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Global Specialists in the Environment

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March 8, 2012

Earl Liverman, On-Scene Coordinator  
United States Environmental Protection Agency  
1910 Northwest Blvd, Suite 208  
Coeur D'Alene, Idaho 83814

Re: Contract Number EP-S7-06-02, Technical Direction Document Number 10-09-0008  
2011 Removal Action Report, Orofino Asbestos Site, Orofino, Clearwater County, Idaho

Dear Mr. Liverman:

Enclosed please find the 2011 removal action report for the Orofino Asbestos Site in Orofino, Clearwater County, Idaho. If you have any questions regarding this submittal, please call me at (206) 920-1739.

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

Steven G. Hall  
START-3 Project Leader

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# REMOVAL ACTION REPORT

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**Orofino Asbestos Site**  
**Orofino, Clearwater County, Idaho**  
**TDD: 10-09-0008**



Prepared for:

U.S. Environmental Protection Agency, Region 10  
1910 Northwest Boulevard, Suite 208  
Coeur d'Alene, Idaho 83814

Prepared by:

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March 8, 2012

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## List of Abbreviations and Acronyms

<b>Abbreviation</b>	<b>Definition</b>
μm	micrometer
%	percent
%R	percent recovery
ACM	asbestos-containing material
ACP	asbestos-cement pipe
AHERA	Asbestos Hazard Emergency Response Act
ASTM	American Society for Testing and Materials
BMPs	Best Management Practices
BS	blank spike
CARB	California Air Resources Board
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Church	First Baptist Church
District	Riverside Water and Sewer District
DQOs	data quality objectives
E & E	Ecology and Environment, Inc.
EMSL	EMSL Analytical, Inc.
EPA	United States Environmental Protection Agency
EQM	Environmental Quality Management, Inc.
ERRS	Emergency and Rapid Response Services
f/cc	fibers per cubic centimeter
H&SP	health and safety plan
HEPA	high efficiency particulate air
ISO	International Organization of Standardization
L/min	liters per minute
MCE	mixed-cellulose ester
McGillivray	McGillivray Environmental
mm	millimeter

## List of Abbreviations and Acronyms (cont.)

<b>Abbreviation</b>	<b>Definition</b>
MS	matrix spike
MSD	matrix spike duplicate
M&R	maintenance and repair
NIOSH	National Institute for Occupational Safety and Health
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
PCM	phase contrast microscopy
PEL	permissible exposure limit
PLM	polarized light microscopy
PPE	personal protective equipment
PRP	potentially responsible party
PRSC	post-removal site controls
QA	quality assurance
QC	quality control
RA	removal action
RPD	relative percent difference
RSE	removal site evaluation
s/cc	structures per cubic centimeter
SARA	Superfund Amendments and Reauthorization Act
SSSP	site-specific sampling plan
START	Superfund Technical Assessment and Response Team
TDD	Technical Direction Document
TEM	transmission electron microscopy
UCSC	unified soil classification system
Vacant Lot	vacant lot at 12976 Highway 12
yd <sup>3</sup>	cubic yards

# Executive Summary

From late August through October 2011, the United States Environmental Protection Agency (EPA) performed a Removal Action (RA) at the Orofino Asbestos Site (the Site) in Orofino, Idaho, to mitigate potential human health risks from exposure to asbestos-contaminated soil placed as fill material at multiple properties. The RA was performed to complete the cleanup begun in 2010.

The Site consisted of 21 properties, including residences, churches, and commercial properties, that had received asbestos-contaminated soil as fill material, and one property where Transite was placed. The asbestos-contaminated soil came from Riverside Water and Sewer District (District) waterline improvement projects performed in the area during 2008 and 2009, in which District contractors allegedly removed asbestos-cement pipe (ACP) improperly from the ground and then gave the soil containing pieces of the ACP to community property owners for use as fill on their properties.

Following Site investigations initiated in June and August 2010, EPA identified seven properties that had received the asbestos-contaminated soil as fill material, and EPA began the RA in the fall of 2010. By the end of the 2010 RA, EPA identified an additional 15 properties that also received the asbestos-contaminated soil as fill material. Because of access and schedule issues, EPA completed cleanup work at 12 of the properties in 2010, with the remaining properties postponed for 2011. At some of the properties planned for 2011 (depending on property-specific conditions and the consent of property owners), EPA placed a temporary gravel barrier over the asbestos-contaminated soil as an interim protective measure until the cleanup could be completed.

EPA returned to the Site in August 2011 to complete the cleanup. During the 2011 RA, EPA removed asbestos-contaminated soil from seven properties. At an eighth property, no ACP was observed, but EPA removed pieces of a different type of asbestos-containing material (ACM) – Transite – from the surface of the ground for proper off-Site disposal. A total of 1,660 cubic yards (yd<sup>3</sup>) of asbestos-contaminated soil was removed from the seven properties and transported to the First Baptist Church (Church) property located at 291 118<sup>th</sup> Street for disposal beneath a protective barrier constructed on-site.

Cleanup work at each property (except the property where the Transite was found) was performed by excavating the asbestos-contaminated soil and an additional 6 inches of the original soil underneath. EPA used Best Management Practices (BMPs) to minimize the release of dust and asbestos fibers during removal activities, and the results of air monitoring and sampling confirmed that levels were below Site action levels. Confirmation samples were collected from each excavation area and analyzed for asbestos, and the results indicated that the asbestos-contaminated soil had been removed from each excavation area.

ACP and Transite recovered during the 2011 RA were transported off-Site to the Graham Road landfill in Medical Lake, Washington, which is licensed to accept asbestos waste. A total of 1,190 pounds of asbestos waste and debris was disposed off-Site during the 2011 RA.

Asbestos-contaminated soil remains on-Site under protective barriers at two properties: the Church and the vacant lot at 12976 Highway 12 (Vacant Lot). Restrictive covenants will be imposed on both properties and will remain in effect as long as the asbestos-contaminated soil is present, and maintenance and repair (M&R) plans will be implemented by each property owner to ensure the integrity of the protective barriers.

The asbestos-contaminated soil from the seven individual properties was transferred to the Church. The Church had also received a large quantity of asbestos-contaminated soil as fill material (approximately 10,420 yd<sup>3</sup>), and rather than removing this asbestos-contaminated soil for off-Site disposal, the Church proposed to EPA to consolidate the asbestos-contaminated soil from the other properties with the contaminated soil at the Church behind an engineered retaining wall and under an asphalt and soil cap. Including the material that was already present, there is an estimated total of 12,100 yd<sup>3</sup> of asbestos-contaminated soil under the protective cover at this property.

At the Vacant Lot, an estimated 16,680 yd<sup>3</sup> of asbestos-contaminated soil is present under a protective barrier of gravel. The gravel was placed there by one of the potentially responsible parties in 2010 pursuant to an Administrative Settlement Agreement and Order on Consent with EPA. In 2011, EPA assessed the gravel barrier and determined that it was sufficient as a final protective barrier for the asbestos-contaminated soil.

# 1 Introduction

In 2008 and 2009, the Riverside Water and Sewer District (District) performed water line improvements in and around the City of Orofino. The purpose of the project was to replace the existing underground water supply pipes, which were composed of asbestos-cement pipe (ACP), with newer pipes. The contract for this project specified that the ACP was to be crushed in place and then covered with backfill. However, the contractors allegedly removed the ACP from the trenches and gave excavated soil containing the ACP as fill material to multiple properties in and around the City of Orofino.

In June 2010, United States Environmental Protection Agency (EPA) On-Scene Coordinator (OSC) Earl Liverman investigated the vacant lot located at 12976 Highway 12 (Vacant Lot) and observed many scattered pieces of suspected ACP laying on the ground. Samples of the ACP were collected and submitted for laboratory analysis, and the results indicated that they contained 8 to 9 percent (%) chrysotile asbestos and therefore met the criteria for asbestos-containing material (ACM) (E & E 2011d).

In August 2010, EPA performed a removal site evaluation (RSE) at six additional properties in and around Orofino that had received the asbestos-contaminated soil as fill material. At each property, EPA again observed broken pieces of ACP and/or Transite, another type of ACM. Analysis of bulk samples of the ACP and Transite collected from the properties confirmed that they were ACM. Additionally, two of four soil samples collected near broken pieces of ACP contained detectable concentrations of chrysotile asbestos (E & E 2011c).

Because of the presence of the uncontrolled and friable ACP and asbestos on the multiple properties, EPA began a removal action (RA) in October 10, 2010, to mitigate the human health hazards to affected residents and the community. At the beginning of the RA, EPA was aware of seven properties that received the contaminated fill. The first property was the Vacant Lot, and one of the potentially responsible parties (PRPs) covered the asbestos-contaminated soil with approximately 4 inches of gravel as an interim protective barrier. The remaining six properties identified during the August 2010 RSE were the subject of the EPA RA. The objective of the RA was to remove the asbestos-contaminated soil and six inches of the original soil underneath for disposal at an appropriate off-Site landfill (E & E 2011b).

During the 2010 RA, EPA identified an additional 14 properties that had received asbestos-contaminated soil as fill material and another property with Transite, for a total of 22 affected properties. Because of access and schedule issues, EPA completed work at 12 of the properties in 2010, and the remaining 10 were planned for cleanup in 2011. Depending on property-specific factors and the consent of the property owner, EPA placed a gravel cover on some of the contaminated fill areas in 2010 as an interim protective barrier (E & E 2011b).

In August 2011, EPA returned to the Site to complete the RA. EPA tasked Ecology and Environment, Inc. (E & E), under Superfund Technical Assessment and Response Team (START)-3 contract number EP-S7-06-02, Technical Direction Document (TDD) number 10-09-0008, to provide technical, sampling, and documentation support for the RA.

The results of the 2010 RA are summarized in the report dated June 22, 2011 (E & E 2011b), and this report for the 2011 RA follows a similar organization: Introduction (Section 1); Site Description and Background (Section 2); Removal Action Description (Section 3); Project Organization, Cost, and Schedule (Section 4); Removal Activities (Section 5); Post-Removal Site Controls (Section 6); Waste Management, Transportation, and Disposal Activities (Section 7); Sampling and Monitoring Activities (Section 8); Quality Assurance/Quality Control (Section 9); Community Relations (Section 10); Health and Safety (Section 11); Difficulties Encountered/Recommendations (Section 12); Summary and Conclusions (Section 13); and References (Section 14). Photographs taken throughout the 2011 RA are presented in Appendix A.

## 2 Site Description and Background

### 2.1 Site Location and Layout

<b>Site Name</b>	Orofino Asbestos Site
<b>Owner</b>	Multiple
<b>SSID #</b>	10JN
<b>CERCLIS #</b>	IDN001002885
<b>Location</b>	Orofino, Clearwater County, Idaho
<b>Latitude</b>	46° 28.41' 11" N
<b>Longitude</b>	116° 15.10' 57" W

The Orofino Asbestos Site includes 21 individual properties that received asbestos-contaminated soil as fill material in and around the City of Orofino and one property where Transite was placed (Figure 2-1). Orofino is a rural community located in the North Central Region of Idaho along Orofino Creek and the Clearwater River. The population is approximately 3,300 and the City is the county seat for Clearwater County.

Cleanup was completed at 12 of the 22 properties during the 2010 RA, and the remaining 10 were addressed during the 2011 RA. Additionally, one of the PRPs completed an interim action in 2010 at the Vacant Lot. Figure 2-1 also shows the status of each property at the beginning of the 2011 RA.

### 2.2 Surrounding Land Uses

Information related to surrounding land uses is unchanged from the 2010 RA report (E & E 2011b).

### 2.3 Site History, Operations, and Ownership

Information related to Site history, operations, and ownership is unchanged from the 2010 RA report (E & E 2011b).

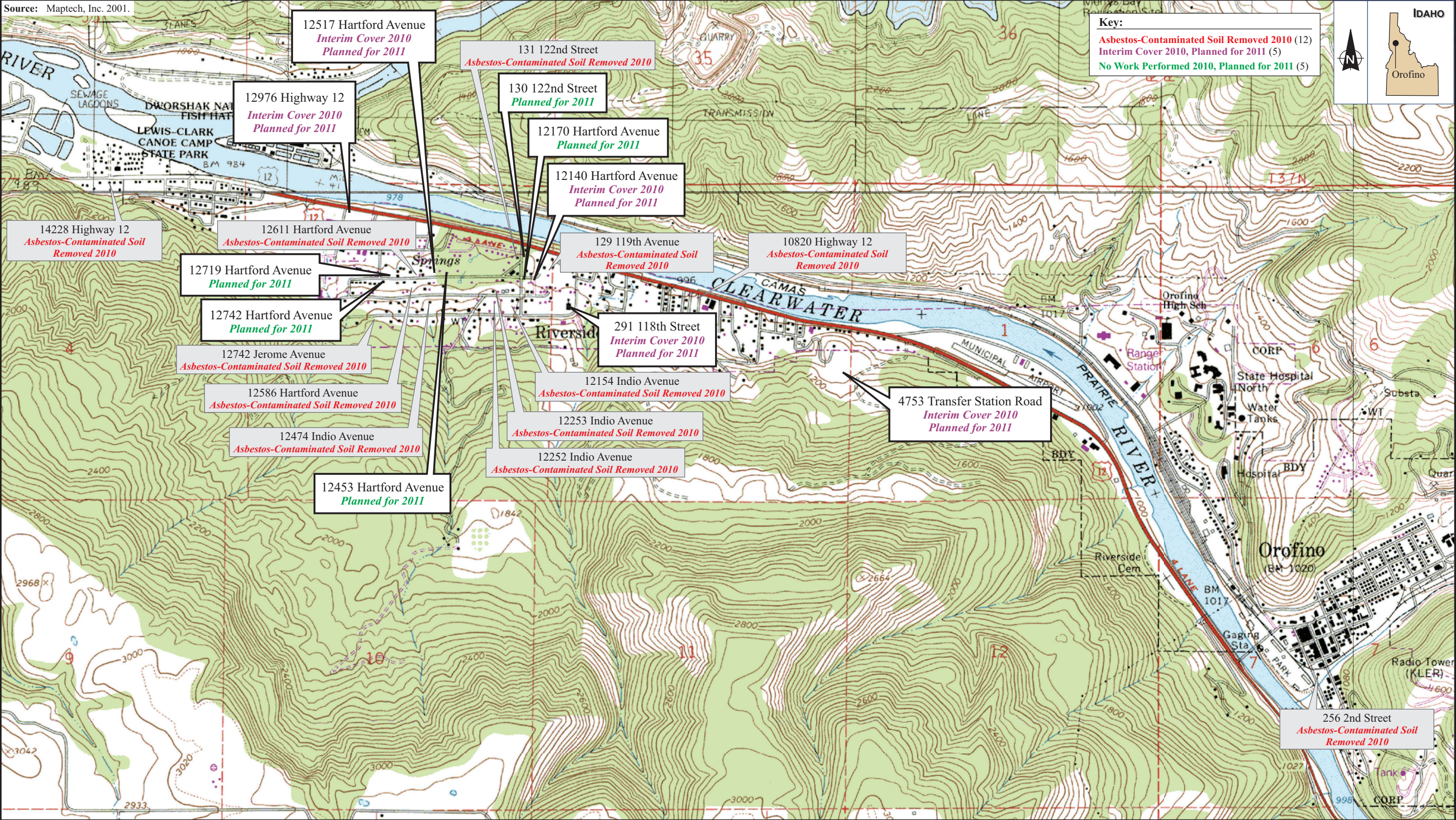
### 2.4 Regulatory and Enforcement History

There are no known regulatory or enforcement actions at the Site prior to EPA's involvement in 2010. For a summary of EPA's 2010 investigations and RA, refer to Section 2.4 of the 2010 RA report (E & E 2011b). The RAs performed at the Site include an interim action performed by one of the PRPs at the Vacant Lot and the EPA RAs performed in 2010 and 2011.

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Source: Maptech, Inc. 2001.





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# 3 Removal Action Description

EPA performed the 2011 RA at the Orofino Asbestos Site to address the potential human health risks from asbestos fibers caused by the placement of asbestos-contaminated soil as fill material at various locations in the community. The 2011 RA was performed to complete the cleanup begun by EPA in 2010 at the Site.

## 3.1 Removal Action Objectives

The objective of the 2011 RA was to remove asbestos-contaminated soil from eight of the remaining properties and to consolidate it under a protective barrier to be constructed at the ninth property—the First Baptist Church (Church) located at 291 118<sup>th</sup> Street. At some of these properties, EPA had placed gravel barriers in 2010 as an interim protective measure until the RA could be completed. For these properties, the interim gravel barrier was removed so that the asbestos-contaminated soil underneath could be removed.

The 10<sup>th</sup> property (the Vacant Lot), which was covered by an interim gravel barrier in 2010 by one of the PRPs, was to receive additional gravel. Figure 3-1 shows the 10 properties to be addressed during the 2011 RA and the removal objectives for each.

During the 2010 RA, EPA transported the asbestos-contaminated soil off- Site to the Graham Road Landfill in Medical Lake, Washington, which is licensed for asbestos waste. Of the remaining properties that still had asbestos-contaminated soil, the largest quantity was at the Church. Rather than requesting that the asbestos-contaminated soil on their property be removed, the Church proposed that the contaminated soil from eight of the remaining properties be consolidated with the contaminated soil already on their property beneath an engineered protective barrier to be constructed by EPA. EPA accepted the Church proposal because on-Site disposal beneath a protective barrier provides an acceptable degree of protection and because of the cost savings associated with not having to transport the contaminated materials off-Site.

Specifically, the 2011 removal objectives included the following steps:

- 1. Eight Properties Designated for Removal.** Remove asbestos-contaminated soil and any ACP from eight properties (see Figure 3-1). Specifically, for each of these properties, the objective was to:
  - If applicable, remove the interim gravel barrier from any property where it was placed and determine eligibility for reuse;
  - Excavate asbestos-contaminated soil until the underlying native material is observed;
  - Continue to over-excavate an additional 6 inches into the native material to ensure that all asbestos was removed;
  - Recover any large pieces of ACP for off-Site disposal, to minimize the ACP left on-Site;
  - Transport the asbestos-contaminated soil to the Church;
  - Collect a confirmation soil sample for off-Site analysis to confirm the removal of asbestos;

- Backfill over-excavated areas with clean material such as soil or gravel; and
- Re-grade disturbed areas to ensure proper surface water drainage, followed by the application of hydroseed or sod, where appropriate.

**2. First Baptist Church, 291 118<sup>th</sup> Street.** Consolidate asbestos-contaminated soil from the eight properties discussed above at this property beneath a protective barrier consisting of a retaining wall and asphalt and soil barriers. The retaining wall was constructed in accordance with the design calculations provided by JM Engineering (JM Engineering 2011) on behalf of Wilbert Precast, Inc. of Spokane, Washington, and the soil compaction and asphalt parking lot specifications prepared by START (E & E 2011a). Specific steps included:

- Remove the interim gravel barrier placed in 2010 from the Church parking lot;
- Consolidate asbestos-contaminated soil from the eight remote properties with the asbestos-contaminated soil already present at this location;
- Construct an engineered retaining wall along the northern and western edges of the contaminated fill area, and place contaminated soil behind the wall; and
- Cover the asbestos-contaminated soil with an asphalt and soil cap. The asphalt portion of the cap will be suitable for a parking lot, and the soil portion of the cap will function as a dry retention basin for surface water control and to prevent erosion.

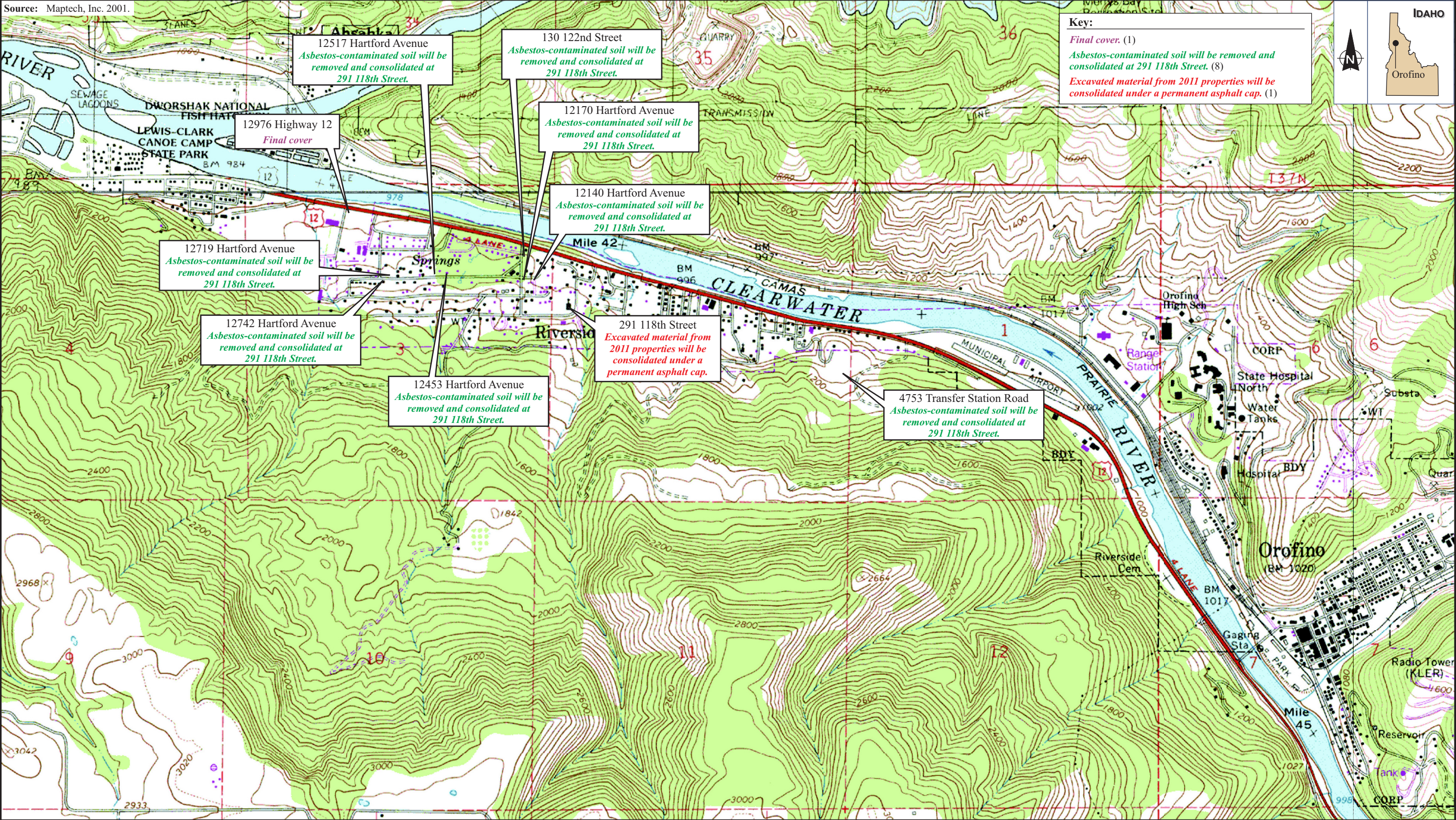
### **3.2 Changes to the Removal Action Scope during Cleanup**

At the property at 130 122<sup>nd</sup> Street, EPA observed piles of soil that contained Transite, a type of ACM. However, no ACP was observed, and it did not appear that these piles were related to the District water line improvement project. For this property, EPA removed the Transite only and did not remove the soil because the Transite was only located on the surface of the soil piles and there was no evidence of contaminated fill material on the property. The Transite was disposed properly off-Site with ACP recovered from other properties.

For the Vacant Lot at 12976 Highway 12, EPA determined that the protective gravel barrier that had been placed there in 2010 by one of the PRPs was sufficient as a long-term barrier. Therefore, no additional work was performed at this property during 2011. This decision was based on the protectiveness of the existing protective barrier including access controls, likely future commercial use of the property, the restrictive covenants likely to be imposed on the property, and an M&R Plan to be developed to maintain the long-term durability and effectiveness of the barrier.



Source: Maptech, Inc. 2001.



**ecology and environment, inc.**  
Global Specialists in the Environment  
Seattle, Washington

0 1600 3200  
Approximate Scale in Feet

**OROFINO ASBESTOS SITE**  
Orofino, Idaho

Figure 3-1  
2011 REMOVAL ACTION OBJECTIVES

Date:  
3/8/12

Drawn by:  
AES

10:START-3\10080001\fig 3-1



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## 4 Project Organization, Cost, and Schedule

EPA Region 10 performed the 2011 RA from late August through October 2011. This section describes the participating organizations, project costs, and schedule.

### 4.1 Key Organizations and Roles

The 2011 RA was performed by EPA and its contractors:

**On-Scene Coordinator:** The RA was performed under the supervision of an EPA OSC.

**START:** E & E, under an EPA Region 10 START contract, provided on-Site technical assistance, collected and submitted environmental samples, and documented Site activities.

**Emergency and Rapid Response Services:** RA cleanup work was performed under the EPA Region 10 Emergency and Rapid Response Services (ERRS) contract by Environmental Quality Management, Inc. (EQM) and its subcontractor McGillivray Environmental (McGillivray).

### 4.2 Project Costs

EPA costs for the RA included ERRS and START. Estimated costs for the RA, including both 2010 and 2011, through December 31, 2011, are summarized below in Table 4-1.

**Table 4-1 Project Costs**

	<b>Cost to Date (\$)</b>	<b>Ceiling Costs (\$)</b>
<b>Extramural Costs</b>		
ERRS	1,357,000	1,438,000
START-3	285,000	290,000
<b>Total</b>	<b>1,642,000</b>	<b>1,728,000</b>

### 4.3 Final Project Schedule

Table 4-2 summarizes the project schedule during the 2011 removal activities.

**Table 4-2 Project Schedule**

Activity	Date
EPA, ERRS, and START performed a Site-walk to plan for the RA and discuss requirements for the engineered retaining wall.	August 9, 2011
EPA, ERRS, and START mobilized to the Site to begin the RA.	August 22, 2011
START demobilized from the Site.	October 4, 2011
Completed construction of the Church retaining wall and asphalt and soil barriers; EPA and ERRS demobilized from the Site.	October 25, 2011



## 5 Removal Activities

The removal activities performed during the 2011 RA were similar to the 2010 activities and included the removal of asbestos-contaminated soil from properties in the vicinity of Orofino, Idaho (E&E 2011b). However, instead of sending the asbestos-contaminated soil off-Site for disposal at a licensed landfill, the waste was consolidated beneath a protective barrier constructed at the Church.

### 5.1 Mobilization and Site Layout

EPA, ERRS, and START personnel arrived in Orofino on August 22, 2011. ERRS brought equipment including excavators, a skid steer, several dump trucks, and two water trucks to perform the RA. START brought air monitoring equipment, dust monitors, soil and bulk sampling equipment, and a twenty-foot trailer to be used for equipment storage and office space. The trailer and other equipment were staged at the Church.

### 5.2 Contaminated Soil Removal from Properties

This section describes the general activities, and information for each property is discussed in Section 5.6.

Prior to removal work on each property, EPA contacted the property owner to discuss the cleanup process and schedule for their property. EPA also had the property owner complete and sign a *Consent for Entry and Access to Property* form if not already completed in 2010.

ERRS established a work zone around the area of asbestos-contaminated soil with a silt fence and an orange construction fence. The silt fence was used to help prevent soil runoff during dust suppression and removal activities, and the orange construction fence was placed on the outside of the silt fence as a visual barrier to establish the perimeter of the exclusion zone (i.e., the work zone requiring appropriate personal protective equipment [PPE]) and to preclude entry by the public. Additionally, air sampling pumps and DataRAM dust monitors were set up around the perimeter of the work zone to monitor for the potential release of asbestos fibers and particulates. The air sampling pumps were used to collect samples to be analyzed for asbestos and other fibers at an off-Site laboratory, while the DataRAM dust monitors provided real-time data about airborne particulate levels.

Once each work zone was established, ERRS removed any interim gravel layers, if present. The upper layer of the gravel that was not in direct contact with the asbestos-contaminated soil was set aside for re-use as backfill. ERRS then excavated the asbestos-contaminated soil and any remaining gravel into piles with a skid steer and/or mini-excavator. Once the asbestos-contaminated soil was removed, ERRS over-excavated an additional 6 inches to ensure that any additional contaminated soil was removed. ERRS then used an excavator to transfer the asbestos-contaminated soil into dump trucks. The loads were covered by tarps and then transferred to the Church parking lot staging area. Best Management Practices (BMPs) were implemented during off-loading to control for fugitive dust emissions.

As the asbestos-contaminated soil was excavated and loaded into the dump trucks, visible pieces of ACP were segregated from the asbestos-contaminated soil for separate handling and disposal.

During excavation activities, workers inside the work zone wore level C PPE, including Tyvek coveralls, rubber boots, nitrile gloves, hard hats, and half mask respirators with high-efficiency particulate air (HEPA) filters. START provided ERRS personnel with personal air sampling pumps to monitor their potential exposure to asbestos and other fibers. The results of the air monitoring are discussed in Section 8. All of the samples were below Site action levels, which indicates that BMPs such as spraying water to control dust were successful in preventing asbestos fibers from becoming airborne.

Once the asbestos-contaminated soil was removed, the quantity of recovered ACP was measured and recorded, including the length (linear feet) and weight (pounds). If applicable, START collected a small sample of the ACP for laboratory analyses, and then the remainder of the ACP pieces recovered from each property was placed in asbestos waste disposal bags and transferred to the Church for storage pending off-Site disposal. Recovered pieces of ACP was disposed off Site to minimize the amount remaining on Site and to avoid further asbestos release from the degradation of the ACP.

Upon completion of excavation activities at each property, START collected a 15- to 30-part composite soil sample from the floor of the excavation area for confirmation analysis at an off-Site laboratory. The results of all confirmation soil samples for all properties indicated that no asbestos was detected; for additional details see Section 8.

Once the results of the soil samples were received confirming that no asbestos was present in the excavated areas, ERRS backfilled, re-graded, and restored each property as described during the 2010 RA (E & E 2011b). Residential property owners were provided the option of having soil or gravel used for the backfill material. Following cleanup activities, EPA provided each property owner with a letter describing the work performed on their property.

### **5.3 Protective Barrier Construction**

The asbestos-contaminated soil from the remote properties was consolidated under a protective barrier that was constructed at the Church. Before receiving the asbestos-contaminated soil from the remote properties, ERRS removed the interim gravel cap that had been placed in 2010 over the contaminated fill at the Church, and the gravel was subsequently reused as the sub-base for the asphalt layer component of the protective barrier. As the asbestos-contaminated soil was removed from the remote properties and transported to the Church, the material was placed in stockpiles until it could be placed and compacted.

The asbestos-contaminated soil was placed and compacted behind a gravity-based retaining wall that was constructed with blocks specially manufactured by Wilbert Precast, Inc. of Spokane, Washington (JM Engineering 2011). The wall was constructed along the north and west boundaries of the Church's parking area. The original grade of the property sloped down from the Church building to the north and west, and the retaining wall along those slopes allowed for the consolidation of the contaminated material under an expanded parking area for the Church.

After preparing and compacting the soil base along the path of the wall, ERRS set the manufactured blocks and then placed and compacted the asbestos-contaminated soil behind. Compaction was performed to achieve the requirements presented in the design (E & E 2011a), and on-Site compaction confirmation testing was performed by an ERRS subcontractor. Once all the asbestos-contaminated soil was placed and compacted, ERRS prepared the surface with drainage features, including a hydroseeded dry retention pond on the western portion of the protective barrier. Then, a subcontractor installed an asphalt surface to be used for the Church parking lot to the east of the dry retention pond. A chain-link fence was also installed at the top of the retaining wall for public safety. Following the completion of the asphalt parking lot, the protective barrier / parking lot was surveyed by an ERRS subcontractor. A diagram of the protective barrier at 291 118<sup>th</sup> St. is provided in Appendix B.

## **5.4 Best Management Practices and Air Monitoring**

Throughout the 2011 RA, EPA used the same BMPs as reported for the 2010 RA (E & E 2011b). START also performed air monitoring during removal activities similar to that performed during the 2010 RA (E & E 2011b). The results of the air monitoring are discussed in Section 8.

## **5.5 Off-Site Disposal**

Pieces of ACP and Transite recovered from the properties were disposed off-Site at the Graham Road landfill located in Medical Lake, Washington. Unlike the 2010 RA, no asbestos-contaminated soil was disposed off-Site; instead, all asbestos-contaminated soil removed from the eight individual properties was consolidated along with contaminated fill already present under the protective barrier constructed at the Church

## **5.6 Property-Specific Information**

Table 5-1 presents a summary of data for the properties involved in the 2011 RA, including the address of each property, a brief description of the removal activities, and the dates that cleanup work was performed. The table also provides, if applicable, the volume of asbestos-contaminated soil removed, the length and weight of recovered ACP or ACM, and the type and quantity of any backfill provided. Figures with details of the work performed at each property are provided in Appendix C, and information sheets summarizing the removal work and results for each property are provided in Appendix D.

A summary of the status of all Orofino Asbestos Site properties at the conclusion of the 2010-2011 removal activities is provided in Figure 5-1.

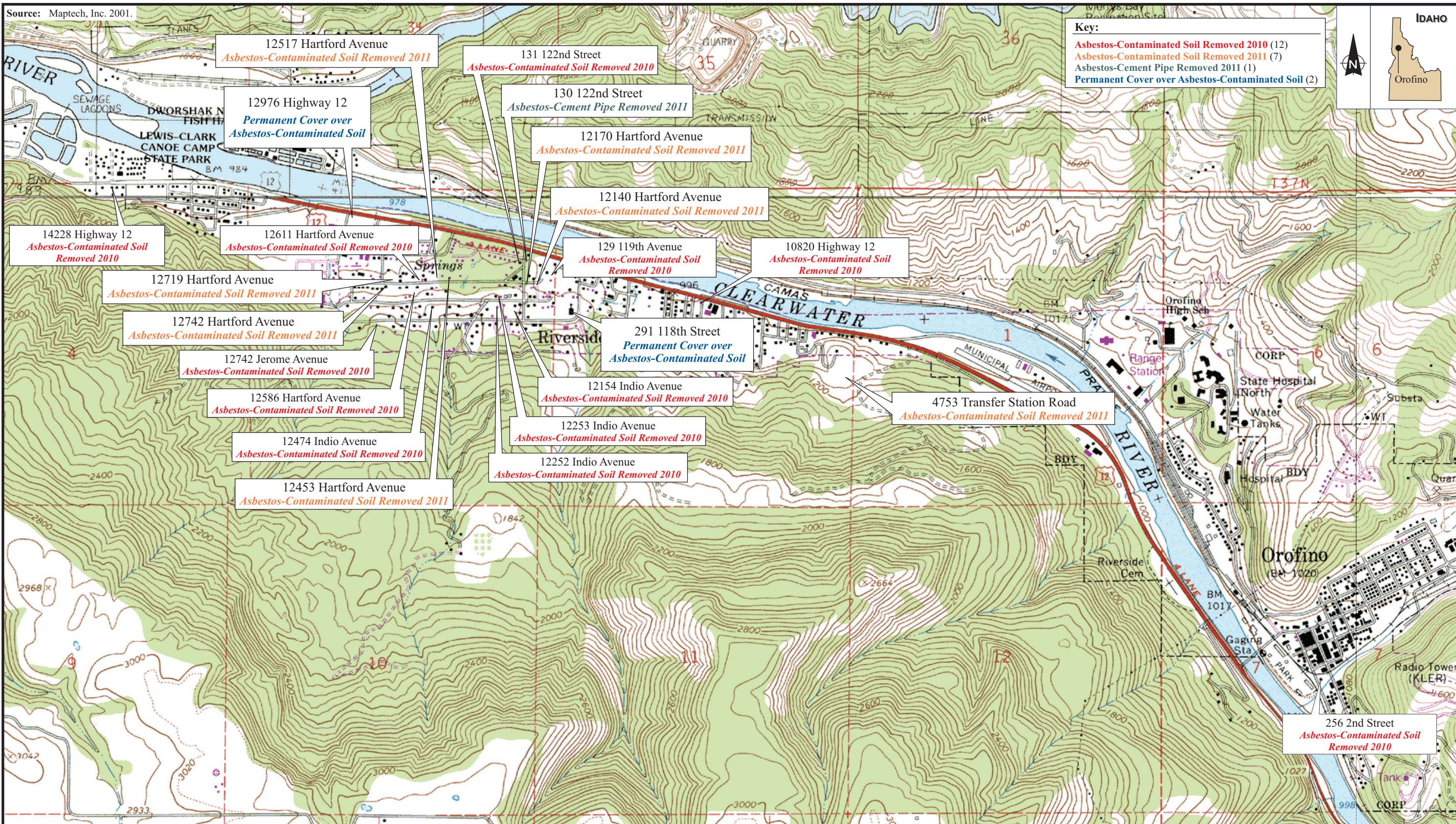
Table 5-1										
Summary of Work Performed Orofino Asbestos Site, 2011 Removal Action Orofino, Idaho										
Property Address	2011 Removal Work	2011 Individual Property Figure	Dates		Volume Asbestos-Contaminated Soil Removed (cubic yards)	Recovered ACP/ACM		Backfill / Interim Cover		Comment
			Start	Finish		Length (linear feet)	Weight (pounds)	Material	Volume (cubic yards)	
Original Action Memorandum Properties										
12976 Highway 12	Final Cover	C-1	–	–	–	–	–	–	–	Gravel cover installed by PRP in 2010.
291 118th Street	Asbestos-contaminated Soil Consolidated Beneath a Protective Barrier Constructed on-Site at the Church	C-2	8/24/2011	10/25/2011	–	27.9	213	1" Gravel	728	
								Drain Rock	166	
								Pit Run	81	
								Top Soil	753	
4753 Transfer Station Road	Asbestos-Contaminated Soil Removed	C-3	8/25/2011	9/16/2011	430	11.5	96	1" Gravel	39	
Properties Identified during 2010 Removal Work										
12140 Hartford Avenue	Asbestos-Contaminated Soil Removed	C-4	8/23/2011	8/31/2011	310	2.16	80	1" Gravel	165	
12170 Hartford Avenue	Asbestos-Contaminated Soil Removed	C-5	8/24/2011	9/12/2011	60	1.25	12	1" Gravel	10	
12453 Hartford Avenue	Asbestos-Contaminated Soil Removed	C-6	8/25/2011	8/29/2011	80	–	–	Top Soil	15	
12517 Hartford Avenue	Asbestos-Contaminated Soil Removed	C-7	9/8/2011	9/21/2011	560	58.8	687	Sand	10	
12719 Hartford Avenue	Asbestos-Contaminated Soil Removed	C-7	9/8/2011	9/21/2011	560	58.8	687	1" Gravel	469	
12719 Hartford Avenue	Asbestos-Contaminated Soil Removed	C-8	9/1/2011	9/14/2011	210	8	76.8	1" Gravel	64	
12742 Hartford Avenue	Asbestos-Contaminated Soil Removed	C-8	9/1/2011	9/14/2011	210	8	76.8	1" Gravel	64	
12742 Hartford Avenue	Asbestos-Contaminated Soil Removed	C-9	8/31/2011	9/12/2011	10	–	–	Top Soil	4.5	No ACP observed by EPA.
130 122nd Street	ACM (Transite) Removed and Disposed at Graham Road Landfill in Medical Lake, Washington	C-10	9/27/2011	9/27/2011	–	–	90	–	–	No ACP observed, only Transite.
2011 Totals					1,660	109.6	1,254.8			

Key:

- " = inch
- = not applicable
- ACM = asbestos-containing material
- ACP = asbestos-cement pipe
- EPA = United States Environmental Protection Agency



Source: Maptech, Inc. 2001.





