Teck

Pend Oreille Mine (POM) Closure

Historic Debris Field Data Gap Assessment and Feasibility Study Work Plan

Draft

Project Revision: 0

Project Preparation Date: February 21, 2023

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Project Revision History					
Revision	**Date (dd-mm-yy)**	**Details of Change**	**Author/Editor**	**Reviewer**	**Approver**
0	21-02-2023	Prepared	Ward McDonald	John Haney	Bruce Howard

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1 Introduction

The Pend Oreille Mine (POM) is an underground lead-zinc mine located approximately 2 miles north of Metaline Falls, in Pend Oreille County, Washington (see "Vicinity Map", Figure 1-1). The POM is owned and operated by Teck Washington, Inc. (TWI) and generally consists of underground mine workings, concrete foundations from the former mill and crusher buildings, administrative offices and maintenance buildings, closed Tailings Disposal Facilities (TDF1 and TDF2), an open TDF (TDF3), a Waste Rock Pile, and associated trafficways and parking areas. The overall layout of the mine is shown on the "Site Plan", Figure 1-2.

Mining and milling operations at the POM ceased in 2019 and TWI announced that the mine would permanently close in April 2021. As part of the mine closure, TWI desires to better understand the magnitude and extent of the Historic Debris Field (Debris Field) located west-northwest of the former Mill Building (see Figure 1-2). This area previously was assessed in 2005 and several contaminants of concern (COCs) were identified at concentrations slightly greater than the Washington State Department of Ecology (Ecology) Model Toxics Control Act (MTCA) cleanup levels for unrestricted land use (GeoEngineers Inc. [GeoEngineers] 2006). GeoEngineers also conducted a slope stability assessment of the Debris Field area to evaluate whether remedial actions could result in slope failure.

The Debris Field, placed long before TWI acquired the property, extends northwest from the former Mill Building and reportedly is present on TWI and Seattle City Light (SCL) property. SCL is aware of the Debris Field and has participated in discussions with TWI about this proposed assessment. The limits of the Debris Field were estimated by GeoEngineers using a geophysical assessment conducted by GeoPotential Environmental and Exploration Geophysics (GeoPotential) in 2005 (see Figure 2-1). Although the limits of the Debris Field are generally known, the magnitude and extent of COCs within those limits require additional assessment to fill data gaps from the 2005 assessment.

On 10 August 2022, TWI entered the Debris Field into Ecology's Voluntary Cleanup Program (VCP) and subsequently provided Ecology with their Historic Debris Field Present State Memorandum (PSA memo) summarizing previous assessment data collected on the area (see Appendix A) for review and comment. Ecology provided their comments regarding current conditions at the Debris Field in two letters to TWI. The first letter was in response to the memorandum and the second letter was in response to TWI's request for a technical opinion related to the acceptance of the Debris Field into the VCP program. The letters are dated 14 July 2022 and 3 October 2022, respectively. In the response letters, Ecology indicated that "the Debris Field is a good candidate for the VCP program"; and Ecology stated the characterization is sufficient to establish cleanup standards and select a cleanup action for the site. However, Ecology noted there are data gaps regarding the comprehensive nature and extent of hazardous waste as well as the current slope stability. Therefore, Haley & Aldrich recommends conducting the following prior to selecting a cleanup action:

1. Assessing the extent of trichloroethylene (TCE)-contaminated material(s) present and assessing for the presence of Resource Conservation and Recovery Act (RCRA) 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) in soil and seepage water;
2. Calculating an updated volume of material at the Debris Field based on additional data;
3. Conducting seep water sampling during greater seasonal flows to supplement the June 2005 sampling event;

4. Conducting a terrestrial ecological evaluation (TEE) in accordance with Washington Administrative Code (WAC) 173-340-7490 through 7494;
5. Conducting a slope survey to assess slope stability and evaluate potential risks posed to workers during remedial field actions; and
6. Providing Ecology with a Feasibility Study (FS) to assess the “most protective” remedial alternative for the Debris Field.

TWI plans to conduct additional environmental site assessment to fill data gaps and prepare an FS for closure. The planned activities in this Work Plan are based on a review of data collected during the 2005 assessment, a site visit conducted by Haley & Aldrich during the fall of 2022 (2022 site visit), the PSA memo, and correspondence and discussions with Ecology. This Work Plan provides: a general background of the POM, goals and objectives for the project, details of data gap assessment and slope survey field activities, data gap assessment and FS reporting details, and the planned project schedule. Details regarding each of these tasks are provided in the following sections.

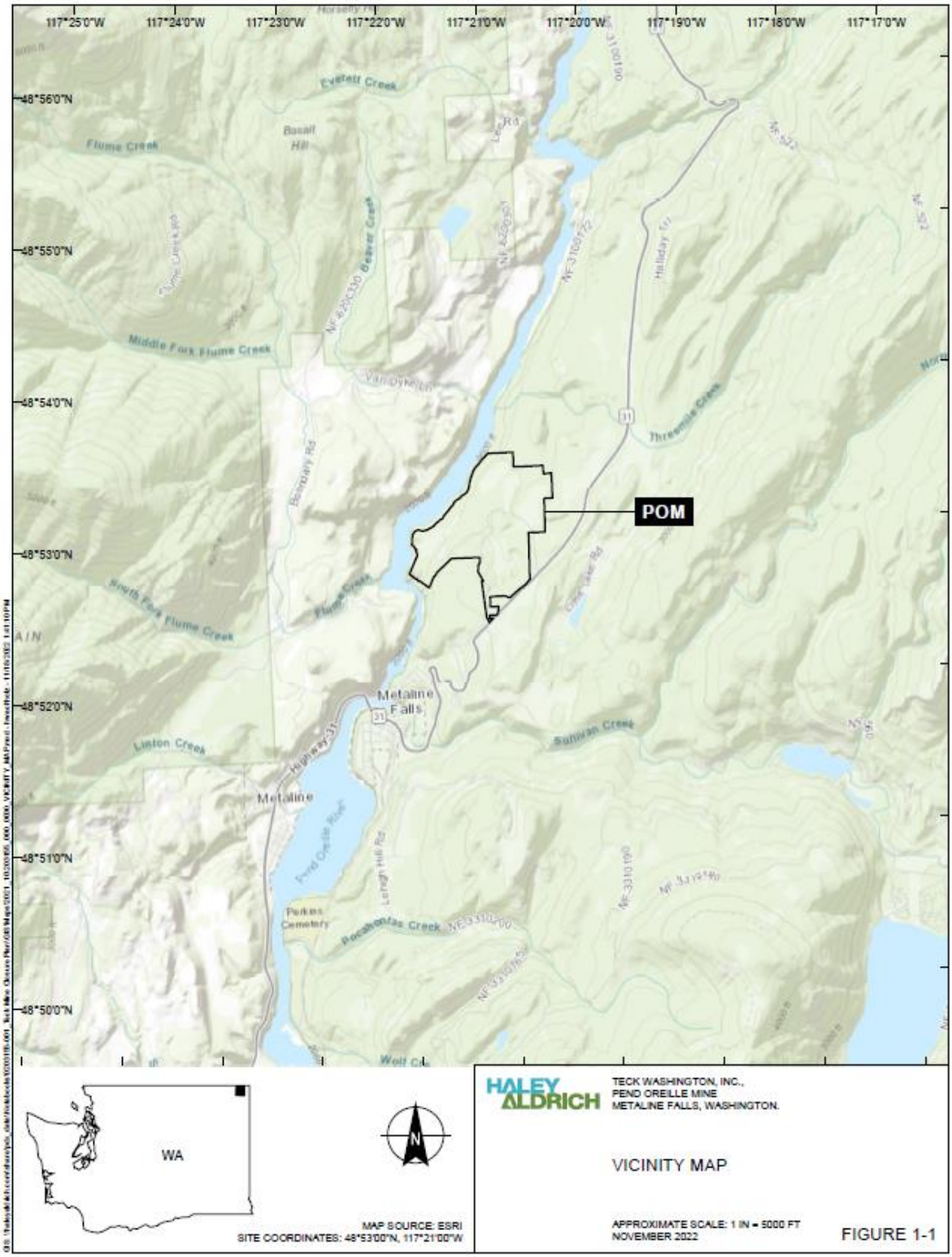

Figure 1-1: Vicinity Map

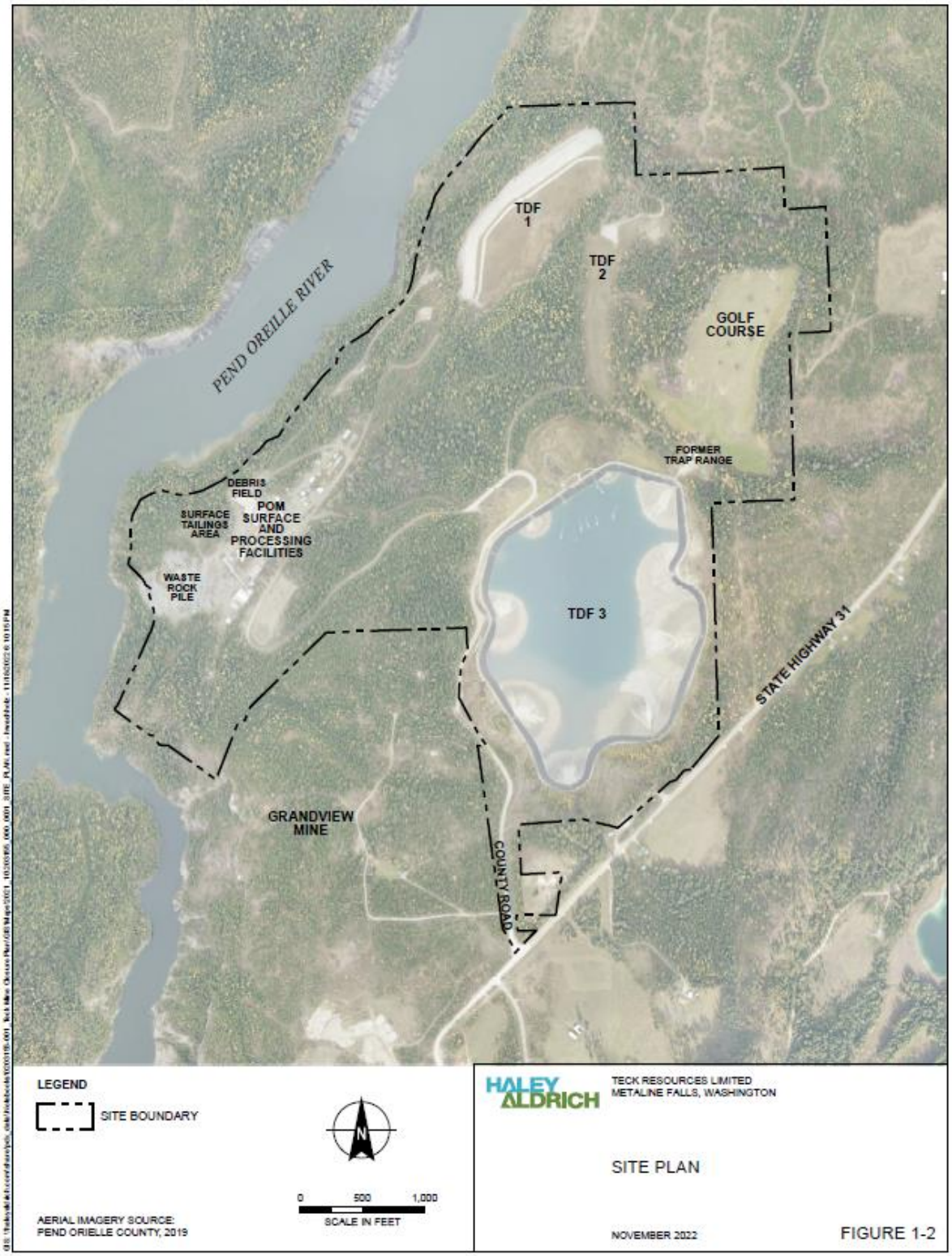

Figure 1-2: Site Plan

2 Background

Mining activities at the POM began in the early 1900s and continued until operations ceased in 1977; the Debris Field is assumed to have been created during this period of mining. TWI purchased the site in 1999 (known at the time as Teck Cominco American Incorporated) and restarted mining operations in 2004. As previously mentioned, the POM ceased operations permanently in 2019.

Ore processing operations at the POM prior to 1977 included crushing and concentrating lead and zinc ore using sulfide flotation and thickening; by-products of mining and milling included waste rock and a tailings slurry. During operations, the lead and zinc ore were generally extracted from two main ore horizons known as the Josephine and Yellowhead horizons. The geology/hydrogeology, and general location of these ore bodies, and pre-1977 historical disposal practices for the waste rock/tailings during operations are discussed in the following sections.

2.1 Site Geology and Hydrogeology

The surface operations of the POM are underlain by glaciolacustrine deposits consisting of laminated clay, silt, and fine sand with thin beds of localized stratified sand and gravel (GeoEngineers 2006). Glaciolacustrine sand and gravel terraces are also present on surrounding mountains at altitudes up to 2,600 feet, and sand and gravel overburden covers the valley floor to depths between 10 and 250 feet. The glaciolacustrine deposits at the POM are underlain by bedrock consisting of the Ledbetter Slate and Metaline Limestone Formations, the latter of which contains the Josephine and Yellowhead horizons.

The Ledbetter Slate formed in the Ordovician Period and occurred in thicknesses up to about 3,000 feet and the Metaline Limestone formed in the mid Cambrian Period and occurs in thicknesses up to about 2,500 feet. The Pend Oreille River valley floor, lower hills, and valley walls are comprised of these formations. The Maitlen Formation, consisting of phyllite, limestone, and shale, and the Gypsy Formation (quartzite) underlie the Metaline Limestone and are exposed in the valley walls in some locations. The Josephine Horizon is present in the upper 500 feet of the Metaline Limestone and the Yellowhead Horizon is present about 500 feet below the Josephine Horizon between about 1,000 and 2,400 feet beneath the top of the Metaline Limestone.

According to the 2000 Final Environmental Impact Statement (FEIS) for the POM, the shallow sediments of the Metaline Falls area create an unconfined aquifer that is primarily influenced by precipitation in the highland areas to the east and west of the Pend Oreille River and by the river itself which acts as a groundwater sink. The glacial sediments can be locally saturated with groundwater in depressions and along major river courses (ENSR 2000).

Based on the FEIS, the bedrock aquifer is located beneath the Ledbetter which acts as an aquiclude to downward movement in the area of the Debris Field. Groundwater generally flows towards the Pend Oreille River, from the south to the northwest (ENSR 2000). Groundwater discharges from seeps and springs in the glacial sediments east of the Debris Field.

2.2 Debris Field

According to the 2006 assessment report, the Debris Field is approximately 200-feet-wide by 300-feet-long and is located on the densely-vegetated, steep hillside north-northwest of the former Mill Building and upland of the Pend Oreille River (see "Proposed Assessment Locations", Figure 2-1). However, Haley & Aldrich observed tailings at shallow depths south-southwest of the estimated Debris Field limits during our 2022 site visit; these observations indicate COCs in the Debris Field might extent beyond the boundaries delineated by the 2005 assessment. Furthermore, a timber launder running through the Debris Field reportedly was used to dispose of mill tailings in the Pend Oreille River prior to TWI operations. The tailings would have been disposed through this area during a time when cyanide was used to process ore.

The Debris Field was first identified during a United States Environmental Protection Agency (EPA) site inspection in 2005. Additional site reconnaissance completed by GeoEngineers between June and August 2005 identified unlabeled metal drums, wood debris (potentially part of the timber launder), and various metal debris (including engine parts) on the Debris Field slope.

During the 2005 assessment, several soil samples were collected from hand auger borings and analyzed for: total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), cyanide, pH, organochlorine pesticides, and polychlorinated biphenyls (PCBs). Analytical results indicate that trichloroethene (TCE) was identified at concentrations greater than the MTCA Method A cleanup level of 0.03 milligrams per kilogram (mg/kg) at three locations. Analytical results indicate that TPH, cyanide, dichloro-diphenyl-trichloroethane (DDT), beta-hexachlorocyclohexane (beta-BHC), and PCBs were present in soil samples but at concentrations less than applicable cleanup levels. The laboratory report from the 2005 assessment is provided in "2005 Analytical Results", Appendix B.

GeoEngineers collected one water sample from the seep located near the northwest limits of the Debris Field (see Figure 2-1); the sample was collected over two consecutive days to obtain enough volume for planned analyses. The sample was analyzed for TPH, VOCs, cyanide, pH, organochlorine pesticides, and PCBs. Analytical results from the sample indicate benzene and methyl tert-butyl ether (MTBE) were detected at concentrations less than the applicable cleanup levels. In addition, analytical results indicate that endosulfan was detected below cleanup levels. Analytical results indicate TPH, cyanide, and PCBs concentrations in the seep water sample was not detected above the method reporting limit.

During the 2005 slope stability assessment, GeoEngineers observed a failure of relatively loose soil/debris within the Debris Field that could have occurred during a time of heavy precipitation (GeoEngineers 2006). Additionally, GeoEngineers concluded that "the existing slope and Debris Field are generally stable in the current configuration" and that "complete removal (at the time of the assessment) is not appropriate because of the high risk to structural integrity of the buildings located upgradient of the Debris Field" (i.e., the former Mill Building).

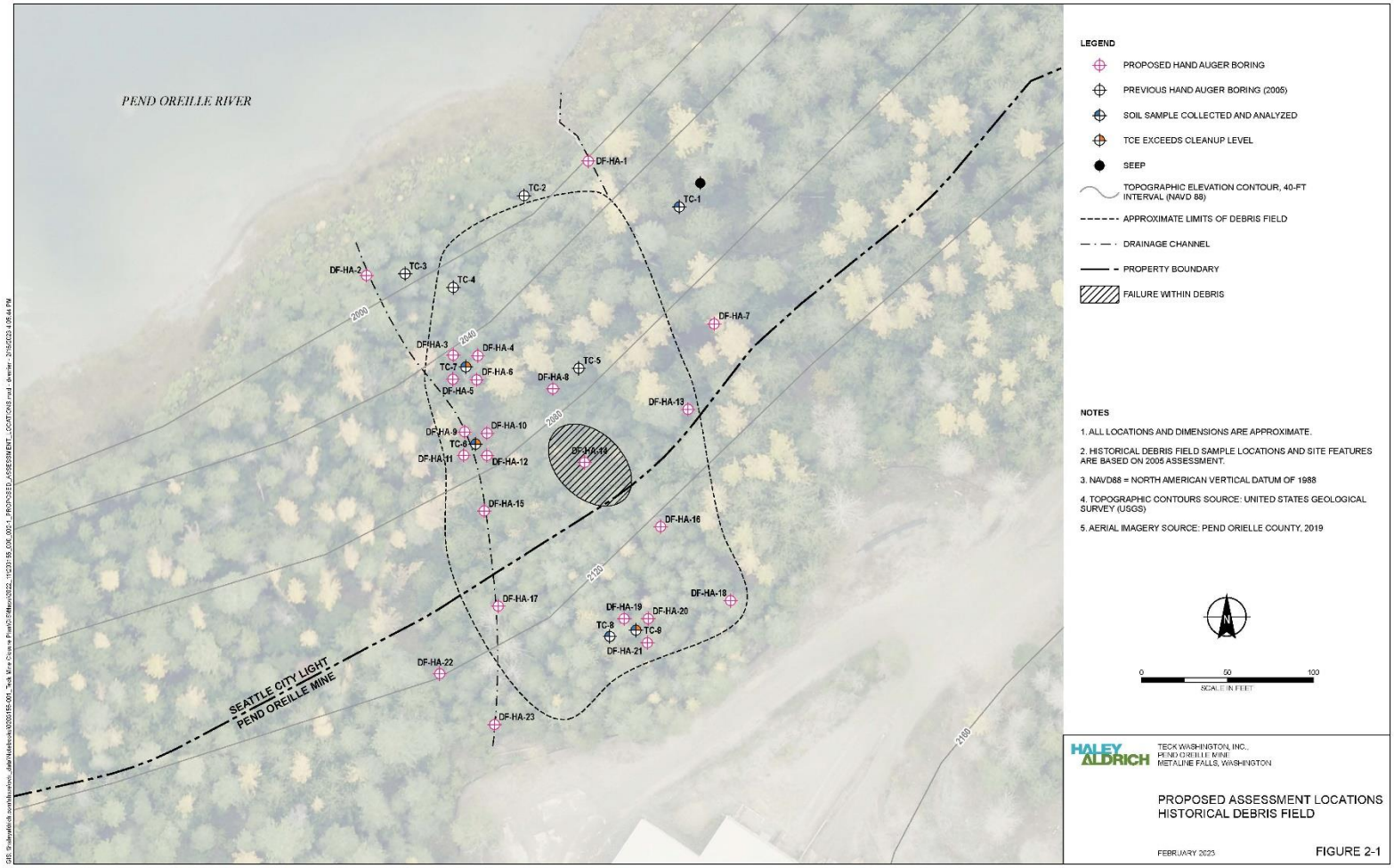

Figure 2-1: Proposed Assessment Locations Historic Debris Field

3 Goals and Objectives

TWI has prepared this Work Plan to identify protocols and procedures that will guide the data gap assessment and slope survey field work based on the response letters from Ecology. The goal for the project is to fill data gaps from the 2005 assessment, assess current conditions of the slope, use the data collected to date to prepare an FS that assesses alternatives to remediate the site. The objectives to meet these goals include (with reference to Haley & Aldrich recommendations):

- Collecting additional soil samples to fill data gaps and further assess the magnitude and extent, including volume, of COCs present in soil in accordance with WAC 173-340-350 (Haley & Aldrich recommendation 1 and 2).
- Collecting seep water samples from the Debris Field to assess if COCs are present during times of greater seasonal flows (Haley & Aldrich recommendation 2).
- Conducting a TEE (recommendation 4).
- Conducting a slope survey to assess current conditions of the slope and potential impacts to slope stability during remedial actions (recommendation 5).
- Preparing an FS for remediation of the Debris Field (recommendation 6).

Additional details of the planned tasks to meet the project goals and objectives for the data gap assessment, slope survey, and preparation of the FS, are summarized in the following sections.

4 Data Gap Assessment

This section describes the approach and methodology to conduct the data gap assessment and slope survey to meet the goals and objectives of the project. This assessment will include collecting solid media and seep/surface water samples from the Debris Field and submitting the samples for laboratory chemical analyses and conducting a field reconnaissance to assess the current conditions of the slope and compare current slope conditions to the 2005 assessment. Protocols for sampling methodologies will generally follow the “Operating Procedures for Surficial Soil Sampling” standard operating procedures (SOPs) in Appendix C; surficial soil as referenced herein refers to soil or soil-like material located less than six feet bgs. Additional details for planned activities are summarized in the following sections.

4.1 Data Gap Assessment Pre-Field Activities

Haley & Aldrich will complete the following tasks prior to commencing surface and subsurface field activities:

- Update our existing TWI site-specific Health and Safety Plan (HASP) as necessary to include planned field activities. The HASP will describe planned field activities, potential hazards, and mitigation methods. The HASP also will include a transportation plan that reflects current access and traffic conditions.

- Identify sub-surface exploration locations with white paint, stakes, and/or flagging and record each location using a global positioning system (GPS) (see Figure 2-1 for exploration locations) prior to subsurface activities.
- Haley & Aldrich will notify the Washington State Utility Notification Center (Notification Center) after the assessment locations are marked to inform them of planned activities. The Notification Center will then notify utility companies in the area to locate and mark underground utilities entering the assessment area.
- A private utility locator will locate and mark conductible utilities near planned assessment locations. Assessment locations will be adjusted in the field, if necessary, to avoid identified underground utilities.
- TWI will provide notifications to SCL for access to their property.

4.2 Data Gap Assessment Field Investigation Approach

Since equipment access at the Debris Field is limited, hand auger borings (or similar hand-excavation methods) will be used to collect surficial soil samples at approximately 23 exploration locations during the data gap assessment (see Figure 2-1 for planned locations). Each hand auger (boring) location will be advanced to target depths listed in "Planned Boring Depths & Sample Analyses", (Table 1) or refusal, whichever comes first. The target boring depths are based on 2005 assessment sample depths and observed depths of contaminants. The data collected from each boring location, and subsequent laboratory assessment, will be used to assess one or more of the following:

- magnitude and extent of TCE near 2005 assessment sample locations TC-6, TC-7, and TC-9 (11 boring locations);
- magnitude and extent of RCRA 8 metals (23 boring locations);
- confirm limits of the Debris Field (10 boring locations);
- media in slope failure (1 boring location); and/or
- sediments in drainage channel(s) (6 boring locations).

The proposed boring locations are shown on Figure 2-1 and the target depths, intended purpose, and proposed chemical analyses for samples collected at each boring location are summarized in Table 1.

Soil and seep/surface water samples will be collected in new, laboratory-provided sample containers. After collection, the samples will be stored in an insulated cooler with ice until delivered to the laboratory for analysis under chain-of-custody. Haley & Aldrich will submit select soil samples to Eurofins Environmental Testing Northwest, LLC in Spokane Valley, Washington (Eurofins), for chemical analyses using standard turn-around-times (typically 10 business days).

Haley & Aldrich will visually field-screen and log the materials encountered during the field work in general accordance with ASTM International (ASTM) Method D 2488. In addition, Haley & Aldrich will map (using GPS) and label each boring location as "Debris Field Hand Auger (DF-HA)" followed by the corresponding boring location number as shown on Figure 2-1 (e.g., DF-HA-1, 2, 3, etc.). Haley & Aldrich will estimate the limits of the Debris Field based on visual observations, boring log data, and available LiDAR images. We also will use GPS to locate and map major site features (i.e., slope failure, visible debris, etc.).

Haley & Aldrich will collect at least one soil sample from each foot explored and submit select soil samples to the analytical laboratory for analysis; soil sample names will be referenced to the boring location and depth range in feet bgs (e.g., a sample collected from between ground surface and one foot bgs from hand auger 1 will be named “DF-HA-1 (0-1)”). After each boring is terminated and samples have been collected, the boring will be backfilled with remaining excavated soil.

Haley & Aldrich will collect up to four water samples from seep and/or drainage locations in and around the Debris Field, if flowing water is observed. The sample locations will be designated according to the following: a surface water sample collected from the first observed source will be “DF-SW-1”; subsequent surface water sample names will be indexed accordingly (i.e., DF-SW-2, -3, -4). Haley & Aldrich will collect water samples by allowing water to flow directly into laboratory-provided sample containers or, if necessary using a stilling well/sump and peristaltic pump. We will use GPS to locate and map seep/surface water sample locations.

4.2.1 Chemical Analyses

Analytical results from the 2005 assessment identified TCE as a COC present in boring locations TC-6, -7, and -9 at concentrations greater than MTCA Method B cleanup levels. Therefore, additional soil samples will be collected from locations around these previous borings to assess the magnitude and extent of TCE present in the Debris Field. Additionally, Ecology recommended submitting samples from the Debris Field for RCRA 8 metals analyses. Therefore, Haley & Aldrich will submit one soil sample from each boring location (23 total) for RCRA 8 metals. Soil samples will be submitted for chemical analyses based on site observations during field activities. Table 1 provides a summary of planned chemical analyses by location.

Seep/surface water samples, if collected, will be analyzed for VOCs and RCRA 8 metals to assess the soil-to-surface water pathway.

4.3 Slope Survey

Due to the potential for catastrophic slope failure from any remediation efforts including excavation and vegetation removal in this area, Haley & Aldrich will conduct a slope stability survey as part of the FS. This survey will include at least a review of historical topographic maps and aerial photographs of the Debris Field area to assess potential changes in the slope over time. TWI also will contact SCL and request copies of data related to slopes stability in the area and/or specific to the Debris Field. Potential for slope failure will be one of the criteria used to select a site remedy.

Haley & Aldrich will conduct a field reconnaissance of the Debris Field slope during the data gap assessment to survey the slope and compare slope features (angles, drainages, failures, etc.) to the 2005 assessment. During the survey, Haley & Aldrich will map three transects from the highest elevations to the lowest elevations of the Debris Field limits and towards the Pend Oreille River. The transects generally will be aligned along the southwest, central, and northeast portions of the Debris Field. While walking each transect, Haley & Aldrich will record changes in slope angles using a handheld angle/range finder, slope lengths using a measuring tape, and log locations of prominent slope features using GPS. Haley & Aldrich will attempt to locate and measure the limits of the previously identified debris failure and map each transect and site feature in the field. After the reconnaissance, Haley & Aldrich will compare recorded data to the 2005 assessment, evaluate if the previously identified slope failure has worsened and/or if additional slope failures have occurred, and assess if these failures pose a risk to site workers during potential remedial actions.

5 Data Gap Assessment and Feasibility Study Report

After the data gap assessment has been conducted and analytical data has been received from the laboratory, chemical analytical results will be reviewed to assess for potential pathways and impacts to human and environmental receptors. If empirical data indicates that no pathway is present from impacted soil to groundwater, additional assessment of groundwater will not be conducted.

Haley & Aldrich will prepare a data gap assessment and FS report. The data gap assessment documentation will summarize the general background of the POM, summary of site assessment data, and findings. The report will include general site information, a conceptual site model, identify likely cleanup levels for COC, include a TEE, tables, figures, and laboratory reports with chain-of-custody documentation in general accordance with WAC 173-350(7)(c).

The report also will include a focused FS prepared in general accordance with WAC 173-340-350 (8) and Ecology's "Toxics Cleanup Program FS Guidance" checklist which is presented in Appendix D. The FS will include a list of potentially affected receptors, point of compliance for each media type (based on local, state, and federal laws), assessment of remedial alternatives in general accordance with WAC 173-340-350 and 360, and TWI's recommended cleanup action, if warranted. Because construction activities on the Debris Field would create concerns for slope stability, TWI will include slope stability as one of the evaluation criteria for comparing feasible remedial options.

6 Schedule

TWI will not initiate field activities until Ecology has provided concurrence with this Work Plan. TWI anticipates the field activities will occur in two mobilization events during the spring of 2023: the first event will include pre-field activities (markings for utility locates and mapping visible boundary of Debris Field) and the second event will include hand auger borings, sample collection, and slope survey reconnaissance. TWI anticipates that this first event will take approximately three business days, and the second field event will take approximately five business days to complete.

