Terrestrial Ecological Evaluation Summary Report

Northwest Pipeline GP Meter Station Facilities Throughout Washington State

Prepared For:

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1.0 INTRODUCTION

Environmental Partners, Inc. (EPI) has prepared this Terrestrial Ecological Evaluation Summary Report to document the activities performed and results of the Terrestrial Ecological Evaluations (TEEs) conducted for Northwest Pipeline GP (NWPL GP) meter station facilities located throughout Washington State.

NWPL GP prepared a *Terrestrial Ecological Evaluation Program* document dated April 2011, which was submitted to Ecology on April 15, 2011.

On May 13, 2011, The Washington State Department of Ecology (Ecology) submitted a *Transmittal of Ecology Approval and Comment of the revised Terrestrial Ecological Evaluation Program, Northwest Pipeline GP Meter Station Facilities throughout Washington State, April 2011, prepared by Williams Gas Pipeline; Environmental Partners, Inc; and Portnoy Environmental to NWPL GP, conditionally approving the document. Subsequent to receipt of the conditional approval letter, EPI incorporated the single comment provided by Ecology into the May 2011 <i>Terrestrial Ecological Evaluation Program* document (TEE Program Document). The revised TEE Program Document is included in Attachment A; the conditional approval letter is presented as Attachment B.

1.1 Background

NWPL GP is evaluating the environmental conditions at over 70 meter station facilities throughout Washington State, which have soil impacted with inorganic mercury and/or arsenic, and which have similar site conditions (*i.e.*, uncapped commercial/industrial type facilities, in rural locations, identical site usage, and the same contaminants). The meter station facilities are where gas is being regulated and metered from the main supply pipelines to local distribution companies (LDCs) or wholesale customers.

Based on the similarities of site conditions and COCs, NWPL GP has created a Model TEE approach based on the Site-Specific TEE

2.0 OBJECTIVES

The general objectives of the Model TEE study for NWPL GP meter station facilities were to evaluate the initial soil cleanup levels for inorganic mercury and arsenic of 2 and 20 mg/kg, respectively, for protectiveness of potential ecological receptors.

The specific objectives of the Model TEE were as follows:

- Divide the state into representative areas;
- Establish site groupings and a representative facility within each representative area;
- Collect TEE samples from each representative facility and analyze for appropriate terrestrial and ecological protectiveness through bioassay testing and bioaccumulation study; and

• Establish appropriate TEE cleanup levels that are protective of all terrestrial and ecological receptors for each representative area.

3.0 METHODOLOGY

The methods utilized for conducting the TEEs are described in the following sections and in the TEE Program Document.

3.1 Modified Model TEE based upon Site-Specific TEE

The meter station facilities did not qualify for primary TEE exclusions or for the Simplified TEE process provided in MTCA due to the uncapped and often rural nature of the facilities, and the generally surficial nature of the COCs. As such, a modified model Site-specific TEE process was implemented. The modified model Site-specific TEE is composed of several components. These components include problem formulation and selection and implementation of appropriate terrestrial ecological evaluation methods.

3.1.1 **Problem Formulation**

A problem formulation was conducted as a part of the TEE in accordance with WAC 173-340-7493(2). Problem formulation includes identification of the chemicals of ecological concern, potential exposure pathways, potential terrestrial ecological receptors, and a toxicological assessment. The elements of the TEE problem formulation are detailed in the TEE Program Document and are summarized as follows:

- The identified chemicals of ecological concern are the COCs for the meter station facilities, inorganic mercury and arsenic.
- The primary exposure pathway for inorganic mercury and arsenic in soil at the NWPL GP meter stations occurs via direct contact.
- Contact with contaminated soil can directly impact vegetation and soil biota.
- The secondary exposure pathway is ingestion of affected vegetation and soil biota containing bioaccumulated COCs at significant levels by ground-feeding birds and mammals.

3.1.2 Site-Specific TEE Method Selection

3.1.2.1 Mercury

Soil containing inorganic mercury at the meter stations has been characterized to the MTCA Method A Soil Cleanup Level for Unrestricted Land Uses of 2 milligrams/kilogram (mg/kg), which is the initially selected cleanup level for NWPL GP meter station facilities.

The Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (Table 749-3) are specified as 0.3 mg/kg, 0.1 mg/kg, and 5.5 mg/kg for Plants, Soil Biota, and Wildlife, respectively. Since wildlife receptors are protected at a soil concentration greater than the initially selected cleanup level of 2 mg/kg, soil at facilities that are in compliance with the 2 mg/kg mercury cleanup level will be protective of wildlife receptors. However, because the selected cleanup level of 2 mg/kg for the protection of plants and soil biota, modified site-specific TEE methods were selected in accordance with WAC 173-340-7493 for these potential exposures.

The selected TEE methods for mercury are site-specific soil bioassay for plants and soil biota.

3.1.2.2 Arsenic

Soil containing arsenic at the meter stations has been characterized to the MTCA Method A Soil Cleanup Level for Unrestricted Land Uses of 20 mg/kg, which is the initially selected cleanup level for NWPL GP meter station facilities.

The Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (Table 749-3) are specified as 10 mg/kg, 60 mg/kg, and 7 mg/kg for Plants, Soil Biota, and Wildlife, respectively. Since soil biota receptors are protected at a soil concentration greater than the initially selected cleanup level of 20 mg/kg, soil at facilities that are in compliance with the 20 mg/kg arsenic cleanup level will be protective of soil biota receptors. However, because the selected cleanup level of 20 mg/kg exceeds the limits established for the protection of plants and wildlife, modified site-specific TEE methods were selected in accordance with WAC 173-340-7493 for these potential exposures.

The selected TEE methods for arsenic are site-specific soil bioassay for plants and site-specific bioaccumulation evaluation for wildlife. Calculated indicator concentrations for the Mammalian herbivore surrogate receptor (vole) using the default values supplied in Tables 749-4 and 749-5 indicate that the established initial soil cleanup level for arsenic of 20 mg/kg is protective of mammalian herbivores. As such, the site-specific bioaccumulation evaluations for wildlife were only for mammalian predator species (shrew) and avian predator species (American Robin).

3.2 Site Groupings and Representative Sites

In the May 13, 2011 conditional approval letter, Ecology approved the division of the meter station facilities into four representative groups based on geographic area and regional climate, and the terrestrial ecological evaluation of appropriate representative facilities within each area. Data collected

at the representative facility(s) will be used for determining compliance with TEE for the other meter stations within each representative area.

The rationale for the site groupings is detailed in the TEE Program Document. The proposed representative areas as they relate to the NWPL GP pipeline are depicted on **Figure 1**. The representative facilities and meter station facilities within each area are presented in the following sections.

3.2.1 Northwest Washington Representative Area

The representative facility for the Northwest Washington Representative Area is the Snohomish Compressor Station for both mercury and arsenic.

Data collected at this facility will be considered representative of the following NWPL GP meter station facilities:

- Chehalis
- Evergreen Shores (Black Lake)
- McCleary Aberdeen
- North Seattle Everett
- North Tacoma
- Oak Harbor Stanwood
- Olympia
- Sedro Woolley
- Shelton
- South Seattle
- South Tacoma
- Toledo

3.2.2 Southwest Washington/Columbia River Basin Representative Area

The representative facility for the Southwest Washington/Columbia River Basin Representative Area is the Washougal Compressor Station for both mercury and arsenic:

Data collected at this facility will be considered representative of the following NWPL GP meter station facilities:

- Deer Island
- Kalama
- Stevenson
- Stevenson #2
- Vanalco
- Vancouver
- Washougal

3.2.3 Central Washington Representative Area

The representative facility for the Central Washington Representative Area is Yakima Firing Center Meter Station for arsenic and Ellensburg Meter Station for mercury.

Data collected at these facilities will be considered representative of the following NWPL GP meter station facilities:

- Alcoa Wenatchee
- Burbank Heights
- Connell
- Ellensburg
- Goldendale
- Grandview
- John Day Dam
- Kawecki Chemical
- Kennewick
- Klickitat
- Lind
- Menan Starch
- Moses Lake
- Pasco
- Prosser
- Quincy
- Ritzville
- Sandvik Special Metals
- Sunnyside
- Unocal Finley
- Walla Walla
- Warden
- Wenatchee
- Yakima
- Zillah Toppenish

3.2.4 Eastern Washington Representative Area

The representative facility for the Eastern Washington Representative Area is Spokane Mead Meter Station for arsenic and Star Road Meter Station for mercury.

Data collected at these facilities will be considered representative of the following NWPL GP meter station facilities:

- Cheney Medical Lake
- Colfax
- Genesee
- Pullman

- Spokane West
- Spokane Mead
- Star Road

Note: In the Ecology approved TEE Program Document; it was originally proposed that the Cheney Medical Lake Meter Station facility would be used for the representative facility in the Eastern Washington sub-region. However, during the approval process for the TEE Program Document, the Cheney Medical Lake facility was remediated and there were no remaining soils at the site with the concentration ranges required for bioassay analysis. Therefore, an alternate location (*i.e.*, Starr Road) was selected as the representative facility for mercury.

3.3 TEE Sampling and Analysis

TEE samples were collected from each representative facility where previously collected data indicated that COCs in soil were close to the initially selected cleanup level for each COC (*i.e.*, 2 mg/kg for mercury and 20 mg/kg for arsenic). Prior to performing the necessary TEE analysis, a sample was collected from each TEE sample and submitted for confirmation analysis to verify the COC concentration.

Samples for confirmation analyses were submitted to Friedman & Bruya, Inc. of Seattle, Washington or ESC Lab Sciences of Mt. Juliet, Tennessee for analysis of mercury by EPA Method 7471 and arsenic by EPA Method 6010B, as applicable.

As indicated in the TEE Program Document, TEE samples qualified for bioassay analysis and bioaccumulation factor (BAF) testing if the concentration for mercury ranged from 2 mg/kg to 6 mg/kg, and/or the concentration for arsenic ranged from 20 mg/kg to 60 mg/kg. The TEE samples selected from each representative facility, original COC concentration, and confirmation concentration are presented in Table 1. Laboratory analytical reports for confirmation soil samples are provided in Attachment C.

With the exception of arsenic in the Southwestern Washington/Colombia River Basin, Central Washington, and Eastern Washington representative areas, each TEE sample presented in Table 1 qualified for bioassay analysis and/or BAF testing in accordance with the concentration ranges presented in the TEE Program Document. For the remaining representative areas, there were no concentrations detected above the initially selected arsenic cleanup level of 20 mg/kg. Therefore, the maximum arsenic concentration detected in each of the representative areas was analyzed for TEE compliance.

3.3.1 Soil Bioassay

Soil bioassay analyses were conducted to evaluate the protectiveness of mercury concentrations in soil to vascular plants and soil biota and arsenic concentrations in soil to vascular plants. Soil for bioassay analyses were submitted to Nautilus Environmental (Nautilus), a Department of Ecology accredited laboratory located in Tacoma, Washington.

As presented in the TEE Program Document, soil bioassay for plants was conducted in accordance with Ecology Publication No. 96-324, *Early Seedling Growth Protocol for Soil Toxicity Screening*. Soil

bioassay for soil biota was conducted in accordance with Ecology Publication No. 96-327, *Earthworm Bioassay Protocol for Soil Toxicity Screening*. No soil dilution was performed prior to analysis.

3.3.2 Bioaccumulation Study

In order to assess the protectiveness of the established initial cleanup level for arsenic in soil of 20 mg/kg for potential wildlife receptors, a 28-day earthworm (Eisenia *fetida*) bioaccumulation study was conducted, as allowed by WAC 173-340-7493(3)(c)(i). For predatory wildlife receptors, the surrogate species are the American Robin and the Shrew; both are ground-feeding carnivorous species. Therefore, in accordance with Ecology's Wildlife Exposure Model for Site-Specific Evaluations (WEM; Table 749-4), the potential exposure pathway for these receptors is through consumption of worms living in contaminated soil.

The selected soil samples were submitted to Nautilus. The methodology used for growing worms in contaminated media was in accordance with the *Standard Guide for Conducting Laboratory Soil Toxicity or Bioaccumulation Tests with the Lumbricid Earthworm Eisenia Fetida* (ASTM E1676-04, 2007).

Following the 28-day bioaccumulation incubation period, the earthworms were removed from the soil, placed in chemistry containers, and submitted to Test America of Seattle, Washington for determination of arsenic concentration by EPA method 6010B.

Results of the earthworm bioaccumulation study and confirmation soil sampling were subsequently used to calculate site-specific BAFs for the selected representative sites. BAFs were calculated by dividing the worm arsenic concentration by the confirmation soil arsenic concentration for each representative facility. The calculated site-specific BAFs were then used to calculate region-specific indicator concentrations that are considered protective of potential wildlife receptors using the equations provided in the WEM, Table 749-4 in MTCA. As no Toxicity Reference Value for the more toxic form of arsenic (arsenic III) was provided in MTCA Table 749-4 for the American Robin, EPI used a value of 2.24 mg/kg-day as provided in the U.S. EPA document, *Ecological Soil Screening Levels for Arsenic*, March 2005, to calculate the region-specific indicator concentrations for the avian predator. This is a more conservative value than that provided in MTCA for the less toxic arsenic V.

4.0 FINDINGS

The results of the bioassay analysis and BAF study are presented in the following sections. The Soil Toxicity Evaluation report prepared by Nautilus is included as Attachment D.

4.1 Lettuce Bioassay Tests

Results of the lettuce bioassay tests conducted on soils from representative meter station facilities impacted with mercury are as follows:

- Snohomish Compressor Station (Northwest Washington Representative Area) mercury concentration 2.5 mg/kg **soil not toxic**.
- Washougal Compressor Station (Southwest Washington/Columbia River Representative Area)
 mercury concentration 2.6 mg/kg soil not toxic.
- Ellensburg Meter Station (Central Washington Representative Area) mercury concentration 2.8 mg/kg **soil not toxic**.
- Star Road Meter Station (Eastern Washington Representative Area) mercury concentration 3.3 mg/kg – soil not toxic.

Results of the lettuce bioassay tests indicate that the initially established soil cleanup level for mercury of 2 mg/kg is protective of plants in each of the representative areas.

Results of the lettuce bioassay tests conducted on soils from representative meter station facilities impacted with arsenic indicate:

- Snohomish Compressor Station (Northwest Washington Representative Area) arsenic concentration 48.1 mg/kg **soil not toxic**.
- Washougal Compressor Station (Southwest Washington/Columbia River Representative Area)

 arsenic concentration 16 mg/kg soil not toxic.
- Yakima Firing Center Meter Station (Central Washington Representative Area) arsenic concentration 14 mg/kg **soil not toxic**.
- Spokane Mead Meter Station (Eastern Washington Representative Area) arsenic concentration 18.1 mg/kg – results inconclusive*.

*Note: The control sample for the lettuce bioassay sample from Spokane Mead Meter Station did not meet the minimum criteria for seeding growth and therefore the results were inconclusive. The lettuce bioassay test will be re-performed on the TEE sample from Spokane Mead.

Results of the lettuce bioassay tests indicate that the initially established soil cleanup level for arsenic of 20 mg/kg is protective of plants in the Northwest Washington Representative Area. For the Southwest Washington/Colombia River and Central Washington Representative Areas, the concentration analyzed represents the arsenic concentration that is protective of plants. No arsenic concentration protective of plants has yet been established for the Eastern Washington Representative Area.

4.2 Earthworm Bioassay Tests

Results of the earthworm bioassay tests conducted on soils from representative meter station facilities impacted with mercury indicate:

- Snohomish Compressor Station (Northwest Washington Representative Area) mercury concentration 2.5 mg/kg **soil not toxic**.
- Washougal Compressor Station (Southwest Washington/Columbia River Representative Area)

 mercury concentration 2.6 mg/kg soil not toxic.
- Ellensburg Meter Station (Central Washington Representative Area) mercury concentration 2.8 mg/kg **soil not toxic**.
- Star Road Meter Station (Eastern Washington Representative Area) mercury concentration 3.3 mg/kg – soil not toxic.

Results of the earthworm bioassay tests indicate that the initially established soil cleanup level for mercury of 2 mg/kg is protective of soil biota in each of the representative areas.

4.3 Earthworm 28-day Bioaccumulation Study

Results of the 28-day earthworm bioaccumulation study conducted using soils from representative meter station facilities impacted with arsenic indicate:

- For the Snohomish Compressor Station (Northwest Washington Representative Area), the calculated BAF was 0.16, and the calculated indicator concentrations for arsenic in soil that are considered protective of avian predators and mammalian predators are 58 mg/kg and 47 mg/kg, respectively.
- For the Washougal Compressor Station (Southwest Washington/Columbia River Representative Area), the calculated BAF was 0.26, and the calculated indicator concentrations for arsenic in soil that are considered protective of avian predators and mammalian predators are 45 mg/kg and 30 mg/kg, respectively.
- For the Yakima Firing Center Meter Station (Central Washington Representative Area), the calculated BAF was 0.53, and the calculated indicator concentrations for arsenic in soil that are considered protective of avian predators and mammalian predators are 29 mg/kg and 15 mg/kg, respectively.
- For the Spokane Mead Meter Station (Eastern Washington Representative Area), the calculated BAF was 0.13, and the calculated indicator concentrations for arsenic in soil that are considered protective of avian predators and mammalian predators are 63 mg/kg and 56 mg/kg, respectively.

Calculation worksheets for region-specific soil indicator concentrations that are considered protective of wildlife calculated using Site-specific BAF values determined from the 28-day earthworm bioaccumulation studies are presented as Attachment E.

4.4 Data Summary

Table 2 summarizes the cumulative TEE data collected during this study.

Based on the work documented herein, the TEE cleanup levels that are protective of all potential terrestrial and ecological receptors for the representative areas are as follows:

- Northwest Washington Representative Area
 - Arsenic 47 mg/kg
 - Mercury 2.5 mg/kg
- Southwest Washington/Colombia River Representative Area
 - Arsenic 16 mg/kg
 - Mercury 2.6 mg/kg
- Central Washington Representative Area
 - Arsenic 14 mg/kg
 - Mercury 2.8 mg/kg
- Eastern Washington Representative Area
 - Arsenic No Value Yet Established
 - Mercury 3.3 mg/kg

5.0 CONCLUSIONS

The conclusions of the modified Site-Specific TEE study conducted for the NWPL GP Meter Station Facilities in Washington State are as follows:

- Results of the lettuce and earthworm bioassay tests indicate that the established initial soil cleanup level for mercury of 2 mg/kg is protective of all potential ecological receptors at all of the selected representative meter station facilities.
- Results of the lettuce bioassay and earthworm bioaccumulation tests indicate that the established initial soil cleanup level for arsenic of 20 mg/kg is protective of potential ecological receptors in the Northwest Washington Representative Area.
- The TEE cleanup level for arsenic applicable to the Southwest Washington/Colombia River Representative Area is 16 mg/kg. This cleanup level is based on the protection of plants ecological pathway of concern.
- The TEE cleanup level for arsenic applicable to the Central Washington Representative Area is 14 mg/kg. This cleanup level is based on the protection of plants ecological pathway of concern.

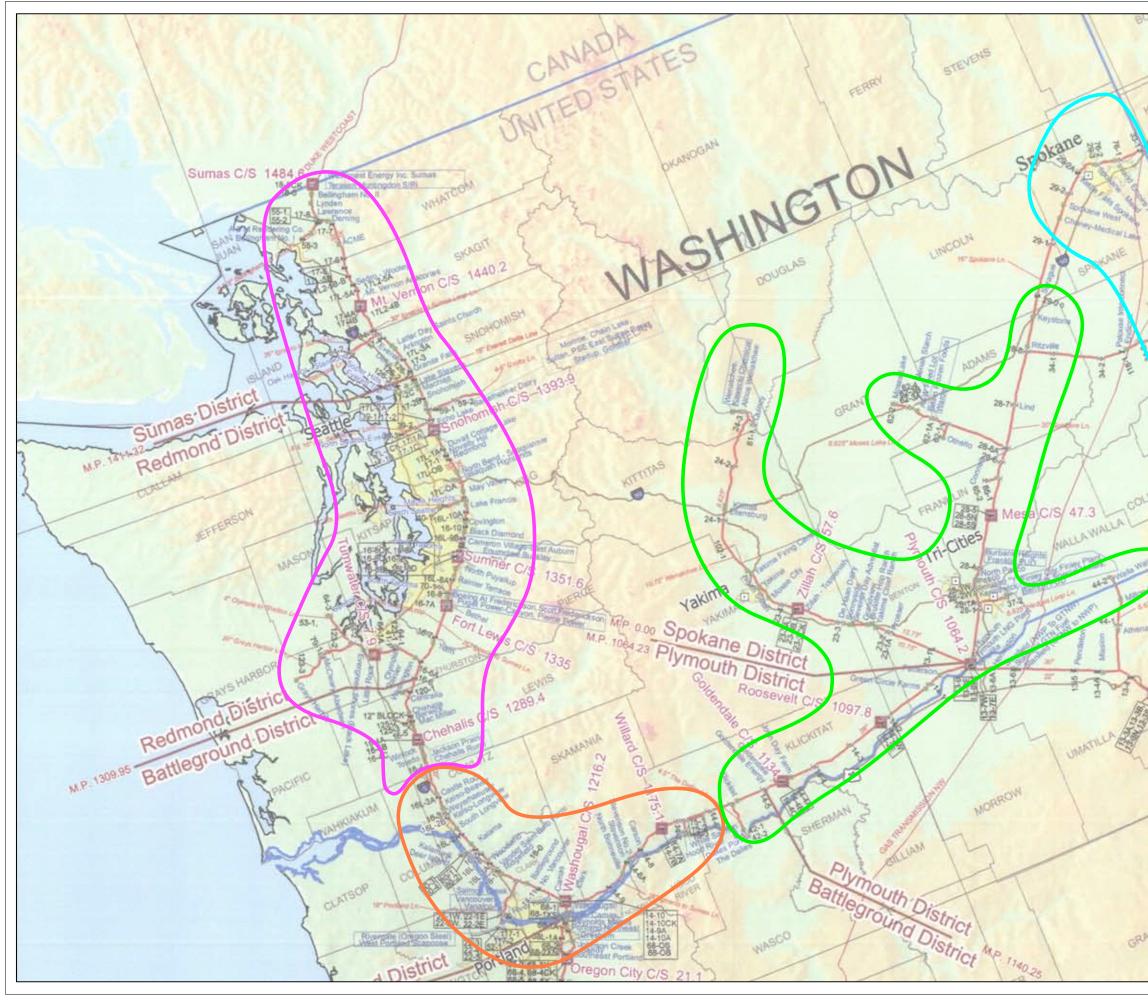
- The TEE cleanup level for arsenic established for the Southwest Washington/Colombia River and Central Washington Representative areas are based upon the maximum concentrations detected in each region. If in the future, arsenic is detected at concentrations that exceed the current maximum concentrations, NWPL GP reserves the right to perform additional lettuce bioassay tests to assess the protectiveness of arsenic in soil for that particular region.
- Based on the work conducted as part of this TEE, no TEE cleanup level for arsenic was established for the Eastern Washington Representative Area. The absence of a TEE cleanup level for arsenic in the Eastern Washington Representative Area represents a data gap for this study. NWPL GP is currently working to fill this data gap and will submit an addendum to this report when complete.

6.0 CLOSING

The representative area data described herein, and the cleanup levels that are protective of the potential ecological receptors developed during the site-specific TEEs will be used as a reference for compliance during the assessment and remediation of the individual meter station facilities. The procedures and methods for assessing and remediating each individual meter station facility will be presented in an *Assessment Results and Remedial Action Report* submitted for each meter station facility. These reports will include a section referencing the TEE work documented herein.

7.0 REFERENCES

- Environmental Partners, Inc. (EPI)¹, Portnoy Environmental², Williams Gas Pipeline², 2011, Terrestrial Ecological Evaluation Program, Northwest Pipeline GP Meter Station Facilities Throughout Washington State; ¹Seattle, Washington; ²Houston, Texas; May.
- U.S. Environmental Protection Agency (EPA), 2005, Ecological Soil Screening Levels for Arsenic; Office of Solid Waste and Emergency Response, Washington, DC; March.



| And a second | ASHINGTON ASHINGTON ASHINGTON ASHINGTON/COLUMBIA BASIN ASHINGTON/COLUMBIA BASIN ASHINGTON/C | FIGURE 1 | "REPRESENTATIVE AREAS" SHEET DRAWN BY REVIEWED BY DATE 1 of 1 ARM EMK 01/13/1 |
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Table 1TEE Bioassay Soil and Bioaccumulation Confirmation Sample Results (in mg/kg)and Bioaccumulation Factor for ArsenicNorthwest Pipeline GPWasington State Meter Station Facilities

| | | TEE Sample | LAB Report | Mercury | | | Arsenic | | | | |
|--|---------------------------------------|------------|------------|--|---------------------------------------|---|--|---------------------------------------|---|--|--|
| Region | Representative Facility | | | Original Concentration ^A | Bioassay Sample Collection Date | Confirmation Sample Analytical Result ^a | Original Concentration ^B | Bioassay Sample Collection Date | Confirmation Sample Analytical Result ^B | E. <i>fetida</i> 28-Day Analytical Result ^c | Bioaccumulation Factor ^D |
| Northwest Washington Representation Area | Snohomish Compressor Station | SH4-W64 | 105017 | NA | NA | NA | 44 | 5/3/11 | 48.1 | 7.8 | 0.16 |
| Northwest \ Represent | | SHSB2-3:18 | 105180 | 12 | 5/13/11 | 2.5 | NA | NA | NA | NA | NA |
| Southwest Washington / Columbia River Basin Representation Area | Washougal Compressor Station | WS11-AM24 | L517283 | NA | NA | NA | 26 | 5/17/11 | 16 | 4.1 | 0.26 |
| | | WSSB6-0910 | L517283 | 2.7 | 5/17/01 | 2.6 | NA | NA | NA | NA | NA |
| Central Washington Representation Area | Yakima Firing Center Meter Station | YFSS-D1 | L517283 | NA | NA | NA | <0.21 | 5/17/11 | 14 | 7.4 | 0.53 |
| Central W Represent | Ellensburg Meter Station | ELSS-0810 | L517283 | 2.3 | 5/17/11 | 2.8 | NA | NA | NA | NA | NA |
| Eastern Washington Representation Area | Spokane Mead Meter Station | BKG | 106382 | NA | NA | NA | N/A | 5/16/11 | 18.1 | <2.3 | 0.13 ^E |
| Eastern W Represent | Star Road Meter Station | 1807 | 105338 | 3.3 | 5/16/11 | 3.3 | NA | NA | NA | NA | NA |

Notes: All concentrations in milligrams per kilogram (mg/kg) unless otherwise indicated.

^AMercury analysis by EPA Method 1631E and Method 7471

^BArsenic analysis by Method 200.8

^cArsenic analysis by EPA Method 6010B

^DUnitless

^EBioaccumulation Factor calclated using the E. *foetida* 28-day detection limit.

Table 2 TEE Cleanup Level Summary Northwest Pipeline GP Wasington State Meter Station Facilities

| Region | Representative Facility | сос | Concentration Protective of Soil Biota | Concentration Protective of Plants | Concentration Protective of Mamallian and Avian Predators | Final TEE Cleanup Level |
|---|---------------------------------------|---------|--|---------------------------------------|--|-------------------------|
| Vashington ation Area | Snohomish | Arsenic | 60ª | 48.1 | 47 | 47 |
| Northwest Washington Representation Area | Compressor Station | Mercury | 2.5 | 2.5 | 5.5 ^b | 2.5 |
| Southwest Washington / Columbia River Basin Representation Area | Washougal Compressor Station | Arsenic | 60ª | 16 | 30 | 16 |
| Southwest V Columbia F Represent | | Mercury | 2.6 | 2.6 | 5.5 ^b | 2.6 |
| Central Washington Representation Area | Yakima Firing Center Meter Station | Arsenic | 60ª | 14 | 15 | 14 |
| Central Wa Represent | Ellensburg Meter Station | Mercury | 2.8 | 2.8 | 5.5 ^b | 2.8 |
| ashington ation Area | Spokane Mead Meter Station | Arsenic | 60ª | NVE | 56 | NVE |
| Eastern Washington Representation Area | Star Road Meter Station | Mercury | 3.3 | 3.3 | 5.5 ^b | 3.3 |

Notes: All concentrations in milligrams per kilogram (mg/kg) unless otherwise indicated.

a Book value for arsenic concentration protective of soil biota (MTCA Table 749-3)

b Book value for mercury concentration protective of mamalian and avian predators (MTCA Table 749-3)

NVE Lettuce bioassay control sample not valid, result inconclusive and therefore no value yet established

Attachment A

Terrestrial Ecological Evaluation Program

Northwest Pipeline GP Meter Station Facilities Throughout Washington State

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May 2011

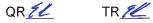
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1.0 INTRODUCTION

This *Terrestrial Ecological Evaluation Program* document provides the rationale, methodology, and procedures proposed for Terrestrial Ecological Evaluations (TEEs) for Northwest Pipeline General Partnership (NWPL GP) meter station facilities, as required by the Model Toxics Control Act (RCW 70.105D) and its implementing regulations (WAC 173-340), which are collectively referred to herein as "MTCA".

NWPL GP is evaluating the environmental conditions at over 70 meter station facilities throughout Washington State, which have similar site conditions (*i.e.*, uncapped commercial/industrial type facilities, in rural locations, identical site usage, and the same single contaminant). The meter station facilities are where gas is being regulated and metered from the main supply pipelines to local distribution companies (LDCs) or a wholesale customers. The LDC then distributes the gas to local consumers.

NWPL GP originally submitted a draft *Terrestrial Ecological Evaluation Program* document to Mr. Dave Sternberg at Ecology on October 11, 2010. The October 11, 2010 document was disseminated to and reviewed by each of the four Ecology regional Voluntary Cleanup Program (VCP) managers for NWPL GP facilities. Consolidated comments were returned to NWPL GP via email on November 8, 2010.

NWPL GP submitted a *Technical Memorandum Re: Response to Ecology Comments – Terrestrial Ecological Evaluation Program: Northwest Pipeline GP Meter Station Facilities Throughout Washington State dated January 13, 2011 (Technical Memorandum). The Technical Memorandum was again disseminated to and reviewed by each of the four Ecology regional VCP managers. Ecology comments and concerns were consolidated and communicated via Letter <i>Re: Transmittal of Ecology Comments on the* [Technical Memorandum] dated March 29, 2011.

This revised document incorporates each of the comments and concerns raised by Ecology in the March 29, 2011 transmittal letter.

This document has been prepared in order to evaluate NWPL GP meter station facilities for TEE compliance for the two confirmed contaminants of concern (COCs); inorganic mercury and arsenic. No other COCs have been identified for NWPL GP meter station facilities. The procedures and methods for assessing each individual meter station facility will be presented in an *Assessment Results and Remedial Action Report* submitted for each meter station facility.

1.1 Facility Description

Meter station facilities are small (typically less than ½ acre) and are relatively simple to assess and remediate. A meter station typically consists of several pipe runs and a small meter building or canopy cover, within a fenced, gravel-covered lot. Meter stations are typically located proximal to the main pipeline. The meter stations have controlled access and the general maintenance of these facilities includes active housekeeping, maintenance such as weed suppression, and maintenance of the integrity of the fencing, gates, and interior buildings/structures.

Based on work conducted since 2005 and prior knowledge of site conditions, a thorough understanding of typical site conditions such as mode of release, vertical and horizontal migration of impacts, hot spots, and contaminant distribution has been formed.

1.2 Conceptual Site Model

The principal COC at NWPL GP meter station facilities is inorganic mercury. The primary source of mercury releases has been accidental spillage of inorganic mercury during historic maintenance and calibration of a certain type of differential pressure manometer (meters) that contained mercury (*i.e.*, American A-88 meters). NWPL GP used such manometers to measure the differential pressures across orifice plates in order to calculate flow volumes through the pipelines, laterals, and taps that supply its customers. It is important to note that not all of the manometers historically used by NWPL GP contained mercury and that the installation of manometers that utilized mercury was phased out in the mid-to-late 1980's.

A secondary, and less common source of potential mercury releases at NWPL GP meter station facilities has been from "thermowells". Thermowells are test tube-shaped "wells" installed in the meter station piping into which thermometers were placed to measure gas temperatures. In some instances, mercury was also placed in the well to improve the thermal conductance between the well and thermometer. The practice of placing mercury in thermowells varied regionally along the NWPL GP pipeline system. The thermowells did not contain large amounts of mercury, but there was the potential for some spillage or drippage when a thermowell was filled and/or when a thermometer was inserted and/or removed. The use of mercury in thermowells was phased out by 1993.

Both the former A-88 meters and the thermowells are point sources of release. These releases have generally been to either bare soil or gravel covered surfaces beneath and adjacent to the meters and above grade portions of the piping runs. These areas are typically either under cover of a supported metal roof or inside a metal building to protect the equipment from the weather.

A less common COC at NWPL GP meter station facilities is arsenic. Although the exact source of arsenic is not known, releases of arsenic appear to be operationally related, surficial releases. Arsenic impacts have typically been identified near buildings and operational equipment. Concentrations are highest at or near the ground surface and attenuate quickly with depth.

2.0 PROBLEM FORMULATION

MTCA requires the completion of a TEE in accordance with WAC 173-340-7490.

2.1 Primary TEE Exclusions

The NWPL GP meter station facilities typically do not qualify for the primary exclusions from the TEE documented in WAC 173-340-7491(1) because of their often rural locations, uncapped site conditions (*i.e.*, typically the facilities are gravel-covered), and the contamination is surficial in nature (*i.e.*, typically less than 3 feet). Therefore, further evaluation is required.

