ND	---	25.0	"	"	---	---	---	---	---	---	---
Tetrachloroethene (PCE)	ND	---	25.0	"	"	---	---	---	---	---	---	---
Toluene	ND	---	100	"	"	---	---	---	---	---	---	---
1,2,3-Trichlorobenzene	ND	---	100	"	"	---	---	---	---	---	---	---
1,2,4-Trichlorobenzene	ND	---	100	"	"	---	---	---	---	---	---	---
1,1,1-Trichloroethane	ND	---	50.0	"	"	---	---	---	---	---	---	---
1,1,2-Trichloroethane	ND	---	25.0	"	"	---	---	---	---	---	---	---
Trichloroethene (TCE)	ND	---	25.0	"	"	---	---	---	---	---	---	---
Trichlorofluoromethane	ND	---	250	"	"	---	---	---	---	---	---	---
1,2,3-Trichloropropane	ND	---	25.0	"	"	---	---	---	---	---	---	---
1,2,4-Trimethylbenzene	ND	---	50.0	"	"	---	---	---	---	---	---	---
1,3,5-Trimethylbenzene	ND	---	50.0	"	"	---	---	---	---	---	---	---
Vinyl chloride	ND	---	25.0	"	"	---	---	---	---	---	---	---
m,p-Xylene	ND	---	50.0	"	"	---	---	---	---	---	---	---
o-Xylene	ND	---	25.0	"	"	---	---	---	---	---	---	---
<b>Surr: Dibromofluoromethane (Surr)</b>		<b>Recovery: 98 %</b>		<b>Limits: 70-130 %</b>		<b>Dilution: 1x</b>						
1,4-Difluorobenzene (Surr)		104 %		70-130 %		"						
Toluene-d8 (Surr)		96 %		70-130 %		"						
4-Bromofluorobenzene (Surr)		102 %		70-130 %		"						

**LCS (8010169-BS1)** **Analyzed: 01/21/08 10:24**

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Philip Nerenberg, Lab Director

Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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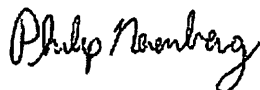
## QUALITY CONTROL (QC) SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 8010169 - EPA 5035-Mod (w/o Field Pres.)</b>						<b>Soil</b>						
<b>LCS (8010169-BS1)</b>						<b>Analyzed: 01/21/08 10:24</b>						
Acetone	1360	---	1000	ug/kg wet	50	2000	---	68	65-135%	---	---	
Benzene	1050	---	12.5	"	"	1000	---	105	65-135%	---	---	
Bromobenzene	1040	---	25.0	"	"	1000	---	104	65-135%	---	---	
Bromochloromethane	992	---	25.0	"	"	1000	---	99	65-135%	---	---	
Bromodichloromethane	980	---	25.0	"	"	1000	---	98	65-135%	---	---	
Bromoform	986	---	50.0	"	"	1000	---	99	65-135%	---	---	
Bromomethane	560	---	500	"	"	1000	---	56	65-135%	---	---	Q-08
2-Butanone (MEK)	1500	---	500	"	"	2000	---	75	65-135%	---	---	
n-Butylbenzene	897	---	25.0	"	"	1000	---	90	65-135%	---	---	
sec-Butylbenzene	1100	---	25.0	"	"	1000	---	110	65-135%	---	---	
tert-Butylbenzene	1040	---	25.0	"	"	1000	---	104	65-135%	---	---	
Carbon tetrachloride	970	---	25.0	"	"	1000	---	97	65-135%	---	---	
Chlorobenzene	1070	---	25.0	"	"	1000	---	107	65-135%	---	---	
Chloroethane	780	---	500	"	"	1000	---	78	65-135%	---	---	
Chloroform	1100	---	250	"	"	1000	---	110	65-135%	---	---	
Chloromethane	932	---	250	"	"	1000	---	93	65-135%	---	---	
2-Chlorotoluene	1120	---	25.0	"	"	1000	---	112	65-135%	---	---	
4-Chlorotoluene	1180	---	25.0	"	"	1000	---	118	65-135%	---	---	
1,2-Dibromo-3-chloropropane	997	---	100	"	"	1000	---	100	65-135%	---	---	
Dibromochloromethane	1020	---	50.0	"	"	1000	---	102	65-135%	---	---	
1,2-Dibromoethane (EDB)	1050	---	25.0	"	"	1000	---	105	65-135%	---	---	
Dibromomethane	1060	---	25.0	"	"	1000	---	106	65-135%	---	---	
1,2-Dichlorobenzene	1100	---	25.0	"	"	1000	---	110	65-135%	---	---	
1,3-Dichlorobenzene	1060	---	25.0	"	"	1000	---	106	65-135%	---	---	
1,4-Dichlorobenzene	1020	---	25.0	"	"	1000	---	102	65-135%	---	---	
Dichlorodifluoromethane	792	---	50.0	"	"	1000	---	79	65-135%	---	---	
1,1-Dichloroethane	998	---	25.0	"	"	1000	---	100	65-135%	---	---	
1,2-Dichloroethane (EDC)	1120	---	25.0	"	"	1000	---	112	65-135%	---	---	
1,1-Dichloroethene	1040	---	25.0	"	"	1000	---	104	65-135%	---	---	
cis-1,2-Dichloroethene	1010	---	25.0	"	"	1000	---	101	65-135%	---	---	
trans-1,2-Dichloroethene	994	---	25.0	"	"	1000	---	99	65-135%	---	---	
1,2-Dichloropropane	1140	---	25.0	"	"	1000	---	114	65-135%	---	---	
1,3-Dichloropropane	1100	---	25.0	"	"	1000	---	110	65-135%	---	---	
2,2-Dichloropropane	998	---	50.0	"	"	1000	---	100	65-135%	---	---	
1,1-Dichloropropene	1100	---	25.0	"	"	1000	---	110	65-135%	---	---	

