



ecology and environment, inc.

International Specialists in the Environment

333 SW Fifth Avenue
Portland, Oregon 97204
Tel: (503) 248-5600, Fax: (503) 248-5577

April 2, 2008

Jeffry Rodin, On-Scene Coordinator
United States Environmental Protection Agency
1200 Sixth Avenue, Mail Stop ECL-116
Seattle, Washington 98101

Re: Contract Number: EP-S7-06-02; Technical Direction Document Number: 07-08-0011
Swift Creek Asbestos Site Time-Critical Removal Action Report

Dear Mr. Rodin:

Enclosed please find three copies of the Swift Creek Asbestos Site Time-Critical Removal Action Report which occurred in Everson, Washington, in November 2007. Please contact Jim Petersen at (503) 248-5600 or me at (206) 920-1739 if you have any questions or comments regarding this submittal.

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

Steven G. Hall
START-3 Project Leader

enclosure

cc: James Petersen, Project Manager, E & E, Portland, Oregon



**Swift Creek Asbestos
Site Time-Critical
Removal Action Report
Everson, Washington**

TDD Number: 07-08-0011

April 2008

Prepared for:
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
1200 Sixth Avenue
Seattle, Washington 98101

Prepared by:
James Petersen
ECOLOGY AND ENVIRONMENT, INC.
720 Third Avenue, Suite 1700
Seattle, Washington 98104

Table of Contents

Section	Page
1	Introduction 1-1
2	Site Background..... 2-1
2.1	Site Location 2-1
2.2	Site Description..... 2-1
2.3	Site Characterization 2-1
2.4	Integrated Assessment Findings..... 2-2
2.5	Time-Critical Removal Action..... 2-3
3	EPA Actions..... 3-1
3.1	Preliminary Site Survey 3-1
3.2	Dredged Material Regrading..... 3-2
3.3	Erosion Control Measures..... 3-3
3.4	Dust Suppressant Application..... 3-3
4	Sampling and Analytical Protocol 4-1
4.1	Sampling Methodology 4-1
4.2	Analytical Protocol..... 4-2
4.3	Global Positioning System 4-3
4.4	Investigation-Derived Waste..... 4-3
5	Quality Assurance/ Quality Control 5-1
5.1	Satisfaction of Data Quality Objectives 5-1
5.2	Quality Assurance/Quality Control Samples 5-2
5.3	Project-Specific Data Quality Objectives 5-2
5.3.1	Completeness 5-2
5.3.2	Representativeness 5-2
5.3.3	Comparability..... 5-2
5.4	Laboratory Quality Assurance/Quality Control Parameters 5-2
5.4.1	Field and Matrix Blanks..... 5-2
5.4.2	Other Asbestos Quality Assurance/Quality Control Parameters 5-3

Table of Contents (cont.)

Section		Page
6	Sample Results	6-1
	6.1 Air Filter Samples	6-1
7	Summary and Conclusions	7-1
	7.1 Summary	7-1
	7.2 Conclusions	7-1
8	References	8-1
A	Photographic Documentation	
B	Data Validation Memoranda	
C	Global Positioning System Data	



List of Tables



Table		Page
4-1	Sample Collection and Analytical Summary	4-4
6-1	Air Filter Sample Analytical Results	6-3

Note: This page intentionally left blank.



List of Figures



		Page
1-1	Site Location Map.....	1-2
1-2	Site Map.....	1-3
2-1	Surrounding Properties Map.....	2-4
4-1	Sample Location Map.....	4-5

Note: This page intentionally left blank.

List of Abbreviations and Acronyms

<u>Acronym</u>	<u>Definition</u>
%	percent
µg/m ³	micrograms per cubic meter
µm	micrometers
Corps	United States Army Corps of Engineers
DQOs	Data Quality Objectives
E & E	Ecology & Environment, Inc.
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
ERRS	Emergency and Rapid Response Services
fibers/cc	fibers per cubic centimeter of air
GPS	Global Positioning System
IA	Integrated Assessment
IDW	Investigation Derived Waste
ISO	International Organization for Standardization
MET	meteorological
mm	millimeter
MS	Matrix Spike
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
QA	Quality Assurance
QC	Quality Control
SAM	Site Assessment Manager
SOPs	Standard Operating Procedures
SSSP	Site-Specific Sampling Plan
START	Superfund Technical Assessment and Response Team
structures/cc	structures per cubic centimeter of air
TAL	Target Analyte List
TCRA	Time-Critical Removal Action
TDD	Technical Direction Document
TEM	Transmission Electron Microscopy

1

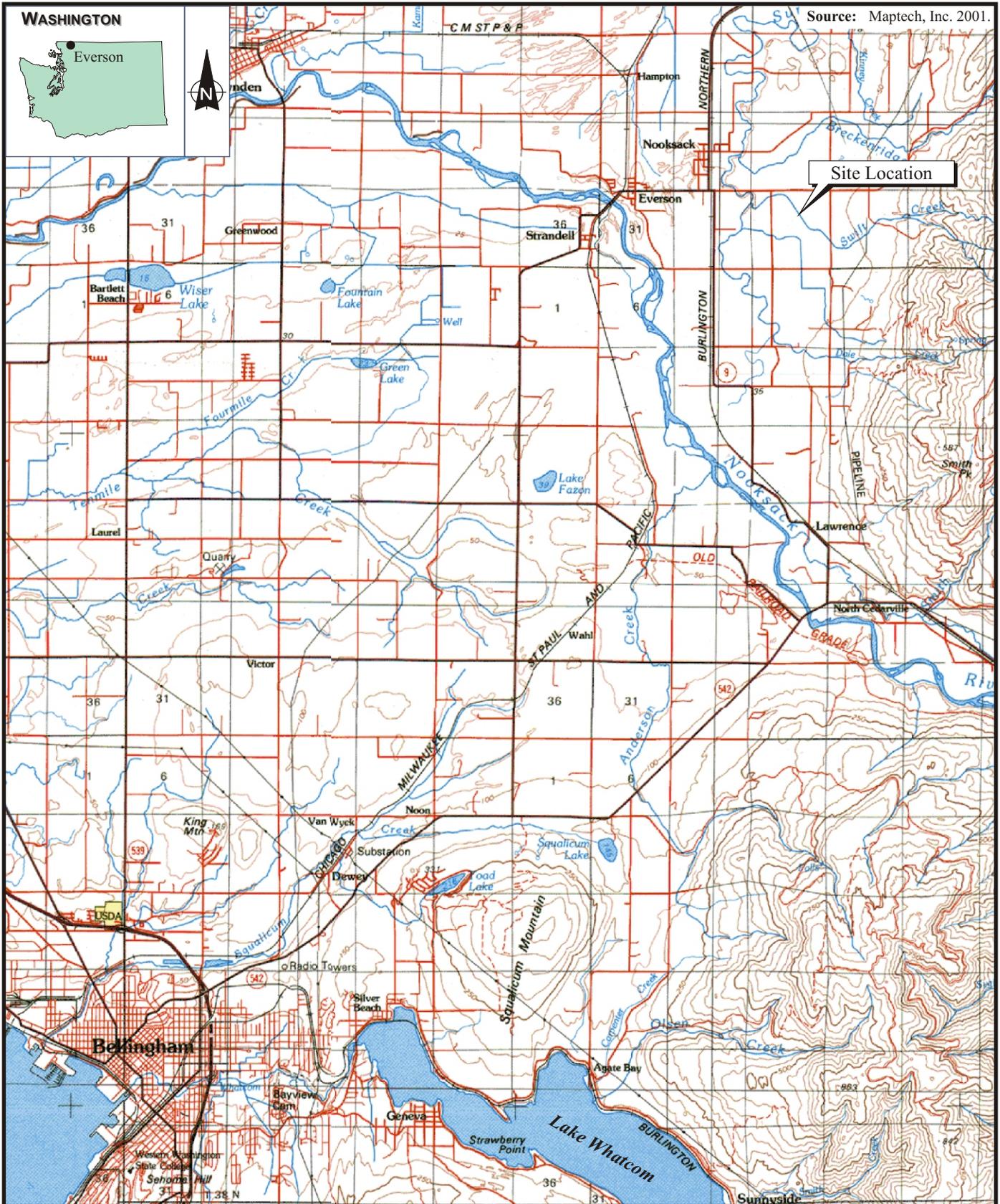
Introduction

The United States Environmental Protection Agency (EPA), Region 10, Emergency Response Unit has tasked Ecology & Environment, Inc. (E & E), under Superfund Technical Assessment and Response Team (START)-3 contract number EP-S7-06-02, to assist with a Time-Critical Removal Action (TCRA) at the Swift Creek Asbestos Site near Everson, Washington (Figure 1-1), under Technical Direction Document (TDD) 07-08-0011. The EPA mobilized emergency response resources based upon the findings of the Integrated Assessment (IA) conducted at the site in May 2006, activity-based sampling conducted by EPA in August 2006, and the requests of the Whatcom County government. EPA tasked START to monitor, provide technical advice, and document all site stabilization efforts at the site. The START role was to assist EPA TRCA, and evaluate and minimize potential off-site hazards from the stabilization of asbestos-containing dredge material piles along an approximate one-mile length of Swift Creek between Oat Coles and Goodwin Roads (Figure 1-2).

Based on this information, the START was tasked by the EPA to:

- Revise the IA Site-Specific Sampling Plan (SSSP) as required to characterize any airborne asbestos hazards at the site during site activities;
- Collect air filter samples to evaluate asbestos concentrations in air during site stabilization activities;
- Arrange for commercial laboratory analysis of the samples collected at the site; and
- Write a report detailing the site stabilization efforts and the results.

This document includes site background information (Section 2), EPA actions at the site (Section 3), field sampling activities and analytical protocols (Section 4), quality assurance/quality control (QA/QC) criteria (Section 5), sample results (Section 6), summary and conclusions (Section 7), and references (Section 8).



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

SWIFT CREEK ASBESTOS
 Everson, Washington

0 1.75
 Approximate Scale in Miles

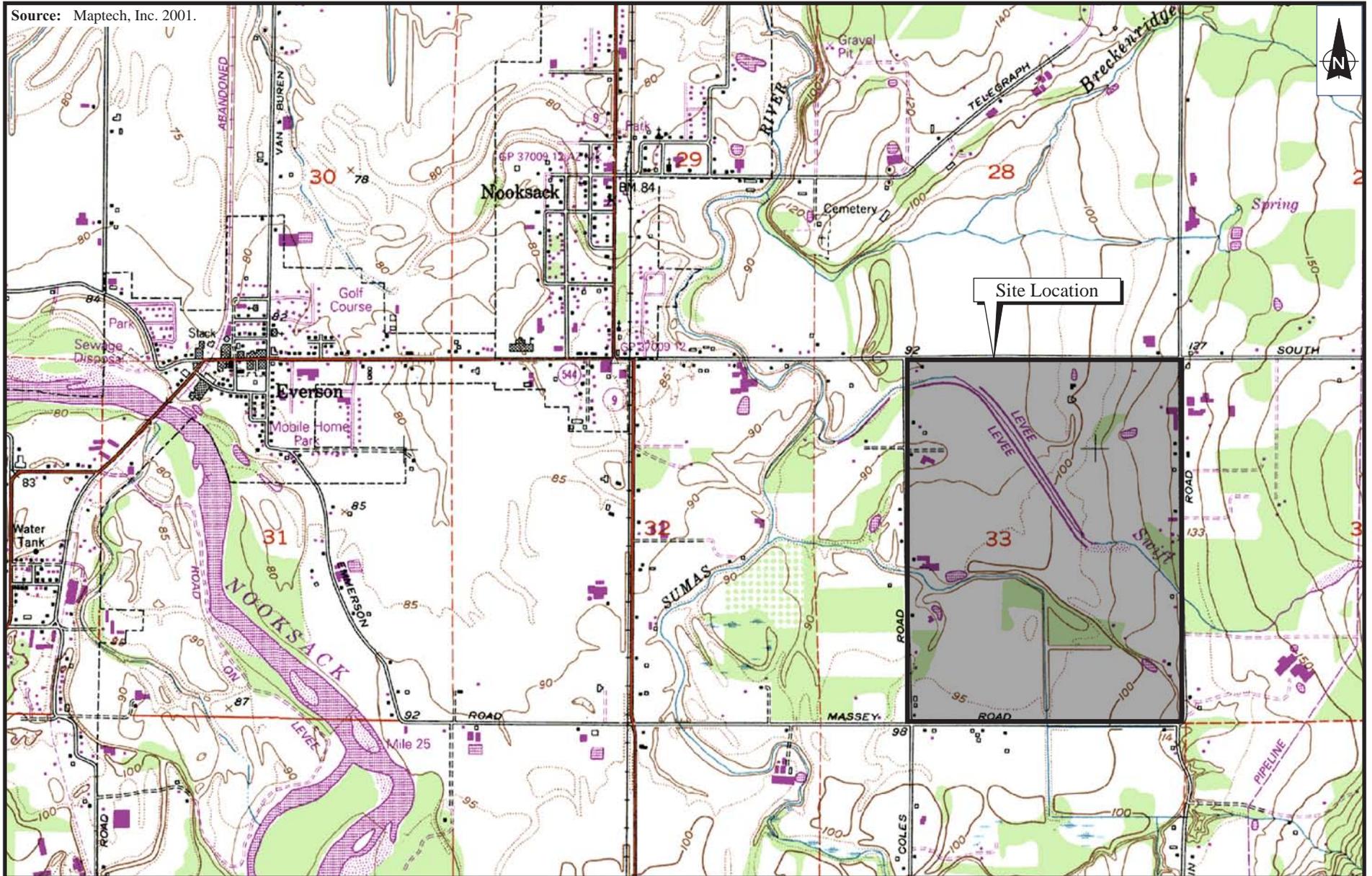
Figure 1-1
 SITE LOCATION MAP

Date:
 4-13-06

Drawn by:
 AES

10:START-3\06030020\fig 1-1

Source: Maptech, Inc. 2001.



C-1



SWIFT CREEK ASBESTOS
Everson, Washington



Figure 1-2
SITE MAP

Date:
4/13/06

Drawn by:
AES

10:START-3\06030020\fig 1-2

2

Site Background

This section describes the site location (subsection 2.1), site description (subsection 2.2), site characterization (subsection 2.3), summary of the Integrated Assessment findings (subsection 2.4), and the initiation of the TCRA (subsection 2.5).

2.1 Site Location

Site Name:	Swift Creek Asbestos Site
Location:	Swift Creek between Goodwin Road and Oat Coles Road, approximately two miles east of Everson, Washington
Latitude:	48° 55' 7.13" North
Longitude:	122° 18' 14.99" West
Site Owners:	Nine privately owned parcels; various owners.
Site Contact:	Paul Pittman Flood Control Officer Whatcom County Public Works Department (360) 676-6876

2.2 Site Description

The Swift Creek Asbestos Site is located in Whatcom County, approximately 12 miles northeast of Bellingham, Washington. There are nine adjacent privately-owned properties located along the banks of Swift Creek between Goodwin and Oat Coles Roads. The land surrounding the Swift Creek site is used for agricultural and residential purposes. The Great Western Lumber Company property is located immediately upstream of the dredged area of Swift Creek on the east side of Goodwin Road. The source of the asbestos is a landslide located approximately 1.7 miles upstream from Goodwin Road near the headwaters of Swift Creek (Figure 2-1).

2.3 Site Characterization

Historically, the Swift Creek drainage has been plagued by landslide problems. The reactivation of the ancient landslide occurred at least 73 years ago by erosion of the ancient slide debris by Swift Creek. The landslide encompasses approximately 225 acres (not all presently active), extending from an elevation of 1,000 feet up to an elevation of approximately 2,600 feet (Ecology 1977b).

The excessive sediment in Swift Creek is caused by the large, complex landslide in the upper watershed of Sumas Mountain. The exposed slide material contains

naturally-occurring elevated levels of asbestos, nickel, manganese, cobalt, chromium, and magnesium. These chemicals are present in amounts toxic enough to prevent vegetation from growing on the slide material, and Swift Creek has no resident fish. The movement of sediment downstream in Swift Creek contributes to water quality problems in the Sumas River. (Ecology 2005)

To prevent flooding, the Swift Creek channel has been maintained by annual dredging, done initially by the U.S. Army Corps of Engineers (Corps), then for many years by Whatcom County. The dredged material was stockpiled on the banks of Swift Creek predominantly between Oat Coles and Goodwin Roads. In past years, stockpiled dredge material was removed from the banks of Swift Creek by the public, including local business and residents, for a variety of uses. The practice of removing dredged material from the banks of Swift Creek for public use was later disallowed by the Corps due to human health concerns about the naturally-occurring asbestos in Swift Creek sediments. Additional dredge material was added to the stockpile in 2005 and now piles of this material remain along the banks of the creek. Neither the Corps nor Whatcom County has dredged Swift Creek since 2006. No decision has been made on when dredging will resume due to the concern over the asbestos hazards to human health and the environment.