2.2 Simplified TEE Standards

On June 23, 2010, NWPL GP participated in a video conference meeting with the Ecology Voluntary Cleanup Program (VCP) managers to present a proposed "model approach" program by which NWPL GP meter stations could qualify for a Simplified TEE based on the qualifying regulations documented in WAC 173-340-7491(2)(a). While Ecology agreed that on an individual basis certain meter station facilities *may* qualify for a Simplified TEE, Ecology had too many concerns to approve the program as a whole using the model approach presented.

2.3 Modified Model TEE based upon Site-Specific TEE

Since Ecology had concerns with approving a model approach for justifying a Simplified TEE for meter station facilities, NWPL GP is proposing a modified model approach TEE program herein based upon the Site-Specific TEE procedures documented in WAC 173-340-7493.

As previously indicated, the primary COC at the meter stations is inorganic mercury and a less common COC is arsenic.

Inorganic mercury soil impacts at the meter stations have been characterized to the MTCA Method A Soil Cleanup Level for Unrestricted Land Uses of 2 milligrams/kilogram (mg/kg), which is the initially selected cleanup level for NWPL GP meter station facilities. The Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (Table 749-3) are specified as 0.3 mg/kg, 0.1 mg/kg, and 5.5 mg/kg for Plants, Soil Biota, and Wildlife, respectively. Since wildlife receptors are protected at a soil concentration greater than the initially selected cleanup level of 2 mg/kg, facilities that are in compliance with the 2 mg/kg mercury cleanup level will be protective of wildlife receptors. However, because the selected cleanup level of 2 mg/kg exceeds the limits established for the protection of plants and soil biota, it is proposed to perform a modified Site-Specific TEE according to WAC 173-340-7493 for these potential exposures.

Arsenic soil impacts at the meter stations have been characterized to the MTCA Method A Soil Cleanup Level for Unrestricted Land Uses of 20 mg/kg, which is the initially selected cleanup level for NWPL GP meter station facilities. The Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (Table 749-3) are specified as 10 mg/kg, 60 mg/kg, and 7 mg/kg for Plants, Soil Biota, and

Wildlife, respectively. Since soil biota receptors are protected at a soil concentration greater than the initially selected cleanup level of 20 mg/kg, facilities that are in compliance with the 20 mg/kg arsenic cleanup level will be protective of soil biota receptors. However, because the selected cleanup level of 20 mg/kg exceeds the limits established for the protection of plants and wildlife, it is proposed to perform a modified Site-Specific TEE according to WAC 173-340-7493 for these potential exposures.

2.3.1 Exposure Pathways

The primary exposure pathway for inorganic mercury and arsenic at the NWPL GP meter stations occurs via direct contact. The contact with contaminated soil can directly impact vegetation and soil biota. Indirect impacts can occur when animals feed on affected media, resulting in bioaccumulation of contaminants through the food chain. These secondary receptors could include ground-feeding birds and mammals, and small-mammal predators. Plants exposed to contaminants may directly uptake the contamination from the soil in their roots. Animals may be exposed from direct contact with contaminated soil or by consuming affected plants and/or soil biota.

2.3.2 Receptors of Concern

The receptors of concern differ for mercury and arsenic. The receptors of concern for both of these compounds are summarized below.

2.3.2.1 Receptors of Concern – Mercury

As indicated above, the inorganic mercury cleanup level for NWPL GP meter station facilities is 2 mg/kg. The inorganic mercury ecological indicator soil concentration for protection of wildlife receptors is 5.5 mg/kg, which is based on Ecology's Wildlife Exposure Model for Site-specific Evaluations (Table 749-4). Therefore, wildlife receptors such as potentially exposed avian or mammalian receptors are not considered receptors of concern at NWPL GP meter station facilities that meet the 2 mg/kg cleanup level.

Assuming that the 2 mg/kg selected cleanup level for inorganic mercury has been achieved, the primary receptors of concern for mercury include vascular vegetation and soil biota.

2.3.2.2 Receptors of Concern – Arsenic

The arsenic cleanup level for NWPL GP meter stations is 20 mg/kg. The arsenic ecological indicator soil concentration for protection of soil biota receptors is 60 mg/kg. Therefore, soil biota receptors such are not considered receptors of concern at NWPL GP meter station facilities that meet the 20 mg/kg arsenic cleanup level.

Assuming that the 20 mg/kg selected cleanup level for arsenic has been achieved, the primary receptors of concern for arsenic include vascular vegetation and wildlife.

2.3.3 Toxicological Assessment

The mercury cleanup levels established in MTCA on Table 749-3 for the TEE are based on toxicological effects described in the EPA document *Mercury Study: Report to Congress, Volume VI: An Ecological Assessment for Anthropogenic Mercury Emissions in the United States* (EPA-452/R-97-008, December 1997), which stated that "earthworms accumulated an average of 21.3 times the mercury concentration of the soil to which they were exposed" (Beyer *et al.*, 1985).

Much of the research done on the effects of mercury toxicity is based on methylmercury. Methylmercury is a neurotoxin capable of impacting reproductive health, causing nervous tissue and liver damage, and impairing motor functions in birds and mammals (EPA-425/R-97-008).

Since the impacts at NWPL GP meter stations are from inorganic mercury, which can be converted to the more toxic form of methylmercury through biological methylation, collecting site-specific toxicological data is essential for determining if the initially selected cleanup level of 2 mg/kg is protective of vascular vegetation and soil biota.

An initial toxicological literature study was performed to determine if arsenic could be ruled out for any of the potential receptors of concern. Based on the toxicological information obtained, it is unlikely that arsenic can be ruled out of TEE consideration. The sampling proposed herein will provide empirical site- and compound-specific toxicological data to determine protective concentrations of arsenic. This data will be more beneficial than performing an overly exhaustive literature study for arsenic.

3.0 METHODOLOGY

The proposed modified Site-Specific TEE will identify and address the issue of soil toxicity at the NWPL GP meter stations and its effects on vascular plants and soil biota.

The approach proposed herein is to divide Washington State into representative areas based on regional climate and geography and to collect empirical data at a representative facility within each area. The other meter stations assessed and remediated within a given representative area will utilize the data collected at the area's representative facility for determining compliance with TEE.

The proposed division of Washington State includes four ecological regions, focusing mainly on geographic location and its associated climate systems. These proposed representative areas include:

- a. Northwest Washington: located in the Puget Sound trough with a maritime climate, forested foothills, and abundant riparian habitat. Experiences high volumes of rainfall, averaging 40-80-inches annually. Significant development has occurred along the Interstate-5 corridor, which the NWPL GP pipeline parallels.
- b. Southwest Washington/Columbia River Basin: located to the west of the Cascade Mountain Range. Climate is similar to Northwest Washington; however, rainfall is slightly greater, receiving an annual precipitation of 55-140-inches.
- c. Central Washington: located to the east and in the rain shadow of the Cascade Mountain Range and stretches east toward the Columbia Plateau of central Washington. Precipitation averages 20-inches annually, encouraging growth of shrub-steppe vegetation.
- d. Eastern Washington: located near the Washington/Idaho border, near the foothills of the Canadian Rocky Mountain Range. Precipitation averages 30-inches annually and vegetation ranges from a sage-steppe ecosystem to evergreen forests.

The proposed representative areas as they relate to the NWPL GP pipeline are depicted on Figure 1.

3.1 Soil Bioassay

Soil bioassay analysis will be necessary to evaluate the protectiveness of mercury concentrations for vascular plants and soil biota. Bioassay analysis will be necessary to evaluate the protectiveness of arsenic concentrations for vascular plants.

In order to address whether chemical impacts to representative soils are protective of vascular plants and soil biota, soil samples will be subjected to bioassay screening as specified in WAC 173-340-7493(3)(b)(i). The samples for bioassay screening analyses will be collected from areas where the concentrations of impacts are representative of the initial cleanup levels selected for each compound

(*i.e.*, 2 mg/kg for mercury and 20 mg/kg for arsenic). The previously collected assessment data will be used to determine the sampling location. No soil dilution will be performed prior to analysis.

In order to confirm the contaminant concentration prior to bioassay analysis, a sample will be submitted from the bioassay sample collected and will be analyzed for mercury using EPA Method 7471 and arsenic using EPA Method 6010B.

Bioassay tests proposed herein are to be performed on concentrations of soil that are at, or slightly higher than the initially selected cleanup level of 2 mg/kg for mercury and 20 mg/kg for arsenic, meaning that soils that are representative of the cleanup level for each COC, or slightly more contaminated than post-remedial concentrations, will be used for the bioassays. Therefore, if the bioassays on the more-highly contaminated soil are shown to be protective of ecological risks, soils from sites remediated to 2 mg/kg for mercury and 20 mg/kg for arsenic are also considered protective.

For purposes of this TEE, the acceptable range of concentrations for performing the bioassay analysis shall be considered between 2 and 6 mg/kg for mercury, and between 20 mg/kg and 60 mg/kg for arsenic.

If the bioassay screening analysis determines that the soils are not protective of plants and/or soil biota for a particular region, then serial dilutions of samples will be performed to determine concentrations that are protective. If serial dilutions are necessary, contaminant analysis will be performed on the diluted soils to confirm the concentration of COCs prior to performing additional bioassay analysis.

The methodology for the soil bioassay for plants will be in accordance with the Ecology Publication No. 96-324, *Early Seedling Growth Protocol for Soil Toxicity Screening*. The methodology for soil bioassay for soil biota will be in accordance with the Ecology Publication No. 96-327, *Earthworm Bioassay Protocol for Soil Toxicity Screening*. The soil bioassay analysis will be performed by Nautilus Environmental, a Department of Ecology accredited laboratory located in Tacoma, Washington.

3.2 Bioaccumulation Factor Calculation

As presented above, arsenic is the only COC applicable to potential wildlife receptors and requires further evaluation for protectiveness.

For wildlife receptors, the surrogate species are the American Robin and the Shrew; both are ground-feeding carnivorous species. Therefore, in accordance with Ecology's Wildlife Exposure Model for Site-Specific Evaluations (WEM; Table 749-4), the potential exposure pathway for these receptors is through consumption of worms living in contaminated soil. The driving factor in calculating a site-specific indicator concentration using the WEM is the bioaccumulation factor (BAF) for worms living in the contaminated media. In order to calculate site-specific indicator concentrations for wildlife receptors, site-specific BAFs for arsenic will be assessed as allowed by WAC 173-340-7493(3)(c)(i).

The BAFs for biota will be measured by collecting and analyzing worm samples living in representative arsenic-contaminated soils. If worms are not available in the representative soils, other biota (*e.g.*, spiders, potato bug, etc.) will be collected and analyzed in lieu of worms.

If no biotas are present in the representative soils, worms will be grown in contaminated media and then analyzed for arsenic concentration. Using previously collected assessment data to determine the sampling location, contaminated media will be collected for purposes of growing worms. In order to confirm the contaminant concentration prior to growing worms, a sample will be submitted from the contaminated media collected and analyzed for arsenic.

Methodology for growing worms in contaminated media will be in accordance with the *Standard Guide for Conducting Laboratory Soil Toxicity or Bioaccumulation Tests with the Lumbricid Earthworm Eisenia Fetida* (ASTM E1676-04, 2007).

After growing the worms in the contaminated media using the above method, the worms will be analyzed for arsenic.

The BAFs are determined by dividing the concentrations of arsenic within the biota samples by the concentration within the soil in which the biota were collected or grown. The resulting BAFs will then be used in the WEM equations to calculate site-specific concentrations that are protective of wildlife receptors.

4.0 SITE GROUPINGS AND REPRESENTATIVE SITES

The following summarizes the NWPL GP proposed representative areas, the associated NWPL GP meter station facilities, and the proposed representative facility for each area; see **Figure 1**.

4.1 Northwest Washington Representative Area

The representative facility for the Northwest Washington Representative Area is the Snohomish Compressor Station for both arsenic and mercury.

Data collected at this facility will be representative of the following NWPL GP meter station facilities:

- Chehalis
- Evergreen Shores (Black Lake)
- McCleary Aberdeen
- North Seattle Everett
- North Tacoma
- Oak Harbor Stanwood
- Olympia
- Sedro Woolley
- Shelton
- South Seattle
- South Tacoma
- Toledo

4.2 Southwest Washington/Columbia River Basin Representative Area

The representative facility for the Southwest Washington/Columbia River Basin Representative Area is the Washougal Compressor Station for both arsenic and mercury:

Data collected at this facility will be representative of the following NWPL GP meter station facilities:

- Deer Island
- Kalama
- Stevenson
- Stevenson #2
- Vanalco
- Vancouver
- Washougal

4.3 Central Washington Representative Area

The representative facility for the Central Washington Representative Area is Yakima Firing Center Meter Station for arsenic and Ellensburg Meter Station for mercury.

Data collected at these facilities will be representative of the following NWPL GP meter station facilities:

- Alcoa Wenatchee
- Burbank Heights
- Connell
- Ellensburg
- Goldendale*
- Grandview*
- John Day Dam*
- Kawecki Chemical
- Kennewick
- Klickitat*
- Lind
- Menan Starch
- Moses Lake
- Pasco
- Prosser*
- Quincy
- Ritzville*
- Sandvik Special Metals
- Sunnyside
- Unocal Finley
- Walla Walla
- Warden
- Wenatchee
- Yakima*
- Zillah Toppenish*

4.4 Eastern Washington Representative Area

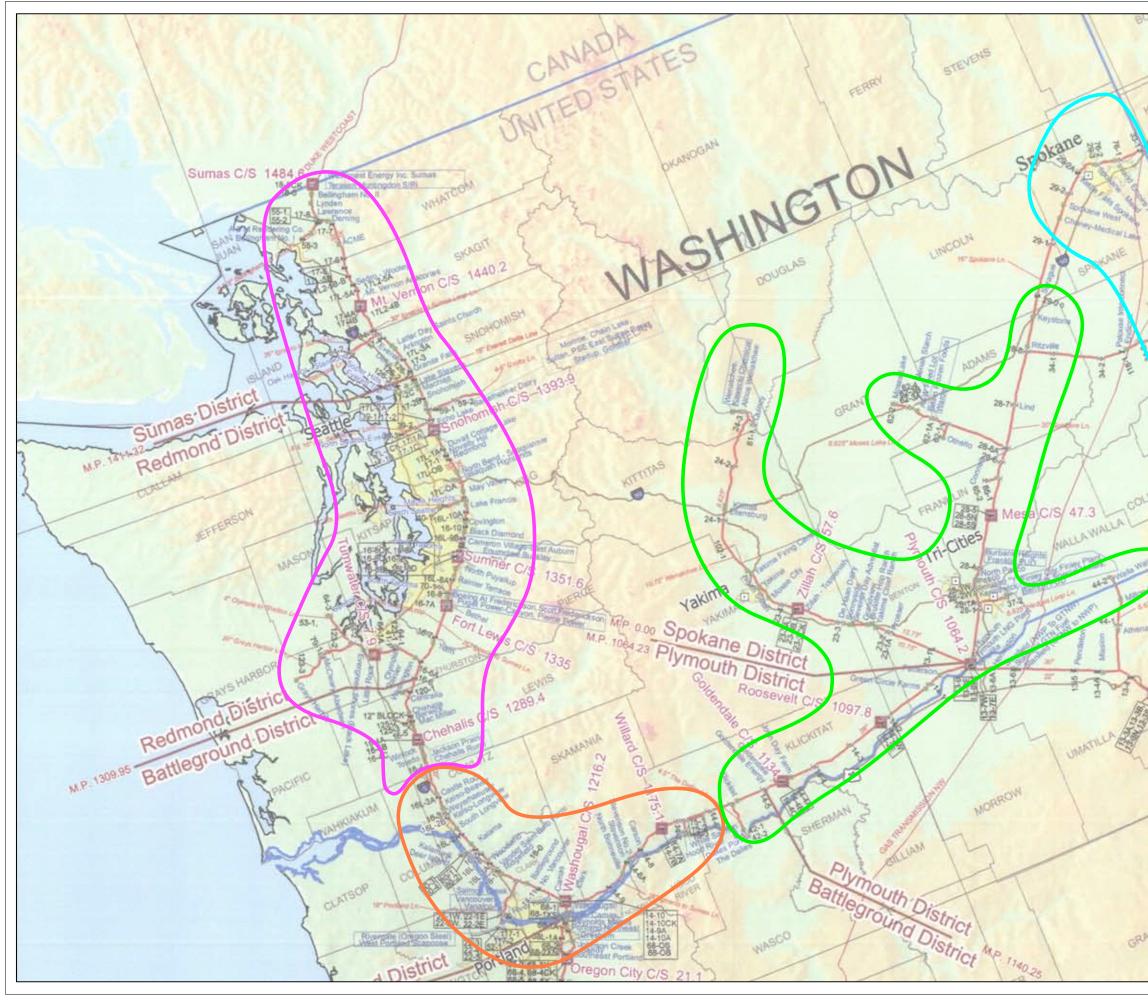
The representative facility for the Eastern Washington Representative Area is Spokane Mead Meter Station for arsenic and Cheney Medical Lake Meter Station for mercury:

Data collected at these facilities will be representative of the following NWPL GP meter station facilities:

- Cheney Medical Lake
- Colfax
- Genesee
- Pullman
- Spokane West
- Spokane Mead

5.0 CLOSING

Upon written acceptance of this proposed modified Site-Specific TEE program by Ecology, an individual TEE will be submitted for each meter station facility/site using this document and the representative facility data as a reference for compliance.



| And a second | ASHINGTON ASHINGTON ASHINGTON ASHINGTON/COLUMBIA BASIN ASHINGTON/COLUMBIA BASIN ASHINGTON/C | FIGURE 1 | "REPRESENTATIVE AREAS" SHEET DRAWN BY REVIEWED BY DATE 1 of 1 ARM EMK 01/13/1 |
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Attachment B



STATE OF WASHINGTON

19 2011

7-6300

MAY

DEPARTMENT OF ECOLOG

PO Box 47775 • Olympia, Washington 98504-7775 • (360)

May 13, 2011

Mr. Aaron Galer, Environmental Scientist III Williams - Northwest Pipeline 295 Chipeta Way # 1 Salt Lake City, UT 84108-1285

Mr. Mark S. Nelson, P.E., Group Leader, Environmental Remediation Williams Gas Pipeline P.O. Box 1396 Houston, TX 77251

Re: Transmittal of Ecology Approval and Comment on the revised *Terrestrial Ecological Evaluation Program, Northwest Pipeline GP Meter Station Facilities throughout Washington State,* April 2011, prepared by Williams Gas Pipeline; Environmental Partners, Inc; and Portnoy Environmental.

Dear Mr. Galer and Mr. Nelson:

Thank you for submitting the above-referenced revised Terrestrial Ecological Evaluation (TEE) Program document in response to our comments. Ecology approves the above-referenced document <u>provided</u> that the following comment is incorporated:

• The 3rd paragraph of Section 3.1 states that in order to confirm the contaminant concentration prior to bioassay analysis, samples will be analyzed for mercury and arsenic. However, a similar statement is not provided in Section 3.2. Please also add this to Section 3.2.

If you have any questions, please contact me at (360) 407-6247 or via e-mail at stee461@ecy.wa.gov.

Sincerely,

SStel

Steve Teel, LHG Site Manager/Hydrogeologist Toxics Cleanup Program Southwest Regional Office

ST/ksc:TEE M-S approval May 2011

By certified mail: (7010 0780 0002 3400 6118 // 7010 0780 0002 3400 6088)

cc: Eric Koltes, Environmental Partners, Inc. Mr. Alan Hopkins, P.G., Portnoy Environmental Scott Rose – Ecology-SWRO Dale Myers – Ecology-NWRO Norm Peck – Ecology-CRO Jason Shira – Ecology-CRO Patti Carter – Ecology-ERO Mike Hibbler – Ecology-ERO Brendan Dowling – Ecology-ERO

Attachment C

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Charlene Morrow, M.S. Yelena Aravkina, M.S. Bradley T. Benson, B.S. Kurt Johnson, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 TEL: (206) 285-8282 FAX: (206) 283-5044 e-mail: fbi@isomedia.com

May 3, 2011

Clint Moseley, Project Manager Portnoy Environmental 1414 W Sam Houston Pkwy N, Suite 170 Houston, TX 77043

RE: Snohomish TEE 534512-RXG99, F&BI 105017

Dear Mr. Moseley:

Included are the results from the testing of material submitted on May 3, 2011 from the Snohomish TEE 534512-RXG99, F&BI 105017 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Eric Koltes, Tim Jenkins, Alan Hopkins, Mike Portnoy PRT0503R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on May 3, 2011 by Friedman & Bruya, Inc. from the Portnoy Environmental Snohomish TEE 534512-RXG99 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | <u>Portnoy Environmental</u> |
|---------------|------------------------------|
| 105017-01 | SH3-AX36 |
| 105017-02 | SH4-W64 |
| 105017-03 | SH9-Q39 |

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

| Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units: | SH3-AX36 05/03/11 05/03/11 05/03/11 Soil mg/kg (ppm) | Client: Project: Lab ID: Data File: Instrument: Operator: | Portnoy Environmental Snohomish TEE 534512-RXG99 104017-01 104017-01.016 ICPMS1 AP |
|--|---|--|---|
| Internal Standard: Indium | % Recovery: 93 | Lower Limit: 60 | Upper Limit: 125 |
| Analyte: | Concentration mg/kg (ppm) | | |
| Arsenic | 40.6 | | |

2

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

| Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units: | SH4-W64 05/03/11 05/03/11 05/03/11 Soil mg/kg (ppm) | Client: Project: Lab ID: Data File: Instrument: Operator: | Portnoy Environmental Snohomish TEE 534512-RXG99 104017-02 104017-02.017 ICPMS1 AP |
|--|--|--|---|
| Internal Standard: Indium | % Recovery: 95 | Lower Limit: 60 | Upper Limit: 125 |
| Analyte: | Concentration mg/kg (ppm) | | |
| Arsenic | 48.1 | | |

3

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

| Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units: | SH9-Q39 05/03/11 05/03/11 05/03/11 Soil mg/kg (ppm) | Client: Project: Lab ID: Data File: Instrument: Operator: | Portnoy Environmental Snohomish TEE 534512-RXG99 104017-03 104017-03.018 ICPMS1 AP |
|--|--|--|---|
| Internal Standard: Indium | % Recovery: 88 | Lower Limit: 60 | Upper Limit: 125 |
| Analyte: | Concentration mg/kg (ppm) | | |
| Arsenic | 2.17 | | |

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

| Analysis For 100 | tal Mictalo Dy Hi | | |
|--|---|--|---|
| Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units: | Method Blank Not Applicable 05/02/11 05/03/11 Soil mg/kg (ppm) | Client: Project: Lab ID: Data File: Instrument: Operator: | Portnoy Environmental Snohomish TEE 534512-RXG99 I1-307 mb I1-307 mb.015 ICPMS1 AP |
| Internal Standard: Indium | % Recovery: 91 | Lower Limit: 60 | Upper Limit: 125 |
| Analyte: | Concentration mg/kg (ppm) | | |
| Arsenic | <1 | | |

ENVIRONMENTAL CHEMISTS

Date of Report: 05/03/11 Date Received: 05/03/11 Project: Snohomish TEE 534512-RXG99, F&BI 105017

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

| Laboratory Code | : 104291-22 | (Matrix Spi | ike) | Percent | Percent | | |
|-----------------|--------------------|----------------|------------------|----------------|-----------------|------------------------|-------------------|
| Analyte | Reporting Units | Spike Level | Sample Result | Recovery MS | Recovery MSD | Acceptance Criteria | RPD (Limit 20) |
| Arsenic | mg/kg (ppm) |) 10 | 6.07 | 89 b | 89 b | 44-151 | 0 b |

Laboratory Code: Laboratory Control Sample

| Laboratory | Out. Habbilatory cont | | Percent | |
|------------|-----------------------|----------------|-----------------|------------------------|
| Analyte | Reporting Units | Spike Level | Recovery LCS | Acceptance Criteria |
| Arsenic | mg/kg (ppm) | 10 | 99 | 80-120 |

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

| 105017 | | | ME | 057031 | (1) | 4 | ALI | |
|--|---|--------------------------------|-----------------|---------------------------------------|---------------------------------------|-------------------------------------|--|----|
| Portnoy Environmental | Alternate billing information: Direct Bill to Mark Nelson | nformation: | Analvsis/ | Analvsis/Container/Preservative | sservative | | ENVIRON OF CONTRACT Page of Dr. Page of Dr | 10 |
| | Report to: | Alan Hopkins | | | | 12065 Lebanon Road | anon Road | |
| | Email to: | NWPL TEAM | EDD | | | Mt Juliet, TN 37122 | N 37122 | |
| Project Project Description: Snohowitch TEE | City/Sate Collected | | | | , à l | Phone (61 | Phone (615) 758-5858 Dhone (810) 767 - 5850 | |
| Phone: Client Project #: FAX: | ESC Key: | PORTENVTX- WAHG | 2 0051 | · . | · · · · · · · · · · · · · · · · · · · | FAX (61 | FAX (615) 758-5859 | |
| Collected by: C . Mose fer Site/Facility ID#: | P.O.4 | 534512-RXG99 | S-M | : | | | | |
| Collected by (signature): Rush? (Lab N | - | Date Results Needed: | ou 6 | 1999 1999 1999 1999 | IZ | GeCode portenvtx | | |
| | Same Day200% Next Day100% Two Day50% | Emai?NoYes of FAX? No Yes of | 124-C | | | Template/Prelogin | | |
| Packed on Ice N Y CompGrab | Matrix [*] Depth | | | | | Shipped Via: Remarka/Contaminant | Sample # (lab only) | |
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| | | | | | | | | |
| *Matrix: SS - SoiVSolig GW - Groundwater WW - WasteWater | - MO | Drinking Water OT - Other | | a | 114 | Te | Temp | |
| Remarks: | | 1 | | | w.n.t. | O | Other | |
| Relinquished fiy: (Signature) | 11 TIME RACE | Received by (Signature) | | Samples relurned via (10+4) | ed via () UP-8 ourier () | | (lab use only) | |
| Relinquished by: (Slower Slower Slowe | 1 Time Hacaly | a land Erred | | Temp: | Bottos Ferra | | | |
| Relinquished by: (Signated) | | Nacalvad Britab bya(Signature) | | Dete: | | | NCE | |
| | | | | | Samp ¹ | Samples received at A | 0. 41 | |

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Charlene Morrow, M.S. Yelena Aravkina, M.S. Bradley T. Benson, B.S. Kurt Johnson, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 TEL: (206) 285-8282 FAX: (206) 283-5044 e-mail: fbi@isomedia.com

May 17, 2011

Eric Koltes, Project Manager Environmental Partners, Inc. 295 NE Gilman Blvd., Suite 201 Issaquah, WA 98027

RE: Snohomish C/S Job 47308.36, F&BI 105180

Dear Mr. Koltes:

Included are the results from the testing of material submitted on May 13, 2011 from the Snohomish C/S Job 47308.36, F&BI 105180 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Colorf

Michael Erdahl Project Manager

Enclosures EPI0517R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on May 13, 2011 by Friedman & Bruya, Inc. from the Environmental Partners Snohomish C/S Job 47308.36, F&BI 105180 project. Samples were logged in under the laboratory ID's listed below.

| <u>Laboratory ID</u> | Environmental Partners |
|----------------------|-------------------------------|
| 105180-01 | SHSB2-3:18 |

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/17/11 Date Received: 05/13/11 Project: Snohomish C/S Job 47308.36, F&BI 105180 Date Extracted: 05/17/11 Date Analyzed: 05/17/11

RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

Total Mercury

Sample ID Laboratory ID

2.5

SHSB2-3:18 105180-01 1/2

Method Blank

< 0.1

ENVIRONMENTAL CHEMISTS

Date of Report: 05/17/11 Date Received: 05/13/11 Project: Snohomish C/S Job 47308.36, F&BI 105180

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 105187-03 (Matrix Spike)

| Laboratory Code: | 100107-00 (11140) | IIX OPIRC | / | Percent | Percent | | |
|------------------|--------------------|----------------|------------------|----------------|-----------------|------------------------|-------------------|
| Analyte | Reporting Units | Spike Level | Sample Result | Recovery MS | Recovery MSD | Acceptance Criteria | RPD (Limit 20) |
| Mercury | mg/kg (ppm) | 0.125 | <0.1 | 101 | 100 | 45-162 | 1 |

Laboratory Code: Laboratory Control Sample

| | | | Percent | | |
|---------|--------------------|----------------|-----------------|------------------------|--|
| Analyte | Reporting Units | Spike Level | Recovery LCS | Acceptance Criteria | |
| Mercury | mg/kg (ppm) | 0.125 | 107 | 63-144 | |

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

| 081501 | | | SAMH | SAMPLE CHAIN UT | HAI | <u>C</u> | Ś | 8 | NUCLI | 3 | MG | 5 | | 111- | - | | |
|-------------------------------------|------------------------------|-----------------|-----------------|----------------------|--------------|------------|------------|---------------|------------------|--------------|------------------|-----------------------|---------|---|-----------|-----------------|------|
| | LALTE S | <i>,</i> , | SA | SAMPLERS (signature) | signature) | M | X | (| | | | | PAGE # | | JRNAR | TURNAROUND TIME | |
| |) (- (| - | 밁 | PROJECT ID/ADDRESS | ADDRE | SS | | | | OL | JOB # | | | Standard | | | |
| Sompany Environmental Farmers, mic | Farme | rs, IIIc. | | HSIMOHONSH | ISH | 5/0 | ~ | | 47 | 47308. | 36 | | Rush o | Rush charges authorized by: | authoriz | ed by: | |
| uddress 295 NE Gilman Blvd. | Blvd. | | S | SITE NAME | | | | - | | REMARKS | KS | | | 6 | AMPLE | SAMPLEDISPOSAL | |
| Sity, State, ZIP Issaquah, WA 98027 |)8027 | ie (| | TEE | | | | | | | | | | Dispose after 30 days Return samples | nples | ays | |
| 395-0010 | Fax # _(4 | (425) 395-0011 | | | | | | | | | | | 1 | Will call with instructions | th instru | ctions | |
| | | | 2 | | | | | Þ | ANALYSES | SES R | EQUE | REQUESTED | | | ŀ | | |
| Sample ID | | Date Sampled | Time Sampled | Matrix | # of jars | 8015 - GRO | 8015 - DRO | BTEX by 8021B | BTEX by 602 | VOC by 8260C | VOC by 524 | MERCURY | | | | Notes | |
| SH582-3:18 | 10 | 5/13/11 | 1300 | 2105 | | | | | | | | × | | | | | |
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| 9 | | | | | | | | | | \top | | • | | | | | |
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| Friedman & Bruya, Inc. | | S | SIGNATURE | | | | PRINT | NAME | m | | $\left \right $ | | COMPANY | NY | | AI | TIME |
| 3012 16th Avenue West | Relinguished | uishedby: | Hot . | | AS | Ashley | Hor | A | | | | F | | | | 513/11 | 4:38 |
| Seattle, WA 98119-2029 | Received the Relinquished | Received by: | lent | | N | Michael | Ede | Z | | | | K.K. | 4 | | | 11/2/1 | -4:3 |
| Fax (206) 283-5044 | Receiv | Received by: | | | | | | | | Sai | nples | Samples received at H | ved a | ut. H | 00 | | |
| ÷ | | | | | | | | | | × | | | | | | | |



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

Tax I.D. 62-0814289

Est. 1970

Alan Hopkins and NWPL Team Portnoy Environmental 1414 W. Sam Houston Pkwy. N., Suite 170 Houston, TX 77043

Report Summary

Friday May 27, 2011

Report Number: L517283 Samples Received: 05/20/11 Client Project:

Description:

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

Tom Mellette , ESC Representative

Laboratory Certification Numbers

Entire Report Reviewed By:

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT - PH-0197, FL - E87487 GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704, ND - R-140 NJ - TN002,NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 00109, WV - 233 AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032008A, TX - T104704245, OK-9915

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences. Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

This report may not be reproduced, except in full, without written approval from ESC Lab Sciences. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

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| TOUR LAB OF CHOICE | | | | | Mt. Juli (615) 75 1-800-76 Fax (615 | 57-5859 5) 758-5859 62-081428 | |
|--|----------|----------|----------|-----|--|-------------------------------------|----------|
| Alan Hopkins and NWPL Team Portnoy Environmental 1414 W. Sam Houston Pkwy. N., Suit Houston, TX 77043 | | ORT OF . | ANALYSIS | May | 27,2011 | | |
| Date Received : May 20, Description : | 2011 | | | | Sample # : ID : | L517283 | 3-01 |
| Sample ID : YFSS-1110 | | | | | ect # : | | |
| Collected By : Collection Dat e : 05/19/11 00:00 | | | | | | Method | Date |
| Parameter | W.Result | RDL | D.Result | RDL | Units | | |
| Total Solids | 96. | | 96. | | 6 | 2540G | 05/27/11 |
| Arsenic | 12. | 1.0 | 12. | 1.0 | mg/kg | 6010B | 05/25/11 |

BDL - Below Detection Limit RDL - Detection Limit- Estimated Quantitation Limit(EQL) Note: The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC. Reported: 05/27/11 13:39 Printed: 05/27/11 13:39