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## 6 Post-Removal Site Controls

Post-removal site controls (PRSCs) such as administrative or engineered controls are not required at any of the properties where asbestos-contaminated soil was completely removed during the Orofino Asbestos Site RAs.

Asbestos-contaminated soil was left at two properties underneath protective barriers: the Church at 291 118<sup>th</sup> Street, and the Vacant Lot at 12976 Highway 12. Because contaminated materials were left at these properties, they require PRSCs and EPA is currently developing restrictive covenants and maintenance and repair (M&R) plans for each property.

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## 7 Waste Management, Transportation, and Disposal Activities

The wastes generated from the 2011 Orofino Asbestos Site RA included ACM debris (ACP, Transite, and PPE) and asbestos-contaminated soil. The ACM debris was transported off Site to a landfill licensed for asbestos waste. Additionally, approximately 1,660 cubic yards (yd<sup>3</sup>) of asbestos-contaminated soil was removed from seven properties and transported to the Church. At this location, the contaminated soil was consolidated with the estimated 10,420 yd<sup>3</sup> of asbestos-contaminated soil that had already been placed at this property underneath a protective barrier.

In addition to the Church property, asbestos-contaminated soil remains at the Vacant Lot. A protective gravel barrier was placed over the asbestos-contaminated soil at this location by one of the PRPs in 2010.

A summary of these waste streams and final disposition locations is provided below. Copies of applicable waste disposal records are provided in Appendix E.

Waste Stream	Quantity	Final Waste Destination
ACM debris, including ACP, Transite, and PPE	1,190 pounds	Waste Management Graham Road Landfill Medical Lake, Washington
Asbestos-contaminated soil	Approximately 12,100 yd <sup>3</sup> (includes an estimated 10,420 yd <sup>3</sup> that was already present as fill material, plus an additional 1,660 yd <sup>3</sup> that was transported by ERRS during the 2011 RA).	Contained under protective barrier at Church at 291 118 <sup>th</sup> Street
Asbestos-contaminated soil	Approximately 16,860 yd <sup>3</sup>	Covered by protective gravel barrier at Vacant Lot at 12976 Highway 12

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## 8 Sampling and Monitoring Activities

START collected samples of several different matrices, including air, soil, and bulk materials, throughout the 2011 RA to support removal decisions. Summaries of the samples and matrices are provided below:

- Air samples (perimeter and personal monitoring) were analyzed for asbestos and other fibers by phase contrast microscopy (PCM) in accordance with National Institute of Occupational Safety and Health (NIOSH) Method 7400;
- Air samples (perimeter monitoring) were analyzed for asbestos by transmission electron microscopy (TEM) in accordance with International Organization of Standardization (ISO) Method 10312;
- Soil samples were analyzed for asbestos by polarized light microscopy (PLM) in accordance with California Air Resources Board (CARB) Method 435;
- Bulk material samples of ACP were analyzed for asbestos by PLM in accordance with EPA Method 600/R-93-116, Visual Area Estimation; and
- Soil samples were analyzed for geotechnical testing parameters including unified soil classification system (USCS) (American Society for Testing and Materials [ASTM] Method D2487-06), particle size distribution (ASTM Method D422-63), Atterberg limits (ASTM Method D4318-05), compaction (ASTM Method D1557), and hydraulic conductivity (ASTM Method D5084).

Table 8-1 describes the samples collected during the RA and includes the property address, date collected, matrix, and analytical parameter for each. Samples were collected and analyzed in accordance with the START Site-specific sampling plan (SSSP) (E & E 2010). Off-Site asbestos analyses, including PLM, PCM, and TEM, were performed by EMSL Analytical, Inc. (EMSL) of Cinnaminson, New Jersey, as a subcontractor to E & E. Geotechnical testing was performed by GeoTesting Express, Inc. of Acton, Massachusetts. The analytical data reports and validation memoranda are included in Appendix E for asbestos testing and Appendix F for geotechnical testing.

### 8.1 Air Samples

Air samples were collected throughout the RA by START to monitor worker exposure (personal samples) and efforts to reduce off-Site dust and asbestos fiber emissions (perimeter samples).

#### 8.1.1 Personal Samples by PCM

A total of six personal samples (not including blanks) were collected and analyzed using PCM to measure potential asbestos exposures to workers and heavy equipment operators in the work zones. Regardless of the results of the personal air sampling, Site workers wore Level C PPE (including respirators with HEPA cartridges) while working in asbestos-contaminated areas.

Personal samples were collected in accordance with NIOSH method 7400 from multiple workers to measure a range of potential exposure scenarios. Personal samples were collected by placing a

personal air sampling pump on the worker to be monitored. A mixed cellulose ester (MCE) filter cassette was placed in the worker's breathing zone and attached to the pump with polyethylene tubing. Personal samples were generally collected with 25-millimeter (mm) diameter filter cassettes with a pore size of 0.8 micrometer ( $\mu\text{m}$ ) filter. The pumps were set at flow rates of approximately 2 liters per minute (L/min) and allowed to run for a minimum of 2 hours for permissible exposure limit (PEL) samples. The flow rates of the pump were recorded before and after sampling with a flow meter, and the average flow rate for the entire sampling time was calculated. The sample volume was then calculated using the average flow rate and the sample duration.

Table 8-2 summarizes the sample information and PCM results for the personal air samples. PCM results ranged from 0.006 to 0.027 fibers per cubic centimeter of air (f/cc). All of the PCM results were below the Occupational Safety and Health Administration (OSHA) PEL of 0.1 f/cc. According to NIOSH method 7400, the PCM analysis measures asbestos as well as other fibers; therefore, the PCM results may include non-asbestos fibers.

### **8.1.2 Perimeter Samples by PCM and TEM**

A total of 96 perimeter samples were collected for PCM or TEM analyses, although seven PCM samples could not be analyzed because of damage to the filter or overloading. Additionally, several blank filter cassettes were collected. The samples were collected at the perimeter of the work zone of each property during removal activities to monitor asbestos and fiber concentrations. Eighty-five of the perimeter samples and seven blanks were analyzed by PCM, while four samples and one blank were analyzed by TEM.

Perimeter air samples were collected from stationary sources to determine the airborne concentration of asbestos fibers. The samples were collected using Gast pumps at flow rates of approximately 10 L/min. Generally, samples from PCM testing were collected on 0.8  $\mu\text{m}$  MCE filters, and samples for TEM were collected on 0.45  $\mu\text{m}$  filters. The filter cassettes were hung at approximately 4-6 feet above the ground to represent a person's breathing zone.

Most of the samples were collected and analyzed for PCM because of the quicker turn-around times and lower analytical costs. PCM samples were collected daily during RA activities at excavation areas. A smaller subset of the samples was analyzed for asbestos by TEM in accordance with ISO method 10312. While more costly and time consuming, the ISO TEM method has several advantages over PCM, including greater sensitivity, the ability to positively identify asbestos (PCM measures asbestos and other fibers and therefore can not positively identify asbestos), and the ability to differentiate between different asbestos fiber types and sizes. Despite the difference in turn-around time and sensitivity, PCM is an approved method for asbestos analysis, and no data quality was lost due to the use of the PCM analyses.

### **PCM Results**

The results of the PCM analyses performed on the perimeter samples are summarized in Table 8-3. Many of the PCM samples were non-detect, with detection limits ranging from 0.001 to 0.008 f/cc. For samples with detections, the results ranged from 0.0005 to 0.007 f/cc. No fibers were detected on any of the blank samples analyzed. The perimeter monitoring action limit for the RA was 0.01 f/cc, which is the Asbestos Hazard Emergency Response Act (AHERA) clearance limit for asbestos projects. None of the PCM field samples exceeded this action level.

### **TEM Results**

The results of TEM analyses are presented in Table 8-4. With the ISO 10312 TEM method, all individual asbestos structures/fibers detected in the sample field are analyzed, and the length, width, aspect ratio (ratio of length to width), and asbestos species (e.g., chrysotile, amosite, etc.) are recorded.

The results indicate that of the four samples analyzed by TEM, only one (sample number 11082072) contained detectable structures of asbestos. The total asbestos structure concentration for this sample was 0.0035 structures per cubic centimeter (s/cc) of chrysotile asbestos. However, this sample did not contain any PCM-equivalent asbestos structures (i.e., those longer than 5 µm with a width greater than or equal to 0.25 µm and less than or equal to 3.0 µm, and an aspect ratio greater than or equal to 3). While the ISO 10312 TEM method can detect a range of asbestos structure and fiber sizes, reporting the results in terms of PCM-equivalent structures allows for a direct comparison to PCM results and to regulatory limits such as the OSHA PEL. The PCM-equivalent result for this sample was non-detect (less than 0.0017 s/cc). The remaining TEM samples were non-detect for both total asbestos structures and PCM-equivalent structures. The detection limits for these samples ranged from 0.00086 to 0.00099 s/cc, which are well below the perimeter action level of 0.01 s/cc. Additionally, no asbestos fibers were detected on the TEM blank.

## **8.2 Soil Samples for PLM**

START collected a total of eight soil samples for asbestos analysis during the RA. Six were post-excavation confirmation samples, with one composite soil sample collected from each excavation area to confirm that asbestos-contaminated soil had been removed. Post-excavation soil samples were not collected from two properties. At 12453 Hartford Avenue the asbestos-contaminated soil was present in piles on the ground, and because ERRS was able to remove the soil piles without having to over-excavate into the native soil, a confirmation sample was not required. Additionally, at 130 122<sup>nd</sup> Street, only Transite was observed on the surface of soil piles, and it did not appear that these piles were related to the District water line improvement project, so there was no soil excavation or confirmation sampling.

Two of the soil samples (11082306 and 11082307) were collected from clean gravel and soil used as backfill at two of the properties (291 118<sup>th</sup> Street and 12742 Hartford Avenue, respectively).

The soil samples were analyzed for asbestos using PLM following the CARB Method 435 sample preparation method, and the results are summarized in Table 8-5. The results for all soil samples were non-detect with detection limits of 0.1%.

### **8.3 Bulk Material Samples**

During the 2011 RA, bulk material samples of suspect ACP were collected from several properties to determine whether they contained asbestos. Five bulk material samples were collected and analyzed by PLM, and the results are summarized in Table 8-6. All five bulk material samples collected during the RA were positive for asbestos and contained 15% to 20% chrysotile asbestos. Two of the samples (11082404 and 11082305) also contained 2 to 5% crocidolite asbestos.

### **8.4 Geotechnical Testing**

Eight soil samples were collected from the Church property at 291 118<sup>th</sup> St. for geotechnical testing. Five of the soil samples were collected from native soil along the path of the retaining wall, and three were collected from the contaminated fill material placed in the dry retention pond drainage basin. Geotechnical analyses included USCS classification, particle size distribution, Atterberg limits, compaction testing, and hydraulic conductivity, and the results were used in the design and construction monitoring of the retaining wall and asphalt parking lot. The results of the geotechnical analyses are included in Appendix F.

Table 8-1								
Summary of Samples Orofino Asbestos Site, 2011 Removal Action Orofino, Idaho								
EPA Sample ID	Property Address	Sample Date	Matrix	Sample Matrix and Analysis Method				
				Air Samples			Soil Samples	
				NIOSH 7400 PCM (Perimeter)	NIOSH 7400 PCM (Personal)	ISO 10312 TEM (Perimeter)	Geotech Testing	EPA 600/R-93- 116 PLM
11082001	12140 Hartford Avenue	8/23/2011	Air	X				
11082002	12140 Hartford Avenue	8/23/2011	Air	X				
11082003	12140 Hartford Avenue	8/23/2011	Air	X				
11082004	12140 Hartford Avenue	8/23/2011	Air		X			
11082005	12140 Hartford Avenue	8/24/2011	Air	X				
11082006	12140 Hartford Avenue	8/24/2011	Air	X				
11082007	12140 Hartford Avenue	8/24/2011	Air	X				
11082008	12140 Hartford Avenue	8/24/2011	Air		X			
11082009	12170 Hartford Avenue	8/24/2011	Air	X				
11082010	12170 Hartford Avenue	8/24/2011	Air	X				
11082011	12170 Hartford Avenue	8/24/2011	Air	X				
11082012	291 118th Street	8/24/2011	Air	X				
11082013	12453 Hartford Avenue	8/25/2011	Air	X				
11082014	12453 Hartford Avenue	8/25/2011	Air	X				
11082015	291 118th Street	8/25/2011	Air	X				
11082016	291 118th Street	8/25/2011	Air	X				
11082017	291 118th Street	8/26/2011	Air	X				
11082018	291 118th Street	8/26/2011	Air	X				
11082019	291 118th Street	8/26/2011	Air	X				
11082020	4753 Transfer Station Road	8/29/2011	Air	X				
11082021	4753 Transfer Station Road	8/29/2011	Air	X				
11082022	291 118th Street	8/29/2011	Air	X				
11082023	291 118th Street	8/29/2011	Air	X				
11082024	291 118th Street	8/29/2011	Air	X				
11082025	4753 Transfer Station Road	8/30/2011	Air			X		
11082026	4753 Transfer Station Road	8/30/2011	Air	X				
11082027	4753 Transfer Station Road	8/30/2011	Air		X			
11082028	291 118th Street	8/30/2011	Air	X				
11082029	291 118th Street	8/30/2011	Air	X				
11082030	291 118th Street	8/30/2011	Air	X				
11082031	291 118th Street	8/31/2011	Air			X		
11082032	291 118th Street	8/31/2011	Air	X				
11082033	291 118th Street	8/31/2011	Air	X				
11082034	12742 Hartford Avenue	8/31/2011	Air	X				
11082035	12742 Hartford Avenue	8/31/2011	Air	X				
11082036	12742 Hartford Avenue	8/31/2011	Air		X			
11082037	291 118th Street	9/1/2011	Air	X				
11082038	291 118th Street	9/1/2011	Air	X				
11082039	291 118th Street	9/1/2011	Air	X				
11082040	291 118th Street	9/2/2011	Air	X				
11082041	291 118th Street	9/2/2011	Air	X				
11082042	291 118th Street	9/2/2011	Air	X				
11082043	12719 Hartford Avenue	9/2/2011	Air	X				
11082044	12719 Hartford Avenue	9/2/2011	Air	X				
11082045	12719 Hartford Avenue	9/2/2011	Air		X			
11082046	12719 Hartford Avenue	9/6/2011	Air	X				
11082047	12719 Hartford Avenue	9/6/2011	Air	X				
11082048	12719 Hartford Avenue	9/6/2011	Air		X			
11082049	291 118th Street	9/6/2011	Air	X				
11082050	291 118th Street	9/6/2011	Air	X				
11082051	291 118th Street	9/6/2011	Air	X				
11082052	291 118th Street	9/8/2011	Air	X				
11082053	291 118th Street	9/8/2011	Air			X		
11082054	291 118th Street	9/8/2011	Air	X				
11082055	12517 Hartford Avenue	9/8/2011	Air	X				
11082056	12517 Hartford Avenue	9/8/2011	Air	X				
11082057	12517 Hartford Avenue	9/8/2011	Air	X				
11082058	291 118th Street	9/12/2011	Air	X				
11082059	291 118th Street	9/12/2011	Air	X				
11082060	291 118th Street	9/12/2011	Air	X				
11082061	12517 Hartford Avenue	9/12/2011	Air	X				
11082062	12517 Hartford Avenue	9/12/2011	Air	X				
11082063	12517 Hartford Avenue	9/12/2011	Air	X				
11082064	291 118th Street	9/13/2011	Air	X (overloaded)				
11082065	291 118th Street	9/13/2011	Air	X				
11082066	291 118th Street	9/13/2011	Air	X				
11082067	12517 Hartford Avenue	9/13/2011	Air	X				
11082068	12517 Hartford Avenue	9/13/2011	Air	X				
11082069	12517 Hartford Avenue	9/13/2011	Air	X				
11082070	291 118th Street	9/14/2011	Air	X (overloaded)				
11082071	291 118th Street	9/14/2011	Air	X				
11082072	291 118th Street	9/14/2011	Air			X		
11082073	291 118th Street	9/15/2011	Air	X				
11082074	291 118th Street	9/14/2011	Air	X				
11082075	291 118th Street	9/15/2011	Air	X (damaged not analyzed)				
11082076	291 118th Street	9/16/2011	Air	X				

Table 8-1								
Summary of Samples Orofino Asbestos Site, 2011 Removal Action Orofino, Idaho								
EPA Sample ID	Property Address	Sample Date	Matrix	Sample Matrix and Analysis Method				
				Air Samples			Soil Samples	
				NIOSH 7400 PCM (Perimeter)	NIOSH 7400 PCM (Personal)	ISO 10312 TEM (Perimeter)	Geotech Testing	Bulk Samples EPA 600/R-93- 116 PLM
11082077	291 118th Street	9/16/2011	Air	X				
11082078	291 118th Street	9/16/2011	Air	X				
11082079	291 118th Street	9/20/2011	Air	X				
11082080	291 118th Street	9/20/2011	Air	X				
11082081	291 118th Street	9/20/2011	Air	X				
11082082	291 118th Street	9/21/2011	Air	X				
11082083	291 118th Street	9/21/2011	Air	X				
11082084	291 118th Street	9/21/2011	Air	X				
11082085	291 118th Street	9/22/2011	Air	X				
11082086	291 118th Street	9/22/2011	Air	X				
11082087	291 118th Street	9/22/2011	Air	X				
11082088	291 118th Street	9/23/2011	Air	X				
11082089	291 118th Street	9/23/2011	Air	X				
11082090	291 118th Street	9/23/2011	Air	X				
11082091	291 118th Street	9/25/2011	Air	X				
11082092	291 118th Street	9/25/2011	Air	X				
11082093	291 118th Street	9/25/2011	Air	X				
11082094	291 118th Street	9/26/2011	Air	X (overloaded)				
11082095	291 118th Street	9/26/2011	Air	X				
11082096	291 118th Street	9/26/2011	Air	X				
11082097	291 118th Street	9/27/2011	Air	X (overloaded)				
11082098	291 118th Street	9/27/2011	Air	X				
11082099	291 118th Street	9/27/2011	Air	X (overloaded)				
11082100	291 118th Street	10/3/2011	Air	X				
11082101	291 118th Street	10/3/2011	Air	X				
11082102	291 118th Street	10/3/2011	Air	X (overloaded)				
11082201	291 118th Street	8/23/2011	Soil				X	
11082202	291 118th Street	8/23/2011	Soil				X	
11082203	291 118th Street	8/23/2011	Soil				X	
11082204	291 118th Street	8/23/2011	Soil				X	
11082205	291 118th Street	8/23/2011	Soil				X	
11082206	291 118th Street	8/26/2011	Soil				X	
11082207	291 118th Street	8/26/2011	Soil				X	
11082208	291 118th Street	8/26/2011	Soil				X	
11082301	12140 Hartford Avenue	8/24/2011	Soil					X
11082302	12170 Hartford Avenue	8/24/2011	Soil					X
11082303	4753 Transfer Station Road	8/31/2011	Soil					X
11082304	12742 Hartford Avenue	8/31/2011	Soil					X
11082305	12719 Hartford Avenue	9/7/2011	Soil					X
11082306	291 118th Street	9/9/2011	Soil					X
11082307	12742 Hartford Avenue	9/9/2011	Soil					X
11082308	12515 Hartford Avenue	9/13/2011	Soil					X
11082401	12140 Hartford Avenue	8/24/2011	Bulk					X
11082402	12170 Hartford Avenue	8/24/2011	Bulk					X
11082403	4753 Transfer Station Road	8/31/2011	Bulk					X
11082404	12719 Hartford Avenue	9/7/2011	Bulk					X
11082405	12517 Hartford Avenue	9/13/2011	Bulk					X
11082501	Blank	8/29/2011	Air	X (not analyzed)				
11082502	Blank	8/29/2011	Air	X (not analyzed)				
11082503	Blank	8/30/2011	Air			X		
11082504	Blank	8/30/2011	Air	X				
11082505	Blank	8/31/2011	Air			X (not analyzed)		
11082506	Blank	9/2/2011	Air	X (not analyzed)				
11082507	Blank	9/6/2011	Air	X				
11082508	Blank	9/8/2011	Air			X (not analyzed)		
11082509	Blank	9/12/2011	Air	X (not analyzed)				
11082510	Blank	9/13/2011	Air	X				
11082511	Blank	9/14/2011	Air			X (not analyzed)		
11082512	Blank	9/15/2011	Air	X				
11082513	Blank	9/16/2011	Air	X (not analyzed)				
11082514	Blank	9/20/2011	Air	X (not analyzed)				
11082515	Blank	9/21/2011	Air	X (not analyzed)				
11082516	Blank	9/26/2011	Air	X (not analyzed)				
11082517	Blank	10/3/2011	Air	X				

Key:  
 CARB = California Air Resources Board  
 EPA = United States Environmental Protection Agency  
 ID = Identification  
 ISO = International Organization for Standardization  
 n/a = Not Applicable  
 NIOSH = National Institute for Occupational Safety and Health  
 PCM = Phase Contrast Microscopy  
 PLM = Polarized Light Microscopy  
 TEM = Transmission Electron Microscopy



<b>Table 8-2</b>  <b>Personal Air Sample Results - Phase Contrast Microscopy</b> <b>Orofino Asbestos Site, 2011 Removal Action</b> <b>Orofino, Idaho</b>			
<b>EPA Sample ID</b>	<b>Property Address</b>	<b>Sample Date</b>	<b>Asbestos and Other Fibers NIOSH Method 7400 PCM (f/cc)</b>
<b>Action Limit (OSHA PEL)</b>			0.1
11082004	12140 Hartford Avenue	8/23/2011	<b>0.006</b>
11082008	12140 Hartford Avenue	8/24/2011	<b>0.027</b>
11082027	4753 Transfer Station Road	8/30/2011	<b>0.006</b>
11082036	12742 Hartford Avenue	8/31/2011	<b>0.007</b>
11082045	12719 Hartford Avenue	9/2/2011	<b>0.006</b>
11082048	12719 Hartford Avenue	9/6/2011	<b>0.008</b>

Note: A **BOLD** result indicates asbestos and other fibers were detected.

A highlighted cell indicates that the result exceeds the action limit.

Key:

EPA = United States Environmental Protection Agency

f/cc = fibers per cubic centimeter

ID = Identification

NIOSH = National Institute for Occupational Safety and Health

OSHA = Occupational Safety and Health Administration

PCM = Phase Contrast Microscopy

PEL = Permissible Exposure Limit

U = The material was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.

<p align="center"><b>Table 8-3</b></p> <p align="center"><b>Perimeter Air Sample Results - Phase Contrast Microscopy</b></p> <p align="center"><b>Orofino Asbestos Site, 2011 Removal Action</b></p> <p align="center"><b>Orofino, Idaho</b></p>			
<b>EPA Sample ID</b>	<b>Property Address</b>	<b>Sample Date</b>	<b>Asbestos and Other Fibers NIOSH Method 7400 PCM (f/cc)</b>
<b>Action Limit (Clearance Limit)</b>			<b>0.01</b>
11082001	12140 Hartford Avenue	8/23/2011	<b>0.003</b>
11082002	12140 Hartford Avenue	8/23/2011	<0.003
11082003	12140 Hartford Avenue	8/23/2011	<0.003
11082005	12140 Hartford Avenue	8/24/2011	<0.008
11082006	12140 Hartford Avenue	8/24/2011	<0.008
11082007	12140 Hartford Avenue	8/24/2011	<0.008
11082009	12170 Hartford Avenue	8/24/2011	<b>0.005</b>
11082010	12170 Hartford Avenue	8/24/2011	<b>0.006</b>
11082011	12170 Hartford Avenue	8/24/2011	<0.004
11082012	291 118th Street	8/24/2011	<0.001
11082013	12453 Hartford Avenue	8/25/2011	<0.004
11082014	12453 Hartford Avenue	8/25/2011	<0.004
11082015	291 118th Street	8/25/2011	<0.003
11082016	291 118th Street	8/25/2011	<b>0.003</b>
11082017	291 118th Street	8/26/2011	<0.001
11082018	291 118th Street	8/26/2011	<0.004
11082019	291 118th Street	8/26/2011	<0.004
11082020	4753 Transfer Station Road	8/29/2011	<0.002
11082021	4753 Transfer Station Road	8/29/2011	<0.002
11082022	291 118th Street	8/29/2011	<0.004
11082023	291 118th Street	8/29/2011	<0.002
11082024	291 118th Street	8/29/2011	<0.002
11082026	4753 Transfer Station Road	8/30/2011	<b>0.002</b>
11082028	291 118th Street	8/30/2011	<b>0.002</b>
11082029	291 118th Street	8/30/2011	<0.003
11082030	291 118th Street	8/30/2011	<0.003
11082032	291 118th Street	8/31/2011	<b>0.002</b>
11082033	291 118th Street	8/31/2011	<0.002
11082034	12742 Hartford Avenue	8/31/2011	<0.005
11082035	12742 Hartford Avenue	8/31/2011	<0.005
11082037	291 118th Street	9/1/2011	<b>0.002</b>
11082038	291 118th Street	9/1/2011	<b>0.002</b>
11082039	291 118th Street	9/1/2011	<b>0.003</b>
11082040	291 118th Street	9/2/2011	<0.001
11082041	291 118th Street	9/2/2011	<b>0.001</b>
11082042	291 118th Street	9/2/2011	<b>0.007</b>
11082043	12719 Hartford Avenue	9/2/2011	<0.005
11082044	12719 Hartford Avenue	9/2/2011	<b>0.005</b>
11082046	12719 Hartford Avenue	9/6/2011	<b>0.003</b>
11082047	12719 Hartford Avenue	9/6/2011	<b>0.002</b>
11082049	291 118th Street	9/6/2011	<b>0.002</b>
11082050	291 118th Street	9/6/2011	<b>0.002</b>
11082051	291 118th Street	9/6/2011	<b>0.003</b>
11082052	291 118th Street	9/8/2011	<b>0.0005</b>
11082054	291 118th Street	9/8/2011	<b>0.003</b>
11082055	12517 Hartford Avenue	9/8/2011	<b>0.002</b>
11082056	12517 Hartford Avenue	9/8/2011	<0.002
11082057	12517 Hartford Avenue	9/8/2011	<0.002
11082058	291 118th Street	9/12/2011	<b>0.001</b>
11082059	291 118th Street	9/12/2011	<b>0.001</b>
11082060	291 118th Street	9/12/2011	<b>0.002</b>
11082061	12517 Hartford Avenue	9/12/2011	<b>0.003</b>
11082062	12517 Hartford Avenue	9/12/2011	<b>0.002</b>
11082063	12517 Hartford Avenue	9/12/2011	<b>0.004</b>
11082064	291 118th Street	9/13/2011	Not Analyzed (Overloaded)
11082065	291 118th Street	9/13/2011	<b>0.001</b>
11082066	291 118th Street	9/13/2011	<0.002
11082067	12517 Hartford Avenue	9/13/2011	<0.004
11082068	12517 Hartford Avenue	9/13/2011	<0.004
11082069	12517 Hartford Avenue	9/13/2011	<0.004

<p align="center"><b>Table 8-3</b></p> <p align="center"><b>Perimeter Air Sample Results - Phase Contrast Microscopy</b></p> <p align="center"><b>Orofino Asbestos Site, 2011 Removal Action</b></p> <p align="center"><b>Orofino, Idaho</b></p>			
<b>EPA Sample ID</b>	<b>Property Address</b>	<b>Sample Date</b>	<b>Asbestos and Other Fibers NIOSH Method 7400 PCM (f/cc)</b>
<b>Action Limit (Clearance Limit)</b>			<b>0.01</b>
11082070	291 118th Street	9/14/2011	Not Analyzed (Overloaded)
11082071	291 118th Street	9/14/2011	<0.002
11082073	291 118th Street	9/15/2011	<b>0.001</b>
11082074	291 118th Street	9/14/2011	<b>0.002</b>
11082075	291 118th Street	9/15/2011	Not Analyzed (Damaged)
11082076	291 118th Street	9/16/2011	<b>0.0005</b>
11082077	291 118th Street	9/16/2011	<b>0.001</b>
11082078	291 118th Street	9/16/2011	<b>0.0005</b>
11082079	291 118th Street	9/20/2011	<b>0.001</b>
11082080	291 118th Street	9/20/2011	<b>0.003</b>
11082081	291 118th Street	9/20/2011	<b>0.001</b>
11082082	291 118th Street	9/21/2011	<b>0.001</b>
11082083	291 118th Street	9/21/2011	<0.002
11082084	291 118th Street	9/21/2011	<0.0004
11082085	291 118th Street	9/22/2011	<b>0.001</b>
11082086	291 118th Street	9/22/2011	<0.002
11082087	291 118th Street	9/22/2011	<b>0.001</b>
11082088	291 118th Street	9/23/2011	<b>0.001</b>
11082089	291 118th Street	9/23/2011	<0.003
11082090	291 118th Street	9/23/2011	<b>0.004</b>
11082091	291 118th Street	9/25/2011	<b>0.004</b>
11082092	291 118th Street	9/25/2011	<0.002
11082093	291 118th Street	9/25/2011	<b>0.005</b>
11082094	291 118th Street	9/26/2011	Not Analyzed (Overloaded)
11082095	291 118th Street	9/26/2011	<0.003
11082096	291 118th Street	9/26/2011	<b>0.001</b>
11082097	291 118th Street	9/27/2011	Not Analyzed (Overloaded)
11082098	291 118th Street	9/27/2011	<0.002
11082099	291 118th Street	9/27/2011	Not Analyzed (Overloaded)
11082100	291 118th Street	10/3/2011	<b>0.001</b>
11082101	291 118th Street	10/3/2011	<b>0.003</b>
11082102	291 118th Street	10/3/2011	Not Analyzed (Overloaded)
11082504	Blank	8/30/2011	NAD
11082507	Blank	9/6/2011	NAD
11082510	Blank	9/13/2011	NAD
11082512	Blank	9/15/2011	NAD
11082517	Blank	10/3/2011	NAD

Note: A **BOLD** result indicates asbestos and other fibers were detected.

A highlighted cell indicates that the result exceeds the action limit.

Key:

EPA = United States Environmental Protection Agency

f/cc = fibers per cubic centimeter

ID = Identification

NAD = no asbestos detected

NIOSH = National Institute for Occupational Safety and Health

PCM = Phase Contrast Microscopy

Table 8-4				
Perimeter Air Sample Results - Transmission Electron Microscopy				
Orofino Asbestos Site, 2011 Removal Action				
Orofino, Idaho				
EPA Sample ID	Property Address	Sample Date	Asbestos ISO 10312 TEM Results (s/cc)	
			Total Asbestos Structures	PCM-Equivalent Structures
Action Level (Clearance Limit)			0.01	0.01
11082025	4753 Transfer Station Road	8/30/2011	< 0.00099	< 0.00099
11082031	291 118th Street	8/31/2011	< 0.00095	< 0.00095
11082053	291 118th Street	9/8/2011	< 0.00086	< 0.00086
11082072	291 118th Street	9/14/2011	0.0035	< 0.0017
11082503	Blank	8/30/2011	NAD	NAD

Note: A **BOLD** result indicates asbestos and other fibers were detected.

A highlighted cell indicates that the result exceeds the action limit.

Key:

AHERA = Asbestos Hazard Emergency Response Act

BL = Blank

EPA = United States Environmental Protection Agency

ID = Identification

ISO = International Organization for Standardization

NAD = no asbestos detected

NIOSH = National Institute of Occupational Safety and Health

PCM = Phase Contrast Microscopy

s/cc = structures per cubic centimeter

TEM = Transmission Electron Microscopy

<b>Table 8-5</b>  <b>Soil Sample Results</b> <b>Orofino Asbestos Site, 2011 Removal Action</b> <b>Orofino, Idaho</b>				
<b>EPA Sample ID</b>	<b>Property Address</b>	<b>Purpose</b>	<b>Sample Date</b>	<b>Asbestos CARB Method 435 PLM Results (%)</b>
11082301	12140 Hartford Avenue	Post-Excavation	8/24/2011	< 0.1
11082302	12170 Hartford Avenue	Post-Excavation	8/24/2011	< 0.1
11082303	4753 Transfer Station Road	Post-Excavation	8/31/2011	< 0.1
11082304	12742 Hartford Avenue	Post-Excavation	8/31/2011	< 0.1
11082305	12719 Hartford Avenue	Post-Excavation	9/7/2011	< 0.1
11082306	291 118th Street	Background	9/9/2011	< 0.1
11082307	12742 Hartford Avenue	Background	9/9/2011	< 0.1
11082308	12515 Hartford Avenue	Post-Excavation	9/13/2011	< 0.1

A **BOLD** result indicates asbestos was detected.

Key:

CARB = California Air Resources Board

EPA = United States Environmental Protection Agency

ID = Identification

PLM = Polarized Light Microscopy

<b>Table 8-6</b>  <b>Bulk Material Sample Results</b> <b>Orofino Asbestos Site, 2011 Removal Action</b> <b>Orofino, Idaho</b>			
<b>EPA Sample ID</b>	<b>Property Address</b>	<b>Sample Date</b>	<b>Asbestos Type and Percentage EPA 600/R-93-116 PLM (%)</b>
11082401	12140 Hartford Avenue	8/24/2011	Chrysotile 15%
11082402	12170 Hartford Avenue	8/24/2011	Chrysotile 15%
11082403	4753 Transfer Station Road	8/31/2011	Chrysotile 20%
11082404	12719 Hartford Avenue	9/7/2011	Chrysotile 20% Crocidolite 5%
11082405	12517 Hartford Avenue	9/13/2011	Chrysotile 18% Crocidolite 2%

Key:

EPA = United States Environmental Protection Agency

ID = Identification

PLM = Polarized Light Microscopy

# 9 Quality Assurance/Quality Control

Quality assurance (QA) / quality control (QC) data are necessary to determine precision and accuracy and to demonstrate the absence of interferences and/or contamination of sampling equipment, glassware, and reagents. Specific QC requirements for laboratory analyses are incorporated in the *Contract Laboratory Program Statement of Work for Inorganic Analyses* (EPA 2007). These QC requirements, or equivalent requirements found in the analytical methods, were followed for analytical work on the project. This section describes the QA/QC measures taken for the project and provides an evaluation of the usability of data presented in this report.

Data from the START-subcontracted commercial laboratory were reviewed and validated by a START chemist. Data qualifiers were applied as necessary according to the following guidance:

- EPA (2010) *Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review*.

In the absence of other QC guidance, method- and/or standard operating procedure-specific QC limits were also utilized to apply qualifiers to the data.

## 9.1 Satisfaction of Data Quality Objectives

The following EPA (EPA 2000) guidance document was used to establish data quality objectives (DQOs) for this project:

- *Guidance for the Data Quality Objectives Process* (EPA QA/G-4), EPA/600/R-96/055.

EPA determined that definitive data without error and bias determination would be used for the sampling and analyses conducted during the field activities. The data quality achieved during the field work produced sufficient data that met the DQOs stated in the SSSP (E & E 2010). A detailed discussion of accomplished project objectives is presented in the following sections.

## 9.2 QA/QC Samples

Rinsate blank samples were not required as all samples were collected using dedicated sampling equipment. Seventeen air blank samples were collected (approximately one per ten air filter samples). Six of these were submitted for asbestos analysis, with the others placed on hold for future analysis if deemed necessary. Other QC samples such as spike and laboratory duplicate samples are not required for asbestos analysis.

## 9.3 Project-Specific Data Quality Objectives

The laboratory data were reviewed to ensure that DQOs for the project were met. The following describes the laboratories' abilities to meet project DQOs for precision, accuracy, and

completeness and the field team's ability to meet project DQOs for representativeness and comparability. The laboratories and the field team were able to meet DQOs for the project.

#### **9.3.1 Precision**

Precision measures the reproducibility of the sampling and analytical methodology. Laboratory and field precision is defined as the relative percent difference (RPD) between duplicate sample analyses. Laboratory duplicate analyses were not performed.

#### **9.3.2 Accuracy**

Accuracy indicates the conformity of the measurements to fact. Laboratory accuracy is defined as the surrogate spike percent recovery (%R) or the matrix spike (MS)/MS duplicate (MSD)/blank spike (BS) %Rs for all laboratory analyses. Surrogate, MS, MSD, and BS analyses are not applicable to asbestos and geotechnical analyses.

#### **9.3.3 Completeness**

Data completeness is defined as the percentage of usable data (usable data divided by the total possible data). All laboratory data were reviewed for data validation and usability. All sample results were acceptable; therefore, the project DQO for completeness of 90% was met.

#### **9.3.4 Representativeness**

Data representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point or environmental condition. The number and selection of samples were determined in the field to account accurately for Site variations and sample matrices. The DQO for representativeness was met.