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Philip Nerenberg, Lab Director

Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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## QUALITY CONTROL (QC) SAMPLE RESULTS

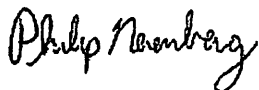
### Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 8010169 - EPA 5035-Mod (w/o Field Pres.)</b>						<b>Soil</b>						
<b>LCS (8010169-BS1)</b>						<b>Analyzed: 01/21/08 10:24</b>						
cis-1,3-Dichloropropene	1110	---	25.0	ug/kg wet	"	1000	---	111	65-135%	---	---	
trans-1,3-Dichloropropene	1130	---	50.0	"	"	1000	---	113	65-135%	---	---	
Ethylbenzene	1080	---	25.0	"	"	1000	---	108	65-135%	---	---	
Hexachlorobutadiene	918	---	100	"	"	1000	---	92	65-135%	---	---	
2-Hexanone	1610	---	500	"	"	2000	---	81	65-135%	---	---	
Isopropylbenzene	1010	---	25.0	"	"	1000	---	101	65-135%	---	---	
4-Isopropyltoluene	1130	---	25.0	"	"	1000	---	113	65-135%	---	---	
4-Methyl-2-pentanone (MiBK)	1750	---	500	"	"	2000	---	88	65-135%	---	---	
Methyl tert-butyl ether (MTBE)	984	---	50.0	"	"	1000	---	98	65-135%	---	---	
Methylene chloride	952	---	250	"	"	1000	---	95	65-135%	---	---	
Naphthalene	1220	---	250	"	"	1000	---	122	65-135%	---	---	
n-Propylbenzene	1060	---	25.0	"	"	1000	---	106	65-135%	---	---	
Styrene	942	---	25.0	"	"	1000	---	94	65-135%	---	---	
1,1,1,2-Tetrachloroethane	1050	---	50.0	"	"	1000	---	105	65-135%	---	---	
1,1,2,2-Tetrachloroethane	996	---	25.0	"	"	1000	---	100	65-135%	---	---	
Tetrachloroethene (PCE)	938	---	25.0	"	"	1000	---	94	65-135%	---	---	
Toluene	976	---	100	"	"	1000	---	98	65-135%	---	---	
1,2,3-Trichlorobenzene	1080	---	100	"	"	1000	---	108	65-135%	---	---	
1,2,4-Trichlorobenzene	1030	---	100	"	"	1000	---	103	65-135%	---	---	
1,1,1-Trichloroethane	988	---	50.0	"	"	1000	---	99	65-135%	---	---	
1,1,2-Trichloroethane	1050	---	25.0	"	"	1000	---	105	65-135%	---	---	
Trichloroethene (TCE)	1110	---	25.0	"	"	1000	---	111	65-135%	---	---	
Trichlorofluoromethane	672	---	250	"	"	1000	---	67	65-135%	---	---	
1,2,3-Trichloropropane	1080	---	25.0	"	"	1000	---	108	65-135%	---	---	
1,2,4-Trimethylbenzene	1150	---	50.0	"	"	1000	---	115	65-135%	---	---	
1,3,5-Trimethylbenzene	1100	---	50.0	"	"	1000	---	110	65-135%	---	---	
Vinyl chloride	1090	---	25.0	"	"	1000	---	109	65-135%	---	---	
m,p-Xylene	2250	---	50.0	"	"	2000	---	113	65-135%	---	---	
o-Xylene	1000	---	25.0	"	"	1000	---	100	65-135%	---	---	
<b>Surr: Dibromofluoromethane (Surr)</b>			<b>Recovery: 98 %</b>	<b>Limits: 70-130 %</b>		<b>Dilution: 1x</b>						
<b>1,4-Difluorobenzene (Surr)</b>			<b>106 %</b>	<b>70-130 %</b>		<b>"</b>						
<b>Toluene-d8 (Surr)</b>			<b>97 %</b>	<b>70-130 %</b>		<b>"</b>						
<b>4-Bromofluorobenzene (Surr)</b>			<b>99 %</b>	<b>70-130 %</b>		<b>"</b>						