Laboratory turn-around times for the analytical methods outlined in this Work Plan are estimated at 10 business days. Upon receipt of laboratory data, data compilation, and validation, development of a draft data gap assessment and FS report is expected to take 10 to 12 weeks. The data gap assessment and FS report will then be submitted to Ecology for review and comment/approval. See Table 2 below, for estimated durations of planned activities.

Table 2 – Approximate Duration of Planned Activities

Planned Activity	Scheduled	Expected Duration of Activity (Business days)
Pre-Field Activities	Spring 2023	3
Hand Auger and Sample Collection Activities		5
Slope Stability Survey		2
Sample Analysis		10
Draft Data Gap Assessment		50 - 60
Feasibility Study Report		
Approximate Total Duration of Planned Activities		78

7 References

1. ENSR, 2000. Final Environmental Impact Statement. July 12, 1999. Ecology Contract No. C9900002. Summary Report Prepared for the Washington State Department of Ecology, Spokane, Washington. ENSR Consulting, Redmond, Washington.
2. GeoEngineers, 2006. Solid Waste Deposit Assessment Pend Oreille Mine, Metaline Falls, Washington. 26 July 2006.
3. Teck Washington Inc., 2022. Historic Debris Field Present State Analysis, Metaline Falls, Washington. 29 April 2022.
4. URS, 2009. Reclamation Cost Estimate Report; Teck American Incorporated, Pend Oreille Mine, 19 August.
5. Washington State Department of Ecology, 2022a. Opinion Letter. 3 October 2022.
6. Washington State Department of Ecology, 2022b. Present State Analysis Letter for Historic Debris Field, Metaline Falls, Washington. 14 July 2022.

https://haleyaldrich.sharepoint.com/sites/EXT-TeckWashingtonIncorporated/Shared Documents/Historic Debris Field/DRAFT Work Plan Rev 3/POM Historic Debris Field Work Plan_D.docx

8 Signatures

Bruce Howard
Environmental Superintendent
Teck Washington Incorporated

Victor Christensen
General Manager
Teck Washington Incorporated

TABLE 1
PLANNED BORING DEPTHS AND SAMPLE ANALYSES
HISTORICAL DEBRIS FIELD DATA GAP ASSESSMENT AND FEASIBILITY STUDY WORK PLAN
PEND OREILLE MINE
METALINE FALLS, WASHINGTON

Boring ID	Target Depth (ft bgs)	Chemical Analyses and Analytical Method	Assessment Rationale
DF-HA-1	3	RCRA 8 Metals- EPA Method 6010	Sediments in Drainage Channel Magnitude and Extent of Debris Field
DF-HA-2	3	RCRA 8 Metals- EPA Method 6010	Sediments in Drainage Channel
DF-HA-3	6	VOC - EPA Method 8260 B RCRA 8 Metals- EPA Method 6010	Magnitude & Extent of TCE
DF-HA-4			
DF-HA-5			
DF-HA-6			
DF-HA-7	3	RCRA 8 Metals- EPA Method 6010	Sediments in Drainage Channel Magnitude and Extent of Debris Field
DF-HA-8	3	RCRA 8 Metals- EPA Method 6010	Magnitude and Extent of Debris Field
DF-HA-9	3	VOC - EPA Method 8260 B RCRA 8 Metals- EPA Method 6010	Sediments in Drainage Channel Magnitude & Extent of TCE
DF-HA-10	6	VOC - EPA Method 8260 B RCRA 8 Metals- EPA Method 6010	Magnitude & Extent of TCE
DF-HA-11			Magnitude & Extent of TCE Magnitude and Extent of Debris Field
DF-HA-12			Magnitude & Extent of TCE
DF-HA-13	3	RCRA 8 Metals- EPA Method 6010	Magnitude and Extent of Debris Field
DF-HA-14	6	RCRA 8 Metals- EPA Method 6010	Media in Slope Failure Magnitude and Extent of Debris Field
DF-HA-15	3	RCRA 8 Metals- EPA Method 6010	Sediments in Drainage Channel
DF-HA-16	3	RCRA 8 Metals- EPA Method 6010	Magnitude and Extent of Debris Field
DF-HA-17	3	RCRA 8 Metals- EPA Method 6010	Sediments in Drainage Channel
DF-HA-18	3	RCRA 8 Metals- EPA Method 6010	Magnitude and Extent of Debris Field
DF-HA-19	6	VOC - EPA Method 8260 B RCRA 8 Metals- EPA Method 6010	Magnitude & Extent of TCE
DF-HA-20			
DF-HA-21			
DF-HA-22	3	RCRA 8 Metals- EPA Method 6010	Magnitude and Extent of Debris Field
DF-HA-23	3	RCRA 8 Metals- EPA Method 6010	Sediments in Drainage Channel Magnitude and Extent of Debris Field

Notes:

ft bgs = feet below ground surface

beta-BHC = beta-hexachlorocyclohexane

DF = Debris Field

HA = Hand auger

EPA = Environmental Protection Agency

RCRA = Resource Conservation and Recovery Act

TBD = to be determined: analytical testing (or not) will be determined based on field observations during data gap assessment.

TCE = trichloroethene

Appendix A – Present State Analysis

Teck

Memorandum

Historic Debris Field Present State

POM-01-TMP

FOR Future Decisions

Revision: 0

Date: 29-Apr-2022

Revision History					
Revision	**Date (dd-MMM-yyyy)**	**Details of Change**	**Author/Editor**	**Reviewer**	**Approver**
0	29-Apr-2022	For Decisions	R.V. Scartozzi	E. Buck/ B. Howard	F. Wimberley
A	13-Dec-2021	For Review	R.V. Scartozzi	E. Buck/ B. Howard	V. Christensen

Project Description			
PROJECT NAME		PEND OREILLE MINE (POM): WBS 530 HISTORIC DEBRIS FIELD – PRESENT STATE	
DECISION No.	NA	**REVISION No.**	ORIGINAL
ORIGINATOR	R. V. SCARTOZZI	**DISCIPLINE/GROUP**	ENVIRONMENTAL

Present State Description

Overview

The Pend Oreille Mine (POM), located in NE Washington State north of Metaline Falls, is an underground lead and zinc operation that has exhausted economical resources and has phased into closure. The mine is located approximately 2 miles north of Metaline Falls, Washington and 95 miles north of Spokane, Washington. The mine has recently announced a transition from care and maintenance status to closure status in April of 2021.

This memo focuses on the Historic Debris Field (HDF) and provides a Present State Analysis, covering the following topics:

- HDF history
- Known extent of potential contamination
- Contamination type
- 2009 Reclamation Plan
- Communities of Interest (COI's)

Historic Debris Field History

Very little is known about the origin of the HDF. The timing of the material placement may have been ongoing since the facility began operating in the early 1950's. Figure 1 shows the location and extent of the HDF. Some of the wood debris is probably part of the launder chute system used to discharge tails from the mill to the river. The discharge point and the debris field location coincide. The launder chute system was abandoned in 1967.

The site was identified on April 6, 2005 during a scheduled site visit/inspection by the Environmental Protection Agency. (Mark Brown correspondence to Washington State Department of Ecology (Ecology), July 28, 2006). In conjunction with Seattle City Light, POM conducted an assessment of the site to determine the extent of the debris field and identify possible contamination sources.

The ensuing report, Solid Waste Deposit Assessment, was completed by GeoEngineers on July 26, 2006, submitted to Ecology, and forms the basis of information for this report.

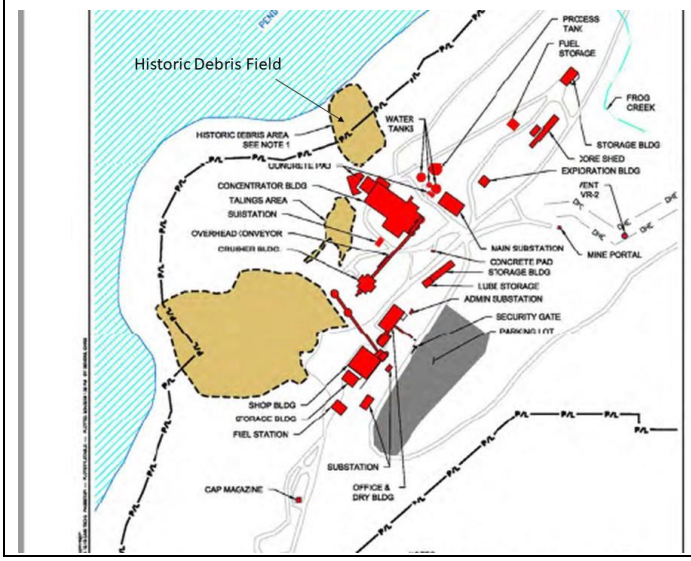

Figure 1: Base map

Extent of Potential Contamination

The three primary objectives for the project report were to (1) assess the extent of the debris field; (2) assess for potential releases to the environment that might be associated with the debris field; and (3) assess slope stability issues if the debris is removed. The extents were determined from a combination of site reconnaissance, soil and waste sampling, a geophysical magnetic survey and ground penetrating radar.

The HDF is on a steep northwest facing slope, beginning at the top of the slope approximately 80 feet from the mill building and extending downslope to within 20-30 feet of the river's edge. Elevations range from 2,145 feet to 2,030 feet (see Figure 2). Roughly half of the HDF is on Teck property while the remainder is on Seattle City Light property. There is small slope failure halfway up the slope that occurred in a debris accumulated area. Vegetation within the HDF is a mixture of deciduous and coniferous trees. Understory vegetation consists of smaller trees, brush, and grasses. It appears that the area was cleared of larger trees in the past. There is a small seep at the base of the slope. No other seeps were present, and groundwater was not encountered in any of the test pits. The total area defining the debris field is about 1.5 acres.

Debris was visible on the surface, partially buried, or encountered in shallow shovel pits. The thickness of the debris is unknown but determined to be in the range of 5.5' thick to 20' thick. The debris is defined by:

- Vegetation consisting of smaller diameter trees and dense underbrush
- Surface debris consisting of metal drums, vehicle body and frame parts, various machine parts, cables, hoses, sheet metal, and wood debris
- Features indicative of past dumping fill soil and debris.

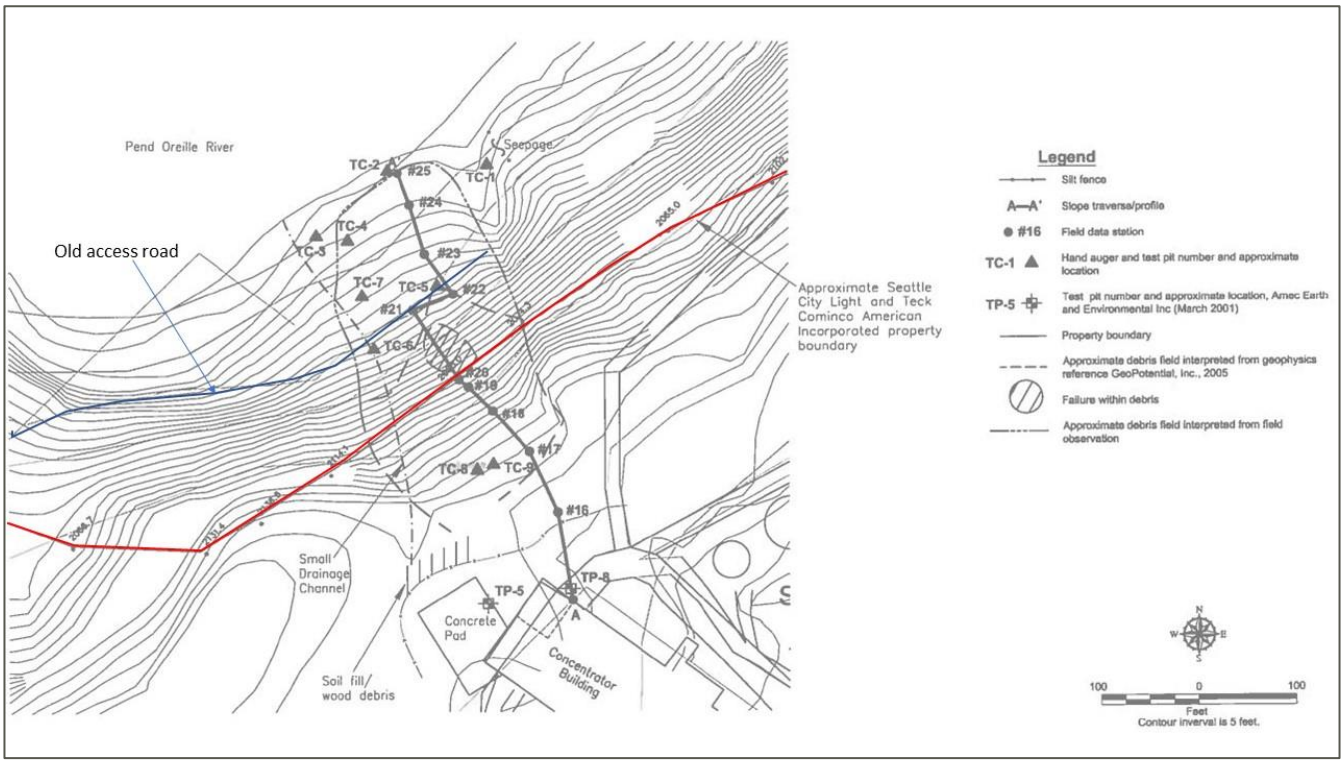

Figure 2: Surveyed extents and relevant features

Contamination Type

The environmental assessment of the HDF identified Trichloroethene present at concentrations exceeding MTCA Method A cleanup levels in soil collected from test pits. Trichloroethene is used as an industrial solvent. Other contaminants, including oil-range petroleum hydrocarbons, organochlorine pesticides, and PCBs were detected at concentrations less than MTCA levels. The presence of partially buried drums suggests that additional undiscovered buried drums might be present.

Water analysis of the seep at the base of the slope did not identify contaminants at concentrations exceeding MTCA groundwater cleanup levels.

2009 Reclamation Plan

The planned closure activities have been previously presented to the Washington State Department of Ecology (Ecology) in two documents, namely ENSR's 2000 "Final Environmental Impact Statement" (FEIS) submitted prior to mining activities and URS's 2009 "Reclamation Plan Report" (Reclamation Plan). The details below are extracted from these documents.

Removal of the debris will require removal of vegetation from the steep slope. The GeoEngineers report states that the removal of the debris is possible without slope failure, but instability issues should be expected by removing the debris and vegetation from the slope, due to:

- Exposure of the slope soil to erosion from precipitation or surface water.
- Potential shallow surface failures in loose soil disturbed by debris removal.
- Potential failure zones in areas where subsurface sand, gravel or seepage is encountered.

COIs

The following entities are identified:

- Washington State Department of Ecology
- Washington State Department of Ecology Shoreline Management
- Department of Natural Resources Shoreline Division
- Pend Oreille County Shoreline Management
- Seattle City Light
- Recreationists using the Pend Oreille River
- Local community

Impact On The Project

Understanding the present state will help prepare POM for future reclamation and closure decisions for this area.

Approvals

		Signature	Date	Role
PREPARED BY	Vince Scartozzi		5/4/2022	Senior Environmental Geologist
REVIEWED BY	Bruce Howard		5/4/22	Environmental Superintendent
REVIEWED BY	Erin Buck		5/3/2022	Engineering Manager
APPROVED BY	Frank Wimberley		5/20/22	Project Manager

Appendix B – 2005 Analytical Results

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Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
TC-1 (0-1)	S5F0090-01	Soil	06/14/05 10:30	06/15/05 11:05
TC-6 (0-2)	S5F0090-06	Soil	06/14/05 15:00	06/15/05 11:05
TC-WS1	S5F0090-08	Water	06/14/05 14:00	06/15/05 11:05

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Semivolatile Petroleum Products by NWTPH-Dx

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-1 (0-1) (S5F0090-01) Soil Sampled: 06/14/05 10:30 Received: 06/15/05 11:05									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	5060156	06/20/05	06/23/05	NWTPH-Dx	
Heavy Oil Range Hydrocarbons	**29.7**	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	*94.8*	*50-150*			"	"	"	"	
Surrogate: p-Terphenyl-d14	*101*	*50-150*			"	"	"	"	
TC-6 (0-2) (S5F0090-06) Soil Sampled: 06/14/05 15:00 Received: 06/15/05 11:05									
Diesel Range Hydrocarbons	ND	100	mg/kg dry	10	5060156	06/20/05	06/23/05	NWTPH-Dx	
Heavy Oil Range Hydrocarbons	**1510**	250	"	"	"	"	"	"	
Surrogate: 2-FBP	*93.5*	*50-150*			"	"	"	"	
Surrogate: p-Terphenyl-d14	*152*	*50-150*			"	"	"	"	*S-02*
TC-WS1 (S5F0090-08) Water Sampled: 06/14/05 14:00 Received: 06/15/05 11:05									
Diesel Range Hydrocarbons	ND	0.250	mg/l	1	5060144	06/17/05	06/24/05	NWTPH-Dx	
Heavy Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surrogate: 2-FBP	*77.2*	*50-150*			"	"	"	"	
Surrogate: p-Terphenyl-d14	*81.0*	*50-150*			"	"	"	"	

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-1 (0-1) (S5F0090-01) Soil Sampled: 06/14/05 10:30 Received: 06/15/05 11:05									
Acetone	ND	1.00	mg/kg dry	1	5060180	06/21/05	06/23/05	EPA 8260B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Bromobenzene	ND	0.100	"	"	"	"	"	"	
Bromochloromethane	ND	0.100	"	"	"	"	"	"	
Bromodichloromethane	ND	0.100	"	"	"	"	"	"	
Bromoform	ND	0.100	"	"	"	"	"	"	
Bromomethane	ND	0.500	"	"	"	"	"	"	
2-Butanone	ND	1.00	"	"	"	"	"	"	
n-Butylbenzene	ND	0.100	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.100	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.100	"	"	"	"	"	"	
Carbon disulfide	ND	0.100	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.100	"	"	"	"	"	"	
Chlorobenzene	ND	0.100	"	"	"	"	"	"	
Chloroethane	ND	0.100	"	"	"	"	"	"	
Chloroform	ND	0.100	"	"	"	"	"	"	
Chloromethane	ND	0.500	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
Dibromochloromethane	ND	0.100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	0.500	"	"	"	"	"	"	
1,2-Dibromoethane	ND	0.100	"	"	"	"	"	"	
Dibromomethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-1 (0-1) (S5F0090-01) Soil Sampled: 06/14/05 10:30 Received: 06/15/05 11:05									
Ethylbenzene	ND	0.100	mg/kg dry	1	5060180	06/21/05	06/23/05	EPA 8260B	
Hexachlorobutadiene	ND	0.100	"	"	"	"	"	"	
2-Hexanone	ND	1.00	"	"	"	"	"	"	
Isopropylbenzene	ND	0.100	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.100	"	"	"	"	"	"	
Methylene chloride	ND	1.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.100	"	"	"	"	"	"	
Naphthalene	ND	0.100	"	"	"	"	"	"	
n-Propylbenzene	ND	0.100	"	"	"	"	"	"	
Styrene	ND	0.100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
Tetrachloroethene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.100	"	"	"	"	"	"	
Trichloroethene	ND	0.0300	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
Vinyl chloride	ND	0.100	"	"	"	"	"	"	
o-Xylene	ND	0.200	"	"	"	"	"	"	
m,p-Xylene	ND	0.400	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*80.4*	*44.8-146*			"	"	"	"	
Surrogate: Toluene-d8	*85.7*	*62.3-143*			"	"	"	"	
Surrogate: 4-bromofluorobenzene	*109*	*52.5-138*			"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-6 (0-2) (S5F0090-06) Soil Sampled: 06/14/05 15:00 Received: 06/15/05 11:05									
Acetone	ND	1.00	mg/kg dry	1	5060180	06/21/05	06/23/05	EPA 8260B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Bromobenzene	ND	0.100	"	"	"	"	"	"	
Bromochloromethane	ND	0.100	"	"	"	"	"	"	
Bromodichloromethane	ND	0.100	"	"	"	"	"	"	
Bromoform	ND	0.100	"	"	"	"	"	"	
Bromomethane	ND	0.500	"	"	"	"	"	"	
2-Butanone	ND	1.00	"	"	"	"	"	"	
n-Butylbenzene	ND	0.100	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.100	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.100	"	"	"	"	"	"	
Carbon disulfide	ND	0.100	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.100	"	"	"	"	"	"	
Chlorobenzene	ND	0.100	"	"	"	"	"	"	
Chloroethane	ND	0.100	"	"	"	"	"	"	
Chloroform	ND	0.100	"	"	"	"	"	"	
Chloromethane	ND	0.500	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
Dibromochloromethane	ND	0.100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	0.500	"	"	"	"	"	"	
1,2-Dibromoethane	ND	0.100	"	"	"	"	"	"	
Dibromomethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-6 (0-2) (S5F0090-06) Soil Sampled: 06/14/05 15:00 Received: 06/15/05 11:05									
Ethylbenzene	ND	0.100	mg/kg dry	1	5060180	06/21/05	06/23/05	EPA 8260B	
Hexachlorobutadiene	ND	0.100	"	"	"	"	"	"	
2-Hexanone	ND	1.00	"	"	"	"	"	"	
Isopropylbenzene	ND	0.100	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.100	"	"	"	"	"	"	
Methylene chloride	ND	1.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.100	"	"	"	"	"	"	
Naphthalene	ND	0.100	"	"	"	"	"	"	
n-Propylbenzene	ND	0.100	"	"	"	"	"	"	
Styrene	ND	0.100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
Tetrachloroethene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.100	"	"	"	"	"	"	
Trichloroethene	**1.76**	0.0300	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
Vinyl chloride	ND	0.100	"	"	"	"	"	"	
o-Xylene	ND	0.200	"	"	"	"	"	"	
m,p-Xylene	ND	0.400	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*81.9*	*44.8-146*			"	"	"	"	
Surrogate: Toluene-d8	*81.9*	*62.3-143*			"	"	"	"	
Surrogate: 4-bromofluorobenzene	*98.4*	*52.5-138*			"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-WS1 (S5F0090-08) Water Sampled: 06/14/05 14:00 Received: 06/15/05 11:05									
Acetone	ND	25.0	ug/l	1	5060118	06/16/05	06/17/05	EPA 8260B	
Benzene	**2.84**	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	1.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	1.00	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-WS1 (S5F0090-08) Water Sampled: 06/14/05 14:00 Received: 06/15/05 11:05									
Ethylbenzene	ND	1.00	ug/l	1	5060118	06/16/05	06/17/05	EPA 8260B	
Hexachlorobutadiene	ND	1.00	"	"	"	"	"	"	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	ND	1.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	10.0	"	"	"	"	"	"	
Methyl tert-butyl ether	**1.80**	1.00	"	"	"	"	"	"	
Naphthalene	ND	1.00	"	"	"	"	"	"	
n-Propylbenzene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
Tetrachloroethene	ND	1.00	"	"	"	"	"	"	
Toluene	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	ND	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	0.200	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*112*	*62.9-131*			"	"	"	"	
Surrogate: Toluene-d8	*102*	*58.7-133*			"	"	"	"	
Surrogate: 4-bromofluorobenzene	*94.0*	*60.8-140*			"	"	"	"	

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F24051: Prepared 06/24/05 Using EPA 3550B										
LCS (5F24051-BS1)										
4,4'-DDT	16.0	2.00	ug/kg wet	16.7		95.8	60-127			
Dieldrin	16.5	2.00	"	16.7		98.8	59-128			
Endosulfan I	7.73	1.00	"	8.33		92.8	32-153			
Endosulfan II	17.9	2.00	"	16.7		107	61-125			
Endosulfan sulfate	17.3	2.00	"	16.7		104	56-125			
Endrin	15.9	2.00	"	16.7		95.2	58-132			
Endrin aldehyde [2C]	18.3	2.00	"	16.7		110	22-144			P-03
Endrin ketone	17.4	2.00	"	16.7		104	50-140			
Heptachlor	7.42	1.00	"	8.33		89.1	59-125			P-03
Heptachlor epoxide	8.12	1.00	"	8.33		97.5	55-125			
Methoxychlor	75.7	2.00	"	83.3		90.9	50-135			
Surrogate: TCX	*6.31*		"	*6.67*		*94.6*	*47-134*			
Surrogate: Decachlorobiphenyl	*6.85*		"	*6.67*		*103*	*35-151*			
LCS Dup (5F24051-BSD1)										
Aldrin	7.32	1.00	ug/kg wet	8.33		87.9	60-125	23.3	30	
alpha-BHC	7.25	1.00	"	8.33		87.0	61-125	12.5	35	
beta-BHC [2C]	7.96	2.00	"	8.33		95.6	37-147	6.44	35	
delta-BHC	7.02	1.00	"	8.33		84.3	57-110	13.9	35	
gamma-BHC (Lindane)	7.05	1.00	"	8.33		84.6	61-125	19.6	30	
alpha-Chlordane	7.18	1.00	"	8.33		86.2	35-151	15.5	35	
gamma-Chlordane	7.34	1.00	"	8.33		88.1	65-125	14.8	35	
4,4'-DDD	14.5	2.00	"	16.7		86.8	70-125	13.5	35	
4,4'-DDE	14.6	2.00	"	16.7		87.4	69-125	11.0	35	
4,4'-DDT	13.5	2.00	"	16.7		80.8	60-127	16.9	35	
Dieldrin	14.7	2.00	"	16.7		88.0	59-128	11.5	35	
Endosulfan I	6.80	1.00	"	8.33		81.6	32-153	12.8	35	
Endosulfan II	15.6	2.00	"	16.7		93.4	61-125	13.7	35	
Endosulfan sulfate	16.2	2.00	"	16.7		97.0	56-125	6.57	35	
Endrin	14.5	2.00	"	16.7		86.8	58-132	9.21	35	
Endrin aldehyde [2C]	14.3	2.00	"	16.7		85.6	22-144	24.5	35	
Endrin ketone	16.5	2.00	"	16.7		98.8	50-140	5.31	35	
Heptachlor	6.28	1.00	"	8.33		75.4	59-125	16.6	30	
Heptachlor epoxide	7.38	1.00	"	8.33		88.6	55-125	9.55	35	
Methoxychlor	72.1	2.00	"	83.3		86.6	50-135	4.87	35	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F24051: Prepared 06/24/05 Using EPA 3550B										
LCS Dup (5F24051-BSD1)										
Surrogate: TCX	*5.89*		*ug/kg wet*	*6.67*		*88.3*	*47-134*			
Surrogate: Decachlorobiphenyl	*6.48*		*"*	*6.67*		*97.2*	*35-151*			
Matrix Spike (5F24051-MS1)					**Source: B5F0427-12**					X
Aldrin	4.24	0.499	ug/kg dry	4.76	ND	89.1	51-125			
alpha-BHC	3.95	0.499	"	4.76	ND	83.0	39-125			
beta-BHC	3.96	0.998	"	4.76	ND	83.2	13-152			
delta-BHC	3.82	0.499	"	4.76	ND	80.3	21-133			
gamma-BHC (Lindane)	3.87	0.499	"	4.76	ND	81.3	36-125			
alpha-Chlordane	3.92	0.499	"	4.76	ND	82.4	24-156			
gamma-Chlordane	4.25	0.499	"	4.76	ND	89.3	34-143			
4,4'-DDD	6.94	0.998	"	9.52	ND	72.9	29-153			
4,4'-DDE	7.94	0.998	"	9.52	ND	83.4	30-160			
4,4'-DDT	7.59	0.998	"	9.52	ND	79.7	31-149			
Dieldrin	7.97	0.998	"	9.52	ND	83.7	41-134			
Endosulfan I	3.65	0.499	"	4.76	ND	76.7	20-155			
Endosulfan II	7.94	0.998	"	9.52	ND	83.4	30-140			
Endosulfan sulfate	8.80	0.998	"	9.52	ND	92.4	14-143			
Endrin	7.26	0.998	"	9.52	ND	76.3	42-137			
Endrin aldehyde	7.26	0.998	"	9.52	ND	76.3	10-144			
Endrin ketone	7.18	0.998	"	9.52	ND	75.4	14-149			
Heptachlor	3.43	0.499	"	4.76	ND	72.1	43-125			
Heptachlor epoxide	3.86	0.499	"	4.76	ND	81.1	51-125			
Methoxychlor	36.0	0.998	"	47.6	ND	75.6	24-138			
Surrogate: TCX	*3.19*		*"*	*3.81*		*83.7*	*47-134*			
Surrogate: Decachlorobiphenyl	*3.34*		*"*	*3.81*		*87.7*	*35-151*			
Matrix Spike (5F24051-MS3)					**Source: B5F0427-12**					
Aldrin	3.98	4.99	ug/kg dry	4.76	ND	83.6	51-125			
alpha-BHC	4.06	4.99	"	4.76	ND	85.3	39-125			
beta-BHC	3.87	9.98	"	4.76	ND	81.3	13-152			
delta-BHC	3.93	4.99	"	4.76	ND	82.6	21-133			
gamma-BHC (Lindane)	3.68	4.99	"	4.76	ND	77.3	36-125			
alpha-Chlordane	4.08	4.99	"	4.76	ND	85.7	24-156			
gamma-Chlordane	4.30	4.99	"	4.76	ND	90.3	34-143			
4,4'-DDD	7.66	9.98	"	9.52	ND	80.5	29-153			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F24051: Prepared 06/24/05 Using EPA 3550B										
Matrix Spike (5F24051-MS3)					**Source: B5F0427-12**					
4,4'-DDE	8.56	9.98	ug/kg dry	9.52	ND	89.9	30-160			
4,4'-DDT	8.40	9.98	"	9.52	ND	88.2	31-149			
Dieldrin	8.67	9.98	"	9.52	ND	91.1	41-134			
Endosulfan I	3.82	4.99	"	4.76	ND	80.3	20-155			
Endosulfan II	8.78	9.98	"	9.52	ND	92.2	30-140			
Endosulfan sulfate	10.0	9.98	"	9.52	ND	105	14-143			
Endrin	7.72	9.98	"	9.52	ND	81.1	42-137			
Endrin aldehyde	8.64	9.98	"	9.52	ND	90.8	10-144			
Endrin ketone	8.68	9.98	"	9.52	ND	91.2	14-149			
Heptachlor	3.54	4.99	"	4.76	ND	74.4	43-125			
Heptachlor epoxide	4.76	4.99	"	4.76	ND	100	51-125			
Methoxychlor	42.7	9.98	"	47.6	ND	89.7	24-138			
Surrogate: TCX	*3.41*		"	*3.81*		*89.5*	*47-134*			
Surrogate: Decachlorobiphenyl	*3.71*		"	*3.81*		*97.4*	*35-151*			
Matrix Spike Dup (5F24051-MSD1)					**Source: B5F0427-12**					X
Aldrin	3.99	0.498	ug/kg dry	4.75	ND	84.0	51-125	6.08	35	
alpha-BHC	3.89	0.498	"	4.75	ND	81.9	39-125	1.53	35	
beta-BHC	3.64	0.997	"	4.75	ND	76.6	13-152	8.42	35	
delta-BHC	3.53	0.498	"	4.75	ND	74.3	21-133	7.89	35	
gamma-BHC (Lindane)	3.84	0.498	"	4.75	ND	80.8	36-125	0.778	35	
alpha-Chlordane	3.67	0.498	"	4.75	ND	77.3	24-156	6.59	35	
gamma-Chlordane	3.88	0.498	"	4.75	ND	81.7	34-143	9.10	35	
4,4'-DDD	6.95	0.997	"	9.50	ND	73.2	29-153	0.144	35	
4,4'-DDE	7.61	0.997	"	9.50	ND	80.1	30-160	4.24	35	
4,4'-DDT	7.82	0.997	"	9.50	ND	82.3	31-149	2.99	35	
Dieldrin	7.71	0.997	"	9.50	ND	81.2	41-134	3.32	35	
Endosulfan I	3.41	0.498	"	4.75	ND	71.8	20-155	6.80	35	
Endosulfan II	7.69	0.997	"	9.50	ND	80.9	30-140	3.20	35	
Endosulfan sulfate	8.48	0.997	"	9.50	ND	89.3	14-143	3.70	35	
Endrin	7.35	0.997	"	9.50	ND	77.4	42-137	1.23	35	
Endrin aldehyde	7.08	0.997	"	9.50	ND	74.5	10-144	2.51	35	
Endrin ketone	7.48	0.997	"	9.50	ND	78.7	14-149	4.09	35	
Heptachlor	3.42	0.498	"	4.75	ND	72.0	43-125	0.292	35	
Heptachlor epoxide	3.76	0.498	"	4.75	ND	79.2	51-125	2.62	35	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F24051: Prepared 06/24/05 Using EPA 3550B										
Matrix Spike Dup (5F24051-MSD1)					**Source: B5F0427-12**					X
Methoxychlor	37.2	0.997	ug/kg dry	47.5	ND	78.3	24-138	3.28	35	
Surrogate: TCX	*3.12*		"	*3.80*		*82.1*	*47-134*			
Surrogate: Decachlorobiphenyl	*3.67*		"	*3.80*		*96.6*	*35-151*			
Matrix Spike Dup (5F24051-MSD3)					**Source: B5F0427-12**					
Aldrin	3.97	4.98	ug/kg dry	4.75	ND	83.6	51-125	0.252	35	
alpha-BHC	3.92	4.98	"	4.75	ND	82.5	39-125	3.51	35	
beta-BHC	3.69	9.97	"	4.75	ND	77.7	13-152	4.76	35	
delta-BHC	3.64	4.98	"	4.75	ND	76.6	21-133	7.66	35	
gamma-BHC (Lindane)	3.60	4.98	"	4.75	ND	75.8	36-125	2.20	35	
alpha-Chlordane	4.03	4.98	"	4.75	ND	84.8	24-156	1.23	35	
gamma-Chlordane	4.16	4.98	"	4.75	ND	87.6	34-143	3.31	35	
4,4'-DDD	7.49	9.97	"	9.50	ND	78.8	29-153	2.24	35	
4,4'-DDE	8.56	9.97	"	9.50	ND	90.1	30-160	0.00	35	
4,4'-DDT	8.11	9.97	"	9.50	ND	85.4	31-149	3.51	35	
Dieldrin	8.55	9.97	"	9.50	ND	90.0	41-134	1.39	35	
Endosulfan I	3.78	4.98	"	4.75	ND	79.6	20-155	1.05	35	
Endosulfan II	8.53	9.97	"	9.50	ND	89.8	30-140	2.89	35	
Endosulfan sulfate	9.43	9.97	"	9.50	ND	99.3	14-143	5.87	35	
Endrin	7.75	9.97	"	9.50	ND	81.6	42-137	0.388	35	
Endrin aldehyde	7.82	9.97	"	9.50	ND	82.3	10-144	9.96	35	
Endrin ketone	8.11	9.97	"	9.50	ND	85.4	14-149	6.79	35	
Heptachlor	3.61	4.98	"	4.75	ND	76.0	43-125	1.96	35	
Heptachlor epoxide	4.39	4.98	"	4.75	ND	92.4	51-125	8.09	35	
Methoxychlor	41.6	9.97	"	47.5	ND	87.6	24-138	2.61	35	
Surrogate: TCX	*3.44*		"	*3.80*		*90.5*	*47-134*			
Surrogate: Decachlorobiphenyl	*3.66*		"	*3.80*		*96.3*	*35-151*			