In 2005, the EPA became aware of the potential asbestos contamination in the fill material and recommended to the Corps and Whatcom County that no dredged material from Swift Creek be removed from the site. The Corps, who issues dredging permits to Whatcom County, and the EPA have expressed concern about dredged material being taken from the site by persons without personal protective equipment. There are also concerns about potential exposures to the public to asbestos-containing material because the material has been used as fill material. To prevent the removal of material from the site, the Corps installed gates at both ends of the site to restrict access. The Corps also placed warning signs to notify the public that Swift Creek sediments contain asbestos and that removing material from the site is prohibited.

2.4 Integrated Assessment Findings

In early 2006, Whatcom County asked the EPA for assistance in determining the asbestos concentration in the dredged materials. In March 2006, EPA tasked the START, under TDD 06-03-0020, to perform an IA. Following discussions with EPA, E & E developed a sampling plan that incorporated: collecting subsurface dredged-material samples at approximately 500-foot intervals throughout the piles on both sides of Swift Creek; collecting personal and perimeter air filter samples during excavation activities; collecting grab samples from the surface of the piles; and submitting these samples to commercial laboratories for asbestos, target analyte list (TAL) metals, and/or geotechnical parameters analyses.

In May 2006, EPA Region 10 performed the IA which included sample collection at locations along the approximately one-mile length of the dredged material piles. The average asbestos concentration for the composite dredged material

samples collected during the IA was approximately 1.6 percent (%), with maximum concentrations of 4.4%. The results of activity-based sampling indicated a cancer risk greater than 1×10^{-4} and prompted the EPA to conduct the TCRA.

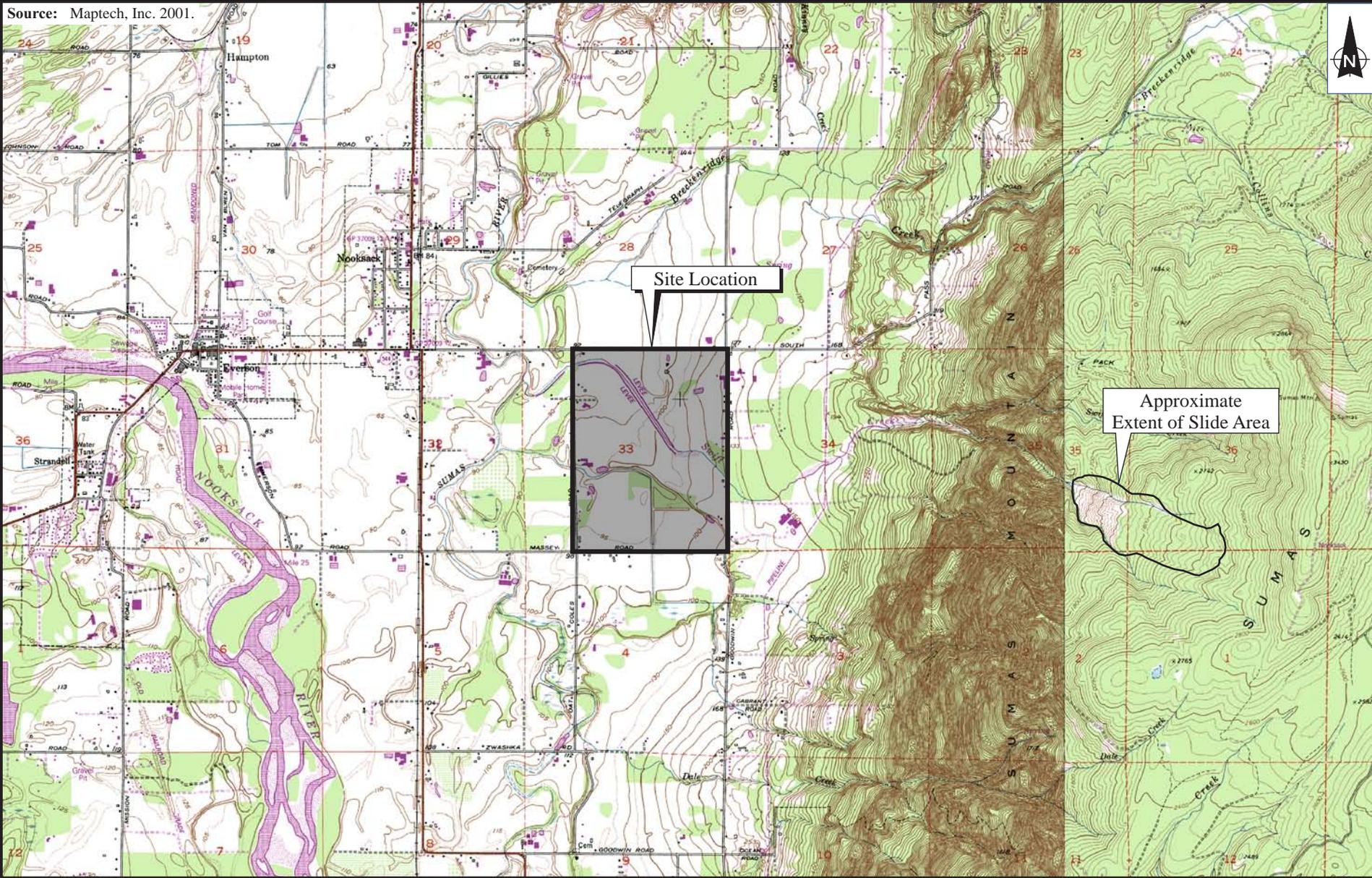
2.5 Time-Critical Removal Action

In November 2007, EPA approved an Action Memo for the Swift Creek Asbestos Site that authorized the regrading and stabilization of asbestos-containing dredge piles as soon as practicable. The planned action was intended to reduce the potential for an uncontrolled release of asbestos from the dredged materials presently stockpiled along Swift Creek by applying a dust suppressant. The existing stockpiled materials would be regraded within the corridor along Swift Creek to prevent erosion and further releases of asbestos from the stockpiles and to prepare the surface for dust suppressant application. Use of dust suppressant on the stockpiles would also minimize the levels of asbestos released through wind-blown dispersion.

The TCRA was scheduled to begin and be completed during November 2007. The participants in the planning and execution of the TCRA included the following:

- Jeffry Rodin, On-Scene Coordinator (OSC), Environmental Protection Agency, Region 10, Seattle, Washington;
- Monica Tonel, Site Assessment Manager (SAM), Environmental Protection Agency, Region 10, Seattle, Washington;
- Paul Pittman, Flood Control Officer, Whatcom County Public Works, Bellingham, Washington;
- Steven Merritt, START-3 Chemist, Ecology & Environment Inc., Seattle, Washington;
- Andy Maguire, START-3 GIS Analyst, Ecology & Environment Inc., Seattle, Washington; and
- Jason Coury, Emergency and Rapid Response Services (ERRS), Environmental Quality Management, Inc., Seattle, Washington.

Source: Maptech, Inc. 2001.



2-4

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

SWIFT CREEK ASBESTOS
 Everson, Washington



Figure 2-1
SURROUNDING PROPERTIES MAP

Date: 3/7/08	Drawn by: AES	10:START-3\07080011\fig 2-1
-----------------	------------------	-----------------------------

3

EPA Actions

This section discusses the activities undertaken by the EPA and its contractors as part of the TCRA at the Swift Creek Asbestos Site from November 7 to November 19, 2007.

3.1 Preliminary Site Survey

On Wednesday, November 7, 2007, EPA OSC Jeff Rodin and SAM Monica Tonel went door-to-door visiting the land owners around the site (10 homes) to obtain site access agreement signatures and explain the planned stabilization activities. On Thursday, November 8, 2007, OSC Rodin and SAM Tonel led a site walk with interested land owners. They listened to concerns from the residents regarding the complexities of the situation and further explained the planned removal action activities beginning on Friday, November 9, 2007. One START and five ERRS personnel mobilized to the site on Thursday, November 8. START Andy Maguire and ERRS Jason Coury participated in a second site walk with OSC Rodin and SAM Tonel to review objectives and prepare for sediment stabilization activities scheduled to commence on Friday, November 9, 2007. SAM Tonel demobilized from the site at the end of the site walk.

On Friday morning, November 9, 2007, OSC Rodin, START, and the ERRS team met at the site to begin the preliminary site stabilization work along Swift Creek. The initial objectives were to regrade stockpiles of asbestos-laden dredged materials along Swift Creek to reduce seasonal erosion and facilitate the application of a dust suppressant. As ERRS began operating earth-moving machinery and equipment, Paul Pittman, Flood Control Officer for Whatcom County Public Works, led OSC Rodin, START, and ERRS on a site walk to identify the eroded locations that needed to be regraded to prevent additional erosion. The group discussed the most effective ways to stabilize the banks using existing dredged material and imported riprap aggregate material.

Paul Pittman pointed out that since 2005, when Whatcom County rebuilt the banks at a 2:1 slope using native dredged material, there had been excessive erosion on both the slopes and along the banks of the creek during the several large winter storms. During the site walk, it was apparent that a majority of these banks had been eroded, thereby resulting in many areas with a vertical creek bank. The erosion of the banks and the deposition of sediments along this relatively flat section of Swift Creek had increased the elevation of the creek bed by approximately eight feet over the elevation at the conclusion of the 2005 dredging event. In some areas, the creek bed and the Swift Creek water level were higher than the adjoining pasture land. Paul Pittman explained the ways in which the creek had flooded adjacent pasture land in the past, by seeping through the banks and breaching them at thinner points, rather than by overtopping them.

With this information, the decision was made to stabilize the existing dredged materials by broadening the dredge pile base, normalizing the stream grade, leveling the top of the banks, installing erosion control features in vulnerable areas to prevent the stream from undercutting the banks, and applying dust suppressant along each bank to minimize surface erosion and mitigate airborne asbestos dust hazards during storms and high winds.

3.2 Dredged Material Regrading

On Saturday, November 10, 2007, ERRS began work grading stockpiled dredge material, working from the west side of the site toward the east on the south bank of Swift Creek. During this first day of stockpile grading, ERRS graded approximately one-third of the southern stream bank and moved piled material to lower areas of the bank upstream. While ERRS worked in the stream channel, the START conducted air particulate monitoring, recording the amount and size of airborne dust migrating off site. START placed DataRAM 4 particulate monitors at downwind locations along the perimeter of the site during all phases of site activity. Very low levels of airborne particulates in respirable size ranges were noted during all monitoring events due to frequent precipitation at the site that kept the dredged material wet and not readily dispersible.

ERRS developed a plan to apply the EPA-approved soil tackifier, a commercially available and ecologically-safe dust suppressant that was to be applied to the banks of Swift Creek after the surface of stockpiled material was prepared by grading. ERRS decided to mix the water-soluble dust suppressant inside 5,000-gallon water trucks and graded the dredged material such that the banks on both sides of Swift Creek were safe for a vehicle to drive across and rapidly disperse the product slurry along the entire length and width of the site. The alternative plan was to pull a water trailer with a bulldozer and use pumps to spray the material; however, this alternative was rejected since it would have been resource intensive and time-consuming. OSC Rodin approved the ERRS plan for the installation of a light-duty roadway along the top of the south bank and the purchase of the dust suppressant before shutting down the site and demobilizing personnel for a day on Sunday, November 11, 2007.

EPA OSC Rodin, one START, and seven ERRS personnel re-mobilized to the site on Monday, November 12, 2007, to grade the stockpiled dredge materials throughout the rest of the site in preparation for dust suppressant application on Thursday, November 15, 2007. ERRS had an additional, larger bulldozer delivered to the site on Monday morning to expedite the work along Swift Creek. The larger bulldozer was used to grade and level the stockpiled materials and fill low areas in the banks along both sides of the creek. ERRS began receiving truckloads of rip rap material and positioning the riprap rocks in selected locations along the stream channel for erosion control. This work continued throughout the week along the entire upstream area from the bridge at Oat Coles Road.

On Tuesday, November 13, 2007, the START conducted co-located particulate monitoring and asbestos air sampling on all heavy equipment and at a fixed perimeter location while ERRS crews were working on the site throughout the day. The goal of the sampling was to measure airborne asbestos concentrations during the work activities. Section 4 presents a discussion of the sampling and analytical methods, and Section 6 presents a discussion of the analytical results.

3.3 Erosion Control Measures

OSC Rodin, START, ERRS, and Paul Pittman, of the Whatcom County Public Works Department, conducted a site walk at the end of the day on Tuesday, November 13, 2007. They inspected the progress ERRS had made preparing the stockpiled dredged material for dust suppressant application. They discussed the need to install additional erosion control measures, including rock and aggregate berms in the channel and at the base of each bank, and ERRS rehearsed the plan for applying the dust suppressant.

ERRS continued the final grading and installation of erosion control measures along the north bank of Swift Creek on Wednesday, November 14, 2007. ERRS armored the eroded creek banks and installed erosion control armoring along the creek using stockpiled material and imported rock. These were the final steps in preparing the stockpiled material along both sides of Swift Creek for the dust suppressant application.

3.4 Dust Suppressant Application

On Thursday, November 15, 2007, the dust suppressant arrived just as ERRS completed the remaining grading and leveling on the south side of the creek. ERRS created a temporary land bridge across the creek, which allowed water trucks to access the north bank and apply the dust suppressant to the north side of the creek. ERRS used two water trucks to complete application on the entire length of berm on the north side of the creek. Prior to and during the application of the dust suppressant, the START conducted co-located air sampling and air monitoring near the stream crossing and at the west end of the northern creek bank to monitor pre-treated conditions related to particulates and airborne asbestos. START observed that the highest particulate levels recorded at the site during dredged material grading were at or below 30 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) of respirable material with an average particle size of 0.6 micrometer (μm). This level is 3 times the approximate background level of $10 \mu\text{g}/\text{m}^3$ at this size range. The continued precipitation and heavy winds at the site during the site stabilization efforts reduced particulate levels in the work area.

On Friday, November 16, 2007, ERRS finished grading and leveling the south bank and placed crushed rock on the south bank between Goodwin Road and the creek crossing site to create an erosion barrier and a roadway. This would support occasional traffic for property owners to access the Double Gate area and the creek crossing site from Goodwin Road. ERRS also continued applying the dust suppressant along the southern bank from Oat Coles Road to the crossing site. There were some minor delays on the second day of application due to the

dust suppressant product congealing inside the water trucks. The trucks were flushed and the product was filtered prior to mixing to prevent this problem from recurring.

ERRS finished applying the dust suppressant along the south bank on Saturday, November 17, 2007. During the final application, START monitored airborne particulate concentrations for worker health and safety purposes. Once the application was completed, ERRS reinstalled the gates and fence sections to restrict access to the site, and ERRS began decontaminating their equipment. On Sunday, November 18, 2007, ERRS completed equipment decontamination and START demobilized from the site. On Monday, November 19, 2007, ERRS demobilized all of their remaining equipment and personnel from the site. The Corps-mandated site access gates at Goodwin Road and Oat Coles Road were secured prior to departure from the site.

4

Sampling and Analytical Protocol

A SSSP was developed by START prior to field sampling for the Integrated Assessment (E & E 2006a). The SSSP was based on a review of background information, interviews with site representatives, and a site reconnaissance by EPA and START personnel in April 2006 (E & E 2006b). The SSSP describes the sampling strategy, sampling methodology, and analytical program to investigate potential hazardous substance sources and potential targets. The TCRA field sampling was conducted in accordance with the approved SSSP, except where noted in this document. EPA OSC Rodin was on site and provided input in determining sampling locations. Deviations from the SSSP were approved by EPA and are discussed as applicable below.

The TCRA field event was conducted from November 7 through November 19, 2007, and included air sampling. A total of six samples, not including QA samples (two air filter field blanks and one air filter media blank), were collected by START from on-site locations. Sample types and methods of collection are described below. Photographic documentation of TCRA field activities is contained in Appendix A.

Alphanumeric identification numbers applied by START to each sample location correspond to the sample numbers collected at that location and the reference numbers used in the report. Sample locations are provided in Figure 4-1.

This section describes sampling methodology (subsection 4.1), analytical protocol (subsection 4.2), Global Positioning System (GPS) data (subsection 4.3), and investigation-derived waste (IDW; subsection 4.4).

4.1 Sampling Methodology

Air sampling followed the standard operating procedures (SOPs) contained in the SSSP (E & E 2006a). Air samples were collected directly onto filters. A total of nine air samples were collected during the TCRA sample collection activities. Three of these samples were collected from pump assemblies mounted on all earth-moving equipment used during a typical day of dredged material regrading. Three of the samples were collected from stationary perimeter locations. Three samples were field blanks. These samples were collected to document asbestos releases to the air during all TCRA field activities.

Air samples were collected using preloaded 25 millimeter (mm) SKC filter cassettes (part number 225-327, 0.45 μm pore size) assembled with 2" spacer cowls in conjunction with SKC personal air pumps. The air pumps were calibrated daily during field activities by START personnel using a BIOS, Inc., DryCal DC-Lite Model DCL-H Primary Gas Flow Calibrator. The pumps were operated at a flow rate of approximately 1.25 liters per minute for both air samplers mounted onto equipment and installed at the site perimeter. Field operation and calibration of the samplers was performed in accordance with the specifications described in National Institute for Occupational Safety and Health (NIOSH) Method 7400.