**Duplicate (8010169-DUP1) Source: A801157-01 Analyzed: 01/21/08 12:23**

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Philip Nerenberg, Lab Director

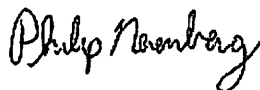
Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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## QUALITY CONTROL (QC) SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 8010169 - EPA 5035-Mod (w/o Field Pres.)</b>						<b>Soil</b>						
<b>Duplicate (8010169-DUP1)</b>			<b>Source: A801157-01</b>			<b>Analyzed: 01/21/08 12:23</b>						
Acetone	ND	---	1060	ug/kg dry	50	---	ND	---	---		30%	
Benzene	ND	---	13.3	"	"	---	ND	---	---		30%	
Bromobenzene	ND	---	26.6	"	"	---	ND	---	---		30%	
Bromochloromethane	ND	---	26.6	"	"	---	ND	---	---		30%	
Bromodichloromethane	ND	---	26.6	"	"	---	ND	---	---		30%	
Bromoform	ND	---	53.1	"	"	---	ND	---	---		30%	
Bromomethane	ND	---	531	"	"	---	ND	---	---		30%	
2-Butanone (MEK)	ND	---	531	"	"	---	ND	---	---		30%	
n-Butylbenzene	ND	---	26.6	"	"	---	ND	---	---		30%	
sec-Butylbenzene	ND	---	26.6	"	"	---	ND	---	---		30%	
tert-Butylbenzene	ND	---	26.6	"	"	---	ND	---	---		30%	
Carbon tetrachloride	ND	---	26.6	"	"	---	ND	---	---		30%	
Chlorobenzene	ND	---	26.6	"	"	---	ND	---	---		30%	
Chloroethane	ND	---	531	"	"	---	ND	---	---		30%	
Chloroform	ND	---	266	"	"	---	ND	---	---		30%	
Chloromethane	ND	---	266	"	"	---	ND	---	---		30%	
2-Chlorotoluene	ND	---	26.6	"	"	---	ND	---	---		30%	
4-Chlorotoluene	ND	---	26.6	"	"	---	ND	---	---		30%	
1,2-Dibromo-3-chloropropane	ND	---	106	"	"	---	ND	---	---		30%	
Dibromochloromethane	ND	---	53.1	"	"	---	ND	---	---		30%	
1,2-Dibromoethane (EDB)	ND	---	26.6	"	"	---	ND	---	---		30%	
Dibromomethane	ND	---	26.6	"	"	---	ND	---	---		30%	
1,2-Dichlorobenzene	ND	---	26.6	"	"	---	ND	---	---		30%	
1,3-Dichlorobenzene	ND	---	26.6	"	"	---	ND	---	---		30%	
1,4-Dichlorobenzene	ND	---	26.6	"	"	---	ND	---	---		30%	
Dichlorodifluoromethane	ND	---	53.1	"	"	---	ND	---	---		30%	
1,1-Dichloroethane	ND	---	26.6	"	"	---	ND	---	---		30%	
1,2-Dichloroethane (EDC)	ND	---	26.6	"	"	---	ND	---	---		30%	
1,1-Dichloroethene	ND	---	26.6	"	"	---	ND	---	---		30%	
cis-1,2-Dichloroethene	ND	---	26.6	"	"	---	ND	---	---		30%	
trans-1,2-Dichloroethene	ND	---	26.6	"	"	---	ND	---	---		30%	
1,2-Dichloropropane	ND	---	26.6	"	"	---	ND	---	---		30%	
1,3-Dichloropropane	ND	---	26.6	"	"	---	ND	---	---		30%	
2,2-Dichloropropane	ND	---	53.1	"	"	---	ND	---	---		30%	
1,1-Dichloropropene	ND	---	26.6	"	"	---	ND	---	---		30%	