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| VOUR LAB OF CHOICE | | | | | Mt. Jul: (615) 75 1-800-70 Fax (615 | 67-5859 5) 758-5859 . 62-081428 | |
|--|----------|-----------|----------|-------|--|---------------------------------------|----------|
| Alan Hopkins and NWPL Team Portnoy Environmental 1414 W. Sam Houston Pkwy. N., Suit Houston, TX 77043 | | PORT OF ; | ANALYSIS | May 2 | 27,2011 | | |
| Date Received : May 20, Description : | 2011 | | | ESC S | Sample # : ID : | L51728 | 3–02 |
| Sample ID : YFSS-D1 Collected By : Collection Date : 05/19/11 00:00 | | | | Proje | ect # : | | |
| Collection Dat e : 05/19/11 00:00 Parameter | W.Result | RDL | D.Result | RDL | Units | Method | Date |
| Total Solids | 97. | | 97. | | 뭥 | 2540G | 05/27/11 |
| Arsenic | 14. | 1.0 | 14. | 1.0 | mg/kg | 6010B | 05/25/11 |

BDL - Below Detection Limit RDL - Detection Limit- Estimated Quantitation Limit(EQL) Note: The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC. Reported: 05/27/11 13:39 Printed: 05/27/11 13:39

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| TOUR LAB OF CHOICE | | | | | Mt. Jul: (615) 7 1-800-70 Fax (61 | 67-5859 5) 758-5859 . 62-081428 | |
|--|----------|-----------|----------|-----|--|---------------------------------------|----------|
| Alan Hopkins and NWPL Team Portnoy Environmental 1414 W. Sam Houston Pkwy. N., Suit Houston, TX 77043 | | PORT OF . | ANALYSIS | May | 27,2011 | | |
| | 2011 | | | | Sample # : | L517283 | 3-03 |
| Sample ID : YFSS-D2 | | | | | ID : ect # : | | |
| Collected By : Collection Date : 05/19/11 00:00 | | | | | | | |
| Parameter | W.Result | RDL | D.Result | RDL | Units | Method | Date |
| Total Solids | 96. | | 96. | | 24 | 2540G | 05/27/11 |
| Arsenic | 8.4 | 1.0 | 8.7 | 1.0 | mg/kg | 6010B | 05/25/11 |

BDL - Below Detection Limit RDL - Detection Limit- Estimated Quantitation Limit(EQL) Note: The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC. Reported: 05/27/11 13:39 Printed: 05/27/11 13:39

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| THE SICILIE INCOME | | | | | Mt. Jul: (615) 79 1-800-70 Fax (619 | 67-5859 5) 758-5859 . 62-081428 | |
|---|----------|---------|----------|------|--|---------------------------------------|----------|
| Alan Hopkins and NWPL Team Portnoy Environmental 1414 W. Sam Houston Pkwy. N., Sui Houston, TX 77043 | | PORT OF | ANALYSIS | May | 27,2011 | | |
| Date Received : May 20, | 2011 | | | ESC | Sample # : | L51728 | 3-04 |
| Description : | | | | Site | ID : | | |
| Sample ID : WS11-AM24 | | | | Proj | ect # : | | |
| Collected By : Collection Dat e : 05/19/11 00:0 | 0 | | | | | | |
| Parameter | W.Result | RDL | D.Result | RDL | Units | Method | Date |
| Total Solids | 76. | | 76. | | ş | 2540G | 05/27/11 |
| Arsenic | 12. | 1.0 | 16. | 1.3 | mg/kg | 6010B | 05/24/11 |

BDL - Below Detection Limit RDL - Detection Limit- Estimated Quantitation Limit(EQL) Note: The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC. Reported: 05/27/11 13:39 Printed: 05/27/11 13:39

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| TOUR LAB OF CHOICE | | | | | Mt. Juli (615) 75 1-800-76 Fax (615 | 57-5859 5) 758-5859 62-081428 | |
|---|----------|----------|----------|-------|--|-------------------------------------|----------|
| Alan Hopkins and NWPL Team Portnoy Environmental 1414 W. Sam Houston Pkwy. N., Sui Houston, TX 77043 | | ORT OF A | ANALYSIS | Мау 2 | 27,2011 | | |
| Date Received : May 20, | 2011 | | | | Sample # : | L517283 | 3-05 |
| Description : Sample ID : WSSB11-2 | | | | | ID : ect # : | | |
| Collected By : Collection Dat e : 05/19/11 00:0 | 0 | | | | | Mathed | Dato |
| Parameter | W.Result | RDL | D.Result | RDL | Units | Method | Date |
| Total Solids | 87. | | 87. | | 8 | 2540G | 05/27/11 |
| Arsenic | 4.8 | 1.0 | 5.5 | 1.1 | mg/kg | 6010B | 05/24/11 |

BDL - Below Detection Limit RDL - Detection Limit- Estimated Quantitation Limit(EQL) Note: The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC. Reported: 05/27/11 13:39 Printed: 05/27/11 13:39

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| TOUR LAB OF CHOICE | | | | | Mt. Jul. (615) 7 1-800-7 Fax (61 | 67-5859 5) 758-5859 . 62-081428 | |
|---|----------|-----------|----------|-------|---|---------------------------------------|----------|
| Alan Hopkins and NWPL Team Portnoy Environmental 1414 W. Sam Houston Pkwy. N., Suite Houston, TX 77043 | | PORT OF A | ANALYSIS | May 2 | 27,2011 | | |
| Date Received : May 20, 2 | 2011 | | | | Sample # : | L51728 | 3-06 |
| Description : | | | | Site | ID : | | |
| Sample ID : WSSB11-1 | | | | Proje | ect # : | | |
| Collected By : Collection Date : 05/19/11 00:00 | | | | | | | |
| Parameter | W.Result | RDL | D.Result | RDL | Units | Method | Date |
| Total Solids | 89. | | 89. | | 8 | 2540G | 05/27/11 |
| Arsenic | 5.4 | 1.0 | 6.0 | 1.1 | mg/kg | 6010B | 05/24/11 |

BDL - Below Detection Limit RDL - Detection Limit- Estimated Quantitation Limit(EQL) Note: The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC. Reported: 05/27/11 13:39 Printed: 05/27/11 13:39

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| TOUR LAB OF CHOICE | | | | | Mt. Juli (615) 75 1-800-76 Fax (615 | 7-5859) 758-5859 62-0814289 | |
|--|----------|----------|----------|-------|--|------------------------------------|----------|
| Alan Hopkins and NWPL Team Portnoy Environmental 1414 W. Sam Houston Pkwy. N., S | | ORT OF # | NALYSIS | Мау З | 27 ,2 011 | | |
| Houston, TX 77043 | 0, 2011 | | | ESC | Sample # : | L517283 | 3-07 |
| Date Received : May 2 Description : | 0, 2011 | | | Site | ID : | | |
| Sample ID : ELSS-0810 | | | | Proj | ect # : | | |
| Collected By : Collection Date : 05/19/11 00 | :00 | | | | w.i.e. | Method | Date |
| Parameter | W.Result | RDL | D.Result | RDL | Units | | |
| Total Solids | 92. | | 92. | | 8 | 2540G | 05/27/11 |
| Mercury | 2.6 | 1.0 | 2.8 | 1.1 | mg/kg | 7471 | 05/25/11 |

BDL - Below Detection Limit RDL - Detection Limit- Estimated Quantitation Limit(EQL) Note: The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC. Reported: 05/27/11 13:39 Printed: 05/27/11 13:39

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| ALATE SICILIEINICIEIS | | | | | Mt. Jul: (615) 75 1-800-76 Fax (615 | 57-5859 5) 758-5859 . 62-081428 | |
|---|----------|----------|----------|-------|--|---------------------------------------|----------|
| Alan Hopkins and NWPL Team Portnoy Environmental 1414 W. Sam Houston Pkwy. N., Sui Houston, TX 77043 | | ORT OF A | NALYSIS | - | 7,2011 | | |
| Date Recerved +1 | 2011 | | | | ample # : | L51728 | 3-08 |
| Description : | | | | Site | ID : | | |
| Sample ID : ELSS-1009 | | | | Proje | ct # : | | |
| Collected By : Collection Date : 05/19/11 00:0 | 0 | | | | | | Data |
| Parameter | W.Result | RDL | D.Result | RDL | Units | Method | Date |
| Total Solids | 95. | | 95. | | 90 | 2540G | 05/27/11 |
| Mercury | 1.4 | 0.20 | 1.5 | 0.21 | mg/kg | 7471 | 05/25/11 |

BDL - Below Detection Limit RDL - Detection Limit- Estimated Quantitation Limit(EQL) Note: The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC. Reported: 05/27/11 13:39 Printed: 05/27/11 13:39

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| VOUR LAB OF CHOICE | | | | | Mt. Jul. (615) 7 1-800-7 Fax (61 | 67-5859 5) 758-5859 . 62-081428 | |
|---|---------------|----------|----------|------|---|---------------------------------------|----------|
| Alan Hopkins and NWPL Team Portnoy Environmental 1414 W. Sam Houston Pkwy. N., Sui Houston, TX 77043 | | ORT OF A | ANALYSIS | Мау | 27,2011 | | |
| | 2011 | | | | Sample # : ID : | L51728 | 3-09 |
| Sample ID : ELSS-1109 Collected By : | _ | | | Proj | ect # : | | |
| Collection Date : 05/19/11 00:0 Parameter | 0 W.Result | RDL_ | D.Result | RDL | Units_ | Method | Date |
| Total Solids | 96. | | 96. | | 8 | 2540G | 05/27/11 |
| Mercury | 13. | 2.0 | 14. | 2.1 | mg/kg | 7471 | 05/25/11 |

BDL - Below Detection Limit RDL - Detection Limit- Estimated Quantitation Limit(EQL) Note: The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC. Reported: 05/27/11 13:39 Printed: 05/27/11 13:39

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| ELA'B SICILIEINICIEIS | | | | | Mt. Juli (615) 75 1-800-76 Fax (615 | 57-5859 5) 758-5859 62-081428 | |
|--|----------|----------|----------|-------|--|-------------------------------------|----------|
| YOUR LAB OF CHOICE | | | | | | | |
| Alan Hopkins and NWPL Team Portnoy Environmental 1414 W. Sam Houston Pkwy. N., Sui | | ORT OF A | NALYSIS | May 2 | 27,2011 | | |
| Houston, TX 77043 | | | | ESC S | ample # : | L51728 | 3-10 |
| Date Received : May 20, | 2011 | | | | <u></u> _ | | |
| Description : | | | | Site | ID : | | |
| Sample ID : WS6-AT35 | | | | Proje | ect # : | | |
| Collected By : Collection Date : 05/19/11 00:0 | 0 | | | | | 31 | |
| Parameter | W.Result | RDL | D.Result | RDL | Units | Method | Date |
| Total Solids | 90. | | 90. | | 8 | 2540G | 05/27/11 |
| Mercury | 1.8 | 0.40 | 2.0 | 0.44 | mg/kg | 7471 | 05/25/11 |

BDL - Below Detection Limit RDL - Detection Limit- Estimated Quantitation Limit(EQL) Note: The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC. Reported: 05/27/11 13:39 Printed: 05/27/11 13:39

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| VOUR LAB OF CHOICE | | | | | Mt. Juli (615) 75 1-800-76 Fax (615 | 7-5859) 758-5859 62-0814289 | |
|--|------------|----------|------------|------|--|------------------------------------|------------------|
| Alan Hopkins and NWPL Team Portnoy Environmental 1414 W. Sam Houston Pkwy. N., Suit Houston, TX 77043 | | ORT OF A | NALYSIS | - | 27,2011 | L517283 | 2_11 |
| Date Received : May 20, Description : Sample ID : WSSB6-0910 | 2011 | | | Site | Sample # : ID : ect # : | F21/593 | |
| Collected By : Collection Date : 05/19/11 00:00 Parameter | W.Result | RDL | D.Result | RDL | Units_ | Method | Date 05/27/11 |
| Total Solids Mercury | 93. 2.4 | 1.0 | 93. 2.6 | 1.1 | % mg∕kg | 2540G 7471 | 05/25/11 |

BDL - Below Detection Limit RDL - Detection Limit- Estimated Quantitation Limit(EQL) Note: The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC. Reported: 05/27/11 13:39 Printed: 05/27/11 13:39

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| TOUR LAB OF CHOICE | | | | | Mt. Juli (615) 75 1-800-76 Fax (615 | 7-5859) 758-5859 62-081428 | |
|--|----------|-----------|----------|-------|--|-----------------------------------|----------|
| Alan Hopkins and NWPL Team Portnoy Environmental 1414 W. Sam Houston Pkwy. N., Suite | | PORT OF A | ANALYSIS | May 2 | 27,2011 | | |
| Houston, TX 77043 Date Received : May 20, 3 | 2011 | | | ESC § | Sample # : | L517283 | 3-12 |
| Description : | | | | Site | ID : | | |
| Sample ID : WSSB6-0911 | | | | Proje | ect # : | | |
| Collected By : Collection Date : 05/19/11 00:00 | | | | | | M. Chard | Data |
| Parameter | W.Result | RDL | D.Result | RDL | Units | Method | Date |
| Total Solids | 93. | | 93. | | <u>ę</u> , | 2540G | 05/27/11 |
| Mercury | 2.4 | 1.0 | 2.5 | 1.1 | mg/kg | 7471 | 05/25/11 |

BDL - Below Detection Limit RDL - Detection Limit- Estimated Quantitation Limit(EQL) Note: The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC. Reported: 05/27/11 13:39 Printed: 05/27/11 13:39

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Summary of Remarks For Samples Printed 05/27/11 at 13:39:32

TSR Signing Reports: 690 R5 - Desired TAT See Tom M prior to all non Template logins for special notes if any. Tom M cell 406-3470 Sample: L517283-01 Account: PORTENVTX Received: 05/20/11 08:45 Due Date: 05/27/11 00:00 RPT Date: 05/27/11 13:39 Sample: L517283-02 Account: PORTENVTX Received: 05/20/11 08:45 Due Date: 05/27/11 00:00 RPT Date: 05/27/11 13:39 Sample: L517283-03 Account: PORTENVTX Received: 05/20/11 08:45 Due Date: 05/27/11 00:00 RPT Date: 05/27/11 13:39 Sample: L517283-04 Account: PORTENVTX Received: 05/20/11 08:45 Due Date: 05/27/11 00:00 RPT Date: 05/27/11 13:39 Refer to 05-0068 Sample: L517283-05 Account: PORTENVIX Received: 05/20/11 08:45 Due Date: 05/27/11 00:00 RPT Date: 05/27/11 13:39 Sample: L517283-06 Account: PORTENVTX Received: 05/20/11 08:45 Due Date: 05/27/11 00:00 RPT Date: 05/27/11 13:39 Sample: L517283-07 Account: PORTENVTX Received: 05/20/11 08:45 Due Date: 05/27/11 00:00 RPT Date: 05/27/11 13:39 Sample: L517283-08 Account: PORTENVTX Received: 05/20/11 08:45 Due Date: 05/27/11 00:00 RPT Date: 05/27/11 13:39 Sample: L517283-09 Account: PORTENVTX Received: 05/20/11 08:45 Due Date: 05/27/11 00:00 RPT Date: 05/27/11 13:39 Sample: L517283-10 Account: PORTENVTX Received: 05/20/11 08:45 Due Date: 05/27/11 00:00 RPT Date: 05/27/11 13:39 Refer to 05-0068 Sample: L517283-11 Account: PORTENVTX Received: 05/20/11 08:45 Due Date: 05/27/11 00:00 RPT Date: 05/27/11 13:39 Sample: L517283-12 Account: PORTENVTX Received: 05/20/11 08:45 Due Date: 05/27/11 00:00 RPT Date: 05/27/11 13:39 Refer to 05-0068

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Charlene Morrow, M.S. Yelena Aravkina, M.S. Bradley T. Benson, B.S. Kurt Johnson, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 TEL: (206) 285-8282 FAX: (206) 283-5044 e-mail: fbi@isomedia.com

June 28, 2011

Eric Koltes, Project Manager Environmental Partners, Inc. 295 NE Gilman Blvd., Suite 201 Issaquah, WA 98027

RE: Job 77380.36, F&BI 106382

Dear Mr. Koltes:

Included are the results from the testing of material submitted on June 28, 2011 from the Job 47380.36, F&BI 106382 project. There are 5 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Cali

Michael Erdahl Project Manager

Enclosures EPI0628R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on June 28, 2011 by Friedman & Bruya, Inc. from the Environmental Partners Job 47380.36, F&BI 106382 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | Environmental Partners |
|---------------|-------------------------------|
| 106382-01 | SMSS-BG |

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

| Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units: | SMSS-BG 06/28/11 06/28/11 06/28/11 Soil mg/kg (ppm) | Client: Project: Lab ID: Data File: Instrument: Operator: | Environmental Partners Job 47380.36, F&BI 106382 106382-01 106382-01.013 ICPMS1 AP |
|--|--|--|---|
| Internal Standard: Indium | % Recovery: 86 | Lower Limit: 60 | Upper Limit: 125 |
| Analyte: | Concentration mg/kg (ppm) | | |

Analyte:

Arsenic

18.1

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

| Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units: | Method Blank Not Applicable 06/27/11 06/28/11 Soil mg/kg (ppm) | Client: Project: Lab ID: Data File: Instrument: Operator: | Environmental Partners Job 47380.36, F&BI 106382 I1-438 mb I1-438 mb.008 ICPMS1 AP | | | | | | |
|--|---|--|---|--|--|--|--|--|--|
| Internal Standard: Indium | % Recovery: 88 | Lower Limit: 60 | Upper Limit: 125 | | | | | | |
| Analyte: | Concentration mg/kg (ppm) | | | | | | | | |

Arsenic

<1

ENVIRONMENTAL CHEMISTS

Date of Report: 06/28/11 Date Received: 06/28/11 Project: Job 47380.36, F&BI 106382

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 106364-01 (Matrix Spike)

| Laboratory Co | Jue. 100304-01 (M | auna opn | | Percent | Percent | | | |
|---------------|-------------------|----------|--------|----------|----------|------------|------------|--|
| | Reporting | Spike | Sample | Recovery | Recovery | Acceptance | RPD | |
| Analyte | Units | Level | Result | MS | MSD | Criteria | (Limit 20) | |
| Arsenic | mg/kg (ppm) | 10 | 6.60 | 100 b | 95 b | 44-151 | 5 b | |

Laboratory Code: Laboratory Control Sample

| | | | Percent | | |
|---------|-----------------|----------------|-----------------|------------------------|--|
| A 7 1 | Reporting Units | Spike Level | Recovery LCS | Acceptance Criteria | |
| Analyte | Reporting Onits | Lever | | 00 100 | |
| Arsenic | mg/kg (ppm) | 10 | 100 | 80-120 | |

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

| 14 | - | e (5/28 | | | | | S | | | | | | | | | | | TIME | | WFOS:E | | |
|-------------------------|----------------------|--------------------------------------|-----------------------------|-------------------------------------|--|--------------------|----------------------------|---------|---|---|------|---|---|--|---|---------------------|---|------------------------|-----------------------|------------------------|--------------------|--------------------|
| -1 | OF | TURNAROUND TIME | | SAMPLE DISPOSAL | days ructions | | Notes | | | | | | | | | 34.00 | | DATE | | 6/28/11 | | |
| 06/28/1 | 1 # HORE # | □ Standard KRUSH i37 € | th charges aut | | Dispose after 30 days Return samples Will call with instructions | | | | | | | | | | | Samples received at | | COMPANY | | Rine | | |
| ME | | JOB # | SC | K S | | ANALYSES REQUESTED | 100 PN 254 | . X | | | | | | | | Sampl | | | | FLR | | |
| DY | 5 | P P | 77308.36 | REMARKS | | YSES R | VOC by 8260C | | | | | | | | | | | | | | | |
| STO | | | | | | ANA | BTEX by 602 BTEX by 602 | | | _ | | | _ | | | | - | AME | | 41 | | |
| L C C | N | | | | | | 090 - 2F08 | | | | | | | | | | | PRINT NAME | | Erdah | | |
| | M | SS | | | | | 8015 - GRO | | | | | | | | | | | a | | -17 | | |
| HAII | ignature) | ADDRE | | | | | # of jars | - | i | | | | | | | | | | | Michael | | |
| LE CI | SAMPLERS (signature) | PROJECT ID/ADDRESS | | SITE NAME | Ee | | Matrix | 2016 | | | | | | | | | | | | | | |
| SAMPLE CHAIN OF CUSTODY | SAI | PR | | SIT | | | Time Sampled | | | | | | | | | | | SIGNATURE | | hr | | |
| | .0 | ers, Inc. | - | | (425) 395-0011 | | Date Sampled | 11/22/2 | | | | | | | | | | | shed by: | Jun | shed by: | d by: |
| | Lours | ll Partne | n Blvd. | 98027 | Fax # _(| | D LAB | ত | | | | ` | | | | | | | Relinquished by: | Recorder | Relinquished by: | Received by: |
| 106382 | | Company Environmental Partners, Inc. | Address 295 NE Gilman Blvd. | City. State. ZIP Issaguah, WA 98027 | Phone # (425) 395-0010 F | | Sample ID | 5M55-BG | | | | | | | • | | | Friedman & Bruya, Inc. | 3012 16th Avenue West | Seattle, WA 98119-2029 | Ph. (206) 285-8282 | Fax (206) 283-5044 |

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Charlene Morrow, M.S. Yelena Aravkina, M.S. Bradley T. Benson, B.S. Kurt Johnson, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 TEL: (206) 285-8282 FAX: (206) 283-5044 e-mail: fbi@isomedia.com

May 31, 2011

Eric Koltes, Project Manager Environmental Partners, Inc. 295 NE Gilman Blvd., Suite 201 Issaquah, WA 98027

RE: Tee 47308.36, F&BI 105338

Dear Mr. Koltes:

Included are the results from the testing of material submitted on May 26, 2011 from the Tee 47308.36, F&BI 105338 project. There are 12 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures EPI0531R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on May 26, 2011 by Friedman & Bruya, Inc. from the Environmental Partners Tee Tee 47308.36, F&BI 105338 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | <u>Environmental Partners</u> |
|---------------|-------------------------------|
| 105338-01 | SMSS-RA2 |
| 105338-02 | SMSS-D2 |
| 105338-03 | SMSS-RA1 |
| 105338-04 | WSSB11-1 |
| 105338-05 | WSSB11-2 |
| 105338-06 | WS11-AM24 |
| 105338-07 | Starroad-1507 |
| 105338-08 | Starroad-1705 |
| 105338-09 | Starroad-1807 |

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 200.8

| Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units: | SMSS-RA2 05/26/11 05/27/11 05/27/11 Soil mg/kg (ppm) | Client: Project: Lab ID: Data File: Instrument: Operator: | Environmental Partners Tee 47308.36, F&BI 105338 105338-01 105338-01.018 ICPMS1 AP |
|--|---|--|---|
| Internal Standard: Indium | % Recovery: 95 | Lower Limit: 60 | Upper Limit: 125 |
| Analyte: | Concentration mg/kg (ppm) | | |

13.8

Analyte:

Arsenic

 $\mathbf{2}$

Analysis For Total Metals By EPA Method 200.8

| Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units: | SMSS-D2 05/26/11 05/27/11 05/27/11 Soil mg/kg (ppm) | Client: Project: Lab ID: Data File: Instrument: Operator: | Environmental Partners Tee 47308.36, F&BI 105338 105338-02 105338-02.021 ICPMS1 AP |
|--|--|--|---|
| Internal Standard: Indium | % Recovery: 92 | Lower Limit: 60 | Upper Limit: 125 |
| Analyte: | Concentration mg/kg (ppm) | | |

Analyte:

Arsenic

11.4

Analysis For Total Metals By EPA Method 200.8

| Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units: | SMSS-RA1 05/26/11 05/27/11 05/27/11 Soil mg/kg (ppm) | Client: Project: Lab ID: Data File: Instrument: Operator: | Environmental Partners Tee 47308.36, F&BI 105338 105338-03 105338-03.022 ICPMS1 AP |
|--|---|--|---|
| Internal Standard: Indium | % Recovery: 92 | Lower Limit: 60 | Upper Limit: 125 |
| Analyte: | Concentration mg/kg (ppm) | | |

16.4

Analyte:

Arsenic

Analysis For Total Metals By EPA Method 200.8

| Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units: | WSSB11-1 05/26/11 05/27/11 05/27/11 Soil mg/kg (ppm) | Client: Project: Lab ID: Data File: Instrument: Operator: | Environmental Partners Tee 47308.36, F&BI 105338 105338-04 105338-04.023 ICPMS1 AP |
|--|---|--|---|
| Internal Standard: Indium | % Recovery: 91 | Lower Limit: 60 | Upper Limit: 125 |
| Analyte: | Concentration mg/kg (ppm) | | |

Analyte:

Arsenic

1.96

Analysis For Total Metals By EPA Method 200.8

| Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units: | WSSB11-2 05/26/11 05/27/11 05/27/11 Soil mg/kg (ppm) | Client: Project: Lab ID: Data File: Instrument: Operator: | Environmental Partners Tee 47308.36, F&BI 105338 105338-05 105338-05.024 ICPMS1 AP |
|--|---|--|---|
| Internal Standard: Indium | % Recovery: 91 | Lower Limit: 60 | Upper Limit: 125 |
| Analyte: | Concentration mg/kg (ppm) | | |

2.84

Arsenic

6

Analysis For Total Metals By EPA Method 200.8

| Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units: | WS11-AM24 05/26/11 05/27/11 05/27/11 Soil mg/kg (ppm) | Client: Project: Lab ID: Data File: Instrument: Operator: | Environmental Partners Tee 47308.36, F&BI 105338 105338-06 105338-06.025 ICPMS1 AP |
|--|--|--|---|
| Internal Standard: Indium | % Recovery: 89 | Lower Limit: 60 | Upper Limit: 125 |
| Analyte: | Concentration mg/kg (ppm) | l | |

4.56

Arsenic

Analysis For Total Metals By EPA Method 200.8

| Client ID: | Method Blank | Client: | Environmental Partners |
|------------------------------|------------------------------------|-----------------------|---------------------------|
| Date Received: | Not Applicable | Project: | Tee 47308.36, F&BI 105338 |
| Date Extracted: | 05/27/11 | Lab ID: | I1-371 mb |
| Date Analyzed: | 05/27/11 | Data File: | I1-371 mb.015 |
| Matrix: | Soil | Instrument: | ICPMS1 |
| Units: | mg/kg (ppm) | Operator: | AP |
| Internal Standard: Indium | % Recovery: 89 Concentration | Lower Limit: 60 | Upper Limit: 125 |

Analyte:

Arsenic

<1

mg/kg (ppm)

ENVIRONMENTAL CHEMISTS

Date of Report: 05/31/11 Date Received: 05/26/11 Project: Tee 47308.36, F&BI 105338 Date Extracted: 05/27/11 Date Analyzed: 05/27/11

RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

| <u>Sample ID</u> Laboratory ID | <u>Total Mercury</u> |
|-----------------------------------|----------------------|
| Starroad-1507 105338-07 1/10 | 13 |
| Starroad-1705 105338-08 1/10 | 6.1 |
| Starroad-1807 105338-09 1/10 | 3.3 |
| Method Blank | <0.1 |

ENVIRONMENTAL CHEMISTS

Date of Report: 05/31/11 Date Received: 05/26/11 Project: Tee 47308.36, F&BI 105338

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 105338-01 (Matrix Spike)

| Analyte | Reporting Units | Spike Level | Sample Result | Percent Recovery MS | Percent Recovery MSD | Acceptance Criteria | RPD (Limit 20) | |
|---------|--------------------|----------------|------------------|---------------------------|----------------------------|------------------------|-------------------|---|
| Arsenic | mg/kg (ppm) | 10 | 13.8 | 110 b | 103 b | 44-151 | 7 b | - |

n

Laboratory Code: Laboratory Control Sample

| | | | Percent | |
|---------|-----------------|----------------|-----------------|------------------------|
| Analyte | Reporting Units | Spike Level | Recovery LCS | Acceptance Criteria |
| Arsenic | mg/kg (ppm) | 10 | 108 | 80-120 |

ENVIRONMENTAL CHEMISTS

Date of Report: 05/31/11 Date Received: 05/26/11 Project: Tee 47308.36, F&BI 105338

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR **TOTAL MERCURY USING EPA METHOD 1631E**

Laboratory Code: 105338-01 1/50 (Matrix Spike)

| Laboratory Couc. | 100000 01 100 | (2.20002222 % | F) | Percent | Percent | | |
|------------------|---------------|---------------|--------|----------|----------|------------|------------|
| | Reporting | Spike | Sample | Recovery | Recovery | Acceptance | RPD |
| Analyte | Units | Level | Result | MS | MSD | Criteria | (Limit 20) |
| Mercury | mg/kg (ppm) | 0.125 | 62 | 0 b | 0 b | 45-162 | 0 b |

Laboratory Code: Laboratory Control Sample

| | | | $\mathbf{Percent}$ | |
|---------|-------------|-------|--------------------|------------|
| | Reporting | Spike | Recovery | Acceptance |
| Analyte | Units | Level | LCS | Criteria |
| Mercury | mg/kg (ppm) | 0.125 | 129 | 63-144 |

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

| 90 | Samples de aven 1, 2 | pland | Sam | | | | | | | | | | | |
|-----------------|---|--------------------|------------|---------------|-------------|---------------|------------|------------|----------------|--|--------------------|------------------|------------------|------------------------------------|
| | | | | | | | | | | | | by: | Received by: | 1x (206) 282-5044 |
| 5/26/11 14/5 | Lnc | +B | PI | 5 | 2052 | a72 | L | 172 | 2010 | | and the | hed by: | Relinquished by | 1. (206) 285-8282 |
| 5/26/11 1415 | | EPI | | | N | octes | 1 T | | and the second | | | P. | Received by: | 10000 1000 1000 1000 0000 |
| DATE , TIME | COMPANY | co | ╀ | | | NAME | PRINI NAME | | | | | | Relinquished by: | 112 16th Avenue West |
| | | | | | | | | | | | SIGNATURA | SIG | | riedman & Bruya, Inc. |
| | | | | | | F | · | | F | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | × | | | | | | | | F | v | | * | 09 | MALLOAD - 1807 |
| | × | | | | | | | | - | 2 | | | 8 | 1 |
| | × | | | | | | | | - | N | | $\left \right $ | 10 | + |
| | | × | | | | | | | - | v | | F | 90 | 22WH-1152 |
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| | | × | | | | | | | - | ~ | | | 50 | SMSS-RAI |
| | | × | | | | | | | - | S | | ľ | 02 | |
| | | × | | | | | | | ~ | V | | 5/26/11 | 0/ | 11 |
| Notes | MERCURY | ALSENIC MERCURY | VOC by 524 | VOC by 8260C | BTEX by 602 | BTEX by 8021E | 8015 - DRO | 8015 - GRO | jars | Matrix | Time Sampled | Date Sampled | a Ma | S S |
| | | REQUESTED | REQUI | | ANALYSES | | | | | | | | | |
| s structions | Return samples Will call with instructions | | 513 | 1816 LOJ HSOL | | 7 | | | E | 16 | | (425) 395-0011 | Fax #(| hone # (425) 395-0010 F |
| SAMPLE DISPOSAL | Dispose a | / | RKS | REMARKS | 0 | 6 | | | | SITE NAME | S | | 98027 | ity, State, ZIP Issaquah, WA 98027 |
| horized by: | ush charges a | 3 | Ř. | 47308.3 | r | | | | (Ŋ | TEE | | | n Blvd. | ddress 295 NE Gilman Blvd. |
| ંગે વ્યવ | C Standard | | JOB # | ب | | | | ESS | DIADDR | PROJECT ID/ADDRESS | Pq | ers, Inc. | ll Partn | ompany Environmental Partners, |
| | PAGE # | | | | | | | ĥ | (signatur | SAMPLERS (signature) | SA | S | LOLTES | end Report To Euc K |
| 1 BI | 05/26/11 | | ME | DY | JSTODY | SOC | OFC | Z | HA | , , , , , , , , , , , , , , | SAMPLE CHAIN OF CL | | | 8 5 5 GD1 |

Attachment D



Soil Toxicity Evaluation

Northwest Pipeline GP Meter Station Facilities throughout Washington State

DRAFT Report

Date: September 1, 2011

Submitted to:

Environmental Partners, Inc. 295 NE Gilman Boulevard Suite 201 Issaquah, Washington 98027

.

Washington Laboratory 5009 Pacific Hwy East Suite 2 Tacoma, WA 98424

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SIGNATURE PAGE

Juran

Washington Laboratory Manager

This report has been prepared based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party.

1.0 INTRODUCTION

Laboratory toxicity testing was conducted on soil samples collected from 7 sites near Northwest Pipeline General Partnership (NWPL GP) meter stations facilities, following site-specific terrestrial ecological evaluation (TEE) methodology under the Model Toxics Control Act (MTCA). The specific contaminants of concern for the bioassay component of the TEE were arsenic and inorganic mercury. Toxicity tests were conducted using the earthworm *Eisenia foetida*, of the family lumbricidae and the butter crunch lettuce seed *Lactuca sativa*. Two different tests were conducted with the earthworm, the 14-day survival test and a 28-day bioaccumulation test. Samples tested for bioaccumulation were then sent to TestAmerica, an analytical laboratory, for arsenic determinations. Testing was initiated June, 2011 at the Washington Laboratory of Nautilus Environmental, located in Tacoma, Washington. Test procedures followed methods published by Washington State Department of Ecology for the Toxics Cleanup Program and ASTM.

DRAFT

2.0 METHODS

2.1 Sample Receipt and Manipulation

Seven soil samples were collected by Environmental Partners personnel between May 3^{rd} and 17^{th} , 2011 into HPDE containers. Individual samples were in labeled plastic jars, transported in coolers, and were received by Nautilus on June 3^{rd} , 2011. All samples were transported in coolers. Individual samples were in labeled plastic jars. Upon receipt in the laboratory, the coolers were opened and the contents inspected and compared with documentation provided on the chain-of-custody forms (COC), where discrepancies occurred, samples identities were confirmed with Environmental Partners. Sample temperatures were measured upon receipt and recorded on both the COC and in a bound logbook maintained in the laboratory. Samples were held in the dark at $4 \pm 2^{\circ}$ C until testing.