A meteorological (MET) station was not used on the site during the response and site stabilization phase. The START relied on qualitative field observations and local weather forecasts to ascertain the appropriate locations for air monitoring and air sampling equipment placement. The high winds and regular precipitation observed during the TCRA were typical of the weather conditions in Whatcom County during the late autumn and early winter.

4.2 Analytical Protocol

Air samples collected from pumps mounted on heavy equipment were intended to determine the airborne asbestos concentrations near the earth-moving equipment during grading activities along Swift Creek. Perimeter air samples were collected to determine the airborne asbestos concentrations outside of the excavation areas. Air samples were collected from pumps mounted to every piece of earth-moving equipment being used at the site on November 13, 2007, when all three (two bulldozers and an excavator) were operating simultaneously at the site for the entire day. A single perimeter air sample was collected at the same time as the equipment air samples were collected at a location downwind of where the regrading was occurring that day. Two other perimeter air samples were collected at downwind locations during the final day of regrading and the first day the dust suppressant was applied to the site. Perimeter air samples were also co-located with particulate monitors and additional particulate monitors were routinely placed around the site at monitoring locations even when sampling was not being conducted. All sampling and monitoring locations are shown in Figure 4-1.

All air filter samples were submitted to Lab/Cor, Inc. and analyzed for asbestos following method NIOSH Method 7400 using Phase Contrast Microscopy (PCM). Select samples were later re-analyzed by International Organization for Standardization (ISO) Method 10312 using Transmitting Electron Microscopy (TEM). Air samples were collected for a period of up to 5 hours, although pumps with lower volumes, including some used to collect equipment samples, faulted during sampling run, reducing the sample volume accordingly. The flow rates for the samples were measured at the beginning and end of the soil sampling period each day. These values were averaged to determine the average flow rate per day and combined with the sample time to determine the total air volume that passed

4. Sampling and Analytical Protocol

through the sample filter collected. A list of all samples collected for fixed laboratory analysis under the TCRA is contained in Table 4-1.

4.3 Global Positioning System

A Trimble Pathfinder Professional GPS survey unit was used by START personnel during the TCRA to approximate the horizontal location coordinates of the air sample locations and other site features. GPS coordinates for sample and monitoring locations are provided in Appendix C.

4.4 Investigation-Derived Waste

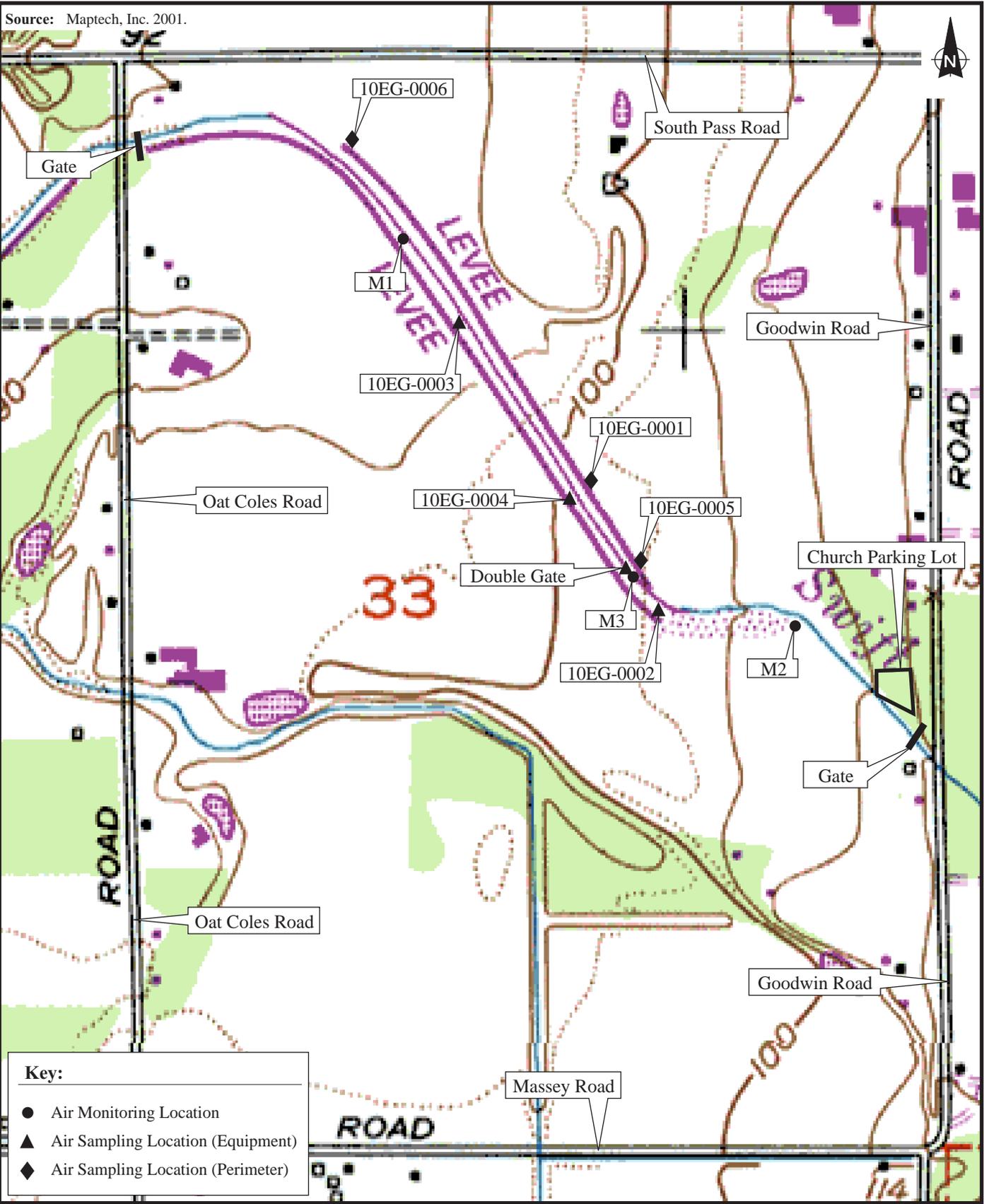
IDW generated during the TCRA sampling effort consisted of solid disposable sampling and personal protective equipment. The IDW was double-bagged and disposed of in a local municipal landfill.

Table 4-1 Sample Collection and Analytical Summary

Sample Information							Analyses		Miscellaneous Information
EPA Sample Identification	Matrix	Type	Volume (L)	Sampler	Collection Date	Collection Time	Asbestos PCM	Asbestos TEM	
10EG-0001	AF	Composite	518.8	SM	11/13/2007	16:05	X	X	Perimeter - North Bank, West of Creek Crossing
10EG-0002	AF	Composite	86.4	SM	11/13/2007	16:10	X	--	Equipment - Small Dozer
10EG-0003	AF	Composite	332.3	SM	11/13/2007	16:15	X	X	Equipment - Large Dozer
10EG-0004	AF	Composite	625.4	SM	11/13/2007	16:20	X	--	Equipment - Excavator
10EG-0005	AF	Composite	521.3	SM	11/15/2007	16:16	X	X	Perimeter - North Bank, At Creek Crossing
10EG-0006	AF	Composite	607.0	SM	11/15/2007	16:27	X	X	Perimeter - North Bank, West End of Levee
10EG-0007	AF	Media Blank	0	SM	11/13/2007	12:00	X	--	Perimeter Media Blank
10EG-0008	AF	Field Blank	0	SM	11/13/2007	12:00	X	--	Equipment Field Blank
10EG-0009	AF	Field Blank	0	SM	11/13/2007	12:00	X	X	Perimeter Field Blank

Key:

- AF = air filter
- L = liter
- PCM = phase contrast microscopy
- SM = Steven Merritt
- TEM = transmission electron microscopy
- = Not Analyzed



Key:

- Air Monitoring Location
- ▲ Air Sampling Location (Equipment)
- ◆ Air Sampling Location (Perimeter)

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

SWIFT CREEK ASBESTOS
Everson, Washington

0 250 500
Approximate Scale in Feet

Figure 4-1
SAMPLE LOCATION MAP

Date: 3-7-08	Drawn by: AES	10:START-3\07080011\fig 4-1
-----------------	------------------	-----------------------------

5

Quality Assurance/ Quality Control

QA/QC data are necessary to determine precision and accuracy and to demonstrate the absence of interferences and/or contamination of sampling equipment and media. Specific QC requirements for laboratory analyses are incorporated in NIOSH Method 7400 and ISO Method 10312. These QC requirements or equivalent requirements found in the specific analytical methods were followed for analytical work on the site. This section describes the QA/QC measures taken for the TCRA and provides an evaluation of the usability of data presented in this report.

All samples were collected following the guidance of the SSSP (E & E 2006a) for field activities. All samples were submitted to Lab/Cor, Inc., a commercial laboratory located in Seattle, Washington. Data from the commercial laboratory was reviewed and validated (as appropriate) by a START-3 chemist. Data qualifiers were applied as necessary according to the following guidance:

- *EPA (1990) Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan and Data Validation Procedures*; and

In the absence of other QC guidance, method-specific QC limits were also utilized to apply qualifiers to the data. Copies of the data QA memoranda are included in Appendix B.

5.1 Satisfaction of Data Quality Objectives

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

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

The EPA OSC 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 meet the DQOs stated in the SSSP (E & E 2006a). A detailed discussion of accomplished TCRA objectives is presented in the following sections.

5.2 Quality Assurance/Quality Control Samples

For the asbestos analyses, QA samples in the form of media blank samples (i.e., field and media blanks) were collected for this project. A total of three blanks were collected and analyzed, and they are discussed further in section 5.4.3.

5.3 Project-Specific Data Quality Objectives

The laboratory data were reviewed to ensure that DQOs for the project were met. The following describes the laboratory's ability to meet project DQOs for precision, accuracy, and completeness and the field team's ability to meet project DQOs for representativeness and comparability. The laboratory and the field team were able to meet DQOs for the project.

5.3.1 Completeness

Data completeness is defined as the percentage of usable data (usable data divided by the total possible data). All data were reviewed for usability. No sample results were rejected, therefore the project DQO for completeness of 90 % was met.

5.3.2 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 of 85 % was met.

5.3.3 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.

5.4 Laboratory Quality Assurance/Quality Control Parameters

The laboratory data also were reviewed for blank samples and miscellaneous parameters. These QA/QC parameters are summarized below. In general, the laboratory and field QA/QC parameters were considered acceptable.

5.4.1 Field and Matrix Blanks

One media blank was collected from an unopened blank filter (10EG-0007), therefore meeting the frequency criteria of one per 20 samples. Two field blanks (10EG-0008 and 10EG-0009) were collected from blank filters opened on-site during the sampling event, therefore meeting the frequency criteria of one per 20 samples. Fibers were detected on the media blanks, including one on the media blank (10EG-0007) and three and five on the field blanks (10EG-0008 and 10EG-0009, respectively). Per the method, the PCM sample results were adjusted

5. Quality Assurance/Quality Control

accordingly to account for the fibers detected on the blanks. For additional information refer to Section 6.1.

5.4.2 Other Asbestos Quality Assurance/Quality Control Parameters

All asbestos analyses were performed according to the listed analytical methods with no discrepancies noted in the laboratory case narratives.

6

Sample Results

This section describes sample locations and analytical results of TCRA samples. The sampling locations, sampling rationale, and analytical results are summarized in the following sections. Table 6-1 summarizes analytical results from the air samples collected during the regrading of dredged material and site stabilization activities. Laboratory data sheets of results for all samples are located in Appendix B.

6.1 Air Filter Samples

A total of nine air filter samples, including six field samples and three field blank samples, were collected during the TCRA. For the field samples, three were collected from pump assemblies mounted on earth-moving equipment used during a typical day of grading dredged material at the site, and three were collected from stationary perimeter locations. The six field samples were collected to document asbestos releases to the air during TCRA field activities. The three field blanks were collected for QA/QC purposes.

All nine samples were originally submitted to Lab/Cor for PCM analyses in accordance with NIOSH Method 7400. Following the receipt of the PCM results, four samples (including three field samples and one field blank) were also analyzed for asbestos by TEM in accordance with ISO Method 10312. See Table 6-1 for air filter sample results.

The PCM results for the samples collected from equipment-mounted pumps ranged from not detected for the sample collected on the small dozer (sample 10EG-0002) to 0.008 fibers per cubic centimeter of air (fibers/cc) for the sample collected on the large dozer (sample 10EG-0003). Because of a pump fault, a smaller sample volume was collected for the sample collected on the small bulldozer, which likely contributed to the non-detect results. The third equipment sample collected from the excavator had a concentration of 0.001 fibers/cc (sample 10EG-0004).

For the perimeter air samples, the results ranged from 0.002 to 0.011 fibers/cc. The highest concentration was obtained at the northwest end of the levee on the north bank of Swift Creek just before dust suppressant was applied and after the regrading of the dredged material at the site had been completed (10EG-0006; 0.011 fibers/cc). The lowest perimeter result was obtained on the north bank, just west of the Double Gate, and in conjunction with the ongoing dredged material grading and equipment air sampling activities (10EG-0001; 0.002 fibers/cc). The other perimeter sample (10EG-0005) was collected at the Double Gate at the

conclusion of grading activities and after the dust suppressant application on the north bank, and the result was 0.005 fibers/cc.

The results for the field blank samples were 1, 3, and 5 fibers detected, for an average of 3 fibers per filter blank. Based on the assessment of the laboratory analyst, the fibers detected on the field blanks were likely organic fibers and not asbestos fibers (Hall 2008). In accordance with NIOSH Method 7400, the PCM sample results were adjusted accordingly to account for the fibers detected on the field blanks.

All PCM results were below the Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) of 0.1 fibers/cc for asbestos. The samples were primarily collected to document potential exposures to TCRA personnel during the removal activities, and therefore the comparison of the PCM results to the PEL, which is based on occupational exposure scenarios, is appropriate. The OSHA PEL is not considered to be protective of the potential chronic exposure risks that may be expected for area residents.

In order to further analyze the air samples, some of the samples (10EG-0003, 10EG-0005, 10EG-0006, and field blank 10EG-0009) were also submitted for TEM analysis by ISO Method 10312. The results for PCM equivalent fibers detected in the three samples ranged from not detected (< 0.001 structures per cubic centimeter of air [structures/cc]) to 0.042 structures/cc, which are comparable to the PCM results for these samples. All TEM results for PCM equivalent fibers were less than the OSHA PEL. TEM results confirmed that all asbestos fibers identified were chrysotile asbestos, which is consistent with earlier findings by EPA (EPA 2007). The field blank (10EG-0009) contained no PCM equivalent fibers, which supports the conclusion of the laboratory that the fibers detected on the field blanks by PCM were not asbestos fibers.

Table 6-1 Air Filter Samples Analytical Results

EPA Sample Identification	Station Location	Sample Volume (L)	NIOSH 7400 PCM Analysis		ISO 10312 TEM Analysis (PCM Equivalent Fibers)	
			Total Fibers	Concentration (Fiber/cc)	Number of Structures	Concentration (Struc/cc)
Equipment Air Filter Samples						
10EG-0002	Variable, Small Dozer	86.4	0	< 0.006	--	--
10EG-0003	Variable, Large Dozer	332.3	5.5	0.008	2	0.042
10EG-0004	Variable, Excavator	625.4	1	0.001	--	--
10EG-0008	Field Blank	NA	3	NA	--	--
Perimeter Air Filter Samples						
10EG-0001	North Bank, Northwest of Double Gate	518.8	2.5	0.002	0	< 0.001
10EG-0005	North Bank, At Double Gate	521.3	5	0.005	1	0.001
10EG-0006	North Bank, Northwest End of Levee	607.0	13	0.011	2	0.010
10EG-0007	Media Blank	NA	1	NA	--	--
10EG-0009	Field Blank	NA	5	NA	0	NA

Note: Bold type indicates the sample result is above the method detection limit.

Key:

- cc = cubic centimeter
- EPA = United States Environmental Protection Agency
- ISO = International Organization for Standardization
- L = liter
- NA = not applicable
- NIOSH = National Institute for Occupational Safety and Health
- PCM = phase contrast microscopy
- Struc = structures
- TEM = transmission electron microscopy
- = not analyzed

7

Summary and Conclusions

7.1 Summary

In November 2007, EPA, START, and ERRS personnel stabilized dredged asbestos-containing material along the one-mile stretch of Swift Creek between Oat Coles Road and Goodwin Road as part of the Swift Creek Asbestos Site TCRA near Everson, Washington. The material was stabilized by armoring selected locations of the stream bank, grading the surface of the material to reduce erosion and prepare for dust suppressant application, and finally applying the dust suppressant. With these activities EPA accomplished the objectives outlined in the Action Memo for the TCRA. The dredged material that had been piled in several locations on both banks of Swift Creek between Oat Coles Road and Goodwin Road before the TCRA were regraded into broad, level banks less susceptible to damage from seasonal flooding. As the material was regraded, the channel and creek banks were armored using nearly 180 tons of imported rip rap and aggregate material to reduce surface and channel erosion. At the conclusion of the site activities, approximately 60,000 gallons of dust suppressant solution was applied to the banks on both sides of Swift Creek to bind the material and reduce wind dispersion of asbestos-containing materials.