#### **9.3.5 Comparability**

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. Data produced for this Site followed applicable field sampling techniques and specific analytical methodology. The DQO for comparability was met.

### **9.4 Laboratory QA/QC Parameters**

The laboratory data also were reviewed for asbestos blank samples. This QA/QC parameter is summarized below.

#### **9.4.1 Field Blanks**

The number of blank samples met the frequency criteria. Asbestos fibers were not detected in any of the blank samples analyzed.

### **9.5 QA/QC Summary**

No QA/QC issues were identified. The results of the data validation and review indicate the data obtained for the 2011 Orofino Asbestos Site RA achieved EPA and project DQOs.



# 10 Community Relations

Throughout the RA, EPA maintained communications with local government agencies such as the Clearwater County Commissioners, City of Orofino, and the District, along with the public, including residents of affected properties and other members of the community. EPA also accommodated local news media and provided information and interviews when requested.

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# 11 Health and Safety

The OSC maintained ultimate authority and responsibility for Site safety during the RA. ERRS and START each developed a Site-specific health and safety plan (H&SP). The OSC conducted a general Site safety meeting at the beginning of the 2011 RA to establish the health and safety procedures for the Site. Daily safety meetings were conducted at the beginning of each day of Site work and the meetings were attended by all personnel present, including the OSC, ERRS, and START. During the daily safety meetings, Site personnel discussed the planned activities for that day and any task-specific health and safety issues. The daily safety meeting also included a review of any health and safety issue from the previous day and any relevant air monitoring data.

The physical hazards at the Site included uneven terrain and heavy equipment (e.g., skid steers, excavators, water trucks, and trucks). The minimum level of PPE for the Site was Level D, including safety glasses, hard hat, safety vest, and steel-toed safety shoes.

The chemical hazard associated with the Site was asbestos. EPA established an exclusion zone around each work area in which ACM or asbestos-contaminated soil was handled or disturbed. Site personnel working in this exclusion zone wore Level C PPE, including respirators with HEPA cartridges. Additionally, ERRS consistently used water from water trucks for dust and airborne asbestos fiber suppression.

The results of air sampling (personal and ambient) and dust monitoring indicated that the Site activities were performed in a manner that was safe for Site personnel, nearby residents, and passers-by.

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# **12 Difficulties Encountered/ Recommendations**

There were no issues that adversely affected conduct of the removal action. However, the cleanup work was challenging because of the close proximity of the properties with adjoining properties, and the narrow community roadways. Close coordination with residents and the general public, along with well-designed and effectively implemented BMPs, ensured that any and all difficulties were avoided or mitigated.

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# 13 Summary and Conclusions

From late August through October 2011, EPA performed an RA at the Orofino Asbestos Site to complete the cleanup of asbestos-contaminated soil that had been placed as fill material at several properties in the community of Orofino, Idaho.

During the 2011 RA, EPA removed asbestos-contaminated soil from seven properties. At an eighth property, no ACP was observed, but EPA removed pieces of a different type of ACM (Transite) from soil piles for proper off-Site disposal. A total of 1,660 yd<sup>3</sup> of asbestos-contaminated soil was removed from the seven properties and transported to the Church property located at 291 118<sup>th</sup> St.

Cleanup work at each property was performed by excavating the asbestos-contaminated soil and an additional 6 inches of the original soil underneath. The results of confirmation sampling and air monitoring indicated that the asbestos-contaminated soil was removed from each excavation area and that BMPs were successful in reducing off-Site migration of dust, asbestos, and other fibers below Site action levels.

ACP recovered during the 2011 RA was transported off-Site to the Graham Road landfill in Medical Lake, Washington, which is licensed to accept asbestos waste. A total of 1,190 pounds of asbestos waste and debris was disposed off-Site during the 2011 RA.

Asbestos-contaminated soil remains on-Site under protective barriers at two properties: the Church at 291 118<sup>th</sup> St., and the Vacant Lot at 12976 Highway 12. Restrictive covenants will be imposed on both properties as long as the asbestos-contaminated soil is present, and EPA is developing M&R plans to be implemented by each property owner.

The asbestos-contaminated soil from the seven individual properties was transferred to the Church located at 291 118<sup>th</sup> St. The Church at this location had also received a large quantity of asbestos-contaminated soil as fill material (approximately 10,420 yd<sup>3</sup>), and rather than removing this asbestos-contaminated soil for off-Site disposal, the Church allowed EPA to consolidate the asbestos-contaminated soil from the other properties with the contaminated soil at the Church behind an engineered retaining wall and asphalt parking lot. Including the material that was already present, there is an estimated total of 12,100 yd<sup>3</sup> of asbestos-contaminated soil under the protective cover at this property.

At the Vacant Lot located at 12976 Highway 12, an estimated 16,680 yd<sup>3</sup> of asbestos-contaminated soil is present under a protective barrier of gravel. The gravel was placed there by one of the PRPs in 2010 pursuant to an Administrative Settlement Agreement and Order on Consent with EPA. In 2011, EPA assessed the gravel barrier and determined that it was sufficient as an indefinite protective barrier for the asbestos-contaminated soil.

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# 14 References

- Ecology and Environment, Inc. (E & E), September 1, 2011a, *2011 Removal Action Specifications and Drawings, Orofino Asbestos Site, Orofino, Clearwater County, Idaho*, prepared for the United States Environmental Protection Agency, Seattle, Washington, under Contract No. EP-S7-06-02, TDD No. 10-09-0008.
- \_\_\_\_\_, June 22, 2011b, *2010 Removal Action Report, Orofino Asbestos Site, Orofino, Clearwater County, Idaho*, prepared for the United States Environmental Protection Agency, Seattle, Washington, under Contract No. EP-S7-06-02, TDD No. 10-09-0008.
- \_\_\_\_\_, March 3, 2011c, *Removal Site Evaluation Report, Orofino Asbestos Site, Orofino, Clearwater County, Idaho*, prepared for the United States Environmental Protection Agency, Seattle, Washington, under Contract No. EP-S7-06-02, TDD No. 10-08-0001.
- \_\_\_\_\_, January 10, 2011d, *Trip Report, Riverview Construction Asbestos Site, Orofino, Idaho*, prepared for the United States Environmental Protection Agency, Seattle, Washington, under Contract No. EP-S7-06-02, TDD No. 10-08-0001.
- \_\_\_\_\_, October 20, 2010, *Site-Specific Sampling Plan for the Orofino Asbestos Site*, prepared for the United States Environmental Protection Agency, Seattle, Washington, under Contract No. EP-S7-06-02, TDD No. 10-09-0008.
- JM Engineering, August 2011, *Structural Design Calculations of Segmental Block Retaining Wall, Contaminated Soil Containment Project, Orofino, Idaho*, for Wilbert Precast, Inc., Spokane, Washington.
- United States Environmental Protection Agency (EPA), January 2010, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review*, OSWER 9240.1-51, EPA 540-R-10-011.
- \_\_\_\_\_, January 2007, *USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis, Multi-Media, Multi-Concentration, ILM05.4*.
- \_\_\_\_\_, August 2000, *Guidance for the Data Quality Objectives Process*, EPA QA/G-4, Office of Research and Development, Washington, D.C., EPA/600/R-96/055.

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# A Photographs

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OROFINO ASBESTOS SITE  
Orofino, Idaho

TDD Number: 10-08-0001

Photographed by: Jessica Beehner - ERRS (JB), Tom Campbell (TC),  
Eric Lindeman (EL), Kip McGillivray - ERRS (KM)

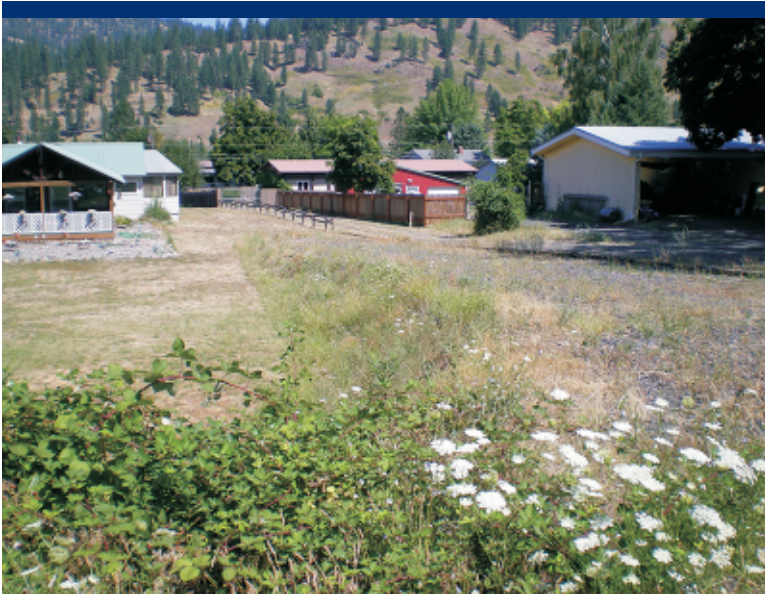


Photo 1 Pre-removal of asbestos-contaminated soil at 12719 Hartford Avenue.

Direction: North Date: 8/9/11 Taken by: JB



Photo 2 Pre-removal of asbestos-contaminated soil at 12140 Hartford Avenue.

Direction: South Date: 8/23/11 Taken by: EL



Photo 3 Pre-removal of asbestos-contaminated soil at 12170 Hartford Avenue.

Direction: Southeast Date: 8/23/11 Taken by: EL

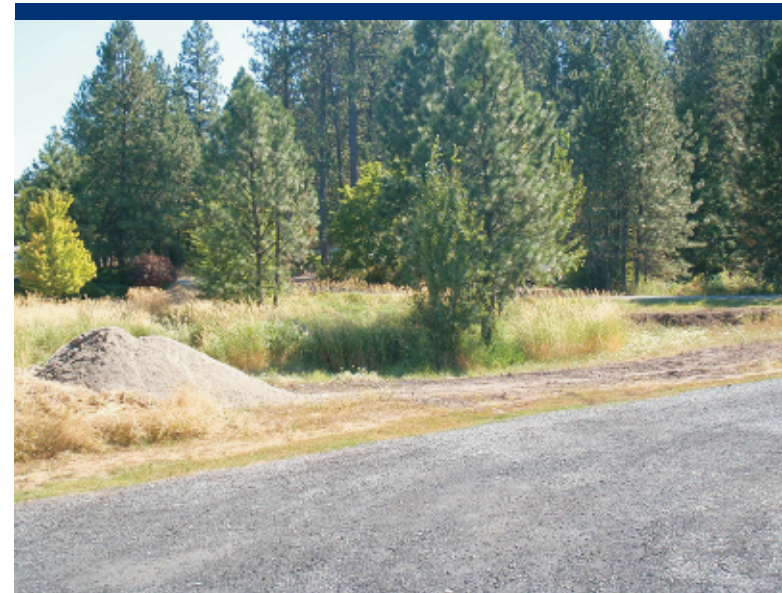


Photo 4 Post-removal of asbestos-contaminated soil from 12453 Hartford Avenue.

Direction: East Date: 8/29/11 Taken by: EL



OROFINO ASBESTOS SITE  
Orofino, Idaho

TDD Number: 10-08-0001

Photographed by: Jessica Beehner - ERRS (JB), Tom Campbell (TC),  
Eric Lindeman (EL), Kip McGillivray - ERRS (KM)



Photo 5 Excavation of asbestos-contaminated soil from 4753 Transfer Station Road.

Direction: North Date: 8/30/11 Taken by: EL



Photo 6 Pre-removal of asbestos-contaminated soil at 12742 Hartford Avenue.

Direction: West Date: 8/31/11 Taken by: EL



Photo 7 12170 Hartford Avenue backfill and hydro-seeding completed.

Direction: East Date: 9/12/11 Taken by: EL



Photo 8 4753 Transfer Station Road Site backfill completed.

Direction: Northwest Date: 9/16/11 Taken by: EL



OROFINO ASBESTOS SITE  
Orofino, Idaho



Photo 9 Small retaining wall completed at 12517 Hartford Avenue.

*Direction: East*

*Date: 9/20/11*

*Taken by: EL*

TDD Number: 10-08-0001

Photographed by: Jessica Beehner - ERRS (JB), Tom Campbell (TC),  
Eric Lindeman (EL), Kip McGillivray - ERRS (KM)



Photo 10 12517 Hartford Avenue backfill and fence completed.

*Direction: East*

*Date: 9/28/11*

*Taken by: EL*



OROFINO ASBESTOS SITE  
Orofino, Idaho



Photo 11 Example of air sampling pump and cassette.

*Direction:*                      *Date:* 9/1/11                      *Taken by:* EL

TDD Number: 10-08-0001

Photographed by: Jessica Beehner - ERRS (JB), Tom Campbell (TC),  
Eric Lindeman (EL), Kip McGillivray - ERRS (KM)



Photo 12 Church parking lot at 291 118th St. before construction of the wall.

*Direction:* East                      *Date:* 8/9/11                      *Taken by:* TC

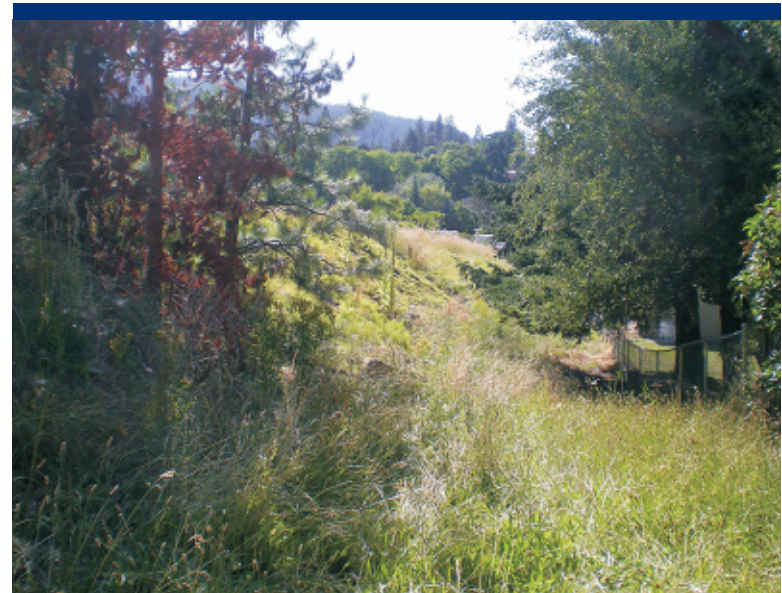


Photo 13 Lower view of the north slope of church parking lot where wall will be constructed.

*Direction:* West                      *Date:* 8/9/11                      *Taken by:* TC



OROFINO ASBESTOS SITE  
Orofino, Idaho

TDD Number: 10-08-0001

Photographed by: Jessica Beehner - ERRS (JB), Tom Campbell (TC),  
Eric Lindeman (EL), Kip McGillivray - ERRS (KM)



Photo 14 Upper view of the north slope of church parking lot where wall will be constructed.

Direction: West Date: 8/23/11 Taken by: EL



Photo 15 Stockpiles of asbestos-contaminated soil from remote properties at 291 118th St.

Direction: Northwest Date: 8/25/11 Taken by: EL



Photo 16 Bagged asbestos-cement pipe (ACP) staged at 291 118th St.

Direction: Down Date: 10/3/11 Taken by: EL



Photo 17 Base blocks of the wall for the north side of the parking lot retaining wall.

Direction: West Date: 9/1/11 Taken by: EL



OROFINO ASBESTOS SITE  
Orofino, Idaho

TDD Number: 10-08-0001

Photographed by: Jessica Beehner - ERRS (JB), Tom Campbell (TC),  
Eric Lindeman (EL), Kip McGillivray - ERRS (KM)



Photo 18 East end of the north side of the retaining wall.

Direction: West Date: 9/14/11 Taken by: EL



Photo 19 View of the completed north side retaining wall.

Direction: West Date: 9/30/11 Taken by: EL



Photo 20 View of north retaining wall from the down hill side.

Direction: East Date: 9/30/11 Taken by: EL



Photo 21 View of the west side of the retaining wall.

Direction: East Date: 10/4/11 Taken by: EL



OROFINO ASBESTOS SITE  
Orofino, Idaho



Photo 22 South terminal end of the retaining wall under construction.

*Direction: Northeast*      *Date: 10/4/11*      *Taken by: EL*



Photo 24 Completed asphalt cover and fence.

*Direction: West*      *Date: N/A*      *Taken by: KM*

TDD Number: 10-08-0001

Photographed by: Jessica Beehner - ERRS (JB), Tom Campbell (TC),  
Eric Lindeman (EL), Kip McGillivray - ERRS (KM)



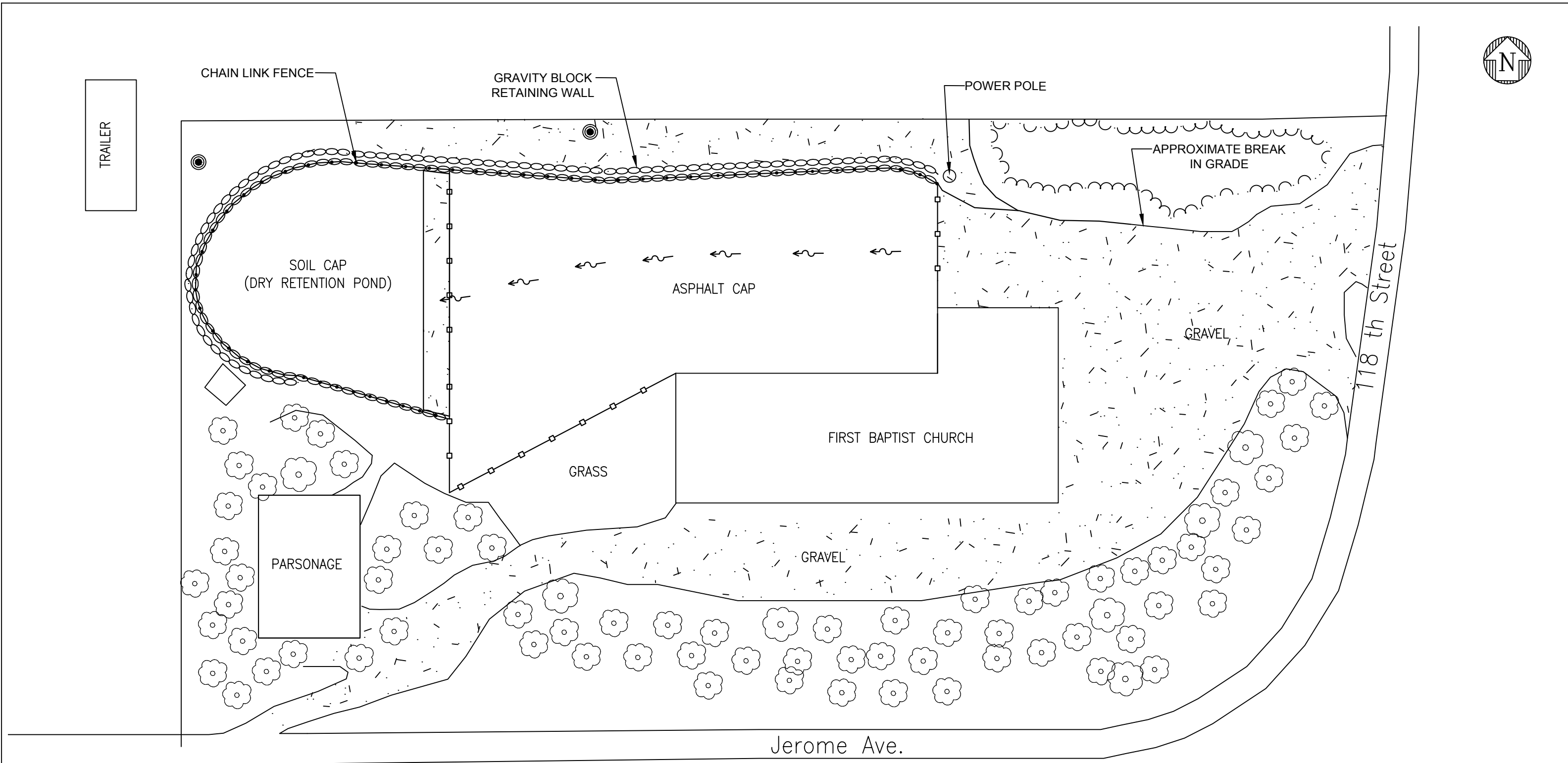
Photo 23 Asphalt subcontractor completes the parking lot.

*Direction: West*      *Date: N/A*      *Taken by: KM*

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# **B 291 118<sup>th</sup> St. Protective Barrier Diagram**

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NOTES

- 1. RETAINING WALL AND ASPHALT LOCATIONS AS SHOWN ARE APPROXIMATE. FIELD LOCATION IS REQUIRED.
- 2. SOME MEASUREMENTS AND FEATURE LOCATIONS ARE APPROXIMATE BASED ON AERIAL PHOTOGRAMMETRY.

LEGEND

- - - - - EXISTING BREAK IN GRADE
- ===== RETAINING WALL
- > -> DRAINAGE SWALE
- EDGE OF ASPHALT
- ⊙ DRY WELL
- CHAIN-LINK FENCE



ATTACHMENT 1  
SITE FIGURE

MAINTENANCE AND REPAIR PLAN  
OROFINO ASBESTOS SITE, CLEARWATER COUNTY, IDAHO

SCALE NOTED	DATE ISSUED 12-06-11	C.A.D. FILE \\CHBDL1\PROJECT\START\CAD\OROFINO.DWG
----------------	-------------------------	---

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# C Individual Property Figures

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Source: Google Earth Pro 2011.



**ecology and environment, inc.**  
Global Specialists in the Environment  
Seattle, Washington

**OROFINO ASBESTOS SITE**  
Orofino, Idaho

0 110 220  
Approximate Scale in Feet

**Figure C-1**  
**12976 HIGHWAY 12**  
**SUMMARY OF 2011 REMOVAL ACTION**

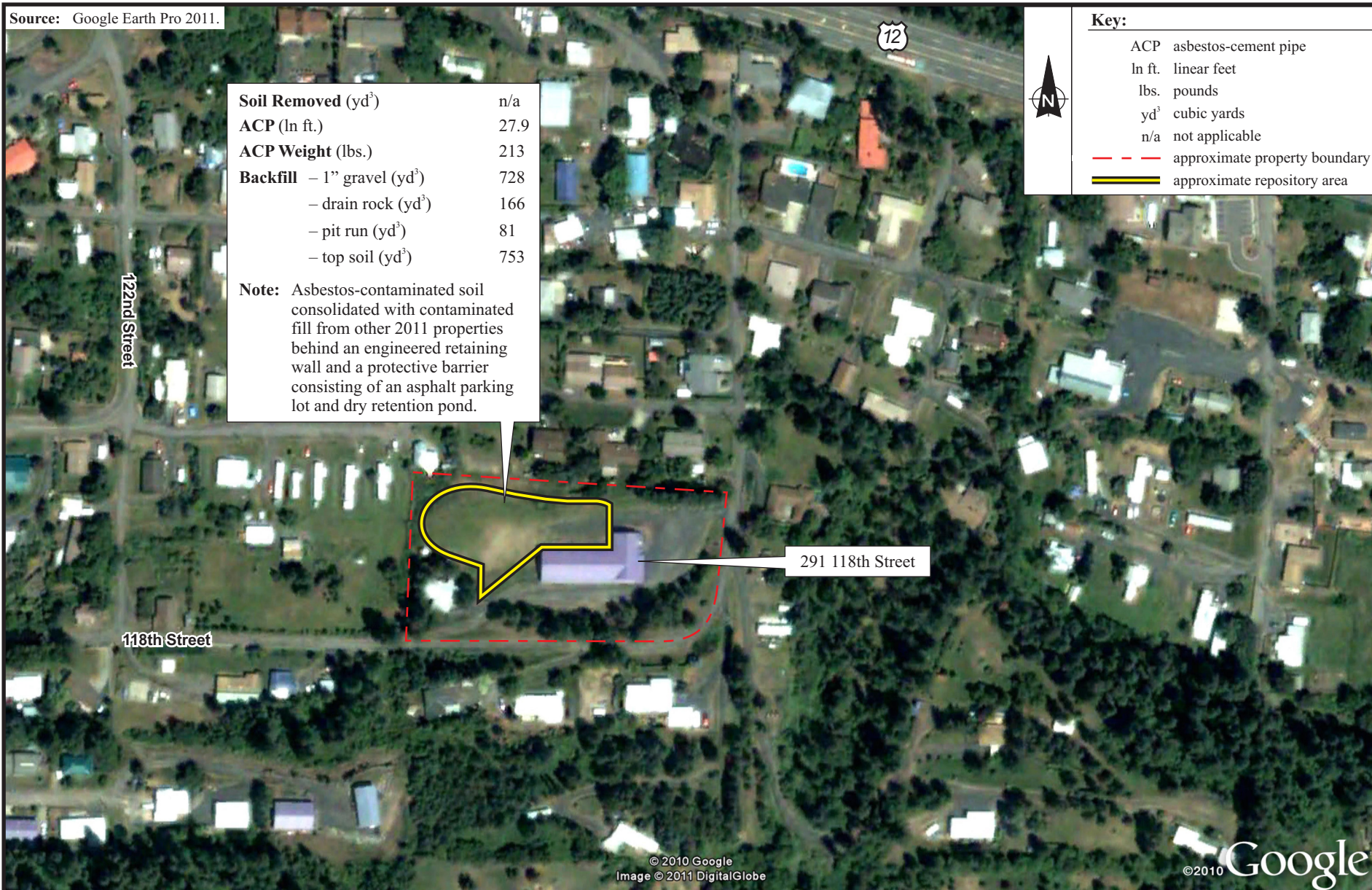
Date:  
1/12/12



Drawn by:  
AES

10:START-3\10080001\fig C-1



Source: Google Earth Pro 2011.


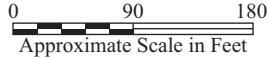


 <b>ecology and environment, inc.</b> Global Specialists in the Environment Seattle, Washington	<b>OROFINO ASBESTOS SITE</b> Orofino, Idaho		<b>Figure C-2</b> <b>291 118th STREET</b> <b>SUMMARY OF 2011 REMOVAL ACTION</b>		
	 Approximate Scale in Feet		Date: 3/8/12	Drawn by: AES	10:START-3\10080001\fig C-2



Source: Google Earth Pro 2011.


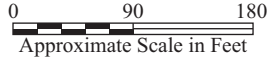


 <b>ecology and environment, inc.</b> Global Specialists in the Environment Seattle, Washington	<b>OROFINO ASBESTOS SITE</b> Orofino, Idaho	<b>Figure C-3</b> <b>4753 TRANSFER STATION ROAD</b> <b>SUMMARY OF 2011 REMOVAL ACTION</b>		
	 Approximate Scale in Feet	Date: 1/12/12	Drawn by: AES	10:START-3\10080001\fig C-3



Source: Google Earth Pro 2011.




 <b>ecology and environment, inc.</b> Global Specialists in the Environment Seattle, Washington	<b>OROFINO ASBESTOS SITE</b> Orofino, Idaho		<b>Figure C-4</b> <b>12140 HARTFORD AVENUE</b> <b>SUMMARY OF 2011 REMOVAL ACTION</b>		
	 Approximate Scale in Feet		Date: 1/12/12	Drawn by: AES	10:START-3\10080001\fig C-4





Source: Google Earth Pro 2011.

**Soil Removed** (yd<sup>3</sup>) 60  
**ACP** (ln ft.) 1.25  
**ACP Weight** (lbs.) 12  
**Backfill** – 1" gravel (yd<sup>3</sup>) 10  
           – top soil (yd<sup>3</sup>) 15  
**Note:** Asbestos-contaminated soil moved to repository at 291 118th Street.

**Key:**

ACP asbestos-cement pipe  
 ln ft. linear feet  
 lbs. pounds  
 yd<sup>3</sup> cubic yards  
 approximate excavation area



 <b>ecology and environment, inc.</b> Global Specialists in the Environment Seattle, Washington	OROFINO ASBESTOS SITE Orofino, Idaho	Figure C-5 12170 HARTFORD AVENUE SUMMARY OF 2011 REMOVAL ACTION		
	 Approximate Scale in Feet	Date: 1/12/12	Drawn by: AES	10:START-3\10080001\fig C-5



Source: Google Earth Pro 2011.



**ecology and environment, inc.**  
Global Specialists in the Environment  
Seattle, Washington

**OROFINO ASBESTOS SITE**  
Orofino, Idaho

0 90 180  
Approximate Scale in Feet

**Figure C-6**  
**12453 HARTFORD AVENUE**  
**SUMMARY OF 2011 REMOVAL ACTION**

Date:  
1/12/12


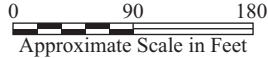
Drawn by:  
AES

10:START-3\10080001\fig C-6



Source: Google Earth Pro 2011.


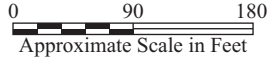


 <b>ecology and environment, inc.</b> Global Specialists in the Environment Seattle, Washington	<b>OROFINO ASBESTOS SITE</b> Orofino, Idaho	<b>Figure C-7</b> <b>12517 HARTFORD AVENUE</b> <b>SUMMARY OF 2011 REMOVAL ACTION</b>		
	 Approximate Scale in Feet	Date: 1/12/12	Drawn by: AES	10:START-3\10080001\fig C-7



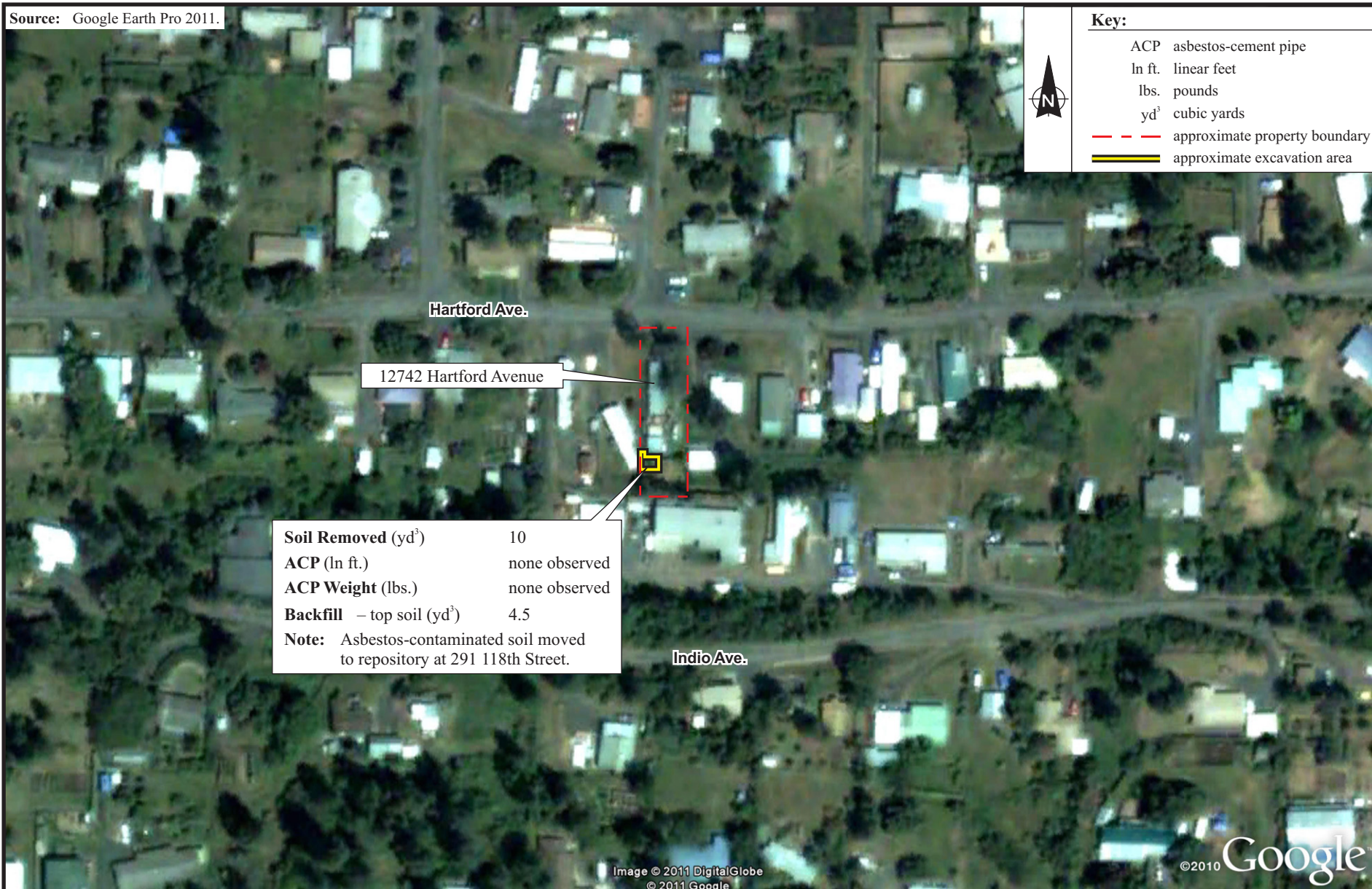
Source: Google Earth Pro 2011.


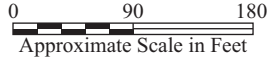


 <b>ecology and environment, inc.</b> Global Specialists in the Environment Seattle, Washington	OROFINO ASBESTOS SITE Orofino, Idaho		Figure C-8 12719 HARTFORD AVENUE SUMMARY OF 2011 REMOVAL ACTION		
	 Approximate Scale in Feet		Date: 1/12/12	Drawn by: AES	10:START-3\10080001\fig C-8



Source: Google Earth Pro 2011.



 <b>ecology and environment, inc.</b> Global Specialists in the Environment Seattle, Washington	<b>OROFINO ASBESTOS SITE</b> Orofino, Idaho	<b>Figure C-9</b> <b>12742 HARTFORD AVENUE</b> <b>SUMMARY OF 2011 REMOVAL ACTION</b>		
	 Approximate Scale in Feet	Date: 1/12/12	Drawn by: AES	10:START-3\10080001\fig C-9





Source: Google Earth Pro 2011.



**Key:**

- ACP asbestos-cement pipe
- ln ft. linear feet
- lbs. pounds
- yd<sup>3</sup> cubic yards
- n/a not applicable
- approximate property boundary
- approximate removal area

 <b>ecology and environment, inc.</b> Global Specialists in the Environment Seattle, Washington	OROFINO ASBESTOS SITE Orofino, Idaho		Figure C-10 130 122nd STREET SUMMARY OF 2011 REMOVAL ACTION		
	 Approximate Scale in Feet		Date: 1/12/12	Drawn by: AES	10:START-3\10080001\fig C-10

# **D Individual Property Reports**

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## **Property Data Sheet**

**Property Address:** 12976 Highway 12

**Property Figure:** C-1

**Description:**

An estimated quantity of 16,680 cubic yards (yd<sup>3</sup>) of contaminated excavated material was placed as backfill on this property. In 2010, the responsible party placed a 4-inch gravel barrier over the contaminated fill as a protective barrier under an Administrative Settlement Agreement and Order on Consent with EPA.

In 2011, EPA assessed the gravel barrier and determined that it was sufficient as an indefinite protective barrier for the asbestos-contaminated soil. No removal activities were performed by EPA at this site in 2011.

Asbestos (percent and asbestiform): no sample collected

Length of asbestos-cement pipe recovered: not applicable

Weight of recovered asbestos-cement pipe: not applicable

## Property Data Sheet

**Property Address:** 291 118<sup>th</sup> St.

**Property Figure:** C-2

**Description:**

An estimated quantity of 10,420 cubic yards (yd<sup>3</sup>) of contaminated excavated material was placed as backfill on this property. Rather than removing the contaminated material for off-Site disposal, the church at this property allowed EPA to consolidate the contaminated material from the other properties with the material already on the property behind an engineered retaining wall and a protective barrier consisting of an asphalt parking lot and dry retention pond. With the addition of 1,660 yd<sup>3</sup> of contaminated material from other properties and including the material that was already present, there is an estimated total of 12,100 yd<sup>3</sup> of asbestos-contaminated soil under the protective barrier at this property.

Asbestos (percent and asbestiform): no sample collected

Length of asbestos-cement pipe recovered: not applicable

Weight of recovered asbestos-cement pipe: not applicable

## **Property Data Sheet**

**Property Address:** 4753 Transfer Station Road

**Property Figure:** C-3

### **Description:**

The property owner reported receiving approximately 8,000 cubic yards (yd<sup>3</sup>) of contaminated excavated material as backfill on this property. Asbestos testing results from a piece of asbestos-containing pipe (ACP) collected from this property indicated 20% chrysotile asbestos.

Cleanup started August 25, 2011, and the backfill was completed on September 16, 2011. Approximately 430 yd<sup>3</sup> of asbestos-contaminated fill material was removed. The staged broken concrete pieces were moved into the excavation before backfill was placed. Approximately 39 yd<sup>3</sup> of one-inch gravel, as requested by the property owner, was used to backfill the property. The backfill was graded and compacted to the existing grade before returning the excavated area to the property owner.

Perimeter and personal air monitoring was conducted during cleanup activities. A soil composite confirmation sample was non-detect for asbestos, before the backfill was placed in the excavation.

Asbestos (percent and asbestiform): 20% Chrysotile

Length of asbestos-cement pipe recovered: 11.5 feet

Weight of recovered asbestos-cement pipe: 96 pounds

## **Property Data Sheet**

**Property Address:** 12140 Hartford Avenue

**Property Figure:** C-4

**Description:**

The property owner reported receiving approximately 200 cubic yards (yd<sup>3</sup>) of contaminated excavated material as backfill on this property. Asbestos testing results from a piece of asbestos-containing pipe (ACP) collected from this property indicated 15% chrysotile asbestos.

Cleanup started August 23, 2011, and the backfill was completed on August 31, 2011. Approximately 310 yd<sup>3</sup> of asbestos-contaminated fill material was removed. Approximately 165 yd<sup>3</sup> of one-inch gravel, as requested by the property owner, was used to backfill the property. The backfill was graded and compacted to the existing grade before returning the excavated area to the property owner.