Large pieces of wood, debris and rocks were removed from soils prior to testing. No sieving was performed on the samples. Analysis of soil pH, conductivity, and moisture content were performed upon sample receipt.

Sample ID's with corresponding dates of collection, and test initiation dates for all three tests are provided in Table 1.

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| Client ID | Nautilus Log-In Number | Date Collected | Lettuce Test Initiation | 14-day Earthworm Test Initiation | 28-day Earthworm Test Initiation | |
|---------------|------------------------------|-------------------|----------------------------|--|--|--|
| SHSB2-3:18 | S11-061 | May 13, 2011 | June 7, 2011 | June 9, 2011 | NT | |
| WSSB6-0910 | S11-055 | – May 17, 2011 | June 7, 2011 | June 9, 2011 | NT | |
| ELSS-0810 | S11-057 | Widy 17, 2011 | June / / 2011 | , | | |
| STARROAD 1807 | S11-059 | May 16, 2011 | June 7, 2011 | June 9, 2011 | NT | |
| SH4-W64 | S11-062 | May 3, 2011 | June 7, 2011 | NT | June 9, 2011 | |
| WS11-AM24 | S11-051 | – May 17, 2011 | June 7, 2011 | NT | June 9, 2011 | |
| YFSS-D1 | S11-053 | 1viay 17, 2011 | June 7, 2011 | | , | |

Table 1. Sample collection, receipt, expiration, and test initiation dates.

2.2 Lettuce seedling survival and biomass test methods

A lettuce seedling survival and biomass test was conducted on samples received June 3, 2011 using butter crunch lettuce seeds, *Lactuca sativa*. The organisms were obtained from Territorial Seed Company, Oregon. The tests were initiated on June 7, 2011. Tests were performed according to procedures presented by WADOE (1996) and ASTM (1994). Test procedures are summarized in Table 2.

Prior to test initiation, 300 g subsamples were collected from the negative control and each site, for use in the test, as well as for initial pH measurements. Using an Orion 230 meter, pH measurements were taken by making a slurry of de-ionized (DI) water and soil in a 1:1 ratio (i.e., 25 mL DI water: 25 g soil). Soil slurry pH was measured after allowing soil/water mixture to stir for 5 minutes. Once the measurement was taken, the slurry was allowed to settle for 30 minutes, after which the pH of the supernatant liquid was measured. Sample soils were hydrated with DI water to match control friability where necessary, and distributed into three poly flat 36-cell trays with humidity domes. Five replicates per sample, each containing 50 g of soil, were randomly distributed into trays. Sample distribution took place according to a randomization sheet and planting maps created in Excel. Trays were placed in an environmental chamber at 25°C under a 16:8 hour light:dark photoperiod.

Lighting for the test was provided by 2-bulb gro-lights placed over each planting tray. Light measurements were taken upon test initiation, day seven, and at termination using a Milwaukee SM 700 photometer. Test temperatures were measured daily from a surrogate test chamber.

| Test start date | June 7, 2011 |
|-------------------------------------|---|
| Test end date | June 21, 2011 |
| Test organism | Lactuca sativa |
| Test organism source | Territorial Seed Company, Cottage Grove, OR |
| Test duration | 14 days |
| Test chamber | 60-mL planting cell with 4 drainage holes in bottom |
| Test soil/replicate | 50 g dry weight |
| Water source for hydration | De-ionized water |
| Control soil | 70% sand, 20% kaolin clay, 10% peat moss, 0.45% CaCO ₃ |
| Number of organisms/replicate | 12 |
| Number of replicates/sample | 5 |
| Test temperature | 20-30℃ |
| Illumination | 16:8 hr light:dark photoperiod |
| Test acceptance criterion | ≥90% mean germination in control organisms |
| Positive control reference toxicant | Boric acid |

Table 2. Summary of testing conditions for the lettuce survival and biomass test.

The tests were terminated on day 14, June 21, 2011. At test termination, the number of seedlings in each replicate was counted and observations on seedling condition (e.g., chlorosis, wilting) were recorded. The above-soil portion of each seedling was then cut at the soil using scissors; and placed in a pre-tared weigh boat corresponding to the replicate number. A 25 g subsamble of soil from each site was collected for final pH measurements from a randomly chosen replicate.

Weigh boats containing seedlings were weighed immediately after cutting using a Mettler AE 240 scale, in order to obtain wet weights, and were subsequently placed in a Thelco 28 oven to dry for 24 hours. Seedlings were weighed at the end of the drying period in order to obtain dry weights. The endpoints calculated were the number of seedling surviving and their biomass (evaluated on the basis of dry weight divided by final count). The test acceptance criterion for the negative control was seedling survival of \geq 90 percent. Statistics were run using Biostat software on all sites where survival or growth were less than control, using a level of significance of 0.05.

A reference toxicant test (positive control) was conducted in conjunction with the lettuce seedling survival and biomass tests using boric acid as the toxicant. Test organisms were exposed to control, 40, 80, 160, 320 and 640 mg/kg boron for the same duration as the concurrent soil test, and the results of this test were compared with historical data for the species to determine whether the sensitivity of the organisms was appropriate.

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2.3 Earthworm 14- day survival test methods

An earthworm survival test was conducted on samples received June 3, 2011 using the red wiggler worm, *Eisenia foetida*. The organisms were obtained from Aquatic Research Organisms, NH. Nautilus Environmental received the organisms at the laboratory on June 2, 2011 in good condition. Tests were initiated on June 9, 2011 according to procedures presented by WADOE (1996) and ASTM (1994). Test procedures are summarized in Table 3.

| Test start date | June 9, 2011 |
|-------------------------------------|---|
| Test end date | June 23, 2011 |
| Test organism | Eisenia foetida |
| Test organism source | Aquatic Research Organisms, Hampton, NH |
| Test organism age | >90 days |
| Test duration | 14 days |
| Test chamber | 1-L glass jar |
| Test soil/replicate | 200 g dry weight |
| Water source for hydration | De-ionized water |
| Control soil | 70% sand, 20% kaolin clay, 10% peat moss, 0.45% CaCO $_3$ |
| Number of organisms/replicate | 10 |
| Number of replicates/sample | 3 |
| Test temperature | 22± 2°C |
| Illumination | Continuous lighting |
| Test acceptance criterion | ≥90% mean survival of control organisms |
| Positive control reference toxicant | 2-chloroacetamide |

Table 3. Summary of testing conditions for the earthworm survival test.

Twenty-four hours prior to testing, 25 g of soil was removed from each sample, the initial weight of soil and vessel was obtained, and samples were then placed in a Thelco 28 oven set to between 103 and 105°C to dry for 24 hours. After 24 hours, samples were removed from the oven, allowed to cool, and final weights were obtained to determine the moisture content of each sample. Samples with a moisture content of less than 35 percent were then hydrated to match control levels or control friability, as required. Moisture content upon receipt of the samples, as well as hydration requirements and amount of water added to samples is contained in Table 4.

On test initiation, pH and conductivity measurements were conducted on a slurry of de-ionized (DI) water and soil in a 1:1 ratio (i.e., 25 mL DI water:25 g soil). Soil slurry pH was measured after allowing soil/water mixture to stir for 5 minutes. Once the measurement was taken, the slurry was allowed to settle for 30 minutes, after which the pH of the supernatant liquid was Nautilus Environmental

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measured. Conductivity and pH measurements were conducted utilizing an Orion 130A and Orion 320 meter, respectively.

Sample soils were hydrated with DI water where necessary, and distributed into 1-L labeled glass jars prior to test initiation. Three replicates and a surrogate were used for each sample, each containing 200 g of soil. Moisture content was also determined at test initiation. Sample distribution took place according to a randomization sheet created in Excel. Organisms, greater than 90 days old, were added following sample distribution, once samples were confirmed to be within acceptable temperature range. Jars were placed in an environmental chamber at $22 \pm 2^{\circ}$ C under continuous light conditions.

Test temperatures were measured daily from surrogate test chambers. Test chambers were misted daily with DI water in order to maintain proper moisture levels.

| Client ID | Nautilus Log-In | Initial Moisture Content (%) | Hydration Needed (%) | Amount of Water Added to Sample (ml) |
|---------------|--------------------|------------------------------------|----------------------------|--|
| SHSB2-3:18 | S11-061 | 7.3 | 27.7 | 166 |
| WSSB6-0910 | S11-055 | 7.3 | 27.7 | 166 |
| ELSS-0810 | S11-057 | 8.7 | 26.3 | 158 |
| STARROAD 1807 | S11-059 | 12.1 | 22.9 | 137 |
| SH4-W64 | S11-062 | 14.2 | 20.8 | 125 |
| WS11-AM24 | S11-051 | 30.1 | 4.1 | 24.7 |
| YFSS-D1 | S11-053 | 7.3 | 27.7 | 166 |

Table 4. Pre-test hydration used for visual match of control friability.

The tests were terminated on day 14, June 23, 2011. At test termination, prior to counting, observations were made of each test chamber, including dead organisms on the surface or any behavior abnormalities. To count test organisms, sample replicates were transferred to a flat surface lined with moistened paper towels, animals were counted, and any behavior (e.g., lack of burrowing, coiling, "balling" together), or morphological changes (e.g., contraction, rigidity, ulceration of the integument, segmental constriction, segmental loss) were noted. The surrogate chamber was used to determine final moisture content, and final pH and conductivity measurements.

The endpoint calculated was earthworm survival. The test acceptance criterion for the negative control was earthworm survival of \geq 90 percent. Statistics were run using Biostat software on all sites where survival were less than control, using a level of significance of 0.05.

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A reference toxicant test (positive control) was conducted in conjunction with the earthworm survival tests using 2-chloroacetamide. Test organisms were exposed to control, 10, 20, 40, and 80 mg/kg 2-chloroacetamide for the same duration as the concurrent soil tests, and the results of this test were compared with historical data for the species to determine whether the sensitivity of the organisms was appropriate.

2.4 Earthworm 28- day bioaccumulation test methods

Methods for the 28-day tests with earthworms followed the same methods as the 14-day for test initiation and daily monitoring, as outlined in Section 2.3. The test was terminated on July 7, 2011 following the same procedures. Worms were then separated from the soil and were stored in clean glass jars overnight to allow for depuration. The day following termination, worms were placed in chemistry containers by site and sent to an analytical chemical laboratory for analysis. There were no statistical endpoints calculated for this test. The chemistry data is reported here and will be used by Environmental Partners to calculate a bioaccumulation factor.

3.0 RESULTS

Results of toxicity tests conducted using butter crunch lettuce starting June 7, 2011 are summarized in Tables 5 and 6. Results of toxicity tests conducted using *E. foetida* starting June 9, 2011 are summarized in Tables 7 and 8. Detailed results of the soil toxicity tests and statistical analyses are provided in Appendix A. Copies of the laboratory bench sheets, reference toxicant test results, and chain-of-custody forms are in Appendices B, C, and D.

3.1 Lettuce toxicity results

Mean survival was 91.7 percent for the artificial soil control. The mean survival in the test soils ranged from 78.3 to 91.7 percent. None of the sites exhibited significant toxic effects when compared to negative control survival results.

Mean biomass was 1.18 mg per seedling for the artificial soil control. Mean biomass in the test soils ranged from 1.00 to 2.27 mg per seedling. None of the sites were significantly different than the negative control for growth.

| Site ID/ Nautilus Log-In Number | % Survival | Mean Survival (%) | % of Control | Significant Decrease from Control? (p<0.05) |
|---------------------------------------|---------------|----------------------|--------------|---|
| | 91.7 | | | |
| | 75.0 | | | |
| Negative Control | 91.7 | 91.7 ± 10.2 | | |
| | 100 | | | |
| | 100 | | <u></u> | ···· |
| | 91.7 | | | |
| SHSB2-3:18 | 91.7 | | 100 | N T |
| S11-061 | 100 | 91.7 ± 5.9 | 100 | No |
| 511-001 | 91.7 | | | |
| | 83.3 | | | · · · · · · · · · · · · · · · · · · · |
| | 100 | | | |
| WSSB6-0910 | 91.7 | | | |
| S11-055 | 91.7 | 85.0 ± 16.0 | 92.7 | No |
| 511-000 | 83.3 | | | |
| | 58.3 | | | |
| | 58.3 | | | |
| ET CC 0010 | 91.7 | 78.3 ± 19.2 | | |
| ELSS-0810 | 83.3 | | 85.4 | No |
| SS11-057 | 100 | | | |
| | 58.3 | | | |
| | 100 | | 100 | |
| | 83.3 | 91.7 ± 5.9 | | _ |
| STARROAD 1807 | 91.7 | | | No |
| S11-059 | 91.7 | | | |
| | 91.7 | | | |
| | 75.0 | | | |
| | 100 | | 100 | No |
| SH4-W64 | 91.7 | 91.7 ± 10.2 | | |
| S11-062 | 91.7 | | | |
| | 100 | | | |
| | 91.7 | | | |
| | 91.7 | | | |
| WS11-AM24 | 91.7 | 85.0 ± 10.9 | 92.7 | No |
| S11-051 | 83.3 | | | |
| | 66.7 | | | |
| | 100 | | | |
| 1000 54 | 100 | | | |
| YFSS-D1 | 58.3 | 86.7 ± 17.3 | 94.5 | No |
| S11-053 | 91.7 | | | |
| | 83.3 | | | |

 Table 5. Results (means ± standard deviations) for L. sativa survival

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| Site ID/Nautilus Log-In Number | Growth per Seedling (mg) | Mean Growth per Organism (mg) | % of Control | Significant Decrease from Control? (p<0.05) |
|-----------------------------------|--------------------------------------|-------------------------------------|--------------|---|
| Negative Control | 1.56 1.39 0.62 1.34 0.99 | 1.18 ± 0.38 | | |
| SHSB2-3:18 S11-061 | 1.34 1.67 1.74 0.75 1.56 | 1.41 ± 0.40 | 119 | No |
| WSSB6-0910 S11-055 | 1.11 1.17 1.58 2.12 1.45 | 1.49 ± 0.40 | 126 | No |
| ELSS-0810 SS11-057 | 0.98 0.94 1.27 1.07 0.77 | 1.01 ± 0.18 | 85.6 | No |
| STARROAD 1807 S11-059 | 2.30 1.77 2.31 2.24 2.72 | 2.27 ± 0.34 | 192 | No |
| SH4-W64 S11-062 | 1.23 1.71 1.57 1.93 2.26 | 1.74 ± 0.38 | 147 | No |
| WS11-AM24 S11-051 | 1.22 2.00 0.90 1.00 1.05 | 1.23 ± 0.44 | 104 | No |
| YFSS-D1 S11-053 | 0.56 1.00 0.87 1.38 1.20 | 1.00 ± 0.31 | 84.7 | No |

Table 6. Results (means ± standard deviations) for *L. sativa* growth

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Earthworm 14-day toxicity results

3.2

Mean survival was 100 percent for the artificial soil control as well as the test sites, SHSB2-3:18 and WSSB6-0910, and STARROAD 1807. Site ELSS-0810 had 96.7 percent survival. None of the test sites were significantly different from the control.

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| Site ID/Nautilus Log-In Number | Survival (%) | Mean Survival (%) | % of Control | Significant Decrease from Control? (p<0.05) |
|-----------------------------------|--------------|----------------------|--------------|---|
| | 100 | | | |
| Negative Control | 100 | 100 ± 0.0 | | |
| | 100 | | | |
| CUCD2 2.10 | 100 | | | |
| SHSB2-3:18 S11-061 | 100 | 100 ± 0.0 | 100 | No |
| 511-001 | 100 | | | |
| 14/CCD (0010 | 100 | 100 ± 0.0 | | |
| WSSB6-0910 | 100 | | 100 | No |
| S11-055 | 100 | | | |
| ELCC 0010 | 100 | | | |
| ELSS-0810 | 90.0 | 96.7 ± 5.8 | 96.7 | No |
| SS11-057 | 100 | | | |
| | 100 | <u> </u> | | |
| STARROAD 1807 | 100 | 100 ± 0.0 | 100 | No |
| S11-059 | 100 | | | |

| Table 7. Results (means ± standard | deviations) for <i>E. foetida</i> survival |
|------------------------------------|--|
|------------------------------------|--|

3.3 Earthworm 28-day bioaccumulation results

Control arsenic concentrations were determined to be 3.6 mg/kg at test termination. Site concentrations ranged from 4.1 to 7.8 mg/kg.

| Site ID/Nautilus Log-In Number | Arsenic Concentration (mg/kg) |
|--------------------------------|-------------------------------|
| Negative Control | 3.6 |
| SH4-W64 | 7.8 |
| S11-062 | 7.0 |
| WS11-AM24 | 4.1 |
| S11-051 | T.1 |
| YFSS-D1 | 7.4 |
| S11-053 | I . (|

Table 8. Analytical chemistry results after 28-days for *E. foetida*

3.4 Soil Chemistries

Soil chemistry data are provided in Appendix B. Lettuce test sample pH from test initiation and termination are provided in Tables 9, while pH, conductivity, and percent moisture data for the 14-day earthworm are contained in Table 10. A summary of physical and chemical characteristics measured during testing is provided in Tables 11 through 13.

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For the lettuce test temperatures ranged between 21.5 and 28.0°C for the duration of the test. The temperature in the 14-day earthworm test ranged from 21.9-22.0 °C, while the 28-day test ranged from 21.3-22.0 °C for the duration of the tests.

| Sample ID | Nautilus Log-In | Soil Slu | ırry pH | Soil Super | natant pH |
|---------------|--------------------|----------|---------|------------|-----------|
| | Number — | Initial | Final | Initial | Final |
| SHSB2-3:18 | S11-061 | 5.14 | 5.66 | 5.94 | 5.69 |
| WSSB6-0910 | S11-055 | 7.41 | 7.73 | 7.51 | 7.80 |
| ELSS-0810 | S11-057 | 6.85 | 7.34 | 7.28 | 7.67 |
| STARROAD 1807 | S11-059 | 7.50 | 8.10 | 7.52 | 8.13 |
| SH4-W64 | S11-062 | 7.05 | 7.58 | 7.50 | 7.55 |
| WS11-AM24 | S11-051 | 7.50 | 7.94 | 7.51 | 8.00 |
| YFSS-D1 | S11-053 | 7.51 | 7.93 | 7.52 | 7.93 |

Table 9. Initial and final pH values for 14-day lettuce tests

| Table 10. | Initial and final | soil chemistry | v values for | the <i>E. foetida</i> tests |
|-----------|-------------------|----------------|--------------|-----------------------------|
|-----------|-------------------|----------------|--------------|-----------------------------|

| Sample ID | Nautilus Log-In | % Mo | isture | Soil Sh | urry pH | Soil S Conductivi | |
|---------------------|--------------------|-------------|----------|---------|---------|----------------------|-------|
| | Number | Initial | Final | Initial | Final | Initial | Final |
| | | | 14-day 7 | Гests | | | |
| Negative Control | | 51.5 | 38.1 | 7.63 | 7.69 | 285 | 473 |
| SHSB2-3:18 | S11-061 | 10.1 | 19.1 | 8.09 | 7.59 | 71 | 370 |
| WSSB6-0910 | S11-055 | 5.5 | 16.8 | 8.10 | 6.66 | 17 | 219 |
| ELSS-0810 | S11-057 | 5.5 | 22.0 | 8.28 | 7.55 | 30 | 335 |
| STARROAD 1807 | S11-059 | 14.2 | 28.9 | 7.68 | 6.76 | 46 | 603 |
| | | | 28-day 7 | Tests | | | |
| Negative Control | | 46.2 | 50.6 | 7.54 | 7.08 | 529 | 607 |
| SH4-W64 | S11-062 | 7.76 | 13.1 | 8.23 | 7.50 | 84 | 43 |
| WS11-AM24 | S11-051 | 38.9 | 51.5 | 6.54 | 5.54 | 16 | 15 |
| YFSS-D1 | S11-053 | 9.17 | 14.2 | 7.00 | 6.80 | 34 | 120 |

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| Parameter | Criteria | Count | Minimum | Maximum | Average | Acceptable? |
|-----------------------------|----------|-------|---------|---------|---------|-------------|
| Initial pH (Slurry) | >5.0 | 7 | 5.14 | 7.51 | 6.99 | Yes |
| Initial pH (Supernatant) | >5.0 | 7 | 5.94 | 7.52 | 7.25 | Yes |
| Temperature (°C) | 20-30 | 15 | 21.4 | 28.0 | 25.1 | Yes |
| Light Reading (Lux) | >1000 | 3 | 2146 | 2262 | 2203 | Yes |

Table 11. Summary of Chemical/Physical Characteristics measured during L. sativa testing

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Table 12. Summary of Chemical/Physical Characteristics measured during the 14-day E.

foetida testing

| Parameter | Criteria | Count | Minimum | Maximum | Average | Acceptable? Samples affected |
|---|-------------|-------|---------|---------|---------|------------------------------------|
| Initial Moisture Fraction (%) | 35-45 | 5 | 5.49 | 51.5 | 17.3 | No ¹ All three sites |
| Initial Slurry pH | >5.0 | 5 | 7.63 | 8.28 | 7.96 | Yes |
| Initial Slurry Conductivity (µS/cm) | | 5 | 17 | 285 | 90.0 | Yes |
| Temperature (°C) | <u>22+2</u> | 15 | 21.9 | 22.0 | 22.0 | Yes |

¹Deviation from protocol not expected to influence results of the test, see QA/QC for discussion

| Table 13. Summary of Chemical/Physical Characteristics measured during the 28-day E. | |
|--|--|
| foetida testing | |

| Parameter | Criteria | Count | Minimum | Maximum | Average | Acceptable? Samples affected |
|---|----------|-------|---------|---------|---------|---|
| Initial Moisture Fraction (%) | 35-45 | 4 | 7.76 | 51.5 | 26.8 | No ¹ SH4-W64, YFSS- D1 |
| Initial Slurry pH | >5.0 | 4 | 6.54 | 8.23 | 7.33 | Yes |
| Initial Slurry Conductivity (µS/cm) | | 4 | 16 | 529 | 166 | Yes |
| Temperature (°C) | 22±2 | 29 | 21.3 | 22 | 21.9 | Yes |

¹Deviation from protocol not expected to influence results of the test, see QA/QC for discussion

4.0 QA/QC

In both the 14- and 28-day earthworm tests, due to the nature of some of the soils, (consisting mostly of rocks and little to no organic matter that could hold moisture), all samples except WS11-AM24 were hydrated to 35 percent moisture content based on calculations. However, the measured percent moisture was significantly less than 35 percent. All samples took on the same appearance and friability as the control soil and the low moisture content is not thought to have affected the results.

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All three tests met the acceptability criterion for negative control performance. Temperature readings remained within parameters for the duration of the test.

Results of reference toxicant test (positive control) conducted with the test organisms are provided in Table 14. The EC50 values fell within the acceptable range of mean \pm two standard deviations for historical data, indicating that the test organisms appeared to have been of an appropriate degree of sensitivity.

| Species | Endpoint | Date Initiated | EC50 | Historical range (mean ± 2 SD) | Coefficient of Variation (%) |
|-----------------|----------|-------------------|----------------------------------|-----------------------------------|---------------------------------|
| Lactuca sativa | Survival | 6/7/2011 | 174 mg/kg B | 106 - 377 | 28.1 |
| | Biomass | 6/7/2011 | 123 mg/kg B | 96.6 - 194 | 16.8 |
| Eisenia foetida | Survival | 6/9/2011 | 35.8 mg/kg 2- Chloroacetamide | 7.0 - 80.9 | 42.0 |

| Table 14. Reference toxi | icant test results. |
|--------------------------|---------------------|
|--------------------------|---------------------|

5.0 REFERENCES

- American Society of Testing and Materials (ASTM). 1999. Standard guide for conducting terrestrial plant toxicity tests. ASTM designation E1963-98.
- American Society of Testing and Materials (ASTM). 1997. Standard guide for conducting laboratory soil toxicity or bioaccumulation tests with the lumbricid earthworm *Eisenia* fetida. ASTM designation E1676-97.
- Biostat. DMMP/SMS Bioassay Statistics Program for Microsoft Windows. Developed by Corps of Engineers, Seattle District
- Washington State Department of Ecology (WDOE). 1996. Earthworm bioassay protocol for soil toxicity screening. WDOE Environmental Investigations and Laboratory Services Program Publication No. 96-327.

APPENDIX A – Summary of Results and Statistics

| | | | Survival | /al | | | Growth | | | |
|---------------------|------------|----------------|--------------|-----------------------------|--------------|---------------------------|-------------------------------|-----------------------------|-----------------------------|-------------|
| Concentration | Rep | # Alive | % Survival | Mean % St. Survival Dev. | Tare Weight | t Total Dry Weight (g) | Total Seedling Weight (mg) | Growth per Seedling (mg) | Mean Growth per Org (mg) | St. Dev. |
| | 0 | ÷ | 91.7 71.0 | | 1.63560 | 1.65274 | 17.14 19.60 | 1.56 | | |
| I aboratory Control | V et | א ר | 91.7 | 91.7 10.2 | _ | 1.43108 | 6.80 | 0.62 | 1.18 | 0.38 |
| |) 4 | : 64 | 100.0 | | - | 1.55564 | 16.04 | 1.34 | | |
| | Ś | 12 | 100.0 | | 1.54137 | 1.55324 | 11.87 | 0.99 | | |
| | - | = | 91.7 | | 1.73975 | 1.75454 | 14.79 | 1.34 | | |
| 01-00000 | 2 | 1 | 91.7 | | - | 1.77874 | 18.37 | 1.67 | | |
| 01.0-20000 | ო | 12 | 100.0 | 91.7 5.9 | - | 1.68107 | 20.85 | 1.74 | 1.41 | 0.40 |
| 100-110 | 4 | ŧ | 91.7 | | 1.50294 | 1.51123 | 8.29 | 0.75 | | - |
| | ŋ | 10 | 83.3 | • | 1.49273 | 1.50835 | 15.62 | 1.56 | | |
| | | 12 | 100.0 | | 1.50121 | 1.51454 | 13.33 | 1.11 | | |
| | N | ÷ | 91.7 | | 1.49888 | 1.51179 | 12.91 | 1.17 | | |
| VVSSB0-0910 | ო | ÷ | 91.7 | 85.0 16.0 | - | 1.53038 | 17.33 | 1.58 | 1.49 | 0.40 |
| CC0-11C | 4 | 10 | 83.3 | | 1.48985 | 1.51108 | 21.23 | 2.12 | | |
| | S | 7 | 58.3 | | 1.48325 | 1.49343 | 10.18 | 1.45 | | |
| | - | ~ | 58.3 | | 1.66060 | 1.66749 | 6.89 | 0.98 | | |
| | 2 | 11 | 91.7 | | 1.67227 | 1.68264 | 10.37 | 0.94 | | |
| ELSS-U810 | ю | 10 | 83.3 | 78.3 19.2 | | 1.72053 | 12.67 | 1.27 | 1.01 | 0.18 |
| 100-112 | 4 | 12 | 100.0 | | 1.59567 | 1.60853 | 12.86 | 1.07 | | |
| | ഹ | 7 | 58.3 | | 1.44806 | 1.45345 | 5.39 | 0.77 | | |
| | - | 12 | 100.0 | | 1.54378 | 1.57139 | 27.61 | 2.30 | | |
| | N | 10 | 83.3 | | 1.52690 | 1.54464 | 17.74 | 1.77 | | |
| STARHUAD 180/ | ო | 11 | 91.7 | 91.7 5.9 | - | 1.64619 | 25.46 | 2.31 | 2.27 | 0.34 |
| ACU-110 | 4 | 11 | 91.7 | | 1.69490 | 1.71952 | 24.62 | 2.24 | | |
| | 5 | 11 | 91.7 | | 1.48753 | 1.51747 | 29.94 | 2.72 | | |
| | - | 6 | 75.0 | | 1.52711 | 1.53821 | 11.10 | 1.23 | | |
| CILA MEA | 2 | 12 | 100.0 | | 1.49895 | 1.51949 | 20.54 | 1.71 | | |
| 4014-100 | ო | ÷ | 91.7 | 91.7 10 | 10.2 1.34947 | 1.36679 | 17.32 | 1.57 | 1.74 | 0.38 |
| 200-110 | 4 | ÷ | 91.7 | | 1.33579 | 1.35705 | 21.26 | 1.93 | | |
| | ى س | 12 | 100.0 | | 1.44537 | 1.47247 | 27.10 | 2.26 | | |
| | | = | 91.7 | | 1.39530 | 1.40868 | 13.38 | 1.22 | | |
| NUCLE AND | N | 1 | 91.7 | | 1.75900 | 1.78095 | 21.95 | 2.00 | | |
| W311-AM24 | <i>с</i> о | = | 91.7 | 85.0 10 | 10.9 1.75735 | 1.76722 | 9.87 | 0.90 | 1.23 | 0.44 |
| 100-110 | 4 | 10 | 83.3 | | 1.46752 | 1.47747 | 9.95 | 1.00 | | |
| | ŝ | ∞ | 66.7 | | 1.62414 | 1.63251 | 8.37 | 1.05 | | |
| | - | 12 | 100.0 | | 1.66880 | | 6.72 | 0.56 | | |
| VECO D4 | 2 | 12 | 100.0 | | - | * | 11.96 | 1.00 | | |
| 0-00-LT | ო | 7 | 58.3 | 86.7 17 | 17.3 1.51489 | | 6.12 | 0.87 | 1.00 | 0.31 |
| 000-110 | 4 | 1 | 91.7 | | 1.53656 | - | 15.18 | 1.38 | | |
| | ß | 10 | 83.3 | | 1.57413 | 1.58613 | 12.00 | 1.20 | | |

Appendix Table A-1: Lactuca sativa 14-day Survival and Growth Northwest Pipeline GP TEE Program Test Initiated June 7, 2011

| Site | Rep | # Alive | % Survival | Mean % Survival | St. Dev. |
|---------------|-----|---------|------------|-----------------|----------|
| Leberatory | 1 | 10 | 100 | | |
| Laboratory | 2 | 10 | 100 | 100.0 | 0.0 |
| Control | 3 | 10 | 100 | | |
| 01000.0.10 | 1 | 10 | 100 | | |
| SHSB2-3:18 | 2 | 10 | 100 | 100.0 | 0.0 |
| S11-061 | 3 | 10 | 100 | | |
| W00DC 0010 | 1 | 10 | 100 | | |
| WSSB6-0910 | 2 | 10 | 100 | 100.0 | 0.0 |
| S11-055 | 3 | 10 | 100 | | |
| FL 00 0010 | 1 | 10 | 100 | | |
| ELSS-0810 | 2 | 9 | 90 | 96.7 | 5.8 |
| S11-057 | 3 | 10 | 100 | | |
| OTADDOAD 1007 | 1 | 10 | 100 | | |
| STARROAD 1807 | 2 | 10 | 100 | 100.0 | 0.0 |
| S11-059 | 3 | 10 | 100 | | |

Appendix Table A-21. *Eisenia. fetida* 14-Day Survival Northwest Pipeline GP TEE Program Test Initiated June 9, 2011

Project Name: EPI-Northwest Pipeline GP TEE Program

| Sample: | x1 |
|-------------|------------------|
| Samp ID: | ELSS-0810 |
| Alias: | Lettuce Survival |
| Replicates: | 5 |
| Mean: | 78.32 |
| SD: | 19.206 |
| Tr Mean: | 70.656 |
| Trans SD: | 26.607 |

| Ref Samp: | x2 |
|-------------|------------------|
| Ref ID: | Control |
| Alias: | Lettuce Survival |
| Replicates: | 5 |
| Mean: | 91.68 |
| SD: | 10.206 |
| Tr Mean: | 87.139 |
| Trans SD: | 25.638 |

| Shapiro-Wilk Results: | Levene's Results: | Test Results: |
|--|---|--|
| Residual Mean: 0 Residual SD: 16.953 SS: 5460.98 K: 5 b: 69.424 Alpha Level: 0.05 Calculated Value: 0.8826 | Ref. Residual SD: 7.376 Deg. of Freedom: 8 Alpha Level: 0.1 Calculated Value: 0.4126 | Statistic: Student's t Balanced Design: Yes Transformation: ArcSin Experimental Hypothesis Null: x1 >= x2 Alternate: x1 < x2 |
| Critical Value: <= 0.84 Normally Distributed: Yes Override Option: N/A | 2 Critical Value: >= 1.860 Variances Homogeneous: Yes | Degrees of Freedom: 8 Experimental Alpha Level: 0.05 Calculated Value: 0.9975 Critical Value: >= 1.860 Accept Null Hypothesis: Yes Power: Min. Difference for Power: |

| | | | Trans. | Levene's | Levene's | Mann- | | Shipiro- |
|------|-----------|--|--|--|--|--|--|--|
| Test | Trans. | Reference | Reference | Test | Reference | Whitney | | Wilk |
| | Test Data | Data | Data | Residuals | Residuals | Ranks | Rankits | Residuals |
| 58.3 | 49.778 | 91.7 | 73.256 | 20.879 | 13.883 | | | -27.139 |
| 91.7 | 73.256 | 75 | 60 | 2.599 | 27.139 | | | -20.879 |
| | 65.879 | 91.7 | 73.256 | 4.777 | 13.883 | | | -20.879 |
| | 114.591 | 100 | 114.591 | 43.935 | 27.453 | | | -13.883 |
| | 49.778 | 100 | 114.591 | 20.879 | 27.453 | | | -13.883 |
| | | | | | | | | -4.777 |
| | | | | | | | | 2.599 |
| | | | | | | | | 27.453 |
| | | | | | | | | 27.453 |
| | | | | | | | | 43.935 |
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| - | Data | Data Test Data 58.3 49.778 91.7 73.256 83.3 65.879 100 114.591 | Data Test Data Data 58.3 49.778 91.7 91.7 73.256 75 83.3 65.879 91.7 100 114.591 100 | Data Test Data Data Data 58.3 49.778 91.7 73.256 91.7 73.256 75 60 83.3 65.879 91.7 73.256 100 114.591 100 114.591 | Data Test Data Data Data Residuals 58.3 49.778 91.7 73.256 20.879 91.7 73.256 75 60 2.599 83.3 65.879 91.7 73.256 4.777 100 114.591 100 114.591 43.935 | Data Test Data Data Data Residuals Residuals 58.3 49.778 91.7 73.256 20.879 13.883 91.7 73.256 75 60 2.599 27.139 83.3 65.879 91.7 73.256 4.777 13.883 100 114.591 100 114.591 43.935 27.453 | Data Test Data Data Data Residuals Residuals Ranks 58.3 49.778 91.7 73.256 20.879 13.883 91.7 73.256 75 60 2.599 27.139 83.3 65.879 91.7 73.256 4.777 13.883 100 114.591 100 114.591 43.935 27.453 | Data Test Data Data Data Residuals Residuals Ranks Rankits 58.3 49.778 91.7 73.256 20.879 13.883 91.7 73.256 75 60 2.599 27.139 83.3 65.879 91.7 73.256 4.777 13.883 100 114.591 100 114.591 43.935 27.453 |