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5G05054: Prepared 07/05/05 Using 5F28027										
Cal Standard (5G05054-CAL1)										
Aldrin	1.12		ug/l	1.00		112				
Aldrin [2C]	1.14		"	1.00		114				
alpha-BHC	1.03		"	1.00		103				
alpha-BHC [2C]	1.03		"	1.00		103				
beta-BHC	1.67		"	1.00		167				
beta-BHC [2C]	1.37		"	1.00		137				
delta-BHC	1.08		"	1.00		108				
delta-BHC [2C]	1.10		"	1.00		110				
gamma-BHC (Lindane)	1.06		"	1.00		106				
gamma-BHC (Lindane) [2C]	1.00		"	1.00		100				
alpha-Chlordane	1.17		"	1.00		117				
alpha-Chlordane [2C]	1.23		"	1.00		123				
gamma-Chlordane	1.21		"	1.00		121				
gamma-Chlordane [2C]	1.29		"	1.00		129				
4,4'-DDD	2.46		"	2.00		123				
4,4'-DDD [2C]	2.35		"	2.00		118				
4,4'-DDE	2.44		"	2.00		122				
4,4'-DDE [2C]	2.41		"	2.00		120				
4,4'-DDT	2.93		"	2.00		146				
4,4'-DDT [2C]	2.76		"	2.00		138				
Dieldrin	2.32		"	2.00		116				
Dieldrin [2C]	2.40		"	2.00		120				
Endosulfan I	1.30		"	1.00		130				
Endosulfan I [2C]	1.24		"	1.00		124				
Endosulfan II	2.38		"	2.00		119				
Endosulfan II [2C]	2.46		"	2.00		123				
Endosulfan sulfate	2.31		"	2.00		116				
Endosulfan sulfate [2C]	2.26		"	2.00		113				
Endrin	2.53		"	2.00		126				
Endrin [2C]	2.61		"	2.00		130				
Endrin aldehyde	2.46		"	2.00		123				
Endrin aldehyde [2C]	2.37		"	2.00		118				
Endrin ketone	2.62		"	2.00		131				
Endrin ketone [2C]	2.29		"	2.00		114				
Heptachlor	1.39		"	1.00		139				

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5G05054: Prepared 07/05/05 Using 5F28027										
Cal Standard (5G05054-CAL1)										
Heptachlor [2C]	1.45		ug/l	1.00		145				
Heptachlor epoxide	1.32		"	1.00		132				
Heptachlor epoxide [2C]	1.23		"	1.00		123				
Methoxychlor	15.9		"	10.0		159				
Methoxychlor [2C]	15.7		"	10.0		157				
Surrogate: TCX	*2.54*		"	*2.00*		*127*	*20-129*			
Surrogate: TCX [2C]	*2.48*		"	*2.00*		*124*	*20-129*			
Surrogate: Decachlorobiphenyl	*5.20*		"	*4.00*		*130*	*10-131*			
Surrogate: Decachlorobiphenyl [2C]	*5.26*		"	*4.00*		*132*	*10-131*			
Cal Standard (5G05054-CAL2)										
Aldrin	5.01		ug/l	5.00		100				
Aldrin [2C]	5.16		"	5.00		103				
alpha-BHC	4.96		"	5.00		99.2				
alpha-BHC [2C]	5.17		"	5.00		103				
beta-BHC	5.20		"	5.00		104				
beta-BHC [2C]	5.32		"	5.00		106				
delta-BHC	5.88		"	5.00		118				
delta-BHC [2C]	5.15		"	5.00		103				
gamma-BHC (Lindane)	5.19		"	5.00		104				
gamma-BHC (Lindane) [2C]	5.13		"	5.00		103				
alpha-Chlordane	5.07		"	5.00		101				
alpha-Chlordane [2C]	5.59		"	5.00		112				
gamma-Chlordane	4.82		"	5.00		96.4				
gamma-Chlordane [2C]	5.16		"	5.00		103				
4,4'-DDD	10.6		"	10.0		106				
4,4'-DDD [2C]	11.0		"	10.0		110				
4,4'-DDE	10.5		"	10.0		105				
4,4'-DDE [2C]	10.7		"	10.0		107				
4,4'-DDT	12.3		"	10.0		123				
4,4'-DDT [2C]	12.2		"	10.0		122				
Dieldrin	10.7		"	10.0		107				
Dieldrin [2C]	10.9		"	10.0		109				
Endosulfan I	5.41		"	5.00		108				
Endosulfan I [2C]	5.40		"	5.00		108				

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5G05054: Prepared 07/05/05 Using 5F28027										
Cal Standard (5G05054-CAL2)										
Endosulfan II	10.5		ug/l	10.0		105				
Endosulfan II [2C]	10.7		"	10.0		107				
Endosulfan sulfate	10.4		"	10.0		104				
Endosulfan sulfate [2C]	10.4		"	10.0		104				
Endrin	11.4		"	10.0		114				
Endrin [2C]	11.5		"	10.0		115				
Endrin aldehyde	10.3		"	10.0		103				
Endrin aldehyde [2C]	10.2		"	10.0		102				
Endrin ketone	11.3		"	10.0		113				
Endrin ketone [2C]	10.1		"	10.0		101				
Heptachlor	5.92		"	5.00		118				
Heptachlor [2C]	5.89		"	5.00		118				
Heptachlor epoxide	5.29		"	5.00		106				
Heptachlor epoxide [2C]	5.26		"	5.00		105				
Methoxychlor	69.8		"	50.0		140				
Methoxychlor [2C]	69.7		"	50.0		139				
Surrogate: TCX	*11.5*		"	*10.0*		*115*	*20-129*			
Surrogate: TCX [2C]	*11.6*		"	*10.0*		*116*	*20-129*			
Surrogate: Decachlorobiphenyl	*21.8*		"	*20.0*		*109*	*10-131*			
Surrogate: Decachlorobiphenyl [2C]	*23.0*		"	*20.0*		*115*	*10-131*			
Cal Standard (5G05054-CAL3)										
Aldrin	10.4		ug/l	10.0		104				
Aldrin [2C]	11.1		"	10.0		111				
alpha-BHC	10.5		"	10.0		105				
alpha-BHC [2C]	11.0		"	10.0		110				
beta-BHC	10.5		"	10.0		105				
beta-BHC [2C]	11.0		"	10.0		110				
delta-BHC	10.9		"	10.0		109				
delta-BHC [2C]	11.0		"	10.0		110				
gamma-BHC (Lindane)	10.8		"	10.0		108				
gamma-BHC (Lindane) [2C]	11.2		"	10.0		112				
alpha-Chlordane	10.5		"	10.0		105				
alpha-Chlordane [2C]	11.3		"	10.0		113				
gamma-Chlordane	10.4		"	10.0		104				

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5G05054: Prepared 07/05/05 Using 5F28027										
Cal Standard (5G05054-CAL3)										
gamma-Chlordane [2C]	10.5		ug/l	10.0		105				
4,4'-DDD	21.4		"	20.0		107				
4,4'-DDD [2C]	22.5		"	20.0		112				
4,4'-DDE	21.6		"	20.0		108				
4,4'-DDE [2C]	22.7		"	20.0		114				
4,4'-DDT	25.7		"	20.0		128				
4,4'-DDT [2C]	25.8		"	20.0		129				
Dieldrin	22.3		"	20.0		112				
Dieldrin [2C]	23.3		"	20.0		116				
Endosulfan I	11.0		"	10.0		110				
Endosulfan I [2C]	11.2		"	10.0		112				
Endosulfan II	21.5		"	20.0		108				
Endosulfan II [2C]	22.3		"	20.0		112				
Endosulfan sulfate	21.5		"	20.0		108				
Endosulfan sulfate [2C]	21.5		"	20.0		108				
Endrin	23.7		"	20.0		118				
Endrin [2C]	24.5		"	20.0		122				
Endrin aldehyde	20.9		"	20.0		104				
Endrin aldehyde [2C]	21.6		"	20.0		108				
Endrin ketone	21.7		"	20.0		108				
Endrin ketone [2C]	21.2		"	20.0		106				
Heptachlor	11.4		"	10.0		114				
Heptachlor [2C]	11.8		"	10.0		118				
Heptachlor epoxide	10.0		"	10.0		100				
Heptachlor epoxide [2C]	11.0		"	10.0		110				
Methoxychlor	141		"	100		141				
Methoxychlor [2C]	141		"	100		141				
Surrogate: TCX	*23.5*		"	*20.0*		*118*	*20-129*			
Surrogate: TCX [2C]	*23.1*		"	*20.0*		*116*	*20-129*			
Surrogate: Decachlorobiphenyl	*43.4*		"	*40.0*		*108*	*10-131*			
Surrogate: Decachlorobiphenyl [2C]	*44.7*		"	*40.0*		*112*	*10-131*			

North Creek Analytical - Spokane

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Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5G05054: Prepared 07/05/05 Using 5F28027										
Cal Standard (5G05054-CAL4)										
Aldrin	27.9		ug/l	25.0		112				
Aldrin [2C]	30.2		"	25.0		121				
alpha-BHC	28.9		"	25.0		116				
alpha-BHC [2C]	30.7		"	25.0		123				
beta-BHC	27.9		"	25.0		112				
beta-BHC [2C]	29.6		"	25.0		118				
delta-BHC	28.4		"	25.0		114				
delta-BHC [2C]	30.7		"	25.0		123				
gamma-BHC (Lindane)	29.1		"	25.0		116				
gamma-BHC (Lindane) [2C]	30.9		"	25.0		124				
alpha-Chlordane	27.9		"	25.0		112				
alpha-Chlordane [2C]	30.6		"	25.0		122				
gamma-Chlordane	28.1		"	25.0		112				
gamma-Chlordane [2C]	28.1		"	25.0		112				
4,4'-DDD	55.7		"	50.0		111				
4,4'-DDD [2C]	59.7		"	50.0		119				
4,4'-DDE	56.8		"	50.0		114				
4,4'-DDE [2C]	61.9		"	50.0		124				
4,4'-DDT	69.9		"	50.0		140				
4,4'-DDT [2C]	70.5		"	50.0		141				
Dieldrin	59.4		"	50.0		119				
Dieldrin [2C]	63.0		"	50.0		126				
Endosulfan I	28.7		"	25.0		115				
Endosulfan I [2C]	30.3		"	25.0		121				
Endosulfan II	55.5		"	50.0		111				
Endosulfan II [2C]	59.3		"	50.0		119				
Endosulfan sulfate	55.8		"	50.0		112				
Endosulfan sulfate [2C]	56.5		"	50.0		113				
Endrin	63.0		"	50.0		126				
Endrin [2C]	65.8		"	50.0		132				
Endrin aldehyde	54.7		"	50.0		109				
Endrin aldehyde [2C]	58.0		"	50.0		116				
Endrin ketone	54.7		"	50.0		109				
Endrin ketone [2C]	56.0		"	50.0		112				
Heptachlor	29.8		"	25.0		119				

North Creek Analytical - Spokane

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Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5G05054: Prepared 07/05/05 Using 5F28027										
Cal Standard (5G05054-CAL4)										
Heptachlor [2C]	31.8		ug/l	25.0		127				
Heptachlor epoxide	27.2		"	25.0		109				
Heptachlor epoxide [2C]	29.7		"	25.0		119				
Methoxychlor	351		"	250		140				
Methoxychlor [2C]	353		"	250		141				
Surrogate: TCX	*61.1*		"	*50.0*		*122*	*20-129*			
Surrogate: TCX [2C]	*60.7*		"	*50.0*		*121*	*20-129*			
Surrogate: Decachlorobiphenyl	*110*		"	*100*		*110*	*10-131*			
Surrogate: Decachlorobiphenyl [2C]	*113*		"	*100*		*113*	*10-131*			
Cal Standard (5G05054-CAL5)										
Aldrin	57.7		ug/l	50.0		115				
Aldrin [2C]	62.8		"	50.0		126				
alpha-BHC	59.1		"	50.0		118				
alpha-BHC [2C]	63.6		"	50.0		127				
beta-BHC	57.0		"	50.0		114				
beta-BHC [2C]	60.9		"	50.0		122				
delta-BHC	58.5		"	50.0		117				
delta-BHC [2C]	63.9		"	50.0		128				
gamma-BHC (Lindane)	59.7		"	50.0		119				
gamma-BHC (Lindane) [2C]	64.3		"	50.0		129				
alpha-Chlordane	57.3		"	50.0		115				
alpha-Chlordane [2C]	63.3		"	50.0		127				
gamma-Chlordane	58.1		"	50.0		116				
gamma-Chlordane [2C]	58.3		"	50.0		117				
4,4'-DDD	113		"	100		113				
4,4'-DDD [2C]	123		"	100		123				
4,4'-DDE	115		"	100		115				
4,4'-DDE [2C]	126		"	100		126				
4,4'-DDT	144		"	100		144				
4,4'-DDT [2C]	146		"	100		146				
Dieldrin	120		"	100		120				
Dieldrin [2C]	128		"	100		128				
Endosulfan I	58.9		"	50.0		118				
Endosulfan I [2C]	62.9		"	50.0		126				

North Creek Analytical - Spokane

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Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5G05054: Prepared 07/05/05 Using 5F28027										
Cal Standard (5G05054-CAL5)										
Endosulfan II	112		ug/l	100		112				
Endosulfan II [2C]	121		"	100		121				
Endosulfan sulfate	114		"	100		114				
Endosulfan sulfate [2C]	116		"	100		116				
Endrin	127		"	100		127				
Endrin [2C]	133		"	100		133				
Endrin aldehyde	113		"	100		113				
Endrin aldehyde [2C]	121		"	100		121				
Endrin ketone	111		"	100		111				
Endrin ketone [2C]	114		"	100		114				
Heptachlor	60.7		"	50.0		121				
Heptachlor [2C]	65.3		"	50.0		131				
Heptachlor epoxide	56.4		"	50.0		113				
Heptachlor epoxide [2C]	61.3		"	50.0		123				
Methoxychlor	669		"	500		134				
Methoxychlor [2C]	674		"	500		135				
Surrogate: TCX	*124*		"	*100*		*124*	*20-129*			
Surrogate: TCX [2C]	*120*		"	*100*		*120*	*20-129*			
Surrogate: Decachlorobiphenyl	*219*		"	*200*		*110*	*10-131*			
Surrogate: Decachlorobiphenyl [2C]	*225*		"	*200*		*112*	*10-131*			
Cal Standard (5G05054-CAL6)										
Aldrin	85.9		ug/l	75.0		115				
Aldrin [2C]	93.6		"	75.0		125				
alpha-BHC	87.0		"	75.0		116				
alpha-BHC [2C]	93.5		"	75.0		125				
beta-BHC	85.1		"	75.0		113				
beta-BHC [2C]	91.3		"	75.0		122				
delta-BHC	87.3		"	75.0		116				
delta-BHC [2C]	95.9		"	75.0		128				
gamma-BHC (Lindane)	88.4		"	75.0		118				
gamma-BHC (Lindane) [2C]	95.4		"	75.0		127				
alpha-Chlordane	85.5		"	75.0		114				
alpha-Chlordane [2C]	94.5		"	75.0		126				
gamma-Chlordane	86.1		"	75.0		115				

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5G05054: Prepared 07/05/05 Using 5F28027										
Cal Standard (5G05054-CAL6)										
gamma-Chlordane [2C]	87.0		ug/l	75.0		116				
4,4'-DDD	167		"	150		111				
4,4'-DDD [2C]	180		"	150		120				
4,4'-DDE	168		"	150		112				
4,4'-DDE [2C]	184		"	150		123				
4,4'-DDT	215		"	150		143				
4,4'-DDT [2C]	216		"	150		144				
Dieldrin	176		"	150		117				
Dieldrin [2C]	187		"	150		125				
Endosulfan I	87.8		"	75.0		117				
Endosulfan I [2C]	93.4		"	75.0		125				
Endosulfan II	166		"	150		111				
Endosulfan II [2C]	179		"	150		119				
Endosulfan sulfate	170		"	150		113				
Endosulfan sulfate [2C]	174		"	150		116				
Endrin	188		"	150		125				
Endrin [2C]	195		"	150		130				
Endrin aldehyde	169		"	150		113				
Endrin aldehyde [2C]	181		"	150		121				
Endrin ketone	164		"	150		109				
Endrin ketone [2C]	170		"	150		113				
Heptachlor	89.6		"	75.0		119				
Heptachlor [2C]	96.1		"	75.0		128				
Heptachlor epoxide	81.6		"	75.0		109				
Heptachlor epoxide [2C]	90.7		"	75.0		121				
Methoxychlor	955		"	750		127				
Methoxychlor [2C]	968		"	750		129				
Surrogate: TCX	*177*		"	*150*		*118*	*20-129*			
Surrogate: TCX [2C]	*174*		"	*150*		*116*	*20-129*			
Surrogate: Decachlorobiphenyl	*321*		"	*300*		*107*	*10-131*			
Surrogate: Decachlorobiphenyl [2C]	*330*		"	*300*		*110*	*10-131*			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5G05054: Prepared 07/05/05 Using 5F28027										
Cal Standard (5G05054-CAL7)										
Aldrin	115		ug/l	100		115				
Aldrin [2C]	126		"	100		126				
alpha-BHC	118		"	100		118				
alpha-BHC [2C]	125		"	100		125				
beta-BHC	116		"	100		116				
beta-BHC [2C]	125		"	100		125				
delta-BHC	118		"	100		118				
delta-BHC [2C]	130		"	100		130				
gamma-BHC (Lindane)	119		"	100		119				
gamma-BHC (Lindane) [2C]	129		"	100		129				
alpha-Chlordane	115		"	100		115				
alpha-Chlordane [2C]	128		"	100		128				
gamma-Chlordane	117		"	100		117				
gamma-Chlordane [2C]	118		"	100		118				
4,4'-DDD	224		"	200		112				
4,4'-DDD [2C]	242		"	200		121				
4,4'-DDE	225		"	200		112				
4,4'-DDE [2C]	245		"	200		122				
4,4'-DDT	287		"	200		144				
4,4'-DDT [2C]	288		"	200		144				
Dieldrin	233		"	200		116				
Dieldrin [2C]	247		"	200		124				
Endosulfan I	118		"	100		118				
Endosulfan I [2C]	126		"	100		126				
Endosulfan II	222		"	200		111				
Endosulfan II [2C]	238		"	200		119				
Endosulfan sulfate	228		"	200		114				
Endosulfan sulfate [2C]	233		"	200		116				
Endrin	248		"	200		124				
Endrin [2C]	258		"	200		129				
Endrin aldehyde	231		"	200		116				
Endrin aldehyde [2C]	246		"	200		123				
Endrin ketone	219		"	200		110				
Endrin ketone [2C]	228		"	200		114				
Heptachlor	121		"	100		121				

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5G05054: Prepared 07/05/05 Using 5F28027										
Cal Standard (5G05054-CAL7)										
Heptachlor [2C]	130		ug/l	100		130				
Heptachlor epoxide	113		"	100		113				
Heptachlor epoxide [2C]	123		"	100		123				
Methoxychlor	1230		"	1000		123				
Methoxychlor [2C]	1240		"	1000		124				
Surrogate: TCX	*238*		"	*200*		*119*	*20-129*			
Surrogate: TCX [2C]	*231*		"	*200*		*116*	*20-129*			
Surrogate: Decachlorobiphenyl	*425*		"	*400*		*106*	*10-131*			
Surrogate: Decachlorobiphenyl [2C]	*435*		"	*400*		*109*	*10-131*			
Cal Standard (5G05054-CAL8)										
Toxaphene	500		ug/l	500		100				
Toxaphene [2C]	500		"	500		100				
Surrogate: TCX	*50.0*		"	*50.0*		*100*	*20-129*			
Surrogate: TCX [2C]	*50.0*		"	*50.0*		*100*	*20-129*			
Surrogate: Decachlorobiphenyl	*50.0*		"	*50.0*		*100*	*10-131*			
Surrogate: Decachlorobiphenyl [2C]	*50.0*		"	*50.0*		*100*	*10-131*			
Cal Standard (5G05054-CAL9)										
Chlordane (tech)	500		ug/l	500		100				
Chlordane (tech) [2C]	500		"	500		100				
Surrogate: TCX	*50.0*		"	*50.0*		*100*	*20-129*			
Surrogate: TCX [2C]	*50.0*		"	*50.0*		*100*	*20-129*			
Surrogate: Decachlorobiphenyl	*50.0*		"	*50.0*		*100*	*10-131*			
Surrogate: Decachlorobiphenyl [2C]	*50.0*		"	*50.0*		*100*	*10-131*			
Calibration Check (5G05054-CCV2)										
Aldrin	52.1		ug/l	50.0		104	85-115			
Aldrin [2C]	52.6		"	50.0		105	85-115			
alpha-BHC	52.5		"	50.0		105	85-115			
alpha-BHC [2C]	53.5		"	50.0		107	85-115			
beta-BHC	46.6		"	50.0		93.2	85-115			
beta-BHC [2C]	49.4		"	50.0		98.8	85-115			
delta-BHC	49.6		"	50.0		99.2	85-115			
delta-BHC [2C]	52.1		"	50.0		104	85-115			
gamma-BHC (Lindane)	52.0		"	50.0		104	85-115			
gamma-BHC (Lindane) [2C]	53.9		"	50.0		108	85-115			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5G05054: Prepared 07/05/05 Using 5F28027										
Calibration Check (5G05054-CCV2)										
alpha-Chlordane	51.9		ug/l	50.0		104	85-115			
alpha-Chlordane [2C]	50.2		"	50.0		100	85-115			
gamma-Chlordane	51.9		"	50.0		104	85-115			
gamma-Chlordane [2C]	49.7		"	50.0		99.4	85-115			
4,4'-DDD	100		"	100		100	85-115			
4,4'-DDD [2C]	102		"	100		102	85-115			
4,4'-DDE	101		"	100		101	85-115			
4,4'-DDE [2C]	103		"	100		103	85-115			
4,4'-DDT	103		"	100		103	85-115			
4,4'-DDT [2C]	105		"	100		105	85-115			
Dieldrin	103		"	100		103	85-115			
Dieldrin [2C]	104		"	100		104	85-115			
Endosulfan I	50.2		"	50.0		100	85-115			
Endosulfan I [2C]	51.6		"	50.0		103	85-115			
Endosulfan II	101		"	100		101	85-115			
Endosulfan II [2C]	90.8		"	100		90.8	85-115			
Endosulfan sulfate	100		"	100		100	85-115			
Endosulfan sulfate [2C]	101		"	100		101	85-115			
Endrin	99.8		"	100		99.8	85-115			
Endrin [2C]	103		"	100		103	85-115			
Endrin aldehyde	99.1		"	100		99.1	85-115			
Endrin aldehyde [2C]	101		"	100		101	85-115			
Endrin ketone	98.2		"	100		98.2	85-115			
Endrin ketone [2C]	101		"	100		101	85-115			
Heptachlor	49.0		"	50.0		98.0	85-115			
Heptachlor [2C]	50.0		"	50.0		100	85-115			
Heptachlor epoxide	48.1		"	50.0		96.2	85-115			
Heptachlor epoxide [2C]	51.2		"	50.0		102	85-115			
Methoxychlor	486		"	500		97.2	85-115			
Methoxychlor [2C]	488		"	500		97.6	85-115			
Surrogate: TCX	*101*		"	*100*		*101*	*20-129*			
Surrogate: TCX [2C]	*101*		"	*100*		*101*	*20-129*			
Surrogate: Decachlorobiphenyl	*198*		"	*200*		*99.0*	*10-131*			
Surrogate: Decachlorobiphenyl [2C]	*198*		"	*200*		*99.0*	*10-131*			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5G05054: Prepared 07/05/05 Using 5F28027										
Calibration Check (5G05054-CCV4)										
Aldrin	50.8		ug/l	50.0		102	85-115			
Aldrin [2C]	51.1		"	50.0		102	85-115			
alpha-BHC	49.6		"	50.0		99.2	85-115			
alpha-BHC [2C]	50.4		"	50.0		101	85-115			
beta-BHC	42.9		"	50.0		85.8	85-115			
beta-BHC [2C]	46.9		"	50.0		93.8	85-115			
delta-BHC	48.5		"	50.0		97.0	85-115			
delta-BHC [2C]	50.6		"	50.0		101	85-115			
gamma-BHC (Lindane)	47.8		"	50.0		95.6	85-115			
gamma-BHC (Lindane) [2C]	50.3		"	50.0		101	85-115			
alpha-Chlordane	49.9		"	50.0		99.8	85-115			
alpha-Chlordane [2C]	49.5		"	50.0		99.0	85-115			
gamma-Chlordane	50.5		"	50.0		101	85-115			
gamma-Chlordane [2C]	48.8		"	50.0		97.6	85-115			
4,4'-DDD	96.9		"	100		96.9	85-115			
4,4'-DDD [2C]	96.7		"	100		96.7	85-115			
4,4'-DDE	100		"	100		100	85-115			
4,4'-DDE [2C]	100		"	100		100	85-115			
4,4'-DDT	89.9		"	100		89.9	85-115			
4,4'-DDT [2C]	93.5		"	100		93.5	85-115			
Dieldrin	101		"	100		101	85-115			
Dieldrin [2C]	100		"	100		100	85-115			
Endosulfan I	49.5		"	50.0		99.0	85-115			
Endosulfan I [2C]	49.9		"	50.0		99.8	85-115			
Endosulfan II	102		"	100		102	85-115			
Endosulfan II [2C]	94.9		"	100		94.9	85-115			
Endosulfan sulfate	99.4		"	100		99.4	85-115			
Endosulfan sulfate [2C]	98.9		"	100		98.9	85-115			
Endrin	94.9		"	100		94.9	85-115			
Endrin [2C]	94.0		"	100		94.0	85-115			
Endrin aldehyde	101		"	100		101	85-115			
Endrin aldehyde [2C]	100		"	100		100	85-115			
Endrin ketone	90.1		"	100		90.1	85-115			
Endrin ketone [2C]	93.1		"	100		93.1	85-115			
Heptachlor	44.4		"	50.0		88.8	85-115			