Perimeter and personal air monitoring was conducted during cleanup activities. A soil composite confirmation sample was non-detect for asbestos, before the backfill was placed in the excavation.

Asbestos (percent and asbestiform): 15% Chrysotile

Length of asbestos-cement pipe recovered: 2.16 feet

Weight of recovered asbestos-cement pipe: 80 pounds

## **Property Data Sheet**

**Property Address:** 12170 Hartford Avenue

**Property Figure:** C-5

### **Description:**

The property owner reported receiving approximately 100 cubic yards (yd<sup>3</sup>) of excavated material as fill in the front yard. Asbestos testing results from a piece of asbestos-containing pipe (ACP) collected from this property indicated 15% chrysotile asbestos.

Cleanup started August 24, 2011, and the backfill was completed on September 12, 2011. Approximately 60 yd<sup>3</sup> of asbestos-contaminated fill material was removed from the front yard and small area on the west side of the property driveway. Approximately 10 yd<sup>3</sup> of one-inch gravel was placed on the driveway as backfill and approximately 15 yd<sup>3</sup> of soil was used to backfill the front yard. A variety of cleaned, local, medium size rocks were used to build a retaining wall on the street side of the yard to stabilize the backfill. The front yard was hydro-seeded and the property owner accepted the responsibility for watering the yard to establish a grassy yard.

Perimeter and personal air monitoring was conducted during cleanup activities. A soil composite confirmation sample was non-detect for asbestos, before the backfill was placed in the excavation.

Asbestos (percent and asbestiform): 15% Chrysotile

Length of asbestos-cement pipe recovered: 1.25 feet

Weight of recovered asbestos-cement pipe: 12 pounds



## **Property Data Sheet**

**Property Address:** 12453 Hartford Avenue

**Property Figure:** C-6

**Description:**

The owner of this vacant property reported receiving approximately 40 cubic yards (yd<sup>3</sup>) of contaminated excavated material in three dump truck piles on the property. No asbestos testing was done, because there were no pieces of asbestos-containing pipe (ACP) observed or collected from this property.

Cleanup started August 25, 2011, and completed on August 29, 2011. After the cleanup the owner indicated that one pile of sand that was removed was not contaminated and he wanted it replaced. One truck load of 10 yd<sup>3</sup> of sand was returned to the property on August 29, 2011. Approximately 80 yd<sup>3</sup> of asbestos-contaminated fill material was removed from the property.

Perimeter air monitoring was conducted during cleanup activities. No soil composite confirmation sample was taken from this site because the contaminated soil and native soil was easily delineated.

Asbestos (percent and asbestiform): None

Length of asbestos-cement pipe recovered: None

Weight of recovered asbestos-cement pipe: None

## **Property Data Sheet**

**Property Address:** 12517 Hartford Avenue

**Property Figure:** C-7

### **Description:**

The property owner reported receiving approximately 510 cubic yards (yd<sup>3</sup>) of contaminated excavated material as fill to extend a parking lot. Asbestos testing results from a piece of asbestos-containing pipe (ACP) collected from this property indicated 18% chrysotile and 2% crocidolite asbestos.

Cleanup started September 8, 2011, with the manual removal of a concrete landscaping block retaining wall. The blocks were carefully removed so that they could be used to rebuild the retaining wall during the backfill process. Existing posts for a chain-link fence, which was not completed, were also removed. Approximately 560 yd<sup>3</sup> of asbestos-contaminated fill material was removed. Approximately 469 yd<sup>3</sup> of one-inch gravel, as requested by the property owner, was used to backfill the property. The backfill was graded and compacted behind the retaining wall. A new chain-link fence was constructed and cleaned, large boulders from the site were placed in front of the fence to restrict vehicles from driving through the fence. Cleanup was completed on September 21, 2011.

Perimeter and personal air monitoring was conducted during cleanup activities. A soil composite confirmation sample was non-detect for asbestos, before the backfill was placed in the excavation.

Asbestos (percent and asbestiform): 18% Chrysotile and 2% Crocidolite

Length of asbestos-cement pipe recovered: 58.8 feet

Weight of recovered asbestos-cement pipe: 687 pounds

## **Property Data Sheet**

**Property Address:** 12719 Hartford Avenue

**Property Figure:** C-8

### **Description:**

The property owner reported receiving an unknown amount of contaminated excavated material. Asbestos testing results from a piece of asbestos-containing pipe (ACP) collected from this property indicated 20% chrysotile and 5% crocidolite asbestos.

Cleanup started September 1, 2011, and the backfill was completed on September 14, 2011. Approximately 210 yd<sup>3</sup> of asbestos-contaminated fill material was removed. Approximately 64. yd<sup>3</sup> one-inch gravel, as requested by the property owner, was used to backfill the property. The backfill was graded and compacted to the existing grade before returning the excavated area to the property owner.

Perimeter and personal air monitoring was conducted during cleanup activities. A soil composite confirmation sample was non-detect for asbestos, before the backfill was placed in the excavation.

Asbestos (percent and asbestiform): 20% Chrysotile and 5% Crocidolite

Length of asbestos-cement pipe recovered: 8 feet

Weight of recovered asbestos-cement pipe: 76.8 pounds

## **Property Data Sheet**

**Property Address:** 12742 Hartford Avenue

**Property Figure:** C-9

### **Description:**

The property owner reported receiving an unknown amount of contaminated excavated material which was placed as fill in his back yard. No asbestos testing was done, because there were no pieces of asbestos-containing pipe (ACP) observed or collected from this property.

Cleanup started August 31, 2011, and the backfill was completed on September 12, 2011. Approximately 10 yd<sup>3</sup> of asbestos-contaminated fill material was removed.

Approximately 4.5 yd<sup>3</sup> of top soil was used to backfill the property. The backfill was graded, compacted to the existing grade, and hydro-seeded. The property owner accepted the responsibility for watering the yard to establish a grassy yard.

Perimeter and personal air monitoring was conducted during cleanup activities. A soil composite confirmation sample was non-detect for asbestos, before the backfill was placed in the excavation.

Asbestos (percent and asbestiform): No sample collected

Length of asbestos-cement pipe recovered: None

Weight of recovered asbestos-cement pipe: None

## **Property Data Sheet**

**Property Address:** 130 122<sup>nd</sup> Street

**Property Figure:** C-10

### **Description:**

The property owner for this vacant lot was not identified. There was a small quantity of asbestos-containing transite siding identified on the surface of this property. The siding was removed to remove the potential of public exposure. Because it was not asbestos-containing pipe (ACP), no asbestos testing was done.

The cleanup was started and completed on September 27, 2011.

No perimeter and personal air monitoring was conducted during cleanup activities nor any soil sampling.

Asbestos (percent and asbestiform): No sample submitted

Length of asbestos-cement pipe recovered: Not applicable

Weight of recovered transite siding: 90 pounds



# **E Waste Disposal Records**

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GRAHAM ROAD LANDFILL  
S. 1820 GRAHAM ROAD  
MEDICAL LAKE, WA 99022

(509) 244-0151

# INVOICE

Customer: MCGILLIVRAY ENVIRONMENTAL  
Account Number: 518-0001085-1518-0  
Invoice Date: 12/01/2011  
Invoice Number: 0054558-1518-2  
Due Date: Due Upon Receipt  
WM ezPay Account ID: 00006-83969-25008

Total Current Charges      Total Amount Due

50.60

50.60

## Account Summary

Description	Amount
Previous Balance	100.94
Total Credits and Adjustments	0.00
Total Payments Received	100.94-
Total Current Charges	50.60
<b>Total Amount Due</b>	<b>50.60</b>
Total Amount Past Due	0.00

Please pay total amount due. Thank you for your business.

## Service Period: NOVEMBER 2011

Description	Amount
Landfill	50.60
<b>Total Current Charges</b>	<b>50.60</b>

The landfill is closed on all major holidays.

If full payment of the invoiced amount is not received on or before the delinquent date, you will be charged a monthly late fee of 1% of the unpaid amount, with a minimum monthly charge of \$1.00, or such lesser late fee allowed under applicable law, regulation or contract. For each returned check, a fee will be assessed on your next billing equal to the maximum amount permitted by applicable state law.

Want to pay this bill on-line? Visit [www.wm.com](http://www.wm.com) and click on My Account to make a convenient, secure payment.

Current Due	Over 30	Over 60	Over 90	Over 120	Total Due
50.60	0.00	0.00	0.00	0.00	50.60



(509) 244-0151

Learn how we Think Green at  
[www.wm.com/thinkgreen](http://www.wm.com/thinkgreen)

## Payment Coupon

Please detach and send with checks only (no cash).  
Please send all other correspondence to your local WM site.

Your Account Number

518-0001085-1518-0

Invoice Date

12/01/2011

Your Invoice Number

0054558-1518-2

Due Date

Upon Receipt

Total Due

50.60

Amount Paid

Pay your WM bill online at  
[www.wm.com](http://www.wm.com). To pay by  
phone, call 866-964-2729

1518518000108500054558000000050600000005060 2

0047752 01 AB 0.368 \*\*AUTO T1 17335 83849-104141 -C014 11391166

MCGILLIVRAY ENVIRONMENTAL  
PO BOX 1041  
OSBURN ID 83849-1041

WASTE MANAGEMENT  
PO BOX 541065  
LOS ANGELES CA 90054-1065

From everyday collection to environmental protection,  
Think Green. Think Waste Management.

Printed on  
recycled paper.



GRAHAM ROAD LANDFILL  
S. 1820 GRAHAM ROAD  
MEDICAL LAKE, WA 99022

Customer: MCGILLIVRAY ENVIRONMENTAL  
Account Number: 518-0001085-1518-0  
Invoice Date: 12/01/2011  
Invoice Number: 0054558-1518-2  
Due Date: Due Upon Receipt  
WM ezPay Account ID: 00006-83969-25008

Service Location: 518-1085 McGillivray Environmental PO Box 1041 Osburn Id 83849						
Date	Ticket	Description	Quantity	U/M	Rate	Amount
11/07/11	391447	Vehicle#: dayne				
		Po#: orofino asb site				
		Asbestos	1.50	YDS	25.95	38.93
		Minimum charge applied				1.40
		Refuse tax		YDS		
		Fuel surcharge - landfill	1.00	PCT	7.12	3.27
		Standard environmental fee - small (landfill)	1.00	LOD	7.00	7.00
		<b>Ticket Total</b>				<b>50.60</b>
<b>Total charges for service location</b>						<b>50.60</b>
<b>Total Current Charges</b>						<b>50.60</b>

Payments Received Detail		Amount
11/14/2011	Payment - thank you	100.94-
<b>Total Payments Received</b>		<b>100.94-</b>

# **F Asbestos Testing Reports**

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# ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104  
Tel: (206) 624-9537, Fax: (206) 621-9832

## MEMORANDUM

DATE: September 16, 2011

TO: Steve Hall, START-3 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, WA *MW*

SUBJ: Data Quality Assurance Review, Orofino Asbestos Site,  
Orofino, Idaho

REF: TDD: 10-09-0008 PAN: 002233.0603.01RZ

The data quality assurance review of 28 air filter and 5 bulk samples collected from the Orofino Asbestos site in Orofino, Idaho, has been completed. Phase contrast microscopy (PCM) and polarized light microscopy (PLM) asbestos analyses were performed by EMSL, Inc., Cinnaminson, New Jersey.

The samples were numbered:

8-30-11					
Air PCM	11082026	11082027	11082028	11082029	
	11082030	11082504			
8-31-11					
Air PCM	11082032	11082033	11082034	11082035	
	11082036				
9-1-11					
Air PCM	11082037	11082038	11082039		
Bulk PLM	11082403				
9-2-11					
Air PCM	11082040	11082041	11082042	11082043	11082044
	11082045	11082506			
9-6-11					
Air PCM	11082046	11082047	11082048	11082049	11082050
	11082051	11082507			
9-7-11					
Bulk PLM	11082305	11082404			
9-8-11					
Bulk PLM	11082306	11082307			

#### Data Qualifications:

The samples were collected between August 30 and September 8, 2011, and were analyzed by September 12, 2011. No issues were noted in the laboratory case narratives.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

#### Data Qualifiers and Definitions

- J - The associated numerical value is an estimated quantity because the reported concentrations were less than the sample detection limits but greater than the instrument detection limits or because quality control criteria limits were not met.
- U - The material was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
- UJ - The material was analyzed for, but not detected. The reported detection limit is estimated because quality control criteria were not met.

**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone: (800) 220-3675 Fax: (856) 786-5974 Email: cinnaslab@EMSL.com

Attn: **Eric Lindeman**  
**Ecology & Environment, Inc.**  
**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: ECOL44  
Customer PO:  
Received: 09/01/11 9:20 AM  
EMSL Order: 041123616

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/1/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082026		8/30/2011	5125.42	18	100	0.001	22.9	0.002	
041123616-0002									
11082027		8/30/2011	979.77	11	100	0.003	14.0	0.006	
041123616-0003									
11082028		8/30/2011	5827.41	18	100	0.0005	22.9	0.002	
041123616-0004									
11082029		8/30/2011	886.24	<5.5	100	0.003	<7.01 U	<0.003 U	
041123616-0005									
11082030		8/30/2011	869.76	<5.5	100	0.003	<7.01 U	<0.003 U	
041123616-0006									
11082504		8/30/2011							Field Blank Not Analyzed
041123616-0008									

The results reported have been blank corrected as applicable.

Initial report from

Analyst(s)

Lauren Kerber (5)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.25. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.  
Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03036

1  
MW 9/16/11

**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone: (800) 220-3675 Fax: (856) 786-5974 Email: cinnasblab@EMSL.com

Attn: **Eric Lindeman**  
**Ecology & Environment, Inc.**  
**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: **ECOL44**  
Customer PO:  
Received: **09/02/11 9:30 AM**  
EMSL Order: **041123727**

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: **10-09-0008**

EMSL Proj:  
Analysis Date: **9/6/2011**

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

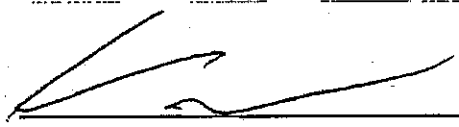
Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082032		8/31/2011	6101.70	25	100	0.0004	31.8	0.002	
041123727-0001									
11082033		8/31/2011	1093.75	<5.5	100	0.002	<7.01	<0.002	U
041123727-0002									
11082034		8/31/2011	589.99	<5.5	100	0.005	<7.01	<0.005	U
041123727-0003									
11082035		8/31/2011	584.44	<5.5	100	0.005	<7.01	<0.005	U
041123727-0004									
11082036		8/31/2011	644.11	9	100	0.004	11.5	0.007	
041123727-0005									

No discernable field blanks submitted with this sample set.

Initial report from 09/06/2011 09:27:43

Analyst(s)

Lauren Kerber (5)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03036

mw 9-16-11

**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone: (800) 220-3675 Fax: (856) 786-5974 Email: [cinna@labweb.EMSL.com](mailto:cinna@labweb.EMSL.com)

Attn: **Eric Lindeman**  
**Ecology & Environment, Inc.**  
**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: ECOL44  
Customer PO:  
Received: 09/06/11 8:20 AM  
EMSL Order: 041123883

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-009-0008

EMSL Proj:  
Analysis Date: 9/8/2011


**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082037		9/2/2011	6065.35	28	100	0.0004	35.7	0.002	
041123883-0001									
11082038		9/2/2011	5884.70	19	100	0.0005	24.2	0.002	
041123883-0002									
11082039		9/2/2011	1162.92	6	100	0.002	7.64	0.003	
041123883-0003									
11082040		9/2/2011	2220.80	<5.5	100	0.001	<7.01 U	<0.001 U	
041123883-0004									
11082041		9/2/2011	2437.07	6	100	0.001	7.64	0.001	
041123883-0005									
11082042		9/2/2011	463.50	7	100	0.006	8.92	0.007	
041123883-0006									
11082043		9/2/2011	558.64	<5.5	100	0.005	<7.01 U	<0.005 U	
041123883-0007									
11082044		9/2/2011	563.02	6	100	0.005	7.64	0.005	
041123883-0008									
11082045		9/2/2011	532.05	7	100	0.005	8.92	0.006	
041123883-0009									
11082506		9/2/2011							Field Blank Not Analyzed
041123883-0010									

Initial report from 09/08/2011 09:16:52

Analyst(s)

Lauren Kerber (9)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03036

MW 9-16-11



EMSL Analytical, Inc.

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Attn: **Eric Lindeman**  
**Ecology & Environment, Inc.**  
**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: ECOL44  
Customer PO:  
Received: 09/06/11 8:20 AM  
EMSL Order: 041123883

Fax: (206) 621-9832 Phone: (206) 624-9537

Project: 10-009-0008

EMSL Proj:  
Analysis Date: 9/8/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,  
Revision 3, Issue 2, 8/15/94**

Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
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The results reported have been blank corrected as applicable.

Initial report from 09/08/2011 09:16:52

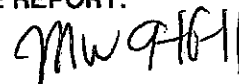
Analyst(s)

Lauren Kerber (9)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10B72, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03036







EMSL Analytical, Inc.

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Seattle, WA 98104

Customer ID: ECOL44  
Customer PO:  
Received: 09/08/11 10:30 AM  
EMSL Order: 041124098

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/10/2011

### Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method, Revision 3, Issue 2, 8/15/94

Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082046		9/6/2011	1203.84	8	100	0.002	10.2	0.003	
041124098-0001									
11082047		9/6/2011	1190.16	6	100	0.002	7.64	0.002	
041124098-0002									
11082048		9/6/2011	1278.42	21	100	0.002	26.8	0.008	
041124098-0003									
11082049		9/6/2011	6164.03	27	100	0.0004	34.4	0.002	
041124098-0004									
11082050		9/6/2011	5782.10	18	100	0.0005	22.9	0.002	
041124098-0005									
11082051		9/6/2011	1140.02	6	100	0.002	7.64	0.003	
041124098-0006									
110822507		9/6/2011							Field Blank Not Analyzed
041124098-0007									

The results reported have been blank corrected as applicable.

Initial report from 09/12/2011 07:53:32

Analyst(s)

Lauren Kerber (6)

Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP C3036

mw 9-16-11

**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

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Attn: **Eric Lindeman**  
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**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: ECOL44  
Customer PO:  
Received: 09/12/11 8:15 AM  
EMSL Order: 041124282

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/12/2011

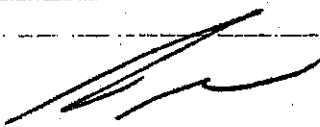
**Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method  
with CARB 435 Prep (Milling). Level B for 0.1% Target Analytical Sensitivity**

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
11082306 041124282-0001		Gray Non-Fibrous Heterogeneous		100.00% Non-fibrous (other)	None Detected
11082307 041124282-0002		Brown Non-Fibrous Heterogeneous		100.00% Non-fibrous (other)	None Detected

Initial report from 09/13/2011 08:10:42

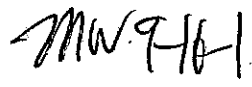
Analyst(s)

Chris Little (2)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ



**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone: (800) 220-3675 Fax: (856) 785-2974 Email: [info@emsl.com](mailto:info@emsl.com)

Attn: **Eric Lindeman**  
**Ecology & Environment, Inc.**  
**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: ECOL44  
Customer PO:  
Received: 09/02/11 9:30 AM  
EMSL Order: 041123728

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/2/2011

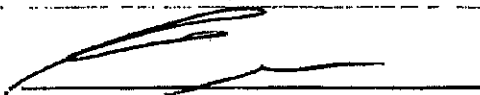
### Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
11082403 041123728-0001		Gray Fibrous Homogeneous		80% Non-fibrous (other)	20% Chrysotile

Initial report from 09/02/2011 16:02:04

Analyst(s)

McLaughlin Paul (1)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036





EMSL Analytical, Inc.

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Attn: Eric Lindeman  
Ecology & Environment, Inc.  
720 3rd Ave  
Suite 1700  
Seattle, WA 98104

Customer ID: ECOL44  
Customer PO:  
Received: 09/08/11 10:30 AM  
EMSL Order: 041124094

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/8/2011

**Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method  
with CARB 435 Prep (Milling). Level B for 0.1% Target Analytical Sensitivity**

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
11082305 041124094-0001		Brown Fibrous Homogeneous	1.00% Cellulose	99.00% Non-fibrous (other)	None Detected

Initial report from 09/08/2011 16:21:21

Analyst(s)

Garret Vliet (1)

  
Stephen Stiegel, CIH, Laboratory Manager  
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ

Test Report PLMPTC-7.121.0 Printed: 9/8/2011 4:21:21 PM

**THIS IS THE LAST PAGE OF THE REPORT.**

MW 9-16-11

**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone (800) 220-3675 Fax (856) 786-5974 Email [cin@asblab.com](mailto:cin@asblab.com)

Attn: **Eric Lindeman**  
**Ecology & Environment, Inc.**  
**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: ECOL44  
Customer PO:  
Received: 09/08/11 10:30 AM  
EMSL Order: 041124097

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/8/2011

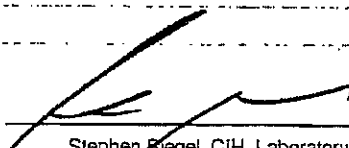
**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using  
Polarized Light Microscopy**

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
11082404		Gray/White		75% Non-fibrous (other)	20% Chrysotile
041124097-0001		Fibrous			5% Crocidolite
		Homogeneous			

Initial report from 09/08/2011 16:22:02

Analyst(s)

Garret Vilel (1)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-D, AIHA-LAP, LLC-IHLAP Lab 100184, NYS ELAP 10872, NJ DEP 03036

*MW 9-11*





# ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104  
Tel: (206) 624-9537, Fax: (206) 621-9832

## MEMORANDUM

DATE: September 28, 2011

TO: Steve Hall, START-3 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, WA *MW*

SUBJ: Data Quality Assurance Review, Orofino Asbestos Site,  
Orofino, Idaho

REF: TDD: 10-09-0008

PAN: 002233.0603.01RZ

The data quality assurance review of 38 air filter and 2 bulk samples collected from the Orofino Asbestos site in Orofino, Idaho, has been completed. Phase contrast microscopy (PCM) and polarized light microscopy (PLM) asbestos analyses were performed by EMSL, Inc., Cinnaminson, New Jersey.

The samples were numbered:

9-8-11

Air PCM	11082052	11082054	11082055	11082056
	11082057			

9-12-11

Air PCM	11082058	11082059	11082060	11082061	11082062
	11082063	11082509 (field blank – not analyzed)			

9-13-11

Air PCM	11082064 (overloaded – not analyzed)			11082065	11082066
	11082067	11082068	11082069	11082510	

Bulk-PLM

<del>11082308</del>	<del>11082405</del>
---------------------	---------------------

9-14-11

Air PCM	11082070 (overloaded – not analyzed)	11082071
---------	--------------------------------------	----------

9-15-11

Air PCM	11082073	11082074	11082075 (no filter in cassette – not analyzed)
	11082512 (field blank – not analyzed)		

9-16-11

Air PCM	11082076	11082077	11082078
	11082513 (field blank – not analyzed)		

9-20-11  
Air PCM      11082079      11082080      11082081  
                 11082514 (field blank – not analyzed)

9-21-11  
Air PCM      11082082      11082083      11082084

9-22-11  
Air PCM      11082085      11082086      11082087  
                 11082515 (field blank – not analyzed)

9-23-11  
Air PCM      11082088      11082089      11082090

9-25-11  
Air PCM      11082091      11082092      11082093

Data Qualifications:

The samples were collected between September 8 and 25, 2011, and were analyzed by September 27, 2011. No issues were noted in the laboratory case narratives other than those noted above with some samples.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

- J - The associated numerical value is an estimated quantity because the reported concentrations were less than the sample detection limits but greater than the instrument detection limits or because quality control criteria limits were not met.
- U - The material was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
- UJ - The material was analyzed for, but not detected. The reported detection limit is estimated because quality control criteria were not met.

**EMSL Analytical, Inc.**

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Attn: **Eric Lindeman**  
**Ecology & Environment, Inc.**  
**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: ECOL44  
Customer PO:  
Received: 09/12/11 8:15 AM  
EMSL Order: 041124284

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/12/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

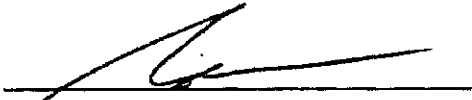
Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082052		9/8/2011	6836.17	7	100	0.0004	8.92	0.0005	
041124284-0001									
11082054		9/8/2011	1394.89	8	100	0.002	10.2	0.003	
041124284-0002									
11082055		9/8/2011	1230.35	6	100	0.002	7.64	0.002	
041124284-0003									
11082056		9/8/2011	1260.00	<5.5	100	0.002	<7.01	<0.002	✓
041124284-0004									
11082057		9/8/2011	1194.34	<5.5	100	0.002	<7.01	<0.002	✓
041124284-0005									

No discernable field blanks submitted with this sample set.

Initial report from 09/12/2011 15:48:23

Analyst(s)

Dave Poitras (5)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03036

*MW 9-28-11*

**EMSL Analytical, Inc.**

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Attn: **Eric Lindeman**  
**Ecology & Environment, Inc.**  
**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: ECOL44  
Customer PO:  
Received: 09/15/11 9:40 AM  
EMSL Order: 041124665

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/15/2011

**Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method  
with CARB 435 Prep (Milling). Level B for 0.1% Target Analytical Sensitivity**

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
11082308		Brown	2.00% Cellulose	96.00% Non-fibrous (other)	None Detected
041124665-0001		Non-Fibrous	2.00% Glass		
		Homogeneous			

Initial report from 09/16/2011 09:10:49

Analyst(s)

Anne Paul (1)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ

Test Report PLMPTC-7.121.0 Printed: 9/16/2011 9:10:49 AM

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1



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200 Route 130 North, Cinnaminson, NJ 08077

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**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: ECOL44  
Customer PO:  
Received: 09/15/11 9:40 AM  
EMSL Order: 041124664

Fax: (206) 621-9832

Phone: (206) 624-9537

EMSL Proj:  
Analysis Date: 9/15/2011

Project: 10-09-0008

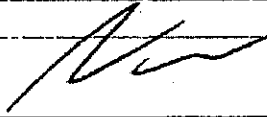
**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using  
Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
11082405		Gray/White		80% Non-fibrous (other)	18% Chrysotile
041124664-0001		Fibrous			2% Crocidolite
		Homogeneous			

Initial report from 09/15/2011 14:34:22

Analyst(s)

Garret Vilet (1)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036

*MW 9-28-11*



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Customer ID: ECOL44  
Customer PO:  
Received: 09/14/11 9:25 AM  
EMSL Order: 041124589

Fax: (206) 621-9832 Phone: (206) 624-9537

Project: 10-08-0009

EMSL Proj:  
Analysis Date: 9/15/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082058		9/12/2011	9402.53	24	100	0.0003	30.6	0.001	
041124589-0001									
11082059		9/12/2011	9112.03	18	100	0.0003	22.9	0.001	
041124589-0002									
11082060		9/12/2011	1739.30	6	100	0.002	7.64	0.002	
041124589-0003									
11082061		9/12/2011	1446.80	9	100	0.002	11.5	0.003	
041124589-0004									
11082062		9/12/2011	1926.70	8	100	0.001	10.2	0.002	
041124589-0005									
11082063		9/12/2011	1889.00	14	100	0.001	17.8	0.004	
041124589-0006									
11082509		9/12/2011							Field Blank Not Analyzed
041124589-0007									

The results reported have been blank corrected as applicable.

Initial report from 09/15/2011 12:17:14

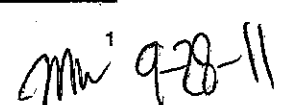
Analyst(s)

Lauren Kerber (6)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 6-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03036



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**Seattle, WA 98104**

Customer ID: ECOL44  
Customer PO:  
Received: 09/15/11 9:40 AM  
EMSL Order: 041124666

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/16/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082064		9/13/2011							Overloaded
041124666-0001									
11082065		9/13/2011	5936.31	11	100	0.0005	14.0	0.001	
041124666-0002									
11082066		9/13/2011	1175.77	<5.5	100	0.002	<7.01	<0.002	
041124666-0003									
11082067		9/13/2011	726.45	<5.5	100	0.004	<7.01	<0.004	
041124666-0004									
11082068		9/13/2011	728.99	<5.5	100	0.004	<7.01	<0.004	
041124666-0005									
11082069		9/13/2011	729.05	<5.5	100	0.004	<7.01	<0.004	
041124666-0006									
11082510		9/13/2011		<5.5	100		<7.01		Field Blank
041124666-0007									

The results reported have been blank corrected as applicable.

Initial report from 09/16/2011 12:18:45

Analyst(s)

Dave Stanhope (7)

Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

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mw 9-20-11

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Customer ID: **ECOL44**  
Customer PO:  
Received: **09/16/11 10:00 AM**  
EMSL Order: **041124770**

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: **9/16/2011**

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**


Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>3</sup>	Fibers/ cc	Notes
11082070		9/14/2011							Overloaded
041124770-0001									
11082071		9/14/2011	1246.80	<5.5	100	0.002	<7.01	<0.002	
041124770-0002									

No discernable field blanks submitted with this sample set.

Initial report from 09/16/2011 12:57:39

Analyst(s)

Dave Stanhope (2)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>3</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.  
Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10672, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03036

1  
Mr 9-28-11

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Customer ID: ECOL44  
Customer PO:  
Received: 09/19/11 8:40 AM  
EMSL Order: 041124909

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/20/2011

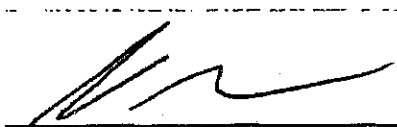
**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082073		9/15/2011	6376.57	17	100	0.0004	21.7	0.001	
041124909-0001									
11082074		9/15/2011	1321.72	6	100	0.002	7.64	0.002	
041124909-0002									
11082075		9/15/2011							Not Analyzed No filter in cassette
041124909-0003									
11082512		9/15/2011							Field Blank Not Analyzed
041124909-0004									

The results reported have been blank corrected as applicable.

Initial report from 09/21/2011 08:30:05

Analyst(s)  
Dave Stanhope (2)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03036

*Handwritten signature/initials*



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**Suite 1700**  
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Customer ID: ECOL44  
Customer PO:  
Received: 09/21/11 9:15 AM  
EMSL Order: 041125177

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/22/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,  
Revision 3, Issue 2, 8/15/94**


Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082076		9/16/2011	11042.59	11	100	0.0002	14.0	0.0005	
041125177-0001									
11082077		9/16/2011	2210.40	6	100	0.001	7.64	0.001	
041125177-0002									
11082078		9/16/2011	11038.15	11	100	0.0002	14.0	0.0005	
041125177-0003									
11082513		9/16/2011							Field Blank Not Analyzed
041125177-0004									

The results reported have been blank corrected as applicable.

Initial report from 09/22/2011 11:43:09

Analyst(s)

Lauren Kerber (3)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03036

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Customer ID: ECOL44  
Customer PO:  
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EMSL Order: 041125306

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/22/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**


Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082079		9/20/2011	5933.38	9	100	0.0005	11.5	0.001	
041125306-0001									
11082080		9/20/2011	1225.94	7	100	0.002	8.92	0.003	
041125306-0002									
11082081		9/20/2011	6126.90	14	100	0.0004	17.8	0.001	
041125306-0003									
11082514		9/20/2011							Field Blank Not Analyzed
041125306-0004									

The results reported have been blank corrected as applicable.

Initial report from 09/22/2011 14:48:12

Analyst(s)

Lauren Kerber (3)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03036

*MW 9-28-11*

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Customer ID: ECOL44  
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Received: 09/23/11 9:15 AM  
EMSL Order: 041125487

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Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/23/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**


Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082082		9/21/2011	5013.47	6.5	100	0.001	8.28	0.001	
041125487-0001									
11082083		9/21/2011	1289.14	<5.5	100	0.002	<7.01	<0.002	
041125487-0002									
11082084		9/21/2011	6100.50	<5.5	100	0.0004	<7.01	<0.0004	
041125487-0003									

No discernable field blanks submitted with this sample set.

Initial report from 09/23/2011 13:36:49

Analyst(s)

Dave Stanhope (3)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.  
Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP C3036

gm 9/28/11

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Customer PO:  
Received: 09/26/11 8:20 AM  
EMSL Order: 041125660

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/27/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

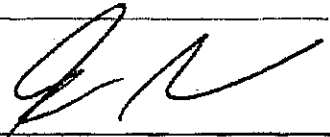
Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082085		9/22/2011	6696.51	19	100	0.0004	24.2	0.001	
041125660-0001									
11082086		9/22/2011	1360.72	<5.5	100	0.002	<7.01	<0.002	
041125660-0002									
11082087		9/22/2011	6317.07	15	100	0.0004	19.1	0.001	
041125660-0003									
11082515		9/22/2011							Field Blank Not Analyzed
041125660-0004									

The results reported have been blank corrected as applicable.

Initial report from 09/27/2011 13:33:03

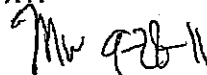
Analyst(s)

Lauren Kerber (3)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03036



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**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: **ECOL44**  
Customer PO:  
Received: **09/26/11 8:20 AM**  
EMSL Order: **041125659**

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: **9/27/2011**

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

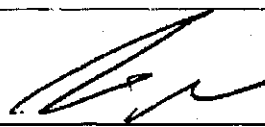
Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082088		9/23/2011	4115.33	11	100	0.001	14.0	0.001	
041125659-0001									
11082089		9/23/2011	796.50	<5.5	100	0.003	<7.01	<0.003	
041125659-0002									
11082090		9/23/2011	4069.31	29	100	0.001	36.9	0.004	
041125659-0003									

No discernable field blanks submitted with this sample set.

Initial report from 09/27/2011 13:32:29

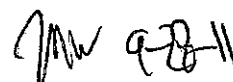
Analyst(s)

Lauren Kerber (3)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.28. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03036



**EMSL Analytical, Inc.**

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Attn: **Eric Lindeman**  
**Ecology & Environment, Inc.**  
**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: ECOL44  
Customer PO:  
Received: 09/27/11 10:30 AM  
EMSL Order: 041125829

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/27/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082091		9/25/2011	1214.10	9	100	0.002	11.5	0.004	
041125829-0001									
11082092		9/25/2011	1190.70	<5.5	100	0.002	<7.01	<0.002	
041125829-0002									
11082093		9/25/2011	1227.90	12	100	0.002	15.3	0.005	
041125829-0003									

No discernable field blanks submitted with this sample set.

Initial report from 09/27/2011 15:22:08

Analyst(s)

Lauren Kerber (3)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP D3036

*MW 9-28-11*





# ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104  
Tel: (206) 624-9537, Fax: (206) 621-9832

## MEMORANDUM

DATE: October 10, 2011

TO: Steve Hall, START-3 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, WA *MW*

SUBJ: Data Quality Assurance Review, Orofino Asbestos Site,  
Orofino, Idaho

REF: TDD: 10-09-0008 PAN: 002233.0603.01RZ

The data quality assurance review of 38 air filter and 2 bulk samples collected from the Orofino Asbestos site in Orofino, Idaho, has been completed. Phase contrast microscopy (PCM) and polarized light microscopy (PLM) asbestos analyses were performed by EMSL, Inc., Cinnaminson, New Jersey.

The samples were numbered:

8-23-11				
Air PCM	11082001	11082002	11082003	11082004
8-24-11				
Air PCM	11082005	11082006	11082007	11082008
	11082009	11082010	11082011	11082012
8-25-11				
Air PCM	11082013	11082014	11082015	11082016
8-26-11				
Air PCM	11082017	11082018	11082019	
8-29-11				
Air PCM	11082020	11082021	11082022	11082023
	11082024	11082501 (field blank – not analyzed)		
	11082502 (field blank – not analyzed)			
9-26-11				
Air PCM	11082094	11082095	11082096	
	11082516 (field blank – not analyzed)			
9-27-11				
Air PCM	11082097 (overloaded – not analyzed)		11082098	
	11082099 (overloaded – not analyzed)			

10-3-11

Air PCM      11082100      11082101      11082102 (overloaded – not analyzed)  
11082517 (field blank – not analyzed)

Data Qualifications:

The samples were collected between August 23 and October 3, 2011, and were analyzed by October 5, 2011. No issues were noted in the laboratory case narratives other than those noted above with some samples.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

- J -      The associated numerical value is an estimated quantity because the reported concentrations were less than the sample detection limits but greater than the instrument detection limits or because quality control criteria limits were not met.
- U -      The material was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
- UJ -     The material was analyzed for, but not detected. The reported detection limit is estimated because quality control criteria were not met.

**EMSL Analytical, Inc.**

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Attn: **Eric Lindeman**  
**Ecology & Environment, Inc.**  
720 3rd Ave  
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Seattle, WA 98104

Customer ID: ECOL44  
Customer PO:  
Received: 08/29/11 10:15 AM  
EMSL Order: 041123316

Fax: (206) 621-9832  
Project: SITE # 10-09-0008

Phone: (206) 624-9537

EMSL Proj:  
Analysis Date: 8/30/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

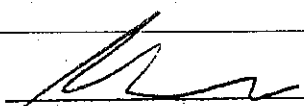
Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082001	PL-1	8/23/2011	1067.73	6	100	0.003	7.64	0.003	
041123316-0001									
11082002	PL-2	8/23/2011	1021.62	<5.5	100	0.003	<7.01	<0.003	
041123316-0002									
11082003	PL-3	8/23/2011	1023.58	<5.5	100	0.003	<7.01	<0.003	
041123316-0003									
11082004	AW-1	8/23/2011	976.90	12	100	0.003	15.3	0.006	
041123316-0004									

No discernable field blanks submitted with this sample set.