Project Name: EPI-Northwest Pipeline GP TEE Program

| Sample: | x1 |
|-------------|----------------|
| Samp ID: | ELSS-0810 |
| Alias: | Lettuce Growth |
| Replicates: | 5 |
| Mean: | 1.006 |
| SD: | 0.183 |
| Tr Mean: | 1.173 |
| Trans SD: | 0.078 |

| Ref Samp: | x2 |
|-------------|----------------|
| Ref ID: | Control |
| Alias: | Lettuce Growth |
| Replicates: | 5 |
| Mean: | 1.18 |
| SD: | 0.375 |
| Tr Mean: | 1.239 |
| Trans SD: | 0.158 |

| Shapiro-Wilk Results: | | Levene's Results: | | Test Results: | |
|---|--|---|---|--|----------------------------|
| K: b: Alpha Level: Calculated Value: | 0.081 0.124 5 0.343 0.05 0.9541 | Test Residual Mean: Test Residual SD: Ref. Residual Mean: Ref. Residual SD: Deg. of Freedom: Alpha Level: Calculated Value: | 0.047 0.125 0.073 8 0.1 1.7833 | Statistic: Student's t Balanced Design: Yes Transformation: Sqr Root (x + Experimental Hypothesis Null: x1 >= x2 Alternate: x1 < x2 | .375) |
| Critical Value: | <= 0.842 | Critical Value: | >= 1.860 | | |
| Normally Distributed: Override Option: | | Variances Homogeneous: | Yes | Degrees of Freedom: 8 Experimental Alpha Level: (Calculated Value: (Critical Value: 2 Accept Null Hypothesis: 3 | 0.05 0.8381 >= 1.860 |
| | | | | Power: Min. Difference for Power: | |

| | | | | Trans. | Levene's | Levene's | Mann- | | Shipiro- |
|-----------|------|-----------|-----------|-----------|-----------|-----------|---------|---------|-----------|
| Replicate | Test | Trans. | Reference | Reference | Test | Reference | Whitney | | Wilk |
| Number | Data | Test Data | Data | Data | Residuals | Residuals | Ranks | Rankits | Residuals |
| 1 | 0.98 | 1.164 | 1.56 | 1.391 | 0.009 | 0.152 | | | -0.242 |
| 2 | 0.94 | 1.147 | 1.39 | 1.329 | 0.026 | 0.09 | | | -0.103 |
| 3 | 1.27 | 1.283 | 0.62 | 0.997 | 0.109 | 0.242 | | | -0.071 |
| 4 | 1.07 | 1.202 | 1.34 | 1.31 | 0.029 | 0.071 | | | -0.026 |
| 5 | 0.77 | 1.07 | 0.99 | 1.168 | 0.103 | 0.071 | | | -0.009 |
| 6 | | | | | | | | | 0.029 |
| 7 | | | | | | | | | 0.071 |
| 8 | | | | | | | | | 0.09 |
| 9 | | | | | | | | | 0.109 |
| 10 | | | | | | | | | 0.152 |
| 10 | | | | | | | | | |
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Project Name: EPI-Northwest Pipeline GP TEE Program

| Sample: | x1 |
|-------------|------------------|
| Samp ID: | WS11-AM24 |
| Alias: | Lettuce Survival |
| Replicates: | 5 |
| Mean: | 85.02 |
| SD: | 10.868 |
| Tr Mean: | 68.08 |
| Trans SD: | 8.105 |

| Ref Samp: | x2 |
|-------------|------------------|
| Ref ID: | Control |
| Alias: | Lettuce Survival |
| Replicates: | 5 |
| Mean: | 91.68 |
| SD: | 10.206 |
| Tr Mean: | 87.139 |
| Trans SD: | 25.638 |

| Shapiro-Wilk Results: | | Levene's Results: | | Test Results: | |
|--|-----------------------------------|--|------------------------------|---|--------------------------|
| K: b: | 12.337 2892.022 5 51.573 | Test Residual Mean: Test Residual SD: Ref. Residual Mean: Ref. Residual SD: Deg. of Freedom: | 4.18 21.962 7.376 8 | Statistic: Approximate t Balanced Design: Yes Transformation: ArcSin Experimental Hypothesis Null: x1 >= x2 | |
| Alpha Level: | | Alpha Level: Calculated Value: | | Alternate: $x1 < x2$ | |
| Calculated Value: | | | | Alternate: Al CAL | |
| Critical Value: | <= 0.842 | Critical Value: | >= 1.800 | | |
| Normally Distributed: Override Option: | | Variances Homogeneous: | No | Degrees of Freedom: 5 Experimental Alpha Level: 0 Calculated Value: 1 Critical Value: > |).05 .5849 = 2.015 |
| | | | | Accept Null Hypothesis: Y Power: Min. Difference for Power: | es |

| | | | | Trans. | Levene's | Levene's | Mann- | | Shipiro- |
|-----------|------|-----------|-----------|-----------|-----------|-----------|---------|---------|-----------|
| Replicate | Test | Trans. | Reference | Reference | Test | Reference | Whitney | | Wilk |
| Number | Data | Test Data | Data | Data | Residuals | Residuals | Ranks | Rankits | Residuals |
| 1 | 91.7 | 73.256 | 91.7 | 73.256 | 5.175 | 13.883 | | | -27.139 |
| 2 | 91.7 | 73.256 | 75 | 60 | 5.175 | 27.139 | | | -13.883 |
| 3 | 91.7 | 73.256 | 91.7 | 73.256 | 5.175 | 13.883 | | | -13.883 |
| 4 | 83.3 | 65.879 | 100 | 114.591 | 2.201 | 27.453 | | | -13.325 |
| 5 | 66.7 | 54.756 | 100 | 114.591 | 13.325 | 27.453 | | | -2.201 |
| 6 | | | | | | | | | 5.175 |
| 7 | | | | | | | | | 5.175 |
| 8 | | | | | | | | | 5.175 |
| 9 | | | | | | | | | 27.453 |
| 10 | | | | | | | | | 27.453 |
| 10 | | | | | | | | | |
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Project Name: EPI-Northwest Pipeline GP TEE Program

| Sample: | x1 |
|-------------|------------------|
| Samp ID: | WSSB6-0910 |
| Alias: | Lettuce Survival |
| Replicates: | 5 |
| Mean: | 85 |
| SD: | 16.051 |
| Tr Mean: | 85 |
| Trans SD: | 16.051 |

| Ref Samp: | x2 |
|-------------|------------------|
| Ref ID: | Control |
| Alias: | Lettuce Survival |
| Replicates: | 5 |
| Mean: | 91.68 |
| SD: | 10.206 |
| Tr Mean: | 91.68 |
| Trans SD: | 10.206 |

| Shapiro-Wilk Results: | | Levene's Results: | | Test Results: | |
|--|-------------------|--|-------------------------|---|--|
| K: | 8.728 1447.228 | Test Residual Mean: Test Residual SD: Ref. Residual Mean: Ref. Residual SD: Deg. of Freedom: | 9.815 6.672 6.966 | Statistic: Student's t Balanced Design: Yes Transformation: No Transform | ation |
| Alpha Level: Calculated Value: Critical Value: | 0.05 0.8653 | Alpha Level: Calculated Value: Critical Value: | 0.1 0.871 | Experimental Hypothesis Null: x1 >= x2 Alternate: x1 < x2 | |
| Normally Distributed: Override Option: | | Variances Homogeneous: | Yes | Degrees of Freedom: Experimental Alpha Level: Calculated Value: Critical Value: Accept Null Hypothesis: | 0.05 0.7853 > = 1.860 |
| | | | | Power: Min. Difference for Power: | |

| | | | | Trans. | Levene's | Levene's | Mann- | | Shipiro- |
|-----------|------|-----------|-----------|-----------|-----------|-----------|---------|---------|-----------|
| Replicate | Test | Trans. | Reference | Reference | Test | Reference | Whitney | | Wilk |
| Number | Data | Test Data | Data | Data | Residuals | Residuals | Ranks | Rankits | Residuals |
| 1 | 100 | 100 | 91.7 | 91.7 | 15 | 0.02 | | | -26.7 |
| 2 | 91.7 | 91.7 | 75 | 75 | 6.7 | 16.68 | | | -16.68 |
| 3 | 91.7 | 91.7 | 91.7 | 91.7 | 6.7 | 0.02 | | | -1.7 |
| 4 | 83.3 | 83.3 | 100 | 100 | 1.7 | 8.32 | | | 0.02 |
| 5 | 58.3 | 58.3 | 100 | 100 | 26.7 | 8.32 | | | 0.02 |
| 6 | | | | | | | | | 6.7 |
| 7 | | | | | | | | | 6.7 |
| 8 | | | | | | | | | 8.32 |
| 9 | | | | | | | | | 8.32 |
| 10 | | | | | | | | | 15 |
| 10 | | | | | | | | | |
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Project Name: EPI-Northwest Pipeline GP TEE Program

| Sample: | x1 |
|-------------|------------------|
| Samp ID: | YFSS-D1 |
| Alias: | Lettuce Survival |
| Replicates: | 5 |
| Mean: | 86.66 |
| SD: | 17.298 |
| Tr Mean: | 86.66 |
| Trans SD: | 17.298 |

| Ref Samp: | x2 |
|-------------|------------------|
| Ref ID: | Control |
| Alias: | Lettuce Survival |
| Replicates: | 5 |
| Mean: | 91.68 |
| SD: | 10.206 |
| Tr Mean: | 91.68 |
| Trans SD: | 10.206 |

| Shapiro-Wilk Results: | | Levene's Results: | | Test Results: | | |
|--|---|--|---|---|--|----------------------------|
| K: | 9.215 1613.56 5 37.528 0.05 0.8728 | Test Residual Mean: Test Residual SD: Ref. Residual Mean: Ref. Residual SD: Deg. of Freedom: Alpha Level: Calculated Value: Critical Value: | 9.899 6.672 6.966 8 0.1 1.1114 | Balanced Design: Transformation: Experiment | No Transforr al Hypothesis x1 >= x2 | |
| Normally Distributed: Override Option: | Yes | Variances Homogeneous: | Yes | Experimental Calc C Accept Nul | of Freedom: Alpha Level: ulated Value: Critical Value: Il Hypothesis: Power: ce for Power: | 0.05 0.5589 >= 1.860 |

| | | | | Trans. | Levene's | Levene's | Mann- | | Shipiro- |
|-----------|------|-----------|-----------|-----------|-----------|-----------|---------|---------|-----------|
| Replicate | Test | Trans. | Reference | Reference | Test | Reference | Whitney | | Wilk |
| Number | Data | Test Data | Data | Data | Residuals | Residuals | Ranks | Rankits | Residuals |
| 1 | 100 | 100 | 91.7 | 91.7 | 13.34 | 0.02 | | | -28.36 |
| 2 | 100 | 100 | 75 | 75 | 13.34 | 16.68 | | | -16.68 |
| 3 | 58.3 | 58.3 | 91.7 | 91.7 | 28.36 | 0.02 | | | -3.36 |
| 4 | 91.7 | 91.7 | 100 | 100 | 5.04 | 8.32 | | | 0.02 |
| 5 | 83.3 | 83.3 | 100 | 100 | 3.36 | 8.32 | | | 0.02 |
| 6 | | | | | | | | | 5.04 |
| 7 | | | | | | | | | 8.32 |
| 8 | | | | | | | | | 8.32 |
| 9 | | | | | | | | | 13.34 |
| 10 | | | | | | | | | 13.34 |
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Project Name: EPI-Northwest Pipeline GP TEE Program

| Sample: | x1 |
|-------------|----------------|
| Samp ID: | YFSS-D1 |
| Alias: | Lettuce Growth |
| Replicates: | 5 |
| Mean: | 1.002 |
| SD: | 0.314 |
| Tr Mean: | 1.002 |
| Trans SD: | 0.314 |

| Ref Samp: | x2 |
|-------------|----------------|
| Ref ID: | Control |
| Alias: | Lettuce Growth |
| Replicates: | 5 |
| Mean: | 1.18 |
| SD: | 0.375 |
| Tr Mean: | 1.18 |
| Trans SD: | 0.375 |

| Shapiro-W | ilk Results: | | Levene's Results: | | Test Results: | | |
|-----------|---|------------------------------|--|---------------------------|--|--|---------------------------|
| F | K: | 0.225 0.959 5 0.942 | Test Residual Mean: Test Residual SD: Ref. Residual Mean: Ref. Residual SD: Deg. of Freedom: Alpha Level: | 0.18 0.3 0.169 8 | Balanced Design: Transformation: Experiment Null: | No Transforr al Hypothesis x1 >= x2 | |
| Ca | Iculated Value: Critical Value: | | Calculated Value: Critical Value: | | Alternate: | x1 < x2 | |
| 0 | Normally Distributed: verride Option: | Yes | Variances Homogeneous: | Yes | Experimental Calc C Accept Nul | of Freedom: Alpha Level: ulated Value: Critical Value: Il Hypothesis: Power: ce for Power: | 0.05 0.813 >= 1.860 |

| | | | | Trans. | Levene's | Levene's | Mann- | | Shipiro- |
|-----------|------|-----------|-----------|-----------|-----------|-----------|---------|-----------|-----------|
| Replicate | Test | Trans. | Reference | Reference | Test | Reference | Whitney | Develoite | Wilk |
| Number | Data | Test Data | Data | Data | Residuals | Residuals | Ranks | Rankits | Residuals |
| 1 | 0.56 | 0.56 | 1.56 | 1.56 | 0.442 | 0.38 | | | -0.56 |
| 2 | 1 | 1 | 1.39 | 1.39 | 0.002 | 0.21 | | | -0.442 |
| 3 | 0.87 | 0.87 | 0.62 | 0.62 | 0.132 | 0.56 | | | -0.19 |
| 4 | 1.38 | 1.38 | 1.34 | 1.34 | 0.378 | 0.16 | | | -0.132 |
| 5 | 1.2 | 1.2 | 0.99 | 0.99 | 0.198 | 0.19 | | | -0.002 |
| 6 | | | | | | | | | 0.16 |
| 7 | | | | | | | | | 0.198 |
| 8 | | | | | | | | | 0.21 |
| 9 | | | | | | | | | 0.378 |
| 10 | | | | | | | | | 0.38 |
| 10 | | | | | | | | | |
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APPENDIX B - Laboratory Datasheets

14-Day Soll Toxicity Test

Soil Quality Measurements

Sample IDS: 44582-3:18 Wester-0410, ELES-0810, STREPORD 1807, SH4-Wich, WSII-AW24, YESS-DI Test#s: 110 6 - 7004, 7004, 7009, 7009, 7010, 7011, 7012 Nautilus Log-In #s: 5/1-0/01, 5/1-055, 5/1-053, 5/1-053, 5/1-062, 5/1-051, 5/1-053 Client: ENV/NOVIM_ENANTRANS, INC. Start Date/Time: (e17/11/1430 Species: Lactuce sativa (butter crunch lettuce) End Date/Time: (2/21/11/1300

| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | 21.5 - 10 22.0 0 22.0 23.5 - 10 22.0 22.0 22.0 22.0 10 22.0 10 22.0 22. | 100 2742 00 14 10 10 14 10 1 | 0 21.5 -/. 1 25.0 K/K 2 25.0 K/K 3 25.0 K/K 4 23.8 K/K 5 24.0 K/K 6 23.8 K/K 7 23.8 K/K 6 23.0 K/K 7 28.0 K/K 8 34.0 C/C 10 348 R/M 11 26.0 C/C 12 24.0 C/C 13 23.5 B/C 14 210.0 M/M 13 23.5 C/C 14 210.0 M/M Monents: A/C M | Light Tech Intensity Initials (lux) |
|---|---|--|--|---|
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| ZLO H/H ZS:0 H/H ZS:0 H/H Z3:5 H/H Z1:0 H/H Z2:0 H/H Z1:0 C/H Z1:0 C/H Z1:0 C/H Z1:1 Z1:4 Z2:5 Z0 Z2:5 Z0 Z2:5 Z0 Z1:1 Z1:4 Z1:1 Z1:4 Z1:1 Z1:4 Z2:5 Z0 Z2:5 Z0 Z2:5 Z0 Z1:5 C/M Z1:0 C/M Z2:5 Z1:0 | 24.0 H/H 23.6 H/H 23.6 H/H 23.6 H/H 23.0 H/H 28.0 H/H 28.0 H/H 28.0 H/H 28.0 H/H 28.0 H/H 28.0 H/H 214,0 H | The stand | 2 24.0 H/H 3 25.0 H/H 4 23.8 H/H 5 24.0 H/H 6 24.0 H/H 7 28.0 H/H 8 34.0 H/H 9 25.5 8 11 26.0 11 12 34.0 11 13 25.5 8 14 210.0 14 13 23.5 8 14 210.0 14 12 240.0 14 13 23.5 8 14 210.0 14 15 213.5 60 14 210.0 14 15 213.5 60 14 210.0 14 | ١ |
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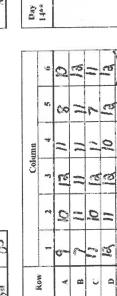
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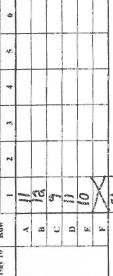
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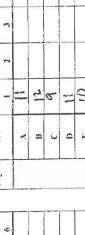
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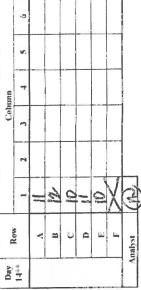
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Analyst



W-Willing

as Day 14: Include sublethal observations:

Voullus Eavironmental 5009 Pacific Hwy. E., Salte 2. Jaconna, WA 98424.

E

QC Check:

Comments:

N= No germination C= Chlorosis

D= Desiccation N= Mottling

N= Normal

Nautilus Environmental

140.02

| Washington | Laboratory |
|------------|------------|
|------------|------------|

| | I antreno | entime | | Start Date & Time: Stop Date & Time: | 4/21/11 1300 | |
|------------------------|----------------|---------------|--------------------------|---|-------------------------------|--|
| est #'s: | 11000- | TROU | , TOD7, TO | 08, 7009, 7010, | -TOU, TO12 | |
| Sample ID | Cont. | Rep. | No. Seedlings Emerged | Shoot Pan Tare Wt. (g) | Pan + Wet Shoot Wt. (g) | Pan + Dry Shoot Wt. (g |
| CON | 36 | 1 | | 1.63560 | 1.1001073 | 1.65274 |
| | 24 | 2 | 9 | 1.42428 | 101014 | 1.43 08 |
| F(0) | 11 | 3 4 | 12 | 529100 | 1.76700 | 55564 |
| | 34 | 5 | 12 | 1.54137 | 1.72831 | 1.55324 |
| | 32 | | 0-1-1 | | ON 2.121109 | 1.75454 |
| 511-0/01 | 21 | 2 | | 171037 | 2.04951 | 1.77874 |
| 5 | 13 | 3 | 12 | .66022 | 2.00733 | GA.66 1.69107 |
| 13 | E. | -4 | | 1.30294 | 1.78289 | 1.51123 |
| · | 38 | 5 | 10 | 41273 | 34101- | 1.50835 |
| 511-055 | 30 | 1 | 12 | 1.50121 | .74003 | 10179 |
| all leader | 39 | 2 | | 1.41882 | 11600 | 1.53038 |
| ° (3) | 17 | 3 | 11 | 1.9 309 | 103040 | 1.5108 |
| a good | 22 | 4 | 10 | 18703 | | A State of the second sec |
| | | 5 | | 1. 10260 | 1. 6139(00) 1. 661211 8098 | 1.66749 |
| 511-157 | 29 | 1 | 1 | 1.66060 | 1. 102.54 | 1.68264 |
| . I | 12 | 2 | | 1 ATECT | 1.75783 | 1.72053 |
| 43 | 3 | 3 | 10 | 120510 | 1.103925 | 1,60853 |
| P | 35 | 4 | 14- | 1443010 | 1,43233 | 145345 |
| | 27 | 1 | | 64329 | 2.10/010 | 157/39 |
| 511-059 | 28 | 2 | -18- | 152/090 | 1.980110 | 1.54464 |
| + 10- | 1 | 3 | 81 | 102023 | 2.16859 | 1.64619 |
| *@ | 14 | 4 | | 109440 | 2.15932 | 171952 |
| | 33 | 5 | | 1.48753 | 2.0 8108 | 1.51747 |
| all Mat. | 1-12- | 1 | a | 5271 | 1.75354 | 1.5382 |
| 511-0122 | 37 | 2 | 12 | 1.49895 | 388.4 | 1.51777 |
| *0 | 118 | 3 | 1 | 1.34943 | 1.10147 | 1.366.79 |
| | S | 4 | | 1.33534 1.44534 1.39530 | 1.10703 | 147247 |
| | 16 | 5 | 12/ | 1.445.24 | 1.705910 | 40868 |
| 511-051 | 20 | 1 | 1 | A A A A | 1.55903 | 78075 |
| Sector Sector | 30 | 2 | | | 2.0410 | 1.76722 |
| *0 | | 3 | | 1.75735 | 1. 96124 | 147747 |
| | 17 | 4 | | 1.46752 | 1:14/093 | 16325 |
| | 16 | 5 | 12 | 1.1010880 | 1.72670 | 1.67.552 |
| 511-053 | 1.4 | $\frac{1}{2}$ | 112 | 1.47496 | 1.57018 | 148692 |
| der the | 4 | $\frac{2}{3}$ | 14 | 1.51489 | 56672 | 1.52.101 |
| ×3 | 23 20 40 | 4 | <u> </u> | 1.5359 454 | | 1.55174 |
| | 145 | 5 | 10 | 1.57413 | 1.109235 | 1,58613 |
| and the state products | 1 211 | 1 | | | | |
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| | | 4 | | | | |
| | - | 5 | | | | 9.6 |
| Tech Initi | als: | | | | (1) | <u>i y</u> |
| Comment | ••• | Initial | number of see | ds added to each repli | cate = 12 | - ~ |
| Comment | | | 7 | and the second se | 1: 107.0 | QC: (1) |
| Date/Tim | e 1n: | 6/24 | 11 150 5/11 153 | | | |

H Samples rated 0-5 from least rocky (1) to most rocky (5).

| 50 | |
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| I4-Day | 11.11 |
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| ity. | ALC: N |
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| No. | |

Client: Editopophloched Partriers Start Date Time: Lo 19/11/1400 Sumple IIN: 5145 D. 2:18, W55 E.G. Office 14: 1100-7029 to 7032

End Date/Tince: (0/22/11 1309 **Diservici featuria** Day 14

Day 7

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Observations

Sublethal

| | Conductivity (uhom-cm) al initial fingl | 245 | | Marin Mi | 04 71 370 | A CONTRACTOR OF THE OWNER OWNE | ALL STATE OF LANS | 012 11 010 | | | 55 30 335 | | | Ho 40 1003 | | | | | |
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| | pII (units) initial final | 1. | | | 8.09 7.59 | All and a second se | A State of the second sec | 8.10 10.1010 | | | 18.28 7.55 | | | 7.108 10.710 | | | | The second s | |
| | % Moisture | 184 38.12 | 5/5 | | 1.01 19.1 | In a water | | 5.49 16.8 | | | 5.49 22.0 | | | 14/10/289 | | | | | |
| | Kep. Cont. # # | 0/ 1 | 2 3 | 3 | 1 12 | 2 | 0 | 14 | 2 11 | 3 | 1 5 | <u>ي</u> | - | 1 7 | 3 | 3 9 | gimer | 14 | |
| STARCOAD RUT | Sample ID | CON | | | 541-061 | | | 511-255 | | | 511-057 | | | SI-059 | | | | | |
| | Tiech Init. | 52 | -M | AT 1 | W. | è | 5 | 20 | 00 | t | Cer | (Se) | 60 | 27- | X | Carl. | | | |
| E155-0810, | Temp (°C) | 220 | 22.0 | 21.9 | 21.9 | 210 | 5 | 22.0 | 33.0 | 0.66 | 22.0 | 22.0 | 33.1 | 31.9 | 22.0 | 0.22 | | | |
| (1) | Test Dav | 0 | I | ei. | 3 | + | urs. | 9 | r | 90 | 0 | 10 | 1 | 12 | 13 | 14 | | | |

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| Sublethal Observations K | N= Normal burrowed | E= Exposed/on surface | B= Balled together | D= Dead | W= Segmental swelling | L- Lesions/alcers | C= Coiling | S= Shortching/stiffening |
|--------------------------|--------------------|-----------------------|--------------------|---------|-----------------------|-------------------|------------|--------------------------|
| Sub | - | 1 | Ba | Du | 1 | 1 | U | 2=5 |

ENN. R.M.A. Test Chamber. ()rganites scarse: QA Review:

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lest Species:

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Nautilus Environmental Washington Laboratory 5009 Pacific Hwy. E., Suite 2 Tacoma, WA 98424 Raw Data Sheet Soil Data 14-Day Soil Toxicity Test

| Client: Environmental Partners Inc. Test #5: 11010-T029 +1 T03 | 6 |
|--|-----|
| Sample IDs: 5/1387 - 3:18, WSSB6-0910, ELSS-0810, Log-In#s: 511-061, 055, 057, Date: 10/9/11 1400 STAPPOAD 1807 Species: E. Dettelo | 059 |
| Date: 10/9/11 1400 STRPPOAD 1807 Species: E. DeHiller | |

Soil Weights and Moisture Fraction (MF):

| | | Pre-Test | 0 | | Day 0 | | | Day 14 / | 2,5 | |
|---------------------------|----------|--------------|------|---------|--------|--------|-------------|-----------|---------|--------|
| | Initial | Final | (*) | Initial | Final | (A) | Initial | Final | | |
| Site | (wet) | (dry) | MF | (wet) | (dry) | MF | (wet) | (dry) | MF | |
| 511-061 | 264 | 24.7 | 7.3 | 76.7 | 76.4 | 10.1 | 158.0 | 154.0 | 19. | |
| 51-055 | 26,6 | 24.9 | 7.3 | 78.9 | 77.6 | 5.49 | 1110.2 | 13.4 | 110.8 | |
| 511-057 | 26.1 | 24.1 | 97 | 77.5 | 76.5 | 5.49 | | 88.4 | 22.0 | |
| 511-059 | 26.4 | 23.7 | 12.1 | 78.4 | 75.3 | 14.16 | 140.5 | 134.9 | 38.12 | |
| 14 day con | | | | 02754 | 66.9 | 51.5 | 101.1 | 111.0 | - Onlar | |
| | | a 4 a | 1.10 | 103.0 | 100.2 | -7 -7/ | 124.5 | 121.9 | 13. | |
| 511-062 | 264 | 28.3 | 14.2 | 73.1 | 36.1 | 7.76 | 139.2 | 130.7 | | 5 |
| 511-051 | 26.4 | 20.5 | 30.9 | 05,4 | 103.3 | 9.17 | 1420 | 121-97-90 | | 0138.9 |
| | 26.4 | | 1.2 | 105.5 | 494.29 | | 105.7 | 17.3 | 50.6 | |
| 25 day LON BT 80 makan | | | | 92.6 | 843 | 49.7 | 28.4 | 118.2 | 10592 | \$ 68. |
| " 40 My/1Kg | | | | 70.8 | 62.7 | 47.9 | 105.4 | 9623 | 51.2 | |
| N 20 malka | | | | 78.1 | 70.2 | 46.2 | 28.5 | 107.10 | 77.3 | |
| 10 mg kg | | | | 82.6 | 74.6 | 47.1 | 143.2 | 135.0 | 77.3 | |
| 11 UN | | 11 - co. 114 | | 102.1 | 94,2 | 46.2 | 145.8 | 13/09 | 55.3 | |
| | | | | | | | | | | |
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| muuta taistata. | A | X | 35 | X | CF | NF | (R) | | X | |
| Tech Initials: | LØ. | | V-1 | w . | W73 | 111- | | - Und | | |

Date/Time in/Temp: Date/Time out/Temp:

1400 1040 6/10/11 1330 109 030 10/28/11 / 830 /1 \$11

MF = (I-F)/[A-(I-F)]*100

MF= Moisture fraction of bulk soil (in %) i= Initial wet weight of sample + pan (g) F=Final dry weight of sample + pan (g) A= Initial aliquot weight (g))

Bdue to texture of samples, matched To moisture on ficularility instead of volume

Environmental Quality Results - 28-Day Soil Bioassay Nautilus Environmental

| Client: Sample ID: Test #: Nautilus Cl | Enviror SH4-W 1106-703 heck-In#: | 1 minital 64 YESS 03 1106- 511-062 | Partn -DI, WSI TO34 11. 1511-01 | LVS -A131 (BKG) 06-7035 51, 511-053 | | · | End | Date/Time: st Species: | 6 41 1 1 7 1 1 Eisenia | foetida |
|---|---|---|--|--|----------|-----------------------|----------------------|---------------------------|------------------------------|---------------|
| Test | Temp | Tech | · [| | % Mo | | | | Conductivity | |
| Day | (°C) | Initials | | Site | Day 0 | Day 28 | Day 0 | Day 28 | Day 0 | Day 28 |
| 0 | 22.0 | \gg | | ION | 51.5 | 50.6 | 7.54 | 1.08 | 529 | 601 |
| 1 | 22.0 | ME | | SII-002 | 7.76 | 13.1 | 8.23 | 7.50, | 84 | 43 |
| 2 | 21.9 | ME | | SII-051 | 38.9 | 51.5 | 6.54 | 5.54 | 16 | 15 |
| 3 | 21.9 | MP | | 611-053 | 9.17 | 14.2 | 7.00 | 6.8D | 34 | 120 |
| 4 | 21.9 | (D) | | | | , | | | | a 1 |
| 5 | 21.9 | C+ | | | | | | | | |
| 6 | 22.0 | X | | | | | | | | |
| 7 | 21.8 | 80 | | | | | | | | |
| 8 | 22.0 | 84 | | | | | | | | |
| 9 | 1. | TC 1 | | | | | | | | |
| 10 | 22.0 | (A) | | | | | | | | |
| | 21.9 | 10 | | | | | | | | |
| 11 | | 01 94 | | | | | | | | |
| 12 | 21.9 | 5 | | | | | | | | |
| 13 | 22.D | 2 | | ······ | <u>.</u> | | | | | |
| 14 | 21.9 | 2 | | C | | | | | 1 a | |
| 15 | 22.D | <u>IF</u> | | | | | | | | |
| 16 | 22.0 | <u>y</u> | | | | | | ļ | | |
| 17 | 22.0 | (1) | | | | | | | | |
| 18 | 22:0 | | 1 | analyzer and a subsection of the subsection of | | | | | | |
| 19 | 22.0 | <u>Q</u> | | | | | | | | |
| 20 | 21.9 | Se | | | | | | | | |
| 21 | 21.3 | 75 | | an data hasan an | | | | | | |
| 22 | 22.0 | 25 | | | | | 1 | | 1 | |
| 23 | 21.8 | 84- 19 | 1 | | | | 2 2 2 2 | | | |
| 24 | 22.0 | 62 | | an a | | | | | | |
| 25 | 22.0 | | | | | | | | | |
| 25 | 22.0 | A State | | | | and the second second | | | | |
| 2.7 | 12.0 | ME | | | | | ļ | | | |
| - 28 | 22.0 | 85 | | | | : | | | | |
| <u>[</u> | | | | | | | | 1 | l | |
| | | alila | | Tech initials | X | hington Labor |] atory - 5009 Pt | icific Hwy. E., | Suite 2. Tacon | na, WA 98424. |

QA Review/Date D / 9/1/11 Test Chamber: EAN. C.M. A

Eisenia fetida 28-Day Bioassay

Nautilus Environmental Washington Laboratory 5009 Pacific Hwy. E., Suite 2 Tacoma, WA 98424

Client/Project ID: Environmental Partners Test No.: 11000-7033, 11000-7034, 11000-7035