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Philip Nerenberg, Lab Director

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Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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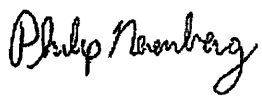
## QUALITY CONTROL (QC) SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 8010169 - EPA 5035-Mod (w/o Field Pres.)</b>			<b>Soil</b>									
<b>Duplicate (8010169-DUP1)</b>			<b>Source: A801157-01</b>			<b>Analyzed: 01/21/08 12:23</b>						
cis-1,3-Dichloropropene	ND	---	26.6	ug/kg dry	"	---	ND	---	---		30%	
trans-1,3-Dichloropropene	ND	---	53.1	"	"	---	ND	---	---		30%	
Ethylbenzene	ND	---	26.6	"	"	---	ND	---	---		30%	
Hexachlorobutadiene	ND	---	106	"	"	---	ND	---	---		30%	
2-Hexanone	ND	---	531	"	"	---	ND	---	---		30%	
Isopropylbenzene	ND	---	26.6	"	"	---	ND	---	---		30%	
4-Isopropyltoluene	ND	---	26.6	"	"	---	ND	---	---		30%	
4-Methyl-2-pentanone (MiBK)	ND	---	531	"	"	---	ND	---	---		30%	
Methyl tert-butyl ether (MTBE)	ND	---	53.1	"	"	---	ND	---	---		30%	
Methylene chloride	ND	---	266	"	"	---	ND	---	---		30%	
Naphthalene	ND	---	266	"	"	---	ND	---	---		30%	
n-Propylbenzene	ND	---	26.6	"	"	---	ND	---	---		30%	
Styrene	ND	---	26.6	"	"	---	ND	---	---		30%	
1,1,1,2-Tetrachloroethane	ND	---	53.1	"	"	---	ND	---	---		30%	
1,1,2,2-Tetrachloroethane	ND	---	26.6	"	"	---	ND	---	---		30%	
Tetrachloroethene (PCE)	ND	---	26.6	"	"	---	ND	---	---		30%	
Toluene	ND	---	106	"	"	---	ND	---	---		30%	
1,2,3-Trichlorobenzene	ND	---	106	"	"	---	ND	---	---		30%	
1,2,4-Trichlorobenzene	ND	---	106	"	"	---	ND	---	---		30%	
1,1,1-Trichloroethane	ND	---	53.1	"	"	---	ND	---	---		30%	
1,1,2-Trichloroethane	ND	---	26.6	"	"	---	ND	---	---		30%	
Trichloroethene (TCE)	ND	---	26.6	"	"	---	ND	---	---		30%	
Trichlorofluoromethane	ND	---	266	"	"	---	ND	---	---		30%	
1,2,3-Trichloropropane	ND	---	26.6	"	"	---	ND	---	---		30%	
1,2,4-Trimethylbenzene	ND	---	53.1	"	"	---	ND	---	---		30%	
1,3,5-Trimethylbenzene	ND	---	53.1	"	"	---	ND	---	---		30%	
Vinyl chloride	ND	---	26.6	"	"	---	ND	---	---		30%	
m,p-Xylene	ND	---	53.1	"	"	---	ND	---	---		30%	
o-Xylene	ND	---	26.6	"	"	---	ND	---	---		30%	
Surr: Dibromofluoromethane (Surr)			Recovery: 106 %	Limits: 70-130 %	Dilution: 1x							
1,4-Difluorobenzene (Surr)			105 %	70-130 %	"							
Toluene-d8 (Surr)			97 %	70-130 %	"							
4-Bromofluorobenzene (Surr)			98 %	70-130 %	"							