7.2 Conclusions

Results of the previous investigations indicate that the Swift Creek Asbestos Site is a source of hazardous contamination, including asbestos and metals, which pose a human health hazard and prevent vegetation from taking root in the sediments originating from a landslide on Sumas Mountain. Contaminants from on-site sediment deposits could potentially migrate to downwind locations including nearby residential soils through wind entrainment and re-deposition of particulate matter. Site stabilization work, intended to reduced erosion and release of windborne asbestos, was completed during the TCRA along the section of Swift Creek where the majority of dredged material had been stockpiled. Whatcom County will monitor the impact of seasonal storms at the site and will continue to work with the Corps, EPA, and stakeholders to develop a more permanent solution to the ongoing hazards at the site. While it is assumed that the dust suppressant has reduced the airborne asbestos concentration migrating off site, it is not known how long or how effectively the suppressant will withstand weathering in the future. A periodic ambient air sampling effort is recommended to confirm these assumptions and monitor degradation at the site.

8

References

- Ecology & Environment (E & E), February 2007, *Summary Report of EPA Activities, Swift Creek Asbestos Site*, Whatcom County, Washington, prepared for the U.S. Environmental Protection Agency, Contract Number EP-S7-06-02, Seattle, Washington.
- _____, April 28, 2006a, *Swift Creek Asbestos Site-Specific Sampling Plan*, Everson, Washington, prepared for the U.S. Environmental Protection Agency, Contract Number EP-S7-06-02, Seattle, Washington.
- _____, April 5, 2006b, *Swift Creek Site Visit Project Logbook*.
- U. S. Environmental Protection Agency (EPA), February 9, 2007, *Release of Final Summary Report of EPA Activities, Swift Creek Asbestos Site, Whatcom County, Washington*.
- _____, September 24, 2006a, Integrated risk information system, <http://www.epa.gov/iris/subst/0371.htm>.
- _____, July 2004a, *USEPA Contract Laboratory Program National Functional Guidelines For Inorganic Data Review*, EPA 540-R-04-004.
- _____, March 2004b, *USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis, Multi-Media, Multi-Concentration, ILM05.3*.
- _____, 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.
- _____, April 1990, *Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan and Data Validation Procedures, Interim Final*, EPA/540/G-90/004, OSWER Directive 9360.4-01.
- Washington State Department of Ecology (Ecology), June 24, 2005, *In the Matter of Granting a Water Quality Certification to Whatcom County Public Works, Order #2453*.
- _____, February 11, 1977b, Letter from Darrel Anderson, *Sumas River, Swift Creek, Drainage Asbestos Fibre Source Investigation*.

A

Photographic Documentation

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: Swift Creek flowing under western bridge.

Time: 12:16

Direction: Northeast

Date: 11/8/2007

Photo No: 1377



Description: Swift Creek flowing under Oat Coles Road bridge.

Time: 12:16

Direction: North

Date: 11/8/2007

Photo No: 1379

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: Swift Creek at the south bank near Oat Coles Road.

Time: 13:32 **Direction:** Northeast

Date: 11/8/2007 **Photo No:** 1381



Description: Dredge stockpiles on south bank at Oat Coles Road.

Time: 13:32 **Direction:** West

Date: 11/8/2007 **Photo No:** 1382

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: Elevated creek grade in channel midway between Goodwin and Oat Coles Road.

Time: 13:42 **Direction:** Northeast

Date: 11/8/2007 **Photo No:** 1383



Description: Dredge stockpile configuration on south bank prior to any site stabilization efforts.

Time: 13:46 **Direction:** Northwest

Date: 11/8/2007 **Photo No:** 1384

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: Surface runoff erosion on south bank of Swift Creek prior to any site stabilization efforts.

Time: 11:13

Direction: Down

Date: 11/9/2007

Photo No: 1385



Description: Swift Creek channel erosion apparent along entire length of dredged areas.

Time: 11:46

Direction: Northwest

Date: 11/9/2007

Photo No: 1386

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: Severely eroded south bank of Swift Creek near the crossing site.

Time: 12:07

Direction: Northwest

Date: 11/10/2007

Photo No: 1394



Description: ERRS beginning stabilization of stockpiled materials on south bank of Swift Creek.

Time: 12:01

Direction: Northwest

Date: 11/10/2007

Photo No: 1393

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: Particulate monitoring conducted by START during ERRS bank grading work.

Time: 09:08 **Direction:** Southeast

Date: 11/10/2007 **Photo No:** 1388



Description: OSC Rodin leading a site walk at the crossing site as ERRS begins work on the south bank of Swift Creek.

Time: 12:14 **Direction:** Northwest

Date: 11/10/2007 **Photo No:** 1396

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: Initial condition of Swift Creek (foreground) and the eroding source deposit on Sumas Mountain (background).

Time: 12:27

Direction: Northeast

Date: 11/10/2007

Photo No: 1400



Description: Large ERRS bulldozer making quick work of grading and leveling material along south bank of Swift Creek.

Time: 13:52

Direction: Northwest

Date: 11/12/2007

Photo No: 1404

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: ERRS armoring stream channel with new aggregate material and existing piles.

Time: 10:30

Direction: Southeast

Date: 11/13/2007

Photo No: 1422



Description: START conducting co-located particulate monitoring and asbestos air sampling on north bank.

Time: 10:27

Direction: Southeast

Date: 11/13/2007

Photo No: 1421

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: START asbestos air sampling on large ERRS bulldozer working along south bank of Swift Creek.

Time: 11:04

Direction: North

Date: 11/13/2007

Photo No: 1426



Description: ERRS continued armoring creek channel with larger rocks and other available materials.

Time: 16:46

Direction: North

Date: 11/14/2007

Photo No: 1429

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: South bank of Swift Creek near the end of the stabilization efforts.

Time: 16:46

Direction: Northwest

Date: 11/14/2007

Photo No: 1430



Description: View of completed aggregate and rock armoring on the north bank of Swift Creek.

Time: 16:49

Direction: North

Date: 11/14/2007

Photo No: 1435

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: Completed armoring and stockpile grading at crossing site of Swift Creek.

Time: 16:49

Direction: East

Date: 11/14/2007

Photo No: 1436



Description: Grading and leveling completed on north side of Swift Creek.

Time: 16:52

Direction: Northeast

Date: 11/14/2007

Photo No: 1439

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: View of armoring placed along channel bend east of crossing site and material regraded upon completion.

Time: 16:52 **Direction:** Northeast

Date: 11/14/2007 **Photo No:** 1440



Description: Reverse view of previous photo, looking back at the crossing site after regrading both banks.

Time: 16:53 **Direction:** Southwest

Date: 11/14/2007 **Photo No:** 1441

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: View of north bank on east side of site near Goodwin Road after grading.

Time: 16:55 **Direction:** West

Date: 11/12/2007 **Photo No:** 1442



Description: View of channel armoring and erosion control measures installed near Goodwin Road.

Time: 16:56 **Direction:** South

Date: 11/14/2007 **Photo No:** 1443

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: Installation of final aggregate and rock armoring throughout channel before applying dust suppressant to banks.

Time: 17:00

Direction: Northwest

Date: 11/14/2007

Photo No: 1446



Description: ERRS moving loads of delivered rock to be used as erosion control measures in Swift Creek.

Time: 17:03

Direction: Northwest

Date: 11/14/2007

Photo No: 1447

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: Arrival of the first truckload of the dust suppressant material to be applied at the site.

Time: 09:15

Direction: South

Date: 11/15/2007

Photo No: 1450



Description: ERRS stages containers of dust suppressant as final grading and leveling of channel is completed.

Time: 09:18

Direction: South

Date: 11/15/2007

Photo No: 1452

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: START conducting particulate monitoring and asbestos air sampling near crossing site.

Time: 11:15 **Direction:** North

Date: 11/15/2007 **Photo No:** 1458



Description: START conducting particulate monitoring as final grading is conducted on north bank of Swift Creek.

Time: 11:10 **Direction:** North

Date: 11/13/2007 **Photo No:** 1428

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: START conducting particulate monitoring and asbestos air sampling on west side of north bank.

Time: 11:27 **Direction:** West

Date: 11/15/2007 **Photo No:** 1461



Description: ERRS offloading rock and creating additional erosion control features in channel of Swift Creek.

Time: 11:31 **Direction:** Southeast

Date: 11/15/2007 **Photo No:** 1463

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: ERRS completing erosion control features in Swift Creek using delivered rock material.

Time: 11:31 **Direction:** Southeast

Date: 11/15/2007 **Photo No:** 1464



Description: ERRS mixing the dust suppressant in the tanker truck for application along the banks of Swift Creek.

Time: 14:25 **Direction:** East

Date: 11/15/2007 **Photo No:** 1466

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: OSC Rodin inspecting final installation of armoring and observing application of dust suppressant at crossing site.

Time: 15:01 **Direction:** Northwest

Date: 11/15/2007 **Photo No:** 1468



Description: ERRS applying dust suppressant to the north bank of Swift Creek downstream of crossing site.

Time: 15:03 **Direction:** Northwest

Date: 11/15/2007 **Photo No:** 1469

PHOTO DOCUMENTATION

Site: Swift Creek Asbestos Site	Lat/Long: N48 55.1418 W122 18.0559	Dates: November 9-30, 2007
Location: Everson, WA	Camera: Sony PowerShot A530	Photographers: Maguire and Merritt, E & E



Description: ERRS applying dust suppressant to the spots on the bank following a pass by the water truck.

Time: 15:07 **Direction:** South

Date: 11/15/2007 **Photo No:** 2486



Description: ERRS spraying dust suppressant to ensure uniform coverage over entire site.

Time: 15:07 **Direction:** South

Date: 11/15/2007 **Photo No:** 1471

B

Data Validation Memoranda



ecology and environment, inc.

International Specialists in the Environment

720 Third Avenue, Suite 1700

Seattle, Washington 98104

Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: March 14, 2008

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

TO: Jim Petersen, Project Manager, E & E, Portland, OR

SUBJ: **Data Quality Assurance Review, Swift Creek Asbestos Site, Everson, Washington**

REF: TDD: 07-08-0011 PAN: 002233.0253.01RA

The data quality assurance review of 5 air filter samples collected from the Swift Creek Asbestos site in Everson, Washington, has been completed. Transmission electron microscopy (TEM) asbestos analyses (ISO method 10312) were performed by Lab/Cor, Inc., Seattle, Washington.

The samples were numbered:

10EG-0001 10EG-0003 10EG-0005 10EG-0006 10EG-0009

Data Qualifications:

The samples were received at the laboratory on February 25, 2008, and were analyzed by March 3, 2008. No discrepancies were noted in the laboratory case narrative.

The overall usefulness of the data is based on the criteria outlined in 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.



Lab/Cor, Inc.
7619 6th Ave NW
Seattle, WA 98117

Analysis Report Cover
Final Report

Phone: (206) 781-0155
Fax: (206) 789-8424
http://www.labcor.net

A Professional Service Corporation in the Northwest

Job Number: 080316 **SEA**
Client: Ecology & Environment
Address: 720 3rd Ave
Suite 1700
Seattle, WA 98104

Report Number: 080316R02
Report Date: 3/13/2008

Project Name: 2233.0253.01RA
Project No.:
PO Number:
Sub Project:
Reference No.:

Enclosed please find results for samples submitted to our laboratory. A list of samples and analyses follows:

Lab/Cor Sample #	Client Sample # and Description	Analysis	Analysis Notes	Date Received:
080316 - S1	10EG-0001 - North Berm, West of Crossing	ISO 10312, Direct		2/25/2008
080316 - S2	10EG-0003 - Variable, Large Dozer	ISO 10312, Direct		2/25/2008
080316 - S3	10EG-0005 - North Berm, At Crossing	ISO 10312, Direct		2/25/2008
080316 - S4	10EG-0006 - North Berm, Far West End	ISO 10312, Direct		2/25/2008
080316 - S5	10EG-0009 - TB03	ISO 10312, Direct		2/25/2008

ISO 10312, Direct - Preparation and analysis of the above samples was conducted in accordance with the ISO method 10312 (Direct) for the identification of asbestos. Briefly, the samples were collapsed with acetone, then etched in a low temperature plasma etcher to remove the top surface of the filter and other organics. The samples were carbon coated at high vacuum with a thin layer of carbon, placed on 200 mesh copper grids and allowed to dissolve in acetone until cleared of filter debris.

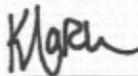
TEM analysis was performed using a transmission electron microscope equipped with an EDS X ray analyzer. The air samples were analyzed at various approximate screen magnifications of 5,000x for PCM equivalent structures, 10,000x for asbestos structures greater than 5.0 micrometer lengths, and 20,000x for asbestos structures greater than 0.5 micrometer lengths. An accelerating voltage of 100 KV was applied. The sizing of grid openings was performed on the microscope at a magnification of approximately 550X.

Disclaimer The results reported relate only to the samples tested or analyzed. Interpretation of these results is the sole responsibility of the client.

If further clarification of these results is needed, please call us. Thank you for allowing the staff at Lab/Cor, Inc. the opportunity to provide you with the analytical services.

This report is a revision of 080316R01 made on March 3, 2008. Steve Hall of Ecology and Environment requested changes to the PCME fiber count category and to the Concentration Calculations based on minimum fiber counts.

Sincerely,

x 

Kate March
Analyst

MW 3/14/08

ISO 10312, Direct Summary Data

Job Number: 080316 SEA
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No.: S1

Client Sample No.: 10EG-0001
Description: North Berm, West of Crossing

Analyst(s) Analysis Date
KM 2/27/2008
KM 2/28/2008

Volume (L) : 518.8
Lab Filter Area (mm²) : 385
Grid Openings Analyzed : 65
Average Grid Opening Area : 0.011
Area Analyzed (mm²) : 0.715
Analytical Sens. (struc/cc) : 0.00104
Dectection Limit. (struc/cc) : 0.0031

Structure Type	Filter Density (s/mm ²)	Concentration* (struc/cc)	95% Confidence Interval (struc/cc)	Structure Count' Prim/Total
Primary Asbestos Structures	128.7	0.095	0.077 - 0.117 - Poisson	92
Total Asbestos Structures	209.8	0.156	0.132 - 0.183 - Poisson	150
PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	0	< 0.001	0 - 0.004 - Poisson	0
PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	1.4	0.001	0 - 0.006 - Poisson	1
Asbestos Structures >5um and 3:1	7	0.005	0.002 - 0.012 - Poisson	5
Asbestos Fibers and Bundles > 5um and 3:1	2.8	0.002	0 - 0.007 - Poisson	2

¹ Concentration and 95% Confidence Level are calculated based upon the number showing under the Structure Count header.

Lab/Cor Sample No.: S2

Client Sample No.: 10EG-0003
Description: Variable, Large Dozer

Analyst(s) Analysis Date
KM 2/28/2008

Volume (L) : 332.25
Lab Filter Area (mm²) : 385
Grid Openings Analyzed : 5
Average Grid Opening Area : 0.011
Area Analyzed (mm²) : 0.055
Analytical Sens. (struc/cc) : 0.02107
Dectection Limit. (struc/cc) : 0.06299

Structure Type	Filter Density (s/mm ²)	Concentration* (struc/cc)	95% Confidence Interval (struc/cc)	Structure Count' Prim/Total
Primary Asbestos Structures	1127.3	1.306	1.001 - 1.675 - Poisson	62
Total Asbestos Structures	1981.8	2.296	2.044 - 2.963 - Gaussian	109
PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	36.4	0.042	0.005 - 0.152 - Poisson	2
PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	36.4	0.042	0.005 - 0.152 - Poisson	2
Asbestos Structures >5um and 3:1	163.6	0.19	0.087 - 0.36 - Poisson	9
Asbestos Fibers and Bundles > 5um and 3:1	54.5	0.063	0.013 - 0.185 - Poisson	3

¹ Concentration and 95% Confidence Level are calculated based upon the number showing under the Structure Count header.

* One-sided upper 95% Poisson confidence limits may be used to calculate sample concentrations ([Struc count] * [Analytical Sensitivity]) when the structure count is below 4. The limits are: 0 str - 0, 1 str - 1, 2 str - 2, 3 str - 3

ISO 10312, Direct Summary Data

Job Number: 080316 **SEA**
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No.: S3

Client Sample No.: 10EG-0005
Description: North Berm, At Crossing

Analyst(s) **Analysis Date**
KM 3/3/2008

Volume (L) : 521.28
Lab Filter Area (mm²) : 385
Grid Openings Analyzed : 67
Average Grid Opening Area : 0.011
Area Analyzed (mm²) : 0.737
Analytical Sens. (struc/cc) : 0.001
Detection Limit. (struc/cc) : 0.003

Structure Type	Filter Density (s/mm ²)	Concentration* (struc/cc)	95% Confidence Interval (struc/cc)	Structure Count ¹ Prim/Total
Primary Asbestos Structures	35.3	0.026	0.017 - 0.038 - Poisson	26
Total Asbestos Structures	58.3	0.043	0.031 - 0.058 - Poisson	43
PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	1.4	0.001	0 - 0.006 - Poisson	1
PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	0	< 0.001	0 - 0.004 - Poisson	0
Asbestos Structures >5um and 3:1	5.4	0.004	0.001 - 0.01 - Poisson	4
Asbestos Fibers and Bundles > 5um and 3:1	2.7	0.002	0 - 0.007 - Poisson	2

¹ Concentration and 95% Confidence Level are calculated based upon the number showing under the Structure Count header.