Start Date/Time: (2/9/11 End Date/Time: 7/7/11

| Sample ID | Cont. # | Rep. # | Initial Org. wt. (gm) | Initial No. Worms | Initial Avg. per Organism (gm) | Final Org. wt. (gm) | Final No. Worms | Initial Avg. per Organism (gm) |
|--------------|------------|-----------------|-----------------------------|-------------------------|---|---------------------------|-----------------------|---|
| ion | 6 | 1 | (8-44-14-902M | 10 | | 3.42983 | 10 | |
| 0014 | 10 | 2 | 4.34417 | 10 70 | | 2.74904 | 10 | |
| | 1 | 3 | 442805 | 10 | | 2.75244 | 10 | |
| | • | 4 | | | | | | |
| | - | 5 | | | | | | |
| 511-062 | 7 | 1 | 4,26905 | 10 | | 2.53325 | | |
| DIFUGO | 75.4 | 2 | 239522 | 10 | | 6.05009 | 10 | |
| | 11 | 3 | 337532 4.15407 | 10 | | 2.055 | 4 | |
| | | 4 | <u> </u> | | | | | |
| | | 5 | | | | | | |
| | d | 1 | 3,81916 | 10 | | 1.86036 | 10 | |
| 511-051 | 12 | 2 | 4.01945 | 10 10 10 | Contractory of the second states of the | 2.101031 | 10 | |
| | 104 | 3 | 4.44998 | 10 | | 2.5/0/78 | 10 | |
| | 7 | 4 | 19. 7. 7. 7. 112 | 3.07 | States and the second | | | |
| | | 1 | | | Service Contraction of the | | | |
| | | 5 | a goolic | 10 | | 2.5088 | 10 | |
| 81-053 | 3 | 1 | 3.88745 | 0 10 10 | | 1,43401 | 10 | |
| | 11 | 2 | 408357 | 10 | | 25521 | 10 | |
| | 12 | 3 | 3,98070 | 10 | | 1. 2. 2. 441 | | |
| | | 4 | | | | | | |
| | | 5 | | | | | | |
| | | 1 | | | | | | |
| | | 2 | | | | | | |
| | 1 | 3 | | | | | | Contraction of the second s |
| | 1 | 4 | | | | | | |
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| | | 3 | 1 | <u> </u> | | | | |
| | | 4 | | | | | 4 | |
| | | 5 h Initials | | 1/F | | | X | |

QA (R)

28-Day Soil Survival Results Nautilus Environmental

Client: Test No.: Test Date:

Environmental Partners 11010-T033 to T035 6 9/11 Eisenia foetida

Test Organism:

| Sample | Container | Rep. # | Initial Number | Final Number | Sublethal Observations | Tech Initials |
|--------------|-----------|-----------|--|--|---------------------------|--|
| 1D | # | | A | 10 | | S.F. |
| | 6 | | 10 10 | | | X |
| to 1 | 10 | 2 | 10 | 10 | - 7 | X |
| LOW | | 3 | 10 | | NE | |
| | | 4 | | | | |
| | | 5 | In | 10 | R. | -19 |
| | 1 | 1 | 10 10 | and the second data and the second of the second se | - N | 18 |
| 511-062 | 5 | 2 | 10 | -12- | | - A |
| SILVEL | <u></u> | 3 | 10 | | | Xi |
| | | 4 5 | | | | |
| | 0 | | (h) | ID | N. | N |
| | 8 | | 10 | 10 | Ň | X |
| 51-051 | 12 | 2 | | 10 | N N | -A- |
| 011001 | | 3 | 10 | <u> </u> | | <u> </u> |
| | | -4 | | | | |
| | | 5 | 10 | 10 | | X |
| | 3 | 1 | | 10 | N | - Maria |
| 511-053 | | 2 | 10 | 10 | N | 81- |
| 51-025 | | 3 | | | - ^v | |
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| ter terreter | | | e 2 Tacoron WA | | | L |

Washington Laboratory - 5009 Pacific Hwy, E., Suite 2. Tacoma, WA 98424

22/

QA Check:

Comments:

Sublethal Observations Nev:

N= Normal/horrowed

E- Exposed on an face B= Balled together

Li= Dead

3.1

W - Segmental swelling

L= Lesions/alcers

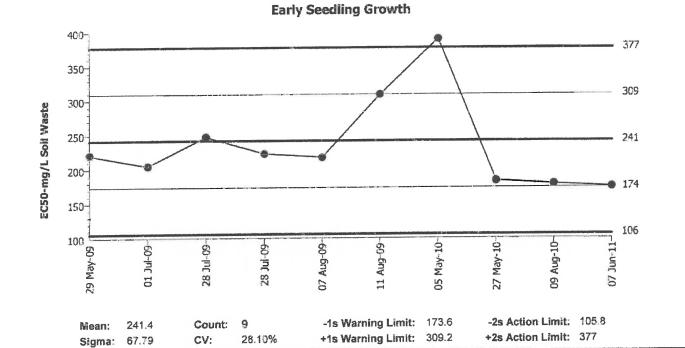
C Coiling

S= Shortening/stiffcning

APPENDIX C - Reference Toxicant Test Results

CETIS QC Plot

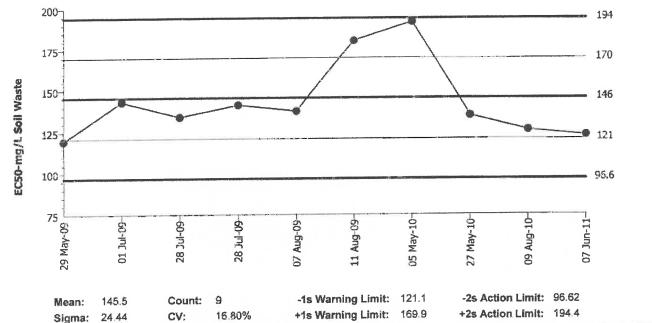
| Early Seedling Growth | | Nautilus Environmental WA |
|----------------------------|------------------------------------|-------------------------------|
| Test Type: Survival-Growth | Organism: Lactuca sativa (Lettuce) | Soil Waste |
| Protocol: WDOE 96-324 | Endpoint: Survival Rate | Reference Toxicant-REF |



Quality Control Data

| | · | | | OC Data | Delta | Sigma | Warning | Action | Test ID | Analysis ID |
|-------|------|-----------------|----|------------------|--------|---------|----------|--------|--------------|--------------|
| Point | 2009 | 1.1. A.B. 11991 | 29 | QC Data 220.6 | -20.79 | -0.3067 | statting | | 09-0219-1410 | |
| 2 | 2005 | Jul | 1 | 204.7 | -36.73 | -0.5415 | | | 11-7520-9930 | 03-2799-1846 |
| 5 | | 301 | 28 | 247.1 | 5.725 | 0.08445 | | | 11-1163-7315 | 08-7410-7616 |
| | | | 28 | 222.6 | -18.81 | -0.2774 | | | 18-2758-4943 | 00-2970-8628 |
| | | Aug | 7 | 217.2 | -24.18 | -0.3567 | | | 15-7179-2232 | 06-8206-1666 |
| | | | 11 | 308.6 | 67.19 | 0.9912 | | | 11-5703-1897 | 11-2523-5381 |
| | 2010 | May | 5 | 390.1 | 148.7 | 2.194 | (+) | (+) | 18-1256-6303 | 03-7353-3083 |
| 3 | | | 27 | 183 | -58.44 | -0.8621 | | | 07-5797-7609 | 02-8388-1573 |
| 3 | | Aug | 9 | 178.5 | -62.87 | -0.9274 | | | 12-0568-9729 | 00-4825-3515 |
| 10 | 2011 | Jun | 7 | 174.4 | -67.04 | -0.9889 | | | 14-4891-1513 | 00-5788-6680 |
| | | | | | | | | | | |

CETIS QC Plot Nautilus Environmental WA Early Seedling Growth Soil Waste Organism: Lactuca sativa (Lettuce) Material: Test Type: Survival-Growth Source: **Reference Toxicant-REF** Endpoint: Mean Dry Biomass-mg Protocol: WDOE 96-324 **Early Seedling Growth** 200-



Quality Control Data

| Guant | y con | troi Data | 24 | | | | | | | |
|-------|-------|-----------|-----|---------|--------|----------|---------|--------|--------------|--------------|
| Point | Year | Month | Day | QC Data | Delta | Sigma | Warning | Action | Test ID | Analysis ID |
| | 2009 | | | 119.5 | -25.98 | -1.063 | (-) | | 09-0219-1410 | 17-6385-6463 |
| 2 | | Jul | 1 | 143.2 | -2.338 | -0.09565 | | | 11-7520-9930 | 03-2381-2203 |
| 3 | | | 28 | 134 | -11.49 | -0.47 | | | 11-1163-7315 | 02-6860-1115 |
| 4 | | | | 141.2 | -4.285 | -0.1753 | | | 18-2758-4943 | 06-5912-1272 |
| 5 | | Aug | 7 | 137.6 | -7.927 | -0.3244 | | | 15-7179-2232 | 09-0615-4224 |
| 5 | | rug | 11 | 180.6 | 35.06 | 1.435 | (+) | | 11-5703-1897 | 06-6378-5558 |
| | 2010 | May | 5 | 192.1 | 46.62 | 1.908 | (+) | | 18-1256-6303 | 11-1099-1174 |
| 3 | 2010 | is sury | 27 | 135 | -10.5 | -0.4295 | | | 07-5797-7609 | 00-1486-3034 |
| | | | | | -19.28 | -0.7888 | | | 12-0568-9729 | 16-9445-1694 |
| 9 | | Aug | 9 | 126.2 | -13.20 | -0.1000 | | | | |
| 10 | 2011 | Jun | 7 | 123.1 | -22.38 | -0.9158 | | | 14-4891-1513 | 14-6511-7777 |

Analyst: IF QA: W

| CETIS Sun | nmary Repo | rt | | | | | | oort Date: t Code: | | 0711LS 14 | |
|---|---|-------------------|-----------------|---|------------------|--|------------------|--|-------------------------|-------------|-----------|
| Early Seedling | g Growth | | | | | | | | Nautili | us Environ | mental WA |
| Batch ID: Start Date: Ending Date: Duration: | 18-2865-3267 07 Jun-11 14:30 21 Jun-11 13:00 13d 22h |) | Species: La | rvival-Growtl DOE 96-324 ctuca sativa rritorial Seed | | | | uent: Not | ghan Feuk Applicable | | |
| | 02-9240-0634 07 Jun-11 14:30 07 Jun-11 14:30 N/A | | Waterial: So | 060711LS il Waste ference Toxi | cant | | - | ent: Ref nject: | erence Toxic | cant Test | |
| Comparison S | Summary | | | | | | | | | | |
| Analysis ID | Endpoint | | NOEL | LOEL | TOEL | PMSD | TU | Method | | | |
| 16-6058-4487 | Mean Dry Bioma | ass-mg | 80 | 160 | 113.1 | 36.9% | | | ny-One Rani | | 4 |
| 13-0090-5880 | Survival Rate | | 80 | 160 | 113.1 | 15.0% | | Dunnett's | Multiple Co | mparison I | |
| Point Estimat | e Summary | | | | | | | | | | |
| Analysis ID | Endpoint | | Level | mg/kg | 95% L.CL | 95% UCL | TU | Method | | | |
| 14-6511-7777 | Mean Dry Bioma | ass-mg | IC25 | 96.96 | 69.77 | 107.2 | | Linear Int | erpolation (I | CPIN) | |
| | Contract Contractor | | IC50 EC50 | 123.1 | 103 | 141.1 | | Trimmed | Spearman-k | (ärber | (W.S |
| 00-5788-6680 | | | EC30 | 1/4.4 | 100.0 | 100.0 | | T this is the second se | oposition | | |
| | mass-mg Summ | | | | | | | 014 5 | Cad Dave | CV% | %Effect |
| Conc-mg/kg | | Count | | 95% LCL | 95% UCL 1,193 | Min 0.3375 | Max 1,398 | 0.2003 | Std Dev 0.448 | 43.68% | 0.0% |
| 0 | Background Soil | | 1.025 | 0.8582 | 1.456 | 0.3375 | 1.785 | 0.1329 | 0.2972 | 22:1% | -31.13% |
| 40 | | 5 | 1.345 1.127 | 1.035 | 1.219 | 0.9242 | 1.502 | 0.11 | 0.246 | 21.82% | -9.93% |
| 08 | | 5 | 0.2675 | 0.2004 | 0.3346 | 0.01 | 0.5108 | 0.08033 | 0.1796 | 67.15% | 73.91% |
| 160 | | 5 | 0.2875 | 0.005819 | 0.04818 | 0 | 0.1283 | 0.02537 | 0.05672 | 210.1% | 97.37% |
| 320 | | 5 5 | 0.027 | 0.002146 | 0.02386 | 0 | 0.065 | 0.013 | 0.02907 | 223.6% | 98.73% |
| 640 | | .) | 0,010 | 0.002 140 | 0.02000 | ÷ | | | | | |
| Survival Rate | | | | | | | | | Odd Davi | C) /0/ | %Effect |
| Conc-mg/kg | | Count | | 95% LCL | 95% UCL | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | Max 1 | 0.02041 | Std Dev 0.04564 | CV% | 0.0% |
| D | Background Soil | | 0.95 | 0.933 | 0.967 | 0.9167 | 1 | 0.03333 | 0.07454 | 7.71% | -1.75% |
| 40 | | 5 | 0.9667 | 0.9388 | 0.9945 0.9472 | 0.8333 0.9167 | 1 | 0.01667 | 0.03727 | 3.99% | 1.75% |
| 80 | | 5 | 0.9333 | 0.9194 0.4577 | 0.6423 | 0.3107 | 0.9167 | 0.1106 | 0.2472 | 44.95% | 42.11% |
| 160 | | 5 = | 0.55 0.06667 | 0.03258 | 0.1008 | 0.2.5 | 0.1667 | 0.04082 | 0.09129 | 136.9% | 92.93% |
| 320 640 | | 5 5 | 0.01667 | 0.002751 | 0.03058 | 0 | 0.08333 | 0.01667 | 0.03727 | 223.6% | 98.25% |
| | mass-mg Detail | | 0,01507 | | | - | | | | | |
| Conc-mg/kg | | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | | | | | |
| 0 | Background Soil | | 1.232 | 0.3375 | 0.8133 | 1.347 | | | | | |
| 40 | | 0.9925 | | 1.393 | 1.786 | 1.383 | | | | | |
| 80 | | 0.9242 | | 1.502 | 1.246 | 1.031 | | | | | |
| 160 | | 0.3042 | | 0.01 | 0.5108 | 0.2875 | | | | | |
| 320 | | 0 | 0.006663 | 0 | 0.1283 | 0 | | | | | |
| 640 | | 0 | 0 | 0 | 0 | 0.065 | -11 ¹ | | | | |
| Survival Rate | Detail | Stantan - C C. In | | | | | | | | | |
| Conc-mg/kg | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | satu, | | | | |
| 0 | Background Soil | | 1 | 0.9167 | 0.9167 | 0.9167 | | | | | |
| 40 | | 1 | 1 | 1 | 0.8333 | 1 | | | | | |
| 80 | | 0.9167 | | 0.9167 | 0.9167 | 1 | | | | | |
| 160 | | 0.5833 | | 0.25 | 0.9167 | 0.5833 | | | | | |
| 320 | | 0 | 0.1667 | 0 | 0.1667 | 0 0.08333 | | | | | |
| 640 | | 0 | 0 | 0 | 0 | 0.00000 | | | | | |

Report Date:

31 Aug-11 16:13 (p 1 of 1)

CETIS Summary Report

14-Day Soil Toxicity Test

Soil Quality Measurements

| | a ana ana ana ana ana ana ana ana ana a | ş |
|--------------------|---|------------|
| Reference Towicard | 640mg/Kg B1503 | RT000711LS |
| Cheat: | Sample ID: | Test ID: |

| Tech Initials | 3 | (I) | J. | W | 15- | H. | È | Hr: | S | 3 | \$ | Z | Ì | 66 | È |
|--------------------------|------|------|------|------|-------|------|------|------|------|------|------|------|------|------|-------|
| Light Intensity (Lux) | 2197 | | | | | | | 2162 | | | | | | | 2195 |
| Temperature (°C) | 21.5 | 24.0 | 27.0 | 25.0 | 2.5.X | 24.0 | 25.0 | 23.8 | 24,0 | 25.5 | 34.5 | 26.0 | 26.0 | 33.5 | 249.0 |
| Test Day | 0 | - | 7 | ~ | ** | â | 6 | 7 | æ | 6 | 10 | | 12 | 13 | 14 |

Lactuca source (buller erunch lettere) 1430 Start Date/Time: (0/7/11 I.nd Date/Fine: 12121/11 Test Species:

| Conc. (ppm) | Soil sturry pH (units) | pH (units) | Soil super (ur | Soil supernatant pH (units) |
|---------------|------------------------|------------|-------------------|--------------------------------|
| | initial | final | initial | fual |
| Lab Control | 1.27 | 1.81 | 7.37 | 1:40 |
| 40 | T.16 | 7.100 | 7.13 | 1.2 |
| 80 | 7.10 | 159 | 1.07 | 3.05 |
| 160 | F0.F.3 | 3.60 | Part | 3.63 |
| 320 | 7.05 | 3.4% | 1),L | 1.5 |
| 019 | 6.93 | 7.8 | 1911 | 立ちの |
| Tech Initials | 30 | e | No. | È |

Test Chambers RWDINA

a

T2coma, WA 98424

(253) 922-4296

5009 Pacific Hwy. E. Suite 2

Nautilus Environmental Washington Laboratory

QC Checks

Contraents:

Soil Toxicity Test

Client/Sample ID: Reference Toxicant

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Test Species: Lactuca sativa (buttererunch lettuce)

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Lettuce Seed Daily Germination Counts

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QC Check:

Comments:

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Nautilus Environmental

Washington Laboratory

| | EPf | Kefere | Mie Oficant | Start Date & Time: | 10/7/11 1430 | <u>አ</u> ን |
|--|---|--|--------------------------|---|---|-------------------------|
| ecies: | Lactuca | sativa | | Stop Date & Time: | and the second se | <u><u>'</u><u>U</u></u> |
| st #'s: | -1106 | -TFD | to thread = | DHO RTOLOD | 711-s | |
| ample ID | Cont. | Rep. | No. Seedlings Emerged | Shoot Pan Tare Wt. (g) | Pan + Wet Shoot Wt. (g) | 1 |
| | 40 | 1 | 17 | 1.627-688-13 | 1954-40 | 1.62263 |
| CON | 30 2 | 2 | 13 | 159712 | 1.98134 | 1.60374 |
| | pass interest of the pass of the second s | 3 | | 1.52754 | 1.3810100 | 1.53159 |
| | 10 | <u> </u> | | .52307 | 3307 | 1.53683 |
| ere - Sustain of Steeler an advancement | 23 | -+ 5 | | 1.56192 53 | 34 89805 | 1.51.5695 |
| - | 20 | 1 | 12 | 66/013 | 34 89805 | 1.568.04 |
| 40 | 25 | | | 100471 | 1.901020 | 1.61874 |
| | 3 | 2 | 12- | 121634 | 2.05702 | 1.69256 |
| | 19 | Contraction of the second seco | 16 | 22912 | 1,93691 | 1.76086 |
| | 8 | 4 | | 16124 | 2.0.1103 | 1.78393 |
| | 210 | 5 | 12 | 100268 | 1.32514 | 1.101367 |
| 80 | 9 | 1 | | 1.00258 | 1329 8 | 1.1.19/03 |
| | 24 | 2 | 111 | 15529 | 2.040108 | 171331 |
| | | 3 | | 1.67500 | 1.91320 | 1.108995 |
| | 13 | 4 | | | 14503 | 1.73202 |
| | 13 | 5 | 12- | 1 | 1. 102073 1.773 | |
| Non | 1 /1 | 1 | | | 1.76364 | 1.73996 |
| | 27 | 2 | 5 | 1.73726 | | 1.5506 |
| | 21 | 3 | 3 | 1.55054 | .56756 | 1.54741 |
| | 17 | 4 | | 1.94120 | 1.58.093 | 1.62738 |
| | 110 | 5 | 4 | 1.50213 | 1.97501.9 | 1.07 100 |
| 320 | 18 | 1 | 0 | 1.23.27 | 1.54589 | 1.53001 |
| and the second s | de fe | 2 | 2 | 1.52993 | 1.94907 | 1.0000 |
| AND | 14 | 3 | 0 | 1.528112 | 5 G A 2. 188 | 1.81628 |
| | 5 | 4 | 2 | 1.81 610-17 | 1.824095 | 1.01000 |
| and the second | 17 | 5 | 0 | 1.107107 | | |
| 640 | 28 | 1 | 0 | 01.547838 | | |
| | 28 | 2 | 8 | 1.52280 | | |
| Per 1 (1999) | 10 | 3 | 0 | 1,60600 | | |
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Comments: Date/Time in:

| Initial number of seeds a | added to each replicate | = 12 |
|---------------------------|-------------------------|-------|
| <u>ul210</u> | Oven Temp (°C): | 107.0 |
| 7/6/11 1580 | Oven Temp (°C): | 102.0 |

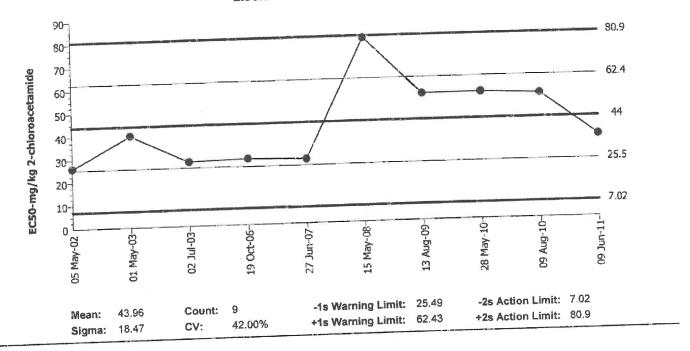
QC:

112 Date/Time out: 7

CETIS QC Plot

| | | | | | And a second |
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| | and a second | | and a second | | Nautilus Environmental WA |
| Eisenia 14- | d Survival Soil Test | | | | 2-chioroacetamide |
| | | Orgoniem' | Eisenia fetida (Red worm) | | |
| Test Type: | Survival | | | Source: | Reference Toxicant-REF |
| | | Endpoint | Survival Rate | 304160. | |
| Protocol: | WDOE 96-327 | | | | |

Eisenia 14-d Survival Soil Test



| | | trol Data | | | | | Mouning | Action | Test ID | Analysis ID |
|-------|------|-----------|-----|---------|--------|---------|---------|--------|--------------|---|
| Point | Year | Month | Day | QC Data | Delta | Sigma | Warning | Action | | |
| | 2002 | | 5 | 26.17 | -17.79 | -0.9631 | | | 18-0678-2428 | |
| 2 | 2003 | - | 1 | 39.91 | -4.055 | -0.2195 | | | 02-9873-1034 | |
| 3 | | Jul | 2 | 28.07 | -15.89 | -0.8602 | | | | |
| | 2006 | Oct | 19 | 28.75 | -15.21 | -0.8232 | | | 19-0311-5351 | |
| 5 | 2007 | | 27 | 28.01 | -15.95 | -0.8634 | 0.00 | | 20-3102-3790 | |
| 6 | | May | 15 | 80 | 36.04 | 1,951 | (+) | | 20-6120-4139 | |
| 7 | | Aug | 13 | 55.16 | 11.2 | 0.6061 | | | 13-2033-4602 | the second se |
| 8 | | May | 28 | 55.28 | 11.32 | 0.6127 | | | | 02-4525-0355 |
| 9 | | Aug | 9 | 54.28 | 10.32 | 0.5589 | | | 14-4766-0393 | |
| 10 | 2011 | - | 9 | 35.82 | -8.136 | -0.4405 | | | 14-4:00-0050 | 10.0100 |

Analyst:______ QA:_____

| CETIS Sum | mary Repo | rt | | | | | | Report Dat Test Code: | | | lun-11 14:5 911EF 14 | • • |
|---|--|--------|--|---|--------------|----------------------|-----|--|-------|--------------|-------------------------------------|---------|
| | - | | | | со со — со ф | | | Test Code: | | | s Environn | |
| Eisenia 14-d S | urvival Soil Tes | t | | | | | | A | | | | |
| Batch ID: Start Date: Ending Date: Duration: | 20-0867-4021 09 Jun-11 14:00 23 Jun-11 14:00 14d Dh | | Test Type: Protocol: Species: Source: | Survival WDOE 96-327 Eisenia fetida Aquatic Resear | rch Organisn | ns, NH | | Analyst: Diluent: Brine: Age: | | han Feuk | | |
| | 06-4903-5718 09 Jun-11 14:00 23 Jun-11 14:00 N/A | | Code: Material: Source: Station: | RT060911EF 2-chloroacetan Reference Tox | | | U | Client: Project: | Refe | arence Toxic | ant Test | |
| Comparison S | Summary | | | | | and the state of the | | Meti | | | | |
| Analysis ID | Endpoint | | NOEL | | TOEL | PMSD | TU | | | Multiple Cor | nnarison Tr | est |
| 14-8257-9163 | Survival Rate | | 20 | 40 | 28.28 | 6.59% | | | neu s | | invanisori in | **** |
| Point Estimate Analysis ID | e Summary Endpoint | | Leve | mg/kg | 95% LCL | ****** | TU | Meti | | | F10 to a a | |
| | Survival Rate | | EC50 | 35.82 | 31.38 | 40.89 | | Trim | med | Spearman-k | arber | |
| Survival Rate | | | | 95% LCL | 95% UCL | Min | Max | c Std | Err | Std Dev | CV% | %Effect |
| | Control Type | Cour | nt Mean 1 | 1 95% LUL | 1 | 1 | 1 | 0 | | 0 | 0.0% | 0.0% |
| 0 | Control Sed | 3 | 0.933 | | 0.9549 | 0.9 | 1 | 0.03 | 333 | 0.05774 | 6.19% | 6.67% |
| 10 | | 3 | 0,933 | 1 | 1 | 1 | 1 | C | | 0 | 0.0% | 0.0% |
| 20 | | 3 3 | 0.366 | | 0.3882 | 0.3 | 0.4 | 0.03 | 333 | 0.05774 | 15.75% | 63.33% |
| 40 | | 3 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | | 100.0% |
| 80 | | | | | | | | | | | | |
| Survival Rate | | - | | 0 10 2 | | | | | | | | |
| Conc-mg/kg | Control Type | Rep | | | | | | | | | | |
| 0 | Control Sed | 1 | 1 | 1 0.9 | | | | | | | | |
| 10 | | 1 | 0.9 | 1 | | | | | | | | |
| 20 | | 1 | 1 0.3 | 0.4 | | | | | | | | |
| 40 | | 0.4 | 0.3 | 0.4 | | | | | | | | |
| 80 | | 0 | V | v | | | | | | | فالمو بالمنطونية وتبادئ وعادي ويترب | |

000-089-180-4

Analyst:______ OA:______

Report Date:

29 Jun-11 14:51 (p 1 of 1) PT060011EE114-4766-0393

Environmental Quality Results - 14-Day Soil Nautilus Environmental

final C 0 0 3 0 0 寸 t 0 0 C. 0 0 0 5 3 Survival 400 Eisenia joenido 2) 4 initial 9 10 100 2 1 0 10 3 11 01 Ê Ŧ 1 Gi 21 lation 683 650 612 è Start Date/Time: (019 final HE0/ 45 Conductivity (mbom-cm) 210 End Date/Time: 20 524 **Test Species:** 580 528 initial 7.99 7.30 4.4 4.80 7.65 final R pH (units) initial fin 7.35 1.28 1.29 1.25 12 48.8 572 630 Ruch 44.21 553 final A % Moisture 1-16+ 647 0 initial 10. t t **Tech Inituits** SUD Cont. 3 9 14 09 30 5 the second 0 * 1 2 The second second 5 Rep. $\sigma r_{\rm b}$ e 1 rs, 1.1 - \mathcal{O} ~ e7, Conc. ug/J. Con 01 20 40 08 80 ug/L. 2-Chloroacetamide KTDUR RD911 EI Reference Towicant S Tech Initials S 30 Z 35 10 3 3 25 R -10 14 11 22.0 72.0 23.0 0.12 22.0 21.5 22.0 2.0 22.1) 21.9 32.6 2.9 220 Temp (°C) 219 21.9 Sample ID: Test Day 14 Client: Test #: $\tilde{\mathbf{T}}$ 9 10 -----12 9 -00 -NP) 0 , , ~ PP4

Test Chamber: Rpn A

Washington Laboratory - 5000 Pacific Hwy. F., Suite 2. Incoma, WA 98424

APPENDIX D - Chain-of-Custody Forms

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| Multilitä Chulkingingingingingingingingingingingingingi | N | (| | 4 | TING LOCAT | resting Location (Please Check Box) | Check Box) | | | | Chain of Custody | ustody |
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| Report to: Structure for the foundation of the foundat | amu'a Collartion 5v: | | | | | | | | | ANAL | ses required | с) |
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| Address EFF ALE GLUTIAN GLAD FLAC GLAD FLAC Chyl State (zer [55:6:0:14] und 78:0:2:14] und 78:0:0:14] Und 78:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0 | | JURDNACN | | | Compan | . > | and the second | | 371 | 34 | | əture |
| Contract 155-05.0 155-05.0 Сонтакт 155-05.0 Сонтакт 15 1 <td></td> <td>295 NE G</td> <td>(VW)</td> <td></td> <td>Address</td> <td>Alternation of the second s</td> <td>JANE</td> <td>a substantia de la constantia de la constan</td> <td>n JL S</td> <td>70</td> <td></td> <td>Jadı</td> | | 295 NE G | (VW) | | Address | Alternation of the second s | JANE | a substantia de la constantia de la constan | n JL S | 70 | | Jadı |
| Fridual Each Each Phone Email $eric$ (Eucr ES) Email Email $eric$ (Eucr ES) SHEG 22-31/G 51/3/11 501L 1 1 SHEG 22-0(2) 51/3/11 501L 1 1 SHEG 22-0(2) 51/3/11 501L 1 1 SHE 200-3/27 51/3/11 501L 1 1 SHE 200-3/17/11 501L 1 1 1 SHE 200-3/17/11 501L 1 1 1 SHE 200-3/17/11 501L 2 1 1 SHE 200 5/17/11 501L 1 1 SHE 200 5/17/11 501L 1 1 SHE 200 5/17/11 501L 501L 1 Witt 5/17/11 501L 501L 1 Witt 5/17/11 501L 501L 1 Witt 5/11 501L 501L 1 <td>City/State/Zip Contact-</td> <td>155000Ar</td> <td>WA 0614</td> <td>12086</td> <td>City/Sta Contact</td> <td>ite/Zip</td> <td></td> <td></td> <td>tana iti na panananan</td> <td>pa - j</td> <td></td> <td>m9T Ji</td> | City/State/Zip Contact- | 155000Ar | WA 0614 | 12086 | City/Sta Contact | ite/Zip | | | tana iti na panananan | pa - j | | m9T Ji |
| DATE TARE MATRIX CONVERT MO. OF COMMENTS \mathcal{L}_{2} $S[i_3]_{11}$ $SoiL$ i_1 $SoiL$ i_1 $SoiL$ i_2 $S[i_2]_{11}$ $SoiL$ i_1 $SoiL$ i_1 $SoiL$ i_2 $S[i_2]_{11}$ $SoiL$ i_1 $SoiL$ i_1 $SoiL$ i_2 $S[i_2]_{11}$ $SoiL$ i_1 $SoiL$ i_2 i_2 $S[i_1]_{11}$ $SoiL$ i_1 $SoiL$ i_2 $S[i_1]_{11}$ $SoiL$ i_1 i_2 i_2 $S[i_1]_{11}$ $SoiL$ i_1 i_2 i_2 $S[i_2]_{11}$ $SoiL$ i_2 < | Phone # | 0 | Korre Pirwa | 5 corr | Phone Email | | | | | LVSSE | | qieceA |
| SHERZ-3:16 $5[13]_{11}$ SCIL 1 1 2 $2555 - cg_{10}$ $5[17]_{11}$ $5c_{1L}$ 1 | And I show the second | | A New | MATRIX | CONTAINER | WO, OF | COMMENTS | | ar anna 14 17 19,144 | 10:5 | | |
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| $SHY-M[G]$ $S(S)T$ S_0TL Z Z X X $W(S)(L-M)X2H$ $S(T)T H$ S_0TL S_0TL X X $W(S)(L-M)X2H$ $S(T)T H$ S_0TL S_0TL X $W(S)(L-M)X2H$ $S(T)T H$ S_0TL Z X $W(S)(L-M)X2H$ $S(T)T H$ S_0TL T X $W(S)(L-M)X2H$ $S(T)T H$ S_0TL $RELINOUSHED BY (CLEMT)$ X $W(S)(L-M)X2H$ $S(T)TL$ $S(T)$ $RELINOUSHED BY (CLEMT)$ X $W(S)(L-M)X2H$ T $S(T)TL$ $S(T)$ X X $W(S)(L-M)X2H$ $RELINOUSHED BY (CLEMT)$ $RELINOUSHED BY (CLEMT)$ X $W(S)(L-M)X2H$ $RECINATIONRECINATIONRECINATIONRECINATIONW(S)(L-M)X2HRECINATIONRECINATIONRECINATIONRECINATIONW(S)(L-M)X2HRECINATIONRECINATIONRECINATIONRECINATIONW(S)(L-M)X2HRECINATIONRECINATIONRECINATIONRECINATIONW(R)RECINATIONRECINATIONRECINATIONRECINATIONRECINATIONW(R)RECINATIONRECINATIONRECINATIONRECINATIONRECINATIONW(R)RECINATIONRECINATION$ | 1200 0000 1607 | Shely | A no substitution of the | 5012 | | - | | | | -+- | | |
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| Soil Soil Soll Relation Relation Solution Soluti | YF 55-01 | 5/111 | | 5015 | | - | | | <u>× </u> _ | | | |
| WESC-AW-35/Brc/Strint Soil Soil FR55-56 501 501 FR55-56 511 501 FR055-786 71111 FR055-786 71111 FR055-786 71111 FR055-786 71111 FR055-786 71111 FR055-786 71111 FR055-786 501 FR056-786 501 FR056-786 501 FR058-786 501 FL55-56 511-055 FL55-56 511-055 FL55-56 511-055 FL55-56 511-055 FL55 501 FL55 501 FL55 501 FL55 501 FL55 501 FR050 500 FR050 500 FL55 501 FR050 500 FR050 | WS11-A131 (8K | 0 | | Solt | | ~ | | | ~ | 1000 | 1 | |
| States - Big S | WSG-AW35 BEL | | | Sore | and the second se | - | | | | 10-14 | 11 | |
| PROJECT INFORMATION SAMPLE RECEIPT RELINDUGGHED BY (CLIENT) Client: Total No. of Contrainers Separate Client: Total No. of Contrainers Separate PO No.: Recrived Good Condition? EALC Shipped ELSS Contrainers Spectral INSTRUCTIONS/COMMENTS: EACHW OW ELSS Climpt Climpt Received Good Condition? ELSS Shipped Climpt Sective device | <u>i</u> | 5/11/11 | | 501L | | | | | - | 0 | NITSHED BY (COURTER | |
| and No. of Containers (Somether) A A The Annal A | | MATION | and the second | SAMPLE RECEIP | | | RELINOUGHED BY (CLICN) | | 1 Clonents and | | | |
| resived Good Condition? Exic Kory Locyes (2): (mined with the condition of the conduction of the condu | Cleat | | Total No | , of Containers | | (Signature) | The 1 | 0 | | | | (Date) |
| atches Test Schedule? Company Company Exit Row MENTAL PARTNELS (MC, Company Lefter & Contrast Schedule? Exit Row Mental RECEIVED BY (COURTER) (Time) 899% (Contrast Schedule) (Time) 899\% (Contrast Schedule) (Time) 899\% (Con | - ON Da | | Received | Good Condition | | (Printed Name) | | (Date) | (Phried Nam | (9 | | |
| Letture & Earthwelth (Segnature) RECEIVED BY (COURIER) (1990) (2990) (290) | Shipped | a a constant | Matches | Test Schedule? | | (Company) | | 45/20, | (Company) | | | |
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| (Petroof (Petroof (Conpary) (Conpary) | ELSS-06 | 0-115 | | | Ware Must | (Segnature) | | (Time) | S | くちょう | S | 2 Tar |
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| | | | | | | (Company) | | | Company | Aut. Tu | S | |