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Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5G05054: Prepared 07/05/05 Using 5F28027										
Calibration Check (5G05054-CCV4)										
Heptachlor [2C]	45.3		ug/l	50.0		90.6	85-115			
Heptachlor epoxide	47.4		"	50.0		94.8	85-115			
Heptachlor epoxide [2C]	49.6		"	50.0		99.2	85-115			
Methoxychlor	433		"	500		86.6	85-115			
Methoxychlor [2C]	431		"	500		86.2	85-115			
Surrogate: TCX	*97.6*		"	*100*		*97.6*	*20-129*			
Surrogate: TCX [2C]	*97.5*		"	*100*		*97.5*	*20-129*			
Surrogate: Decachlorobiphenyl	*200*		"	*200*		*100*	*10-131*			
Surrogate: Decachlorobiphenyl [2C]	*195*		"	*200*		*97.5*	*10-131*			
Calibration Check (5G05054-CCV6)										
Aldrin	51.2		ug/l	50.0		102	85-115			
Aldrin [2C]	53.0		"	50.0		106	85-115			
alpha-BHC	52.7		"	50.0		105	85-115			
alpha-BHC [2C]	54.7		"	50.0		109	85-115			
beta-BHC	46.9		"	50.0		93.8	85-115			
beta-BHC [2C]	50.8		"	50.0		102	85-115			
delta-BHC	50.2		"	50.0		100	85-115			
delta-BHC [2C]	54.1		"	50.0		108	85-115			
gamma-BHC (Lindane)	52.0		"	50.0		104	85-115			
gamma-BHC (Lindane) [2C]	54.9		"	50.0		110	85-115			
alpha-Chlordane	49.0		"	50.0		98.0	85-115			
alpha-Chlordane [2C]	49.1		"	50.0		98.2	85-115			
gamma-Chlordane	49.9		"	50.0		99.8	85-115			
gamma-Chlordane [2C]	48.6		"	50.0		97.2	85-115			
4,4'-DDD	104		"	100		104	85-115			
4,4'-DDD [2C]	108		"	100		108	85-115			
4,4'-DDE	97.2		"	100		97.2	85-115			
4,4'-DDE [2C]	99.8		"	100		99.8	85-115			
4,4'-DDT	74.1		"	100		74.1	85-115			
4,4'-DDT [2C]	76.6		"	100		76.6	85-115			
Dieldrin	98.6		"	100		98.6	85-115			
Dieldrin [2C]	99.5		"	100		99.5	85-115			
Endosulfan I	48.4		"	50.0		96.8	85-115			
Endosulfan I [2C]	49.5		"	50.0		99.0	85-115			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5G05054: Prepared 07/05/05 Using 5F28027										
Calibration Check (5G05054-CCV6)										
Endosulfan II	95.4		ug/l	100		95.4	85-115			
Endosulfan II [2C]	93.8		"	100		93.8	85-115			
Endosulfan sulfate	96.1		"	100		96.1	85-115			
Endosulfan sulfate [2C]	95.4		"	100		95.4	85-115			
Endrin	95.5		"	100		95.5	85-115			
Endrin [2C]	97.4		"	100		97.4	85-115			
Endrin aldehyde	96.3		"	100		96.3	85-115			
Endrin aldehyde [2C]	96.0		"	100		96.0	85-115			
Endrin ketone	91.0		"	100		91.0	85-115			
Endrin ketone [2C]	94.7		"	100		94.7	85-115			
Heptachlor	47.0		"	50.0		94.0	85-115			
Heptachlor [2C]	48.6		"	50.0		97.2	85-115			
Heptachlor epoxide	48.4		"	50.0		96.8	85-115			
Heptachlor epoxide [2C]	50.3		"	50.0		101	85-115			
Methoxychlor	403		"	500		80.6	85-115			
Methoxychlor [2C]	406		"	500		81.2	85-115			
Surrogate: TCX	*103*		"	*100*		*103*	*20-129*			
Surrogate: TCX [2C]	*103*		"	*100*		*103*	*20-129*			
Surrogate: Decachlorobiphenyl	*180*		"	*200*		*90.0*	*10-131*			
Surrogate: Decachlorobiphenyl [2C]	*177*		"	*200*		*88.5*	*10-131*			
Secondary Cal Check (5G05054-SCV2)										
Aldrin	52.3		ug/l	50.0		105	80-120			
Aldrin [2C]	53.5		"	50.0		107	80-120			
alpha-BHC	50.3		"	50.0		101	80-120			
alpha-BHC [2C]	51.5		"	50.0		103	80-120			
beta-BHC	47.8		"	50.0		95.6	80-120			
beta-BHC [2C]	51.0		"	50.0		102	80-120			
delta-BHC	47.2		"	50.0		94.4	80-120			
delta-BHC [2C]	50.0		"	50.0		100	80-120			
gamma-BHC (Lindane)	48.4		"	50.0		96.8	80-120			
gamma-BHC (Lindane) [2C]	50.3		"	50.0		101	80-120			
alpha-Chlordane	50.1		"	50.0		100	80-120			
alpha-Chlordane [2C]	50.2		"	50.0		100	80-120			
gamma-Chlordane	50.9		"	50.0		102	80-120			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5G05054: Prepared 07/05/05 Using 5F28027										
Secondary Cal Check (5G05054-SCV2)										
gamma-Chlordane [2C]	49.9		ug/l	50.0		99.8	80-120			
4,4'-DDD	91.6		"	100		91.6	80-120			
4,4'-DDD [2C]	93.4		"	100		93.4	80-120			
4,4'-DDE	97.7		"	100		97.7	80-120			
4,4'-DDE [2C]	101		"	100		101	80-120			
4,4'-DDT	92.0		"	100		92.0	80-120			
4,4'-DDT [2C]	95.2		"	100		95.2	80-120			
Dieldrin	98.4		"	100		98.4	80-120			
Dieldrin [2C]	99.6		"	100		99.6	80-120			
Endosulfan I	46.6		"	50.0		93.2	80-120			
Endosulfan I [2C]	47.9		"	50.0		95.8	80-120			
Endosulfan II	100		"	100		100	80-120			
Endosulfan II [2C]	96.6		"	100		96.6	80-120			
Endosulfan sulfate	102		"	100		102	80-120			
Endosulfan sulfate [2C]	103		"	100		103	80-120			
Endrin	91.8		"	100		91.8	80-120			
Endrin [2C]	93.9		"	100		93.9	80-120			
Endrin aldehyde	109		"	100		109	80-120			
Endrin aldehyde [2C]	112		"	100		112	80-120			
Endrin ketone	99.5		"	100		99.5	80-120			
Endrin ketone [2C]	104		"	100		104	80-120			
Heptachlor	42.7		"	50.0		85.4	80-120			
Heptachlor [2C]	43.0		"	50.0		86.0	80-120			
Heptachlor epoxide	48.6		"	50.0		97.2	80-120			
Heptachlor epoxide [2C]	51.0		"	50.0		102	80-120			
Methoxychlor	438		"	500		87.6	80-120			
Methoxychlor [2C]	443		"	500		88.6	80-120			
Surrogate: TCX	*95.2*		"	*100*		*95.2*	*20-129*			
Surrogate: TCX [2C]	*96.3*		"	*100*		*96.3*	*20-129*			
Surrogate: Decachlorobiphenyl	*176*		"	*200*		*88.0*	*10-131*			
Surrogate: Decachlorobiphenyl [2C]	*177*		"	*200*		*88.5*	*10-131*			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F24051: Prepared 06/24/05 Using EPA 3550B										
Blank (5F24051-BLK2)										
Aroclor 1016	ND	25.0	ug/kg wet							
Aroclor 1221	ND	50.0	"							
Aroclor 1232	ND	25.0	"							
Aroclor 1242	ND	25.0	"							
Aroclor 1248	ND	25.0	"							
Aroclor 1254	ND	25.0	"							
Aroclor 1260	ND	25.0	"							
Aroclor 1262	ND	25.0	"							
Aroclor 1268	ND	25.0	"							
Surrogate: TCX	*6.10*		"	*6.67*		*91.5*	*19-149*			
Surrogate: Decachlorobiphenyl	*7.01*		"	*6.67*		*105*	*37-151*			
LCS (5F24051-BS2)										
Aroclor 1016	72.8	25.0	ug/kg wet	83.3		87.4	63-125			
Aroclor 1260	83.5	25.0	"	83.3		100	64-125			
Surrogate: TCX	*6.41*		"	*6.67*		*96.1*	*19-149*			
Surrogate: Decachlorobiphenyl	*6.92*		"	*6.67*		*104*	*37-151*			
LCS Dup (5F24051-BSD2)										
Aroclor 1016	74.4	25.0	ug/kg wet	83.3		89.3	63-125	2.17	30	
Aroclor 1260	86.2	25.0	"	83.3		103	64-125	3.18	30	
Surrogate: TCX	*6.51*		"	*6.67*		*97.6*	*19-149*			
Surrogate: Decachlorobiphenyl	*7.09*		"	*6.67*		*106*	*37-151*			
Matrix Spike (5F24051-MS2)					**Source: B5F0427-12**					**X**
Aroclor 1016	3.44	12.4	ug/kg dry	47.4	ND	7.26	28-136			
Aroclor 1260	16.7	12.4	"	47.4	24.7	-16.9	35-152			
Surrogate: TCX	*0.762*		"	*3.79*		*20.1*	*19-149*			
Surrogate: Decachlorobiphenyl	*0.999*		"	*3.79*		*26.4*	*37-151*			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F24051: Prepared 06/24/05 Using EPA 3550B										
Matrix Spike Dup (5F24051-MSD2)					**Source: B5F0427-12**					**X**
Aroclor 1016	42.5	12.5	ug/kg dry	47.5	ND	89.5	28-136	170	35	
Aroclor 1260	60.0	12.5	"	47.5	24.7	74.3	35-152	113	35	
Surrogate: TCX	*3.50*		"	*3.80*		*92.1*	*19-149*			
Surrogate: Decachlorobiphenyl	*3.88*		"	*3.80*		*102*	*37-151*			
Batch 5F30001: Prepared 06/30/05 Using 5F24051										
Calibration Check (5F30001-CCV1)										
Aroclor 1016	948		ug/l	1000		94.8	85-115			
Aroclor 1016 [2C]	1000		"	1000		100	85-115			
Aroclor 1260	1030		"	1000		103	85-115			
Aroclor 1260 [2C]	970		"	1000		97.0	85-115			
Surrogate: TCX	*95.4*		"	*100*		*95.4*	*25-129*			
Surrogate: TCX [2C]	*99.1*		"	*100*		*99.1*	*25-129*			
Surrogate: Decachlorobiphenyl	*99.4*		"	*100*		*99.4*	*22-125*			
Surrogate: Decachlorobiphenyl [2C]	*90.7*		"	*100*		*90.7*	*22-125*			
Calibration Check (5F30001-CCV2)										
Aroclor 1016	943		ug/l	1000		94.3	85-115			
Aroclor 1016 [2C]	862		"	1000		86.2	85-115			
Aroclor 1260	1040		"	1000		104	85-115			
Aroclor 1260 [2C]	958		"	1000		95.8	85-115			
Surrogate: TCX	*94.3*		"	*100*		*94.3*	*25-129*			
Surrogate: TCX [2C]	*94.2*		"	*100*		*94.2*	*25-129*			
Surrogate: Decachlorobiphenyl	*99.1*		"	*100*		*99.1*	*22-125*			
Surrogate: Decachlorobiphenyl [2C]	*94.3*		"	*100*		*94.3*	*22-125*			

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F30001: Prepared 06/30/05 Using 5F24051										
Calibration Check (5F30001-CCV4)										
Aroclor 1016	1020		ug/l	1000		102	85-115			
Aroclor 1016 [2C]	1050		"	1000		105	85-115			
Aroclor 1260	1070		"	1000		107	85-115			
Aroclor 1260 [2C]	1100		"	1000		110	85-115			
Surrogate: TCX	*96.0*		"	*100*		*96.0*	*25-129*			
Surrogate: TCX [2C]	*98.2*		"	*100*		*98.2*	*25-129*			
Surrogate: Decachlorobiphenyl	*104*		"	*100*		*104*	*22-125*			
Surrogate: Decachlorobiphenyl [2C]	*104*		"	*100*		*104*	*22-125*			
Calibration Check (5F30001-CCV6)										
Aroclor 1016	964		ug/l	1000		96.4	85-115			
Aroclor 1016 [2C]	963		"	1000		96.3	85-115			
Aroclor 1260	1060		"	1000		106	85-115			
Aroclor 1260 [2C]	1040		"	1000		104	85-115			
Surrogate: TCX	*95.5*		"	*100*		*95.5*	*25-129*			
Surrogate: TCX [2C]	*97.7*		"	*100*		*97.7*	*25-129*			
Surrogate: Decachlorobiphenyl	*102*		"	*100*		*102*	*22-125*			
Surrogate: Decachlorobiphenyl [2C]	*104*		"	*100*		*104*	*22-125*			
Calibration Check (5F30001-CCV8)										
Aroclor 1016	977		ug/l	1000		97.7	85-115			
Aroclor 1016 [2C]	960		"	1000		96.0	85-115			
Aroclor 1260	1060		"	1000		106	85-115			
Aroclor 1260 [2C]	1010		"	1000		101	85-115			
Surrogate: TCX	*95.6*		"	*100*		*95.6*	*25-129*			
Surrogate: TCX [2C]	*97.6*		"	*100*		*97.6*	*25-129*			
Surrogate: Decachlorobiphenyl	*102*		"	*100*		*102*	*22-125*			
Surrogate: Decachlorobiphenyl [2C]	*96.7*		"	*100*		*96.7*	*22-125*			

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F30001: Prepared 06/30/05 Using 5F24051										
Calibration Check (5F30001-CCVA)										
Aroclor 1016	1010		ug/l	1000		101	85-115			
Aroclor 1016 [2C]	968		"	1000		96.8	85-115			
Aroclor 1260	1040		"	1000		104	85-115			
Aroclor 1260 [2C]	963		"	1000		96.3	85-115			
Surrogate: TCX	*95.4*		"	*100*		*95.4*	*25-129*			
Surrogate: TCX [2C]	*91.4*		"	*100*		*91.4*	*25-129*			
Surrogate: Decachlorobiphenyl	*103*		"	*100*		*103*	*22-125*			
Surrogate: Decachlorobiphenyl [2C]	*95.1*		"	*100*		*95.1*	*22-125*			
Calibration Check (5F30001-CCVC)										
Aroclor 1016	974		ug/l	1000		97.4	85-115			
Aroclor 1016 [2C]	934		"	1000		93.4	85-115			
Aroclor 1260	1070		"	1000		107	85-115			
Aroclor 1260 [2C]	989		"	1000		98.9	85-115			
Surrogate: TCX	*96.0*		"	*100*		*96.0*	*25-129*			
Surrogate: TCX [2C]	*95.5*		"	*100*		*95.5*	*25-129*			
Surrogate: Decachlorobiphenyl	*104*		"	*100*		*104*	*22-125*			
Surrogate: Decachlorobiphenyl [2C]	*99.3*		"	*100*		*99.3*	*22-125*			
Calibration Check (5F30001-CCVE)										
Aroclor 1016	1020		ug/l	1000		102	85-115			
Aroclor 1016 [2C]	999		"	1000		99.9	85-115			
Aroclor 1260	1070		"	1000		107	85-115			
Aroclor 1260 [2C]	988		"	1000		98.8	85-115			
Surrogate: TCX	*96.7*		"	*100*		*96.7*	*25-129*			
Surrogate: TCX [2C]	*98.6*		"	*100*		*98.6*	*25-129*			
Surrogate: Decachlorobiphenyl	*104*		"	*100*		*104*	*22-125*			
Surrogate: Decachlorobiphenyl [2C]	*95.1*		"	*100*		*95.1*	*22-125*			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F30001: Prepared 06/30/05 Using 5F24051										
Calibration Check (5F30001-CCVG)										
Aroclor 1016	1010		ug/l	1000		101	85-115			
Aroclor 1016 [2C]	903		"	1000		90.3	85-115			
Aroclor 1260	1020		"	1000		102	85-115			
Aroclor 1260 [2C]	797		"	1000		79.7	85-115			
Surrogate: TCX	*97.6*		"	*100*		*97.6*	*25-129*			
Surrogate: TCX [2C]	*97.7*		"	*100*		*97.7*	*25-129*			
Surrogate: Decachlorobiphenyl	*96.8*		"	*100*		*96.8*	*22-125*			
Surrogate: Decachlorobiphenyl [2C]	*78.7*		"	*100*		*78.7*	*22-125*			
Calibration Check (5F30001-CCVI)										
Aroclor 1016	972		ug/l	1000		97.2	85-115			
Aroclor 1016 [2C]	938		"	1000		93.8	85-115			
Aroclor 1260	1040		"	1000		104	85-115			
Aroclor 1260 [2C]	927		"	1000		92.7	85-115			
Surrogate: TCX	*96.4*		"	*100*		*96.4*	*25-129*			
Surrogate: TCX [2C]	*92.6*		"	*100*		*92.6*	*25-129*			
Surrogate: Decachlorobiphenyl	*98.6*		"	*100*		*98.6*	*22-125*			
Surrogate: Decachlorobiphenyl [2C]	*87.2*		"	*100*		*87.2*	*22-125*			
Calibration Check (5F30001-CCVK)										
Aroclor 1016	1030		ug/l	1000		103	85-115			
Aroclor 1016 [2C]	1000		"	1000		100	85-115			
Aroclor 1260	1110		"	1000		111	85-115			
Aroclor 1260 [2C]	1010		"	1000		101	85-115			
Surrogate: TCX	*98.4*		"	*100*		*98.4*	*25-129*			
Surrogate: TCX [2C]	*97.0*		"	*100*		*97.0*	*25-129*			
Surrogate: Decachlorobiphenyl	*107*		"	*100*		*107*	*22-125*			
Surrogate: Decachlorobiphenyl [2C]	*95.9*		"	*100*		*95.9*	*22-125*			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F27064: Prepared 06/27/05 Using Dry Weight										
Blank (5F27064-BLK1)										
Dry Weight	99.8	1.00	%							

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Notes and Definitions

P-03	Greater than 40% difference between two dissimilar columns. After evaluation, the lower result has been reported.
Q-05	RPD values are not controlled at sample concentrations less than 10 times the reporting limit.
S-02	The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.
X	See case narrative.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

North Creek Analytical - Spokane

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CHAIN OF CUSTODY RECORD

GeoEngineers
523 EAST SECOND AVE.
SPOKANE, WASHINGTON 99202
(509) 363-3125

Geo Engineers

DATE 6/14/05
PAGE 1 OF 1
LAB NCA
LAB NO. 55F0090

PROJECT NAME/LOCATION TECK COMINCO
PROJECT NUMBER 6601-003-09
PROJECT MANAGER DAVE ENOS
SAMPLED BY MARJAN ROTTINO

SAMPLE IDENTIFICATION		SAMPLE COLLECTION			# OF	ANALYSIS REQUIRED				NOTES/COMMENTS
LAB	GEOENGINEERS	DATE	TIME	MATRIX	JARS	VOC 8260	NWTPH-DX	TOTAL CYANIDE	pH	(Preserved, filtered, etc.)
	TC-1 (0-1)	6/14/05	10:30	S	2	X	X	X	X	STANDARD TAT
	TC-2 (0-1)	"	11:00	S	3					
	TC-3 (0-1.5)	"	11:20	S	3					
	TC-4 (0-2)	"	11:10	S	2					
	TC-6 (0-2)	"	15:00	S	2	X	X	X	X	
	TC-7 (4-4.5)	"	16:00	S	2					
	TC-WS1	"	09:00	W	8	X	X	X		

RELINQUISHED BY	FIRM	RELINQUISHED BY	FIRM	RELINQUISHED BY	FIRM
SIGNATURE	GEI	SIGNATURE	NCA'S	SIGNATURE	
PRINTED NAME Dave Enos		PRINTED NAME Chris Williams		PRINTED NAME	
DATE 6/15/05 TIME 09:00		DATE 6/15/05 TIME 11:05 AM		DATE TIME	
RECEIVED BY	FIRM	RECEIVED BY	FIRM	RECEIVED BY	FIRM
SIGNATURE		SIGNATURE		SIGNATURE	
PRINTED NAME		PRINTED NAME		PRINTED NAME	
DATE TIME		DATE TIME		DATE TIME	

ADDITIONAL COMMENTS:
VOC'S - NON-LISTED VOCS MIGHT BE PRESENT - CALL DAVE ENOS TO DISCUSS
HOLD ALL SAMPLES FOR POSSIBLE ADDITIONAL ANALYSES

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
TC-7 (4-4.5)	S5F0098-01	Soil	06/15/05 11:00	06/16/05 12:53
TC-8 (2-2.5)	S5F0098-02	Soil	06/15/05 13:00	06/16/05 12:53
TC-9 (4-4.5)	S5F0098-03	Soil	06/15/05 14:00	06/16/05 12:53
TC-WS1	S5F0098-04	Water	06/15/05 09:00	06/16/05 12:53

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Semivolatile Petroleum Products by NWTPH-Dx

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-7 (4-4.5) (S5F0098-01) Soil Sampled: 06/15/05 11:00 Received: 06/16/05 12:53									
Diesel Range Hydrocarbons	ND	100	mg/kg dry	10	5060156	06/20/05	06/23/05	NWTPH-Dx	
Heavy Oil Range Hydrocarbons	**521**	250	"	"	"	"	"	"	
Surrogate: 2-FBP	*101*	*50-150*			"	"	"	"	
Surrogate: p-Terphenyl-d14	*130*	*50-150*			"	"	"	"	
TC-9 (4-4.5) (S5F0098-03) Soil Sampled: 06/15/05 14:00 Received: 06/16/05 12:53									
Diesel Range Hydrocarbons	ND	1000	mg/kg dry	100	5060156	06/20/05	06/23/05	NWTPH-Dx	
Heavy Oil Range Hydrocarbons	**1740**	700	"	"	"	"	"	"	
Surrogate: 2-FBP	*69.7*	*50-150*			"	"	"	"	
Surrogate: p-Terphenyl-d14	*130*	*50-150*			"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-7 (4-4.5) (S5F0098-01) Soil Sampled: 06/15/05 11:00 Received: 06/16/05 12:53									
Acetone	ND	1.00	mg/kg dry	1	5060180	06/21/05	06/23/05	EPA 8260B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Bromobenzene	ND	0.100	"	"	"	"	"	"	
Bromochloromethane	ND	0.100	"	"	"	"	"	"	
Bromodichloromethane	ND	0.100	"	"	"	"	"	"	
Bromoform	ND	0.100	"	"	"	"	"	"	
Bromomethane	ND	0.500	"	"	"	"	"	"	
2-Butanone	ND	1.00	"	"	"	"	"	"	
n-Butylbenzene	ND	0.100	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.100	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.100	"	"	"	"	"	"	
Carbon disulfide	ND	0.100	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.100	"	"	"	"	"	"	
Chlorobenzene	ND	0.100	"	"	"	"	"	"	
Chloroethane	ND	0.100	"	"	"	"	"	"	
Chloroform	ND	0.100	"	"	"	"	"	"	
Chloromethane	ND	0.500	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
Dibromochloromethane	ND	0.100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	0.500	"	"	"	"	"	"	
1,2-Dibromoethane	ND	0.100	"	"	"	"	"	"	
Dibromomethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-7 (4-4.5) (S5F0098-01) Soil Sampled: 06/15/05 11:00 Received: 06/16/05 12:53									
Ethylbenzene	ND	0.100	mg/kg dry	1	5060180	06/21/05	06/23/05	EPA 8260B	
Hexachlorobutadiene	ND	0.100	"	"	"	"	"	"	
2-Hexanone	ND	1.00	"	"	"	"	"	"	
Isopropylbenzene	ND	0.100	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.100	"	"	"	"	"	"	
Methylene chloride	ND	1.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.100	"	"	"	"	"	"	
Naphthalene	ND	0.100	"	"	"	"	"	"	
n-Propylbenzene	ND	0.100	"	"	"	"	"	"	
Styrene	ND	0.100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
Tetrachloroethene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.100	"	"	"	"	"	"	
Trichloroethene	**0.205**	0.0300	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
Vinyl chloride	ND	0.100	"	"	"	"	"	"	
o-Xylene	ND	0.200	"	"	"	"	"	"	
m,p-Xylene	ND	0.400	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*83.7*	*44.8-146*			"	"	"	"	
Surrogate: Toluene-d8	*82.2*	*62.3-143*			"	"	"	"	
Surrogate: 4-bromofluorobenzene	*83.9*	*52.5-138*			"	"	"	"	

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-9 (4-4.5) (S5F0098-03) Soil Sampled: 06/15/05 14:00 Received: 06/16/05 12:53									
Acetone	ND	1.00	mg/kg dry	1	5060180	06/21/05	06/23/05	EPA 8260B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Bromobenzene	ND	0.100	"	"	"	"	"	"	
Bromochloromethane	ND	0.100	"	"	"	"	"	"	
Bromodichloromethane	ND	0.100	"	"	"	"	"	"	
Bromoform	ND	0.100	"	"	"	"	"	"	
Bromomethane	ND	0.500	"	"	"	"	"	"	
2-Butanone	ND	1.00	"	"	"	"	"	"	
n-Butylbenzene	ND	0.100	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.100	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.100	"	"	"	"	"	"	
Carbon disulfide	ND	0.100	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.100	"	"	"	"	"	"	
Chlorobenzene	ND	0.100	"	"	"	"	"	"	
Chloroethane	ND	0.100	"	"	"	"	"	"	
Chloroform	ND	0.100	"	"	"	"	"	"	
Chloromethane	ND	0.500	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
Dibromochloromethane	ND	0.100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	0.500	"	"	"	"	"	"	
1,2-Dibromoethane	ND	0.100	"	"	"	"	"	"	
Dibromomethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-9 (4-4.5) (S5F0098-03) Soil Sampled: 06/15/05 14:00 Received: 06/16/05 12:53									
Ethylbenzene	ND	0.100	mg/kg dry	1	5060180	06/21/05	06/23/05	EPA 8260B	
Hexachlorobutadiene	ND	0.100	"	"	"	"	"	"	
2-Hexanone	ND	1.00	"	"	"	"	"	"	
Isopropylbenzene	ND	0.100	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.100	"	"	"	"	"	"	
Methylene chloride	ND	1.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.100	"	"	"	"	"	"	
Naphthalene	ND	0.100	"	"	"	"	"	"	
n-Propylbenzene	ND	0.100	"	"	"	"	"	"	
Styrene	ND	0.100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
Tetrachloroethene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.100	"	"	"	"	"	"	
Trichloroethene	**0.144**	0.0300	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
Vinyl chloride	ND	0.100	"	"	"	"	"	"	
o-Xylene	ND	0.200	"	"	"	"	"	"	
m,p-Xylene	ND	0.400	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*89.3*	*44.8-146*			"	"	"	"	
Surrogate: Toluene-d8	*86.4*	*62.3-143*			"	"	"	"	
Surrogate: 4-bromofluorobenzene	*116*	*52.5-138*			"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Conventional Chemistry Parameters by APHA/EPA Methods

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-7 (4-4.5) (S5F0098-01) Soil Sampled: 06/15/05 11:00 Received: 06/16/05 12:53									
Cyanide (total)	ND	0.0500	mg/kg	10	5060229	06/28/05	06/28/05	EPA 335.2	
pH	**7.16**		pH Units	1	5060182	06/22/05	06/22/05	EPA 9045B	
% Solids	**84.3**	0.0100	% by Weight	"	5060169	06/21/05	06/21/05	Gravimetry	
TC-8 (2-2.5) (S5F0098-02) Soil Sampled: 06/15/05 13:00 Received: 06/16/05 12:53									
Cyanide (total)	ND	0.0500	mg/kg	10	5060229	06/28/05	06/28/05	EPA 335.2	
% Solids	**87.0**	0.0100	% by Weight	1	5060169	06/21/05	06/21/05	Gravimetry	
TC-9 (4-4.5) (S5F0098-03) Soil Sampled: 06/15/05 14:00 Received: 06/16/05 12:53									
Cyanide (total)	**0.393**	0.0500	mg/kg	10	5060229	06/28/05	06/28/05	EPA 335.2	
pH	**7.75**		pH Units	1	5060182	06/22/05	06/22/05	EPA 9045B	
% Solids	**71.4**	0.0100	% by Weight	"	5060169	06/21/05	06/21/05	Gravimetry	

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Conventional Chemistry Parameters by APHA/EPA Methods

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-1 (0-1) (S5F0090-01) Soil Sampled: 06/14/05 10:30 Received: 06/15/05 11:05									
Cyanide (total)	ND	0.0500	mg/kg	10	5060229	06/28/05	06/28/05	EPA 335.2	
pH	**7.77**		pH Units	1	5060182	06/22/05	06/22/05	EPA 9045B	
% Solids	**86.8**	0.0100	% by Weight	"	5060169	06/21/05	06/21/05	Gravimetry	
TC-6 (0-2) (S5F0090-06) Soil Sampled: 06/14/05 15:00 Received: 06/15/05 11:05									
Cyanide (total)	**0.0719**	0.0500	mg/kg	10	5060229	06/28/05	06/28/05	EPA 335.2	
pH	**7.21**		pH Units	1	5060182	06/22/05	06/22/05	EPA 9045B	
% Solids	**78.5**	0.0100	% by Weight	"	5060169	06/21/05	06/21/05	Gravimetry	
TC-WS1 (S5F0090-08) Water Sampled: 06/14/05 14:00 Received: 06/15/05 11:05									
Cyanide (total)	ND	0.00500	mg/l	1	5060139	06/16/05	06/16/05	EPA 335.2	