Lab/Cor Sample No.: S4

Client Sample No.: 10EG-0006
Description: North Berm, Far West End

Analyst(s) **Analysis Date**
KM 3/3/2008

Volume (L) : 607.01
Lab Filter Area (mm²) : 385
Grid Openings Analyzed : 12
Average Grid Opening Area : 0.011
Area Analyzed (mm²) : 0.132
Analytical Sens. (struc/cc) : 0.0048
Detection Limit. (struc/cc) : 0.01437

Structure Type	Filter Density (s/mm ²)	Concentration* (struc/cc)	95% Confidence Interval (struc/cc)	Structure Count ¹ Prim/Total
Primary Asbestos Structures	515.2	0.327	0.254 - 0.414 - Poisson	68
Total Asbestos Structures	757.6	0.48	0.391 - 0.585 - Poisson	100
PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	15.2	0.01	0.001 - 0.035 - Poisson	2
PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	0	< 0.005	0 - 0.018 - Poisson	0
Asbestos Structures >5um and 3:1	45.5	0.029	0.011 - 0.063 - Poisson	6
Asbestos Fibers and Bundles > 5um and 3:1	30.3	0.019	0.005 - 0.049 - Poisson	4

¹ Concentration and 95% Confidence Level are calculated based upon the number showing under the Structure Count header.

* One-sided upper 95% Poisson confidence limits may be used to calculate sample concentrations ([Structure count] * [Analytical Sensitivity]) when the structure count is below 4. The limits are: 0 str - 0, 1 str - 1, 2 str - 2, 3 str - 3

MW
3/4/08

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S1
Client Sample No: 10EG-0001
Description: North Berm, West of Crossing

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	1	C1				NSD							
G1	2	E1	CDQ	1	1	B	0.75	0.25	3	Chrysotile	Mg, Si		
G1	2	E1	CDQ	2		MD 4-0	5.25	3.2	1.6	Chrysotile			AS>5, 3:1
G1	2	E1	CDQ		2	MF	1.85	0.08	23.1	Chrysotile			
G1	2	E1	CDQ		3	MF	1.5	0.1	15	Chrysotile			
G1	2	E1	CDQ		4	MF	0.8	0.11	7.3	Chrysotile			
G1	2	E1	CDQ		5	MF	0.65	0.08	8.1	Chrysotile			
G1	3	G1	CD	3	6	F	0.9	0.1	9	Chrysotile			
G1	3	G1	CD	4	7	F	0.95	0.1	9.5	Chrysotile			
G1	4	I1	CD	5	8	F	0.7	0.1	7	Chrysotile			
G1	4	I1	CD	6	9	B	1	0.12	8.3	Chrysotile			
G1	4	I1	CD	7		CD 4-0	2.7	0.35	7.7	Chrysotile	Mg, Si		
						Item Type	Item Num		Confirmed	Comment			
						Brightfield	J647BF						
						Diffraction	J647DF		KM	2/27/2008			
G1	4	I1	CDQ		10	CF	2.7	0.1	27	Chrysotile			
G1	4	I1	CDQ		11	CF	0.7	0.1	7	Chrysotile			
G1	4	I1	CDQ		12	CB	0.65	0.12	5.4	Chrysotile			
G1	4	I1	CDQ		13	CF	0.5	0.1	5	Chrysotile			
G1	4	I1	CDQ	8	14	B	2.2	0.2	11	Chrysotile			
G1	4	I1	CD	9	15	F	0.7	0.1	7	Chrysotile			
G1	4	I1	CD	10		MD 1-0	2	0.6	3.3	Chrysotile			
G1	4	I1	CD		16	MF	0.7	0.1	7	Chrysotile			
G1	4	I1	CD	11	17	F	0.55	0.1	5.5	Chrysotile			
G1	4	I1	CD	12	18	F	0.6	0.1	6	Chrysotile			
						Item Type	Item Num		Confirmed	Comment			
						Spectra	J647SP						
G1	4	I1	CD	13	19	F	0.7	0.1	7	Chrysotile			
G1	5	D2	CD	14		MD 5-1	10	6	1.7	Chrysotile			AS>5, 3:1
G1	5	D2	CD		20	MF	6	0.1	60	Chrysotile			AFB>5, 3:1
G1	5	D2	CD		21	MF	4	0.1	40	Chrysotile			

Count Categories

AFB>5, 3:1 Asbestos Fibers and Bundles > 5um and 3:1 AS>5, 3:1
 PCMEFmodNIOS PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1 PCMESmodNIOS PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1

PAS Primary Asbestos Structures
 TAS Total Asbestos Structures

JMW
3/4/08

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S1
Client Sample No: 10EG-0001
Description: North Berm, West of Crossing

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	5	D2	CD		22	MR 3-0	3	3	1	Chrysotile			
G1	6	F2				NSD							
G1	7	H2	CD	15	23	F	0.51	0.08	6.4	Chrysotile			
G1	7	H2	CD	16	24	CC 4-0	1.2	0.5	2.4	Chrysotile			
G1	7	H2	CD	17		MD 2-0	0.9	0.8	1.1	Chrysotile			
G1	7	H2	CD		25	MF	0.9	0.1	9	Chrysotile			
G1	7	H2	CD		26	MF	0.6	0.1	6	Chrysotile			
G1	7	H2	CD	18		MD 1-0	2.5	0.8	3.1	Chrysotile			
G1	7	H2	CD		27	MF	0.85	0.1	8.5	Chrysotile			
G1	8	C3	CD	19	28	F	0.9	0.1	9	Chrysotile			
G1	9	E3	CD	20	29	B	2.6	0.15	17.3	Chrysotile			
G1	9	E3	CD	21		MD 1-0	6	2	3	Chrysotile			AS>5, 3:1, PCMESmodNIOSH
G1	9	E3	CD		30	MB	4.5	0.12	37.5	Chrysotile			
G1	10	G3	NAM	22	31	F	1.1	0.03	36.7	Non Asbestos Mineral	Al, Si		
G1	11	I3	CD	23	32	F	0.6	0.1	6	Chrysotile			
G1	11	I3	CD	24	33	B	1.2	0.3	4	Chrysotile			
G1	11	I3	CD	25	34	F	0.51	0.1	5.1	Chrysotile			
G1	11	I3	NAM	26		MD 23-0	32	8	4	Non Asbestos Mineral	Mg, Si		
G1	11	I3	NAM		35	MF	4.5	0.1	45	Non Asbestos Mineral			
G1	11	I3	NAM		36	MF	2	0.08	25	Non Asbestos Mineral			
G1	11	I3	NAM		37	MF	1.1	0.1	11	Non Asbestos Mineral			
G1	11	I3	NAM		38	MR 20-0	2	2	1	Non Asbestos Mineral			

Count Categories

AFB>5, 3:1 Asbestos Fibers and Bundles > 5um and 3:1 AS>5, 3:1 Asbestos Structures >5um and 3:1 PAS
 PCMEFmodNIOSH PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1 PCMESmodNIOSH PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1 TAS

Page 6 of 29
 Primary Asbestos Structures
 Total Asbestos Structures

MW 3/4/08

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
 Client: Ecology & Environment
 Project Name: 2233.0253.01RA

Report Number: 080316R02
 Date Received: 2/25/2008

Lab/Cor Sample No: S1
 Client Sample No: 10EG-0001
 Description: North Berm, West of Crossing

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	12	D4	CD	27	39	CC 100-0	4.8	3.8	1.3	Chrysotile			
G1	13	F4				NSD							
G1	14	H4				NSD							
G1	15	J4				NSD							
G1	16	D5				NSD							
G1	17	G5				NSD							
G1	18	H5	CD	28		CD 13-0	3.25	0.8	4.1	Chrysotile			
G1	18	H5	CD		40	CF	0.85	0.08	10.6	Chrysotile			
G1	18	H5	CD		41	CF	0.7	0.05	14	Chrysotile			
G1	18	H5	CD		42	CF	0.5	0.08	6.2	Chrysotile			
G1	18	H5	CD		43	CR 10-0	2.5	0.7	3.6	Chrysotile			
G1	19	I5	CD	29	44	B	2.5	0.3	8.3	Chrysotile			
G1	20	J5				NSD							
G1	21	F7				NSD							
G1	22	G7				NSD							
G1	23	H7				NSD							
G1	24	I7				NSD							
G1	25	J7				NSD							
G2	26	A1				NSD							
G2	27	C1				NSD							
G2	28	E1				NSD							
G2	29	G1				NSD							
G2	30	H2	CD	30	45	B	1.12	0.2	5.6	Chrysotile			
G2	31	F2	CMQ	31		MD 2-0	0.8	0.8	1	Chrysotile	Mg, Si		
G2	31	F2	CMQ		46	MF	0.7	0.1	7	Chrysotile			
G2	31	F2	CMQ		47	MF	0.5	0.1	5	Chrysotile			
G2	31	F2	CD	32		MD 5-1	7	5.8	1.2	Chrysotile			AS>5, 3:1
G2	31	F2	CD		48	MF	6.2	0.1	62	Chrysotile			AFB>5, 3:1
G2	31	F2	CD		49	MF	4	0.1	40	Chrysotile			
G2	31	F2	CD		50	MF	1.8	0.1	18	Chrysotile			
G2	31	F2	CD		51	MF	0.8	0.1	8	Chrysotile			

Count Categories

AFB>5, 3:1 Asbestos Fibers and Bundles > 5um and 3:1 AS>5, 3:1
 PCMEFmodNIOS PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1 PCMESmodNIOS PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1

PAS Primary Asbestos Structures
 TAS Total Asbestos Structures

MW
2/28/08

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S1
Client Sample No: 10EG-0001
Description: North Berm, West of Crossing

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G2	31	F2	CD		52	MF	0.7	0.08	8.8	Chrysotile			
G2	32	D2	CD	33	53	F	2.5	0.1	25	Chrysotile			
G2	32	D2	NAM	34	54	F	4.35	0.65	6.7	Non Asbestos Mineral	Na, Mg, Al, Si, Ca, Fe	Possible Magnesiohornblende	
G2	33	B2	CD	35	55	F	0.65	0.1	6.5	Chrysotile			
G2	34	C3	CD	36	56	F	0.5	0.1	5	Chrysotile			
G2	34	C3	CD	37	57	F	0.5	0.1	5	Chrysotile			
G2	34	C3	CD	38	58	F	0.6	0.1	6	Chrysotile			
G2	34	C3	CD	39	59	F	2.1	0.1	21	Chrysotile			
G2	34	C3	CD	40	60	CC 5-0	1.75	0.7	2.5	Chrysotile			
G2	34	C3	CD	41	61	MC 8-0	1.5	0.8	1.9	Chrysotile			
G2	34	C3	CD	42	62	CC 3-0	1.1	0.4	2.8	Chrysotile			
G2	34	C3	CD	43	63	F	1.1	0.1	11	Chrysotile			
G2	34	C3	CD	44		CD 3-0	1.85	1	1.9	Chrysotile			
G2	34	C3	CD		64	CF	1.8	0.1	18	Chrysotile			
G2	34	C3	CD		65	CF	1.2	0.1	12	Chrysotile			
G2	34	C3	CD		66	CF	0.5	0.08	6.2	Chrysotile			
G2	35	E3	CD	45	67	F	0.9	0.11	8.2	Chrysotile			
G2	35	E3	CD	46	68	F	0.6	0.05	12	Chrysotile			
G2	35	E3	CD	47	69	F	1.2	0.05	24	Chrysotile			
G2	36	G3				NSD							
G2	37	H4				NSD							
G2	38	F4				NSD							
G2	39	D4				NSD							
G2	40	B4				NSD							
G2	41	C5				NSD							
G2	42	D5	CD	48	70	F	0.5	0.1	5	Chrysotile			
G2	42	D5	CD	49	71	F	0.6	0.08	7.5	Chrysotile			
G2	42	D5	CD	50		CD 4-0	4.8	1	4.8	Chrysotile			
G2	42	D5	CD		72	CB	3.2	0.22	14.5	Chrysotile			

Count Categories

AFB>5, 3:1	Asbestos Fibers and Bundles > 5um and 3:1	AS>5, 3:1	Asbestos Structures >5um and 3:1	PAS	Primary Asbestos Structures
PCMEFmodNIOS	PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	PCMESmodNIOS	PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	TAS	Total Asbestos Structures

MW 3/14/08

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S1

Client Sample No: 10EG-0001

Description: North Berm, West of Crossing

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G2	42	D5	CD		73	CF	1.25	0.08	15.6	Chrysotile			
G2	42	D5	CD		74	CB	1.1	0.1	11	Chrysotile			
G2	42	D5	CD		75	CF	0.65	0.1	6.5	Chrysotile			
G2	42	D5	CD	51	76	B	1.4	0.15	9.3	Chrysotile			
G2	43	G5	CD	52	77	B	1.25	0.15	8.3	Chrysotile			
G2	44	H5				NSD							
G2	45	I5				NSD							
G2	46	C6				NSD							
G2	47	D6	CD	53	78	B	1.2	0.22	5.5	Chrysotile			
G2	48	G6	CD	54	79	F	0.6	0.08	7.5	Chrysotile			
G2	49	H6	CD	55	80	CC 15-0	1.5	0.9	1.7	Chrysotile			
G2	49	H6	CD	56	81	F	0.5	0.08	6.2	Chrysotile			
G2	50	I6	CD	57	82	F	0.85	0.08	10.6	Chrysotile			
G2	51	A7				NSD							
G2	52	C7				NSD							
G2	53	E7				NSD							
G2	54	G7	CD	58		MD 2-0	1.2	0.85	1.4	Chrysotile			
G2	54	G7	CD		83	MF	1.1	0.1	11	Chrysotile			
G2	54	G7	CD		84	MF	1	0.1	10	Chrysotile			
G3	55	D6				NSD							
G3	56	G6	CD	59	85	F	2	0.1	20	Chrysotile			
G3	57	H6				NSD							
G3	58	I6	CD	60	86	CC 35-0	4.25	3.85	1.1	Chrysotile			
G3	59	D7				NSD							
G3	60	F7				NSD							
G3	61	H7	CD	61	87	F	0.65	0.1	6.5	Chrysotile			
G3	62	C8				NSD							
G3	63	E8	CD	62	88	B	4.1	0.2	20.5	Chrysotile			
G3	64	G8				NSD							
G3	65	I8	CD	63	89	B	0.9	0.3	3	Chrysotile			
G3	65	I8	CD	64		CD 3-0	1.12	0.5	2.2	Chrysotile			

Count Categories

AFB>5, 3:1	Asbestos Fibers and Bundles > 5um and 3:1	AS>5, 3:1	Asbestos Structures >5um and 3:1	PAS
PCMEFmodNIOS	PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	PCMESmodNIOS	PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	TAS

Primary Asbestos Structures
 Total Asbestos Structures

MW
3/4/08

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S1

Client Sample No: 10EG-0001

Description: North Berm, West of Crossing

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G3	65	18	CD		90	CF	0.85	0.1	8.5	Chrysotile			
G3	65	18	CD		91	CB	0.75	0.18	4.2	Chrysotile			
G3	65	18	CD		92	CF	0.5	0.1	5	Chrysotile			
G3	65	18	CD	65		CD 3-0	1.2	0.7	1.7	Chrysotile			
G3	65	18	CD		93	CF	1.2	0.1	12	Chrysotile			
G3	65	18	CD		94	CF	0.6	0.1	6	Chrysotile			
G3	65	18	CD		95	CF	0.5	0.1	5	Chrysotile			
G3	65	18	CD	66	96	F	0.5	0.1	5	Chrysotile			
G3	65	18	CD	67	97	B	0.7	18	0	Chrysotile			
G3	65	18	CD	68	98	F	0.5	0.08	6.2	Chrysotile			
G3	65	18	CD	69		CD 10-0	3.3	3	1.1	Chrysotile			
G3	65	18	CD		99	CF	1.7	0.1	17	Chrysotile			
G3	65	18	CD		100	CF	1.65	0.1	16.5	Chrysotile			
G3	65	18	CD		101	CB	1.6	0.2	8	Chrysotile			
G3	65	18	CD		102	CF	1.3	0.08	16.2	Chrysotile			
G3	65	18	CD		103	CF	1.2	0.1	12	Chrysotile			
G3	65	18	CD		104	CF	1.2	0.1	12	Chrysotile			
G3	65	18	CD		105	CB	0.7	0.25	2.8	Chrysotile			
G3	65	18	CD		106	CR 3-0	1.58	0.6	2.6	Chrysotile			
G3	65	18	CD	70		MD 1-0	2.2	0.7	3.1	Chrysotile			
G3	65	18	CD		107	MF	2.2	0.15	14.7	Chrysotile			
G3	65	18	CD	71		CD 3-0	2	1.2	1.7	Chrysotile			
G3	65	18	CD		108	CF	1.2	0.1	12	Chrysotile			
G3	65	18	CD		109	CF	0.8	0.1	8	Chrysotile			
G3	65	18	CD		110	CF	0.5	0.1	5	Chrysotile			
G3	65	18	CD	72	111	F	0.5	0.08	6.2	Chrysotile			
G3	65	18	CD	73		MD 2-0	1.85	0.5	3.7	Chrysotile			
G3	65	18	CD		112	MB	1.5	0.15	10	Chrysotile			
G3	65	18	CD		113	MB	1.5	0.15	10	Chrysotile			
G3	65	18	CD	74	114	F	0.8	0.1	8	Chrysotile			
G3	65	18	CD	75	115	F	0.6	0.1	6	Chrysotile			