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contr

Table 1 Summany of Soil Sample Analytical Results for Diesel and Oil Range Total Petroleum Hydrocarbons (in mg/kg) Remedial Action Excavation Seattle, WA

| PA32117 14 190 2.000 2.000 PA32217 21 190 4.50 4.200 PA32217 21 190 4.50 4.200 PA32112 12 190 4.50 4.200 PA332147 14 190 4.50 4.200 PA332147 14 190 4.50 4.200 PA45114 14 190 4.50 4.200 PA45114 14 190 4.50 4.200 PA45117 15 No. 2.200 4.200 PA45117 17 Yes 4.50 4.200 PA45117 18 Yes 4.50 4.200 PA45217 17 Yes 5.5 | Sample ID | Sampia Depth (feet bgs) | Final Performance Sample | Diesel- Range TPH ^{ex} | Oll-Range TPH ⁰¹ | |
|---|-----------------|----------------------------|--------------------------------|------------------------------------|--------------------------------|----------|
| Patholine Tel No. | P-B-1:13 | | | | | |
| De11:10 16 Yes 420 -220 PB-22135 13.3 Yes 14.0 -220 PB-22135 13.3 Yes 420 -220 PB-22135 13.3 Yes 420 -220 PB-22135 13.5 Yes 690 -220 PB-22135 15.5 Yes 690 -220 PB-3216 16 Yes 690 -220 PB-3216 16 Yes 690 -220 PB-3216 16 Yes 450 -220 PB-3216 16 Yes 450 -220 PB-3216 16 Yes 450 -220 PB-3216 15 Yes 450 -220 PB-3217 17 Yes 450 -220 PB-3217 13 Yes 450 -220 PB-3217 13 Yes 450 -220 PB-3217 15 Yes 450 | P-B-1:16 | | | | | |
| Bar | | 16 | Yes | <50 | <250 | |
| Base Test Test <thtest< th=""> Test Test <tht< td=""><td></td><td></td><td></td><td></td><td></td><td></td></tht<></thtest<> | | | | | | |
| Page 125 12.5 Yes <50 <220 PA3115 13 Yes <50 | P-B-22:13.5 | | | | <250 | |
| P4-31:16 14 Yes 2.029 -232. P4-31:15 15.5 Yes 856 -232. P4-32:14 14 Yes -252. -252. P4-32:14 14 Yes -450. -252. P4-32:14 14 Yes -450. -252. P4-33:14 14 Yes -450. -252. P4-35:14 14 Yes -50. -250. P2-35:14 14 Yes -50. -250. P2-45:15 15 No. .260. -250. P2-45:17 17 Yes -50. -250. P2-45:17 18 Yes -50. -250. P2-45:17 18 Yes -50. -250. P2-45:17 17 Yes -50. -250. P2-45:17 18 Yes -50. -250. P2-45:17 18 Yes -50. -250. P2-45:17 17 Yes </td <td>P-B-24:12.5</td> <td>12.5</td> <td>Yes</td> <td><50</td> <td></td> <td></td> | P-B-24:12.5 | 12.5 | Yes | <50 | | |
| B-B-B-B-B-B-B-B-B-B-B-B-B-B-B-B-B-B-B- | P-B-3:13 | | | | | |
| B-B-32:1/I 14 No. 2.280 420 PA-32:1/I 21 Yes 450 420 PA-32:1/I 12 Yes 470 420 PA-32:1/I 16 Yes 450 420 PA-33:1/I 16 Yes 450 420 PA-32:1/I 16 Yes 450 420 PA-33:1/I 16 Yes 450 420 PA-32:1/I 16 Yes 450 420 PA-45:1.1 15 Yes 450 420 PA-45:1.1 15 Yes 450 420 PA-45:1.1 17 Yes 450 420 PA-45:1.1 18 Yes 450 420 PA-45:1.1 13 Yes 450 420 PA-45:1.1 13 Yes 450 420 PA-45:1.1 13 Yes 450 420 PA-45:1.2 12.5 Yes 450 | P-8-31:14 | | | | | |
| PA-32:21 21 Yes 450 420 PA-32:12 12 Yes 450 420 PA-35:16 16 Yes 450 420 PA-35:17 17 Yes 450 420 PA-35:17 15 Ne 50 420 PA-35:17 15 Yes 450 420 PA-35:17 15 Yes 450 420 PA-35:17 17 Yes 450 420 PA-35:17 13 Yes 450 420 PA-35:17 13 Yes 450 420 PA-35:17 13 Yes 450 420 PA-35:17 15 Ne 450 420 PA-35:12 15 Yes 450 420 | P-B-32:14 | 14 | | 2.200 | <250 | |
| Passing 16 Yes <50 <220 Passing 16 Yes <50 | P-B-32:21 | | | | | |
| B-B-B-B-B-B-B-B-B-B-B-B-B-B-B-B-B-B-B- | P-B-34:12 | | | | | |
| B-B-B-011 13 | | | | <50 | <250 | |
| DB-86.14 14 Yes 450 250 DB-86.11 15 No. 2,800 250 DB-86.115 15 No. 2,800 250 DB-85.115 15 Yes 450 420 DB-85.117 17 Yes 450 420 DB-85.117 17 Yes 4,50 420 DB-85.117 17 Yes 4,50 420 DB-85.117 13 Yes 5,50 420 DB-85.117 13 Yes 5,50 420 DB-85.117 13 Yes 5,50 420 DB-86.13 14 Yes 5,50 | P-B-37:14 | | | | | |
| PA-8.015 15 No J.200 C220 PA-8.017 17 Yms 450 C220 PA-8.017 17 Yms 450 C220 PA-8.015 15 Yms 450 C220 PA-8.115 15 Yms 450 C220 PA-8.115 15 Yms 450 C220 PA-8.112 13 Yms 450 C220 PA-8.113 13 Yms 450 C220 PA-8.113 13 Yms 450 C220 PA-8.12 13 Yms 450 C220 PA-8.12 12 Yms 450 C | | | Yes | | | |
| plsB017 17 Yes 450 220 Pa95315 15 Yes 450 220 Pa95317 13 Yes 450 220 Pa95317 15 Ne 450 220 Pa953212 25 Yes 450 220 Pa95321 43 Yes 50 220 | | 14 | | | | |
| AbbBit 15 Yes 450 220 PABBIT 15 Yes 450 220 PABBIT 15 Yes 450 220 PABBIT 15 Yes 450 420 PABBIT 15 Yes 450 420 PABBIT 13 Yes 450 420 PABBIT 13.5 Yes 450 420 PABBIT 13 Yes 450 420 PABBIT 13 Yes 450 420 < | | | | | | |
| B-84:15 15 Yms 4:50 220 P-85:017 17 Yms 1,700 520 P-85:016 15 Yms 4:50 -520 P-85:017 13 Yms 4:50 -520 P-85:016 13 Yms 4:50 -520 P-85:017 13 Yms 1.020 -520 P-85:017 13 Yms 1.020 -520 P-85:017 13 Yms 1.020 -520 P-85:017 13 Yms 4:50 -520 P-85:017 13 Yms 4:50 -520 P-85:017 15 No 2.999 -520 P-85:017 15 No 2.999 -520 P-87:015 15 No 2.990 -520 P-87:024 24 Yms -550 -520 P-87:021 13 Yms -50 -520 P-88:021 2.5 Yms -50 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> | | | | | | |
| p42.65.17 17 Ym 1.700 -220 p42.65.17 15 Ym -220 -220 p42.61.18 13 Ym -220 -220 p42.61.18 13 Ym -220 -220 p42.61.18 13 Ym -250 -220 p43.61.17 13 Ym -650 -220 p43.61.17 13 Ym -650 -220 p43.61.17 13 Ym -650 -220 p43.61.17 12.5 | | | | | | |
| B-B-0112 19 Yes 450 -520 B-B-0112 13 Yes 4.500 -520 P-B-0112 13 Yes 4.500 -520 P-B-0112 13 Yes 4.500 -520 P-B-0112 13 Yes 4.500 -520 P-B-01125 12.5 Yes 4.500 -520 P-B-01125 12.5 Yes 4.500 -520 P-B-01125 13.5 Yes 4.500 -520 P-B-0125 13.5 Yes 4.500 -520 P-B-0125 12.5 Yes 4.50 -520 P-B-0125 12.5 Yes 4.50 -520 P-B-0125 12.5 Yes -50 -520 P-B-0125 12.5 <td< td=""><td>P-B-55:17</td><td></td><td></td><td></td><td></td><td></td></td<> | P-B-55:17 | | | | | |
| Description 1.900 220 P4:95:12 13 Yes 4.50 220 P4:95:13 13 Yes 4.50 220 P4:95:13 13 Yes 4.50 220 P4:95:13 13 Yes 4.50 220 P4:95:12 12.5 Yes 50 220 P4:95:12 12.5 Yes 140 220 P4:95:12 12.5 Yes 160 220 P4:97:12 12.5 Yes 50 220 P4:97:12 12.5 Yes 50 220 P4:97:24 24 Yes 50 220 P4:97:12 13 Yes 50 220 P4:97:12 13 Yes 50 220 P4:97:12 13 Yes 20 220 P4:97:12 10 Yes 20 220 P4:97:12 10 Yes .20 | | | | | | |
| P4-85.12.0 12.5 Yes - 450 - 220 P4-85.12.0 13 Yes 1.700 520 - 5 | | | | | <250 | |
| P4-85.117 13 Yes 1.709 520. 520. P4-86.12 13 Yes 450. -220. P4-86.12 13 Yes 450. -220. P4-86.12 13 Yes 450. -220. P4-86.12 13 Yes 440. 520. -220. P4-96.12 13.5 Yes 440. 520. -220. P4-97.12 13.5 Yes 450. -220. P4-97.220. P2-92.021.5 | P-B-63:12.5 | 12.5 | Yes | <50 | <250 | |
| D_2_B_B_B_17 13 Yes <50 250 <th< td=""><td>P-B-65:13</td><td></td><td></td><td></td><td><250</td><td></td></th<> | P-B-65:13 | | | | <250 | |
| 62.87.19.26 12.25 12.8 12.8 P4297128 12.25 19.8 12.80 12.80 P4297128 12.3 19.8 12.80 12.80 P4297128 12.3 19.8 12.80 12.80 P4297128 12.3 19.8 12.80 12.80 P4297128 12.5 19.8 5.50 -22.0 P4297128 12.5 19.8 45.50 -22.0 P4297128 12.5 19.8 45.0 -22.0 P4297128 13 19.7 19.8 -20.2 -22.0 P4297128 11 19.8 9.20 -22.0 -22.0 P4297129 10 19.8 9.20 -22.0 -22.0 P42971217 10 19.8 9.20 -22.0< | DLP-8-66:13 | 13 | | <50 | | |
| L28.41.15 19.5 Yes -520 -520 L28.41.15 19.5 No 2.200 -520 L29.10.15 19. No 2.200 -520 L20.10.15 22.5 No 3.200 -520 L9.17.524 24 Yes -550 -520 L9.27.524 24 Yes -550 -520 L9.27.524 24 Yes -550 -520 L9.26.012.5 12.5 Yes -550 -520 L9.26.012.5 12.5 Yes -550 -520 L9.26.012.5 12.5 Yes -550 -520 L9.26.012.5 13 Yes -550 -520 L9.26.012.7 17 Yes -520 -520 L9.26.012.7 10 Ne -520 -520 L9.26.012.7 17 Yes -520 -520 L9.26.012.7 17 Yes -520 -520 L9.26.012.7 1 | P-3 87:12.5 | | | | 1(350) | B-64:12. |
| PA-0.015 15 No 2.269 | | | | | | |
| PA-TO235 P2-55 No. 3.660 -(220) PA-TS24 24 Yes 450 -(20) PA-B20123 13 Yes 450 -(20) PA-B20123 13 Yes 450 -(20) PA-B20123 14 Yes 450 -(20) PA-B20123 28 Yes 450 -(20) PA-B2012 29 Yes 450 -(20) PA-B413 Yes 450 -(22) -(22) PA-B4121 11 Yes 450 -(22) PA-B4121 11 Yes 450 -(22) PA-B42411 11 Yes 450 -(20) PA-B424211 11 Yes 450 -(20) PA-B502717 17 Yes | | | No | 2,900 | <250 | |
| P.B.75.24 24 Yes <50 | P-B-70:23.5 | 23.5 | No | 3,500 | | |
| PAB-B12 13 Yes 450 -(280) PAB-B125 12.5 Yes 450 -(280) PAB-B125 12.5 Yes 450 -(280) PAB-B125 12.5 Yes 450 -(280) PAB-B125 25 Yes 450 -(280) PAB-B125 28 Yes -(50) -(280) PAB-B125 28 Yes -(50) -(280) PAB-B125 28 Yes -(50) -(280) PAB-B125 13 Yes -(50) -(280) PAB-B121 11 Yes -(50) -(280) PAB-B121 12 Yes -(50) -(280) PAB-B123 13 Yes -(50) -(280) PAB-B127-11 10 Yes -(50) -(280) PAB-B27-12-16 115 Yes -(50) -(280) PAB-B27-17-17 10 Yes -(50) -(280) PAB-B27-17-16 | P-B-75:24 | | | | | |
| PAB-0.215 12.5 Yes 450 -220 PAB-0.125 12.5 Yes 450 -220 PAB-0.125 12.5 Yes 450 -220 PAB-0.125 25 Yes 450 -220 PAB-0.125 26 Yes 450 -220 PAB-0.125 26 Yes 450 -220 PAB-0.125 28 Yes 450 -220 PAB-0.125 29 Yes 450 -220 PAB-0.125 29 Yes 450 -220 PAB-0.125 10 Nes 520 -220 PAB-0.117 11 Yes 450 -220 PAB-0.117 11 Yes 450 -220 PAB-0.117 11 Yes 450 -220 PAB-0.118 115 Yes 450 -220 PAB-0.118 115 Yes 450 -220 PAB-0.111 Yes 50 < | | | | | | |
| PB-B-13 26 Yes 450 -280 PB-B-13 14 Yes 450 -280 PD-B-B-524 14 Yes 450 -280 PD-B-B-523 28 Yes 450 -280 PD-B-B-523 28 Yes 450 -220 PD-B-B-523 29 Yes 450 -220 PD-B-B-513 13 Yes 450 -220 PB-B-17 17 Yes 450 -220 PB-B-37 12 Yes 450 -220 PB-B-37 12 Yes 450 -220 PB-B-37 10 Yes 450 -220 PB-B-37 10 Yes 450 -220 PB-337 9 Yes 450 -220 PB-337.27 10 Yes 450 -220 PB-337.47 9 Yes 450 -220 PB-337.47 9 Yes 450 <td< td=""><td>P-8-80:12.5</td><td></td><td></td><td></td><td></td><td></td></td<> | P-8-80:12.5 | | | | | |
| D-B-B-Stat 14 Yes <50 <280 D-B-B-Stat 29 Yes <50 | | | | | | |
| DeB:530 29 Yes <50 <220 DPB:552 29 Yes <50 | | | | | | |
| Applicity 10 Yes 50 -520 Applicity 10 No 6,200 -520 PASS-17 17 Yes 6,50 -520 PASS-17 10 No 6,200 -520 PASS-17 11 Yes 4,50 -520 PASS-17,12,6 12,5 Yes 4,50 -520 PASS-17,12,6 13 Yes 4,50 -520 PASS-17,13 13 Yes 4,50 -520 PASS-17,13 10 Yes 4,50 -520 PASS-17,13 10 Yes 4,50 -520 PASS-17,14 10 Yes 50 -520 PASS-17,15 10 Yes 50 -520 PASS-17,16 10 Yes 50 -520 PASS-17,16 10 Yes 50 -520 PASS-17,16 10 Yes 50 -520 PASS-17,10 10 Yes | LP-8-85:29 | | Yes | | | |
| Lable217 17 Yes -50 -220 PASW2-17 10 No 6.200 -220 PASW2-17 11 Yes 450 -220 PASW2-11 11 Yes 450 -220 PASW2-11 11 Yes 450 -220 PASW2-11 11 Yes 520 -220 PASW2-113 10 Yes 520 -220 PASW2-113 10 Yes 520 -220 PASW2-113 10 Yes 140 -220 PASW2-113 10 Yes 140 -220 PASW2-113 10 Yes 140 -220 PASW2-113 10 Yes 10 -220 PASW2-116 10 Yes 50 -220 PASW2-116 10 No 720 360 PASW2-10 10.5 No 360 220 PASW2-10 10.5 No 360 | DLP-8-85:29 | | | | | |
| P_ESEV.10 10 No. 6.260 -220. P_ESEV.210 11 11 Yes < | | | Yes | | <250 | |
| LB STVATULE / 12.9 Yes -500 -520 LB STVATULE / 11 Yes -520 -520 LB STVATULE / 11 Yes -520 -520 LP SEWACTILE / 11 Yes -520 -520 LP SEWACTILE / 11 Yes -520 -730 LP SEWACTILE / 115 Yes 1.400 -520 LP SEWACTILE / 115 Yes 1.400 -520 LP SEWACTILE / 14 Yes 1.400 -520 LP SEWACTILE / 10 Yes -520 -520 LP SEWACTILE / 10 Yes -50 -520 LP SEWACTILE / 10 Yes -50 -520 LP SEWACTILE / 115 Yes -50 -520 LP SEWACTILE / 110 Yes -50 -520 LP SEWACTILE / 110 Yes -50 -520 LP SEWACTILE / 110 Yes -50 -520 | | 10 | | | | |
| Lassyster 11 Yes 9,200 | P-ESW-42:11 | | | | | |
| PLSEW:09:07 0.5 Yes 4.50 -(250) PLSEW:01:07:10 13 Yes 4.600 (250) PLSEW:01:07:10 115 Yes 4.600 (250) PLSEW:01:07:10 115 Yes 1.400 (220) PLSEW:73:11:5 115 Yes 1.400 (220) PLSEW:73:16:18 Yes 1.2200 1.510 PLSEW:73:16:18 Yes 4.500 -4201 PLSEW:14:14 14 Yes 4.500 -4201 PLSEW:15:10 10 Yes -50 -4201 PLSEW:15:10:11 11 Yes -50 -4201 PLSEW:16:11:11 Yes -50 -4201 -4201 PLSEW:16:11:11 Yes -50 -4201 -4201 PLSEW:10:11:11 Yes -50 -4201 -4201 PLSEW:10:10:10:10:5 No \$100 -4201 -4201 PLSEW:40:10:11:11 Yes -4201 -4201 -4201 | P-ESW-47:12.5 | | Yes | 9,200 | | |
| PLSBW7117 13 Yes 5,449 C230 PLSBW72115 10 Yes 7,468 C230 PLSBW72115 115 Yes 1,460 C220 PLSBW72115 115 Yes 1,460 C220 PLSBW72115 115 Yes 1,2500 C20 PLSBW7215 9 Yes 2,2500 C20 PLSBW7316 10 Yes 2,250 C20 PLSBW14122 2 Yes 5,26 C20 PLSBW71111 11 Yes 5,20 C20 PLSBW71111 11 Yes 5,20 C20 PLSBW71111 11 Yes 5,20 C20 PLSBW71111 11 Ne 5,20 C20 PLSBW74011 11 Ne 5,20 C20 PLSBW74011 11 Yes 2,20 C20 PLSBW74011 11 Yes 2,20 C20 PLSBW74011 11 Y | | | | <50 | | |
| UP-ESW-73:11.6 11:5 13:6 14:50 12:20 UP-ESW-73:11.6 11:5 11:5 11:5 12:20:0 12:20:0 UP-ESW-73:11.6 11:5 11:5 11:5 12:20:0 12:20:0 12:20:0 UP-ESW-73:16 13 Yes 4:20:0 -2:20:0 12:20:0 12:20:0 UP-ESW-74:16 14 Yes 4:20:0 -2:20:0 12:20:0 12:20:0 UP-ESW-74:16:2 2:9 Yes 4:20:0 -2:20:0 12:20:0 12:20:0 UP-ESW-74:16:2 10 Yes 5:50 -2:20:0 12:20:0 12:20:0 UP-MSW-11:1 11 Nes 5:50 -2:20:0 12:20:0 12:20:0 UP-MSW-10:1:10 10:5 Yes 2:20:0 12:20:0 12:20:0 12:20:0 UP-MSW-10:1:10 10:5 Yes 2:20:0 12:20:0 12:20:0 12:20:0 12:20:0 12:20:0 12:20:0 12:20:0 12:20:0 12:20:0 12:20:0 12:20:0 12:20:0 <td>LP-ESW-71:13</td> <td></td> <td></td> <td>2,400</td> <td></td> <td></td> | LP-ESW-71:13 | | | 2,400 | | |
| In-Estiv/32:i07 18 Yes 110 -220 PESW73:07 0 Yes 12.200 370 PESW73:07 0 Yes 12.200 370 PESW73:07 0 Yes 12.200 370 PESW74:14 14 Yes 6.6600 -220 PESW74:17:0 0 Yes 4.200 -220 PASW71:17:0 11 Yes 4.50 -220 PASW71:17:0 11.5 Yes 5.0 -220 PASW1:17:0 11.5 Yes 5.0 -220 PASW1:10:0 10 -50. -220 -220 PASW1:10:0 10.5 No 3.090 370 PASW1:10:1 11 Ne 5.0 -220 PASW2:01:1 11 Ne 5.0 -220 PASW2:01:1 11 Ne 5.0 -220 PSSW2:01:1 11 Ne 5.0 -220 PSSW2:01:1 11 | | | | 1,400 | | |
| LP_SDV:7214:1 14 Yes 6.600 -220 LP_SDV:7214:1 14 Yes 4.500 -220 LP_SDV:7217:1 10 Yes 4.500 -220 LP_SDV:74:17:1 110 Yes 4.500 -220 LP_SDV:74:17:1 110 Yes 4.501 -220 LP_SDV:74:17:1 111 Yes 4.501 -220 LPASW:74:17:1 111 Yes 4.501 -220 LPASW:74:10:1 11 Yes 5.50 -220 LPASW:71:0:1 10:5 No 3.690 270 LPASW:71:0:1 10:5 No 3.690 220 LPSSW:70:0:1 10:5 No 3.690 220 LPSSW:70:10:1 10:5 No 3.690 220 LPSSW:70:11:1 11 No 1.200 220 LPSSW:70:11:1 11 No 3.690 220 LPSSW:70:11:1 11 No 3.690 220 <tr< td=""><td></td><td>18</td><td></td><td></td><td></td><td></td></tr<> | | 18 | | | | |
| Le Silv 2422 22 Yes 4.800 -230 Le Silv 7442 9 Yes 4.50 -230 PASW 71, 11 No -50 -230 PASW 71, 11 No -700 3.60 PASW 71, 10, 1 No -700 3.60 PASW 71, 10, 1 No -700 3.60 PASW 71, 10, 2 10.5 No 3.60 2.50 PASW 71, 10, 2 10.5 No 13.600 -230 PASW 71, 10, 2 11 No 13.600 2.60 PASW 71, 11 Yes -240 -220 -250 PASW 71, 12 No 13.600 2.60 -250 PASW 71, 13 19 No 14.600 2.60 PASW 71, 13 14< | LP-ESW-73:9 | | | | | |
| P_ESW.74.07 B Yes | | | | | <250 | |
| LABSY-11:1: 11 Yes -50 -520 LABSY-11:1: 115 115 Yes -50 -520 PASW-11:1: 115 115 Yes -50 -520 PASW-20:10: 10 -50 -520 -520 PASW-41:1: 11 No 77.00 360 PASW-41:1: 11 Yes -50 -520 PASW-76:10: 10.5 No 8.26% 370 PASW-77:10:5: 10.5 Yes 220 -250 PASW-421:1: 11 Ne 13.26% -220 PSSW-321:2: 13 No 13.26% -220 PSSW-321:2: 13 No 13.26% -220 PSSW-40:1:4: 19 No 12.6% -220 PSSW-40:1:4: 19 No 12.6% -220 PSSW-40:1:4: 14 Yes -220 -220 PSSW-40:1:1:1: 11 No 3.260 -220 | LP-ESW-74:9 | | | | | l |
| DateSite Tip Yes | | | | | | |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | | | | | <250 | |
| Bible Web:11 The Yes C20 PASW240:11 T1 Yes 220 C220 PASW27:02 T0.5 Yes 220 C250 PASW27:02 T0.5 Yes 220 C250 PASW27:01:05 T0.5 Yes 220 C250 PASW24:11 T1 No T2.000 C250 PASW24:11 T1 No T2.000 C250 PASW25:11:1 T1 No T2.000 C250 PASW25:11:1 T1 No T2.000 C250 PASW25:11:1 T1 No T2.000 C250 PASW26:11:1 T1 No T2.000 C250 PASW24:11:1 T1 Yes C20 C250 PASW24:11:1 T1 <t< td=""><td>LP-NSW-30:10</td><td>10</td><td></td><td></td><td></td><td></td></t<> | LP-NSW-30:10 | 10 | | | | |
| Linksyntra 10:5 No. 3,996 370 Linksyntra 10:5 Ves 220 -250 JPSSYL2510:2 10:5 Ves 220 -250 JPSSYL2510:2 10:5 Ves 220 -250 JPSSSL2510:2 10:5 Ves 220 -250 JPSSSL2511:1 11 Nes 3,269 -250 JPSSSL2511:1 13 No 5,269 -250 JPSSSL2511:1 13 No 5,269 -260 JPSSSL2511:1 13 No 5,269 -260 JPSSSL2511:1 13 No 5,269 -260 JPSSSL2511:1 14 Yes -250 -260 JPSSSL2511:1 11 No 3,460 -250 JPSSSL2511:1 11 Ne 3,260 -250 JPSSSL2511:1 11 Ne 4,260 -260 JPSSSL2511:1 11 Ne 4,260 -260 JPSSSL2511 | | | | | | |
| PL-NSY-77:10.5 10.5 Yes 220 -(25) PL-SSY45.6 8.5 6.5 10 (26) PL-SSY45.11 11 No 13.00 (25) PL-SSY45.11 11 No 13.00 (25) PL-SSY45.11 11 No 13.00 180 PL-SSY45.11 11 No 13.00 180 PL-SSY45.11 15 No 15.00 250 PL-SSY46.13 16 15.00 260 260 PL-SSY46.13 19 No 12.00 260 260 PL-SSY46.14 19 No 12.00 260 260 260 PL-SSY44.13 13 Yes 250 | LP-NSW-7:10.5 | | | | | |
| SBW-420-11 11 No. 12,000 -220. PSSW-301-17 11 Yes 13,000 -220. PSSW-301-17 12 No. 13,000 360. PSSW-301-17 12 No. 13,000 360. PSSW-301-17 12 No. 13,000 360. PSSW-301-18 13 No. 5,800. -220. PSSW-401-16 14 No. 7,800. -220. PSSW-401-26 20 Yes 7,240. -220. PSSW-401-26 4 Yes 5,240. -250. PSSW-401-26 4 Yes 5,240. -250. PSSW-411-11 No. 4,340. -250. -250. PSSW-4413 13 Yes 5,20. -250. PSSW-4411 14 Yes 5,20. -250. PSSW-4411 14 Yes 5,20. -250. PSSW-4411 14 Yes 5,20. -250. <t< td=""><td>LP-NSW-7R:10.5</td><td></td><td>Yes</td><td></td><td></td><td></td></t<> | LP-NSW-7R:10.5 | | Yes | | | |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | | | No | | | |
| P_SSW23712 12 No 13.005 320 P_SSW340712 13 No 5.800 <250 | LP-SSW-29:11 | | | 2,290 | | |
| LSSW40:14 14 No 2.200 <250 | LP-SSW-37:12 | 12 | | 13.000 | | |
| LSSYM 420:13 19 No. 12.600 280 LSSYM 420:13 19 Yes 720 523 LSSYM 420:13 9 Yes 450 -5230 LSSYM 420:14 14 Yes 2400 -5230 LSSYM 420:14 14 Yes 2400 -5230 LPSSYM 420:14 14 Yes 2400 -5230 LPSSYM 420:14 11 No. 3406 -7230 LPSSYM 441:13 13 Yes 5400 -7230 LPSSYM 441:14 14 Yes -500 -2290 LPSSYM 441:14 14 Yes -500 -2290 LPSSYM 441:14 14 Yes -500 -2290 LPSSYM 491:16 14 Yes -500 -2290 LPSSYM 491:16 14 Yes -500 -5200 LPSSYM 491:16 14 Yes -500 -5200 LPMSW 191:16:11 10 Yes -500 -5200 | LP-SSW-38:13 | | | | | |
| Lassing Lassing <thlassing< th=""> <thlassing< th=""> <thl< td=""><td></td><td></td><td></td><td></td><td></td><td></td></thl<></thlassing<></thlassing<> | | | | | | |
| L_R_SNV-407:14 14 Yes 2.400 < | LP-SSW-40:25 | | | | | |
| D_sSYM_40R:1f 19 Yes < | | | | <50 | | 1 |
| D=SSW44:11 11 No. 3.460 <td>LP-SSW-40R:19</td> <td></td> <td>Yas</td> <td><50</td> <td><250</td> <td>ł</td> | LP-SSW-40R:19 | | Yas | <50 | <250 | ł |
| P_SSV4.413 13 Yes 690 220 P_SSV4.423 0.5 0.5 Yes 260 220 P_SSV4.421 11 Yes 4.420 220 220 P_SSV4.421.17 11 Yes 4.420 220 220 P_SSV4.421.17 11 Yes 4.200 220 220 P_SSV4.421.17 11 Yes 4.200 220 220 P_SSV4.91.16 14 Yes 4.500 2200 2200 P_SSV4.91.17 12 Yes 4.500 2500 2500 P_SSV4.91.16 11 Yes 4.500 2500 2500 P_MSV5.91.11 11 No 4.200 2500 2500 P_MSV5.92.11.17 11 Yes 500 2520 2500 P_MSV5.93.11.17 11 Yes 500 2520 2400 P_MSV5.91.17 11 Yes 500 2520 2400 P_MSV5.91.16 | LP-SSW-44:11 | 11 | No | | <250 | |
| STM Construction Construction STM 14 Yes Construction Construction STM 14 Yes Construction Construction Construction PSSVM-81:01 14 Yes Construction Constructio | LP-SSW-44:13 | | | | | 1 |
| L_RSWH_48:14 14 Yes 5200 -2200 P_SSWH_48:14 14 Yes 5.200 -2200 P_SSWH_48:17 19 Yes 1.400 -2200 P_SSWH_48:17 19 Yes 5.200 -2200 P_SWH_51:12 12 Yes -500 -2200 P_SWH_51:12 12 Yes -500 -2250 P_MSWH_51:12 12 Yes -500 -2250 P_MSWH_51:12 11 Yes -500 -2250 P_MSWH_51:11 11 Ne -2200 -2200 P_MSWH_51:11 11 Ne -500 -2200 P_MSWH_51:12 11 Ne -500 -2200 P_MSWH_51:12 11 Ne -500 -2200 P_MSWH_51:12 12 Ne -500 -2200 P_MSWH_51:13 15 Yes -500 -2200 P_MSWH_51:15 15 Yes -500 -2200 P | | 11 | Yes | | | 1 |
| P_SSW4.01:1 14 Yes 6,289 -250 P_SSW4.01:1 19 Yes 4.60 -252 P_SSW4.01:12 12 Yes -50 -223 P_SW5.141:11 11 Yes -50 -222 P_WSW5.111:11 11 Yes -50 -222 P_WSW5.111:11 11 Yes -50 -222 P_WSW5.111:11 11 Yes -50 -252 P_WSW5.111:11 11 Yes -50 -252 P_WSW5.201:25 10.5 Yes -250 -252 P_WSW5.201:25 11 11 Yes -50 -252 P_WSW5.98:11 11 No 250 -252 -252 P_WSW5.98:11 11 Yes -50 -252 -252 P_WSW5.91:12 12 No 1500 -252 -252 P_WSW5.91:12 12 No 1500 -252 -252 P_WSW5.91:12 12 | LP-SSW-48:14 | 14 | Yes | 670 | | 1 |
| SYMD-134.22 12 Yea | LP-SSW-49:14 | | | 6,300 | | 1 |
| LS_SNS-16:11 11 Yes <50 <220 PMSW-16:12 12 Yes 2.600 <250 | | | | <50 | <250 | 1 |
| PLWSW19127 12 Yes 2,500 - | LP-SWS-14:11 | 11 | Yes | <50 | <250 | 4 |
| DWSW-21:11 11 No 12,000 439 DWSW-21:11 11 No 2,000 -725 DWSW-21:11 11 No 2,000 -725 DWSW-31:11 11 No 2,000 -725 DWSW-351:11 11 No 4,000 380 DWSW-51:11 11 No 4,000 380 DWSW-51:11 11 No 4,000 -225 DWSW-51:11 12 No 10,000 -225 DWSW-51:15 15 Yes <50 | LP-WSW-19:12 | | | | | 1 |
| DAMSWARD CSD CZD DAMSWARD 11 Ves CSD DAMSWARD 11 No 2,260 CSD DAMSWARD 11 Ves CSD CZSD DAMSWARD 0.5 Ves CSD CZSD DAMSWARD 10.5 No CSD CZSD DAMSWARD | | | | 17,000 | | 1 |
| PLMSW-SBC.11' 11 Yes | | 11 | Yes | | | 1 |
| P_WSW-5111 11 No. 5,000 380 P_WSW-55117 11 Yes <50. | LP-WSW-39:11 | 11 | | 2,900 | | 1 |
| DataStructure 11 Yes <200 DataStructure 12 No 66,060 <260 | LP-WSW-39R:11 | | No | | | 1 |
| Purktyk-51:17 12 No. 100,000 <250 Purktyk-51:15 15 Yen <50 | LP-WSW-5R:11 | 11 | Yes | <50 | <250 | 1 |
| DFMSW45125 9.5 Yes <50 <220 DFMSW518127 12 Yes 1500 <223 | LP-WSW-51:12 | | | | | 1 |
| D-H301323 12 Yes 1,500 <250 | | | | | <250 | 1 |
| DPMSWR5212 12 No 5300 <250 DPMSWr5212 9.5 Ves 430 <252 | LP-WSW-51RR-12 | 12 | Yas | 1.500 | <250 | 1 |
| D-MSW-M57115 11.5 Yes <50 <220 D-MSW-M5115 11.5 Yes <50 | LP-WSW-52:12 | | | | <250 | 1 |
| CHARDWEDTLD TO Yes <250 <250 LPMSW-68:10' 10 Yes <50 | | | | | | 1 |
| LP-WSW-59:11' 11 Yes <50 <250 LP-WSW-611.5' 11.5 No 7.200 350 LP-WSW-6R:11.5' 11.5 No 2.800 <250 | | 10 | Yes | <50 | <250 | 1 |
| LP-WSW-6R:11.5 11.5 No 2.800 <250 LP-WSW-6R:11.5 11.5 Yes <50 <250 | LP-WSW-59:11' | 11 | | <50 | | 1 |
| LP-WSW-6RR:11.5 11.5 Yes <50 <250 | | | | 2.800 | | 1 |
| 1 D WGW 80-12 12 Yes <50 <250 | LP-WSW-6RR:11.5 | 11.5 | Yes | <50 | <250 | 1 |
| | LP-WSW-60:12 | 12 | Yes | <50 | <250 | 1 |
| MTCA Method A Soli Cleanup Level for 2,000 2,000 | | d A Roll Clar- | un i mel for | | | 1 |