Initial report from

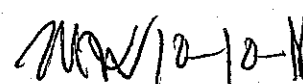
Analyst(s)

Lauren Kerber (4)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-60 fibers = 0.30, 61-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10672, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03036



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720 3rd Ave  
Suite 1700  
Seattle, WA 98104

Customer ID: EGOL44  
Customer PO:  
Received: 08/29/11 10:15 AM  
EMSL Order: 041123317

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: SITE # 10-09-0008

EMSL Proj:  
Analysis Date: 8/30/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,  
Revision 3, Issue 2, 8/15/94**

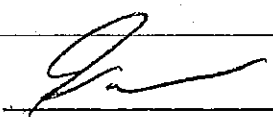
Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082005	PL-1	8/24/2011	350.64	<5.5	100	0.008	<7.01	<0.008	
041123317-0001									
11082006	PL-2	8/24/2011	334.04	<5.5	100	0.008	<7.01	<0.008	
041123317-0002									
11082007	PL-3	8/24/2011	342.21	<5.5	100	0.008	<7.01	<0.008	
041123317-0003									
11082008	AW-1	8/24/2011	344.76	19	100	0.008	24.2	0.027	
041123317-0004									

No discernable field blanks submitted with this sample set.

Initial report from 08/30/2011 11:25:50

Analyst(s)

Lauren Kerber (4)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10672, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03035

*MW 10/10/11*

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Customer ID: **ECOL44**  
Customer PO:  
Received: **08/29/11 10:15 AM**  
EMSL Order: **041123314**

Fax: (206) 621-9832  
Project: **SITE # 10-09-0008**

Phone: (206) 624-9537

EMSL Proj:  
Analysis Date: **8/30/2011**

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

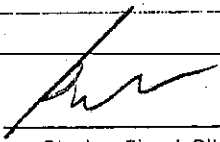
Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082009	WD-1	8/24/2011	631.91	7	100	0.004	8.92	0.005	
041123314-0001									
11082010	WD-2	8/24/2011	621.33	7	100	0.004	8.92	0.006	
041123314-0002									
11082011	WD-3	8/24/2011	604.54	<5.5	100	0.004	<7.01	<0.004	
041123314-0003									
11082012	BCH-1	8/24/2011	2649.87	<5.5	100		<7.01		
041123314-0004									

No discernable field blanks submitted with this sample set.

Initial report from

Analyst(s)

Lauren Kerber (4)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-HLAP Lab 100194, NJ DEP 03036

7 1  
*MW 10-10-11*

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Customer ID: ECOL44  
Customer PO:  
Received: 08/30/11 9:21 AM  
EMSL Order: 041123411

Fax: (206) 621-9832  
Project: SITE 10JN

Phone: (206) 624-9537

EMSL Proj:  
Analysis Date: 8/30/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

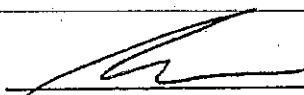
Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082013	JR-1	8/25/2011	682.53	<5.5	100	0.004	<7.01	<0.004	
041123411-0001									
11082014	JR-2	8/25/2011	652.94	<5.5	100	0.004	<7.01	<0.004	
041123411-0002									
11082015	BCH-2	8/25/2011	1044.48	<5.5	100	0.003	<7.01	<0.003	
041123411-0003									
11082016	BCH-3	8/25/2011	3689.82	24	100	0.001	30.6	0.003	
041123411-0004									

No discernable field blanks submitted with this sample set.

Initial report from 08/30/2011 16:45:17

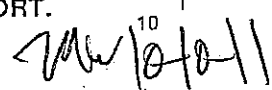
Analyst(s)

Lauren Kerber (4)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.26. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100184, NJ DEP 03036

10  




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Customer ID: ECOL44  
Customer PO:  
Received: 08/30/11 9:21 AM  
EMSL Order: 041123423

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: SITE 10JN

EMSL Proj:  
Analysis Date: 8/30/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

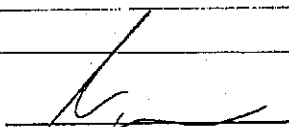
Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082017	BCH-1	8/26/2011	3327.49	<5.5	100	0.001	<7.01	<0.001	
041123423-0001									
11082018	BCH-2	8/26/2011	613.44	<5.5	100	0.004	<7.01	<0.004	
041123423-0002									
11082019	BCH-3	8/26/2011	667.91	<5.5	100	0.004	<7.01	<0.004	
041123423-0003									

No discernable field blanks submitted with this sample set.

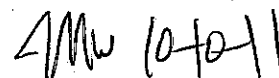
Initial report from

Analyst(s)

Lauren Kerber (3)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.  
Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03038

 10/2/11

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**720 3rd Ave**  
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**Seattle, WA 98104**

Customer ID: ECOL44  
 Customer PO:  
 Received: 08/31/11 9:30 AM  
 EMSL Order: 041123529

Fax: (206) 621-9832 Phone: (206) 624-9537  
 Project: 10-09-0008

EMSL Proj:  
 Analysis Date: 8/31/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082020	TFS-1	8/29/2011	1441.58	<5.5	100	0.002	<7.01	<0.002	
041123529-0001									
11082021	TFS-2	8/29/2011	1393.24	<5.5	100	0.002	<7.01	<0.002	
041123529-0002									
11082022	BCH-1	8/29/2011	6299.27	<5.5	100	0.0004	<7.01	<0.0004	
041123529-0003									
11082023	BCH-2	8/29/2011	1143.73	<5.5	100	0.002	<7.01	<0.002	
041123529-0004									
11082024	BCH-3	8/29/2011	1102.02	<5.5	100	0.002	<7.01	<0.002	
041123529-0005									
11082501	TFS-1 BLANK	8/29/2011							Field Blank Not Analyzed
041123529-0006									
11082502	BCH-1 BLANK	8/29/2011							Field Blank Not Analyzed
041123529-0007									

The results reported have been blank corrected as applicable.

Initial report from 08/31/2011 12:41:38

Analyst(s)

Dave Poltras (5)

Stephen Siegel, CIH, Laboratory Manager  
 or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10672, AIHA-LAP, LLC--ILAP Lab 100194, NJ DEP 03036

*MW 10-10-11*

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**Seattle, WA 98104**

Customer ID: **ECOL44**  
Customer PO:  
Received: **09/28/11 10:30 AM**  
EMSL Order: **041125916**

Fax: (206) 621-9832  
Project: **10-09-0008**

Phone: (206) 624-9537

EMSL Proj:  
Analysis Date: **9/28/2011**

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082094		9/26/2011							Overloaded
041125916-0001									
11082095		9/26/2011	923.74	<5.5	100	0.003	<7.01	<0.003	
041125916-0002									
11082096		9/26/2011	6325.24	13	100	0.0004	16.6	0.001	
041125916-0003									
11082516		9/26/2011							Field Blank Not Analyzed
041125916-0004									

The results reported have been blank corrected as applicable.

Initial report from 09/28/2011 14:38:13

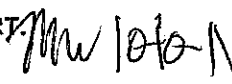
Analyst(s)

Dave Stanhope (3)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03036



**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone: (800) 220-3675

Fax: (856) 786-5974

Email: cinnasblab@EMSL.com

Attn: **Eric Lindeman**  
**Ecology & Environment, Inc.**  
**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: **ECOL44**  
Customer PO:  
Received: **09/29/11 9:20 AM**  
EMSL Order: **041126014**

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: **10-09-0008**

EMSL Proj:  
Analysis Date: **9/30/2011**

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

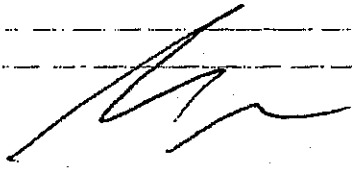
Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082097		9/27/2011							Overloaded
041126014-0001									
11082098		9/27/2011	1167.52	<5.5	100	0.002	<7.01	<0.002	
041126014-0002									
11082099		9/27/2011							Overloaded
041126014-0003									

No discernable field blanks submitted with this sample set.

Initial report from 09/30/2011 12:26:05

Analyst(s)

Dave Stanhope (3)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAC standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10672, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03036

*MW* 10-10-11

**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone: (800) 220-3675 Fax: (856) 786-5974 Email: [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

Attn: **Eric Lindeman**  
**Ecology & Environment, Inc.**  
**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: ECOL44  
Customer PO:  
Received: 10/05/11 9:15 AM  
EMSL Order: 041126616

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 10/5/2011

**Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method,**  
**Revision 3, Issue 2, 8/15/94**

Sample	Location	Sample Date	Volume (liters)	Fibers	Fields	LOD (fib/cc)	Fibers/ mm <sup>2</sup>	Fibers/ cc	Notes
11082100		10/3/2011	6478.18	12	100	0.0004	15.3	0.001	
041126616-0001									
11082101		10/3/2011	1369.70	8	100	0.002	10.2	0.003	
041126616-0002									
11082102		10/3/2011							Overloaded
041126616-0003									
11082517		10/3/2011							Field Blank Not Analyzed
041126616-0004									

The results reported have been blank corrected as applicable.

Initial report from 10/06/2011 08:00:38

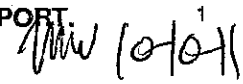
Analyst(s)

Dave Stanhope (3)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

Limit of detection is 7 fibers/mm<sup>2</sup>. Intra-laboratory Sr values: 5-20 fibers = 0.31, 21-50 fibers = 0.30, 51-100 fibers = 0.25. Inter-laboratory Sr values (Average of EMSL round robin data) = 0.29. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. The results in this report meet all requirements of the NELAP standards unless otherwise noted. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, AIHA-LAP, LLC-IHLAP Lab 100194, NJ DEP 03035

 10/01/11



# ecology and environment, inc.

International Specialists in the Environment

720 Third Avenue, Suite 1700, Seattle, WA 98104  
Tel: (206) 624-9537, Fax: (206) 621-9832

## MEMORANDUM

DATE: November 8, 2011

TO: Steve Hall, START-3 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, WA *MW*

SUBJ: **Data Quality Assurance Review, Orofino Asbestos Site,  
Orofino, Idaho**

REF: TDD: 10-09-0008 PAN: 002233.0603.01RZ

The data quality assurance review of 4 air filter samples collected from the Orofino Asbestos site in Orofino, Idaho, has been completed. Transmission electron microscopy (TEM) asbestos analyses (ISO Methods 10312 and 13794) were performed by EMSL, Inc., Cinnaminson, New Jersey. The samples were numbered:

Collected 8-30-11	Air TEM	11082025
Collected 8-31-11	Air TEM	11082031
Collected 9-8-11	Air TEM	11082053
Collected 9-14-11	Air TEM	11082072

### Data Qualifications:

The samples were collected between August 30 and September 14, 2011, and were analyzed by September 22, 2011. The filter for sample 11082072 was overloaded so direct analysis was not performed; indirect analysis was performed on this sample. Microscope calibrations were performed daily and were within QC limits. Asbestos fibers were not detected in ashing, filtration, or laboratory blanks. No other issues were noted in the laboratory case narrative.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.



10-09-0008

version 8-  
DRAFTNational Asbestos Data Entry Spreadsheet (NADES) for Air & Dust Analysis by Superfund TEM  
ANALYTICAL REPORT

SAMPLE/ANALYSIS INFORMATION				ANALYSIS PARAMETERS	
Field Sample Number	11082031	Lab Sample Number	D41123724-0001	Effective filter area (mm <sup>2</sup> )	385
Media	Air	Preparation	Direct	F-factor	1.00E+00
Sample Type	Field Sample	Sample Status	Analyzed	Grid opening area (mm <sup>2</sup> )	0.0132
Air Volume (L)	4890.39	Analysis Date	9/4/2011	# GOs counted	6
QA Sample Type	Not QC	Method SOP	TEM ISO 10312	Sensitivity (1/cc)	9.9E-04
Stopping Rule(s): GO = 6, Structures = , Sensitivity = 1.00E-03					

Desired Confidence Interval (%): 95

Number of Structures with Fatal Data Entry Errors 0  
(Structures with fatal errors are excluded from calculations below)

Mineral Class	Number of Structures (a)	Loading on Filter (b) (s/mm <sup>2</sup> )	Air Conc (c) (s/cc)	95% Confidence Interval	Binning Rule Description:
<b>Total TEM-EPASM Structures</b>					
Total Asbestos	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	Apply to fibers (F) only: L ≥ 0.5µm, AR ≥ 3
Total Chrysotile (CH)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	No restrictions for other structure types.
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
<b>PCM Equivalent Structures (PCME)</b>					
Total Asbestos	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	Apply to all structures where Total column > 0:
Total Chrysotile (CH)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	L > 5µm, W ≥ 0.25µm, AR ≥ 3
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
<b>AHERA (d) Structures</b>					
Total Asbestos	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	Apply to fibers (F) only: L ≥ 0.5µm, AR ≥ 5
Total Chrysotile (CH)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	No restrictions for other structure types.
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
<b>Berman/Crump (2003) Structures</b>					
Total Asbestos	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	Apply to all structures where Total column > 0: L > 10µm, W ≤ 0.4µm
Total Chrysotile (CH)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 3.7E-03	

(a) Based on countable structures only

(b) Loading on Filter (s/mm<sup>2</sup>) = N structures / (GOs Counted \* GO Area)

(c) Air Concentration (s/cc) = (N structures \* EFA) / (GOs Counted \* GO Area \* F-factor \* Air Volume \* 1000)

Dust Loading (s/cm<sup>2</sup>) = (N structures \* EFA) / (GOs Counted \* GO Area \* F-factor \* Dust Collection Area)

(d) Yamate results are expected to be similar to AHERA, but use of AHERA for Yamate may be biased low due to the exclusion of structures &lt;0.5µm.

mw  
11-8-11

FILE NAME:

1-EMSL04-11082031-09-04-11-041123724-TEM-EPASM-D.xls

FILE TYPE: Original

## National Asbestos Data Entry Spreadsheet (NADES) for Air &amp; Dust Analysis by Superfund TEM

Enter Site or Project Name Here:

State/Federal Site or Project Identifier:

10-09-0008

Site/Project  
Identifier Code:

1

Laboratory name:	EMSL04
Instrument:	DL 100 CX II (04-01)
Voltage (kV):	100 kV
Magnification:	20,000 X
Grid opening area (mm <sup>2</sup> ):	0.0132
Scale: 1L =	1.000
Scale: 1D =	1.000
Filter Size (mm):	25.000
Filter Pore Size (um):	0.450
Method SOP (Revision No.):	TEM ISO 10312
Grid Storage Location:	0411-E&E-01, B

Client Sample Number:	11082031
Date received by lab:	09/02/11
Lab Job Number:	041123724
Lab Sample Number:	041123724-0001
Chain of Custody Number:	10-09-0008-08

Sample Type:	Field Sample	▼
QC Sample Type:	Not QC	▼
Media:	Air	▼
Air volume (L) or dust area (cm <sup>2</sup> ):	4890.39	

Number of grids prepared:	3
Prepared by:	J. Cleveland
Preparation date:	09/02/11
Preparation Type:	Direct ▼
Primary filter area (mm <sup>2</sup> ):	385
Secondary Filter Area (mm <sup>2</sup> ):	1282
F- factor: [proposed value shown, cell formula can be over-written if necessary]	1.000
Filter Status:	Analyzed ▼
Analyzed by:	F. Craig
Analysis date:	09/04/11

## F-factor Input Parameters:

## Indirect Prep, Not Ashed

Fraction of primary filter used

Total resuspension volume (mL)

Volume applied to secondary filter (mL)

F-factor

## Indirect Prep, Ashed

Fraction of primary filter used

Total resuspension volume, pre-ashing (mL)

Volume applied to filter for ashing (mL)

Fraction of filter that was ashed

Volume used to resuspend ashed residue (mL)

Volume applied to secondary filter (mL)

F-factor

## COMMENTS

15% PARTICULATE LOADING VERTICAL TD



Check box if this sample was analyzed using more than one instrument, by more than one analyst, or across multiple analysis dates

11811 ml

10-09-0008

**National Asbestos Data Entry Spreadsheet (NADES) for Air & Dust Analysis by Superfund TEM**

CLIENT SAMPLE ID: 11082031  
 LAB SAMPLE ID: 041123724-0001

Media: Air  
 Sample Prep: Direct

Sample Type: Field Sample  
 QC Sample Type: Not QC  
 Sample Status: Analyzed  
 Analysis Date: 9/4/2011

Data Entry by: K. TULLY  
 Data Entry Date: 9/6/2011

QA by: K. Bleakley  
 QA Date: 9/6/2011

One or more sampling rules have been met. No additional grid openings need to be evaluated.

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions (a)		Identification Code (b)	Mineral Type (c)	Other Mineral Description	1 = yes, blank = no			Comments
			Primary	Total	Length	Width				Sketch	Photo	EDS	
B1	B5	ND											
B1	H4	ND											
B1	F8	ND											
B2	G9	ND											
B2	D4	ND											
B2	B6	ND											

11/11/11

SAMPLE/ANALYSIS INFORMATION				ANALYSIS PARAMETERS	
Field Sample Number	11082025	Lab Sample Number	041123616-0001	Effective filter area (mm <sup>2</sup> )	385
Media	Air	Preparation	Direct	F-factor	1.00E+00
Sample Type	Field Sample	Sample Status	Analyzed	Grid opening area (mm <sup>2</sup> )	0.0132
Air Volume (L)	5127.14	Analysis Date	9/1/2011	# GOs counted	6
QA Sample Type	Not QC	Method SOP	TEM ISO 10312	Sensitivity (1/cc)	9.5E-04
Stopping Rule(s):	GO = 6, Structures = , Sensitivity = 1.00E-03				

**Number of Structures with Fatal Data Entry Errors** 0  
*(Structures with fatal errors are excluded from calculations below)*

**Binning Rule Description:**

No restrictions for other structure types.

**Binning Rule Description:**

Apply to all structures where Total column > 0:

$$L > 5\mu\text{m}, W \geq 0.25\mu\text{m}, AR \geq 3$$

**Binning Rule Description:**

Apply to fibers (F) only:  
 $L \geq 0.5 \mu\text{m}$ ,  $AR \geq 5$

No restrictions for other structure types.

Most "secondary" structures (structures that are part of a primary complex structure) are excluded.

**Binning Rule Description:**

Apply to all structures where Total column > 0:  
L > 10um, W ≤ 0.4um

- (a) Based on countable structures only  
(b) Loading on Filler (s/mm<sup>2</sup>) = N structures / (GOs Counted \* GO Area)  
(c) Air Concentration (s/cc) = (N structures \* EFA) / (GOs Counted \* GO Area \* F-factor \* Air Volume \* 1000)  
Dust Loading (s/cm<sup>2</sup>) = (N structures \* EFA) / (GOs Counted \* GO Area \* F-factor \* Dust Collection Area)  
(d) Yamale results are expected to be similar to AHERA, but use of AHERA for Yamale may be biased low due to the exclusion of structures <0.5um.

Date Printed: 9/2/2011  
Time: 8:11:26 AM

FILE NAME:

EMSL04 11082025 090111 041123616 TEM EPASM D.XIS

FILE TYPE:

Original

## National Asbestos Data Entry Spreadsheet (NADES) for Air &amp; Dust Analysis by Superfund TEM

Enter Site or Project Name Here:
State/Federal Site or Project Identifier:

10-09-0008

Site/Project  
Identifier Code:

Laboratory name:	EMSL04
Instrument:	03 JEOL-1200EX
Voltage (kV):	100 kV
Magnification:	20,000X
Grid opening area (mm <sup>2</sup> ):	0.0132
Scale: 1L =	1.000
Scale: 1D =	1.000
Filter Size (mm):	25.000
Filter Pore Size (um):	0.450
Method SOP (Revision No.):	TEM ISO 10312
Grid Storage Location:	0411-E&E-0001

Client Sample Number:	11082025
Date received by lab:	09/01/11
Lab Job Number:	041123616
Lab Sample Number:	041123616-0001
Chain of Custody Number:	10-09-0008-07

Sample Type:	Field Sample	▼
QC Sample Type:	Not QC	▼
Media:	Air	▼
Air volume (L) or dust area (cm <sup>2</sup> ):	5127.14	

Number of grids prepared:	3	
Prepared by:	J. CLEVELAND	
Preparation date:	09/01/11	
Preparation Type:	Direct	▼
Primary filter area (mm <sup>2</sup> ):	385	
Secondary Filter Area (mm <sup>2</sup> ):	1282	
F-factor: [proposed value shown, cell formula can be over-written if necessary]	1.000	
Filter Status:	Analyzed	▼
Analyzed by:	C. GRATZ	
Analysis date:	09/01/11	

## F-factor Input Parameters:

## Indirect Prep, Not Ashed

Fraction of primary filter used  
Total resuspension volume (mL)  
Volume applied to secondary filter (mL)  
F-factor

## Indirect Prep, Ashed

Fraction of primary filter used  
Total resuspension volume, pre-ashing (mL)  
Volume applied to filter for ashing (mL)  
Fraction of filter that was ashed  
Volume used to resuspend ashed residue (mL)  
Volume applied to secondary filter (mL)  
F-factor

## COMMENTS

TRAVERSE DIRECTION VERTICAL LOADING ~ 15%

- ☐ Check box if this sample was analyzed using more than one instrument, by more than one analyst, or across multiple analysis dates

11-8-11 mm

10-09-0008

## National Asbestos Data Entry Spreadsheet (NADES) for Air &amp; Dust Analysis by Superfund TEM

CLIENT SAMPLE ID: 11082025  
 LAB SAMPLE ID: 0411236160001

Media: Air  
 Sample Prep: Direct

Sample Type: Field Sample  
 QC Sample Type: Not QC  
 Sample Status: Analyzed  
 Analysis Date: 9/1/2011

Data Entry by: K. TULLY  
 Data Entry Date: 9/1/2011

QA by: K. Lusher  
 QA Date: 9/2/2011

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions (a)		Identification Code (b)	Mineral Type (c)	Other Mineral Description	1 = yes, blank = no			Comments
			Primary	Total	Length	Width				Sketch	Photo	EDS	
A1	J8	ND											
A1	D7	ND											
A2	E4	ND											
A2	J3	ND											
A3	I7	ND											
A3	B9	ND											

11-8-11



10-09-0008

version B-  
DRAFTNational Asbestos Data Entry Spreadsheet (NADES) for Air & Dust Analysis by Superfund TEM  
ANALYTICAL REPORT

SAMPLE/ANALYSIS INFORMATION				ANALYSIS PARAMETERS	
Field Sample Number	11082053	Lab Sample Number	041124283-0001	Effective filter area (mm <sup>2</sup> )	385
Media	Air	Preparation	Direct	F-factor	1.00E+00
Sample Type	Field Sample	Sample Status	Analyzed	Grid opening area (mm <sup>2</sup> )	0.0132
Air Volume (L)	6800.29	Analysis Date	9/13/2011	# GOs counted	5
QA Sample Type	Not QC	Method SOP	TEM ISO 10312	Sensitivity (1/cc)	8.6E-04
Stopping Rule(s): GO = 5, Structures = , Sensitivity = 1.00E-03					

Desired Confidence Interval (%): 95

Number of Structures with Fatal Data Entry Errors: 0  
(Structures with fatal errors are excluded from calculations below)

Mineral Class	Number of Structures (a)	Loading on Filter (b) (s/mm <sup>2</sup> )	Air Conc (c) (s/cc)	95% Confidence Interval
<b>Total TEM-EPASM Structures</b>				
Total Asbestos	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Total Chrysotile (CH)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03

**Binning Rule Description:**

Apply to fibers (F) only:

L ≥ 0.5um, AR ≥ 3

No restrictions for other structure types.

<b>PCM Equivalent Structures (PCME)</b>				
Total Asbestos	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Total Chrysotile (CH)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03

**Binning Rule Description:**

Apply to all structures where Total column &gt; 0:

L &gt; 5um, W ≥ 0.25um, AR ≥ 3

<b>AHERA (d) Structures</b>				
Total Asbestos	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Total Chrysotile (CH)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03

**Binning Rule Description:**

Apply to fibers (F) only:

L ≥ 0.5um, AR ≥ 5

No restrictions for other structure types.

Most "secondary" structures (structures that are part of a primary complex structure) are excluded.

<b>Berman/Grump (2003) Structures</b>				
Total Asbestos	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Total Chrysotile (CH)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 3.2E-03

**Binning Rule Description:**

Apply to all structures where Total column &gt; 0:

L &gt; 10um, W ≤ 0.4um

(a) Based on countable structures only

(b) Loading on Filter (s/mm<sup>2</sup>) = N structures / (GOs Counted \* GO Area)

(c) Air Concentration (s/cc) = (N structures \* EFA) / (GOs Counted \* GO Area \* F-factor \* Air Volume \* 1000)

Dust Loading (s/cm<sup>2</sup>) = (N structures \* EFA) / (GOs Counted \* GO Area \* F-factor \* Dust Collection Area)

(d) Yamate results are expected to be similar to AHERA, but use of AHERA for Yamate may be biased low due to the exclusion of structures &lt;0.5um.

Date Printed: 9/13/2011  
Time Printed: 3:49 PM

mm 118-11

FILE NAME:

1-EMSL04-11082053-09-13-11-041124283-TEM-ERASM-DXIS

FILE TYPE: Original

## National Asbestos Data Entry Spreadsheet (NADES) for Air &amp; Dust Analysis by Superfund TEM

Enter Site or Project Name Here:
State/Federal Site or Project Identifier:

10-09-0008

Site/Project  
Identifier Code:

1

Laboratory name:	EMSL04
Instrument:	DL 100 CX II (04-01)
Voltage (kV):	100 kV
Magnification:	20,000 X
Grid opening area (mm <sup>2</sup> ):	0.0132
Scale: 1L =	1.000
Scale: 1D =	1.000
Filter Size (mm):	25.000
Filter Pore Size (um):	0.450
Method SOP (Revision No.):	TEM ISO 10312
Grid Storage Location:	0411-E&E-02/A

Client Sample Number:	11082053
Date received by lab:	09/12/11
Lab Job Number:	041124283
Lab Sample Number:	041124283-0001
Chain of Custody Number:	10-09-0008-11

Sample Type:	Field Sample
QC Sample Type:	Not QC
Media:	Air
Air volume (L) or dust area (cm <sup>2</sup> ):	6800.29

Number of grids prepared:	3
Prepared by:	J. Cleveland
Preparation date:	09/12/11
Preparation Type:	Direct
Primary filter area (mm <sup>2</sup> ):	385
Secondary Filter Area (mm <sup>2</sup> ):	1282
F- factor: [proposed value shown, cell formula can be over-written if necessary]	1.000
Filter Status:	Analyzed
Analyzed by:	F. Craig
Analysis date:	09/13/11

## F-factor Input Parameters:

## Indirect Prep, Not Ashed

Fraction of primary filter used

Total resuspension volume (mL)

Volume applied to secondary filter (mL)

F-factor

## Indirect Prep, Ashed

Fraction of primary filter used

Total resuspension volume, pre-ashing (mL)

Volume applied to filter for ashing (mL)

Fraction of filter that was ashed

Volume used to resuspend ashed residue (mL)

Volume applied to secondary filter (mL)

F-factor

## COMMENTS

15% PARTICULATE LOADING VERTICAL TD



Check box if this sample was analyzed using more than one instrument, by more than one analyst, or across multiple analysis dates

11/8/11

10-09-0008

**National Asbestos Data Entry Spreadsheet (NADES) for Air & Dust Analysis by Superfund TEM**

CLIENT SAMPLE ID: 11082053  
 LAB SAMPLE ID: 041124283-0001

Media: Air  
 Sample Prep: Direct

Sample Type: Field Sample  
 QC Sample Type: Not QC  
 Sample Status: Analyzed  
 Analysis Date: 9/13/2011

Data Entry by: T. Peters  
 Data Entry Date: 9/13/2011

QA by: K. TULLY  
 QA Date: 9/13/2011

One or more starting tiles have been used, no additional grid openings need to be evaluated.

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions (a)		Identification Code (b)	Mineral Type (c)	Other Mineral Description	1 = yes, blank = no			Comments
			Primary	Total	Length	Width				Sketch	Photo	EDS	
A2	C9	ND											
A2	H3	ND											
A2	F9	ND											
A3	I5	ND											
A3	D7	ND											

11811  
 11/8/11

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version 8-  
DRAFTNational Asbestos Data Entry Spreadsheet (NADES) for Air & Dust Analysis by Superfund TEM  
ANALYTICAL REPORT

SAMPLE/ANALYSIS INFORMATION				ANALYSIS PARAMETERS	
Field Sample Number	11082072	Lab Sample Number	041124789-0001	Effective filter area (mm <sup>2</sup> )	385
Media	Air	Preparation	Indirect - Ashed	F-factor	5.00E-01
Sample Type	Field Sample	Sample Status	Analyzed	Grid opening area (mm <sup>2</sup> )	0.0132
Air Volume (L)	5606.16	Analysis Date	9/22/2011	# GOs counted	6
QA Sample Type	Not QC	Method SOP	TEM ISO 13784	Sensitivity (1/cc)	1.7E-03
Stopping Rule(s): GO = 6, Structures = , Sensitivity = 1.00E-03					

Desired Confidence Interval (%): 95

Number of Structures with Fatal Data Entry Errors 0  
(Structures with fatal errors are excluded from calculations below)

Mineral Class	Number of Structures (a)	Loading on Filter (b) (s/mm <sup>2</sup> )	Air Conc (c) (s/cc)	95% Confidence Interval
<b>Total TEM-EPASM Structures:</b>				
Total Asbestos	2	2.5E+01	3.5E-03	4.2E-04 - 1.3E-02
Total Chrysotile (CH)	2	2.5E+01	3.5E-03	4.2E-04 - 1.3E-02
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03

## Binning Rule Description:

Apply to fibers (F) only:  
L ≥ 0.5um, AR ≥ 3

No restrictions for other structure types.

<b>PCM Equivalent Structures (PCME):</b>				
Total Asbestos	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Total Chrysotile (CH)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03

## Binning Rule Description:

Apply to all structures where Total column &gt; 0:

L &gt; 5um, W ≥ 0.25um, AR ≥ 3

<b>AHERA (d) Structures:</b>				
Total Asbestos	2	2.5E+01	3.5E-03	4.2E-04 - 1.3E-02
Total Chrysotile (CH)	2	2.5E+01	3.5E-03	4.2E-04 - 1.3E-02
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03

## Binning Rule Description:

Apply to fibers (F) only:  
L ≥ 0.5um, AR ≥ 5

No restrictions for other structure types.

Most "secondary" structures (structures that are part of a primary complex structure) are excluded.

<b>Berman-Crump (2003) Structures:</b>				
Total Asbestos	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Total Chrysotile (CH)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 6.4E-03

## Binning Rule Description:

Apply to all structures where Total column > 0:  
L > 10um, W ≤ 0.4um

(a) Based on countable structures only

(b) Loading on Filter (s/mm<sup>2</sup>) = N structures / (GOs Counted \* GO Area)

(c) Air Concentration (s/cc) = (N structures \* EFA) / (GOs Counted \* GO Area \* F-factor \* Air Volume \* 1000)

Dust Loading (s/cm<sup>2</sup>) = (N structures \* EFA) / (GOs Counted \* GO Area \* F-factor \* Dust Collection Area)

(d) Yamate results are expected to be similar to AHERA, but use of AHERA for Yamate may be biased low due to the exclusion of structures &lt;0.5um.

FILE NAME:

1:EMSL04-11082072-09-22-11-041124769-TEM-EPAS-MIA-XIS

FILE TYPE: Original

## National Asbestos Data Entry Spreadsheet (NADES) for Air &amp; Dust Analysis by Superfund TEM

Enter Site or Project Name Here:
State/Federal Site or Project Identifier:

10-09-0008

Site/Project  
Identifier Code:

1

## F-factor Input Parameters:

## Indirect Prep, Not Ashed

Fraction of primary filter used  
Total resuspension volume (mL)  
Volume applied to secondary filter (mL)  
F-factor

Laboratory name:	EMSL04
Instrument:	DL 100 CX II (04-01)
Voltage (kV):	100 kV
Magnification:	20,000 X
Grid opening area (mm <sup>2</sup> ):	0.0132
Scale: 1L =	1.000
Scale: 1D =	1.000
Filter Size (mm):	25.000
Filter Pore Size (um):	0.450
Method SOP (Revision No.):	TEM ISO 13794
Grid Storage Location:	0411-E&E-02, E

Client Sample Number:	11082072
Date received by lab:	09/16/11
Lab Job Number:	041124769
Lab Sample Number:	041124769-0001
Chain of Custody Number:	10-09-0008-14

Sample Type:	Field Sample
QC Sample Type:	Not QC
Media:	Air
Air volume (L) or dust area (cm <sup>2</sup> ):	5606.16

Number of grids prepared:	3
Prepared by:	D. Stanhope
Preparation date:	09/20/11
Preparation Type:	Indirect - Ashed
Primary filter area (mm <sup>2</sup> ):	385
Secondary Filter Area (mm <sup>2</sup> ):	385
F- factor: [proposed value shown, cell formula can be over-written if necessary]	0.500
Filter Status:	Analyzed
Analyzed by:	F. Craig
Analysis date:	09/22/11

## Indirect Prep, Ashed

1	Fraction of primary filter used
1	Total resuspension volume, pre-ashing (mL)
1	Volume applied to filter for ashing (mL)
0.5	Fraction of filter that was ashed
40	Volume used to resuspend ashed residue (mL)
40	Volume applied to secondary filter (mL)
0.500	F-factor

## COMMENTS

Traverse direction vertical  
Particulate loading 20%

☐ Check box if this sample was analyzed using more than one instrument, by more than one analyst, or across multiple analysis dates

9/22/11

10-09-0008

# National Asbestos Data Entry Spreadsheet (NADES) for Air & Dust Analysis by Superfund TEM

CLIENT SAMPLE ID: 11082072  
 LAB SAMPLE ID: 041124769-0001

Media: Air  
 Sample Prep: Indirect Ashed

Sample Type: Field Sample  
 QC Sample Type: Not QC  
 Sample Status: Analyzed  
 Analysis Date: 9/22/2011

Data Entry by: K. Bleakley  
 Data Entry Date: 9/22/2011

QA by: K. TULLY  
 QA Date: 9/22/2011

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions (a)		Identification Code (b)	Mineral Type (c)	Other Mineral Description	1 = yes, blank = no			Comments
			Primary	Total	Length	Width				Sketch	Photo	EDS	
E4	B7	ND											
E4	G5	ND											
E4	D9	B	1	1	5	0.6	CD	CH		1		1	Faint ED- no photo
E5	I4	F	2	2	3.5	0.09	CD	CH		1	1	1	Photo 011172D
E5	F3	ND											
E5	G6	ND											

0411-8-11





# ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104  
Tel: (206) 624-9537, Fax: (206) 621-9832

## MEMORANDUM

DATE: November 8, 2011

TO: Steve Hall, START-3 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, WA *MW*

SUBJ: **Data Quality Assurance Review, Orofino Asbestos Site,  
Orofino, Idaho**

REF: TDD: 10-09-0008 PAN: 002233.0603.01RZ

The data quality assurance review of 6 bulk samples collected from the Orofino Asbestos site in Orofino, Idaho, has been completed. Polarized light microscopy (PLM) asbestos analyses (EPA Method 600/R-93/116) were performed by EMSL, Inc., Cinnaminson, New Jersey.

The samples were numbered:

Collected 8-24-11	Bulk PLM	11082301	11082302	11082401	11082402
Collected 8-31-11	Bulk PLM	11082303	11082304		

### Data Qualifications:

The samples were collected between August 24 and September 13, 2011, and were analyzed by September 15, 2011. The daily and monthly QC check sample results were within QC limits. No issues were noted in the laboratory case narrative.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone: (800) 220-3675 Fax: (856) 786-5974 Email: [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

Attn: **Eric Lindeman**  
**Ecology & Environment, Inc.**  
720 3rd Ave  
Suite 1700  
Seattle, WA 98104

Customer ID: ECOL44  
Customer PO:  
Received: 08/29/11 10:15 AM  
EMSL Order: 041123311

Fax: (206) 621-9832  
Project: SITE # 10-09-0008

Phone: (206) 624-9537

EMSL Proj:  
Analysis Date: 8/29/2011

**Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method  
with CARB 435 Prep (Milling). Level B for 0.1% Target Analytical Sensitivity**

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
11082301 041123311-0001	PL- CONFIRMATION	Brown Non-Fibrous Heterogeneous		100.00% Non-fibrous (other)	None Detected
11982302 041123311-0002	WARD CONFIRMATION	Brown Non-Fibrous Heterogeneous		100.00% Non-fibrous (other)	None Detected

Initial report from

Analyst(s)

Chris Little (2)

Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. The test results contained within this report meet the requirements of NELAP unless otherwise specified. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ



EMSL Analytical, Inc.

200 Route 130 North, Cinnaminson, NJ 08077

Phone: (800) 220-3675 Fax: (856) 786-5974 Email: [cinnaslab@EMSL.com](mailto:cinnaslab@EMSL.com)

Attn: **Eric Lindeman**  
**Ecology & Environment, Inc.**  
**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: ECOL44  
Customer PO:  
Received: 08/29/11 10:15 AM  
EMSL Order: 041123319

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: SITE # 10-09-0008

EMSL Proj:  
Analysis Date: 8/29/2011

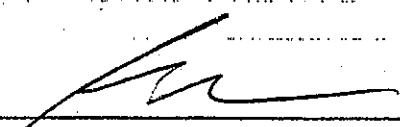
**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
11082401 041123319-0001	PLANK BULK	Gray Fibrous Homogeneous		85% Non-fibrous (other)	15% Chrysotile
11082402 041123319-0002	WARD BULK	Gray Fibrous Homogeneous		85% Non-fibrous (other)	15% Chrysotile

Initial report from

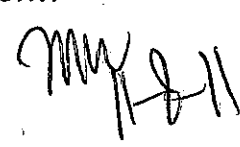
Analyst(s)

Ted Young (2)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036



**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone: (800) 220-3675 Fax: (856) 786-5874 Email: [cinnasblab@EMSL.com](mailto:cinnasblab@EMSL.com)

Attn: **Eric Lindeman**  
**Ecology & Environment, Inc.**  
**720 3rd Ave**  
**Suite 1700**  
**Seattle, WA 98104**

Customer ID: ECOL44  
Customer PO:  
Received: 08/02/11 9:30 AM  
EMSL Order: 041123721

Fax: (206) 621-9832 Phone: (206) 624-9537  
Project: 10-09-0008

EMSL Proj:  
Analysis Date: 9/3/2011


**Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method  
with CARB 435 Prep (Milling). Level B for 0.1% Target Analytical Sensitivity**

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
11082303 041123721-0001		Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected
11082304 041123721-0002		Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected

Initial report from 09/06/2011 09:13:47

Analyst(s)

Dave Poltras (2)

  
Stephen Siegel, CIH, Laboratory Manager  
or other approved signatory

EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. The test results contained within this report meet the requirements of NELAP unless otherwise specified. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ

Test Report PLMPTC-7.121.0 Printed: 9/6/2011 9:15:54 AM

**THIS IS THE LAST PAGE OF THE REPORT.**

1

*MW 11-8-11*



# ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104  
Tel: (206) 624-9537, Fax: (206) 621-9832

## MEMORANDUM

MEMORANDUM

DATE: January 4, 2012

DATE: January 4, 2012

TO: Steve Hall, START-3 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, WA *MW* Mark Woodke, START-3 Chemist, E & E, Seattle, WA

SUBJ: Data Quality Assurance Review, Orofino Asbestos Site, Orofino, Idaho

REF: TDD: 10-09-0008

PAN: 002233.0603.01RZ TEL: 10-09-0008

The data quality assurance review of 1 air filter sample collected from the Orofino Asbestos site in Orofino, Idaho, has been completed. Transmission electron microscopy (TEM; ISO Method 10312) asbestos analyses were performed by EMSL, Inc., Cinnaminson, New Jersey.