Count Categories

AFB>5, 3:1	Asbestos Fibers and Bundles > 5um and 3:1	AS>5, 3:1	Asbestos Structures >5um and 3:1	PAS
PCMEFmodNIOS	PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	PCMESmodNIOS	PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	TAS

MW
3/4/08

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S1
Client Sample No: 10EG-0001
Description: North Berm, West of Crossing

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G3	65	I8	CD	76	116	F	0.7	0.1	7	Chrysotile			
G3	65	I8	CD	77	117	F	1.2	0.1	12	Chrysotile			
G3	65	I8	CD	78	118	F	1.2	0.1	12	Chrysotile			
G3	65	I8	CD	79		CD 3-0	1.35	0.5	2.7	Chrysotile			
G3	65	I8	CD		119	CF	1.3	0.08	16.2	Chrysotile			
G3	65	I8	CD		120	CF	0.7	0.08	8.8	Chrysotile			
G3	65	I8	CD		121	CF	0.6	0.08	7.5	Chrysotile			
G3	65	I8	CD	80	122	F	0.8	0.08	10	Chrysotile			
G3	65	I8	CD	81		MD 8-0	5.5	2	2.8	Chrysotile			AS>5, 3:1
G3	65	I8	CD		123	MF	2.1	0.1	21	Chrysotile			
G3	65	I8	CD		124	MB	1.85	0.12	15.4	Chrysotile			
G3	65	I8	CD		125	MB	1.5	0.08	18.8	Chrysotile			
G3	65	I8	CD		126	MB	1.25	0.18	6.9	Chrysotile			
G3	65	I8	CD		127	MF	0.8	0.1	8	Chrysotile			
G3	65	I8	CD		128	MF	0.7	0.1	7	Chrysotile			
G3	65	I8	CD		129	MF	0.65	0.1	6.5	Chrysotile			
G3	65	I8	CD		130	MF	0.55	0.08	6.9	Chrysotile			
G3	65	I8	CD	82	131	MC 1-0	0.8	0.8	1	Chrysotile			
G3	65	I8	CD	83		CD 3-0	1.2	0.85	1.4	Chrysotile			
G3	65	I8	CD		132	CF	0.7	0.08	8.8	Chrysotile			
G3	65	I8	CD		133	CF	0.7	0.12	5.8	Chrysotile			
G3	65	I8	CD		134	CF	0.5	0.1	5	Chrysotile			
G3	65	I8	CD	84	135	F	0.8	0.1	8	Chrysotile			
G3	65	I8	CD	85	136	B	1.25	0.12	10.4	Chrysotile			
G3	65	I8	CD	86		MD 7-0	4	3.85	1	Chrysotile			
G3	65	I8	CD		137	MF	1.2	0.1	12	Chrysotile			
G3	65	I8	CD		138	MF	0.85	0.1	8.5	Chrysotile			
G3	65	I8	CD		139	MR 5-0	3.8	2	1.9	Chrysotile			
G3	65	I8	CD	87		MD 3-0	1.25	0.8	1.6	Chrysotile			
G3	65	I8	CD		140	MF	0.7	0.1	7	Chrysotile			
G3	65	I8	CD		141	MF	0.7	0.1	7	Chrysotile			

Count Categories

AFB>5, 3:1 Asbestos Fibers and Bundles > 5um and 3:1 AS>5, 3:1 Asbestos Structures >5um and 3:1 PAS
PCMEFmodNIOS PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1 PCMESmodNIOS PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1 TAS

Page 11 of 29
Primary Asbestos Structures
Total Asbestos Structures

MW
3/4-08

ISO 10312, Direct Raw Data

Job Number: 080316 **SEA**
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S1
Client Sample No: 10EG-0001
Description: North Berm, West of Crossing

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G3	65	18	CD		142	MF	0.5	0.08	6.2	Chrysotile			
G3	65	18	CD	88		CD 8-0	4.5	2	2.2	Chrysotile			
G3	65	18	CD		143	CB	1.75	0.2	8.8	Chrysotile			
G3	65	18	CD		144	CF	1.25	0.1	12.5	Chrysotile			
G3	65	18	CD		145	CF	1.1	0.1	11	Chrysotile			
G3	65	18	CD		146	CF	0.5	0.1	5	Chrysotile			
G3	65	18	CD		147	CR 4-0	1.35	0.5	2.7	Chrysotile			
G3	65	18	CD	89	148	F	4.7	0.1	47	Chrysotile			
G3	65	18	CD	90	149	B	0.85	0.18	4.7	Chrysotile			
G3	65	18	CD	91	150	F	1.1	0.1	11	Chrysotile			
G3	65	18	CD	92	151	F	0.85	0.1	8.5	Chrysotile			
G3	65	18	CD	93		MD 1-0	1.8	1	1.8	Chrysotile			
G3	65	18	CD		152	MF	0.7	0.1	7	Chrysotile			
G3	65	18	CD	94	153	F	0.7	0.1	7	Chrysotile			
G3	65	18	CD	95		CD 5-0	1	1	1	Chrysotile			
G3	65	18	CD		154	CF	0.7	0.1	7	Chrysotile			
G3	65	18	CD		155	CF	0.5	0.08	6.2	Chrysotile			
G3	65	18	CD		156	CR 3-0	0.85	0.35	2.4	Chrysotile			

Count Categories

AFB>5, 3:1 Asbestos Fibers and Bundles > 5um and 3:1 AS>5, 3:1 Asbestos Structures >5um and 3:1 PAS

PCMEFmodNIOS PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1 PCMESmodNIOS PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1 TAS

MW
 3/4/08

ISO 10312, Direct Raw Data

Job Number: 080316 **SEA**
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S2
Client Sample No: 10EG-0003
Description: Variable, Large Dozer

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	1	A1	CD	1		CD 3-0	1	0.65	1.5	Chrysotile			
G1	1	A1	CD		1	CF	0.85	0.1	8.5	Chrysotile			
G1	1	A1	CD		2	CF	0.65	0.1	6.5	Chrysotile			
G1	1	A1	CD		3	CF	0.5	0.1	5	Chrysotile			
G1	1	A1	CD	2	4	B	1.3	0.2	6.5	Chrysotile			
G1	1	A1	CD	3		CD 3-0	0.8	0.8	1	Chrysotile			
G1	1	A1	CD		5	CF	0.75	0.08	9.4	Chrysotile			
G1	1	A1	CD		6	CF	0.6	0.1	6	Chrysotile			
G1	1	A1	CD		7	CF	0.6	0.1	6	Chrysotile			
G1	1	A1	CD	4	8	F	0.8	0.1	8	Chrysotile			
G1	1	A1	CD	5	9	F	1.25	0.1	12.5	Chrysotile			
G1	1	A1	CD	6		CD 3-0	1.85	1.5	1.2	Chrysotile			
G1	1	A1	CD		10	CB	1.7	0.25	6.8	Chrysotile			
G1	1	A1	CD		11	CF	0.7	0.1	7	Chrysotile			
G1	1	A1	CD		12	CF	0.6	0.1	6	Chrysotile			
G1	1	A1	CD	7	13	B	0.7	0.15	4.7	Chrysotile			
G1	1	A1	CD	8	14	F	0.5	0.1	5	Chrysotile			
G1	1	A1	CD	9	15	F	1.2	0.08	15	Chrysotile			
G1	1	A1	CD	10		CD 5-0	2.75	2	1.4	Chrysotile			
G1	1	A1	CD		16	CF	2.4	0.1	24	Chrysotile			
G1	1	A1	CD		17	CF	1.2	0.1	12	Chrysotile			
G1	1	A1	CD		18	CF	0.9	0.1	9	Chrysotile			
G1	1	A1	CD		19	CF	0.5	0.1	5	Chrysotile			
G1	1	A1	CD		20	CF	0.5	0.1	5	Chrysotile			
G1	1	A1	CD	11		CD 3-0	1.2	0.8	1.5	Chrysotile			
G1	1	A1	CD		21	CF	1	0.08	12.5	Chrysotile			
G1	1	A1	CD		22	CF	0.75	0.1	7.5	Chrysotile			
G1	1	A1	CD		23	CF	0.55	0.1	5.5	Chrysotile			
G1	1	A1	CD	12	24	B	1.2	0.2	6	Chrysotile			
G1	1	A1	CD	13		CD 4-0	3.2	1.75	1.8	Chrysotile			
G1	1	A1	CD		25	CB	2.8	0.2	14	Chrysotile			

Count Categories

AFB>5, 3:1	Asbestos Fibers and Bundles > 5um and 3:1	AS>5, 3:1	Asbestos Structures >5um and 3:1	PAS
PCMEFmodNIOS	PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	PCMESmodNIOS	PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	TAS

MW
3/4/08

ISO 10312, Direct Raw Data

Job Number: 080316 **SEA**
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S2
Client Sample No: 10EG-0003
Description: Variable, Large Dozer

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	1	A1	CD		26	CB	0.8	0.11	7.3	Chrysotile			
G1	1	A1	CD		27	CF	0.8	0.1	8	Chrysotile			
G1	1	A1	CD		28	CF	0.65	0.05	13	Chrysotile			
G1	1	A1	CD	14		MD 5-1	6	1.2	5	Chrysotile	Mg, Si		AS>5, 3:1, PCMESmodNIOSH
						ItemType	ItemNum			Confirmed	Comment		
						Brightfield	J648BF						
						Diffraction Spectra	J648DF						
							J648SP			KM	2/28/2008		
G1	1	A1	CD		29	MB	6	0.3	20	Chrysotile			AFB>5, 3:1, PCMEFmodNIOSH
G1	1	A1	CD		30	MF	0.8	0.1	8	Chrysotile			
G1	1	A1	CD		31	MR 3-0	6	1	6	Chrysotile			
G1	1	A1	CD	15		MD 2-0	1.2	1.2	1	Chrysotile			
G1	1	A1	CD		32	MF	0.8	0.1	8	Chrysotile			
G1	1	A1	CD		33	MF	0.5	0.1	5	Chrysotile			
G1	1	A1	CD	16	34	B	1.2	0.2	6	Chrysotile			
G1	2	C1	CD	17	35	F	0.5	0.1	5	Chrysotile			
G1	2	C1	CD	18	36	B	0.75	0.12	6.2	Chrysotile			
G1	2	C1	CD	19	37	F	1.85	0.1	18.5	Chrysotile			
G1	2	C1	CD	20	38	F	0.65	0.08	8.1	Chrysotile			
G1	2	C1	CD	21	39	B	1	0.15	6.7	Chrysotile			
G1	2	C1	CD	22		MD 1-0	1.75	1	1.8	Chrysotile			
G1	2	C1	CD		40	MB	1	0.25	4	Chrysotile			
G1	2	C1	CD	23	41	B	0.65	0.2	3.2	Chrysotile			
G1	2	C1	CD	24	42	F	0.5	0.1	5	Chrysotile			
G1	2	C1	CD	25		MD 2-0	1.35	1	1.4	Chrysotile			
G1	2	C1	CD		43	MF	0.8	0.05	16	Chrysotile			
G1	2	C1	CD		44	MF	0.6	0.1	6	Chrysotile			
G1	2	C1	CD	26	45	F	0.5	0.1	5	Chrysotile			
G1	2	C1	CD	27	46	B	4.85	0.65	7.5	Chrysotile			
G1	2	C1	CD	28	47	MC 1-0	1.35	1	1.4	Chrysotile			

Count Categories

AFB>5, 3:1	Asbestos Fibers and Bundles > 5um and 3:1	AS>5, 3:1	Asbestos Structures >5um and 3:1	PAS
PCMEFmodNIOSH	PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	PCMESmodNIOSH	PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	TAS

MW
3/1/08

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S2
Client Sample No: 10EG-0003
Description: Variable, Large Dozer

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	2	C1	CD	29	48	F	1.5	0.1	15	Chrysotile			
G1	2	C1	CD	30		MD 1-0	3.7	1.5	2.5	Chrysotile			
G1	2	C1	CD		49	MF	0.6	0.1	6	Chrysotile			
G1	2	C1	CD	31		MD 3-0	3	1	3	Chrysotile			
G1	2	C1	CD		50	MF	1.1	0.1	11	Chrysotile			
G1	2	C1	CD		51	MF	0.6	0.1	6	Chrysotile			
G1	2	C1	CD		52	MF	0.5	0.1	5	Chrysotile			
G1	2	C1	CD	32	53	F	0.6	0.08	7.5	Chrysotile			
G1	2	C1	CD	33		MD 6-1	30	15	2	Chrysotile			AS>5, 3:1
G1	2	C1	CD		54	MB	6.5	0.6	10.8	Chrysotile			AFB>5, 3:1, PCMEFmodNIOSH
G1	2	C1	CD		55	MB	3.2	0.22	14.5	Chrysotile			
G1	2	C1	CD		56	MB	1.5	0.15	10	Chrysotile			
G1	2	C1	CD		57	MF	0.8	0.1	8	Chrysotile			
G1	2	C1	CD		58	MF	0.7	0.1	7	Chrysotile			
G1	2	C1	CD		59	MR 1-0	9	3.5	2.6	Chrysotile			
G1	2	C1	CD	34		MD 3-0	5.2	3.5	1.5	Chrysotile			AS>5, 3:1
G1	2	C1	CD		60	MF	2	0.08	25	Chrysotile			
G1	2	C1	CD		61	MB	1.5	0.45	3.3	Chrysotile			
G1	2	C1	CD		62	MF	1.2	0.1	12	Chrysotile			
G1	2	C1	CD	35	63	F	0.7	0.1	7	Chrysotile			
G1	2	C1	CD	36		MD 3-0	2.5	0.75	3.3	Chrysotile			
G1	2	C1	CD		64	MF	2.4	0.08	30	Chrysotile			
G1	2	C1	CD		65	MF	1.75	0.1	17.5	Chrysotile			
G1	2	C1	CD		66	MF	0.8	0.05	16	Chrysotile			
G1	2	C1	CD	37	67	F	1.2	0.1	12	Chrysotile			
G2	3	E2	CD	38	68	F	1.75	0.08	21.9	Chrysotile			
G2	3	E2	CD	39		MD 6-0	9	9	1	Chrysotile			AS>5, 3:1
G2	3	E2	CD		69	MB	1.5	0.15	10	Chrysotile			
G2	3	E2	CD		70	MB	0.85	0.12	7.1	Chrysotile			
G2	3	E2	CD		71	MF	0.8	0.1	8	Chrysotile			

Count Categories

AFB>5, 3:1	Asbestos Fibers and Bundles > 5um and 3:1	AS>5, 3:1	Asbestos Structures >5um and 3:1	PAS
PCMEFmodNIOSH	PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	PCMESmodNIOSH	PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	TAS

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
 Client: Ecology & Environment
 Project Name: 2233.0253.01RA

Report Number: 080316R02
 Date Received: 2/25/2008

Lab/Cor Sample No: S2
 Client Sample No: 10EG-0003
 Description: Variable, Large Dozer

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G2	3	E2	CD		72	MF	0.7	0.1	7	Chrysotile			
G2	3	E2	CD		73	MR 2-0	8	3	2.7	Chrysotile			
G2	3	E2	CD	40	74	F	0.8	0.1	8	Chrysotile			
G2	3	E2	CD	41		CD 5-1	5.25	0.8	6.6	Chrysotile			AS>5, 3:1, PCMESmodNIOSH AFB>5, 3:1
G2	3	E2	CD		75	CF	5.25	0.11	47.7	Chrysotile			
G2	3	E2	CD		76	CF	1.5	0.1	15	Chrysotile			
G2	3	E2	CD		77	CF	1.5	0.1	15	Chrysotile			
G2	3	E2	CD		78	CF	0.85	0.1	8.5	Chrysotile			
G2	3	E2	CD		79	CF	0.5	0.1	5	Chrysotile			
G2	3	E2	CD	42		MD 2-0	2.4	1.5	1.6	Chrysotile			
G2	3	E2	CD		80	MB	0.75	0.2	3.8	Chrysotile			
G2	3	E2	CD		81	MB	0.6	0.15	4	Chrysotile			
G2	3	E2	CD	43	82	B	3.1	0.2	15.5	Chrysotile			
G2	3	E2	CD	44	83	F	0.9	0.1	9	Chrysotile			
G2	4	H5	CD	45	84	B	0.65	0.18	3.6	Chrysotile			
G2	4	H5	CD	46	85	CC 2-0	1.5	0.85	1.8	Chrysotile			
G2	4	H5	CD	47		MD 2-0	5.5	4	1.4	Chrysotile			AS>5, 3:1
G2	4	H5	CD		86	MB	1.8	0.2	9	Chrysotile			
G2	4	H5	CD		87	MF	0.6	0.11	5.5	Chrysotile			
G2	4	H5	CD	48		MD 4-0	4	3.8	1.1	Chrysotile			
G2	4	H5	CD		88	MB	3.8	0.2	19	Chrysotile			
G2	4	H5	CD		89	MB	3.5	0.22	15.9	Chrysotile			
G2	4	H5	CD		90	MF	1.2	0.1	12	Chrysotile			
G2	4	H5	CD		91	MF	0.8	0.11	7.3	Chrysotile			
G2	4	H5	CD	49	92	B	4.5	0.35	12.9	Chrysotile			
G2	4	H5	CD	50		MD 2-0	6.5	4.5	1.4	Chrysotile			AS>5, 3:1
G2	4	H5	CD		93	MB	3	0.6	5	Chrysotile			
G2	4	H5	CD		94	MB	0.85	0.12	7.1	Chrysotile			
G2	4	H5	CD	51	95	MC 2-0	5.2	4.5	1.2	Chrysotile			AS>5, 3:1
G2	5	I3	CD	52	96	F	0.8	0.1	8	Chrysotile			