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-1 (0-1) (S5F0090-01) Soil Sampled: 06/14/05 10:30 Received: 06/15/05 11:05									X
Aldrin	ND	1.00	ug/kg dry	1	5F24051	06/24/05	07/07/05	EPA 8081A	
alpha-BHC	ND	1.00	"	"	"	"	"	"	
beta-BHC	**2.24**	2.00	"	"	"	"	"	"	P-03
delta-BHC	ND	1.00	"	"	"	"	"	"	
gamma-BHC (Lindane)	ND	1.00	"	"	"	"	"	"	
Chlordane (tech)	ND	10.0	"	"	"	"	"	"	
alpha-Chlordane	ND	1.00	"	"	"	"	"	"	
gamma-Chlordane	ND	1.00	"	"	"	"	"	"	
4,4'-DDD	ND	2.00	"	"	"	"	"	"	
4,4'-DDE	ND	2.00	"	"	"	"	"	"	
4,4'-DDT	ND	2.00	"	"	"	"	"	"	
Dieldrin	ND	2.00	"	"	"	"	"	"	
Endosulfan I	ND	1.00	"	"	"	"	"	"	
Endosulfan II	ND	2.00	"	"	"	"	"	"	
Endosulfan sulfate	ND	2.00	"	"	"	"	"	"	
Endrin	ND	2.00	"	"	"	"	"	"	
Endrin aldehyde	ND	2.00	"	"	"	"	"	"	
Endrin ketone	ND	2.00	"	"	"	"	"	"	
Heptachlor	ND	1.00	"	"	"	"	"	"	
Heptachlor epoxide	ND	1.00	"	"	"	"	"	"	
Methoxychlor	ND	2.00	"	"	"	"	"	"	
Toxaphene	ND	50.0	"	"	"	"	"	"	
Surrogate: TCX	*79.8*	*47-134*			"	"	"	"	
Surrogate: Decachlorobiphenyl	*89.4*	*35-151*			"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-1 (0-1) (S5F0090-01RE1) Soil Sampled: 06/14/05 10:30 Received: 06/15/05 11:05									
Aldrin	ND	10.0	ug/kg dry	10	5F24051	06/24/05	07/08/05	EPA 8081A	
alpha-BHC	ND	10.0	"	"	"	"	"	"	
beta-BHC	ND	20.0	"	"	"	"	"	"	
delta-BHC	ND	10.0	"	"	"	"	"	"	
gamma-BHC (Lindane)	ND	10.0	"	"	"	"	"	"	
Chlordane (tech)	ND	100	"	"	"	"	"	"	
alpha-Chlordane	ND	10.0	"	"	"	"	"	"	
gamma-Chlordane	ND	10.0	"	"	"	"	"	"	
4,4'-DDD	ND	20.0	"	"	"	"	"	"	
4,4'-DDE	ND	20.0	"	"	"	"	"	"	
4,4'-DDT	ND	20.0	"	"	"	"	"	"	
Dieldrin	ND	20.0	"	"	"	"	"	"	
Endosulfan I	ND	10.0	"	"	"	"	"	"	
Endosulfan II	ND	20.0	"	"	"	"	"	"	
Endosulfan sulfate	ND	20.0	"	"	"	"	"	"	
Endrin	ND	20.0	"	"	"	"	"	"	
Endrin aldehyde	ND	20.0	"	"	"	"	"	"	
Endrin ketone	ND	20.0	"	"	"	"	"	"	
Heptachlor	ND	10.0	"	"	"	"	"	"	
Heptachlor epoxide	ND	10.0	"	"	"	"	"	"	
Methoxychlor	ND	20.0	"	"	"	"	"	"	
Toxaphene	ND	500	"	"	"	"	"	"	
Surrogate: TCX	*98.3*	*47-134*			"	"	"	"	
Surrogate: Decachlorobiphenyl	*112*	*35-151*			"	"	"	"	

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-6 (0-2) (S5F0090-06) Soil Sampled: 06/14/05 15:00 Received: 06/15/05 11:05									X
Aldrin	ND	1.00	ug/kg dry	1	5F24051	06/24/05	07/06/05	EPA 8081A	
alpha-BHC	ND	1.00	"	"	"	"	"	"	
beta-BHC	ND	2.00	"	"	"	"	"	"	
delta-BHC	ND	1.00	"	"	"	"	"	"	
gamma-BHC (Lindane)	ND	1.00	"	"	"	"	"	"	
Chlordane (tech)	ND	10.0	"	"	"	"	"	"	
alpha-Chlordane	ND	1.00	"	"	"	"	"	"	
gamma-Chlordane	ND	1.00	"	"	"	"	"	"	
4,4'-DDD	ND	2.00	"	"	"	"	"	"	
4,4'-DDE	ND	2.00	"	"	"	"	"	"	
4,4'-DDT	**3.05**	2.00	"	"	"	"	"	"	
Dieldrin	ND	2.00	"	"	"	"	"	"	
Endosulfan I	ND	1.00	"	"	"	"	"	"	
Endosulfan II	ND	2.00	"	"	"	"	"	"	
Endosulfan sulfate	ND	2.00	"	"	"	"	"	"	
Endrin	ND	2.00	"	"	"	"	"	"	
Endrin aldehyde	ND	2.00	"	"	"	"	"	"	
Endrin ketone	ND	2.00	"	"	"	"	"	"	
Heptachlor	ND	1.00	"	"	"	"	"	"	
Heptachlor epoxide	ND	1.00	"	"	"	"	"	"	
Methoxychlor	ND	2.00	"	"	"	"	"	"	
Toxaphene	ND	50.0	"	"	"	"	"	"	
Surrogate: TCX	*67.3*	*47-134*			"	"	"	"	
Surrogate: Decachlorobiphenyl	*92.6*	*35-151*			"	"	"	"	

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-6 (0-2) (S5F0090-06RE1) Soil Sampled: 06/14/05 15:00 Received: 06/15/05 11:05									
Aldrin	ND	100	ug/kg dry	100	5F24051	06/24/05	07/08/05	EPA 8081A	
alpha-BHC	ND	100	"	"	"	"	"	"	
beta-BHC	ND	200	"	"	"	"	"	"	
delta-BHC	ND	100	"	"	"	"	"	"	
gamma-BHC (Lindane)	ND	100	"	"	"	"	"	"	
Chlordane (tech)	ND	1000	"	"	"	"	"	"	
alpha-Chlordane	ND	100	"	"	"	"	"	"	
gamma-Chlordane	ND	100	"	"	"	"	"	"	
4,4'-DDD	ND	200	"	"	"	"	"	"	
4,4'-DDE	ND	200	"	"	"	"	"	"	
4,4'-DDT	ND	200	"	"	"	"	"	"	
Dieldrin	ND	200	"	"	"	"	"	"	
Endosulfan I	ND	100	"	"	"	"	"	"	
Endosulfan II	ND	200	"	"	"	"	"	"	
Endosulfan sulfate	ND	200	"	"	"	"	"	"	
Endrin	ND	200	"	"	"	"	"	"	
Endrin aldehyde	ND	200	"	"	"	"	"	"	
Endrin ketone	ND	200	"	"	"	"	"	"	
Heptachlor	ND	100	"	"	"	"	"	"	
Heptachlor epoxide	ND	100	"	"	"	"	"	"	
Methoxychlor	ND	200	"	"	"	"	"	"	
Toxaphene	ND	5000	"	"	"	"	"	"	
Surrogate: TCX	*98.2*	*47-134*			"	"	"	"	*P-03*
Surrogate: Decachlorobiphenyl	*99.0*	*35-151*			"	"	"	"	*P-03*

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Polychlorinated Biphenyls by EPA Method 8082

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-1 (0-1) (S5F0090-01) Soil Sampled: 06/14/05 10:30 Received: 06/15/05 11:05									
Aroclor 1016	ND	25.0	ug/kg dry	1	5F24051	06/24/05	06/29/05	EPA 8082	
Aroclor 1221	ND	50.0	"	"	"	"	"	"	
Aroclor 1232	ND	25.0	"	"	"	"	"	"	
Aroclor 1242	ND	25.0	"	"	"	"	"	"	
Aroclor 1248	ND	25.0	"	"	"	"	"	"	
Aroclor 1254	ND	25.0	"	"	"	"	"	"	
Aroclor 1260	ND	25.0	"	"	"	"	"	"	
Aroclor 1262	ND	25.0	"	"	"	"	"	"	
Aroclor 1268	ND	25.0	"	"	"	"	"	"	
Surrogate: TCX	*90.7*	*19-149*			"	"	"	"	
Surrogate: Decachlorobiphenyl	*104*	*37-151*			"	"	"	"	
TC-6 (0-2) (S5F0090-06) Soil Sampled: 06/14/05 15:00 Received: 06/15/05 11:05									
Aroclor 1016	ND	25.0	ug/kg dry	1	5F24051	06/24/05	06/29/05	EPA 8082	
Aroclor 1221	ND	50.0	"	"	"	"	"	"	
Aroclor 1232	ND	25.0	"	"	"	"	"	"	
Aroclor 1242	ND	25.0	"	"	"	"	"	"	
Aroclor 1248	ND	25.0	"	"	"	"	"	"	
Aroclor 1254	ND	25.0	"	"	"	"	"	"	
Aroclor 1260	**65.5**	25.0	"	"	"	"	"	"	
Aroclor 1262	ND	25.0	"	"	"	"	"	"	
Aroclor 1268	ND	25.0	"	"	"	"	"	"	
Surrogate: TCX	*81.0*	*19-149*			"	"	"	"	
Surrogate: Decachlorobiphenyl	*97.0*	*37-151*			"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Physical Parameters by APHA/ASTM/EPA Methods

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-1 (0-1) (S5F0090-01) Soil Sampled: 06/14/05 10:30 Received: 06/15/05 11:05									
Dry Weight	79.9	1.00	%	1	5F27064	06/27/05	06/28/05	BSOPSPL003R08	
TC-6 (0-2) (S5F0090-06) Soil Sampled: 06/14/05 15:00 Received: 06/15/05 11:05									
Dry Weight	78.9	1.00	%	1	5F27064	06/27/05	06/28/05	BSOPSPL003R08	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Semivolatile Petroleum Products by NWTPH-Dx - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060144: Prepared 06/17/05 Using EPA 3510/600 Series										
Blank (5060144-BLK1)										
Diesel Range Hydrocarbons	ND	0.250	mg/l							
Heavy Oil Range Hydrocarbons	ND	0.500	"							
Surrogate: 2-FBP	*0.167*		"	*0.200*		*83.5*	*50-150*			
Surrogate: p-Terphenyl-d14	*0.174*		"	*0.200*		*87.0*	*50-150*			
LCS (5060144-BS1)										
Diesel Range Hydrocarbons	2.39	0.250	mg/l	2.50		95.6	50-150			
Surrogate: 2-FBP	*0.200*		"	*0.200*		*100*	*50-150*			
Surrogate: p-Terphenyl-d14	*0.192*		"	*0.200*		*96.0*	*50-150*			
LCS Dup (5060144-BSD1)										
Diesel Range Hydrocarbons	2.48	0.250	mg/l	2.50		99.2	50-150	3.70	11.8	
Surrogate: 2-FBP	*0.206*		"	*0.200*		*103*	*50-150*			
Surrogate: p-Terphenyl-d14	*0.197*		"	*0.200*		*98.5*	*50-150*			
Batch 5060156: Prepared 06/20/05 Using EPA 3550B										
Blank (5060156-BLK1)										
Diesel Range Hydrocarbons	ND	10.0	mg/kg wet							
Heavy Oil Range Hydrocarbons	ND	25.0	"							
Surrogate: 2-FBP	*6.14*		"	*6.67*		*92.1*	*50-150*			
Surrogate: p-Terphenyl-d14	*6.28*		"	*6.67*		*94.2*	*50-150*			
LCS (5060156-BS1)										
Diesel Range Hydrocarbons	86.6	10.0	mg/kg wet	83.3		104	50-150			
Surrogate: 2-FBP	*7.51*		"	*6.67*		*113*	*50-150*			
Surrogate: p-Terphenyl-d14	*6.64*		"	*6.67*		*99.6*	*50-150*			

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Semivolatile Petroleum Products by NWTPH-Dx - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060156: Prepared 06/20/05 Using EPA 3550B										
Duplicate (5060156-DUP1)					**Source: S5F0079-01**					
Diesel Range Hydrocarbons	ND	100	mg/kg dry		ND				25	
Heavy Oil Range Hydrocarbons	361	250	"		261			32.2	25	Q-05
Surrogate: 2-FBP	*10.2*		"	*10.9*		*93.6*	*50-150*			
Surrogate: p-Terphenyl-d14	*11.2*		"	*10.9*		*103*	*50-150*			
Matrix Spike (5060156-MS1)					**Source: S5F0079-01**					
Diesel Range Hydrocarbons	157	100	mg/kg dry	136	ND	115	50-150			
Surrogate: 2-FBP	*12.5*		"	*10.9*		*115*	*50-150*			
Surrogate: p-Terphenyl-d14	*11.8*		"	*10.9*		*108*	*50-150*			

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060118: Prepared 06/16/05 Using GC/MS Volatiles										
Blank (5060118-BLK1)										
Acetone	ND	25.0	ug/l							
Benzene	ND	1.00	"							
Bromobenzene	ND	1.00	"							
Bromochloromethane	ND	1.00	"							
Bromodichloromethane	ND	1.00	"							
Bromoform	ND	1.00	"							
Bromomethane	ND	5.00	"							
2-Butanone	ND	10.0	"							
n-Butylbenzene	ND	1.00	"							
sec-Butylbenzene	ND	1.00	"							
tert-Butylbenzene	ND	1.00	"							
Carbon disulfide	ND	1.00	"							
Carbon tetrachloride	ND	1.00	"							
Chlorobenzene	ND	1.00	"							
Chloroethane	ND	1.00	"							
Chloroform	ND	1.00	"							
Chloromethane	ND	5.00	"							
2-Chlorotoluene	ND	1.00	"							
4-Chlorotoluene	ND	1.00	"							
Dibromochloromethane	ND	1.00	"							
1,2-Dibromo-3-chloropropane	ND	5.00	"							
1,2-Dibromoethane	ND	1.00	"							
Dibromomethane	ND	1.00	"							
1,2-Dichlorobenzene	ND	1.00	"							
1,3-Dichlorobenzene	ND	1.00	"							
1,4-Dichlorobenzene	ND	1.00	"							
Dichlorodifluoromethane	ND	1.00	"							
1,1-Dichloroethane	ND	1.00	"							
1,2-Dichloroethane (EDC)	ND	1.00	"							
1,1-Dichloroethene	ND	1.00	"							
cis-1,2-Dichloroethene	ND	1.00	"							
trans-1,2-Dichloroethene	ND	1.00	"							
1,2-Dichloropropane	ND	1.00	"							
1,3-Dichloropropane	ND	1.00	"							
2,2-Dichloropropane	ND	1.00	"							

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060118: Prepared 06/16/05 Using GC/MS Volatiles										
Blank (5060118-BLK1)										
1,1-Dichloropropene	ND	1.00	ug/l							
cis-1,3-Dichloropropene	ND	1.00	"							
trans-1,3-Dichloropropene	ND	1.00	"							
Ethylbenzene	ND	1.00	"							
Hexachlorobutadiene	ND	1.00	"							
2-Hexanone	ND	10.0	"							
Isopropylbenzene	ND	1.00	"							
p-Isopropyltoluene	ND	1.00	"							
Methylene chloride	10.4	5.00	"							
4-Methyl-2-pentanone	ND	10.0	"							
Methyl tert-butyl ether	ND	1.00	"							
Naphthalene	ND	1.00	"							
n-Propylbenzene	ND	1.00	"							
Styrene	ND	1.00	"							
1,1,1,2-Tetrachloroethane	ND	1.00	"							
1,1,2,2-Tetrachloroethane	ND	1.00	"							
Tetrachloroethene	ND	1.00	"							
Toluene	ND	1.00	"							
1,2,3-Trichlorobenzene	ND	1.00	"							
1,2,4-Trichlorobenzene	ND	1.00	"							
1,1,1-Trichloroethane	ND	1.00	"							
1,1,2-Trichloroethane	ND	1.00	"							
Trichloroethene	ND	1.00	"							
Trichlorofluoromethane	ND	1.00	"							
1,2,3-Trichloropropane	ND	1.00	"							
1,2,4-Trimethylbenzene	ND	1.00	"							
1,3,5-Trimethylbenzene	ND	1.00	"							
Vinyl chloride	ND	0.200	"							
o-Xylene	ND	1.00	"							
m,p-Xylene	ND	2.00	"							
Surrogate: Dibromofluoromethane	*10.1*		"	*10.0*		*101*	*62.9-131*			
Surrogate: Toluene-d8	*10.2*		"	*10.0*		*102*	*58.7-133*			
Surrogate: 4-bromofluorobenzene	*8.98*		"	*10.0*		*89.8*	*60.8-140*			

North Creek Analytical - Spokane

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523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060118: Prepared 06/16/05 Using GC/MS Volatiles										
LCS (5060118-BS1)										
Benzene	9.96	1.00	ug/l	10.0		99.6	67.4-116			
Chlorobenzene	10.1	1.00	"	10.0		101	68.3-123			
1,1-Dichloroethene	10.8	1.00	"	10.0		108	67-137			
Toluene	10.0	1.00	"	10.0		100	68.8-139			
Trichloroethene	9.64	1.00	"	10.0		96.4	68.1-128			
Surrogate: Dibromofluoromethane	*10.1*		"	*10.0*		*101*	*62.9-131*			
Surrogate: Toluene-d8	*9.88*		"	*10.0*		*98.8*	*58.7-133*			
Surrogate: 4-bromofluorobenzene	*9.04*		"	*10.0*		*90.4*	*60.8-140*			
Matrix Spike (5060118-MS1)					**Source: S5F0071-01**					
Benzene	10.6	1.00	ug/l	10.0	ND	106	59.7-129			
Chlorobenzene	10.3	1.00	"	10.0	ND	103	75.8-121			
1,1-Dichloroethene	10.8	1.00	"	10.0	ND	108	63.8-137			
Toluene	10.7	1.00	"	10.0	ND	107	84.5-127			
Trichloroethene	10.0	1.00	"	10.0	ND	100	75.5-129			
Surrogate: Dibromofluoromethane	*10.9*		"	*10.0*		*109*	*62.9-131*			
Surrogate: Toluene-d8	*10.3*		"	*10.0*		*103*	*58.7-133*			
Surrogate: 4-bromofluorobenzene	*9.86*		"	*10.0*		*98.6*	*60.8-140*			
Matrix Spike Dup (5060118-MSD1)					**Source: S5F0071-01**					
Benzene	10.7	1.00	ug/l	10.0	ND	107	59.7-129	0.939	10	
Chlorobenzene	10.4	1.00	"	10.0	ND	104	75.8-121	0.966	11	
1,1-Dichloroethene	9.99	1.00	"	10.0	ND	99.9	63.8-137	7.79	14	
Toluene	10.6	1.00	"	10.0	ND	106	84.5-127	0.939	12	
Trichloroethene	10.1	1.00	"	10.0	ND	101	75.5-129	0.995	10	
Surrogate: Dibromofluoromethane	*10.8*		"	*10.0*		*108*	*62.9-131*			
Surrogate: Toluene-d8	*10.1*		"	*10.0*		*101*	*58.7-133*			
Surrogate: 4-bromofluorobenzene	*9.48*		"	*10.0*		*94.8*	*60.8-140*			

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060180: Prepared 06/21/05 Using GC/MS Volatiles										
Blank (5060180-BLK1)										
Acetone	ND	1.00	mg/kg wet							
Benzene	ND	0.0300	"							
Bromobenzene	ND	0.100	"							
Bromochloromethane	ND	0.100	"							
Bromodichloromethane	ND	0.100	"							
Bromoform	ND	0.100	"							
Bromomethane	ND	0.500	"							
2-Butanone	ND	1.00	"							
n-Butylbenzene	ND	0.100	"							
sec-Butylbenzene	ND	0.100	"							
tert-Butylbenzene	ND	0.100	"							
Carbon disulfide	ND	0.100	"							
Carbon tetrachloride	ND	0.100	"							
Chlorobenzene	ND	0.100	"							
Chloroethane	ND	0.100	"							
Chloroform	ND	0.100	"							
Chloromethane	ND	0.500	"							
2-Chlorotoluene	ND	0.100	"							
4-Chlorotoluene	ND	0.100	"							
Dibromochloromethane	ND	0.100	"							
1,2-Dibromo-3-chloropropane	ND	0.500	"							
1,2-Dibromoethane	ND	0.100	"							
Dibromomethane	ND	0.100	"							
1,2-Dichlorobenzene	ND	0.100	"							
1,3-Dichlorobenzene	ND	0.100	"							
1,4-Dichlorobenzene	ND	0.100	"							
Dichlorodifluoromethane	ND	0.100	"							
1,1-Dichloroethane	ND	0.100	"							
1,2-Dichloroethane (EDC)	ND	0.100	"							
1,1-Dichloroethene	ND	0.100	"							
cis-1,2-Dichloroethene	ND	0.100	"							
trans-1,2-Dichloroethene	ND	0.100	"							
1,2-Dichloropropane	ND	0.100	"							
1,3-Dichloropropane	ND	0.100	"							
2,2-Dichloropropane	ND	0.100	"							

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060180: Prepared 06/21/05 Using GC/MS Volatiles										
Blank (5060180-BLK1)										
1,1-Dichloropropene	ND	0.100	mg/kg wet							
cis-1,3-Dichloropropene	ND	0.100	"							
trans-1,3-Dichloropropene	ND	0.100	"							
Ethylbenzene	ND	0.100	"							
Hexachlorobutadiene	ND	0.100	"							
2-Hexanone	ND	1.00	"							
Isopropylbenzene	ND	0.100	"							
p-Isopropyltoluene	ND	0.100	"							
Methylene chloride	ND	1.00	"							
4-Methyl-2-pentanone	ND	1.00	"							
Methyl tert-butyl ether	ND	0.100	"							
Naphthalene	ND	0.100	"							
n-Propylbenzene	ND	0.100	"							
Styrene	ND	0.100	"							
1,1,1,2-Tetrachloroethane	ND	0.100	"							
1,1,2,2-Tetrachloroethane	ND	0.100	"							
Tetrachloroethene	ND	0.0300	"							
Toluene	ND	0.100	"							
1,2,3-Trichlorobenzene	ND	0.100	"							
1,2,4-Trichlorobenzene	ND	0.100	"							
1,1,1-Trichloroethane	ND	0.100	"							
1,1,2-Trichloroethane	ND	0.100	"							
Trichloroethene	ND	0.0300	"							
Trichlorofluoromethane	ND	0.100	"							
1,2,3-Trichloropropane	ND	0.100	"							
1,2,4-Trimethylbenzene	ND	0.100	"							
1,3,5-Trimethylbenzene	ND	0.100	"							
Vinyl chloride	ND	0.100	"							
o-Xylene	ND	0.200	"							
m,p-Xylene	ND	0.400	"							
Surrogate: Dibromofluoromethane	*1.05*		"	*1.00*		*105*	*44.8-146*			
Surrogate: Toluene-d8	*1.04*		"	*1.00*		*104*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*0.676*		"	*1.00*		*67.6*	*52.5-138*			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060180: Prepared 06/21/05 Using GC/MS Volatiles										
LCS (5060180-BS1)										
Benzene	0.522	0.0300	mg/kg wet	0.500		104	72.5-130			
Chlorobenzene	0.510	0.100	"	0.500		102	78.4-120			
1,1-Dichloroethene	0.602	0.100	"	0.500		120	50-150			
Toluene	0.526	0.100	"	0.500		105	75.3-120			
Trichloroethene	0.495	0.0300	"	0.500		99.0	64.5-131			
Surrogate: Dibromofluoromethane	*1.06*		"	*1.00*		*106*	*44.8-146*			
Surrogate: Toluene-d8	*0.996*		"	*1.00*		*99.6*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*0.976*		"	*1.00*		*97.6*	*52.5-138*			
LCS Dup (5060180-BSD1)										
Benzene	0.513	0.0300	mg/kg wet	0.500		103	72.5-130	1.74	25	
Chlorobenzene	0.509	0.100	"	0.500		102	78.4-120	0.196	25	
1,1-Dichloroethene	0.602	0.100	"	0.500		120	50-150	0.00	25	
Toluene	0.514	0.100	"	0.500		103	75.3-120	2.31	25	
Trichloroethene	0.483	0.0300	"	0.500		96.6	64.5-131	2.45	25	
Surrogate: Dibromofluoromethane	*1.02*		"	*1.00*		*102*	*44.8-146*			
Surrogate: Toluene-d8	*0.964*		"	*1.00*		*96.4*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*0.892*		"	*1.00*		*89.2*	*52.5-138*			
Matrix Spike (5060180-MS1)					**Source: S5F0135-02**					
Benzene	0.658	0.0300	mg/kg dry	0.769	ND	85.6	62-130			
Chlorobenzene	0.652	0.100	"	0.769	ND	84.8	70.3-119			
1,1-Dichloroethene	0.758	0.100	"	0.769	ND	98.6	50-150			
Toluene	0.675	0.100	"	0.769	0.0514	81.1	63.8-120			
Trichloroethene	0.621	0.0300	"	0.769	ND	80.8	73.9-122			
Surrogate: Dibromofluoromethane	*1.51*		"	*1.54*		*98.1*	*44.8-146*			
Surrogate: Toluene-d8	*1.26*		"	*1.54*		*81.8*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*1.40*		"	*1.54*		*90.9*	*52.5-138*			

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060180: Prepared 06/21/05 Using GC/MS Volatiles										
Matrix Spike Dup (5060180-MSD1)					**Source: S5F0135-02**					
Benzene	0.666	0.0300	mg/kg dry	0.769	ND	86.6	62-130	1.21	25	
Chlorobenzene	0.673	0.100	"	0.769	ND	87.5	70.3-119	3.17	25	
1,1-Dichloroethene	0.665	0.100	"	0.769	ND	86.5	50-150	13.1	25	
Toluene	0.681	0.100	"	0.769	0.0514	81.9	63.8-120	0.885	25	
Trichloroethene	0.613	0.0300	"	0.769	ND	79.7	73.9-122	1.30	25	
Surrogate: Dibromofluoromethane	*1.42*		"	*1.54*		*92.2*	*44.8-146*			
Surrogate: Toluene-d8	*1.22*		"	*1.54*		*79.2*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*1.27*		"	*1.54*		*82.5*	*52.5-138*			

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	Reported:
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060139: Prepared 06/16/05 Using Wet Chem										
Blank (5060139-BLK1)										
Cyanide (total)	ND	0.00500	mg/l							
LCS (5060139-BS1)										
Cyanide (total)	0.0523	0.00500	mg/l	0.0500		105	56-120			
Duplicate (5060139-DUP1)					Source: S5F0090-08					
Cyanide (total)	ND	0.00500	mg/l		ND				18	
Batch 5060182: Prepared 06/22/05 Using Wet Chem										
LCS (5060182-BS1)										
pH	6.94		pH Units	7.00		99.1	80-120			
Duplicate (5060182-DUP1)					Source: S5F0121-01					
pH	8.17		pH Units		8.21			0.488	20	
Batch 5060229: Prepared 06/28/05 Using Wet Chem										
Blank (5060229-BLK1)										
Cyanide (total)	ND	0.0500	mg/kg							
LCS (5060229-BS1)										
Cyanide (total)	0.0543	0.00500	mg/kg	0.0500		109	56-120			
Duplicate (5060229-DUP1)					Source: S5F0090-01					
Cyanide (total)	ND	0.0500	mg/kg		ND				20	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 12:00

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F24051: Prepared 06/24/05 Using EPA 3550B										
Blank (5F24051-BLK1)										
Aldrin	ND	1.00	ug/kg wet							
alpha-BHC	ND	1.00	"							
beta-BHC	ND	2.00	"							
delta-BHC	ND	1.00	"							
gamma-BHC (Lindane)	ND	1.00	"							
Chlordane (tech)	ND	10.0	"							
alpha-Chlordane	ND	1.00	"							
gamma-Chlordane	ND	1.00	"							
4,4'-DDD	ND	2.00	"							
4,4'-DDE	ND	2.00	"							
4,4'-DDT	ND	2.00	"							
Dieldrin	ND	2.00	"							
Endosulfan I	ND	1.00	"							
Endosulfan II	ND	2.00	"							
Endosulfan sulfate	ND	2.00	"							
Endrin	ND	2.00	"							
Endrin aldehyde	ND	2.00	"							
Endrin ketone	ND	2.00	"							
Heptachlor	ND	1.00	"							
Heptachlor epoxide	ND	1.00	"							
Methoxychlor	ND	2.00	"							
Toxaphene	ND	50.0	"							
Surrogate: TCX	*6.63*		"	*6.67*		*99.4*	*47-134*			
Surrogate: Decachlorobiphenyl	*6.46*		"	*6.67*		*96.9*	*35-151*			
LCS (5F24051-BS1)										
Aldrin	9.25	1.00	ug/kg wet	8.33		111	60-125			
alpha-BHC	8.22	1.00	"	8.33		98.7	61-125			
beta-BHC [2C]	8.49	2.00	"	8.33		102	37-147			P-03
delta-BHC	8.07	1.00	"	8.33		96.9	57-110			
gamma-BHC (Lindane)	8.58	1.00	"	8.33		103	61-125			
alpha-Chlordane	8.39	1.00	"	8.33		101	35-151			
gamma-Chlordane	8.51	1.00	"	8.33		102	65-125			
4,4'-DDD	16.6	2.00	"	16.7		99.4	70-125			
4,4'-DDE	16.3	2.00	"	16.7		97.6	69-125			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Organochlorine Pesticides by EPA Method 8081A