The sample was numbered: 11082503

### Data Qualifications:

The sample was received at the laboratory on September 1, 2011, and was analyzed on December 1, 2011. No issues were noted by the laboratory. There were no detections in the analyzed sample.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

### Data Qualifier and Definition

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

10-09-0008

Version 8  
DRAFT

10-09-0008

## National Asbestos Data Entry Spreadsheet (NADES) for Air &amp; Dust Analysis by Superfund TEM ANALYTICAL REPORT

SAMPLE/ANALYSIS INFORMATION				ANALYSIS PARAMETERS		ANALYSIS INFORMATION	
Field Sample Number:	11082503	Lab Sample Number:	041123516-0007	Effective filter area (mm <sup>2</sup> ):	385	Sample Number:	041123516-0007
Media:	Air	Preparation:	Direct	F-factor:	1.00E+00	Preparation:	Direct
Sample Type:	Field Blank	Sample Status:	Analyzed	Grid opening area (mm <sup>2</sup> ):	0.0132	Sample Status:	Analyzed
Air Volume (L):		Analysis Date:	12/1/2011	#GOS counted:	10	Analysis Date:	12/1/2011
QA Sample Type:	Not QC	Method SOP:	TEM ISO 10312	Sensitivity (1/cc):	blank	Method SOP:	TEM ISO 10312
Stopping Rule(s):	GD = 10, Structures = , Sensitivity = 0.00E+00					Sensitivity:	0.00E+00

Desired Confidence Interval (%): **95** Number of Structures with Fatal Data Entry Errors: **0**  
(Structures with fatal errors are excluded from calculations below)

Mineral Class	Number of Structures (a)	Loading on Filter (b) (s/mm <sup>2</sup> )	Air Conc (c) (s/cc)	95% Confidence Interval
<b>TEM/EPAS/SM Structures</b>				
Total Asbestos	0	0.0E+00	blank	blank - blank
Total Chrysotile (CH)	0	0.0E+00	blank	blank - blank
Total Amphibole	0	0.0E+00	blank	blank - blank
actinolite (AC)	0	0.0E+00	blank	blank - blank
amosite (AM)	0	0.0E+00	blank	blank - blank
anthophyllite (AN)	0	0.0E+00	blank	blank - blank
crocidolite (CR)	0	0.0E+00	blank	blank - blank
tremolite (TR)	0	0.0E+00	blank	blank - blank
Libby amphibole (LA)	0	0.0E+00	blank	blank - blank
other amphibole (OA)	0	0.0E+00	blank	blank - blank
other mineral class (OM)	0	0.0E+00	blank	blank - blank
Solid Soln: Amosite	0	0.0E+00	blank	blank - blank
Solid Soln: Trem-Act	0	0.0E+00	blank	blank - blank
<b>RCME/Equivalent Structures (RCME)</b>				
Total Asbestos	0	0.0E+00	blank	blank - blank
Total Chrysotile (CH)	0	0.0E+00	blank	blank - blank
Total Amphibole	0	0.0E+00	blank	blank - blank
actinolite (AC)	0	0.0E+00	blank	blank - blank
amosite (AM)	0	0.0E+00	blank	blank - blank
anthophyllite (AN)	0	0.0E+00	blank	blank - blank
crocidolite (CR)	0	0.0E+00	blank	blank - blank
tremolite (TR)	0	0.0E+00	blank	blank - blank
Libby amphibole (LA)	0	0.0E+00	blank	blank - blank
other amphibole (OA)	0	0.0E+00	blank	blank - blank
other mineral class (OM)	0	0.0E+00	blank	blank - blank
Solid Soln: Amosite	0	0.0E+00	blank	blank - blank
Solid Soln: Trem-Act	0	0.0E+00	blank	blank - blank
<b>AHERA/HERA Structures</b>				
Total Asbestos	0	0.0E+00	blank	blank - blank
Total Chrysotile (CH)	0	0.0E+00	blank	blank - blank
Total Amphibole	0	0.0E+00	blank	blank - blank
actinolite (AC)	0	0.0E+00	blank	blank - blank
amosite (AM)	0	0.0E+00	blank	blank - blank
anthophyllite (AN)	0	0.0E+00	blank	blank - blank
crocidolite (CR)	0	0.0E+00	blank	blank - blank
tremolite (TR)	0	0.0E+00	blank	blank - blank
Libby amphibole (LA)	0	0.0E+00	blank	blank - blank
other amphibole (OA)	0	0.0E+00	blank	blank - blank
other mineral class (OM)	0	0.0E+00	blank	blank - blank
Solid Soln: Amosite	0	0.0E+00	blank	blank - blank
Solid Soln: Trem-Act	0	0.0E+00	blank	blank - blank
<b>Benham/Grump/2005 Structures</b>				
Total Asbestos	0	0.0E+00	blank	blank - blank
Total Chrysotile (CH)	0	0.0E+00	blank	blank - blank
Total Amphibole	0	0.0E+00	blank	blank - blank
actinolite (AC)	0	0.0E+00	blank	blank - blank
amosite (AM)	0	0.0E+00	blank	blank - blank
anthophyllite (AN)	0	0.0E+00	blank	blank - blank
crocidolite (CR)	0	0.0E+00	blank	blank - blank
tremolite (TR)	0	0.0E+00	blank	blank - blank
Libby amphibole (LA)	0	0.0E+00	blank	blank - blank
other amphibole (OA)	0	0.0E+00	blank	blank - blank
other mineral class (OM)	0	0.0E+00	blank	blank - blank
Solid Soln: Amosite	0	0.0E+00	blank	blank - blank
Solid Soln: Trem-Act	0	0.0E+00	blank	blank - blank

## Binning Rule Description:

Apply to fibers (F) only:  
L ≥ 0.5um, AR ≥ 3

No restrictions for other structure types.

## Binning Rule Description:

Apply to all structures where Total column > 0:

L > 5um, W ≥ 0.25um, AR ≥ 3

## Binning Rule Description:

Apply to fibers (F) only:  
L ≥ 0.5um, AR ≥ 5

No restrictions for other structure types.

Most "secondary" structures (structures that are part of a primary complex structure) are excluded.

## Binning Rule Description:

Apply to all structures where Total column > 0:  
L > 10um, W ≤ 0.4um

(a) Based on countable structures only

(b) Loading on Filter (s/mm<sup>2</sup>) = (N structures \* EFA) / (GOS Counted \* GO Area)

(c) Air Concentration (s/cc) = (N structures \* EFA) / (GOS Counted \* GO Area \* F-factor \* Air Volume \* 1000)

Dust Loading (s/cm<sup>2</sup>) = (N structures \* EFA) / (GOS Counted \* GO Area \* F-factor \* Dust Collection Area)

(d) Yarnate results are expected to be similar to AHERA, but use of AHERA for Yarnate may be biased low due to the exclusion of structures <0.5um.



# **G Geotechnical Testing Results**

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# ecology and environment, inc.

International Specialists in the Environment

720 Third Avenue, Suite 1700, Seattle, WA 98104  
Tel: (206) 624-9537, Fax: (206) 621-9832

## MEMORANDUM

DATE: October 17, 2011  
TO: Steve Hall, START-3 Project Manager, E & E, Seattle, WA  
FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, WA *MW*  
SUBJ: **Data Quality Assurance Review, Orofino Asbestos Site,  
Orofino, Idaho**  
REF: TDD: 10-09-0008 PAN: 002233.0603.01RZ

The data quality assurance review of 8 samples collected from the Orofino Asbestos site in Orofino, Idaho, has been completed. USCS Classification (ASTM Method D 2487-06), particle size analysis (ASTM Method D 422-63), Atterberg Limits (ASTM Method D 4318-05), Compaction Report (ASTM Method D 1557), and Flexible Wall Permeability (ASTM Method D 5084) were performed by Geotesting Express, Acton, MA. All sample analyses were evaluated following EPA's Stage 2 Data Validation Manual Process (S4VM).

The samples were numbered:

11082201	11082202	11082203	11082204	11082205
11082206	11082207	11082208		

### Data Qualifications:

The samples were collected in August 2011, and were analyzed by September 12, 2011. No anomalies were noted in the case narrative.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan and the geotechnical methods. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

### Data Qualifiers and Definitions

- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.
- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.

- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.



Client:	Ecology & Environment, Inc.		
Project:	10-09-0008		
Location:	Orofino, ID	Project No:	GTX-11098
Boring ID:	---	Sample Type:	bucket
Sample ID:	11082201	Test Date:	09/02/11
Depth :	---	Test Id:	216432
Test Comment:	---		
Sample Description:	Moist, dark yellowish brown sandy clay		
Sample Comment:	---		

## USCS Classification - ASTM D 2487-06

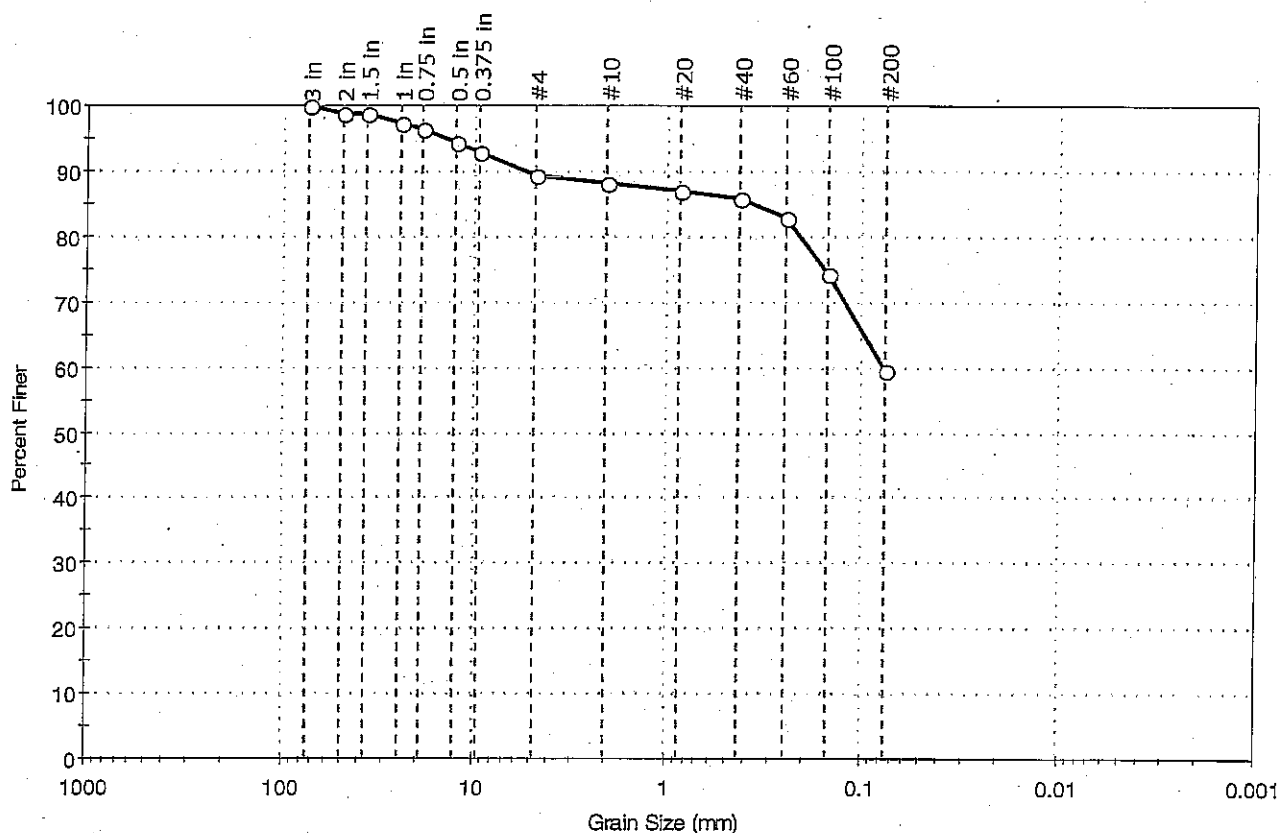
Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	11082201	---	Sandy lean clay	CL	10.6	29.7	59.7

Remarks: Grain Size analysis performed by ASTM D422, results enclosed  
Atterbeg Limits performed by ASTM 4318, results enclosed

*mw 10/17/11*

Client: Ecology & Environment, Inc.	Project: 10-09-0008	Location: Orofino, ID	Project No: GTX-11098
Boring ID: ---	Sample Type: bucket	Tested By: jbr	Checked By: jdt
Sample ID: 11082201	Test Date: 08/30/11	Test Id: 216427	
Depth: ---			
Test Comment: ---			
Sample Description: Moist, dark yellowish brown sandy clay			
Sample Comment: ---			

## Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	10.6	29.7	59.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3 in	75.00	100		
2 in	50.00	99		
1.5 in	37.50	99		
1 in	25.00	97		
0.75 in	19.00	96		
0.5 in	12.70	94		
0.375 in	9.50	93		
#4	4.75	89		
#10	2.00	88		
#20	0.85	87		
#40	0.42	86		
#60	0.25	83		
#100	0.15	74		
#200	0.075	60		

### Coefficients

D <sub>85</sub> = 0.3719 mm	D <sub>30</sub> = N/A
D <sub>60</sub> = 0.0762 mm	D <sub>15</sub> = N/A
D <sub>50</sub> = N/A	D <sub>10</sub> = N/A
C <sub>u</sub> = N/A	C <sub>c</sub> = N/A

### Classification

<u>ASTM</u>	Sandy lean clay (CL)
<u>AASHTO</u>	Clayey Soils (A-6 (4))

### Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED  
Sand/Gravel Hardness : HARD

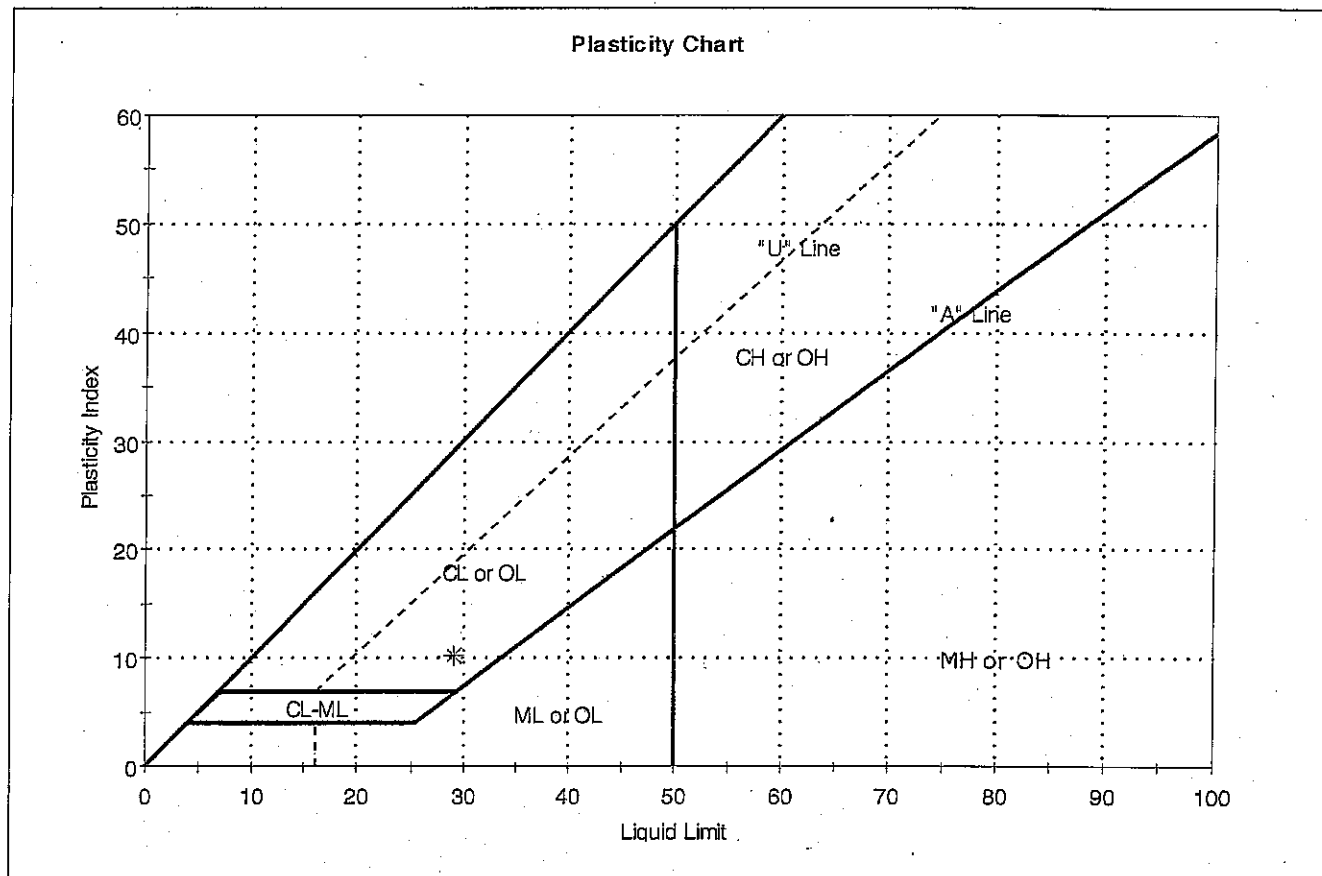
*Handwritten signature/initials*





Client:	Ecology & Environment, Inc.		
Project:	10-09-0008		
Location:	Orofino, ID	Project No:	GTX-11098
Boring ID:	---	Sample Type:	bucket
Sample ID:	11082201	Test Date:	09/02/11
Depth:	---	Test Id:	216437
Test Comment:	---		
Sample Description:	Moist, dark yellowish brown sandy clay		
Sample Comment:	---		

## Atterberg Limits - ASTM D 4318-05



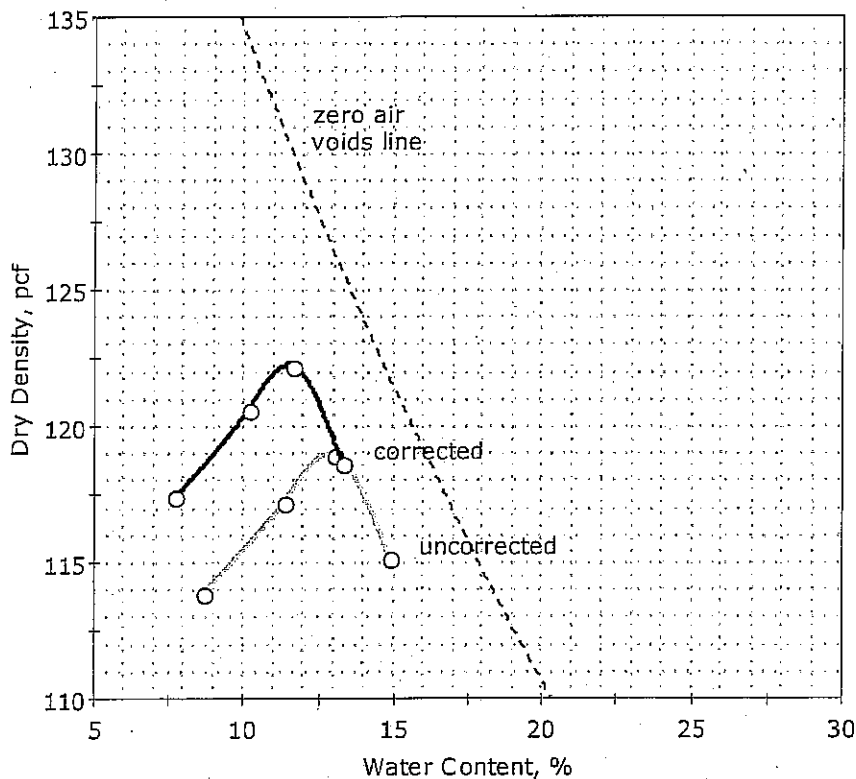
Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	11082201	---	---	14	29	19	10	0	Sandy lean clay (CL)

Sample Prepared using the WET method  
 14% Retained on #40 Sieve  
 Dry Strength: LOW  
 Dilatancy: SLOW  
 Toughness: MEDIUM

*mm 10/17/11*

Client: Ecology & Environment, Inc.	Project No: GTX-11098
Project: 10-09-0008	
Location: Orofino, ID	
Boring ID: ---	Sample Type: bucket
Sample ID: 11082201	Test Date: 09/01/11
Depth: ---	Test Id: 216422
Test Comment: ---	Tested By: cwd
Sample Description: Moist, dark yellowish brown sandy clay	Checked By: jdt
Sample Comment: ---	

## Compaction Report - ASTM D 1557



Data Points	Point 1	Point 2	Point 3	Point 4
Dry density, pcf	113.9	117.2	118.9	115.2
Moisture Content, %	8.6	11.4	13.0	14.9

Method : A

Preparation : WET

As received Moisture :

Rammer : Manual

Zero voids line based on assumed specific gravity of 2.75

Maximum Dry Density= 119.0 pcf

Optimum Moisture= 13.0 %

Oversize Correction (10.6% > #4 Sieve)

Corrected Maximum Dry Density= 122.0 pcf

Corrected Optimum Moisture= 11.5 %

Assumed Average Bulk Specific Gravity = 2.55



Client:	Ecology & Environment, Inc.		
Project:	10-09-0008		
Location:	Orofino, ID	Project No:	GTX-11098
Boring ID:	---	Sample Type:	bucket
Sample ID:	11082202	Test Date:	09/02/11
Depth :	---	Test Id:	21.6433
Test Comment:	---		
Sample Description:	Moist, yellowish brown sandy clay with gravel		
Sample Comment:	---		

## USCS Classification - ASTM D 2487-06

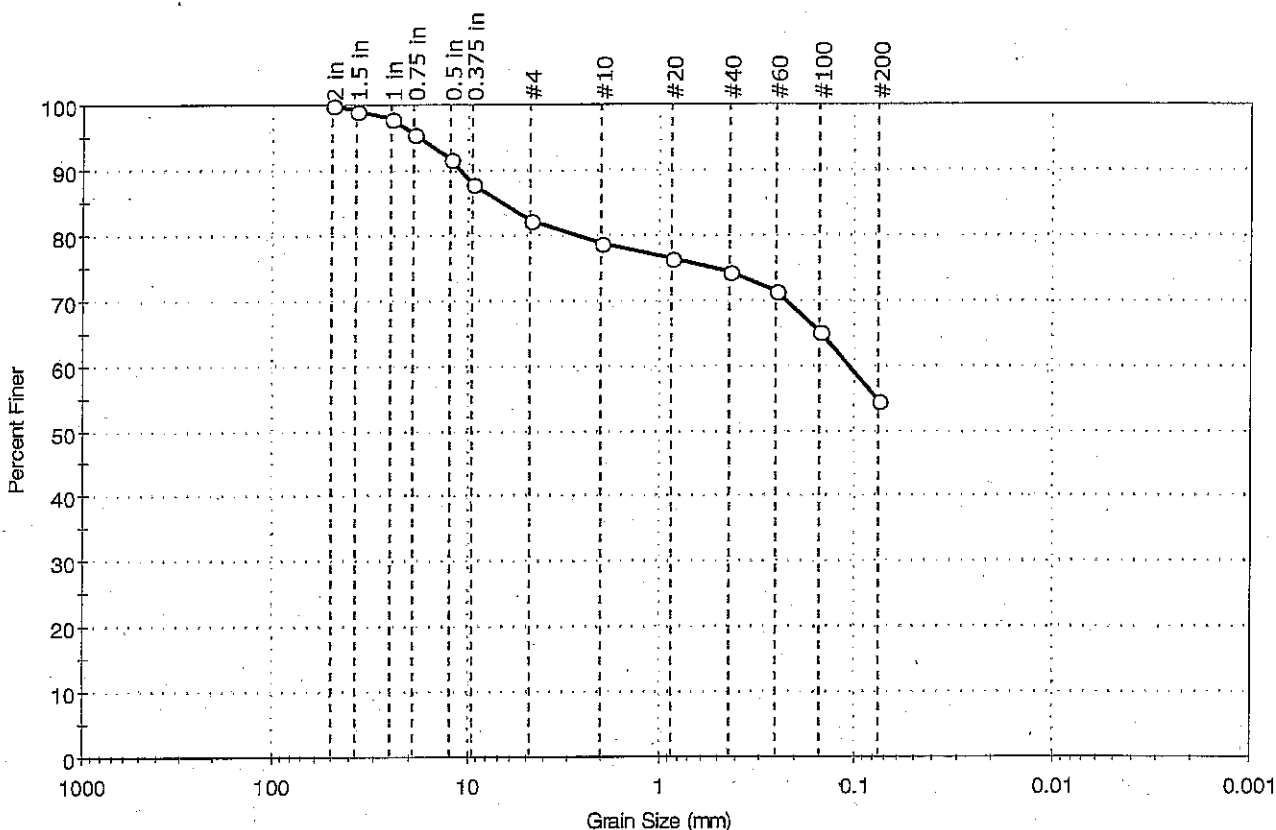
Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	11082202	---	Sandy lean clay with gravel	CL	17.6	27.8	54.6

Remarks: Grain Size analysis performed by ASTM D422, results enclosed  
Atterbeg Limits performed by ASTM 4318, results enclosed

MW 10-17-11

Client: Ecology & Environment, Inc.  
 Project: 10-09-0008  
 Location: Orofino, ID  
 Project No: GTX-11098  
 Boring ID: ---  
 Sample ID: 11082202  
 Depth: ---  
 Sample Type: bucket  
 Test Date: 08/31/11  
 Test Id: 216428  
 Tested By: jbr  
 Checked By: jdt  
 Test Comment: ---  
 Sample Description: Moist, yellowish brown sandy clay with gravel  
 Sample Comment: ---

## Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	17.6	27.8	54.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
2 in	50.00	100		
1.5 in	37.50	99		
1 in	25.00	98		
0.75 in	19.00	96		
0.5 in	12.50	92		
0.375 in	9.50	88		
#4	4.75	82		
#10	2.00	79		
#20	0.85	76		
#40	0.42	74		
#60	0.25	71		
#100	0.15	65		
#200	0.075	55		

### Coefficients

D<sub>85</sub> = 6.6278 mm      D<sub>30</sub> = N/A  
 D<sub>60</sub> = 0.1064 mm      D<sub>15</sub> = N/A  
 D<sub>50</sub> = N/A      D<sub>10</sub> = N/A  
 C<sub>u</sub> = N/A      C<sub>c</sub> = N/A

### Classification

ASTM Sandy lean clay with gravel (CL)

AASHTO Clayey Soils (A-6 (4))

### Sample/Test Description

Sand/Gravel Particle Shape : ---

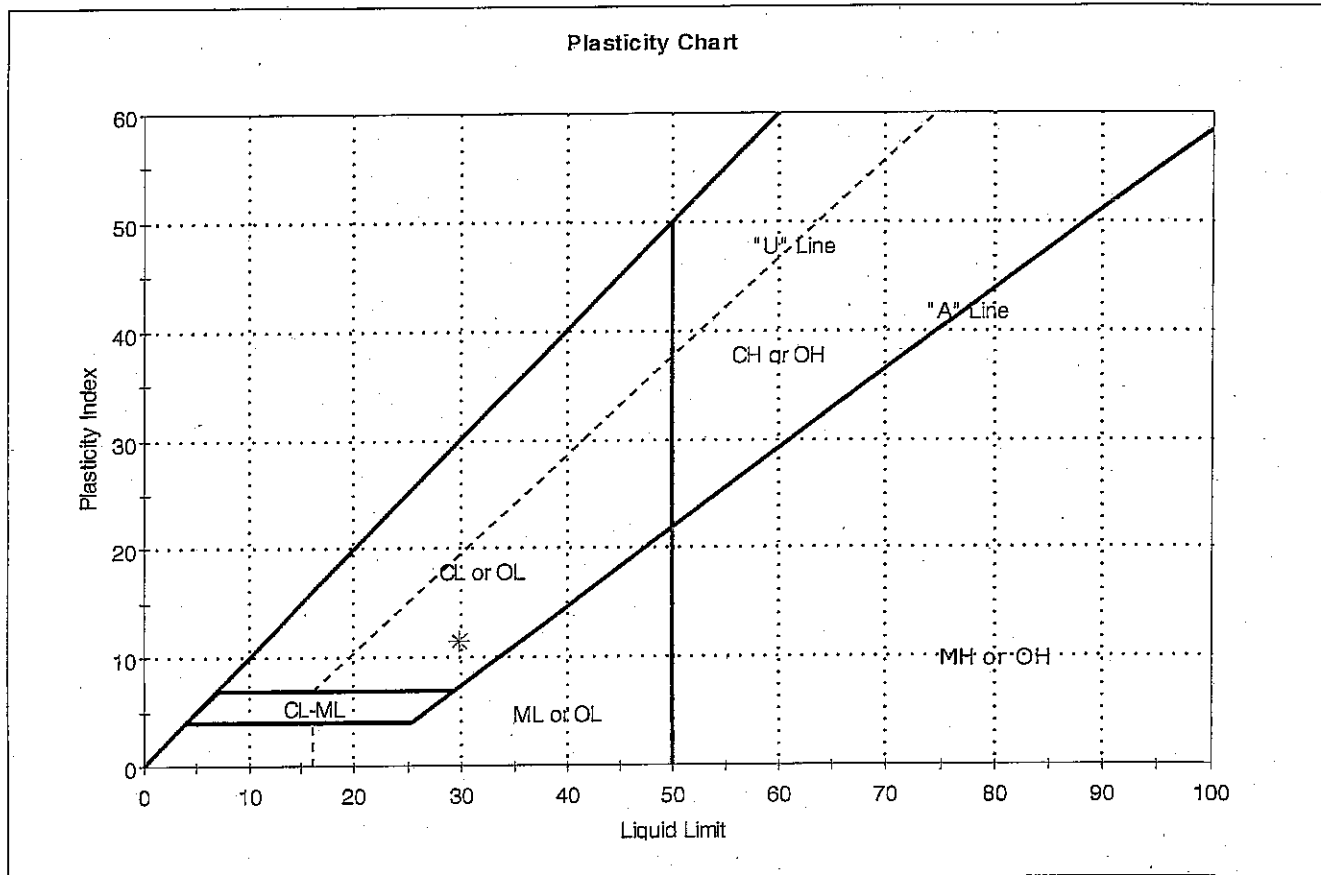
Sand/Gravel Hardness : ---

*Handwritten signature/initials*



Client: Ecology & Environment, Inc.	Project No: GTX-11098	
Project: 10-09-0008		
Location: Orofino, ID	Sample Type: bucket	Tested By: GA
Boring ID: ---	Test Date: 09/02/11	Checked By: jdt
Sample ID: 11082202	Test Id: 216438	
Depth: ---		
Test Comment: ---		
Sample Description: Moist, yellowish brown sandy clay with gravel		
Sample Comment: ---		

## Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	11082202	---	---	13	30	18	12	0	Sandy lean clay with gravel (CL)

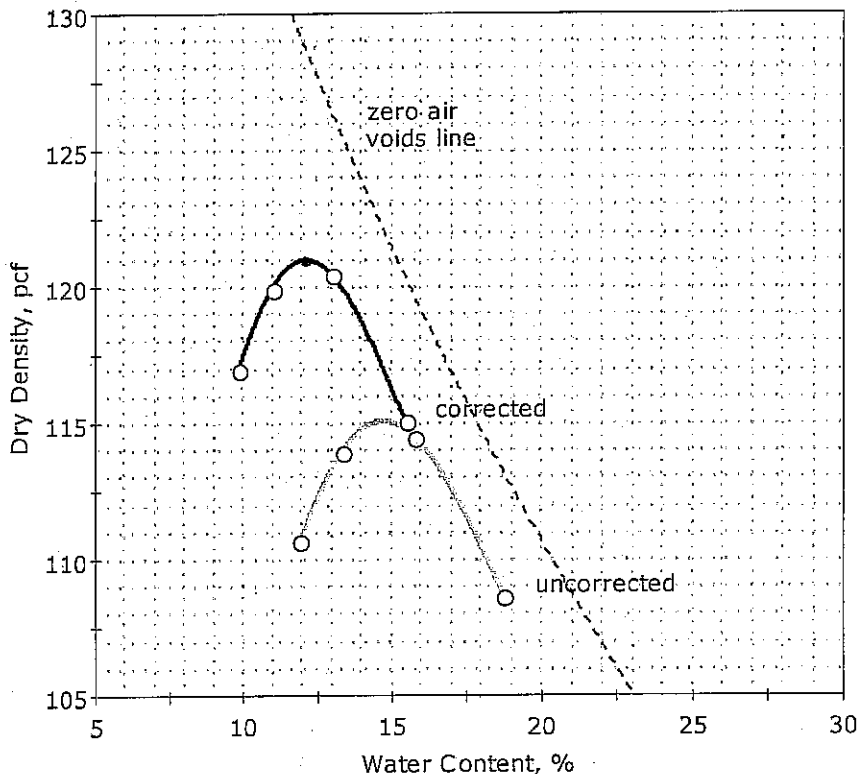
Sample Prepared using the WET method  
 25% Retained on #40 Sieve  
 Dry Strength: LOW  
 Dilatancy: SLOW  
 Toughness: MEDIUM

*MW 10/17/11*



Client: Ecology & Environment, Inc.	Project No: GTX-11098	
Project: 10-09-0008		
Location: Orofino, ID	Sample Type: bucket	Tested By: cwd
Boring ID: ---	Test Date: 09/01/11	Checked By: jdt
Sample ID: 11082202	Test Id: 216423	
Depth: ---		
Test Comment: ---		
Sample Description: Moist, yellowish brown sandy clay with gravel		
Sample Comment: ---		

## Compaction Report - ASTM D 1557



Data Points	Point 1	Point 2	Point 3	Point 4
Dry-density, pcf	110.7	113.9	114.5	108.7
Moisture Content, %	11.9	13.3	15.8	18.8

Method : A

Preparation : WET

As received Moisture :

Rammer : Manual

Zero voids line based on assumed specific gravity of 2.75

Maximum Dry Density= 115.0 pcf

Optimum Moisture= 14.5 %

Oversize Correction (17.6% > #4 Sieve)

Corrected Maximum Dry Density= 121.0 pcf

Corrected Optimum Moisture= 12.0 %

Assumed Average Bulk Specific Gravity = 2.55

*MWB 17-11*



Client:	Ecology & Environment, Inc.		
Project:	10-09-0008	Project No:	GTX-11098
Location:	Orofino, ID		
Boring ID:	---	Sample Type:	bucket
Sample ID:	11082203	Test Date:	09/02/11
Depth :	---	Test Id:	216434
Test Comment:	---		
Sample Description:	Moist, yellowish brown sandy silty clay		
Sample Comment:	---		

## USCS Classification - ASTM D 2487-06

Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	11082203	---	Sandy silty clay	CL-ML	0.3	36.5	63.2

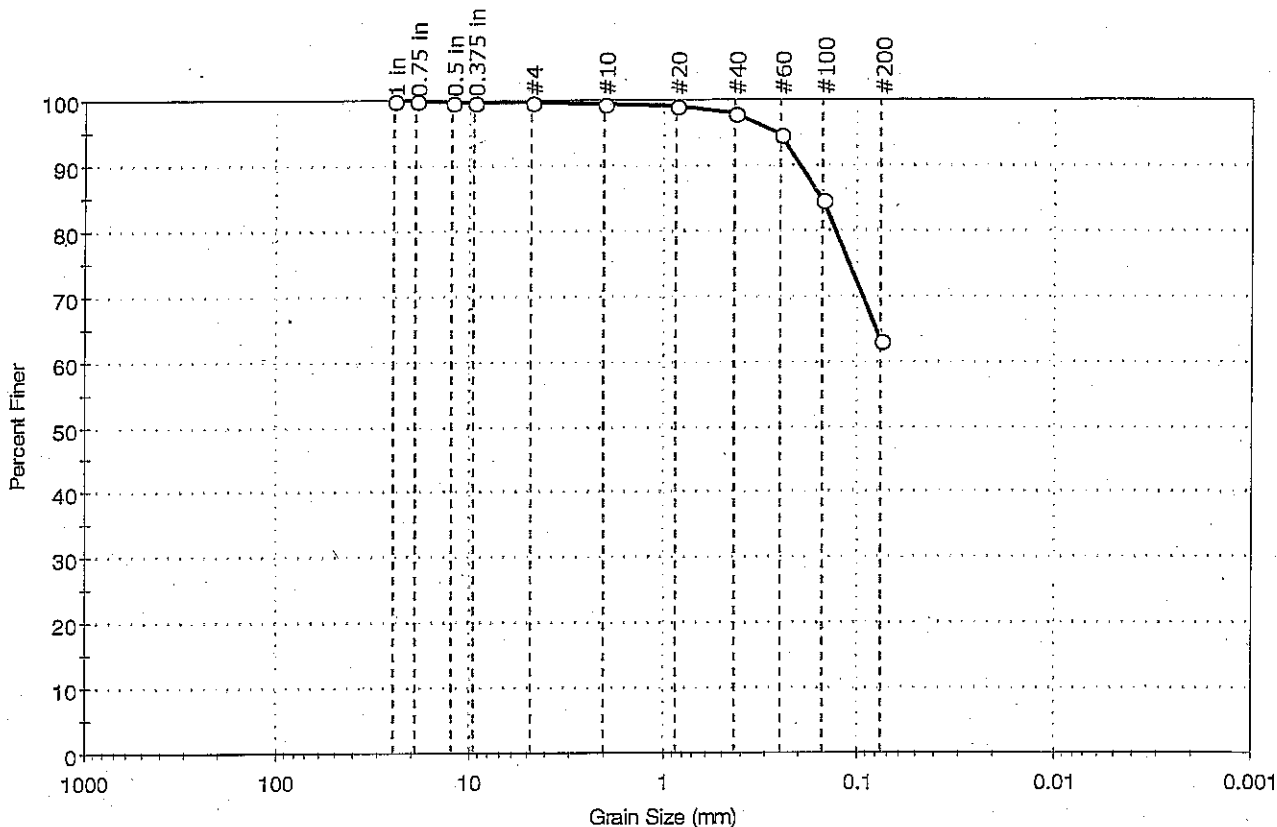
Remarks: Grain Size analysis performed by ASTM D422, results enclosed  
Atterbeg Limits performed by ASTM 4318, results enclosed