Count Categories

AFB>5, 3:1	Asbestos Fibers and Bundles > 5um and 3:1	AS>5, 3:1	Asbestos Structures >5um and 3:1	PAS
PCMEFmodNIOS	PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	PCMESmodNIOS	PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	TAS

*JMW
3/4/08*

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
 Client: Ecology & Environment
 Project Name: 2233.0253.01RA

Report Number: 080316R02
 Date Received: 2/25/2008

Lab/Cor Sample No: S2
 Client Sample No: 10EG-0003
 Description: Variable, Large Dozer

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G2	5	I3	CD	53	97	B	0.6	0.12	5	Chrysotile			
G2	5	I3	CD	54		MD 2-0	2.25	0.85	2.6	Chrysotile			
G2	5	I3	CD		98	MB	1.1	0.15	7.3	Chrysotile			
G2	5	I3	CD		99	MR 1-0	0.8	0.6	1.3	Chrysotile			
G2	5	I3	CD	55		MD 3-0	10	8	1.2	Chrysotile			AS>5, 3:1
G2	5	I3	CD		100	MF	1.8	0.1	18	Chrysotile			
G2	5	I3	CD		101	MF	0.65	0.1	6.5	Chrysotile			
G2	5	I3	CD		102	MF	0.6	0.1	6	Chrysotile			
G2	5	I3	CD	56	103	F	1.8	0.1	18	Chrysotile			
G2	5	I3	CD	57	104	B	0.75	0.15	5	Chrysotile			
G2	5	I3	CD	58	105	F	0.65	0.11	5.9	Chrysotile			
G2	5	I3	CD	59	106	F	0.7	0.1	7	Chrysotile			
G2	5	I3	CD	60	107	F	0.8	0.1	8	Chrysotile			
G2	5	I3	CD	61	108	F	0.85	0.1	8.5	Chrysotile			
G2	5	I3	CD	62	109	F	0.5	0.05	10	Chrysotile			

Count Categories

AFB>5, 3:1 Asbestos Fibers and Bundles > 5um and 3:1 AS>5, 3:1 Asbestos Structures >5um and 3:1 PAS
 PCMEFmodNIOS PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1 PCMESmodNIOS PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1 TAS

MW 3/4/08

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S3
Client Sample No: 10EG-0005
Description: North Berm, At Crossing

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	1	C1				NSD							
G1	2	E1				NSD							
G1	3	G1				NSD							
G1	4	H2	CD	1	1	B	0.6	0.11	5.5	Chrysotile			
G1	5	F2				NSD							
G1	6	D2				NSD							
G1	7	B2				NSD							
G1	8	A3				NSD							
G1	9	C3				NSD							
G1	10	E3				NSD							
G1	11	G3				NSD							
G1	12	I3				NSD							
G1	13	H4	CDQ	2	2	F	0.8	0.1	8	Chrysotile	Mg, Si		
						Item Type	Item Num				Confirmed	Comment	
						Brightfield	J664BF						
						Diffraction	J664DF				KM	3/3/2008	
						Spectra	J664SP						
G1	13	H4	CD	3		CD 11-0	6	4	1.5	Chrysotile			AS>5, 3:1
G1	13	H4	CD		3	CB	4.25	0.6	7.1	Chrysotile			
G1	13	H4	CD		4	CB	1.9	0.22	8.6	Chrysotile			
G1	13	H4	CD		5	CB	1.8	0.2	9	Chrysotile			
G1	13	H4	CD		6	CF	1.1	0.12	9.2	Chrysotile			
G1	13	H4	CD		7	CF	1	0.1	10	Chrysotile			
G1	13	H4	CD		8	CR 6-0	1.5	1.5	1	Chrysotile			
G1	13	H4	CD	4		MD 1-0	1.2	0.3	4	Chrysotile			
G1	13	H4	CD		9	MF	0.65	0.1	6.5	Chrysotile			
G1	13	H4	CD	5	10	F	0.65	0.1	6.5	Chrysotile			
G1	13	H4	CD	6	11	F	1.1	0.08	13.8	Chrysotile			
G1	13	H4	CD	7	12	F	1.2	0.1	12	Chrysotile			
G1	14	F4				NSD							
G1	15	D4				NSD							

Count Categories

AFB>5, 3:1	Asbestos Fibers and Bundles > 5um and 3:1	AS>5, 3:1	Asbestos Structures >5um and 3:1	PAS
PCMEFmodNIOS	PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	PCMESmodNIOS	PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	TAS

MW
3/4/08

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
 Client: Ecology & Environment
 Project Name: 2233.0253.01RA

Report Number: 080316R02
 Date Received: 2/25/2008

Lab/Cor Sample No: S3
 Client Sample No: 10EG-0005
 Description: North Berm, At Crossing

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	16	B4				NSD							
G1	17	A5	CD	8	13	F	0.85	0.1	8.5	Chrysotile			
G1	17	A5	CD	9	14	F	0.5	0.1	5	Chrysotile			
G1	17	A5	CD	10		MD 5-0	4.2	3	1.4	Chrysotile			
G1	17	A5	CD		15	MF	1.5	0.08	18.8	Chrysotile			
G1	17	A5	CD		16	MF	0.7	0.1	7	Chrysotile			
G1	17	A5	CD		17	MR 3-0	4.2	3	1.4	Chrysotile			
G1	18	C5				NSD							
G1	19	D5				NSD							
G1	20	G5				NSD							
G1	21	I5				NSD							
G1	22	J6	CD	11		CD 3-0	1.5	0.5	3	Chrysotile			
G1	22	J6	CD		18	CF	1.2	0.1	12	Chrysotile			
G1	22	J6	CD		19	CB	0.8	0.2	4	Chrysotile			
G1	22	J6	CD		20	CB	0.51	0.2	2.5	Chrysotile			
G1	23	H6				NSD							
G1	24	G6				NSD							
G1	25	D6				NSD							
G1	26	B6				NSD							
G1	27	A7				NSD							
G1	28	C7				NSD							
G1	29	E7	CD	12	21	F	0.51	0.1	5.1	Chrysotile			
G1	30	G7				NSD							
G1	31	I7				NSD							
G1	32	J8				NSD							
G1	33	H8				NSD							
G1	34	F8				NSD							
G2	35	J6	CD	13		MD 17-1	8	6	1.3	Chrysotile			AS>5, 3:1
G2	35	J6	CD		22	MB	6.52	0.45	14.5	Chrysotile			PCMEFmodNIOSH, AFB>5, 3:1
G2	35	J6	CD		23	MF	2.8	0.1	28	Chrysotile			

Count Categories

AFB>5, 3:1 Asbestos Fibers and Bundles > 5um and 3:1 AS>5, 3:1 Asbestos Structures >5um and 3:1 PAS
 PCMEFmodNIOSH PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1 PCMESmodNIOSH PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1 TAS

MW
3/4/08

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S3
Client Sample No: 10EG-0005
Description: North Berm, At Crossing

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G2	35	J6	CD		24	MR 15-0	7	6	1.2	Chrysotile			
G2	35	J6	CD	14	25	CC 6-0	2.8	1	2.8	Chrysotile			
G2	35	J6	CD	15	26	F	0.7	0.08	8.8	Chrysotile			
G2	36	I6				NSD							
G2	37	H6				NSD							
G2	38	H7	NAM	16	27	F	1.75	0.05	35	Non Asbestos Mineral	Al, Si		
G2	39	I7				NSD							
G2	40	J7				NSD							
G2	41	J8				NSD							
G2	42	I8				NSD							
G2	43	H8	CD	17	28	F	1	0.1	10	Chrysotile			
G2	44	I9	CD	18		MD 1-0	5.1	4	1.3	Chrysotile			AS>5, 3:1
G2	44	I9	CD		29	MF	3	0.1	30	Chrysotile			
G3	45	G1	CD	19		MD 1-0	1.25	0.6	2.1	Chrysotile			
G3	45	G1	CD		30	MF	0.85	0.1	8.5	Chrysotile			
G3	46	H1				NSD							
G3	47	H2				NSD							
G3	48	G2				NSD							
G3	49	F2				NSD							
G3	50	G3				NSD							
G3	51	H3				NSD							
G3	52	J4				NSD							
G3	53	I4				NSD							
G3	54	H4				NSD							
G3	55	G4	CD	20		MD 1-0	1.75	0.7	2.5	Chrysotile			
G3	55	G4	CD		31	MB	1.25	0.12	10.4	Chrysotile			
G3	56	G5				NSD							
G3	57	H5				NSD							
G3	58	I5				NSD							

Count Categories

AFB>5, 3:1	Asbestos Fibers and Bundles > 5um and 3:1	AS>5, 3:1	Asbestos Structures >5um and 3:1	PAS
PCMEFmodNIOS	PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	PCMESmodNIOS	PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	TAS

MK
3/4/08

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
 Client: Ecology & Environment
 Project Name: 2233.0253.01RA

Report Number: 080316R02
 Date Received: 2/25/2008

Lab/Cor Sample No: S3
 Client Sample No: 10EG-0005
 Description: North Berm, At Crossing

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G3	59	J5	CD	21		MD 26-1	6	5.5	1.1	Chrysotile			AS>5, 3:1
G3	59	J5	CD		32	MB	5.25	0.2	26.2	Chrysotile			AFB>5, 3:1
G3	59	J5	CD		33	MF	4.2	0.1	42	Chrysotile			
G3	59	J5	CD		34	MF	3	0.1	30	Chrysotile			
G3	59	J5	CD		35	MF	1.5	0.1	15	Chrysotile			
G3	59	J5	CD		36	MF	0.7	0.1	7	Chrysotile			
G3	59	J5	CD		37	MF	0.7	0.1	7	Chrysotile			
G3	59	J5	CD		38	MR 20-0	4.85	3	1.6	Chrysotile			
G3	60	J6				NSD							
G3	61	I6	CD	22	39	B	0.6	0.12	5	Chrysotile			
G3	61	I6	CD	23	40	F	0.5	0.05	10	Chrysotile			
G3	61	I6	CD	24	41	F	0.6	0.1	6	Chrysotile			
G3	61	I6	CD	25	42	F	0.5	0.1	5	Chrysotile			
G3	61	I6	CD	26	43	B	0.85	0.12	7.1	Chrysotile			
G3	61	I6	CD	27	44	F	0.75	0.11	6.8	Chrysotile			
G3	62	H6				NSD							
G3	63	G6				NSD							
G3	64	G7				NSD							
G3	65	H7				NSD							
G3	66	I7				NSD							
G3	67	J7				NSD							

Count Categories

AFB>5, 3:1 Asbestos Fibers and Bundles > 5um and 3:1 AS>5, 3:1 Asbestos Structures >5um and 3:1 PAS
 PCMEFmodNIOS PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1 PCMESmodNIOS PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1 TAS

MW
3/4/08

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S4
Client Sample No: 10EG-0006
Description: North Berm, Far West End

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	1	C1	CD	1	1	F	0.7	0.1	7	Chrysotile			
G1	1	C1	CD	2	2	B	0.65	0.2	3.2	Chrysotile			
G1	1	C1	CD	3	3	F	0.65	0.1	6.5	Chrysotile			
G1	1	C1	CD	4	4	F	0.6	0.1	6	Chrysotile			
G1	1	C1	CD	5	5	F	0.5	0.1	5	Chrysotile			
G1	1	C1	CD	6	6	F	0.6	0.1	6	Chrysotile			
G1	1	C1	CDQ	7	7	B	4.2	1.2	3.5	Chrysotile	Mg, Si		
						ItemType	ItemNum			Confirmed	Comment		
						Brightfield	J665BF						
						DF	J665			KM	3/3/2008		
						Spectra	J665SP						
G1	1	C1	CD	8	8	F	1.2	0.1	12	Chrysotile			
G1	1	C1	CD	9	9	F	0.6	0.1	6	Chrysotile			
G1	1	C1	CD	10	10	F	0.7	0.1	7	Chrysotile			
G1	1	C1	CD	11	11	F	0.65	0.1	6.5	Chrysotile			
G1	1	C1	CD	12		MD 5-0	3	1	3	Chrysotile			
G1	1	C1	CD		12	MF	0.5	0.05	10	Chrysotile			
G1	1	C1	CD		13	MF	0.5	0.05	10	Chrysotile			
G1	1	C1	CD		14	MR 3-0	1.8	0.5	3.6	Chrysotile			
G1	1	C1	CD	13	15	B	1.2	0.2	6	Chrysotile			
G1	2	H3	CD	14		MD 4-0	2.2	1.75	1.3	Chrysotile			
G1	2	H3	CD		16	MF	1.8	0.1	18	Chrysotile			
G1	2	H3	CD		17	MF	1.2	0.08	15	Chrysotile			
G1	2	H3	CD		18	MF	0.8	0.11	7.3	Chrysotile			
G1	2	H3	CD		19	MF	0.6	0.1	6	Chrysotile			
G1	2	H3	CD	15	20	F	0.65	0.1	6.5	Chrysotile			
G1	2	H3	CD	16	21	F	2	0.1	20	Chrysotile			
G1	2	H3	CD	17		MD 1-0	1.8	1.1	1.6	Chrysotile			
G1	2	H3	CD		22	MF	1.2	0.1	12	Chrysotile			
G1	2	H3	NAM	18	23	F	1.2	0.1	12	Non Asbestos Mineral	Al, Si		

Count Categories

AFB>5, 3:1	Asbestos Fibers and Bundles > 5um and 3:1	AS>5, 3:1	Asbestos Structures >5um and 3:1	PAS	Primary Asbestos Structures
PCMEFmodNIOS	PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	PCMESmodNIOS	PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	TAS	Total Asbestos Structures

MW
3/4/08

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
 Client: Ecology & Environment
 Project Name: 2233.0253.01RA

Report Number: 080316R02
 Date Received: 2/25/2008

Lab/Cor Sample No: S4
 Client Sample No: 10EG-0006
 Description: North Berm, Far West End

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	2	H3	CD	19	24	B	1.2	0.22	5.5	Chrysotile			
G1	2	H3	CD	20		MD 105-2	8	8	1	Chrysotile			AS>5, 3:1
G1	2	H3	CD	25		MB	6.8	0.5	13.6	Chrysotile			PCMEFmodNIOSH, AFB>5, 3:1
G1	2	H3	CD	26		MF	5.2	0.1	52	Chrysotile			AFB>5, 3:1
G1	2	H3	CD	27		MF	4.8	0.008	600	Chrysotile			
G1	2	H3	CD	28		MF	3.5	0.1	35	Chrysotile			
G1	2	H3	CD	29		MF	3	0.1	30	Chrysotile			
G1	2	H3	CD	30		MR 100-0	6.5	6	1.1	Chrysotile			
G1	3	G8	CD	21	31	F	0.51	0.08	6.4	Chrysotile			
G1	4	D6	CD	22	32	F	0.8	0.1	8	Chrysotile			
G1	4	D6	CD	23	33	CC 200-10	9	6	1.5	Chrysotile			AS>5, 3:1
G1	4	D6	CD	24	34	B	0.8	0.12	6.7	Chrysotile			
G1	4	D6	CD	25	35	F	0.6	0.05	12	Chrysotile			
G1	5	F3	NAM	26	36	F	1	0.05	20	Non Asbestos Mineral	Al, Si		
G1	6	A5	CD	27	37	B	1.2	0.15	8	Chrysotile			
G1	6	A5	CD	28	38	F	0.6	0.1	6	Chrysotile			
G1	6	A5	CD	29	39	F	1	0.11	9.1	Chrysotile			
G1	6	A5	CD	30	40	F	0.5	0.05	10	Chrysotile			
G1	6	A5	CD	31	41	B	0.8	0.18	4.4	Chrysotile			
G1	6	A5	CD	32	42	F	0.5	0.05	10	Chrysotile			
G1	6	A5	CD	33	43	F	0.75	0.1	7.5	Chrysotile			
G1	7	C8				NSD							
G1	8	I8	CD	34		MD 2-0	4.9	2.8	1.8	Chrysotile			
G1	8	I8	CD	44		MF	1.8	0.1	18	Chrysotile			
G1	8	I8	CD	45		MF	1.5	0.08	18.8	Chrysotile			
G1	8	I8	CD	35	46	F	0.65	0.08	8.1	Chrysotile			
G1	8	I8	CD	36		MD 36-1	9	7	1.3	Chrysotile			AS>5, 3:1
G1	8	I8	CD	47		MB	5.5	0.5	11	Chrysotile			PCMEFmodNIOSH, AFB>5, 3:1