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-7 (4-4.5) (S5F0098-01) Soil Sampled: 06/15/05 11:00 Received: 06/16/05 12:53									X
Aldrin [2C]	ND	1.00	ug/kg dry	1	5F28056	06/28/05	07/06/05	EPA 8081A	
alpha-BHC [2C]	ND	1.00	"	"	"	"	"	"	
beta-BHC [2C]	ND	2.00	"	"	"	"	"	"	
delta-BHC [2C]	ND	1.00	"	"	"	"	"	"	
gamma-BHC (Lindane) [2C]	ND	1.00	"	"	"	"	"	"	
Chlordane (tech) [2C]	ND	10.0	"	"	"	"	"	"	
alpha-Chlordane [2C]	ND	1.00	"	"	"	"	"	"	
gamma-Chlordane [2C]	ND	1.00	"	"	"	"	"	"	
4,4'-DDD [2C]	**7.95**	2.00	"	"	"	"	"	"	P-03
4,4'-DDE [2C]	**3.77**	2.00	"	"	"	"	"	"	
4,4'-DDT [2C]	**13.0**	2.00	"	"	"	"	"	"	
Dieldrin [2C]	ND	2.00	"	"	"	"	"	"	
Endosulfan I [2C]	ND	1.00	"	"	"	"	"	"	
Endosulfan II [2C]	ND	2.00	"	"	"	"	"	"	
Endosulfan sulfate [2C]	ND	2.00	"	"	"	"	"	"	
Endrin [2C]	ND	2.00	"	"	"	"	"	"	
Endrin aldehyde [2C]	ND	2.00	"	"	"	"	"	"	
Endrin ketone [2C]	ND	2.00	"	"	"	"	"	"	
Heptachlor [2C]	ND	1.00	"	"	"	"	"	"	
Heptachlor epoxide [2C]	ND	1.00	"	"	"	"	"	"	
Methoxychlor [2C]	ND	2.00	"	"	"	"	"	"	
Toxaphene [2C]	ND	50.0	"	"	"	"	"	"	
Surrogate: TCX [2C]	*57.8*	*47-134*			"	"	"	"	
Surrogate: Decachlorobiphenyl [2C]	*60.1*	*35-151*			"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Organochlorine Pesticides by EPA Method 8081A

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-7 (4-4.5) (S5F0098-01RE1) Soil Sampled: 06/15/05 11:00 Received: 06/16/05 12:53									
Aldrin [2C]	ND	200	ug/kg dry	200	5F28056	06/28/05	07/06/05	EPA 8081A	
alpha-BHC [2C]	ND	200	"	"	"	"	"	"	
beta-BHC [2C]	ND	400	"	"	"	"	"	"	
delta-BHC [2C]	ND	200	"	"	"	"	"	"	
gamma-BHC (Lindane) [2C]	ND	200	"	"	"	"	"	"	
Chlordane (tech) [2C]	ND	2000	"	"	"	"	"	"	
alpha-Chlordane [2C]	ND	200	"	"	"	"	"	"	
gamma-Chlordane [2C]	ND	200	"	"	"	"	"	"	
4,4'-DDD [2C]	ND	400	"	"	"	"	"	"	
4,4'-DDE [2C]	ND	400	"	"	"	"	"	"	
4,4'-DDT [2C]	ND	400	"	"	"	"	"	"	
Dieldrin [2C]	ND	400	"	"	"	"	"	"	
Endosulfan I [2C]	ND	200	"	"	"	"	"	"	
Endosulfan II [2C]	ND	400	"	"	"	"	"	"	
Endosulfan sulfate [2C]	ND	400	"	"	"	"	"	"	
Endrin [2C]	ND	400	"	"	"	"	"	"	
Endrin aldehyde [2C]	ND	400	"	"	"	"	"	"	
Endrin ketone [2C]	ND	400	"	"	"	"	"	"	
Heptachlor [2C]	ND	200	"	"	"	"	"	"	
Heptachlor epoxide [2C]	ND	200	"	"	"	"	"	"	
Methoxychlor [2C]	ND	400	"	"	"	"	"	"	
Toxaphene [2C]	ND	10000	"	"	"	"	"	"	
Surrogate: TCX [2C]	*116*	*47-134*			"	"	"	"	
Surrogate: Decachlorobiphenyl [2C]	*NR*	*35-151*			"	"	"	"	*S-04*

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Organochlorine Pesticides by EPA Method 8081A

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-9 (4-4.5) (S5F0098-03) Soil Sampled: 06/15/05 14:00 Received: 06/16/05 12:53									X
Aldrin [2C]	ND	1.00	ug/kg dry	1	5F28056	06/28/05	07/06/05	EPA 8081A	
alpha-BHC [2C]	ND	1.00	"	"	"	"	"	"	
beta-BHC [2C]	ND	2.00	"	"	"	"	"	"	
delta-BHC [2C]	ND	1.00	"	"	"	"	"	"	
gamma-BHC (Lindane) [2C]	ND	1.00	"	"	"	"	"	"	
Chlordane (tech) [2C]	ND	10.0	"	"	"	"	"	"	
alpha-Chlordane [2C]	ND	1.00	"	"	"	"	"	"	
gamma-Chlordane [2C]	ND	1.00	"	"	"	"	"	"	
4,4'-DDD [2C]	ND	2.00	"	"	"	"	"	"	
4,4'-DDE [2C]	ND	2.00	"	"	"	"	"	"	
4,4'-DDT [2C]	**2.76**	2.00	"	"	"	"	"	"	
Dieldrin [2C]	ND	2.00	"	"	"	"	"	"	
Endosulfan I [2C]	ND	1.00	"	"	"	"	"	"	
Endosulfan II [2C]	ND	2.00	"	"	"	"	"	"	
Endosulfan sulfate [2C]	ND	2.00	"	"	"	"	"	"	
Endrin [2C]	ND	2.00	"	"	"	"	"	"	
Endrin aldehyde [2C]	ND	2.00	"	"	"	"	"	"	
Endrin ketone [2C]	ND	2.00	"	"	"	"	"	"	
Heptachlor [2C]	ND	1.00	"	"	"	"	"	"	
Heptachlor epoxide [2C]	ND	1.00	"	"	"	"	"	"	
Methoxychlor [2C]	ND	2.00	"	"	"	"	"	"	
Toxaphene [2C]	ND	50.0	"	"	"	"	"	"	
Surrogate: TCX [2C]	*85.8*	*47-134*			"	"	"	"	
Surrogate: Decachlorobiphenyl [2C]	*75.9*	*35-151*			"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Organochlorine Pesticides by EPA Method 8081A

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-9 (4-4.5) (S5F0098-03RE1) Soil Sampled: 06/15/05 14:00 Received: 06/16/05 12:53									
Aldrin [2C]	ND	100	ug/kg dry	100	5F28056	06/28/05	07/06/05	EPA 8081A	
alpha-BHC [2C]	ND	100	"	"	"	"	"	"	
beta-BHC [2C]	ND	200	"	"	"	"	"	"	
delta-BHC [2C]	ND	100	"	"	"	"	"	"	
gamma-BHC (Lindane) [2C]	ND	100	"	"	"	"	"	"	
Chlordane (tech) [2C]	ND	1000	"	"	"	"	"	"	
alpha-Chlordane [2C]	ND	100	"	"	"	"	"	"	
gamma-Chlordane [2C]	ND	100	"	"	"	"	"	"	
4,4'-DDD [2C]	ND	200	"	"	"	"	"	"	
4,4'-DDE [2C]	ND	200	"	"	"	"	"	"	
4,4'-DDT [2C]	ND	200	"	"	"	"	"	"	
Dieldrin [2C]	ND	200	"	"	"	"	"	"	
Endosulfan I [2C]	ND	100	"	"	"	"	"	"	
Endosulfan II [2C]	ND	200	"	"	"	"	"	"	
Endosulfan sulfate [2C]	ND	200	"	"	"	"	"	"	
Endrin [2C]	ND	200	"	"	"	"	"	"	
Endrin aldehyde [2C]	ND	200	"	"	"	"	"	"	
Endrin ketone [2C]	ND	200	"	"	"	"	"	"	
Heptachlor [2C]	ND	100	"	"	"	"	"	"	
Heptachlor epoxide [2C]	ND	100	"	"	"	"	"	"	
Methoxychlor [2C]	ND	200	"	"	"	"	"	"	
Toxaphene [2C]	ND	5000	"	"	"	"	"	"	
Surrogate: TCX [2C]	*98.0*	*47-134*			"	"	"	"	
Surrogate: Decachlorobiphenyl [2C]	*166*	*35-151*			"	"	"	"	*S-04*

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Organochlorine Pesticides by EPA Method 8081A

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-WS1 (S5F0098-04) Water Sampled: 06/15/05 09:00 Received: 06/16/05 12:53									
Aldrin [2C]	ND	0.0800	ug/l	1	5F22064	06/22/05	06/27/05	EPA 8081A	
alpha-BHC [2C]	ND	0.0400	"	"	"	"	"	"	
beta-BHC [2C]	ND	0.0400	"	"	"	"	"	"	
delta-BHC [2C]	ND	0.100	"	"	"	"	"	"	
gamma-BHC (Lindane) [2C]	ND	0.0400	"	"	"	"	"	"	
Chlordane (tech) [2C]	ND	0.500	"	"	"	"	"	"	
alpha-Chlordane [2C]	ND	0.0400	"	"	"	"	"	"	
gamma-Chlordane [2C]	ND	0.0400	"	"	"	"	"	"	
4,4'-DDD [2C]	ND	0.0400	"	"	"	"	"	"	
4,4'-DDE [2C]	ND	0.0800	"	"	"	"	"	"	
4,4'-DDT [2C]	ND	0.0800	"	"	"	"	"	"	
Dieldrin [2C]	ND	0.0800	"	"	"	"	"	"	
Endosulfan I [2C]	**0.0226**	0.0200	"	"	"	"	"	"	
Endosulfan II [2C]	ND	0.0800	"	"	"	"	"	"	
Endosulfan sulfate [2C]	ND	0.100	"	"	"	"	"	"	
Endrin [2C]	ND	0.0800	"	"	"	"	"	"	
Endrin aldehyde [2C]	ND	0.160	"	"	"	"	"	"	
Endrin ketone [2C]	ND	0.0800	"	"	"	"	"	"	
Heptachlor [2C]	ND	0.0800	"	"	"	"	"	"	
Heptachlor epoxide [2C]	ND	0.0400	"	"	"	"	"	"	
Methoxychlor	ND	0.500	"	"	"	"	"	"	
Toxaphene [2C]	ND	2.00	"	"	"	"	"	"	
Surrogate: TCX [2C]	*81.0*	*24-143*			"	"	"	"	
Surrogate: Decachlorobiphenyl [2C]	*84.0*	*10-145*			"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Polychlorinated Biphenyls by EPA Method 8082

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-7 (4-4.5) (S5F0098-01) Soil Sampled: 06/15/05 11:00 Received: 06/16/05 12:53									
Aroclor 1016	ND	25.0	ug/kg dry	1	5F28056	06/28/05	06/30/05	EPA 8082	
Aroclor 1221	ND	50.0	"	"	"	"	"	"	
Aroclor 1232	ND	25.0	"	"	"	"	"	"	
Aroclor 1242	ND	25.0	"	"	"	"	"	"	
Aroclor 1248	ND	25.0	"	"	"	"	"	"	
Aroclor 1254	ND	25.0	"	"	"	"	"	"	
Aroclor 1260	**87.8**	25.0	"	"	"	"	"	"	
Aroclor 1262	ND	25.0	"	"	"	"	"	"	
Aroclor 1268	ND	25.0	"	"	"	"	"	"	
Surrogate: TCX	*86.9*	*19-149*			"	"	"	"	
Surrogate: Decachlorobiphenyl	*96.5*	*37-151*			"	"	"	"	
TC-9 (4-4.5) (S5F0098-03) Soil Sampled: 06/15/05 14:00 Received: 06/16/05 12:53									
Aroclor 1016	ND	25.0	ug/kg dry	1	5F28056	06/28/05	06/29/05	EPA 8082	
Aroclor 1221	ND	50.0	"	"	"	"	"	"	
Aroclor 1232	ND	25.0	"	"	"	"	"	"	
Aroclor 1242	ND	25.0	"	"	"	"	"	"	
Aroclor 1248	ND	25.0	"	"	"	"	"	"	
Aroclor 1254	ND	25.0	"	"	"	"	"	"	
Aroclor 1260	**49.7**	25.0	"	"	"	"	"	"	
Aroclor 1262	ND	25.0	"	"	"	"	"	"	
Aroclor 1268	ND	25.0	"	"	"	"	"	"	
Surrogate: TCX	*90.3*	*19-149*			"	"	"	"	
Surrogate: Decachlorobiphenyl	*98.3*	*37-151*			"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Polychlorinated Biphenyls by EPA Method 8082

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-WS1 (S5F0098-04) Water Sampled: 06/15/05 09:00 Received: 06/16/05 12:53									
Aroclor 1016	ND	0.500	ug/l	1	5F22064	06/22/05	06/28/05	EPA 8082	
Aroclor 1221	ND	0.500	"	"	"	"	"	"	
Aroclor 1232	ND	0.500	"	"	"	"	"	"	
Aroclor 1242	ND	0.500	"	"	"	"	"	"	
Aroclor 1248	ND	0.500	"	"	"	"	"	"	
Aroclor 1254	ND	0.500	"	"	"	"	"	"	
Aroclor 1260	ND	0.500	"	"	"	"	"	"	
Aroclor 1262	ND	0.500	"	"	"	"	"	"	
Aroclor 1268	ND	0.500	"	"	"	"	"	"	
Surrogate: TCX	*81.5*	*25-129*			"	"	"	"	
Surrogate: Decachlorobiphenyl	*99.5*	*22-125*			"	"	"	"	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Physical Parameters by APHA/ASTM/EPA Methods

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TC-7 (4-4.5) (S5F0098-01) Soil Sampled: 06/15/05 11:00 Received: 06/16/05 12:53									
Dry Weight	**76.3**	1.00	%	1	5F29068	06/30/05	06/30/05	BSOPSPL003R08	
TC-9 (4-4.5) (S5F0098-03) Soil Sampled: 06/15/05 14:00 Received: 06/16/05 12:53									
Dry Weight	**75.0**	1.00	%	1	5F29068	06/30/05	06/30/05	BSOPSPL003R08	

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Semivolatile Petroleum Products by NWTPH-Dx - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060156: Prepared 06/20/05 Using EPA 3550B										
Blank (5060156-BLK1)										
Diesel Range Hydrocarbons	ND	10.0	mg/kg wet							
Heavy Oil Range Hydrocarbons	ND	25.0	"							
Surrogate: 2-FBP	*6.14*		"	*6.67*		*92.1*	*50-150*			
Surrogate: p-Terphenyl-d14	*6.28*		"	*6.67*		*94.2*	*50-150*			
LCS (5060156-BS1)										
Diesel Range Hydrocarbons	86.6	10.0	mg/kg wet	83.3		104	50-150			
Surrogate: 2-FBP	*7.51*		"	*6.67*		*113*	*50-150*			
Surrogate: p-Terphenyl-d14	*6.64*		"	*6.67*		*99.6*	*50-150*			
Duplicate (5060156-DUP1)					**Source: S5F0079-01**					
Diesel Range Hydrocarbons	ND	100	mg/kg dry		ND				25	
Heavy Oil Range Hydrocarbons	361	250	"		261			32.2	25	Q-05
Surrogate: 2-FBP	*10.2*		"	*10.9*		*93.6*	*50-150*			
Surrogate: p-Terphenyl-d14	*11.2*		"	*10.9*		*103*	*50-150*			
Matrix Spike (5060156-MS1)					**Source: S5F0079-01**					
Diesel Range Hydrocarbons	157	100	mg/kg dry	136	ND	115	50-150			
Surrogate: 2-FBP	*12.5*		"	*10.9*		*115*	*50-150*			
Surrogate: p-Terphenyl-d14	*11.8*		"	*10.9*		*108*	*50-150*			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060180: Prepared 06/21/05 Using GC/MS Volatiles										
Blank (5060180-BLK1)										
Acetone	ND	1.00	mg/kg wet							
Benzene	ND	0.0300	"							
Bromobenzene	ND	0.100	"							
Bromochloromethane	ND	0.100	"							
Bromodichloromethane	ND	0.100	"							
Bromoform	ND	0.100	"							
Bromomethane	ND	0.500	"							
2-Butanone	ND	1.00	"							
n-Butylbenzene	ND	0.100	"							
sec-Butylbenzene	ND	0.100	"							
tert-Butylbenzene	ND	0.100	"							
Carbon disulfide	ND	0.100	"							
Carbon tetrachloride	ND	0.100	"							
Chlorobenzene	ND	0.100	"							
Chloroethane	ND	0.100	"							
Chloroform	ND	0.100	"							
Chloromethane	ND	0.500	"							
2-Chlorotoluene	ND	0.100	"							
4-Chlorotoluene	ND	0.100	"							
Dibromochloromethane	ND	0.100	"							
1,2-Dibromo-3-chloropropane	ND	0.500	"							
1,2-Dibromoethane	ND	0.100	"							
Dibromomethane	ND	0.100	"							
1,2-Dichlorobenzene	ND	0.100	"							
1,3-Dichlorobenzene	ND	0.100	"							
1,4-Dichlorobenzene	ND	0.100	"							
Dichlorodifluoromethane	ND	0.100	"							
1,1-Dichloroethane	ND	0.100	"							
1,2-Dichloroethane (EDC)	ND	0.100	"							
1,1-Dichloroethene	ND	0.100	"							
cis-1,2-Dichloroethene	ND	0.100	"							
trans-1,2-Dichloroethene	ND	0.100	"							
1,2-Dichloropropane	ND	0.100	"							
1,3-Dichloropropane	ND	0.100	"							
2,2-Dichloropropane	ND	0.100	"							

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060180: Prepared 06/21/05 Using GC/MS Volatiles										
Blank (5060180-BLK1)										
1,1-Dichloropropene	ND	0.100	mg/kg wet							
cis-1,3-Dichloropropene	ND	0.100	"							
trans-1,3-Dichloropropene	ND	0.100	"							
Ethylbenzene	ND	0.100	"							
Hexachlorobutadiene	ND	0.100	"							
2-Hexanone	ND	1.00	"							
Isopropylbenzene	ND	0.100	"							
p-Isopropyltoluene	ND	0.100	"							
Methylene chloride	ND	1.00	"							
4-Methyl-2-pentanone	ND	1.00	"							
Methyl tert-butyl ether	ND	0.100	"							
Naphthalene	ND	0.100	"							
n-Propylbenzene	ND	0.100	"							
Styrene	ND	0.100	"							
1,1,1,2-Tetrachloroethane	ND	0.100	"							
1,1,2,2-Tetrachloroethane	ND	0.100	"							
Tetrachloroethene	ND	0.0300	"							
Toluene	ND	0.100	"							
1,2,3-Trichlorobenzene	ND	0.100	"							
1,2,4-Trichlorobenzene	ND	0.100	"							
1,1,1-Trichloroethane	ND	0.100	"							
1,1,2-Trichloroethane	ND	0.100	"							
Trichloroethene	ND	0.0300	"							
Trichlorofluoromethane	ND	0.100	"							
1,2,3-Trichloropropane	ND	0.100	"							
1,2,4-Trimethylbenzene	ND	0.100	"							
1,3,5-Trimethylbenzene	ND	0.100	"							
Vinyl chloride	ND	0.100	"							
o-Xylene	ND	0.200	"							
m,p-Xylene	ND	0.400	"							
Surrogate: Dibromofluoromethane	*1.05*		"	*1.00*		*105*	*44.8-146*			
Surrogate: Toluene-d8	*1.04*		"	*1.00*		*104*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*0.676*		"	*1.00*		*67.6*	*52.5-138*			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060180: Prepared 06/21/05 Using GC/MS Volatiles										
LCS (5060180-BS1)										
Benzene	0.522	0.0300	mg/kg wet	0.500		104	72.5-130			
Chlorobenzene	0.510	0.100	"	0.500		102	78.4-120			
1,1-Dichloroethene	0.602	0.100	"	0.500		120	50-150			
Toluene	0.526	0.100	"	0.500		105	75.3-120			
Trichloroethene	0.495	0.0300	"	0.500		99.0	64.5-131			
Surrogate: Dibromofluoromethane	*1.06*		"	*1.00*		*106*	*44.8-146*			
Surrogate: Toluene-d8	*0.996*		"	*1.00*		*99.6*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*0.976*		"	*1.00*		*97.6*	*52.5-138*			
LCS Dup (5060180-BSD1)										
Benzene	0.513	0.0300	mg/kg wet	0.500		103	72.5-130	1.74	25	
Chlorobenzene	0.509	0.100	"	0.500		102	78.4-120	0.196	25	
1,1-Dichloroethene	0.602	0.100	"	0.500		120	50-150	0.00	25	
Toluene	0.514	0.100	"	0.500		103	75.3-120	2.31	25	
Trichloroethene	0.483	0.0300	"	0.500		96.6	64.5-131	2.45	25	
Surrogate: Dibromofluoromethane	*1.02*		"	*1.00*		*102*	*44.8-146*			
Surrogate: Toluene-d8	*0.964*		"	*1.00*		*96.4*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*0.892*		"	*1.00*		*89.2*	*52.5-138*			
Matrix Spike (5060180-MS1)					**Source: S5F0135-02**					
Benzene	0.658	0.0300	mg/kg dry	0.769	ND	85.6	62-130			
Chlorobenzene	0.652	0.100	"	0.769	ND	84.8	70.3-119			
1,1-Dichloroethene	0.758	0.100	"	0.769	ND	98.6	50-150			
Toluene	0.675	0.100	"	0.769	0.0514	81.1	63.8-120			
Trichloroethene	0.621	0.0300	"	0.769	ND	80.8	73.9-122			
Surrogate: Dibromofluoromethane	*1.51*		"	*1.54*		*98.1*	*44.8-146*			
Surrogate: Toluene-d8	*1.26*		"	*1.54*		*81.8*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*1.40*		"	*1.54*		*90.9*	*52.5-138*			

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060180: Prepared 06/21/05 Using GC/MS Volatiles										
Matrix Spike Dup (5060180-MSD1)					**Source: S5F0135-02**					
Benzene	0.666	0.0300	mg/kg dry	0.769	ND	86.6	62-130	1.21	25	
Chlorobenzene	0.673	0.100	"	0.769	ND	87.5	70.3-119	3.17	25	
1,1-Dichloroethene	0.665	0.100	"	0.769	ND	86.5	50-150	13.1	25	
Toluene	0.681	0.100	"	0.769	0.0514	81.9	63.8-120	0.885	25	
Trichloroethene	0.613	0.0300	"	0.769	ND	79.7	73.9-122	1.30	25	
Surrogate: Dibromofluoromethane	*1.42*		"	*1.54*		*92.2*	*44.8-146*			
Surrogate: Toluene-d8	*1.22*		"	*1.54*		*79.2*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*1.27*		"	*1.54*		*82.5*	*52.5-138*			

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5060182: Prepared 06/22/05 Using Wet Chem										
LCS (5060182-BS1)										
pH	6.94		pH Units	7.00		99.1	80-120			
Duplicate (5060182-DUP1)					**Source: S5F0121-01**					
pH	8.17		pH Units		8.21			0.488	20	
Batch 5060229: Prepared 06/28/05 Using Wet Chem										
Blank (5060229-BLK1)										
Cyanide (total)	ND	0.0500	mg/kg							
LCS (5060229-BS1)										
Cyanide (total)	0.0543	0.00500	mg/kg	0.0500		109	56-120			
Duplicate (5060229-DUP1)					**Source: S5F0090-01**					
Cyanide (total)	ND	0.0500	mg/kg		ND				20	

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Geo Engineers - Spokane 523 East Second Ave. Spokane, WA 99202	Project: Teck Cominco Project Number: 6601-003-09 Project Manager: Dave Enos	**Reported:** 07/11/05 11:59

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F22064: Prepared 06/22/05 Using EPA 3520C										
Blank (5F22064-BLK1)										
Aldrin [2C]	ND	0.0800	ug/l							
alpha-BHC [2C]	ND	0.0400	"							
beta-BHC [2C]	ND	0.0400	"							
delta-BHC [2C]	ND	0.100	"							
gamma-BHC (Lindane) [2C]	ND	0.0400	"							
Chlordane (tech) [2C]	ND	0.500	"							
alpha-Chlordane [2C]	ND	0.0400	"							
gamma-Chlordane [2C]	ND	0.0400	"							
4,4'-DDD [2C]	ND	0.0400	"							
4,4'-DDE [2C]	ND	0.0800	"							
4,4'-DDT [2C]	ND	0.0800	"							
Dieldrin [2C]	ND	0.0800	"							
Endosulfan I [2C]	ND	0.0200	"							
Endosulfan II [2C]	ND	0.0800	"							
Endosulfan sulfate [2C]	ND	0.100	"							
Endrin [2C]	ND	0.0800	"							
Endrin aldehyde [2C]	ND	0.160	"							
Endrin ketone [2C]	ND	0.0800	"							
Heptachlor [2C]	ND	0.0800	"							
Heptachlor epoxide [2C]	ND	0.0400	"							
Methoxychlor	ND	0.500	"							
Toxaphene [2C]	ND	2.00	"							
Surrogate: TCX [2C]	*0.146*		"	*0.200*		*73.0*	*24-143*			
Surrogate: Decachlorobiphenyl [2C]	*0.157*		"	*0.200*		*78.5*	*10-145*			
LCS (5F22064-BS1)										
Aldrin [2C]	0.226	0.0800	ug/l	0.250		90.4	57-124			
alpha-BHC [2C]	0.204	0.0400	"	0.250		81.6	52-138			
beta-BHC [2C]	0.230	0.0400	"	0.250		92.0	63-129			
delta-BHC [2C]	0.203	0.100	"	0.250		81.2	19-140			
gamma-BHC (Lindane) [2C]	0.207	0.0400	"	0.250		82.8	59-129			
alpha-Chlordane [2C]	0.223	0.0400	"	0.250		89.2	60-120			
gamma-Chlordane [2C]	0.228	0.0400	"	0.250		91.2	58-121			
4,4'-DDD [2C]	0.470	0.0400	"	0.500		94.0	57-129			
4,4'-DDE [2C]	0.452	0.0800	"	0.500		90.4	60-128			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	Reported:
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F22064: Prepared 06/22/05 Using EPA 3520C										
LCS (5F22064-BS1)										
4,4'-DDT [2C]	0.402	0.0800	ug/l	0.500		80.4	60-147			
Dieldrin [2C]	0.453	0.0800	"	0.500		90.6	58-123			
Endosulfan I [2C]	0.227	0.0200	"	0.250		90.8	55-131			
Endosulfan II [2C]	0.466	0.0800	"	0.500		93.2	53-135			
Endosulfan sulfate [2C]	0.455	0.100	"	0.500		91.0	58-120			
Endrin [2C]	0.376	0.0800	"	0.500		75.2	61-134			
Endrin aldehyde [2C]	0.466	0.160	"	0.500		93.2	46-123			
Endrin ketone [2C]	0.528	0.0800	"	0.500		106	55-138			
Heptachlor [2C]	0.189	0.0800	"	0.250		75.6	60-128			
Heptachlor epoxide [2C]	0.227	0.0400	"	0.250		90.8	62-123			
Methoxychlor	2.06	0.500	"	2.50		82.4	60-155			
Surrogate: TCX [2C]	*0.160*		"	*0.200*		*80.0*	*24-143*			
Surrogate: Decachlorobiphenyl [2C]	*0.163*		"	*0.200*		*81.5*	*10-145*			
LCS Dup (5F22064-BSD1)										
Aldrin [2C]	0.233	0.0800	ug/l	0.250		93.2	57-124	3.05	30	
alpha-BHC [2C]	0.203	0.0400	"	0.250		81.2	52-138	0.491	30	
beta-BHC [2C]	0.234	0.0400	"	0.250		93.6	63-129	1.72	30	
delta-BHC [2C]	0.205	0.100	"	0.250		82.0	19-140	0.980	30	
gamma-BHC (Lindane) [2C]	0.210	0.0400	"	0.250		84.0	59-129	1.44	30	
alpha-Chlordane [2C]	0.229	0.0400	"	0.250		91.6	60-120	2.65	30	
gamma-Chlordane [2C]	0.235	0.0400	"	0.250		94.0	58-121	3.02	30	
4,4'-DDD [2C]	0.487	0.0400	"	0.500		97.4	57-129	3.55	30	
4,4'-DDE [2C]	0.470	0.0800	"	0.500		94.0	60-128	3.90	30	
4,4'-DDT [2C]	0.406	0.0800	"	0.500		81.2	60-147	0.990	30	
Dieldrin [2C]	0.480	0.0800	"	0.500		96.0	58-123	5.79	30	
Endosulfan I [2C]	0.234	0.0200	"	0.250		93.6	55-131	3.04	30	
Endosulfan II [2C]	0.474	0.0800	"	0.500		94.8	53-135	1.70	30	
Endosulfan sulfate [2C]	0.461	0.100	"	0.500		92.2	58-120	1.31	30	
Endrin [2C]	0.445	0.0800	"	0.500		89.0	61-134	16.8	30	
Endrin aldehyde [2C]	0.471	0.160	"	0.500		94.2	46-123	1.07	30	
Endrin ketone [2C]	0.490	0.0800	"	0.500		98.0	55-138	7.47	30	
Heptachlor [2C]	0.195	0.0800	"	0.250		78.0	60-128	3.12	30	
Heptachlor epoxide [2C]	0.233	0.0400	"	0.250		93.2	62-123	2.61	30	
Methoxychlor	2.07	0.500	"	2.50		82.8	60-155	0.484	30	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F22064: Prepared 06/22/05 Using EPA 3520C										
LCS Dup (5F22064-BSD1)										
Surrogate: TCX [2C]	*0.162*		*ug/l*	*0.200*		*81.0*	*24-143*			
Surrogate: Decachlorobiphenyl [2C]	*0.166*		*"*	*0.200*		*83.0*	*10-145*			
Batch 5F28056: Prepared 06/28/05 Using EPA 3550B										
Blank (5F28056-BLK1)										
Aldrin [2C]	ND	1.00	ug/kg wet							
alpha-BHC [2C]	ND	1.00	"							
beta-BHC [2C]	ND	2.00	"							
delta-BHC [2C]	ND	1.00	"							
gamma-BHC (Lindane) [2C]	ND	1.00	"							
Chlordane (tech) [2C]	ND	10.0	"							
alpha-Chlordane [2C]	ND	1.00	"							
gamma-Chlordane [2C]	ND	1.00	"							
4,4'-DDD [2C]	ND	2.00	"							
4,4'-DDE [2C]	ND	2.00	"							
4,4'-DDT [2C]	ND	2.00	"							
Dieldrin [2C]	ND	2.00	"							
Endosulfan I [2C]	ND	1.00	"							
Endosulfan II [2C]	ND	2.00	"							
Endosulfan sulfate [2C]	ND	2.00	"							
Endrin [2C]	ND	2.00	"							
Endrin aldehyde [2C]	ND	2.00	"							
Endrin ketone [2C]	ND	2.00	"							
Heptachlor [2C]	ND	1.00	"							
Heptachlor epoxide [2C]	ND	1.00	"							
Methoxychlor [2C]	ND	2.00	"							
Toxaphene [2C]	ND	50.0	"							
Surrogate: TCX [2C]	*6.60*		*"*	*6.67*		*99.0*	*47-134*			
Surrogate: Decachlorobiphenyl [2C]	*7.45*		*"*	*6.67*		*112*	*35-151*			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F28056: Prepared 06/28/05 Using EPA 3550B										
LCS (5F28056-BS1)										
Aldrin [2C]	7.94	1.00	ug/kg wet	8.33		95.3	60-125			
alpha-BHC [2C]	7.50	1.00	"	8.33		90.0	61-125			
beta-BHC [2C]	7.75	2.00	"	8.33		93.0	37-147			
delta-BHC [2C]	6.47	1.00	"	8.33		77.7	57-110			
gamma-BHC (Lindane) [2C]	7.12	1.00	"	8.33		85.5	61-125			
alpha-Chlordane [2C]	7.67	1.00	"	8.33		92.1	35-151			
gamma-Chlordane [2C]	7.65	1.00	"	8.33		91.8	65-125			
4,4'-DDD [2C]	15.4	2.00	"	16.7		92.2	70-125			
4,4'-DDE [2C]	15.4	2.00	"	16.7		92.2	69-125			
4,4'-DDT [2C]	15.9	2.00	"	16.7		95.2	60-127			
Dieldrin [2C]	15.1	2.00	"	16.7		90.4	59-128			
Endosulfan I [2C]	7.01	1.00	"	8.33		84.2	32-153			
Endosulfan II [2C]	16.3	2.00	"	16.7		97.6	61-125			
Endosulfan sulfate [2C]	16.0	2.00	"	16.7		95.8	56-125			
Endrin [2C]	15.5	2.00	"	16.7		92.8	58-132			
Endrin aldehyde [2C]	13.7	2.00	"	16.7		82.0	22-144			
Endrin ketone [2C]	16.2	2.00	"	16.7		97.0	50-140			
Heptachlor [2C]	7.19	1.00	"	8.33		86.3	59-129			
Heptachlor epoxide [2C]	7.89	1.00	"	8.33		94.7	55-125			
Methoxychlor [2C]	79.8	2.00	"	83.3		95.8	50-135			
Surrogate: TCX [2C]	*6.44*		"	*6.67*		*96.6*	*47-134*			
Surrogate: Decachlorobiphenyl [2C]	*7.27*		"	*6.67*		*109*	*35-151*			
LCS Dup (5F28056-BSD1)										
Aldrin [2C]	8.19	1.00	ug/kg wet	8.33		98.3	60-125	3.10	30	
alpha-BHC [2C]	7.68	1.00	"	8.33		92.2	61-125	2.37	35	
beta-BHC [2C]	8.03	2.00	"	8.33		96.4	37-147	3.55	35	
delta-BHC [2C]	6.74	1.00	"	8.33		80.9	57-110	4.09	35	
gamma-BHC (Lindane) [2C]	7.23	1.00	"	8.33		86.8	61-125	1.53	30	
alpha-Chlordane [2C]	8.09	1.00	"	8.33		97.1	35-151	5.33	35	
gamma-Chlordane [2C]	8.12	1.00	"	8.33		97.5	65-125	5.96	35	
4,4'-DDD [2C]	16.2	2.00	"	16.7		97.0	70-125	5.06	35	
4,4'-DDE [2C]	16.2	2.00	"	16.7		97.0	69-125	5.06	35	
4,4'-DDT [2C]	16.9	2.00	"	16.7		101	60-127	6.10	35	
Dieldrin [2C]	15.9	2.00	"	16.7		95.2	59-128	5.16	35	