*mm 10/7/11*



Client: Ecology & Environment, Inc.	Project No: GTX-11098
Project: 10-09-0008	
Location: Orofino, ID	
Boring ID: ---	Sample Type: bucket
Sample ID: 11082203	Test Date: 08/30/11
Depth: ---	Test Id: 216429
Test Comment: ---	Tested By: jbr
Sample Description: Moist, yellowish brown sandy silty clay	Checked By: jdt
Sample Comment: ---	

## Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.3	36.5	63.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	100		
0.5 in	12.50	100		
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	100		
#20	0.85	99		
#40	0.425	98		
#60	0.25	95		
#100	0.15	85		
#200	0.075	63		

### Coefficients

D <sub>85</sub> = 0.1525 mm	D <sub>30</sub> = N/A
D <sub>60</sub> = N/A	D <sub>15</sub> = N/A
D <sub>50</sub> = N/A	D <sub>10</sub> = N/A
C <sub>u</sub> = N/A	C <sub>c</sub> = N/A

### Classification

ASTM	Sandy silty clay (CL-ML)
AASHTO	Silty Soils (A-4 (0))

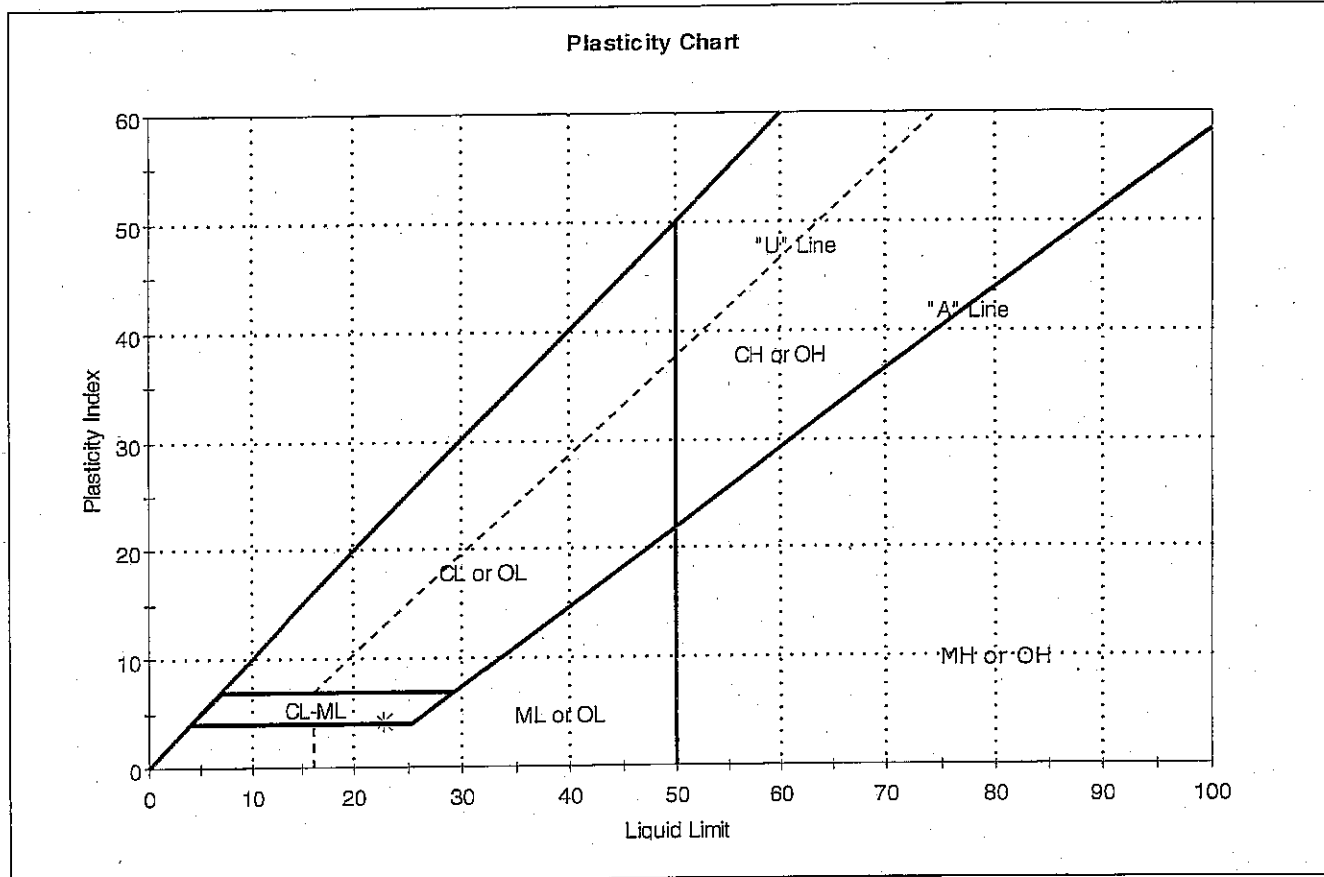
### Sample/Test Description

Sand/Gravel Particle Shape : ---  
Sand/Gravel Hardness : ---



Client: Ecology & Environment, Inc.	Project No: GTX-11098	
Project: 10-09-0008		
Location: Orofino, ID	Sample Type: bucket	Tested By: GA
Boring ID: ---	Test Date: 09/02/11	Checked By: jdt
Sample ID: 11082203	Test Id: 216439	
Depth: ---		
Test Comment: ---		
Sample Description: Moist, yellowish brown sandy silty clay		
Sample Comment: ---		

## Atterberg Limits - ASTM D 4318-05



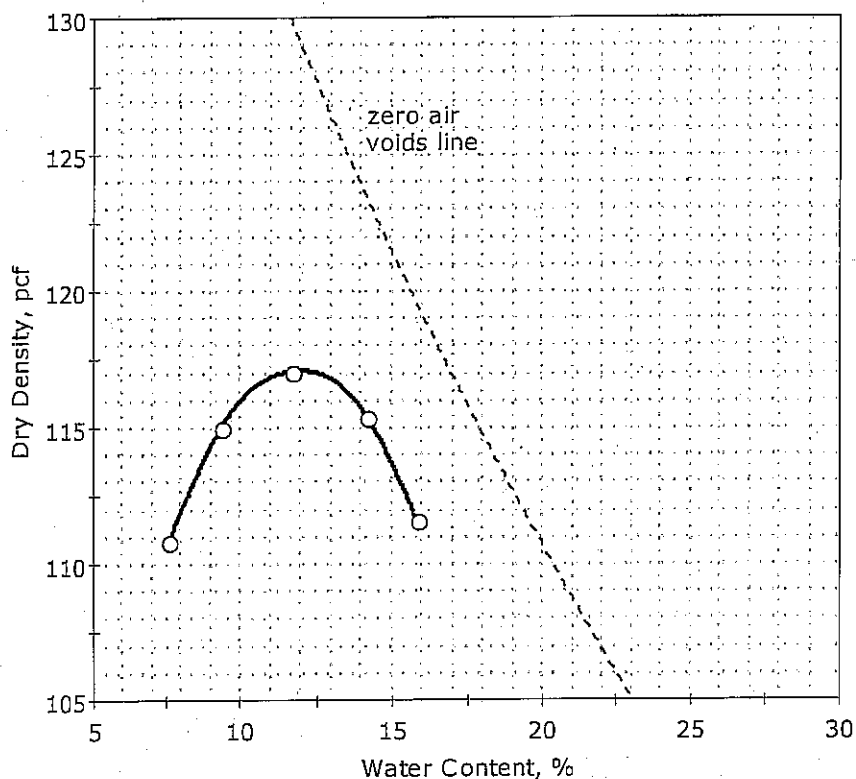
Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	11082203	---	---	8	23	19	4	-3	Sandy silty clay (CL=ML)

Sample Prepared using the WET method  
 2% Retained on #40 Sieve  
 Dry Strength: NONE  
 Dilatancy: RAPID  
 Toughness: LOW

*mm/pjt*

Client:	Ecology & Environment, Inc.		
Project:	10-09-0008		
Location:	Orofino, ID	Project No:	GTX-11098
Boring ID:	---	Sample Type:	bucket
Sample ID:	11082203	Test Date:	09/01/11
Depth:	---	Test Id:	216424
Test Comment:	---		
Sample Description:	Moist, yellowish brown sandy silty clay		
Sample Comment:	---		

## Compaction Report - ASTM D 1557



Data Points	Point 1	Point 2	Point 3	Point 4	Point 5
Dry density, pcf	110.8	115.0	117.1	115.4	111.6
Moisture Content, %	7.6	9.3	11.7	14.2	15.8

Method : A  
Preparation : WET  
As received Moisture :  
Rammer : Manual  
Zero voids line based on assumed specific gravity of 2.75

Maximum Dry Density= 117.0 pcf  
Optimum Moisture= 12.0 %



Client:	Ecology & Environment, Inc.		
Project:	10-09-0008		
Location:	Orofino, ID	Project No:	GTX-11098
Boring ID:	---	Sample Type:	bucket
Sample ID:	11082204	Test Date:	09/02/11
Depth :	---	Test Id:	216435
Test Comment:	---		
Sample Description:	Moist, dark yellowish brown sandy silty clay		
Sample Comment:	---		

## USCS Classification - ASTM D 2487-06

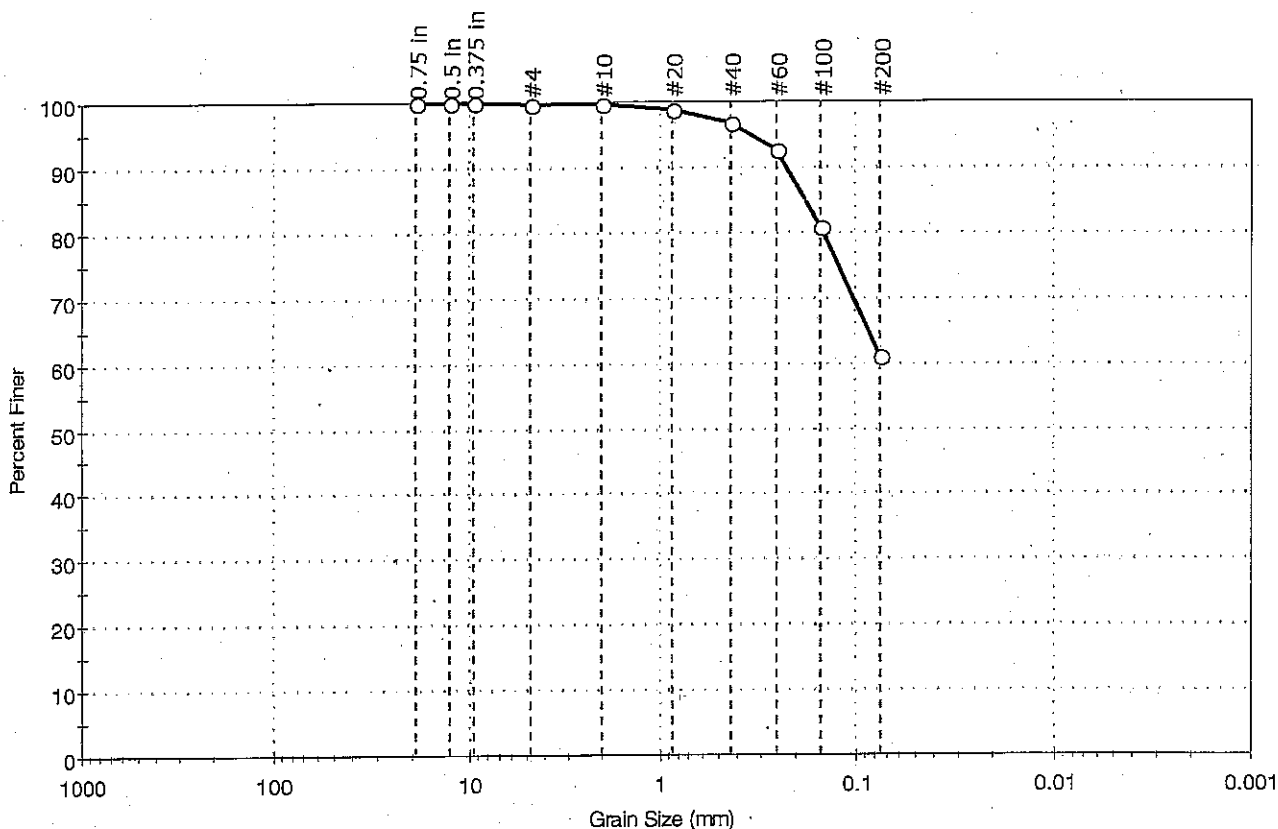
Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	11082204	---	Sandy silty clay	CL-ML	0.2	38.9	60.9

Remarks: Grain Size analysis performed by ASTM D422, results enclosed  
Atterbeg Limits performed by ASTM 4318, results enclosed

*Handwritten signature/initials*

Client: Ecology & Environment, Inc.  
Project: 10-09-0008  
Location: Orofino, ID  
Project No: GTX-11098  
Boring ID: --- Sample Type: bucket Tested By: jbr  
Sample ID: 11082204 Test Date: 08/30/11 Checked By: jdt  
Depth: --- Test Id: 216430  
Test Comment: ---  
Sample Description: Moist, dark yellowish brown sandy silty clay  
Sample Comment: ---

## Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.2	38.9	60.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.70	100		
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	100		
#20	0.85	99		
#40	0.42	97		
#60	0.25	93		
#100	0.15	81		
#200	0.075	61		

### Coefficients

D<sub>85</sub> = 0.1801 mm      D<sub>30</sub> = N/A  
D<sub>60</sub> = N/A      D<sub>15</sub> = N/A  
D<sub>50</sub> = N/A      D<sub>10</sub> = N/A  
C<sub>u</sub> = N/A      C<sub>c</sub> = N/A

### Classification

**ASTM**      Sandy silty clay (CL-ML)

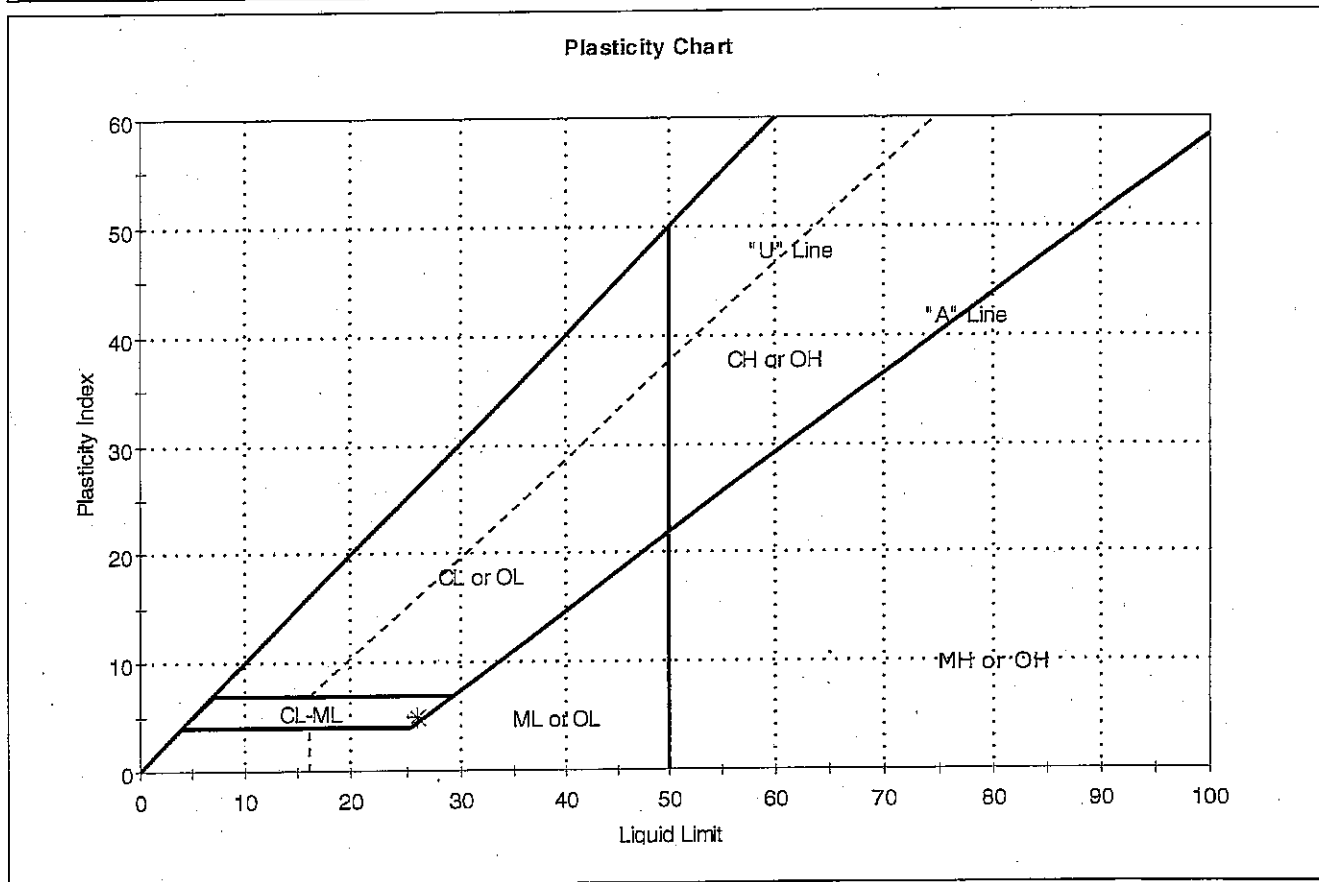
**AASHTO**      Silty Soils (A-4 (0))

### Sample/Test Description

Sand/Gravel Particle Shape : ---  
Sand/Gravel Hardness : ---

Client: Ecology & Environment, Inc.	Project No: GTX-11098
Project: 10-09-0008	
Location: Orofino, ID	
Boring ID: ---	Sample Type: bucket
Sample ID: 11082204	Test Date: 09/02/11
Depth: ---	Test Id: 216440
Test Comment: ---	
Sample Description: Moist, dark yellowish brown sandy silty clay	
Sample Comment: ---	

## Atterberg Limits - ASTM D 4318-05



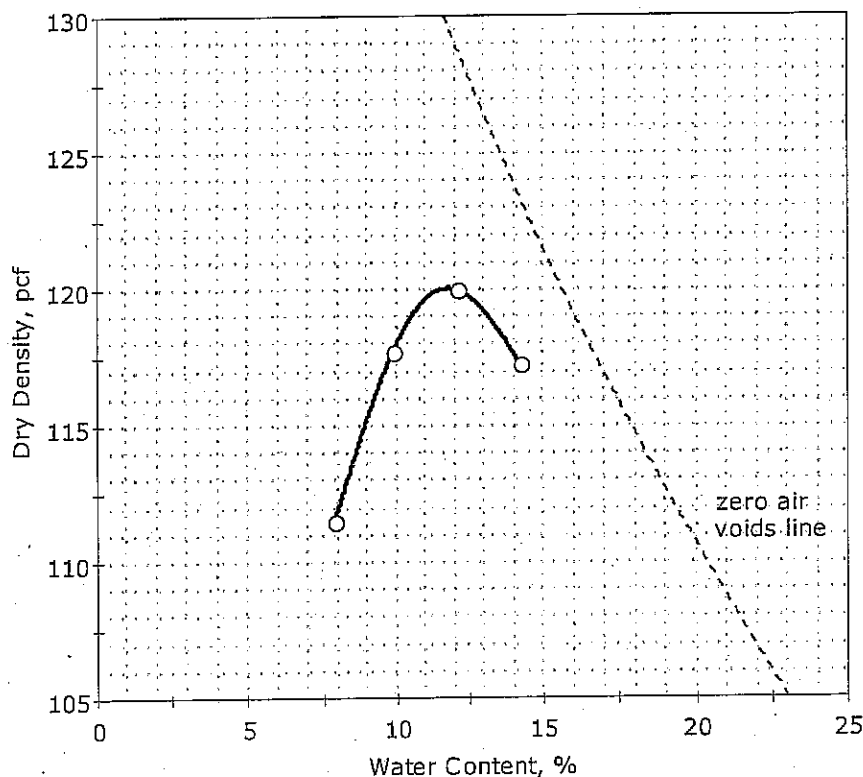
Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	11082204	---	---	9	26	21	5	-2	Sandy silty clay (CL=ML)

Sample Prepared using the WET method  
 3% Retained on #40 Sieve  
 Dry Strength: NONE  
 Dilatancy: RAPID  
 Toughness: LOW



Client: Ecology & Environment, Inc.	Project No: GTX-11098	
Project: 10-09-0008		
Location: Orofino, ID	Sample Type: bucket	Tested By: cwd
Boring ID: ---	Test Date: 09/01/11	Checked By: jdt
Sample ID: 11082204	Test Id: 216425	
Depth: ---		
Test Comment: ---		
Sample Description: Moist, dark yellowish brown sandy silty clay		
Sample Comment: ---		

## Compaction Report - ASTM D 1557



Data Points	Point 1	Point 2	Point 3	Point 4
Dry density, pcf	111.5	117.7	120.0	117.3
Moisture Content, %	7.9	9.9	12.1	14.2

Method : A

Preparation : WET

As received Moisture :

Rammer : Manual

Zero voids line based on assumed specific gravity of 2.75

Maximum Dry Density = 120.0 pcf  
Optimum Moisture = 12.0 %





Client:	Ecology & Environment, Inc.		
Project:	10-09-0008	Project No:	GTX-11098
Location:	Orofino, ID		
Boring ID:	---	Sample Type:	bucket
Sample ID:	11082205	Test Date:	09/02/11
Depth :	---	Test Id:	216436
Test Comment:	---		
Sample Description:	Moist, yellowish brown sandy silt		
Sample Comment:	---		

## USCS Classification - ASTM D 2487-06

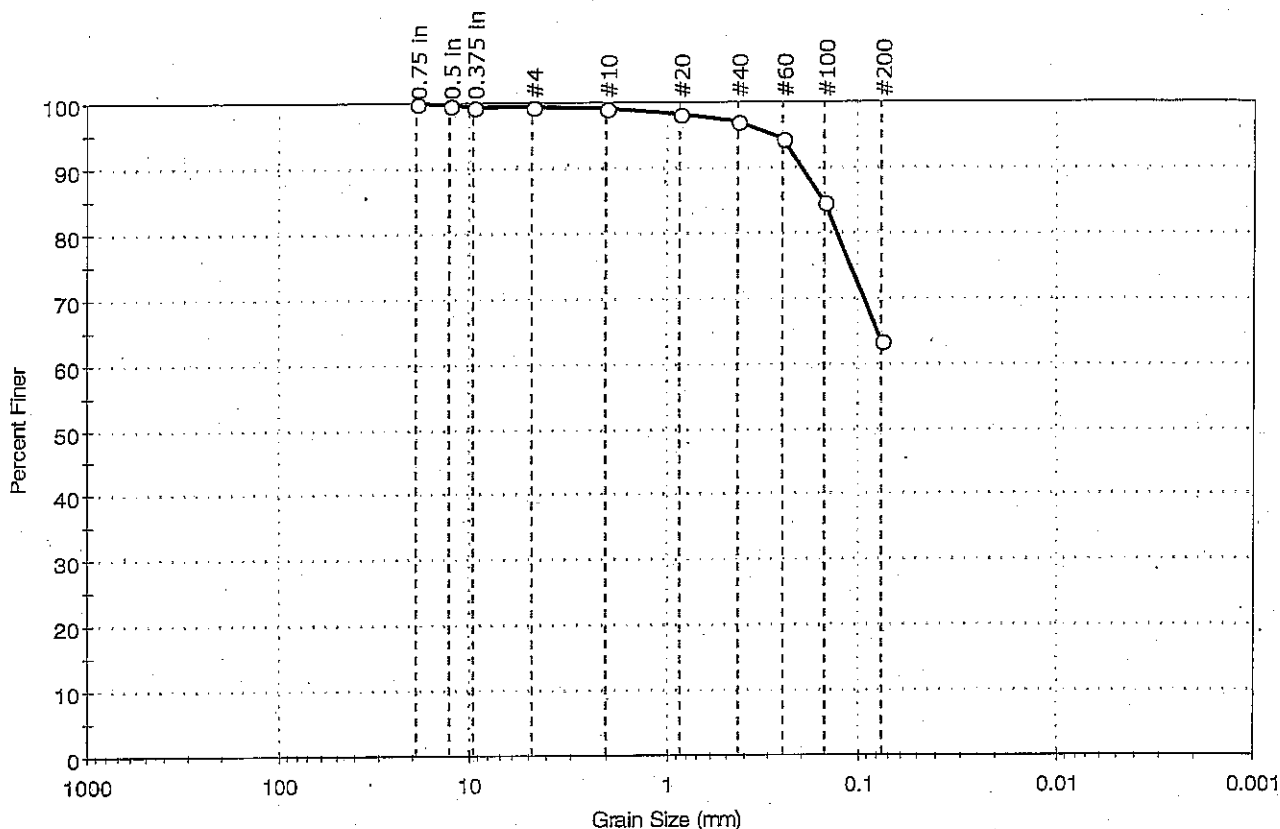
Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	11082205	---	Sandy silt	ML	0.7	36.0	63.3

Remarks: Grain Size analysis performed by ASTM D422, results enclosed  
Atterbeg Limits performed by ASTM 4318, results enclosed

*mm 10-7-11*

Client: Ecology & Environment, Inc.	Project No: GTX-11098
Project: 10-09-0008	
Location: Orofino, ID	
Boring ID: ---	Sample Type: bucket
Sample ID: 11082205	Test Date: 09/01/11
Depth: ---	Test Id: 216431
Test Comment: ---	Tested By: jbr
Sample Description: Moist, yellowish brown sandy silt	Checked By: jdt
Sample Comment: ---	

## Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel	%Sand	%Silt & Clay Size
—	0.7	36.0	63.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.70	100		
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	99		
#20	0.85	98		
#40	0.42	97		
#60	0.25	94		
#100	0.15	85		
#200	0.075	63		

### Coefficients

D <sub>85</sub> = 0.1522 mm	D <sub>30</sub> = N/A
D <sub>60</sub> = N/A	D <sub>15</sub> = N/A
D <sub>50</sub> = N/A	D <sub>10</sub> = N/A
C <sub>u</sub> = N/A	C <sub>c</sub> = N/A

### Classification

ASTM Sandy silt (ML)

AASHTO Silty Soils (A-4 (1))

### Sample/Test Description

Sand/Gravel Particle Shape : ---

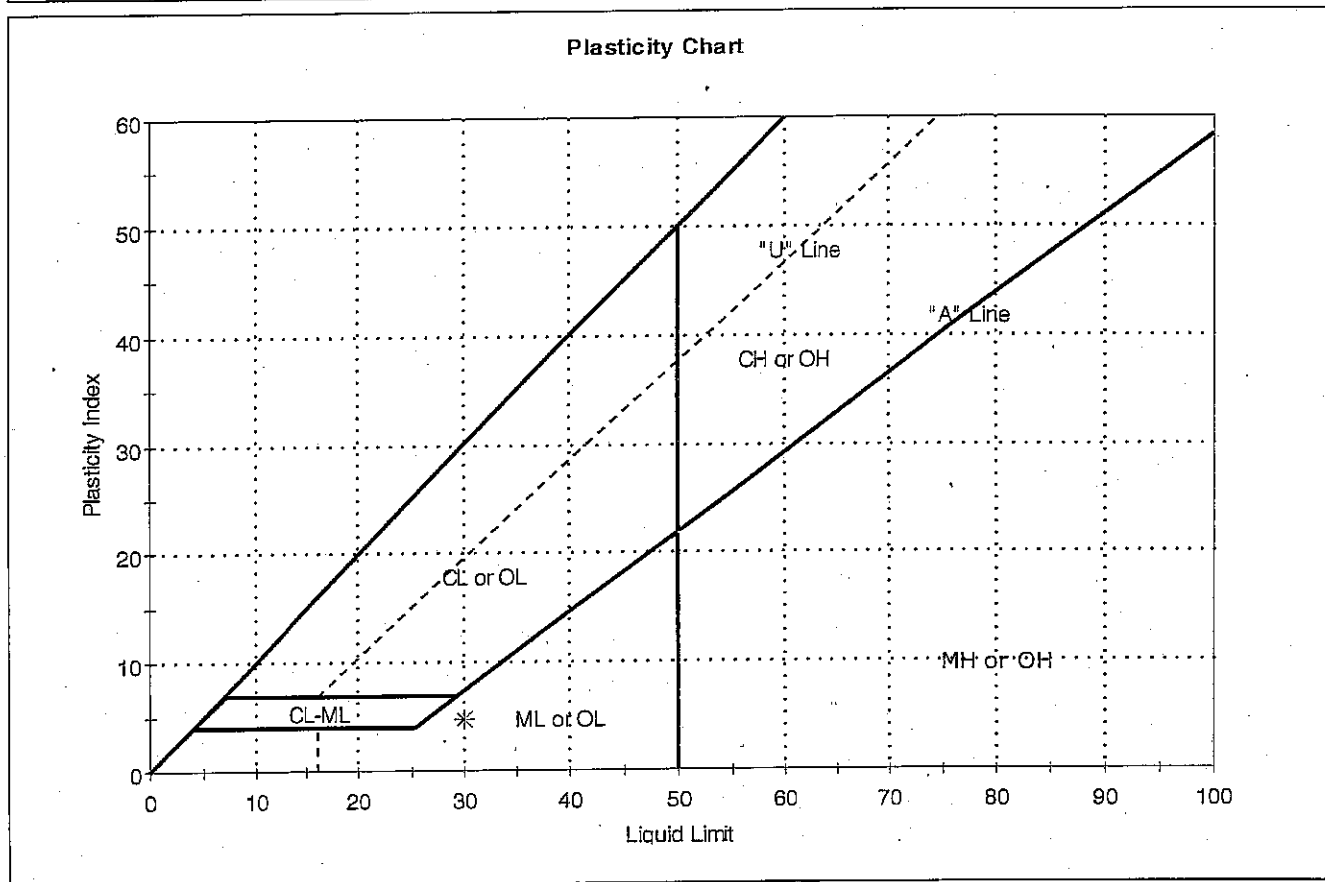
Sand/Gravel Hardness : ---

*mw 10/7/11*



Client: Ecology & Environment, Inc.	Project No: GTX-11098
Project: 10-09-0008	
Location: Orofino, ID	
Boring ID: ---	Sample Type: bucket
Sample ID: 11082205	Test Date: 09/02/11
Depth: ---	Test Id: 216441
Test Comment: ---	
Sample Description: Moist, yellowish brown sandy silt	
Sample Comment: ---	

## Atterberg Limits - ASTM D 4318-05



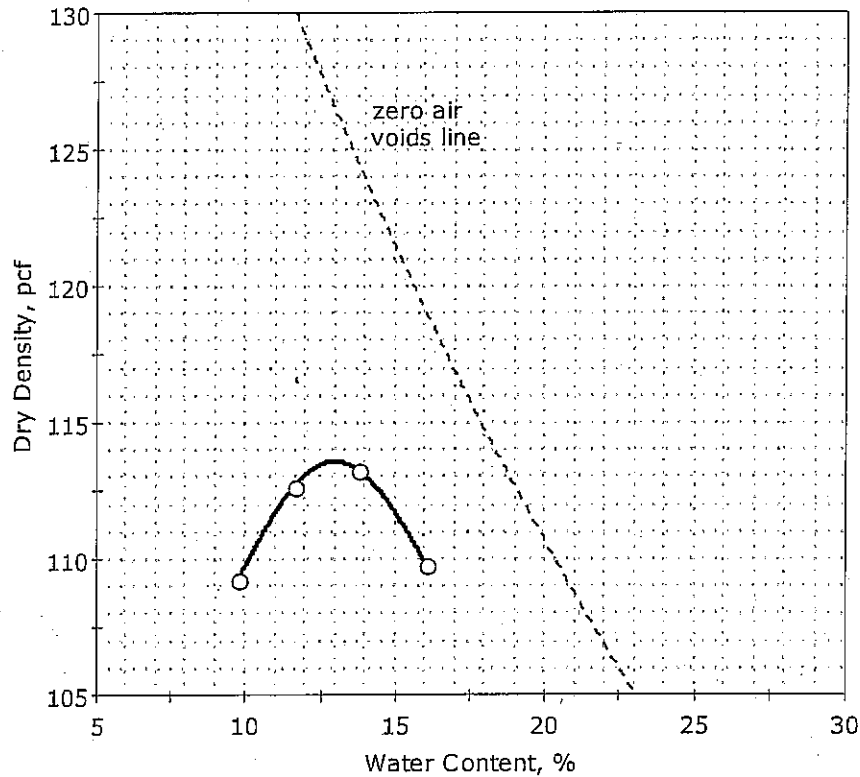
Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	11082205			8	30	25	5	-4	Sandy silt (ML)

Sample Prepared using the WET method  
 3% Retained on #40 Sieve  
 Dry Strength: NONE  
 Dilatancy: RAPID  
 Toughness: LOW

*MW 10-17-11*

Client:	Ecology & Environment, Inc.	Project No:	GTX-11098
Project:	10-09-0008	Sample Type:	bucket
Location:	Orofino, ID	Tested By:	cwd
Boring ID:	---	Test Date:	09/01/11
Sample ID:	11082205	Checked By:	jdt
Depth:	---	Test Id:	216426
Test Comment:	---		
Sample Description:	Moist, yellowish brown sandy silt		
Sample Comment:	---		

## Compaction Report - ASTM D 1557



Data Points	Point 1	Point 2	Point 3	Point 4
Dry density, pcf	109.2	112.7	113.3	109.8
Moisture Content, %	9.8	11.6	13.8	16.1

Method : A

Preparation : WET

As received Moisture :

Rammer : Manual

Zero voids line based on assumed specific gravity of 2.75

Maximum Dry Density= 113.5 pcf  
Optimum Moisture= 13.0 %



Client:	Ecology & Environment, Inc.		
Project:	10-09-0008		
Location:	Orofino, ID	Project No:	GTX-11098
Boring ID:	---	Sample Type:	bucket
Sample ID:	11082206	Test Date:	09/12/11
Depth :	---	Test Id:	216885
Test Comment:	---		
Sample Description:	Moist, dark grayish brown sandy silty clay		
Sample Comment:	---		

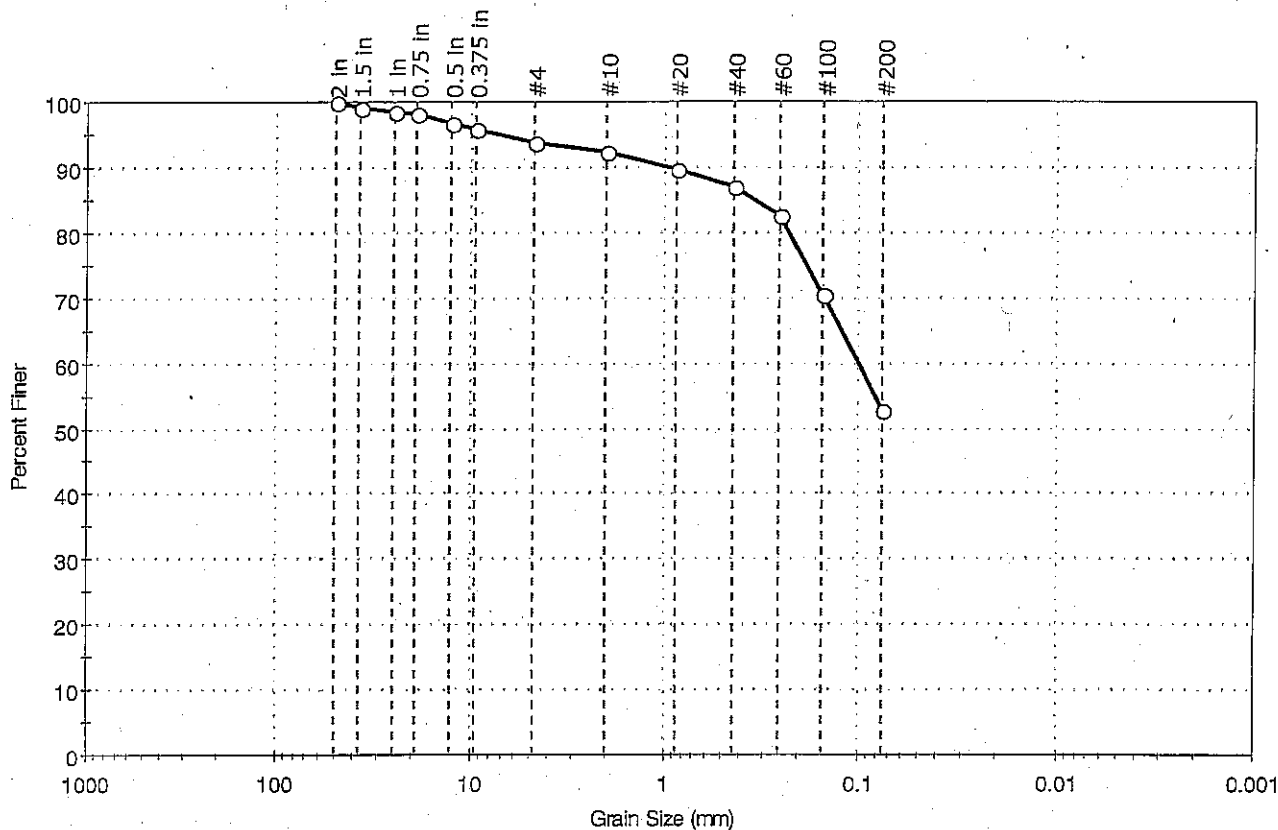
## USCS Classification - ASTM D 2487-06

Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	11082206	---	Sandy silty clay	CL-ML	6.1	41.2	52.7