Apex Laboratories

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Philip Nerenberg, Lab Director

Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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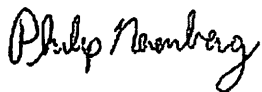
## QUALITY CONTROL (QC) SAMPLE RESULTS

### PAH by EPA 8270C SIM

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 8010172 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8010172-BLK1)</b>						<b>Analyzed: 01/21/08 14:38</b>						
Acenaphthene	ND	---	25.0	ug/kg wet	1	---	---	---	---	---	---	---
Acenaphthylene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Anthracene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Benz(a)anthracene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Benzo(a)pyrene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Benzo(b)fluoranthene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Benzo(k)fluoranthene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Benzo(g,h,i)perylene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Chrysene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Dibenz(a,h)anthracene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Fluoranthene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Fluorene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Indeno(1,2,3-cd)pyrene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Naphthalene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Phenanthrene	ND	---	25.0	"	"	---	---	---	---	---	---	---
Pyrene	ND	---	25.0	"	"	---	---	---	---	---	---	---
<i>Surr: Nitrobenzene-d5 (Surr)</i>			<i>Recovery: 70 %</i>	<i>Limits: 35-120 %</i>		<i>Dilution: 1x</i>						
<i>2-Fluorobiphenyl (Surr)</i>			<i>77 %</i>	<i>45-120 %</i>		<i>"</i>						
<i>p-Terphenyl-d14 (Surr)</i>			<i>78 %</i>	<i>30-120 %</i>		<i>"</i>						
<b>LCS (8010172-BS1)</b>						<b>Analyzed: 01/21/08 14:58</b>						
Acenaphthene	133	---	25.0	ug/kg wet	1	167	---	80	45-120%	---	---	---
Acenaphthylene	132	---	25.0	"	"	167	---	79	45-120%	---	---	---
Anthracene	143	---	25.0	"	"	167	---	86	55-120%	---	---	---
Benz(a)anthracene	131	---	25.0	"	"	167	---	79	50-120%	---	---	---
Benzo(a)pyrene	133	---	25.0	"	"	167	---	80	50-120%	---	---	---
Benzo(b)fluoranthene	137	---	25.0	"	"	167	---	82	45-120%	---	---	---
Benzo(k)fluoranthene	140	---	25.0	"	"	167	---	84	45-125%	---	---	---
Benzo(g,h,i)perylene	120	---	25.0	"	"	167	---	72	40-125%	---	---	---
Chrysene	143	---	25.0	"	"	167	---	86	55-120%	---	---	---
Dibenz(a,h)anthracene	116	---	25.0	"	"	167	---	69	40-125%	---	---	---
Fluoranthene	117	---	25.0	"	"	167	---	70	55-120%	---	---	---
Fluorene	134	---	25.0	"	"	167	---	81	50-120%	---	---	---
Indeno(1,2,3-cd)pyrene	121	---	25.0	"	"	167	---	72	40-120%	---	---	---
1-Methylnaphthalene	134	---	25.0	"	"	167	---	80	45-120%	---	---	---

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Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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### QUALITY CONTROL (QC) SAMPLE RESULTS