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F28056: Prepared 06/28/05 Using EPA 3550B										
LCS Dup (5F28056-BSD1)										
Endosulfan I [2C]	7.32	1.00	ug/kg wet	8.33		87.9	32-153	4.33	35	
Endosulfan II [2C]	17.2	2.00	"	16.7		103	61-125	5.37	35	
Endosulfan sulfate [2C]	16.9	2.00	"	16.7		101	56-125	5.47	35	
Endrin [2C]	16.4	2.00	"	16.7		98.2	58-132	5.64	35	
Endrin aldehyde [2C]	14.3	2.00	"	16.7		85.6	22-144	4.29	35	
Endrin ketone [2C]	17.0	2.00	"	16.7		102	50-140	4.82	35	
Heptachlor [2C]	7.42	1.00	"	8.33		89.1	59-129	3.15	30	
Heptachlor epoxide [2C]	8.27	1.00	"	8.33		99.3	55-125	4.70	35	
Methoxychlor [2C]	83.0	2.00	"	83.3		99.6	50-135	3.93	35	
Surrogate: TCX [2C]	*6.63*		"	*6.67*		*99.4*	*47-134*			
Surrogate: Decachlorobiphenyl [2C]	*7.54*		"	*6.67*		*113*	*35-151*			
Matrix Spike (5F28056-MS1)					**Source: B5F0448-02**					
Aldrin [2C]	9.98	1.00	ug/kg dry	9.26	ND	108	51-125			
alpha-BHC [2C]	8.61	1.00	"	9.26	ND	93.0	39-125			
beta-BHC [2C]	9.37	2.00	"	9.26	ND	101	13-152			
delta-BHC [2C]	7.61	1.00	"	9.26	ND	82.2	21-133			
gamma-BHC (Lindane) [2C]	8.17	1.00	"	9.26	ND	88.2	36-125			
alpha-Chlordane [2C]	8.06	1.00	"	9.26	ND	87.0	24-156			
gamma-Chlordane [2C]	9.07	1.00	"	9.26	ND	97.9	34-143			
4,4'-DDD [2C]	17.6	2.00	"	18.5	ND	95.1	29-153			
4,4'-DDE [2C]	18.3	2.00	"	18.5	ND	98.9	30-160			
4,4'-DDT [2C]	18.4	2.00	"	18.5	ND	99.5	31-149			
Dieldrin [2C]	17.9	2.00	"	18.5	ND	96.8	41-134			
Endosulfan I [2C]	5.89	1.00	"	9.26	ND	63.6	20-155			
Endosulfan II [2C]	19.0	2.00	"	18.5	ND	103	30-140			
Endosulfan sulfate [2C]	19.4	2.00	"	18.5	ND	105	14-143			
Endrin [2C]	18.8	2.00	"	18.5	ND	102	42-137			
Endrin aldehyde [2C]	12.0	2.00	"	18.5	ND	64.9	10-144			
Endrin ketone [2C]	19.0	2.00	"	18.5	ND	103	14-149			
Heptachlor [2C]	8.11	1.00	"	9.26	ND	87.6	43-125			
Heptachlor epoxide [2C]	9.16	1.00	"	9.26	ND	98.9	51-125			
Methoxychlor [2C]	95.5	2.00	"	92.6	0.399	103	24-138			
Surrogate: TCX [2C]	*7.37*		"	*7.41*		*99.5*	*47-134*			
Surrogate: Decachlorobiphenyl [2C]	*8.54*		"	*7.41*		*115*	*35-151*			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Organochlorine Pesticides by EPA Method 8081A - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F28056: Prepared 06/28/05 Using EPA 3550B										
Matrix Spike Dup (5F28056-MSD1)					**Source: B5F0448-02**					
Aldrin [2C]	9.86	1.00	ug/kg dry	9.32	ND	106	51-125	1.21	35	
alpha-BHC [2C]	8.82	1.00	"	9.32	ND	94.6	39-125	2.41	35	
beta-BHC [2C]	9.20	2.00	"	9.32	ND	98.7	13-152	1.83	35	
delta-BHC [2C]	7.30	1.00	"	9.32	ND	78.3	21-133	4.16	35	
gamma-BHC (Lindane) [2C]	8.31	1.00	"	9.32	ND	89.2	36-125	1.70	35	
alpha-Chlordane [2C]	7.98	1.00	"	9.32	ND	85.6	24-156	0.998	35	
gamma-Chlordane [2C]	8.93	1.00	"	9.32	ND	95.8	34-143	1.56	35	
4,4'-DDD [2C]	16.8	2.00	"	18.6	ND	90.3	29-153	4.65	35	
4,4'-DDE [2C]	17.8	2.00	"	18.6	ND	95.7	30-160	2.77	35	
4,4'-DDT [2C]	17.7	2.00	"	18.6	ND	95.2	31-149	3.88	35	
Dieldrin [2C]	17.5	2.00	"	18.6	ND	94.1	41-134	2.26	35	
Endosulfan I [2C]	5.59	1.00	"	9.32	ND	60.0	20-155	5.23	35	
Endosulfan II [2C]	18.4	2.00	"	18.6	ND	98.9	30-140	3.21	35	
Endosulfan sulfate [2C]	18.5	2.00	"	18.6	ND	99.5	14-143	4.75	35	
Endrin [2C]	18.3	2.00	"	18.6	ND	98.4	42-137	2.70	35	
Endrin aldehyde [2C]	11.5	2.00	"	18.6	ND	61.8	10-144	4.26	35	
Endrin ketone [2C]	18.1	2.00	"	18.6	ND	97.3	14-149	4.85	35	
Heptachlor [2C]	8.01	1.00	"	9.32	ND	85.9	43-125	1.24	35	
Heptachlor epoxide [2C]	8.86	1.00	"	9.32	ND	95.1	51-125	3.33	35	
Methoxychlor [2C]	91.9	2.00	"	93.2	0.399	98.2	24-138	3.84	35	
Surrogate: TCX [2C]	*7.59*		"	*7.46*		*102*	*47-134*			
Surrogate: Decachlorobiphenyl [2C]	*8.15*		"	*7.46*		*109*	*35-151*			

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F22064: Prepared 06/22/05 Using EPA 3520C										
Blank (5F22064-BLK2)										
Aroclor 1016	ND	0.500	ug/l							
Aroclor 1221	ND	0.500	"							
Aroclor 1232	ND	0.500	"							
Aroclor 1242	ND	0.500	"							
Aroclor 1248	ND	0.500	"							
Aroclor 1254	ND	0.500	"							
Aroclor 1260	ND	0.500	"							
Aroclor 1262	ND	0.500	"							
Aroclor 1268	ND	0.500	"							
Surrogate: TCX	*0.151*		"	*0.200*		*75.5*	*25-129*			
Surrogate: Decachlorobiphenyl	*0.192*		"	*0.200*		*96.0*	*22-125*			
LCS (5F22064-BS2)										
Aroclor 1016	2.07	0.500	ug/l	2.50		82.8	57-123			
Aroclor 1260	2.42	0.500	"	2.50		96.8	56-125			
Surrogate: TCX	*0.167*		"	*0.200*		*83.5*	*25-129*			
Surrogate: Decachlorobiphenyl	*0.204*		"	*0.200*		*102*	*22-125*			
LCS Dup (5F22064-BSD2)										
Aroclor 1016	2.03	0.500	ug/l	2.50		81.2	57-123	1.95	30	
Aroclor 1260	2.32	0.500	"	2.50		92.8	56-125	4.22	30	
Surrogate: TCX	*0.173*		"	*0.200*		*86.5*	*25-129*			
Surrogate: Decachlorobiphenyl	*0.193*		"	*0.200*		*96.5*	*22-125*			
Batch 5F28056: Prepared 06/28/05 Using EPA 3550B										
Blank (5F28056-BLK2)										
Aroclor 1016	ND	25.0	ug/kg wet							
Aroclor 1221	ND	50.0	"							
Aroclor 1232	ND	25.0	"							
Aroclor 1242	ND	25.0	"							
Aroclor 1248	ND	25.0	"							
Aroclor 1254	ND	25.0	"							
Aroclor 1260	ND	25.0	"							
Aroclor 1262	ND	25.0	"							
Aroclor 1268	ND	25.0	"							

North Creek Analytical - Spokane

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F28056: Prepared 06/28/05 Using EPA 3550B										
Blank (5F28056-BLK2)										
Surrogate: TCX	*6.57*		*ug/kg wet*	*6.67*		*98.5*	*19-149*			
Surrogate: Decachlorobiphenyl	*7.75*		*"*	*6.67*		*116*	*37-151*			
LCS (5F28056-BS2)										
Aroclor 1016	71.0	25.0	ug/kg wet	83.3		85.2	63-125			
Aroclor 1260	86.4	25.0	"	83.3		104	64-125			
Surrogate: TCX	*6.51*		*"*	*6.67*		*97.6*	*19-149*			
Surrogate: Decachlorobiphenyl	*7.35*		*"*	*6.67*		*110*	*37-151*			
LCS Dup (5F28056-BSD2)										
Aroclor 1016	72.0	25.0	ug/kg wet	83.3		86.4	63-125	1.40	30	
Aroclor 1260	86.3	25.0	"	83.3		104	64-125	0.116	30	
Surrogate: TCX	*6.60*		*"*	*6.67*		*99.0*	*19-149*			
Surrogate: Decachlorobiphenyl	*7.51*		*"*	*6.67*		*113*	*37-151*			
Matrix Spike (5F28056-MS2)					**Source: B5F0427-26**					
Aroclor 1016	42.9	12.4	ug/kg dry	51.6	ND	83.1	28-136			
Aroclor 1260	53.8	12.4	"	51.6	2.35	99.7	35-152			
Surrogate: TCX	*3.65*		*"*	*4.13*		*88.4*	*19-149*			
Surrogate: Decachlorobiphenyl	*4.37*		*"*	*4.13*		*106*	*37-151*			
Matrix Spike Dup (5F28056-MSD2)					**Source: B5F0427-26**					
Aroclor 1016	39.7	12.4	ug/kg dry	51.8	ND	76.6	28-136	7.75	35	
Aroclor 1260	55.5	12.4	"	51.8	2.35	103	35-152	3.11	35	
Surrogate: TCX	*3.71*		*"*	*4.14*		*89.6*	*19-149*			
Surrogate: Decachlorobiphenyl	*4.43*		*"*	*4.14*		*107*	*37-151*			

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5F29068: Prepared 06/30/05 Using Dry Weight										
Blank (5F29068-BLK1)										
Dry Weight	100	1.00	%							

Dennis D Wells, Laboratory Director

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Geo Engineers - Spokane	Project: Teck Cominco	
523 East Second Ave.	Project Number: 6601-003-09	**Reported:**
Spokane, WA 99202	Project Manager: Dave Enos	07/11/05 11:59

Notes and Definitions

P-03	Greater than 40% difference between two dissimilar columns. After evaluation, the lower result has been reported.
Q-05	RPD values are not controlled at sample concentrations less than 10 times the reporting limit.
S-04	The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
X	See case narrative.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

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11115 E Montgomery Suite B, Spokane, WA 99206-4776 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7132 503-906-9200 FAX 906-9210
20332 Empire Ave Suite F-1, Bend, OR 99701-5711 541-383-9310 FAX 382-7588
3209 Denali St, Anchorage, AK 99503-4030 907-334-9200 FAX 334-9210

CHAIN OF CUSTODY REPORT

Work Order #: SSF0098

CLIENT: GeoEngineers, Inc.

REPORT TO: Dave Enos
ADDRESS: 523 E 2nd Ave
Spokane, WA 99202
PHONE: (509) 363-3125 FAX:

INVOICE TO: Same

P.O. NUMBER:

PROJECT NAME: Teck Cominco

PROJECT NUMBER: 6601-003-09

SAMPLED BY: M. Rotting

TURNAROUND REQUES
in Business Days *
Organic & Inorganic Analyses: (10) STD | 7 | 5 | 4 | 3 | 2 | 1
Petroleum Hydrocarbon Analyses: 5 STD. | 4 | 3 | 2 | 1 | <1
OTHER Specify:
* Turnaround Requests less than standard may incur Rush

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE: VOC 8260	PRESERVATIVE: Nitric Ac.	REQUESTED ANALYSES: Total Cyanide	REQUESTED ANALYSES: pH	MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	NCA WO ID
1	TC-7 (4-4.5)	6/15/05 1100	X	X	X	X				
2	TC-8 (2-2.5)	" 1300			X					
3	TC-9 (4-4.5)	" 1400	X	X	X	X				
4										
5										
6										
7										
8										
9										
10										

RELEASED BY: Marjan A. Rotting DATE: 6/16/05
PRINT NAME: Marjan A. Rotting FIRM: GEI TIME: 12:15pm
RECEIVED BY: Chris Williams DATE: 6/16/05
PRINT NAME: Chris Williams FIRM: NCA-S TIME: 12:5PM

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:
RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS: CAUTION: Sample TC-8 is an unknown chemical. May be pure cyanide VOC - non listed VOC may be present - Call D Enos. Hold all samples for further tests

TEMP: 7.2°C

COC REV 1/03

Appendix C – Operating Procedures for Surficial Soil Sampling

OPERATING PROCEDURE: 3003

SURFICIAL SOIL SAMPLING

PREPARATION AND APPROVALS

VERSION	AUTHORED/DATE	REVIEWED / DATE	REVIEWED / DATE	REVIEWED / DATE	APPROVED / DATE
Ver. 0.0	JML: June 2003	CSO July 2003			DHS Sept 2003
Ver. 0.1	Updated format Dec. '19				

Total Pages: 20

TABLE OF CONTENTS

LIST OF FIGURES

1. PURPOSE

The purpose of this Operating Procedure (OP) is to describe the procedures for the collection of representative samples of surficial soil. The procedures are intended specifically to minimize alteration of samples during collection. Surficial soil samples as referenced herein mean soils or soil-like material located less than 6 feet below ground surface which may contain quantities of contaminants.

Refer to OP3000 for General Environmental Field Procedures and Protocol, including procedures for decontamination of sampling equipment and/or containers. Refer to OP3001 for Operating Procedures on Preservation and Shipment of Environmental Samples.

Haley & Aldrich (H&A) personnel are to use the techniques in OP3003 to collect surficial soil samples. These operating procedures may be varied or changed as required, dependent upon site conditions, equipment limitations, or limitations imposed by the procedure. In all instances, the actual procedures used should be documented and described in an appropriate site report.

2. EQUIPMENT & SUPPLIES

Required:

1. Site map(s)/plan(s)
2. Safety equipment, as specified in the site-specific Health and Safety Plan
3. Field Log book
4. Stainless steel, plastic, or other appropriate homogenization bucket, bowl or pan
5. Plastic or stainless steel spoons and/or wooden tongue depressors
6. Appropriate size sample containers
7. Plastic zip lock bags
8. Sample Labels
9. Chain of Custody records and custody seals
10. Sampling Record Form (H&A Form 3004)
11. Cooler(s)
12. Ice
13. Decontamination supplies/equipment

Sampling equipment may include one or more of the following:

1. Stainless steel trowel(s) or scoop(s)
2. Stainless steel spade or shovel
3. Bucket auger
4. Bit auger
5. Continuous flight (screw) auger
6. Post-hole auger
7. Extension/drill rods

Version Date: 2019

8. T-handle
9. Core sampler
10. Sampling trier
11. Thin wall tube sampler
12. Split spoons
13. Vehimeyer soil sampler outfit
14. Tubes
15. Points
16. Drive head
17. Drop hammer
18. Puller jack and grip
19. Backhoe
20. Telescopic mechanical sampling arm (aluminum poles)
21. Stainless steel sampling beaker

Optional:

1. Tape measure
2. Survey equipment or global positioning system (GPS) to locate sampling points
3. Survey stakes or flags
4. Camera and film
5. Plastic sheeting or cover

3. PROCEDURE

3.1 Preparation

- Determine the extent of the sampling effort, the sampling methods to be employed, and the types and amounts of equipment and supplies required.
- Obtain necessary sampling and monitoring equipment.
- Decontaminate or pre-clean equipment, and ensure that it is in working order.
- Prepare schedules and coordinate with staff, client, and regulatory agencies, if appropriate.
- Perform a general site survey prior to site entry in accordance with the site specific Health and Safety Plan.
- Use stakes, flagging, or buoys to identify and mark all sampling locations. Specific site factors, including extent and nature of contaminant, should be considered when selecting sample location. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions. All staked locations should be utility-cleared by the property owner or the On-Scene-Coordinator prior to soil sampling, and utility clearance should always be confirmed before beginning work.

3.2 Presampling Observations, Notes and Required Entries

The information listed below will be recorded in a project Field Log book and a Sampling Record Form. The Sampling Record Form is referenced in Appendix C. The following list of measurements and observations represent a minimum requirement for soil samples:

- Sampling Location Number
- Time
- Date Collected
- Samplers (names of individuals who actually collected samples)
- Sample Destination (Analytical Laboratory) to receive samples
- Description of Sample Location with Sketch or Map
- Sample Depth (i.e., distance in feet from ground surface)
- Photograph Number and Roll Used (if applicable).
- Observable Physical Characteristics
  - Odor
  - Color
  - Density, Consistency, etc.
  - Layering
  - Other
- Evidence of Stressed Vegetation or Wild Life in Area where Sample was taken
- Ambient Weather Conditions during Sampling
  - Air Temperature
  - Sky Condition
  - Recent Precipitation or Drought
- Samples Collected (enter all sample numbers collected at this location)

3.3 Sampling Procedures

- After entries are completed, label and number required sample bottles. Fill out the label in indelible ink and carefully and clearly address all categories and parameters.
- Sample analyses will be specified by the Project Coordinator and Site Manager. A list of these analyses and required containers and handling procedures is presented in a Site work plan or related document.

- Sampling instructions have been provided for seven sampling devices most often used to collect surficial soil samples. Select the appropriate sampling device.

- Refer to Operation Procedure OP2001 - Identification and Description of Soils in the Field Using Visual-Manual Methods, if observations of surficial soils are to be recorded.

- Decontaminate sampling device and/or container prior to use according to Operation Procedure OP3000 - General Environmental Field Procedures and Protocol.

- Sample containers (glass jars and vials) should be filled to the top. Refer to a Site work plan or related document for sample volume size and appropriate containers for given analyses. Sample containers should contain laboratory-provided preservatives, if necessary. Care should be taken to prevent the presence of air bubbles in VOA vials. All container caps will include an inner teflon septa or lining and must be tightly secured to contain the sample. All samples will be stored and shipped at 4°C. Refer to OP3001 for operating procedures on sample handling and preservatives.

- Check for appropriate liner in cap and secure cap tightly. Store the samples with ice in a cooler, following these sealing and packing procedures:

  - Ice will be placed in plastic zip-lock bags to contain ice water. Sample containers will be adequately layered in bubble wrap to prevent breakage. Samples will be positioned upright in the cooler to prevent breakage, and samples will be stored and shipped at 4oC.

  - All 40-milliliter VOA vials will be sealed in thick or heavy duty plastic zip lock bags.

  - Check to make sure all appropriate information is in Field Log Book or Sampling Record form and Chain-of-Custody form using indelible ink.

  - If samples are to be shipped to a laboratory for analysis, a Chain-of-Custody record, custody seals, fragile markers, and reinforced nylon tape will all be properly affixed to or on the sample cooler. If samples are to be delivered to the laboratory directly by Haley & Aldrich, then only the Chain-of-Custody record is required.

    - Chain-of-Custody Form - enclose in large plastic zip lock bag and tape to inside top of cooler lid.

    - Custody Seals - place custody seal over cooler gasket separating the cooler lid from the cooler bottom at all sides except hinged location.

    - Nylon Tape - tape completely around cooler at two locations. Tape reinforcing will prevent cooler from opening if the lid locking mechanism fails.

    - Fragile Markers - fragile markers and upright stickers will be affixed to each side of the cooler.

3.4 Sampling Device Instructions

The specific procedures and equipment for surficial soil sampling will be defined in a Site work plan or related document. The following presents a description of seven sampling devices commonly used to collect surficial soil samples within 6 feet of ground surface. The split spoon sampler, when used with drilling equipment, can also collect subsurface soil samples to much greater depths. The most appropriate device for a specific sampling program as described in a Site work plan or related document has been selected based on site conditions (accessibility, type of soil, desired depth of samples, etc.) and on climate conditions (e.g. frozen ground in winter).

The selected devices for each sampling task are described in detail in a Site work plan or related document. Any changes to procedures outlined in a Site work plan or related document will be specified by the Site Manager.

3.4.1 Hand Scoops, Trowels, Spades and Shovels

This method is probably the simplest, most expeditious, direct method for making soil samples accessible. Collection of samples from near-surface soil can be accomplished with tools such as spades, shovels, trowels, and scoops. These devices are easy to operate, decontaminate and work well for sampling most surficial soils. Surface material is removed to the required depth and a stainless steel or plastic scoop is then used to collect the sample. This method can be used in most soil types but is limited to sampling at or near the ground surface. Accurate, representative samples can be collected with this procedure depending on the care and precision demonstrated by the sample team member.

Hand scoops and trowels consist of the usual garden type trowel or scoop usually constructed of stainless steel. A stainless steel laboratory scoop is a preferred scoop device due to its non-corrosive nature. Scoops or trowels work well in collecting grab samples of surficial soils or sludges. A flat, pointed mason trowel to cut a block of the desired soil is helpful when undisturbed profiles are required. A typical shovel or spade constructed of stainless steel can be used to collect representative soil samples near the surface. Devices plated with chrome or other exterior coatings that may chemically alter the sample should not be used. Plating is particularly common with garden implements such as potting trowels.

<u>Procedures for Use</u>

1. Carefully remove the top layer of soil to the desired sample depth with a cleaned, stainless steel spade, shovel, trowel, or scoop. In the case of sludges exposed to air, it may be desirable to remove the first 1-2 centimeters of material prior to collecting sample.

2. Using a cleaned, stainless steel scoop or trowel, collect the desired quantity of soil.

3. If volatile organic analysis is to be performed, transfer the sample directly into an appropriate, labeled sample container with a stainless steel lab spoon, new wooden tongue depressor or equivalent and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval or location into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

3.4.2 Bucket and Bit Augers with Thin-Wall Tube Attachment

This system consists of a bucket or bit auger, or a thin-wall tube sampler, a series of extensions/drill rods, and a "T" handle (Figure 1). A cleaned bucket or bit auger is used to bore a hole to the desired sampling depth and then is withdrawn. When using the bucket auger, the soil sample must be removed from the bucket with a cleaned, stainless steel spoon or trowel. The bucket auger can collect a large soil sample (up to 24 ounces) but is limited in penetrating depth to approximately 2 feet under ideal conditions. Bucket augers are useful for direct sample recovery, because they provide a large volume of sample in a short time. The bit auger has greater penetrating depth (up to 6 feet) but collects a small soil sample. The bit auger tip is removed from the auger when the desired sampling depth is reached and replaced with the thin wall tube attachment. The system is then lowered down the cored hole, and driven into the soil to the completion depth. The system is withdrawn and the core is collected from the thin wall tube sampler.

Other types of augers include continuous flight (screw) and post-hole augers. When continuous flight augers are used, the sample can be collected directly from the flights. The continuous flight augers are satisfactory when a composite of the complete soil column is desired. Post-hole augers have limited utility for sample collection as they are designed to cut through fibrous, rooted, swampy soil and cannot be used below a depth of approximately three feet.

This equipment can be used in a wide variety of soil conditions. The presence of rock layers and collapsing of the borehole usually prohibit sampling at depths greater than 3 to 6 feet. The equipment is inexpensive, easy to operate, and generally works well to sample most soils.

Procedures for Use

1. Attach the cleaned auger bucket or bit to a drill rod extension and further attach the "T" handle to the drill rod.

2. Clear the area to be sampled of any surface debris (twigs, rocks, litter). It may be advisable to remove the first 3 to 6 inches of surface soil for an area approximately 6 inches in radius around the drilling location.

3. Begin augering by rotation of the "T" handle, periodically removing accumulated soils onto a plastic sheet spread near the hole. This prevents accidentally brushing loose material back down the borehole when removing the auger or adding drill rods. It also facilitates refilling the hole, and avoids possible contamination of the surrounding area.

4. After reaching the desired depth, slowly and carefully remove the auger from the hole.

5. If a bucket auger is used, remove the soil sample with a cleaned, stainless steel spoon or trowel.

6. If a bit auger is used, remove the auger tip from the extension rods and replace with a cleaned, thin-wall tube sampler. Install the proper cutting tip.

7. Carefully lower the tube sampler down the borehole. Gradually press the tube sampler into the soil. Take care to avoid scraping the borehole sides. Avoid hammering the drill rods to facilitate coring, as the vibrations may cause the boring walls to collapse.

8. Remove the tube sampler and unscrew the drill rods.

9. Remove the cutting tip, and remove the core from the device.

10. Discard the top of the core (approximately 1 inch), as this possibly represents material collected before penetration of the layer of concern. Place the remaining core into the appropriate labeled sample container. Sample homogenization is not required.

11. If volatile organic analysis is to be performed, transfer the sample into an appropriate, labeled sample container with a stainless steel lab spoon, wooden tongue depressor or equivalent and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

12. If another sample is to be collected in the same hole, but at a greater depth, reattach the auger bit to the drill and assembly, and repeat previous steps, making sure to decontaminate the auger and tube sampler between samples.

13. Abandon the hole according to applicable state regulations. Generally, shallow holes can simply be backfilled with the removed soil material.