Remarks: Grain Size analysis performed by ASTM D422, results enclosed  
Atterbeg Limits performed by ASTM 4318, results enclosed

Client: Ecology & Environment, Inc.  
Project: 10-09-0008  
Location: Orofino, ID  
Project No: GTX-11098  
Boring ID: --- Sample Type: bucket Tested By: jbr  
Sample ID: 11082206 Test Date: 09/01/11 Checked By: jdt  
Depth: --- Test Id: 216887  
Test Comment: ---  
Sample Description: Moist, dark grayish brown sandy silty clay  
Sample Comment: ---

## Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	6.1	41.2	52.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
2 in	50.00	100		
1.5 in	37.50	99		
1 in	25.00	98		
0.75 in	19.00	98		
0.5 in	12.70	97		
0.375 in	9.50	96		
#4	4.75	94		
#10	2.00	92		
#20	0.85	90		
#40	0.42	87		
#60	0.25	83		
#100	0.15	70		
#200	0.075	53		

### Coefficients

D<sub>85</sub> = 0.3295 mm      D<sub>30</sub> = N/A  
D<sub>60</sub> = 0.0998 mm      D<sub>15</sub> = N/A  
D<sub>50</sub> = N/A              D<sub>10</sub> = N/A  
C<sub>u</sub> = N/A                C<sub>c</sub> = N/A

### Classification

**ASTM**      Sandy silty clay (CL-ML)

**AASHTO**      Silty Soils (A-4 (0))

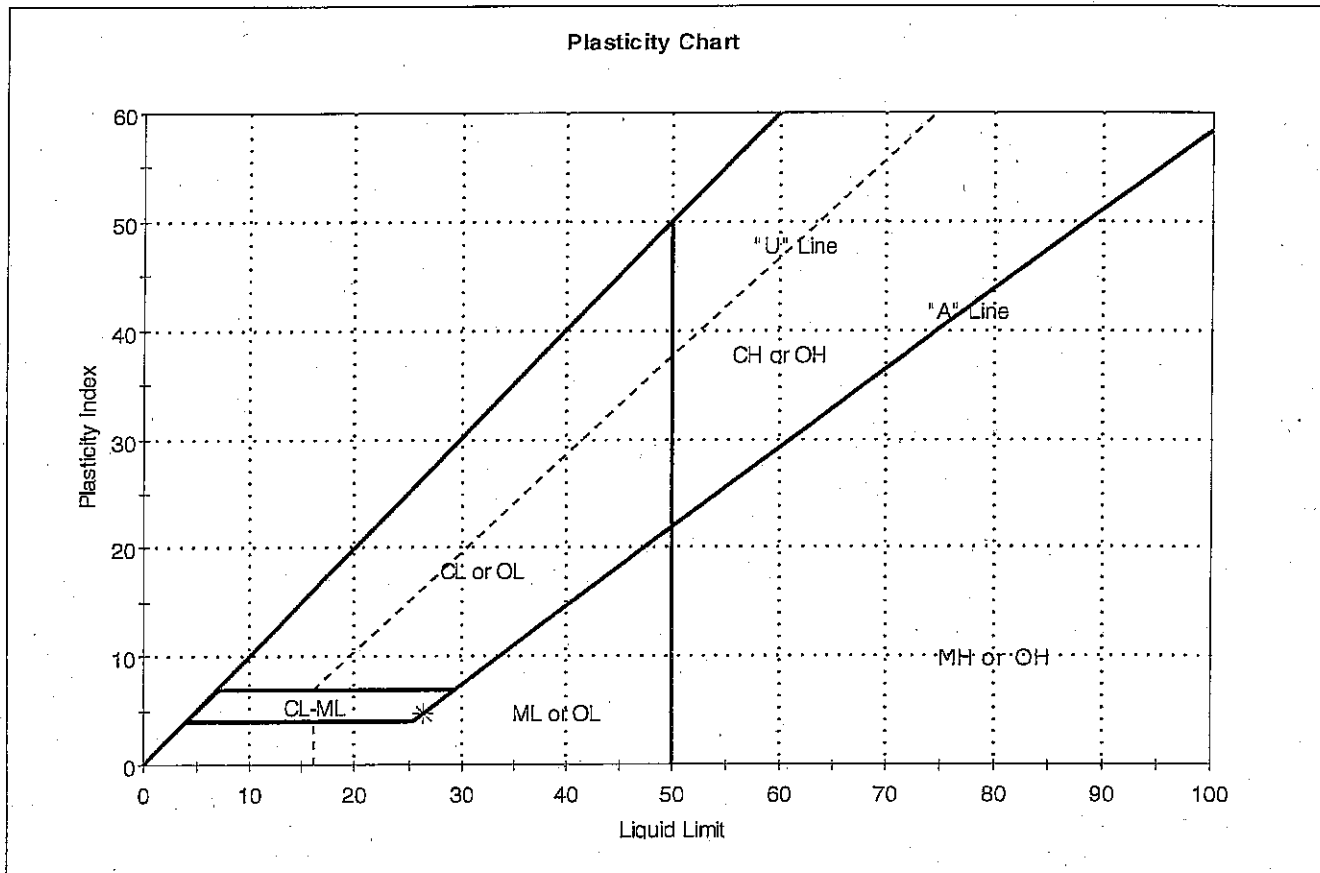
### Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED  
Sand/Gravel Hardness : HARD

*MW 10-7-11*

Client:	Ecology & Environment, Inc.	Project No:	GTX-11098
Project:	10-09-0008	Tested By:	GA
Location:	Orofino, ID	Checked By:	jdt
Boring ID:	---	Sample Type:	bucket
Sample ID:	11082206	Test Date:	09/12/11
Depth:	---	Test Id:	216883
Test Comment:	---		
Sample Description:	Moist, dark grayish brown sandy silty clay		
Sample Comment:	---		

## Atterberg Limits - ASTM D 4318-05



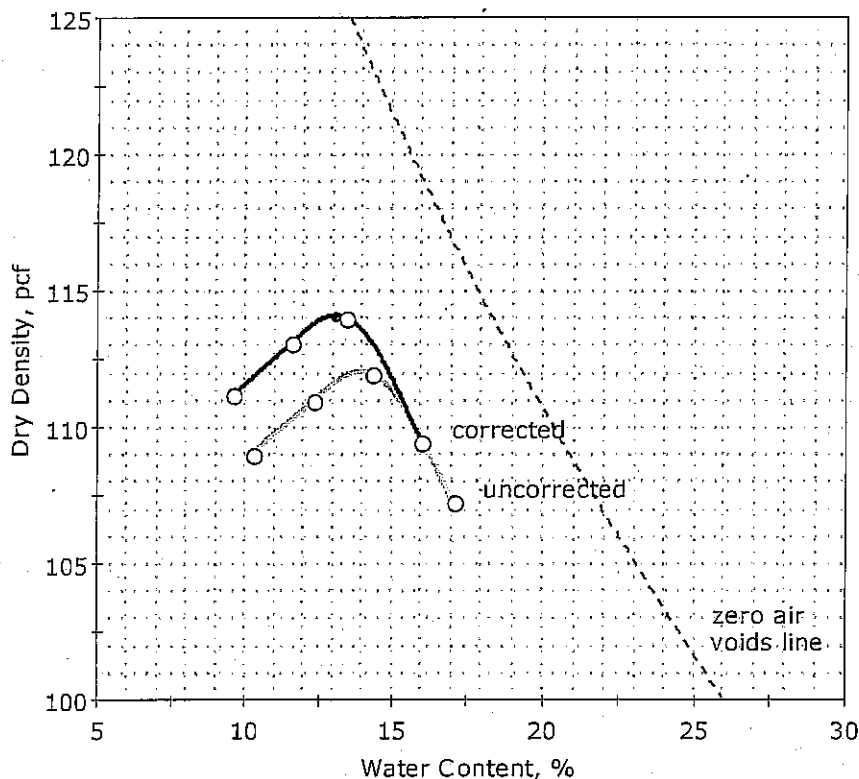
Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	11082206	---	---	6	26	22	4	-4	Sandy silty clay (CL-ML)

Sample Prepared using the WET method  
 13% Retained on #40 Sieve  
 Dry Strength: LOW  
 Dilatancy: RAPID  
 Toughness: LOW



Client:	Ecology & Environment, Inc.	Project No:	GTX-11098
Project:	10-09-0008	Sample Type:	bucket
Location:	Orofino, ID	Tested By:	cwd
Boring ID:	---	Test Date:	09/07/11
Sample ID:	11082206	Checked By:	jdt
Depth:	---	Test Id:	216889
Test Comment:	---		
Sample Description:	Moist, dark grayish brown sandy silty clay		
Sample Comment:	---		

## Compaction Report - ASTM D 1557



Data Points	Point 1	Point 2	Point 3	Point 4
Dry density, pcf	109.1	111.0	112.0	107.3
Moisture Content, %	10.2	12.4	14.3	17.1

Method : A

Preparation : DRY

As received Moisture :

Rammer : Manual

Zero voids line based on assumed specific gravity of 2.75

Maximum Dry Density = 112.0 pcf

Optimum Moisture = 14.0 %

Oversize Correction (6.1% > #4 Sieve)

Corrected Maximum Dry Density = 114.0 pcf

Corrected Optimum Moisture = 13.0 %

Assumed Average Bulk Specific Gravity = 2.55



Client:	Ecology & Environment, Inc.		
Project Name:	10-09-0008		
Project Location:	Orofino, ID		
GTX #:	11098		
Start Date:	9/9/2011	Tested By:	ema
End Date:	9/12/2011	Checked By:	jdt
Boring #:	---		
Sample #:	11082206		
Depth:	---		
Visual Description:	Moist, dark grayish brown sandy silty clay		

## Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D 5084 Constant Volume

Sample Type:	Remolded	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	4/1
Sample Preparation:	Target Compaction: 95% of the Maximum Dry Density (114.0 pcf) at the Optimum Moisture Content (13.0%). Trimmings moisture content = 13.4%		

Parameter	Initial	Final
Height, in	2.00	2.01
Diameter, in	2.85	2.86
Area, in <sup>2</sup>	6.38	6.42
Volume, in <sup>3</sup>	12.8	12.9
Mass, g	410	436
Bulk Density, pcf	122	128
Moisture Content, %	13.2	20.4
Dry Density, pcf	108	107
Degree of Saturation, %	---	95

### B COEFFICIENT DETERMINATION

Cell Pressure, psi:	95.1	Pressure Increment, psi:	4.98
Sample Pressure, psi:	89.9	B Coefficient:	0.95

### FLOW DATA

Date	Trial #	Pressure, psi		Manometer Readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R <sub>t</sub>	Permeability K @ 20 °C, cm/sec
		Cell	Sample	Z <sub>1</sub>	Z <sub>2</sub>	Z <sub>1</sub> -Z <sub>2</sub>						
9/12	1	90	85	8.0	7.5	0.5	22	19.7	9.0E-07	20	1.000	9.0E-07
9/12	2	90	85	8.0	7.5	0.5	22	19.7	9.0E-07	20	1.000	9.0E-07
9/12	3	90	85	8.0	7.5	0.5	23	19.7	8.6E-07	20	1.000	8.6E-07
9/12	4	90	85	8.0	7.5	0.5	23	19.7	8.6E-07	20	1.000	8.6E-07

**PERMEABILITY AT 20° C:  $8.8 \times 10^{-7}$  cm/sec (@ 5 psi effective stress)**

*MW 10-17-11*



Client:	Ecology & Environment, Inc.		
Project:	10-09-0008		
Location:	Orofino, ID	Project No:	GTX-11098
Boring ID:	---	Sample Type:	bucket
Sample ID:	11082207	Test Date:	09/12/11
Depth :	---	Test Id:	216886
Test Comment:	---		
Sample Description:	Moist, reddish brown gravelly clay with sand		
Sample Comment:	---		

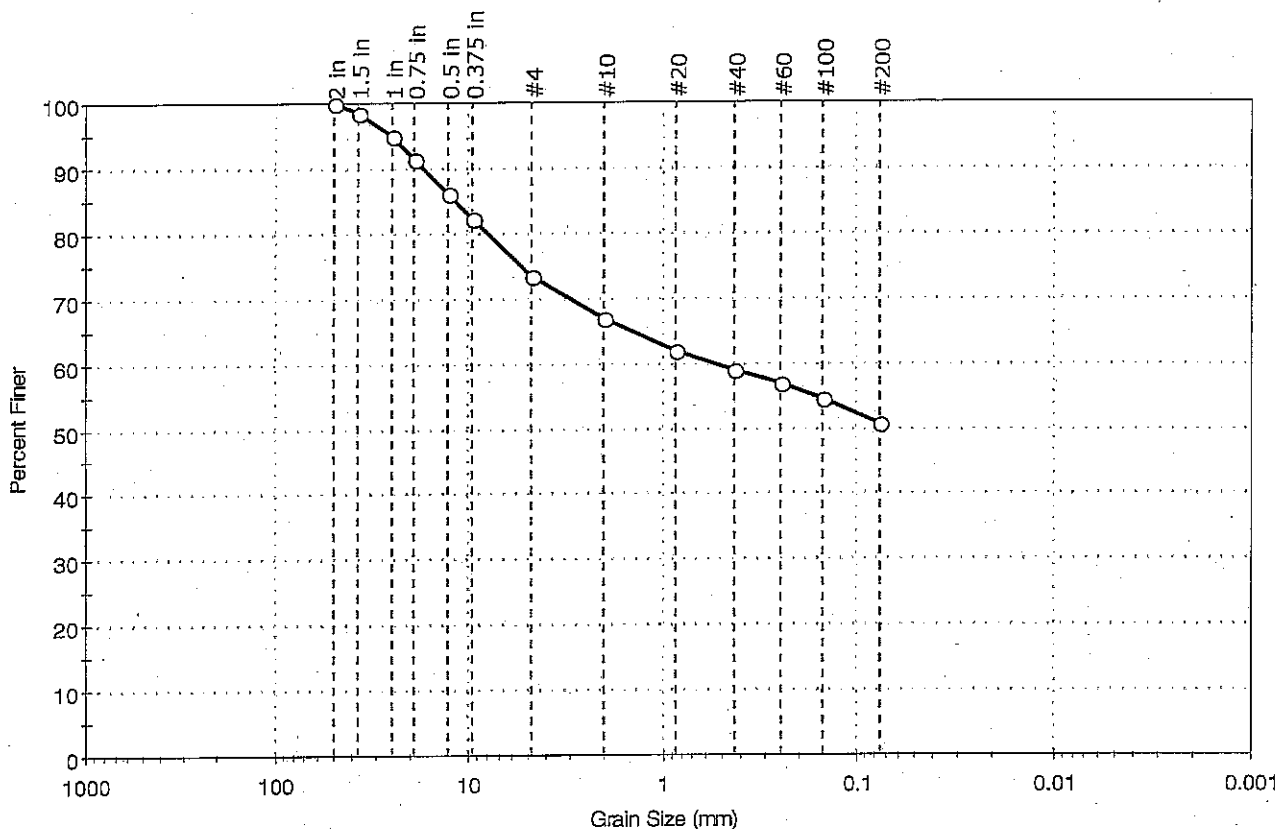
## USCS Classification - ASTM D 2487-06

Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	11082207	---	Gravelly lean clay with sand	CL	26.6	22.7	50.7

Remarks: Grain Size analysis performed by ASTM D422, results enclosed  
Atterbeg Limits performed by ASTM 4318, results enclosed

Client: Ecology & Environment, Inc.	Project No: GTX-11098
Project: 10-09-0008	
Location: Orofino, ID	
Boring ID: ---	Sample Type: bucket
Sample ID: 11082207	Test Date: 09/06/11
Depth: ---	Test Id: 216888
Test Comment: ---	Tested By: jbr
Sample Description: Moist, reddish brown gravelly clay with sand	Checked By: jdt
Sample Comment: ---	

## Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	26.6	22.7	50.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
2 in	50.00	100		
1.5 in	37.50	98		
1 in	25.00	95		
0.75 in	19.00	92		
0.5 in	12.50	86		
0.375 in	9.50	82		
#4	4.75	73		
#10	2.00	67		
#20	0.85	62		
#40	0.425	59		
#60	0.25	57		
#100	0.15	55		
#200	0.075	51		

### Coefficients

D <sub>85</sub> = 11.6972 mm	D <sub>30</sub> = N/A
D <sub>60</sub> = 0.5433 mm	D <sub>15</sub> = N/A
D <sub>50</sub> = N/A	D <sub>10</sub> = N/A
C <sub>u</sub> = N/A	C <sub>c</sub> = N/A

### Classification

<u>ASTM</u>	Gravelly lean clay with sand (CL)
<u>AASHTO</u>	Clayey Silts (A-7-6 (9))

### Sample/Test Description

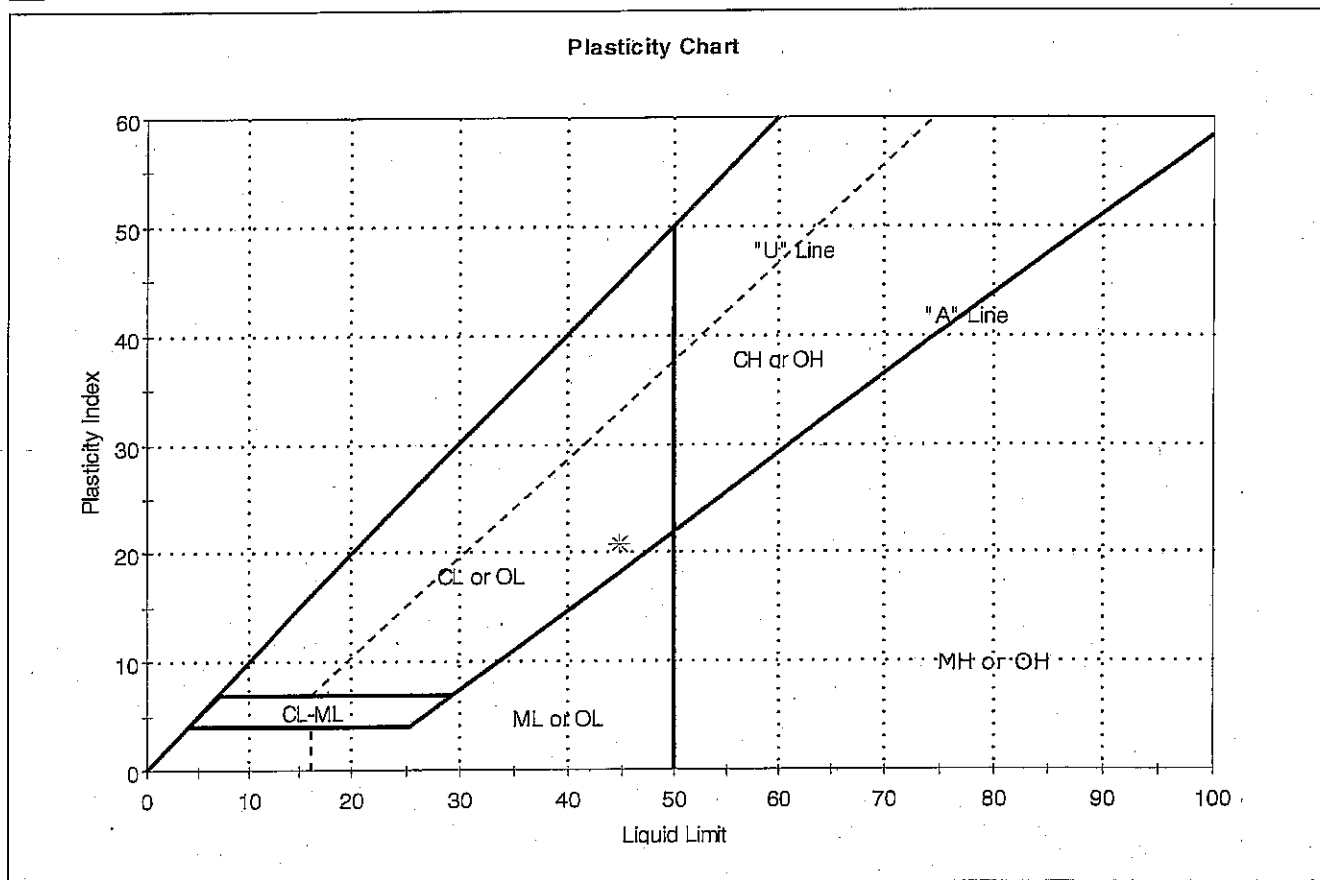
Sand/Gravel Particle Shape : ROUNDED  
Sand/Gravel Hardness : HARD

*MW 10/7/11*



Client: Ecology & Environment, Inc.	Project No: GTX-11098	
Project: 10-09-0008		
Location: Orofino, ID		
Boring ID: ---	Sample Type: bucket	Tested By: GA
Sample ID: 11082207	Test Date: 09/12/11	Checked By: jdt
Depth: ---	Test Id: 216884	
Test Comment: ---		
Sample Description: Moist, reddish brown gravelly clay with sand		
Sample Comment: ---		

## Atterberg Limits - ASTM D 4318-05



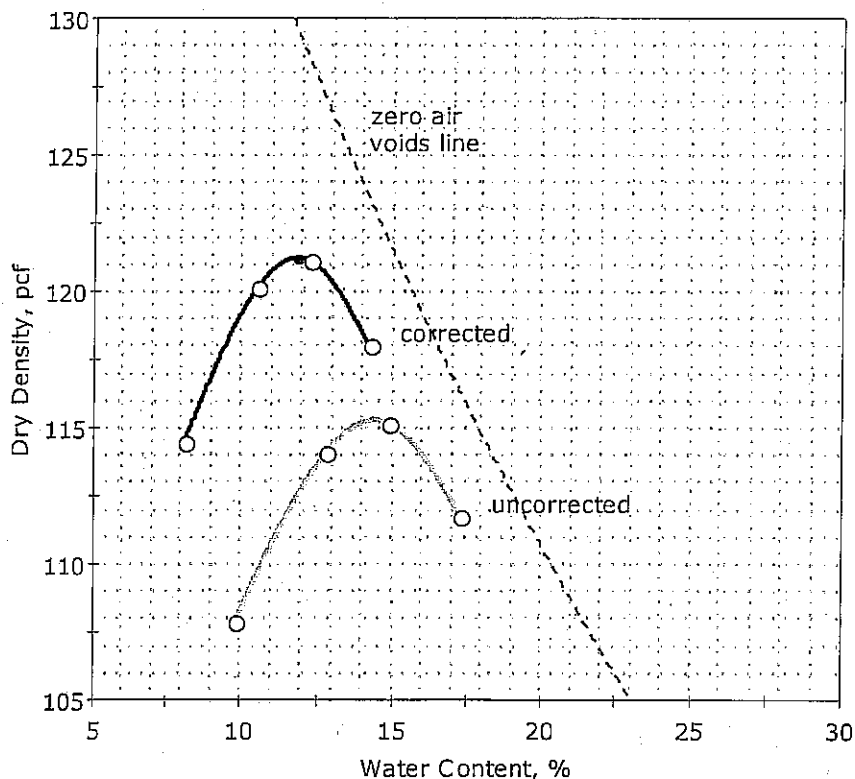
Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	11082207	---	---	9	45	24	21	-1	Gravelly lean clay with sand (CL)

Sample Prepared using the WET method  
 41% Retained on #40 Sieve  
 Dry Strength: MEDIUM  
 Dilatancy: NONE  
 Toughness: MEDIUM

*mm 10/17/11*

Client:	Ecology & Environment, Inc.	Project No:	GTX-11098
Project:	10-09-0008		
Location:	Orofino, ID		
Boring ID:	---	Sample Type:	bucket
Sample ID:	11082207	Test Date:	09/07/11
Depth:	---	Test Id:	216890
Test Comment:	---	Tested By:	cwd
Sample Description:	Moist, reddish brown gravelly clay with sand	Checked By:	jdt
Sample Comment:	---		

## Compaction Report - ASTM D 1557



Data Points	Point 1	Point 2	Point 3	Point 4
Dry density, pcf	107.9	114.1	115.2	111.8
Moisture Content, %	9.8	12.8	14.9	17.3

Method : B

Preparation : WET

As received Moisture :

Rammer : Manual

Zero voids line based on assumed specific gravity of 2.75

Maximum Dry Density= 115.5 pcf  
Optimum Moisture= 14.5 %

Oversize Correction (17.8% > 3/8 inch Sieve)

Corrected Maximum Dry Density= 121.0 pcf  
Corrected Optimum Moisture= 12.0 %

Assumed Average Bulk Specific Gravity = 2.55



Client:	Ecology & Environment, Inc.		
Project:	10-09-0008		
Location:	Orofino, ID	Project No:	GTX-11098
Boring ID:	---	Sample Type:	bucket
Sample ID:	11082208	Test Date:	09/12/11
Depth :	---	Test Id:	216893
Test Comment:	---		
Sample Description:	Moist, dark brown sandy silty clay		
Sample Comment:	---		

## USCS Classification - ASTM D 2487-06

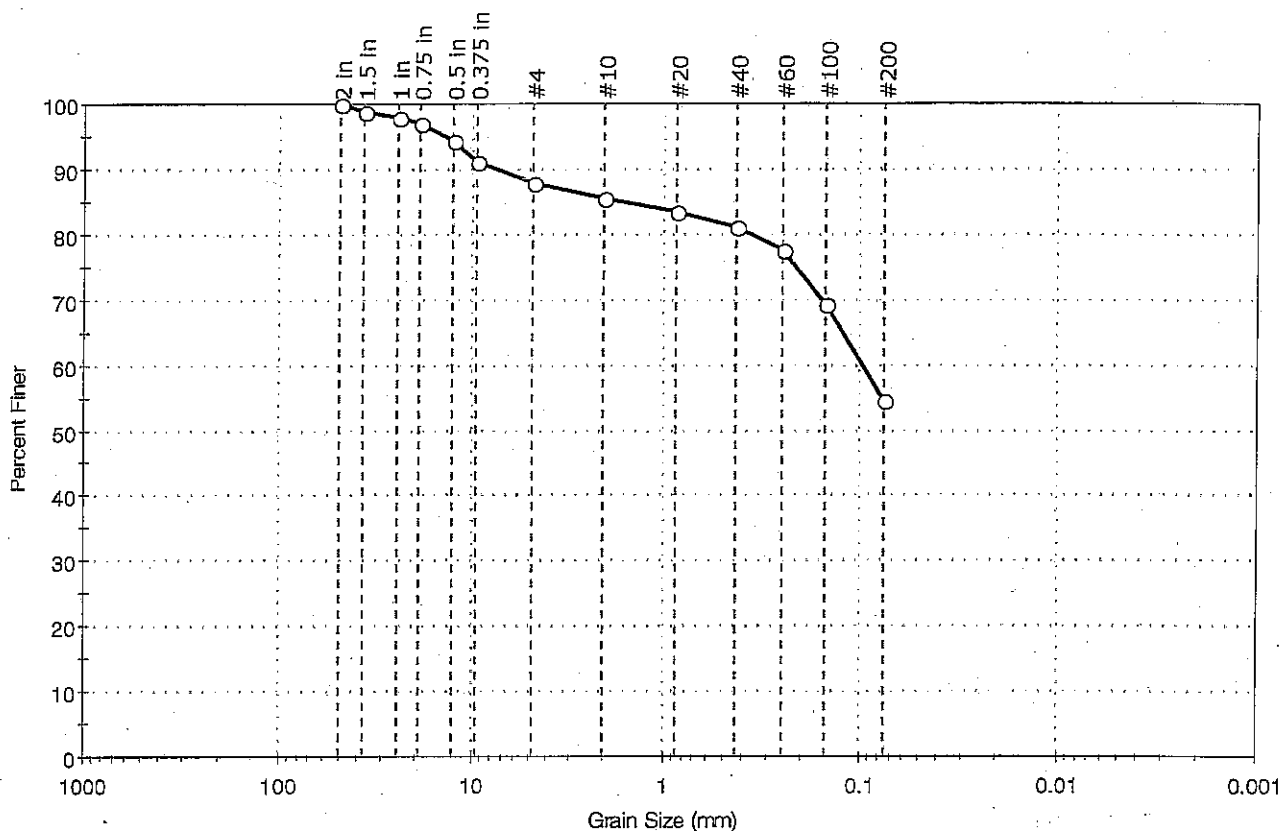
Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	11082208	---	Sandy silty clay	CL-ML	12.2	33.3	54.5

Remarks: Grain Size analysis performed by ASTM D422, results enclosed  
Atterbeg Limits performed by ASTM 4318, results enclosed



Client: Ecology & Environment, Inc.	Project No: GTX-11098
Project: 10-09-0008	
Location: Orofino, ID	
Boring ID: ---	Sample Type: bucket
Sample ID: 11082208	Test Date: 09/01/11
Depth: ---	Test Id: 216894
Test Comment: ---	Tested By: jbr
Sample Description: Moist, dark brown sandy silty clay	Checked By: jdt
Sample Comment: ---	

## Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	12.2	33.3	54.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
2 in	50.00	100		
1.5 in	37.50	99		
1 in	25.00	98		
0.75 in	19.00	97		
0.5 in	12.70	94		
0.375 in	9.50	91		
#4	4.75	88		
#10	2.00	86		
#20	0.85	83		
#40	0.42	81		
#60	0.25	78		
#100	0.15	69		
#200	0.075	54		

### Coefficients

D <sub>85</sub> = 1.5795 mm	D <sub>30</sub> = N/A
D <sub>60</sub> = 0.0973 mm	D <sub>15</sub> = N/A
D <sub>50</sub> = N/A	D <sub>10</sub> = N/A
C <sub>u</sub> = N/A	C <sub>c</sub> = N/A

### Classification

**ASTM** Sandy silty clay (CL-ML)

**AASHTO** Silty Soils (A-4 (0))

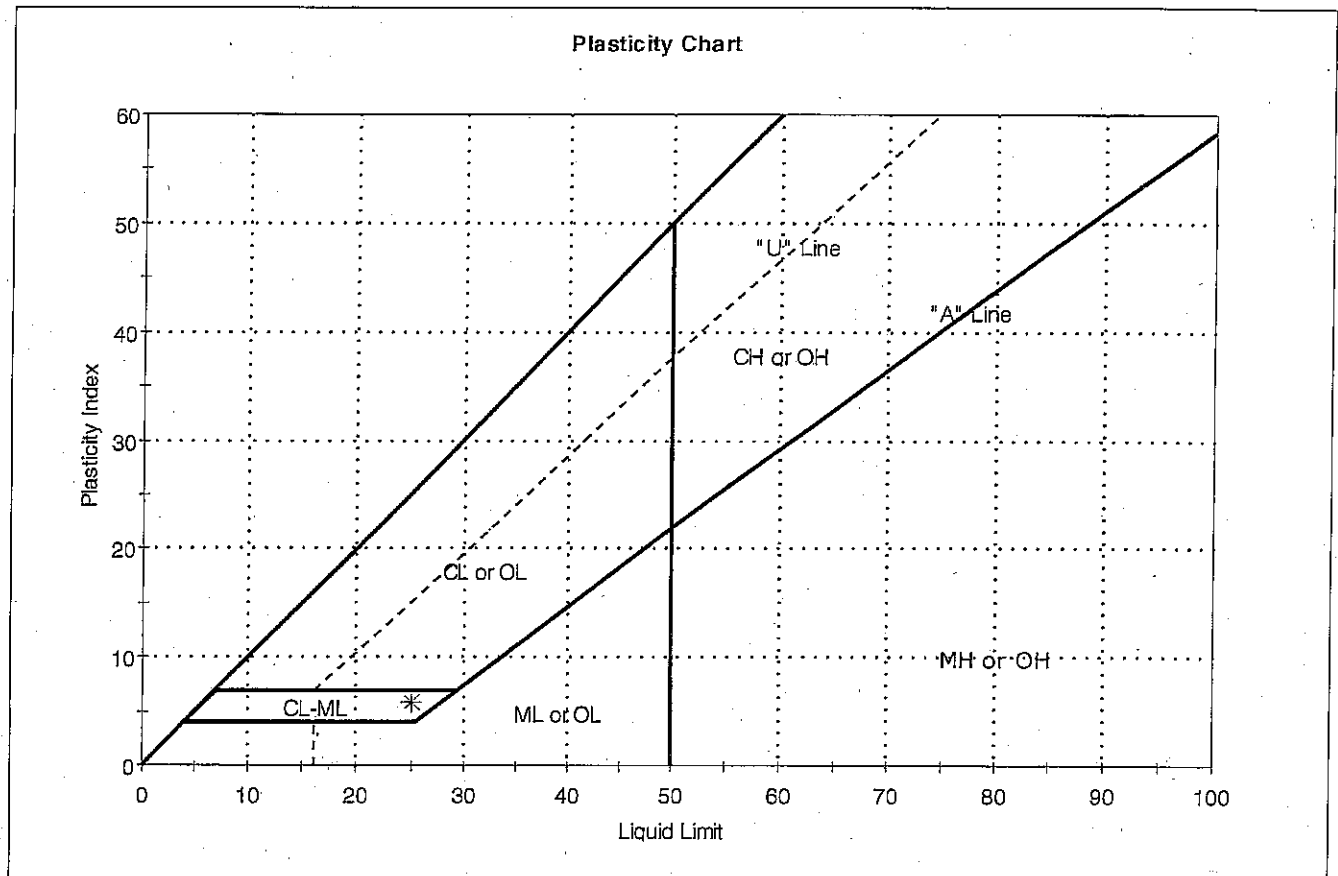
### Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED  
Sand/Gravel Hardness : HARD

*MW 10-17-11*

Client:	Ecology & Environment, Inc.		
Project:	10-09-0008		
Location:	Orofino, ID	Project No:	GTX-11098
Boring ID:	---	Sample Type:	bucket
Sample ID:	11082208	Test Date:	09/12/11
Depth:	---	Test Id:	216892
Test Comment:	---		
Sample Description:	Moist, dark brown sandy silty clay		
Sample Comment:	---		

## Atterberg Limits - ASTM D 4318-05

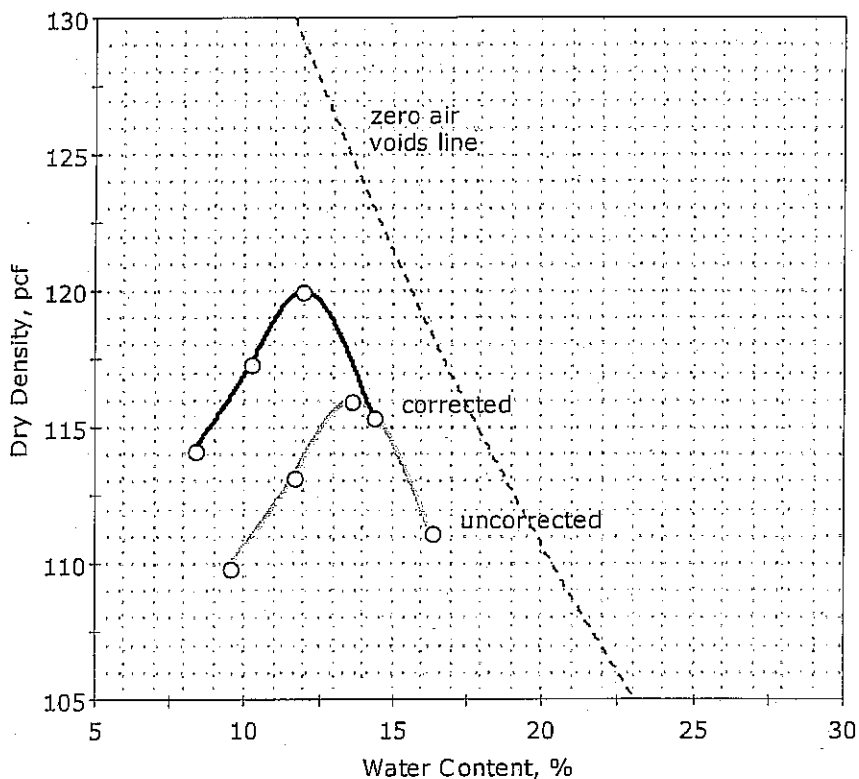


Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	11082208	---	---	6	25	19	6	-2	Sandy silty clay (CL-ML)

Sample Prepared using the WET method  
 19% Retained on #40 Sieve  
 Dry Strength: LOW  
 Dilatancy: SLOW  
 Toughness: LOW

Client:	Ecology & Environment, Inc.	Project No:	GTX-11098
Project:	10-09-0008		
Location:	Orofino, ID		
Boring ID: ---	Sample Type: bucket	Tested By:	cwd
Sample ID:11082208	Test Date: 09/07/11	Checked By:	jdt
Depth : ---	Test Id: 216895		
Test Comment:	---		
Sample Description:	Moist, dark brown sandy silty clay		
Sample Comment:	---		

## Compaction Report - ASTM D 1557



Data Points	Point 1	Point 2	Point 3	Point 4
Dry density, pcf	109.9	113.2	116.0	111.1
Moisture Content, %	9.5	11.6	13.6	16.3

Method : A

Preparation : DRY

As received Moisture :

Rammer : Manual

Zero voids line based on assumed specific gravity of 2.75

Maximum Dry Density= 116.0 pcf  
Optimum Moisture= 13.5 %

Oversize Correction (12.2% > #4 Sieve)

Corrected Maximum Dry Density= 120.0 pcf  
Corrected Optimum Moisture= 12.0 %

Assumed Average Bulk Specific Gravity = 2.55

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