Count Categories

AFB>5, 3:1	Asbestos Fibers and Bundles > 5um and 3:1	AS>5, 3:1	Asbestos Structures >5um and 3:1	PAS
PCMEFmodNIOSH	PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	PCMESmodNIOSH	PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	TAS

Primary Asbestos Structures

Total Asbestos Structures

Handwritten signature and date: MN 3/4/08

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
 Client: Ecology & Environment
 Project Name: 2233.0253.01RA

Report Number: 080316R02
 Date Received: 2/25/2008

Lab/Cor Sample No: S4
 Client Sample No: 10EG-0006
 Description: North Berm, Far West End

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	8	I8	CD		48	MB	4.5	0.11	40.9	Chrysotile			
G1	8	I8	CD		49	MF	1.8	0.1	18	Chrysotile			
G1	8	I8	CD		50	MB	1.75	0.2	8.8	Chrysotile			
G1	8	I8	CD		51	MF	1.2	0.1	12	Chrysotile			
G1	8	I8	CD		52	MF	0.7	0.1	7	Chrysotile			
G1	8	I8	CD		53	MR 30-0	7.5	4.5	1.7	Chrysotile			
G1	8	I8	CD	37	54	F	0.8	0.1	8	Chrysotile			
G2	9	C4	CD	38		MD 5-0	5.2	3.2	1.6	Chrysotile			AS>5, 3:1
G2	9	C4	CD		55	MB	5	0.2	25	Chrysotile			
G2	9	C4	CD		56	MF	3.7	0.1	37	Chrysotile			
G2	9	C4	CD		57	MB	2	0.2	10	Chrysotile			
G2	9	C4	CD		58	MF	0.89	0.1	8.9	Chrysotile			
G2	9	C4	CD		59	MF	0.75	0.1	7.5	Chrysotile			
G2	10	E1	CD	39	60	MC 20-0	3	2.5	1.2	Chrysotile			
G2	10	E1	CD	40	61	F	0.5	0.1	5	Chrysotile			
G2	10	E1	CD	41	62	CC 10-0	1.5	0.5	3	Chrysotile			
G2	11	G4	CD	42	63	F	0.65	0.1	6.5	Chrysotile			
G2	12	J2	CD	43		CD 12-0	2.5	2	1.2	Chrysotile			
G2	12	J2	CD		64	CB	1.85	0.2	9.2	Chrysotile			
G2	12	J2	CD		65	CF	0.5	0.1	5	Chrysotile			
G2	12	J2	CD		66	CR 10-0	1.8	1.2	1.5	Chrysotile			
G2	12	J2	CD	44		MD 2-0	3	2	1.5	Chrysotile			
G2	12	J2	CD		67	MF	0.7	0.1	7	Chrysotile			
G2	12	J2	CD		68	MB	0.7	0.15	4.7	Chrysotile			
G2	12	J2	CD	45	69	F	2	0.1	20	Chrysotile			
G2	12	J2	CD	46	70	B	1.35	0.12	11.2	Chrysotile			
G2	12	J2	CD	47	71	F	1.2	0.1	12	Chrysotile			
G2	12	J2	CD	48	72	F	0.51	0.1	5.1	Chrysotile			
G2	12	J2	CD	49	73	F	0.5	0.1	5	Chrysotile			
G2	12	J2	CD	50	74	F	3	0.1	30	Chrysotile			
G2	12	J2	CD	51	75	F	0.55	0.1	5.5	Chrysotile			

MW31406

Count Categories

AFB>5, 3:1	Asbestos Fibers and Bundles > 5um and 3:1	AS>5, 3:1	Asbestos Structures >5um and 3:1	PAS	Primary Asbestos Structures
PCMEFmodNIOS	PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	PCMESmodNIOS	PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	TAS	Total Asbestos Structures

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S4
Client Sample No: 10EG-0006
Description: North Berm, Far West End

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G2	12	J2	CD	52	76	F	1.15	0.1	11.5	Chrysotile			
G2	12	J2	CD	53	77	B	7.75	0.22	35.2	Chrysotile			AS>5, 3:1, AFB>5, 3:1
G2	12	J2	CD	54	78	F	1.885	0.05	37.7	Chrysotile			
G2	12	J2	CD	55	79	F	0.5	0.05	10	Chrysotile			
G2	12	J2	CD	56	80	F	0.8	0.1	8	Chrysotile			
G2	12	J2	CD	57	81	F	0.6	0.1	6	Chrysotile			
G2	12	J2	CD	58	82	F	1.2	0.1	12	Chrysotile			
G2	12	J2	CD	59	83	F	0.6	0.1	6	Chrysotile			
G2	12	J2	CD	60	84	B	3.5	0.2	17.5	Chrysotile			
G2	12	J2	CD	61		CD 4-0	4.5	0.5	9	Chrysotile			
G2	12	J2	CD		85	MB	2.2	0.11	20	Chrysotile			
G2	12	J2	CD		86	MF	2	0.1	20	Chrysotile			
G2	12	J2	CD		87	MF	0.7	0.1	7	Chrysotile			
G2	12	J2	CD		88	MF	0.8	0.08	10	Chrysotile			
G2	12	J2	CD	62		MD 6-0	4.75	3	1.6	Chrysotile			
G2	12	J2	CD		89	MB	4.8	0.2	24	Chrysotile			
G2	12	J2	CD		90	MB	3.25	0.15	21.7	Chrysotile			
G2	12	J2	CD		91	MF	1.25	0.1	12.5	Chrysotile			
G2	12	J2	CD		92	MB	1.2	0.22	5.5	Chrysotile			
G2	12	J2	CD		93	MF	0.8	0.1	8	Chrysotile			
G2	12	J2	CD		94	MF	0.5	0.1	5	Chrysotile			
G2	12	J2	CD	63	95	F	0.7	0.1	7	Chrysotile			
G2	12	J2	CD	64	96	B	1.5	0.1	15	Chrysotile			
G2	12	J2	CD	65	97	F	0.5	0.1	5	Chrysotile			
G2	12	J2	CD	66	98	B	1.85	0.22	8.4	Chrysotile			
G2	12	J2	CD	67	99	CC 500-100	12	10	1.2	Chrysotile			AS>5, 3:1
G2	12	J2	CD	68	100	B	1.7	0.12	14.2	Chrysotile			
G2	12	J2	CD	69	101	F	0.7	0.1	7	Chrysotile			
G2	12	J2	CD	70	102	CC 5-0	0.7	0.5	1.4	Chrysotile			

Count Categories

AFB>5, 3:1	Asbestos Fibers and Bundles > 5um and 3:1	AS>5, 3:1	Asbestos Structures >5um and 3:1	PAS	Primary Asbestos Structures
PCMEFmodNIOS	PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	PCMESmodNIOS	PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	TAS	Total Asbestos Structures

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S5
Client Sample No: 10EG-0009
Description: TB03

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count	Categories
G1	1	E1				NSD								
G1	2	G1				NSD								
G1	3	I1				NSD								
G1	4	B2				NSD								
G1	5	D2				NSD								
G1	6	F2				NSD								
G1	7	J2				NSD								
G1	8	C3				NSD								
G1	9	E3				NSD								
G1	10	G3				NSD								
G1	11	I3				NSD								
G1	12	D4				NSD								
G1	13	F4				NSD								
G1	14	H4				NSD								
G1	15	J4				NSD								
G1	16	A7				NSD								
G1	17	C7				NSD								
G1	18	E7				NSD								
G1	19	G7				NSD								
G1	20	I7				NSD								
G1	21	B8				NSD								
G1	22	D8				NSD								
G1	23	F8				NSD								
G1	24	H8				NSD								
G1	25	J8				NSD								
G1	26	A9				NSD								
G1	27	B9				NSD								
G1	28	E9				NSD								
G1	29	G9				NSD								
G1	30	I9				NSD								
G1	31	H10				NSD								

MW
3/4/08

Count Categories						Page 26 of 29
AFB>5, 3:1	Asbestos Fibers and Bundles > 5um and 3:1	AS>5, 3:1	Asbestos Structures >5um and 3:1	PAS	Primary Asbestos Structures	
PCMEFmodNIOS	PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	PCMESmodNIOS	PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	TAS	Total Asbestos Structures	

ISO 10312, Direct Raw Data

Job Number: 080316 **SEA**
Client: Ecology & Environment
Project Name: 2233.0253.01RA

Report Number: 080316R02
Date Received: 2/25/2008

Lab/Cor Sample No: S5
Client Sample No: 10EG-0009
Description: TB03

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	32	F10				NSD							
G1	33	D10				NSD							
G1	34	C10				NSD							
G2	35	G1				NSD							
G2	36	I1				NSD							
G2	37	J2				NSD							
G2	38	H2				NSD							
G2	39	F2				NSD							
G2	40	D2				NSD							
G2	41	C3				NSD							
G2	42	E3				NSD							
G2	43	G3				NSD							
G2	44	I3				NSD							
G2	45	J4				NSD							
G2	46	H4				NSD							
G2	47	F4				NSD							
G2	48	D4				NSD							
G2	49	C5				NSD							
G2	50	D5				NSD							
G2	51	G5				NSD							
G2	52	I5				NSD							
G2	53	J5				NSD							
G2	54	J6				NSD							
G2	55	H6				NSD							
G2	56	G6				NSD							
G2	57	D6				NSD							
G2	58	C7				NSD							
G2	59	E7				NSD							
G2	60	G7				NSD							
G2	61	I7				NSD							
G2	62	J8				NSD							

*MW
3/4/08*

Count Categories

AFB>5, 3:1	Asbestos Fibers and Bundles > 5um and 3:1	AS>5, 3:1	Asbestos Structures >5um and 3:1	PAS	Primary Asbestos Structures
PCMEFmodNIOS	PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1	PCMESmodNIOS	PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1	TAS	Total Asbestos Structures

ISO 10312, Direct Raw Data

Job Number: 080316 SEA
 Client: Ecology & Environment
 Project Name: 2233.0253.01RA

Report Number: 080316R02
 Date Received: 2/25/2008

Lab/Cor Sample No: S5
 Client Sample No: 10EG-0009
 Description: TB03

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G2	63	H8				NSD							
G2	64	F8				NSD							
G2	65	D8				NSD							

MW
3/4-08

Count Categories

AFB>5, 3:1 Asbestos Fibers and Bundles > 5um and 3:1 AS>5, 3:1 Asbestos Structures >5um and 3:1 PAS

PCMEFmodNIOS PCM Equivalent Fibers - 0.25-3.0, > 5 & 3:1 PCMESmodNIOS PCM Equivalent Structures - 0.25-3.0, > 5 & 3:1 TAS



ecology and environment, inc.

International Specialists in the Environment

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

MEMORANDUM

DATE: March 14, 2008

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

TO: Jim Petersen, Project Manager, E & E, Portland, OR

SUBJ: **Data Quality Assurance Review, Swift Creek Asbestos Site, Everson, Washington**

REF: TDD: 07-08-0011 PAN: 002233.0253.01RA

The data quality assurance review of 9 air filter samples collected from the Swift Creek Asbestos site in Everson, Washington, has been completed. Phase contrast microscopy (PCM) asbestos analyses (NIOSH method 7400) were performed by Lab/Cor, Inc., Seattle, Washington.

The samples were numbered:

10EG-0001	10EG-0002	10EG-0003	10EG-0004	10EG-0005
10EG-0006	10EG-0007	10EG-0008	10EG-0009	

Data Qualifications:

The samples were received at the laboratory on November 20, 2007, and were analyzed by November 20, 2007. The case narrative noted that the fiber counts in sample 10EG-0007 were altered from 1.5 to 1.0 so that data would report properly. The concentration of the sample was not affected by the change. No other items were noted in the laboratory case narrative.

The overall usefulness of the data is based on the criteria outlined in 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.



Lab/Cor, Inc.
7619 6th Ave NW
Seattle, WA 98117

Analysis Report Cover
Final Report

Phone: (206) 781-0155
Fax: (206) 789-8424
http://www.labcor.net

A Professional Service Corporation in the Northwest

Job Number: 071477 **SEA**
Client: Ecology & Environment
Address: 720 3rd Ave
Suite 1700
Seattle, WA 98104

Report Number: 071477R03
Report Date: 3/7/2008

Project Name: 10EG
Project No.: 10EG-11/20/07-0001
PO Number:
Sub Project:
Reference No.:

Enclosed please find results for samples submitted to our laboratory. A list of samples and analyses follows:

Lab/Cor Sample #	Client Sample # and Description	Analysis	Analysis Notes	Date Received:
071477 - S1	10EG-0001 - North Berm, West of Crossing	NIOSH 7400 (PCM)		11/20/2007
071477 - S2	10EG-0002 - Variable, Small Dozer	NIOSH 7400 (PCM)		11/20/2007
071477 - S3	10EG-0003 - Variable, Large Dozer	NIOSH 7400 (PCM)		11/20/2007
071477 - S4	10EG-0004 - Variable, Excavator	NIOSH 7400 (PCM)		11/20/2007
071477 - S5	10EG-0005 - North Berm, at Crossing	NIOSH 7400 (PCM)		11/20/2007
071477 - S6	10EG-0006 - North Berm, Far West End	NIOSH 7400 (PCM)		11/20/2007
071477 - S7	10EG-0007 - TB01	NIOSH 7400 (PCM)	Fiber counts were altered from 1.5 to 1.0 so that data would report properly. The concentration s of the samples has been unaffected by this change.	11/20/2007
071477 - S8	10EG-0008 - TB02	NIOSH 7400 (PCM)		11/20/2007
071477 - S9	10EG-0009 - TB03	NIOSH 7400 (PCM)		11/20/2007

NIOSH 7400 (PCM) - NIOSH 7400 Preparation and analysis of the above samples was conducted in accordance with the NIOSH 7400 method dated August 15th, 1994. Phase contrast microscopy (PCM) analysis was conducted on air samples collected on mixed cellulose ester (MCE) filters. Samples are placed on a glass slide and exposed to hot acetone vapor until the filter material is completely collapsed. Approximately 0.02ml of Triacetin is placed on the collapsed filter and sealed with a 22mm cover slip. PCM analysis is then performed using a calibrated Olympus BHTU BH-2 phase contrast microscope.

Disclaimer The results reported relate only to the samples tested or analyzed. Interpretation of these results is the sole responsibility of the client.

If further clarification of these results is needed, please call us. Thank you for allowing the staff at Lab/Cor, Inc. the opportunity to provide you with the analytical services.

Sincerely,

x 
Derk Wipprecht
Analyst

MW
3/4-08

NIOSH 7400 (PCM)

Job Number: 071477 SEA
 Client: Ecology & Environment
 Project Name: 10EG

Report Number: 071477R03
 Date Received: 11/20/2007

Lab/Cor Sample No.	Client Sample No.	Description	Volume □ (L)	Total Fibers	Total Fields	Density (Fibers/mm ²)	Concentration (Fiber/cc)	95% Confidence Interval (LCL - UCL)	Analyst	Analyst Date
S1	10EG-0001	North Berm, West of Crossing	518.8	2.5	100	3.185	0.002	0 - 0.007	KM	11/20/2007
S2	10EG-0002	Variable, Small Dozer	86.36	0	100	0	<0.006	0 - 0.021	KM	11/20/2007
S3	10EG-0003	Variable, Large Dozer	332.25	5.5	100	7.006	0.008	0.003 - 0.019	KM	11/20/2007
S4	10EG-0004	Variable, Excavator	625.41	1	100	1.274	0.001	0 - 0.004	KM	11/20/2007
S5	10EG-0005	North Berm, at Crossing	521.28	5	100	6.369	0.005	0.002 - 0.011	KM	11/20/2007
S6	10EG-0006	North Berm, Far West End	607.01	13	100	16.561	0.011	0.006 - 0.018	KM	11/20/2007
S7	10EG-0007	TB01	0	1	100	1.274			KM	11/20/2007

Comments: Fiber counts were altered from 1.5 to 1.0 so that data would report properly. The concentration s of the samples has been unaffected by this change.

S8	10EG-0008	TB02	0	3	100	3.822			KM	11/20/2007
S9	10EG-0009	TB03	0	5	100	6.369			KM	11/20/2007

Reviewed by:

x 
 Derk Wipprecht
 Analyst

MW
 3/4-08

C

Global Positioning System Data

Table C-1**Global Positioning System Coordinates**

Location	Latitude (degrees North)	Longitude (degrees West)
SP26	48.91275	122.293528
Double Gate	48.91315	122.29251
SP14	48.91761	122.29843
SP15 and SP18	48.91406	122.29468
SP27	48.91679	122.29608
West Gate	48.91924	122.30276
Oat Coles Road Bridge	48.91929	122.30288
SP24	48.91351	122.29250
NP04	48.91461	122.29352
NP09	48.91926	122.29840
Goodwin Bridge	48.91093	122.28642
East Gate	48.91116	122.28681

Notes: all GPS locations are \pm 32 feet or less.