3.4.3 Hand Held Corer

The device consists of a "T" handle and cylindrical core tube (Figure 2). The device is equipped with a check valve at the top to prevent washout during retrieval through an overlying water layer, if applicable, and a nosepiece at the bottom to help contain the sample. This device can be used in a wide variety of soil conditions. Hand corers can also be fitted with brass or polycarbonate plastic liners.

Procedures for Use

1. Inspect the corer for proper pre-cleaning.

2. Press the corer in with a smooth continuous motion.

3. Twist the corer, and then withdraw the corer in a single smooth motion.

4. Remove the nosepiece and withdraw the sample into a stainless steel, plastic or other appropriate homogenization container.

5. Transfer the sample into an appropriate sample container with a stainless steel spoon, wooden tongue depressor or equivalent.

3.4.4 Thin Tube Hand Held Sampling Trier

The system consists of a trier, a long hollow cylindrical tube with a slot trending almost its entire vertical length, and a "T" handle (Figure 3). The trier is driven into the soil to be sampled and used to extract a core sample from the appropriate depth. The tip and edges of the tube are sharp to allow the trier to cut a core by rotation of the "T" handle once it is completely pushed-down or manually driven to the depth of collection. Triers range from approximately 20 to 60 inches in length and from approximately 0.5 to 1 inch in diameter.

Procedures for Use

1. Insert the cleaned trier into the soil or sludge material at a 0 to 45^{o} angle from horizontal. This orientation minimizes the spillage of sample from the sampler. Extraction of samples might require tilting of the containers.

2. Rotate the trier once or twice to cut a core of material.

3. Slowly withdraw the trier, making sure the slot is facing upward.

4. If volatile organic analyses are required, transfer the sample into an appropriate, labeled sample container with a stainless steel lab spoon, wooden tongue depressor or equivalent and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

3.4.5 Split Spoon Sampler

Split spoon sampling is generally used to collect undisturbed soil cores of 18 or 24 inches in length. A split spoon sampler consists of a cylindrical hollow steel or stainless steel sampler usually 24 inches long and 2 or 3 inches in outside diameter. A series of consecutive cores may be extracted with a split spoon sampler to give a complete soil column profile, or an auger may be used to drill down to the desired depth for sampling. The split spoon is then driven to its sampling depth through the bottom of the augured hole and the core extracted. Split spoon samplers collect in-situ soil samples that permit stratigraphic logging. To remove the split spoon sampler and collect a soil sample, remove the sampler from the driving rods and unscrew the tapered nosepiece and top piece from the sampler. The spoon will then split into two longitudinal sections. It may be necessary to use a pipe wrench to unlock the threaded nosepieces. This sampling device is almost always used in conjunction with a drilling rig and as such is an equipment intensive effort. However, the split spoon may be used with a hand-held drop hammer for collection of shallow soil samples (less than 6 feet below ground surface).

Refer to Operation Procedures OP2005 - Test Borings, Sampling, Standard Penetration Testing and Borehole Abandonment, and OP3006 - Procedures for Subsurface Soil Sampling for Chemical Analysis, which describe the use of this sampler in greater detail.

Procedures for Use

1. Assemble the sampler by aligning both sides of barrel and then screwing the drive shoe on the bottom and the head piece on top.

2. Place the sampler in a position perpendicular to the sample material.

3. Using a well ring, drive the tube. Do not drive past the bottom of the head piece or compression of the sample will result.

4. Record in the Field Log book or test boring log the length of the tube used to penetrate the material being sampled, and the number of blows required to obtain this depth.

5. Withdraw the sampler, and open by unscrewing the bit and head and splitting the barrel. The amount of recovery and soil type should be recorded on the boring log. If a split sample is desired, a cleaned, stainless steel knife should be used to divide the tube contents in half, longitudinally. This sampler is typically available in 2 and 3 1/2 inch diameters. A larger barrel may be necessary to obtain the required sample volume.

6. Without disturbing the core, transfer it to appropriate labeled sample container(s) and seal tightly.

3.4.6 Test Pit/Trench Excavation

A backhoe can be used to remove sections of soil, when detailed examination of soil characteristics are required. This is a relatively expensive sampling method because of the cost of backhoe operation. Refer to Operation Procedure OP2026 - Exploratory Test Pits for more information on test pit excavations.

Procedures for Use

1. Prior to any excavation with a backhoe, it is important to ensure that all sampling locations are clear of overhead and buried utilities.

2. Review the site specific Health & Safety plan and ensure that all safety precautions including appropriate monitoring equipment are installed as required.

3. Using the backhoe, excavate a trench approximately three feet wide and approximately one foot deep below the cleared sampling location, or as specified in a Site work plan or related document. Place excavated soils on plastic sheets. Trenches greater than five feet deep must be sloped or protected by a shoring system, as required by OSHA regulations.

4. A shovel may be used to remove a one to two inch layer of soil from the vertical face of the pit where sampling is to be done.

5. Record in the Field Log book or test pit log the depth intervals from which the samples are being collected.

6. Samples are taken using a trowel, scoop, or coring device at the desired intervals. Be sure to scrape the vertical face at the point of sampling to remove any soil that may have fallen from above, and to expose fresh soil for sampling. In many instances, samples can be collected directly from the backhoe bucket. A telescopic mechanical arm (see next sampling device) and stainless steel sampling beaker may be used to collect samples.

7. If volatile organic analyses are required, transfer the sample into an appropriate, labeled sample container with a stainless steel lab spoon, wooden tongue depressor or equivalent and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

8. Abandon the pit or excavation according to applicable state regulations. Generally, shallow excavations can simply be backfilled with the removed soil material. The test pit/excavation should be backfilled in accordance with a Site work plan or related document.

3.4.7 Telescopic Mechanical Sampling Arm

The device consists of an aluminum pole approximately 1 to 2 inches in diameter divided into three, 4-foot sections. Attached to the end of the pole is a stainless steel sampling beaker (usually with an 18-ounce capacity). The pole is capable of telescoping from 4 to 12 feet. This mechanical sampling arm is used to collect soil samples from test pits or other excavations. It allows a sample to be collected from a location that would otherwise be difficult to access.

Procedures for Use

1. Attach the cleaned, stainless steel beaker to the end of the pole either by tightening a clamp or wing nuts.

2. Make sure your feet are safely and securely positioned.

3. Telescope the pole to the required length.

4. Lower the pole end into the test pit or other excavation.

5. Collect the sample.

6. Remove the sample from the beaker with a cleaned, stainless steel scoop, trowel or new wooden tongue depressor.

3.5 Sample Containers

The samples for each analysis will be collected in the appropriate containers and handled in accordance with the procedures described in a Site work plan or related document.

3.6 Chain-of-Custody Forms

All samples submitted to the contract analytical laboratory for analyses, will be accompanied by a Chain-of-Custody form. Appropriate Chain-of-Custody procedures will be followed at all times during a sampling event and subsequent transport to the contract analytical laboratory. Refer to OP3026 for operation procedures on completing a Chain-of-Custody form and Chain-of-Custody procedures.

3.7 Decontamination

Soil sampling equipment will be cleaned prior to and between each use according to Operation Procedure OP3000 – General Environmental Field Procedures and Protocol. After decontamination, the equipment will be wrapped in aluminum foil and placed on clean racks off the ground until it is used.

3.8 Quality Assurance/Quality Control

There are no specific quality assurance (QA) activities that apply to the implementation of these operating procedures. However, the following QA procedures apply:

- All data must be documented on field data sheets or within site logbooks.
- All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in a Site work plan or related document. Equipment checkout and calibration activities must occur prior to sampling/operation, and they must be documented.

3.9 Health and Safety

When working with potentially hazardous materials, follow H&A health and safety procedures, in addition to the procedures specified in the site specific Health & Safety Plan.

FIGURES

Figure 1. Sampling Augers

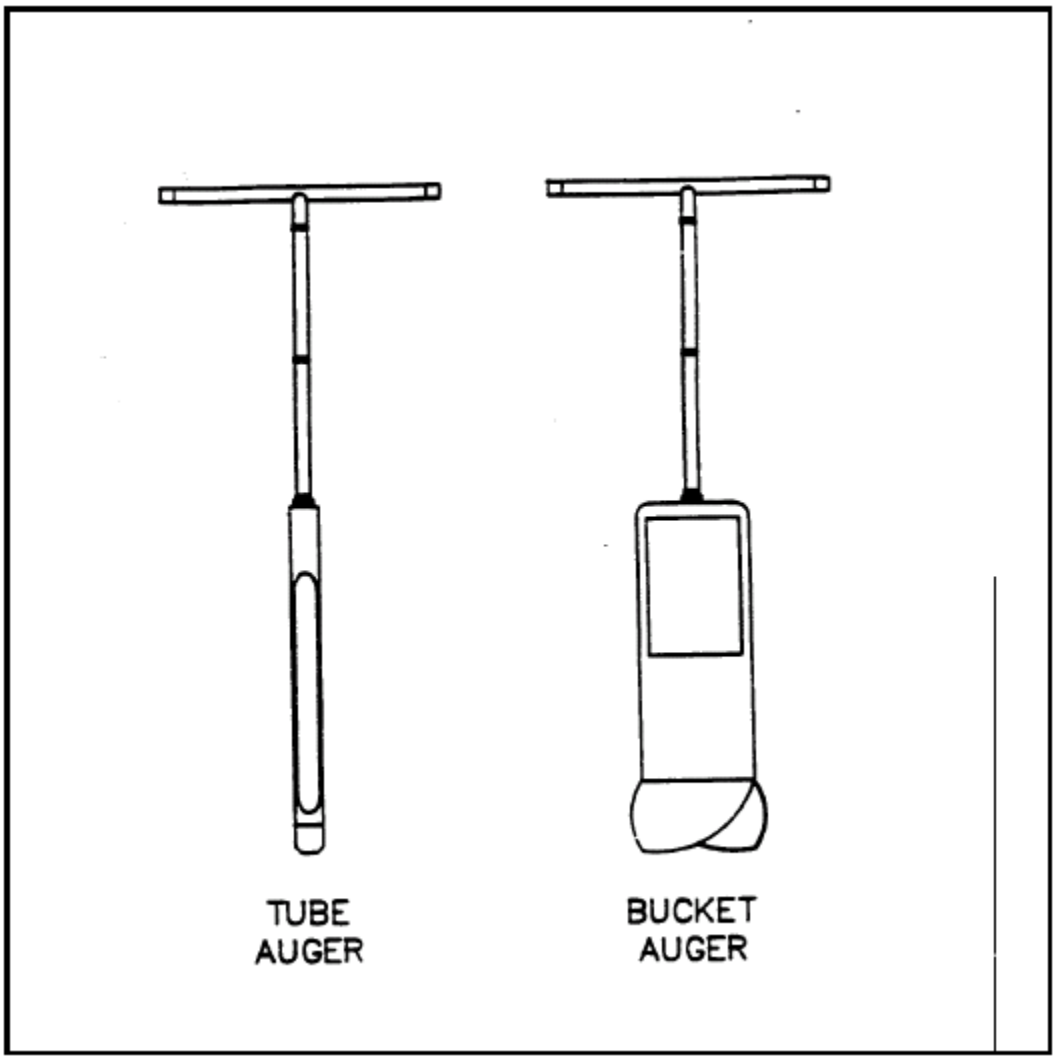


Figure 2. Sample Coring Device

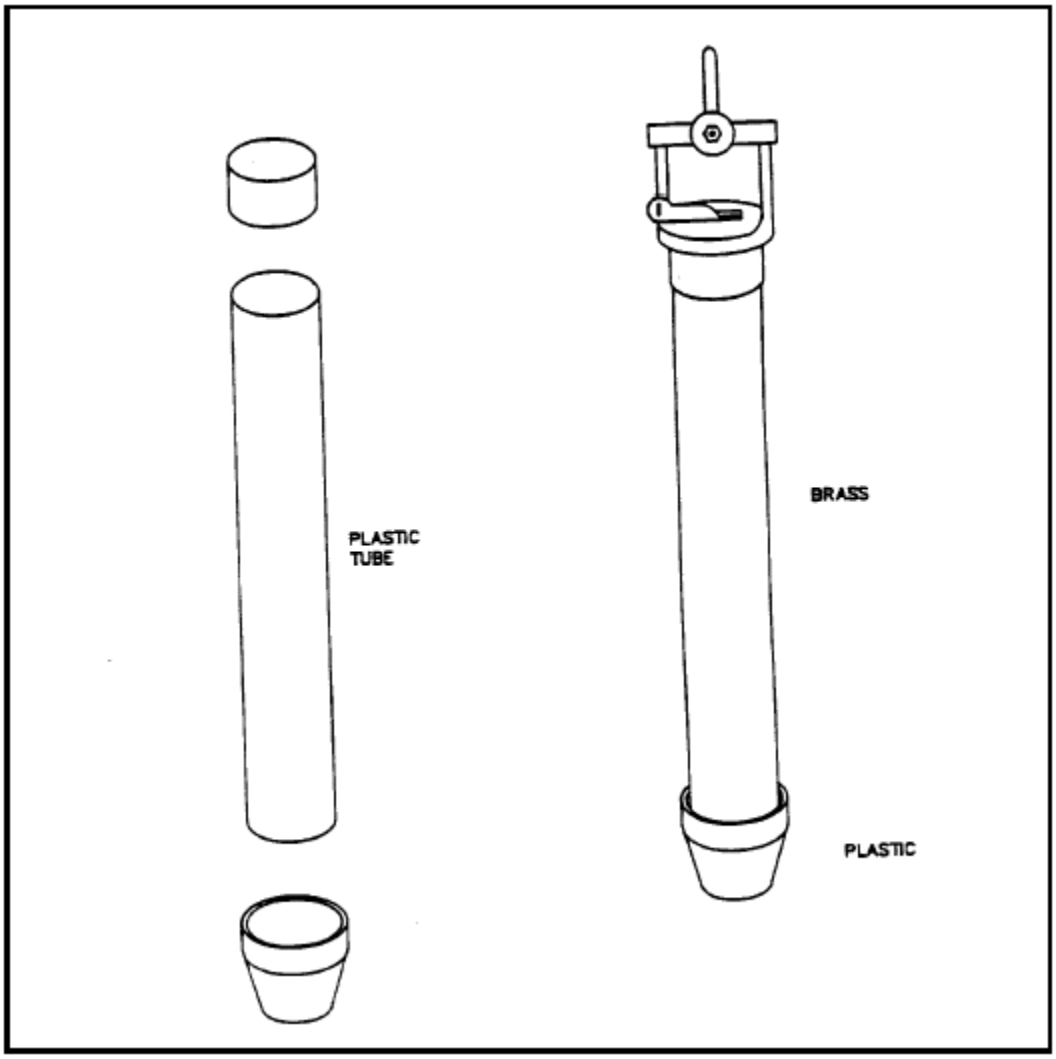
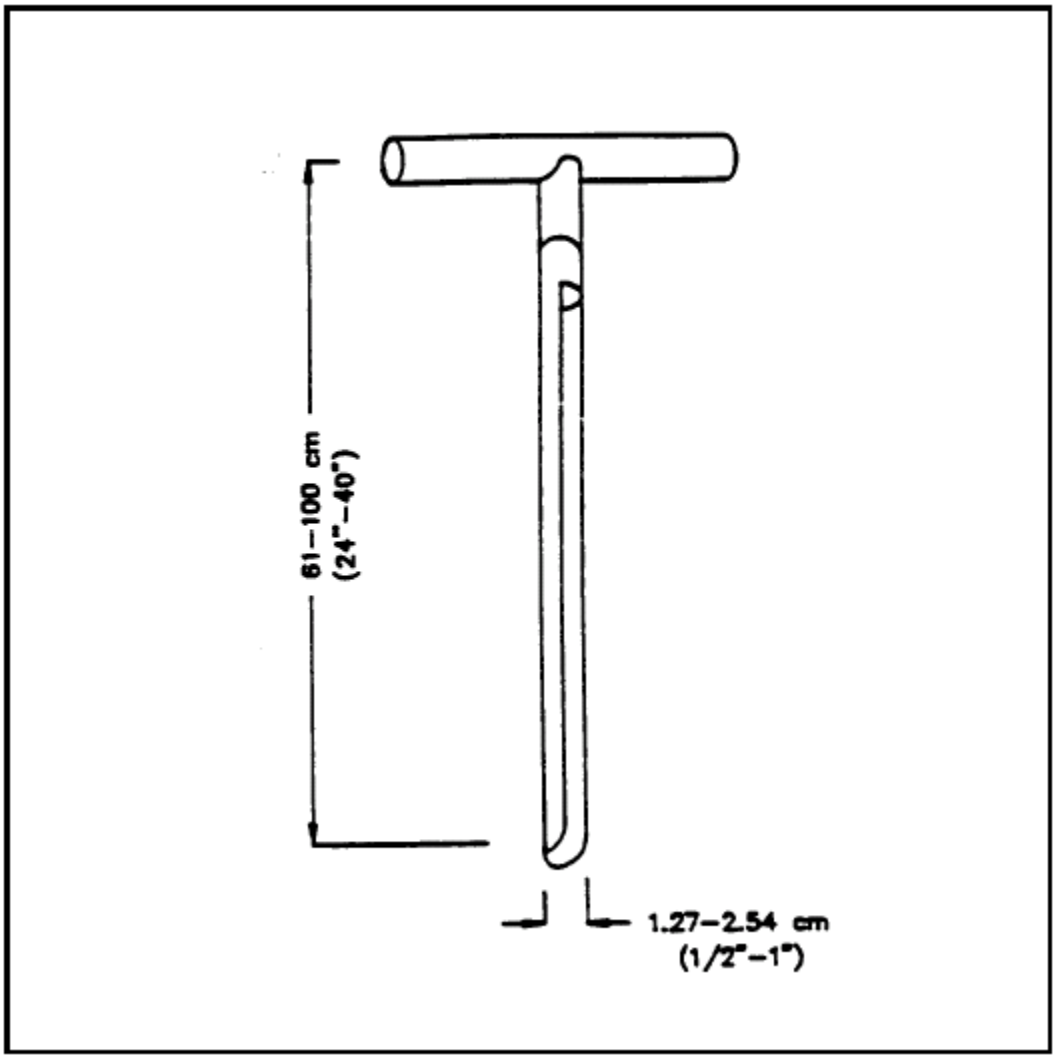


Figure 3. Sampling Trier



APPENDIX A - REFERENCES

- Barth, D.S., Mason, B.J. (1984) Soil Sampling Quality Assurance Guide, Environmental Research Center, University of Nevada, U.S. EPA-600/4-84-043.
- New York State Department of Environmental Conservation (1991), RCRA Quality Assurance Project Plan Guidance, Division of Hazardous Substance Regulation.
- Scalf, M.R., McNabb, J.F., Robert F. Kerr, Manual of Groundwater Quality Sampling Procedures, Environmental Research Laboratory, pp. 72-80.
- United States Environmental Protection Agency (1982), Test Methods For Evaluating Solid Waste, Physical/Chemical Methods, U.S. EPA SW-846, 3rd Edition.
- United States Environmental Protection Agency, (1983) A Methods Manual-Volume II Available Sampling Methods, U.S. EPA-600/X-83-018.
- United States Environmental Protection Agency, (1983) Standard Operating Procedures Toxics and Waste Management Division.
- United States Environmental Protection Agency (1987), A Compendium of Superfund Field Operations Methods, EPA/540/P-87/001, pp. 10-40 to 10-48.
- United States Environmental Protection Agency Environmental Response Team (1994), Standard Operating Procedures: Sediment Sampling, SOP 2016, Rev. 0.0, p. 11, dated 11/17/94.
- United States Environmental Protection Agency Environmental Response Team (2000), Standard Operating Procedures: Soil Sampling, SOP 2012, Rev. 0.0, pp. 1-13, dated 02/18/00.

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APPENDIX B - RELATED HALEY & ALDRICH PROCEDURES

- OP1009 Medical Surveillance Program
- OP1010 Health and Safety Plans
- OP2001 Identification and Description of Soils in the Field Using Visual-Manual Methods
- OP2005 Test Borings, Sampling, Standard Penetration Testing and Borehole Abandonment
- OP2026 Exploratory Test Pits
- OP3001 Preservation and Shipment of Environmental Samples
- OP3004 Stream Sediment and Wetlands Soil Sampling
- OP3026 Chain of Custody

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APPENDIX C - FORMS

- Form 3001 Sampling Labels (Environmental)
- Form 3002 Chain of Custody (Electronic)
- Form 3003 Chain of Custody (Field)
- Form 3004 Sampling Record

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APPENDIX D - GLOSSARY

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Version Date: 2019

Appendix D – Feasibility Study Checklist

Feasibility Study Checklist

Toxics Cleanup Program

May 2016

Publication No. 16-09-007

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Site Name/FSID:

Report Name:

Date Submitted:

Reviewed By:

Review Date:

Feasibility Study (FS) Checklist Guidance

The Model Toxics Control Act (MTCA) regulation Washington Administrative Code (WAC) 173-340-350(8) broadly describes the elements necessary to complete an FS. The purpose of an FS is to develop and evaluate cleanup action alternatives to enable a cleanup action to be selected for the site. At this point in the cleanup process, all remedial investigation (RI) work should be completed and the site should be fully characterized. When selecting cleanup alternatives, make sure remedies are not selected or dismissed prematurely; the FS process should be performed objectively without a preferred remedy in mind.

This FS checklist is considered guidance based on the MTCA cleanup regulation WAC 173-340. Cleanup project managers with the Washington State Department of Ecology (Ecology) have discretion when reviewing and accepting FS reports as site-specific circumstances dictate the necessary scope and breadth of each report.

Note: *This document assumes that an FS and disproportionate cost analysis (DCA) are necessary for the site. If concentrations of hazardous substances do not exceed the cleanup level at a standard point of compliance, no further action is necessary, and an FS is not required. If a potentially liable person (PLP) meets the eligibility criteria and appropriately follows the requirements for use of a model remedy, they are not required to conduct an FS or a DCA. If a PLP and Ecology agree on a permanent remedy a DCA is not required [WAC 173-340-360(3)(d)].*

In addition, there may be circumstances where selection of the appropriate remedy is straightforward or where a comprehensive remedial action will be implemented so that MTCA Method A cleanup levels are ultimately met throughout the site. If either of these situations apply, Ecology encourages PLPs to discuss their preferred approach with a cleanup project manager.

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Feasibility Study Report Body

I. Cover Letter

Include a letter describing the submittal and specifying the desired department action or response.

II. Introduction

For a stand-alone FS, the introduction should include a brief summary of the RI results and previous site investigations; this summary should include the following information, updated with the most recent data:

a. Brief background of the site, site investigations, and any interim actions.

b. Results of any additional investigations conducted since completion of the RI.

c. Conceptual Site Model (CSM). Describe the location, extents, estimated amount, and concentration distribution of contaminants of concern (COC) greater than proposed screening levels for each affected medium.

d. Preliminary cleanup levels for indicator hazardous substances in each medium.

e. Proposed point of compliance for each affected medium, if different from the standard.

f. Applicable local, state, and federal laws

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III. Alternatives

a. **Identify Remedial Action Objectives.** Describe the cleanup objectives and their compliance with MTCA.

b. **Identify a Reasonable Number and Type of Alternatives.** Include a brief description of each alternative. Ecology recommends evaluating at least **three** alternatives, taking into account the characteristics and complexity of the facility, including current site conditions and physical constraints. Include at least one permanent alternative, at least one alternative with a standard point of compliance, and a no action alternative if applicable (see WAC 197-11-440(5)). Do not include alternatives that clearly do not meet the minimum requirements per WAC 173-340-360, do not pass the DCA per WAC 173-340-360(3)(e), or are technically impossible to implement.

Note: *For sites conducting an FS under an order or decree, Ecology makes the final determination of which alternatives must be evaluated in detail in the FS.*

IV. Detailed Evaluation and Selection of Alternatives

a. **Threshold and Other Requirements** [see WAC 173-340-360(2)]. Describe in detail how each alternative meets the criteria outlined below. Alternatives must meet the threshold requirements and use permanent solutions to the maximum extent practicable. If an alternative does not meet these criteria, it should be eliminated from further consideration.

i. **Protect human health and the environment.** This is a critical requirement. Consider to what degree the alternative reduces risk, how much time it will take to meet cleanup standards, and any on-site or off-site risks related to implementing the cleanup. If necessary, evaluate residual threats posed by each alternative, and determine if remedies that are protective of human health are also protective of ecological receptors.

ii. **Comply with cleanup standards.** See WAC 173-340-700 through 173-340-760.

iii. **Comply with applicable state and federal laws.** See WAC 173-340-710.

iv. **Provide for compliance monitoring.** See WAC 173-340-410 and WAC 173-340-720 through 173-340-760.

v. **Reasonable Restoration Time Frame.** Describe the estimated restoration time frame for each alternative and the basis for this estimate. Discuss the reasonableness of this time frame using the criteria in WAC 173-340-360(4).

b. **DCA Ranking Criteria.** Compare and contrast each alternative for each of the following criterion [WAC 173-340-360(3)(f)]. Rank each alternative from most to least permanent, based on the evaluation of the criteria below.

i. **Protectiveness.** Overall protectiveness of human health and the environment.

ii. **Permanence.** The degree to which the alternative permanently reduces the toxicity, mobility, or volume of hazardous substances. Consider treatment capability, reduction of releases, management of the sources of release, degree of irreversibility of treatment, and the quantity and quality of treatment wastes.

iii. **Cost.** The cost to implement the alternative. Includes present capital costs, future capital costs, indirect costs, and operation and maintenance costs.

iv. **Effectiveness over the long-term.** Consider the degree of certainty for cleanup success, long-term reliability, magnitude of residual risk, management of treatment wastes, and management of wastes left untreated.

v. **Management of short-term risks.** Assess the risk to human health and the environment associated with the alternative during construction and implementation.

vi. **Technical and administrative implementability.** Ability to be implemented including consideration of whether the alternative is technically and administratively possible.

vii. **Consider public concerns.** Provide a narrative regarding whether the community has concerns regarding the alternative and, if so, the extent to which the alternative addresses those concerns.

V. Remedy Selection

Detail the rationale behind the selection of the preferred alternative. Detail how the alternative meets the expectations in WAC 173-340-370 and addresses public concerns.

Feasibility Study Figures

General – Figures should include a north arrow, scale, complete legend, measurement units, and annotated clarification as necessary. Figures should not be cluttered and must be legible and explicable. Document text must reference figures and draw conclusions consistent with information presented on figures. Consider using multiple figures when showing large amounts of information.

I. Vicinity Map(s)

a. Show property in relation to surrounding region. Area covered by Vicinity Map should be proportional to site size.

b. Show other applicable items including (but not limited to): surface topography, natural areas, surrounding land uses, location of groundwater supply and monitoring wells within a one mile radius.

II. Site Map(s)

a. Show overall site layout with site features and existing well, boring, and sampling locations labeled consistently with current and historical site data and sample names used in the report. If multiple names exist for a sampling location or area of the site indicate this.

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b. Include COC locations, concentrations, and estimated vertical and horizontal extent of contamination for site media, as applicable. Include any waste materials present on site as well as hazardous substance treatment, storage, or disposal areas (show current and applicable historical features).

c. Show geologic/hydrogeologic information including soil types, wells, screened intervals, and water levels (cross sections are useful for showing this information). Show groundwater flow direction and gradient.

d. Show other relevant information including (but not limited to): site and property boundaries, buildings/facilities on site, historical site features, underground storage tanks (USTs), previous excavation/interim action activity, etc.

III. Conceptual Site Model

Provide figures showing contaminant release(s), fate and transport, exposure pathways, and potential and/or actual receptors. The lateral and vertical extent of contamination, as currently understood, should be clearly conveyed.

Feasibility Study Tables

General - Tables should include detailed notes that explain any assumptions or references. All acronyms used in the table should be defined in a section of the notes even if they are defined in the body of the report so table information can be quickly understood.

I. **ARARs.** Include potentially applicable ARAR values, their sources, and whether or not they apply to each alternative.

II. **Evaluation of Remedial Alternatives.** Include description of each alternative, compliance with the MTCA threshold criteria, and alternative ranking for each DCA criteria.

III. **Cost/Quantity Summary.** Include any quantity or cost assumptions made for each alternative.

IV. **Cost Detail for Alternatives.** Itemize costs for each alternative, including (but not limited to) permitting, oversight, labor, disposal, transportation of materials, material costs, incidentals, operations and maintenance, and reporting costs, and provide a total cost for each alternative.

V. If additional site investigations were conducted after completion of the RI, include sampling information, laboratory methods, applicable cleanup levels, and analytical and field measured data. Group by media type. For larger data sets, consider making a summary table to exceedances. Tables should include cleanup or proposed cleanup levels with any contaminant exceedances clearly indicated using bold font or shading. Non-detecible levels should be noted as "U" with the numerical laboratory reporting limit (RL) provided rather than "ND".

Feasibility Study Appendices

General. Appendices should contain a description of content and explain how to interpret the information for use. Not all of the following suggestions will apply to all sites.

VI. Contractor bids or other documents showing how quantity and/or cost estimates were made.

VII. If additional site investigations were conducted after completion of the RI, include exploratory logs, well installation diagrams, field records, analytical laboratory reports, details of field and analytical methods, and any applicable Work Plans, Sampling and Analysis Plans, etc.

VIII. **Limitations.** Explain any limitations that apply to the work.

IX. Other documents that provide additional context or contribute to the understanding of the site or remedial alternatives; see suggested report format for additional information.

Miscellaneous Items

X. **Certification (Licensed Professional Stamp).** Engineering, geologic, and hydrogeologic work must be performed under the seal of an appropriately licensed professional, as required by RCW 18.43 and 18.220.

XI. **Environmental Information Management (EIM).** All sampling data must be uploaded into Ecology's EIM database. This allows Ecology to access data, check results, and/or perform additional analyses. For more information, reference: Submittal Data Requirements.

XII. Additional information may be requested by Ecology as required to fully assess remedial alternatives.

XIII. **Submittal Requirements:** Ecology requests three copies of reports submitted per WAC 173-340-850. Please contact the cleanup project manager for specific submittal requirements.

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To request ADA accommodation or materials in a format for the visually impaired, call Ecology at 509-454-7834, Relay Service 711, or TTY 877-833-6341.