Note: (a) Analysis for disent-ange total particular hydrocebors (DRPH) using Ecology Manud NMTPH-DL (b) Analysis for our range total particular hydrocebors (DRPH) using Ecology Manud NMTPH-DL (b) relation of scannels and analysis (b) analysis analysis patients (b) Products (b) Product (b) Product (b) Product (b) analysis analysis patients (b) Product (b) Product (b) Product (b) Product (b) (b) analysis analysis patients (b) Product (b) Product (b) Product (b) Product (b) (b) analysis (b) Product (b



THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc. TestAmerica Seattle 5755 8th Street East Tacoma, WA 98424 Tel: (253)922-2310

TestAmerica Job ID: 580-28213-1 Client Project/Site: EPI-As

For: Nautilus Environmental 5009 Pacific Hwy. East Suite 2 Tacoma, Washington 98424

Attn: Cat Curran

Kristine D. allen

Authorized for release by: 09/02/2011 02:20:11 PM Kristine Allen Project Manager I kristine.allen@testamericainc.com

Designee for

..... LINKS

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Expert

Melissa Armstrong Project Manager I melissa.armstrong@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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2

Job ID: 580-28213-1

Laboratory: TestAmerica Seattle

Narrative

Receipt

The following samples were received at the laboratory outside the required temperature criteria: Control (580-28213-1), SMSS-0810 (580-28213-3), SMSS-BG (580-28213-2) at 6.8c.

Sample collection dates and times were not recorded on the sample containers. The samples were logged-in and labeled according to the sample dates and times reported on the Chain of Custody (COC).

Metals

No analytical or quality issues were noted.

Client: Nautilus Environmental Project/Site: EPI-As

4

| Glossary | |
|----------------|--|
| Abbreviation | These commonly used abbreviations may or may not be present in this report. |
| ☆ | Listed under the "D" column to designate that the result is reported on a dry weight basis |
| %R | Percent Recovery |
| DL, RA, RE, IN | Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample |
| EDL | Estimated Detection Limit (Dioxin) |
| EPA | United States Environmental Protection Agency |
| MDL | Method Detection Limit |
| ML | Minimum Level (Dioxin) |
| ND | Not detected at the reporting limit (or method detection limit if shown) |
| PQL | Practical Quantitation Limit |
| RL | Reporting Limit |
| RPD | Relative Percent Difference, a measure of the relative difference between two points |
| TEF | Toxicity Equivalent Factor (Dioxin) |
| | |

TEQ Toxicity Equivalent Quotient (Dioxin)

TestAmerica Seattle 09/02/2011

| Client: Nautilus Environmental Project/Site: EPI-As | | | | | TestAmeri | ca Job ID: 580- | 28213-1 |
|--|------------------|---------|-------------------|---|----------------------------|----------------------------|--------------------|
| Client Sample ID: Control Date Collected: 08/22/11 10:00 Date Received: 08/23/11 15:25 | | | | | Lab Sam | | 8213-1 : Tissue |
| Method: 6010B - Metals (ICP) Analyte Arsenic | Result Qualifier | <u></u> | MDL Unit mg/Kg | D | Prepared 09/01/11 14:39 | Analyzed 09/01/11 23:57 | Dil Fac |

Client: Nautilus Environmental

| Client Sample ID: SMSS-BG | | | | | | | Lab Sam | pie ID: 580-2 | 8213-2 |
|---|--------|---------------------------------------|----|-----|------|---|----------|---------------|----------|
| Date Collected: 08/22/11 10:00 | | | | | | | | Matrix | : Tissue |
| Date Received: 08/23/11 15:25 | | | | | | | | | |
| | | | | | | | | | |
| Method: 6010B - Metals (ICP) | | an analan ang propinsi ng marang ng m | | | | | | | |
| Method: 6010B - Metals (ICP) Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |

Client: Nautilus Environmental

Arsenic

5

| Project/Site: EPI-As | | | | | | | | | |
|--------------------------------|--------|-----------|-----|-----|-------|---|----------------|----------------|----------|
| Client Sample ID: SMSS-0810 | | | | | | | Lab Sam | ple ID: 580-2 | 8213-3 |
| Date Collected: 08/22/11 10:00 | | | | | | | | Matrix | : Tissue |
| Date Received: 08/23/11 15:25 | | | | | | | | | |
| Method: 6010B - Metals (ICP) | | | | | | | | | |
| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
| Arsenic | ND | | 2.1 | | mg/Kg | | 09/01/11 14:39 | 09/02/11 00:11 | 1 |

6

| Lab Sample ID: MB 580-94336/4-A | | | | | | | | | Client Sa | ample ID: M | lethod | l Blan |
|-----------------------------------|--------|-----------|-------|-----|--------|-----------|-------|----------|------------|-------------|---------|---------|
| Matrix: Tissue | | | | | | | | | | Prep Ty | pe: To | otal/N/ |
| Analysis Batch: 94381 | | | | | | | | | | Prep E | Batch: | : 9433 |
| , maryone material of the second | MB | МВ | | | | | | | | | | |
| Analyte | Result | Qualifier | | RL | M | IDL Unit | | D Pr | epared | Analyze | d | Dil Fa |
| Arsenic | ND | | | 3.0 | | mg/Kg | | 09/01 | 1/11 14:39 | 09/01/11 23 | 3:38 | |
| Lab Sample ID: LCS 580-94336/5-A | | | | | | | | Client | Sample | ID: Lab Cor | ntrol S | Sample |
| Matrix: Tissue | | | | | | | | | | Prep Ty | pe: To | otal/N/ |
| Analysis Batch: 94381 | | | | | | | | | | Prep E | Batch: | 94330 |
| | | | Spike | | LCS | LCS | | | | % Rec. | | |
| Analyte | | | Added | | Result | Qualifier | Unit | Ð | % Rec | Limits | | |
| Arsenic | | | 200 | | 190 | | mg/Kg | | 95 | 80 - 120 | | |
| Lab Sample ID: LCSD 580-94336/6-A | | | | | | | Clie | ent Samj | ple ID: La | ab Control | Samp | le Dur |
| Matrix: Tissue | | | | | | | | | | Prep Ty | pe: To | tal/NA |
| Analysis Batch: 94381 | | | | | | | | | | Prep B | latch: | 94336 |
| | | | Spike | | LCSD | LCSD | | | | % Rec. | | RPD |
| Analyte | | | Added | | Result | Qualifier | Unit | D | % Rec | Limits | RPD | Limi |
| Arsenic | | | 200 | | 190 | | mg/Kg | | 95 | 80 - 120 | 0 | 20 |

Client: Nautilus Environmental Project/Site: EPI-As

| onenic wamp | le ID: Contr | ol | | | | L | ab Sample ID | |
|--|--|--|-----|--------------------|-----------------|---|--|-----------------------------------|
| Date Collected | | | | | | | | Matrix: Tissue |
| Date Received: | : 08/23/11 15:2 | 25 | | | | | | |
| | Batch | Batch | | Dilution | Batch | Prepared | | |
| Prep Type | Туре | Method | Run | Factor | Number | Or Analyzed | Analyst | Lab |
| Total/NA | Prep | 30 50 B | | | 94336 | 09/01/11 14:39 | PAB | TAL SEA |
| Total/NA | Analysis | 6010B | | 1 | 94381 | 09/01/11 23:57 | SP | TAL SEA |
| Client Samp | In ID: SMSS | BG | | | | L | ab Sample ID: | 580-28213-2 |
| Date Collected | | | | | | | - | Matrix: Tissue |
| 19to I DUDITIOUS | * UNIZZI E EUNZ | | | | | | | |
| | | | | | | | | |
| | | | | | | | Mental III - 1997 - 199 | ····· |
| | | | | Dilution | Batch | Prepared | NATION OF THE OWNER | |
| Date Received: | : 08/23/11 15:2 Batch | 5 | Run | Dilution Factor | Batch Number | Prepared Or Analyzed | Analyst | Lab |
| Prep Type Total/NA | : 08/23/11 15:2 | :5 Batch | Run | | | • | Analyst PAB | Lab TAL SEA |
| Date Received: Prep Type | : 08/23/11 15:2 Batch Type | 5 Batch Method | Run | | Number | Or Analyzed | | |
| Date Received: Prep Type Total/NA Total/NA | : 08/23/11 15:2 Batch Type Prep Analysis | 25 Batch Method 3050B 6010B | Run | | Number 94336 | Or Analyzed 09/01/11 14:39 09/02/11 00:04 | PAB | TAL SE A TAL SEA |
| Date Received: Prep Type Total/NA Total/NA Client Sampl | : 08/23/11 15:2 Batch Type Prep Analysis | Eatch Method 3050B 6010B | Run | | Number 94336 | Or Analyzed 09/01/11 14:39 09/02/11 00:04 | PAB SP | TAL SEA TAL SEA 580-28213-3 |
| Date Received: Prep Type Total/NA Total/NA Client Sampi Date Collected: | : 08/23/11 15:2 Batch Type Prep Analysis ie ID: SMSS : 08/22/11 10:0 | Eatch Method 3050B 6010B -0810 00 | Run | | Number 94336 | Or Analyzed 09/01/11 14:39 09/02/11 00:04 | PAB SP | TAL SEA TAL SEA 580-28213-3 |
| Date Received: Prep Type Total/NA Total/NA Client Sampl | : 08/23/11 15:2 Batch Type Prep Analysis ie ID: SMSS : 08/22/11 10:0 | Eatch Method 3050B 6010B -0810 00 | Run | | Number 94336 | Or Analyzed 09/01/11 14:39 09/02/11 00:04 | PAB SP | TAL SE A TAL SEA |

| 1 | Batch | Batch | | Dilution | Batch | Prepared | | |
|-----------|----------|--------|-----|----------|--------|----------------|---------|---------|
| Prep Type | Туре | Method | Run | Factor | Number | Or Analyzed | Analyst | Lab |
| Total/NA | Prep | 3050B | | | 94336 | 09/01/11 14:39 | PAB | TAL SEA |
| Total/NA | Analysis | 6010B | | 1 | 94381 | 09/02/11 00:11 | SP | TAL SEA |

Laboratory References:

TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Certification Summary

Client: Nautilus Environmental Project/Site: EPI-As

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| Laboratory | Authority | Program | EPA Region | Certification ID | |
|---------------------|----------------|---------------------------|------------|------------------|---|
| TestAmerica Seattle | Ala ska | Alaska UST | 10 | UST-022 | |
| TestAmerica Seattle | Alaska | TA-Port Heiden Mobile Lab | 10 | UST-093 | |
| TestAmerica Seattle | California | NELAC | 9 | 1115CA | |
| TestAmerica Seattle | Florida | NELAC | 4 | E871074 | |
| TestAmerica Seattle | L-A-B | DoD ELAP | | L2236 | |
| TestAmerica Seattle | L-A-B | ISO/IEC 17025 | | L2236 | |
| TestAmerica Seattle | Louisiana | NELAC | 6 | 05016 | |
| TestAmerica Seattle | Montana | MT DEQ UST | 8 | N/A | |
| TestAmerica Seattle | Oregon | NELAC | 10 | WA100007 | 1 |
| TestAmerica Seattle | USDA | USDA | | P330-11-00222 | |
| TestAmerica Seattle | Washington | State Program | 10 | C553 | |

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

TestAmerica Seattle 09/02/2011

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| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---------------|------------------|--------|----------------|----------------|
| 580-28213-1 | Control | Tissue | 08/22/11 10:00 | 08/23/11 15:25 |
| 580-28213-2 | SMSS-BG | Tissue | 08/22/11 10:00 | 08/23/11 15:25 |
| 580-28213-3 | SMSS-0810 | Tissue | 08/22/11 10:00 | 08/23/11 15:25 |

| Comments DISTRIBUTION: WHITE - Stays with the Samples; CANARY - Returned to Client with Report; PINK - Field CoppPage 12 of 13 | 3. Relinquished By Sign/Print | 2. Relinquished by SigniPrint | n Around Time Required (business days) 24 Hours | Cooler Ves No Cooler Temp: Non-Hazard Flammable | | | | SMSS-0810 8-22-11 | SMSS-BG 8-22-11 | CONTRO1 8.22-11 | Sample I.D. and Location/Description (Containers for each sample may be combined on one line) Date | Contract/Furchase Underriguote No. | EPT-AS | FIFE WAR and Instant (State) WA 98424 | 09 Pacific Hu | Wauthus Envir. | EADER IN ENVIRONMENTAL TESTING | |
|--|-------------------------------|--------------------------------------|--|--|---------------|------------------|--|-------------------|-----------------|-----------------|---|------------------------------------|-----------------------|---------------------------------------|--------------------------------|-------------------------|--|----|
| nt with Report, PINK – Field | Date Time | Date Time | 0 | mable Skin Irritant | | | | loam | loam | 10am | Air Aqueous Sed. Soil | Matrix | 1 | sampler SD | 1elephone Number (Are | Client Contact | TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com | |
| ^{Copy} Page 12 of 13 | 3. Received By Sign/Pri | Time 1. Received By Sign/Pri 1525 | C Requirements (Sp | Poison B Unknown | | | | X | XX | | Unpress H2SO4 HNO3 HCI NaOH ZnAc/ NaOH | Containers & Preservatives | Mansouri | Hellssa A | a Code)/Fax Number 122-4296 | urran | iom A | ě. |
| | int | the the lab | | Sample Disposal Disposal By Lab | | | | | | × | Ars | eni | <u> </u> | Ana | Lab Number | Date 7-23-11 | Rush Short Hold | |
| TAL-800408020219) | Date Time | Date Date Time | | (A fee may be assessed if samples Months are relatined longer than 1 month) | Wet ice/othey | 11(2)=(p. 0)/6.8 | | | | | | Conditions of Receipt | Special Instructions/ | | Page (of | Chain of Custody Number | Chain of Custody Record | 3 |

ē

Client: Nautilus Environmental

Login Number: 28213 List Number: 1

Creator: Kalicki, Samantha

Job Number: 580-28213-1

11

List Source: TestAmerica Seattle

| Question | Answer | Comment |
|---|--------|--|
| Radioactivity either was not measured or, if measured, is at or below background | True | |
| The cooler's custody seal, if present, is intact. | N/A | Not present |
| The cooler or samples do not appear to have been compromised or tampered with. | True | |
| Samples were received on ice. | True | |
| Cooler Temperature is acceptable. | False | Cooler temperature outside required temperature criteria. |
| Cooler Temperature is recorded. | True | |
| COC is present. | True | |
| COC is filled out in ink and legible. | True | |
| COC is filled out with all pertinent information. | True | |
| Is the Field Sampler's name present on COC? | True | |
| There are no discrepancies between the sample IDs on the containers and the COC. | True | |
| Samples are received within Holding Time. | True | |
| Sample containers have legible labels. | True | |
| Containers are not broken or leaking. | True | |
| Sample collection date/times are provided. | False | Refer to Job Narrative for details. |
| Appropriate sample containers are used. | True | |
| Sample bottles are completely filled. | True | |
| Sample Preservation Verified. | N/A | Not needed on tissue. |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs | True | |
| VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter. | N/A | No VOA rec'd. |
| Multiphasic samples are not present. | True | |
| Samples do not require splitting or compositing. | True | |
| Residual Chlorine Checked. | N/A | No analysis requiring residual chlorine check assigned. |

Attachment E

Cleanup Levels for Potential TEE Receptors Northwest Pipeline GP, Washington State Meter Station Facilities Northwest Washington Representation Area ARSENIC

Cleanup Level for Mammalian Predator (Shrew) Equation in Table 749-4

Soil CUL =

T shrew
(FIR shrew X Psb shrew X BAF worm) + (SIR shrew X RGAF shrew)

4

Units

mg/kg

Cleanup Level for Avian Predator (Robin) Equation in Table 749-4

| Soil CUL ≃ | T robin (FIR robin X Psb robin X BAF worm) + (SIR robin X RGAF robin) | AF robin) |
|------------|--|-----------|
| CUL | Units | |
| 58 | mg/kg | |
| Variable | Unit | Value |
| Psb robin | Unitless | 0.52 |
| FIR robin | kg dry food / kg body weight - day | 0.207 |
| SIR robin | kg dry soil / kg body weight - day | 0.0215 |
| RGAF robin | Unitless (Table 749-5) | 1 |
| T robin | mg/kg - day (Table 749-5 footnote a) | 2.24 |
| Home Range | Acres | 0.6 |
| BAF worm | mg/kg worm / mg/kg soil (Table 749-5 footnote a) | 0.16 |

- Notes: Psb FIR FIR SIR RGAF T BAF Proportion of contaminated food in diet

 - Food ingestion rate Soil ingestion rate Gut Absorbsion Factor
- Toxicity Reference Value from Ecological Screening Levels for Arsenic, US EPA, March 2005 Site Specific Bioaccumulation Factor

FIR P BAF SIR RGAF BAF

Soil ingestion rate Gut Absorbsion Factor Site Specific Bioaccumulation Factor

Toxicity Reference Value Food ingestion rate Proportion of contaminated food in diet Bioaccumulation factor

TEE Book Value CUL Protective of Plants
Table 749-3
CUL Units

10

mg/kg

TEE Book Value CUL Protective of Soil Biota

60 ĉ

mg/kg

Units

Notes: T

SIR shrew BAF worm Psb shrew FIR shrew Variable

shrew

mg/kg - day

Unit

RGAF shrew

Unitless (chemical specific-As) kg dry soil / kg body weight - day mg/kg worm / mg/kg soil (Table 749-5 footnote a)

0.0045 0.16

0.45 1.89 Value

0.5

kg dry food / kg body weight - day

unitless

Cleanup Level for Mammalian Herbivore (Vole) Equation in Table 749-4

| Soil CUI = | | T vole | |
|---------------|------------------------------------|---|----------|
| | (FIR vole X P plant, | (FIR vole X P plant, vole X K plant) + (SIR vole X RGAF vole) | AF vole) |
| CUL | Units | | |
| 43 | mg/kg | | |
| | | | |
| Variable | Unit | | Value |
| T vole | mg/kg - day | | 1.15 |
| FIR vole | kg dry food / kg body weight - day | ight - day | 0.315 |
| P plant, vole | unitless | | 1 |
| K plant | mg/kg worm / mg/kg soil | | 0.06 |
| SIR vole | kg dry soil / kg body weight - day | pht - day | 0.0079 |
| | | | |

Notes: T FIR P RGAF

RGAF vole

Unitless (chemical specific-As)

- Toxicity Reference Value Food ingestion rate
- Proportion of contaminated food in diet

- Plant uptake coefficient Soil ingestion rate Gut Absorbsion Factor

Cleanup Levels for Potential TEE Receptors Northwest Pipeline GP, Washington State Meter Station Facilities Southwest Washington/Columbia River Representation Area ARSENIC

Cleanup Level for Avian Predator (Robin) Equation in Table 749-4

| Soil CUL = | T robin (FIR robin X Psb robin X BAF worm) + (SIR robin X RGAF robin) | AF robin) |
|------------|--|-----------|
| CUL 45 | mg/kg | |
| Variable | Unit | Value |
| Psb robin | Unitless | 0.52 |
| FIR robin | kg dry food / kg body weight - day | 0.207 |
| SIR robin | kg dry soil / kg body weight - day | 0.0215 |
| RGAF robin | Unitless (Table 749-5) | 1 |
| T robin | mg/kg - day (Table 749-5 footnote a) | 2.24 |
| Home Range | Acres | 0.6 |
| BAF worm | mg/kg worm / mg/kg soil (Table 749-5 footnote a) | 0.26 |

- Notes: Psb FIR FIR SIR RGAF T BAF
 - Proportion of contaminated food in diet Food ingestion rate Soil ingestion rate

- Gut Absorbsion Factor
- Toxicity Reference Value from Ecological Screening Levels for Arsenic, US EPA, March 2005 Site Specific Bioaccumulation Factor

Cleanup Level for Mammalian Herbivore (Vole) Equation in Table 749-4

| Soil CUL = | | T vole | |
|---------------|------------------------------------|---|----------|
| | (FIR vole X P plant | (FIR vole X P plant, vole X K plant) + (SIR vole X RGAF vole) | AF vole) |
| | Inite | | |
| | Units | | |
| 43 | mg/kg | | |
| | | | |
| Variable | Unit | | Value |
| T vole | mg/kg - day | | 1.15 |
| FIR vole | kg dry food / kg body weight - day | ight - day [| 0.315 |
| P plant, vole | unitless | | 1 |
| K plant | mg/kg worm / mg/kg soil | | 0.06 |
| SIR vole | kg dry soil / kg body weight - day | ght - day | 0.0079 |
| RGAF vole | Unitless (chemical specific-As) | c-As) | 1 |

Notes: T FIR P P K SIR RGAF Toxicity Reference Value

- Food ingestion rate Proportion of contaminated food in diet Plant uptake coefficient Soli ingestion rate

- Gut Absorbsion Factor

Soil CUL =

(FIR shrew X Psb shrew X BAF worm) + (SIR shrew X RGAF shrew)

T shrew

Cleanup Level for Mammalian Predator (Shrew) Equation in Table 749-4

| CUL | Units | | |
|------------|--|-------------------------|--------|
| 30 | mg/kg | | |
| Variable | Unit | | Value |
| T shrew | mg/kg - day | | 1.89 |
| FIR shrew | kg dry food / kg body weight - day | nt - day | 0.45 |
| Psb shrew | unitless | | 0.5 |
| BAF worm | mg/kg worm / mg/kg soil (Table 749-5 footnote a) | Table 749-5 footnote a) | 0.26 |
| SIR shrew | kg dry soil / kg body weight - day | t - day | 0.0045 |
| RGAF shrew | Unitless (chemical specific-As) | As) | 4 |
| | | | |

Notes:

- Food ingestion rate Proportion of contaminated food in diet **Bioaccumulation factor** Toxicity Reference Value
- Soll ingestion rate Gut Absorbsion Factor Site Specific Bioaccumulation Factor

FIR P BAF SIR RGAF BAF

Table 749-3

10 CUL

mg/kg

Units

Fable 749-3

60 5 L

mg/kg

Units

TEE Book Value CUL Protective of Soil Biota

TEE Book Value CUL Protective of Plants

Cleanup Levels for Potential TEE Receptors Northwest Pipeline GP, Washington State Meter Station Facilities Central Washington Representation Area ARSENIC

Cleanup Level for Avian Predator (Robin) Equation in Table 749-4

| Soil CUL = | (FIR robin X Psb robir | T robin (FIR robin X Psb robin X BAF worm) + (SIR robin X RGAF robin) | AF robin) |
|------------|--|--|-----------|
| CUL 29 | Units mg/kg | | |
| Variable | Unit | | Value |
| Psb robin | Unitless | | 0.52 |
| FIR robin | kg dry food / kg body weight - day | ght - day | 0.207 |
| SIR robin | kg dry soil / kg body weight - day | ht - day | 0.0215 |
| RGAF robin | Unitless (Table 749-5) | | 1 |
| T robin | mg/kg - day (Table 749-5 footnote a) | footnote a) | 2.24 |
| Home Range | Acres | | 0.6 |
| BAF worm | mg/kg worm / mg/kg soil (Table 749-5 footnote a) | (Table 749-5 footnote a) | 0.53 |

- Notes: Psb FIR SIR RGAF T BAF
- Proportion of contaminated food in diet Food Ingestion rate Soli Ingestion rate Gut Absorbsion Factor Toxicity Reference Value from Ecological Screening Levels for Arsenic, US EPA, March 2005 Site Specific Bioaccumulation Factor

Cleanup Level for Mammalian Herbivore (Vole) Equation in Table 749-4

| Soil CUL = | | T vole | |
|---------------|------------------------------------|---|----------|
| | (FIR vole X P plant, | (FIR vole X P plant, vole X K plant) + (SIR vole X RGAF vole) | AF vole) |
| CUL | Units | | |
| 43 | mg/kg | | |
| Variable | Unit | | Value |
| T vole | mg/kg - day | | 1.15 |
| FIR vole | kg dry food / kg body weight - day | ght - day | 0.315 |
| P plant, vole | unitless | | 1 |
| K plant | mg/kg worm / mg/kg soil | | 0.06 |
| SIR vole | kg dry soil / kg body weight - day | ht - day | 0.0079 |

Notes: T FIR P P FIR P R GAF

RGAF vole

Unitless (chemical specific-As)

- Toxicity Reference Value
- Food ingestion rate Proportion of contaminated food in diet Plant uptake coefficient Soll ingestion rate Gut Absorbsion Factor

Cleanup Level for Mammalian Predator (Shrew) Equation in Table 749-4

| Soil CUL = | (FIR shrew X Psb shre | T shrew (FIR shrew X Psb shrew X BAF worm) + (SIR shrew X RGAF shrew) | RGAF shrew) |
|------------|--|--|-------------|
| CUL | Units | | |
| 15 | mg/kg | | |
| Variable | Unit | | Value |
| T shrew | mg/kg - day (Table 749-5) |) | 1.89 |
| FIR shrew | kg dry food / kg body weight - day | ght - day | 0.45 |
| Psb shrew | unitless | | 0.5 |
| BAF worm | mg/kg worm / mg/kg soil (Table 749-5 footnote a) | (Table 749-5 footnote a) | 0.53 |
| SIR shrew | kg dry soil / kg body weight - day | ht - day | 0.0045 |
| RGAF shrew | Unitless (chemical specific-As) | c-As) | 1 |

Notes: T

- Toxicity Reference Value Food ingestion rate Proportion of contaminated food in diet Bioaccumulation factor
- Soil ingestion rate

FIR P BAF SIR RGAF BAF

Gut Absorbsion Factor Site Specific Bloaccumulation Factor

TEE Book Value CUL Protective of Plants

Fable 749-3

5 S

mg/kg Inits

Table 749-3

60

mg/kg Units **TEE Book Value CUL Protective of Soil Biota**

Cleanup Levels for Potential TEE Receptors Northwest Pipeline GP, Washington State Meter Station Facilities Eastern Washington Representation Area ARSENIC

Cleanup Level for Avian Predator (Robin) Equation in Table 749-4

| Soil CUL = | (FIR robin X Psb robi | T robin (FIR robin X Psb robin X BAF worm) + (SIR robin X RGAF robin) | SAF robin) |
|------------|--|--|------------|
| CUL | Units | | |
| 63 | mg/kg | | |
| Variable | Unit | | Value |
| Psb robin | Unitless | | 0.52 |
| FIR robin | kg dry food / kg body weight - day | ght - day | 0.207 |
| SIR robin | kg dry soil / kg body weight - day | ht - day | 0.0215 |
| RGAF robin | Unitless (Table 749-5) | | 1 |
| T robin | mg/kg - day (Table 749-5 footnote a) | footnote a) | 2.24 |
| Home Range | Acres | | 0.6 |
| BAF worm | mg/kg worm / mg/kg soil (Table 749-5 footnote a) | (Table 749-5 footnote a) | 0.13 |

- Notes: Psb FIR SIR RGAF T BAF
 - Proportion of contaminated food in diet Food ingestion rate Soil ingestion rate Gut Absorbsion Factor
- Toxicity Reference Value from Ecological Screening Levels for Arsenic, US EPA, March 2005 Site Specific Bioaccumulation Factor

Cleanup Level for Mammalian Herbivore (Vole) Equation in Table 749-4

| Soil CUL = | | T vole | |
|---------------|------------------------------------|---|----------|
| 1 | (FIR vole X P plant, | (FIR vole X P plant, vole X K plant) + (SIR vole X RGAF vole) | AF vole) |
| CUL | Units | | |
| 43 | mg/kg | | |
| Variahia | | | V21.0 |
| | mg/kg - day | | 1.15 |
| FIR vole | kg dry food / kg body weight - day | ight - day | 0.315 |
| P plant, vole | unitless | | 1 |
| K plant | mg/kg worm / mg/kg soil | | 0.06 |
| SIR vole | kg dry soil / kg body weight - day | ght - day | 0.0079 |

Notes: T FIR P K SIR RGAF

RGAF vole

Unitless (chemical specific-As)

- Toxicity Reference Value
- Food ingestion rate Proportion of contaminated food in diet Plant uptake coefficient Soll ingestion rate Gut Absorbsion Factor

Cleanup Level for Mammalian Predator (Shrew) Equation in Table 749-4

| Soil CUL = | (FIR shrew X Psb shre | T shrew (FIR shrew X Psb shrew X BAF worm) + (SIR shrew X RGAF shrew) | RGAF shrew) |
|------------|--|--|-------------|
| 50 | Units mg/kg | | |
| Variable | Unit | | Value |
| T shrew | mg/kg - day (Table 749-5) |) | 1.89 |
| FIR shrew | kg dry food / kg body weight - day | ght - day | 0.45 |
| Psb shrew | unitless | | 0.5 |
| BAF worm | mg/kg worm / mg/kg soil (Table 749-5 footnote a) | (Table 749-5 footnote a) | 0.13 |
| SIR shrew | kg dry soil / kg body weight - day | ht - day | 0.0045 |
| RGAF shrew | Unitless (chemical specific-As) | :-As) | |
| | | | |

Notes: T FIR BAF SIR RGAF BAF

Site Specific Bioaccumulation Factor

TEE Book Value CUL Protective of Plants

| 10 | CUL | Table 749-3 | |
|-------|-------|-------------|--|
| mg/kg | Units | | |

TEE Book Value CUL Protective of Soil Biota Table 749-3

| mg/kg | 60 |
|-------|-----|
| Units | CUL |