#### PAH by EPA 8270C SIM

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 8010172 - EPA 3546</b>						<b>Soil</b>						
<b>LCS (8010172-BS1)</b>						<b>Analyzed: 01/21/08 14:58</b>						
2-Methylnaphthalene	132	---	25.0	ug/kg wet	"	167	---	79	45-120%	---	---	
Naphthalene	131	---	25.0	"	"	167	---	79	40-120%	---	---	
Phenanthrene	137	---	25.0	"	"	167	---	82	50-120%	---	---	
Pyrene	158	---	25.0	"	"	167	---	95	45-125%	---	---	
<i>Surr: Nitrobenzene-d5 (Surr)</i>			<i>Recovery: 71 %</i>					<i>Limits: 35-120 %</i>				<i>Dilution: 1x</i>
<i>2-Fluorobiphenyl (Surr)</i>			<i>77 %</i>					<i>45-120 %</i>				<i>"</i>
<i>p-Terphenyl-d14 (Surr)</i>			<i>77 %</i>					<i>30-120 %</i>				<i>"</i>

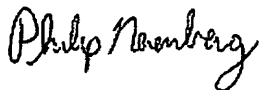


Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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## QUALITY CONTROL (QC) SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 8010177 - EPA 3051</b>						<b>Soil</b>						
<b>Blank (8010177-BLK1)</b>						<b>Analyzed: 02/01/08 16:20</b>						
Cadmium	ND	---	1.00	mg/kg wet	10	---	---	---	---	---	---	B-02
Chromium	ND	---	2.00	"	"	---	---	---	---	---	---	
Lead	ND	---	1.00	"	"	---	---	---	---	---	---	
<b>LCS (8010177-BS1)</b>						<b>Analyzed: 02/01/08 16:23</b>						
Cadmium	46.4	---	1.00	mg/kg wet	10	50.0	---	93	80-120%	---	---	
Chromium	44.5	---	2.00	"	"	50.0	---	89	80-120%	---	---	
Lead	46.3	---	1.00	"	"	50.0	---	93	80-120%	---	---	
<b>LCS (8010177-BS2)</b>						<b>Analyzed: 02/01/08 16:30</b>						
Cadmium	49.1	---	1.00	mg/kg wet	10	50.0	---	98	80-120%	---	---	
Chromium	46.4	---	2.00	"	"	50.0	---	93	80-120%	---	---	
Lead	48.5	---	1.00	"	"	50.0	---	97	80-120%	---	---	



Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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### SAMPLE PREPARATION INFORMATION

#### Apex Laboratories

#### Diesel Range (C10-C22) and Oil Range (C22-C40) Hydrocarbons by NWTPH-Dx

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>EPA 3546 (Fuels)</b>							
Batch: 8010162							
A801157-01	Soil	NWTPH-Dx	01/17/08 10:00	01/18/08 08:11	11.79g/5mL	15g/5mL	1.27
A801157-03	Soil	NWTPH-Dx	01/17/08 11:40	01/18/08 08:11	14.12g/5mL	15g/5mL	1.06
A801157-05	Soil	NWTPH-Dx	01/17/08 13:20	01/18/08 08:11	12.36g/5mL	15g/5mL	1.21

#### Gasoline Range (C6-C10) Hydrocarbons by NWTPH-Gx

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>EPA 5035-Mod (w/o Field Pres.)</b>							
Batch: 8010169							
A801157-01	Soil	NWTPH-Gx	01/17/08 10:00	01/18/08 12:32	10.332g/10mL	10g/10mL	0.97
A801157-03	Soil	NWTPH-Gx	01/17/08 11:40	01/18/08 12:32	10.282g/10mL	10g/10mL	0.97
A801157-05	Soil	NWTPH-Gx	01/17/08 13:20	01/18/08 12:32	10.33g/10mL	10g/10mL	0.97

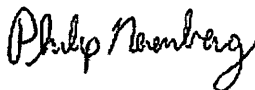
#### Volatile Organic Compounds by EPA 8260B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>EPA 5035-Mod (w/o Field Pres.)</b>							
Batch: 8010169							
A801157-01	Soil	EPA 8260B	01/17/08 10:00	01/18/08 12:32	10.332g/10mL	10g/10mL	0.97
A801157-03	Soil	EPA 8260B	01/17/08 11:40	01/18/08 12:32	10.282g/10mL	10g/10mL	0.97
A801157-05	Soil	EPA 8260B	01/17/08 13:20	01/18/08 12:32	10.33g/10mL	10g/10mL	0.97

#### PAH by EPA 8270C SIM

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>EPA 3546</b>							
Batch: 8010172							
A801157-03	Soil	EPA 8270 SIM	01/17/08 11:40	01/21/08 08:56	10.12g/5mL	15g/5mL	1.48
A801157-05	Soil	EPA 8270 SIM	01/17/08 13:20	01/21/08 08:56	10.75g/5mL	15g/5mL	1.40

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Philip Nerenberg, Lab Director

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# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

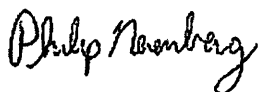
Amec Earth and Environmental, Inc 7376 SW Durham Road Portland, OR 97224	Project: 1505 Killingsworth Project Number: 761M-117120 Project Manager: Dennis Sullivan	Reported: 02/04/08 16:15
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## Apex Laboratories

### Total Metals by EPA 6020 (ICPMS)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RI. Prep Factor
<b>EPA 3051</b>							
<u>Batch: 8010177</u>							
A801157-03	Soil	EPA 6020	01/17/08 11:40	01/21/08 09:59	0.469g/50mL	0.5g/50mL	1.07
A801157-05	Soil	EPA 6020	01/17/08 13:20	01/21/08 09:59	0.508g/50mL	0.5g/50mL	0.98

Apex Laboratories



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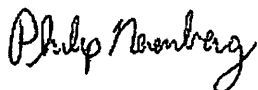
### Notes and Definitions

#### Qualifiers:

- B-02 Analyte detected in the extraction blank at a level below the MRL, but greater than one-half the MRL.
- Q-08 Recovery of Lab Control Spike or Matrix Spike was above established control limits for this analyte. Analyte was not detected, therefore data quality is not affected.

#### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- Batch QC Unless specifically stated, all analyses include full Batch QC, including Sample Duplicates, Matrix Spikes and/or Matrix Spike Duplicates, in order to meet or exceed method and regulatory requirements. This report contains only results for Batch QC derived from samples included in this report. Complete Batch QC results are available upon request. In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.





\* PETROLEUM RELEASE FORM \*

Please Check All That Apply

INCIDENT INFORMATION

RECEIVED BY: (Dept. use only) KPD

LOG NBR: (Dept. use only) 26-08-1529

DATE REPORTED: (today's date) 12/30/08

Q-Time #40918

SITE NAME: Killingsworth Commercial Property

SITE ADDRESS: 1505 NE Killingsworth St.

NON-REGULATED UST

SITE CITY: Portland ZIP: 97211

REGULATED UST & FAC NBR: \_\_\_\_\_

SITE COUNTY: Multnomah PHONE: \_\_\_\_\_

HEATING OIL TANK

MAIL CONTACTS

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

RESPONSIBLE PARTY (person responsible for remedial action)

NAME: \_\_\_\_\_

NAME: Robin Denburg

COMPANY: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

ADDRESS: 4721 NE 31st Ave

CITY: \_\_\_\_\_ ZIP: \_\_\_\_\_

CITY: Portland ZIP: 97211

STATE: \_\_\_\_\_ PHONE: \_\_\_\_\_

STATE: OR PHONE: 503-484-8402

EMAIL: \_\_\_\_\_

EMAIL: robin@realityrobin.com

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

OTHER CONTACT(S) (not required)

NAME: Same as RP

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_ ZIP: \_\_\_\_\_

CITY: \_\_\_\_\_ ZIP: \_\_\_\_\_

STATE: \_\_\_\_\_ PHONE: \_\_\_\_\_

STATE: \_\_\_\_\_ PHONE: \_\_\_\_\_

SITE ASSESSMENT

DATE DISCOVERED: 1 / 25 / 08

DATE TANK IS EMPTY: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

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: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

FINAL REQUEST INVOICE DATE: 11 / 30 / 10 uk

CLEANUP STARTED: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

NO FURTHER ACTION: 11 / 30 / 10

NOTES/COMMENTS: \_\_\_\_\_