Preliminary Site Investigation Report

Simplot Grower Solutions

Facility Site Number: 84612438
VCP Number: CE0419

Moxee, Washington

October 2015

Prepared for:

J.R. Simplot Company
999 Main Street
Boise, Idaho 83707

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999 Main Street
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Prepared by:

Michael R. Murray, Ph.D.

Nancy Nething

Nancy Nething, LG

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Acronyms

Acronym	Definition
BTEX	benzene, toluene, ethylbenzene, and xylenes
CEC	cation exchange capacity
Ecology	Washington Department of Ecology
EPA	U.S. Environmental Protection Agency
GeoEngineers	GeoEngineers, Inc.
GRPH	gasoline range petroleum hydrocarbons
HDR	HDR Engineering, Inc.
MCL	maximum contaminant level
MTCA	Model Toxic Control Act
NRCS	Natural Resources Conservation Service
RPD	relative percent difference
Simplot	J.R. Simplot Company
SOP	standard operating procedure
TDS	total dissolved solids
WAC	Washington Administrative Code
Work Plan	*Preliminary Site Investigation Work Plan*

1 Introduction

The purpose of this *Preliminary Site Investigation Report* is to describe soil and groundwater investigation activities HDR Engineering, Inc. (HDR) conducted, under contract with the J.R. Simplot Company (Simplot), at 7528 Postma Road in Moxee, Washington (Facility Site Number 84612438; VCP Number CE0419).

1.1 Background

On July 2, 2014, Simplot received an early notice letter from Washington Department of Ecology (Ecology) regarding the potential release of hazardous substances from Simplot's Grower Solutions facility at 7528 Postma Road, Moxee, Washington (**Figure 1-1**). Ecology encouraged Simplot to enter into a voluntary clean-up arrangement to address potential site contamination. Ecology's findings were based on information provided by GeoEngineers, Inc. (GeoEngineers), a consulting firm contracted with Ecology, who conducted site investigation activities at the Moxee City Shop, located at 7520 Postma Road, which is immediately adjacent and west of the Simplot facility (**Figure 1-2**). GeoEngineers summarized their field activities and findings in the April 3, 2014 document, *Data Gap Investigation Report– Moxee City Shop and Former Sewage Treatment Plant (STP), Moxee, Washington*.

In response to the early notice letter, Simplot entered into Ecology's Voluntary Cleanup Program, which Ecology acknowledged in a letter dated December 16, 2014. Under contract with Simplot, HDR developed a *Preliminary Site Investigation Work Plan* (Work Plan) in February 2015. Ecology provided comments to the Work Plan on March 27, 2015 (email from Ecology's Jennifer Lind to HDR's Michael Murray). Following a series of email exchanges between HDR and Ecology on sampling approach, the Work Plan was finalized on May 28, 2015.

1.1.1 Moxee Facility

The Simplot Grower Solutions site is located at 7528 Postma Road in Moxee, Washington, and occupies approximately 3.4 acres. The property is bounded by a railroad line and State Route 24 on the south, a municipal maintenance shop facility to the west (Moxee City Shop), and commercial properties on the north and east (**Figure 1-2**), including a fueling station northeast of the property. The facility operates as an agricultural products retail location. Five structures are on the property ranging from retail space to product storage warehouses. Fertilizers are delivered to the facility by rail or truck and stored onsite either in bulk tanks or retail size containers. In addition, Simplot creates some custom fertilizer blends. Fertilizers are in both solid and liquid forms and are primarily formulations of nitrogen (N), phosphorus (P_2O_5), and potassium (K_20), including ammonium sulfate and triple super phosphate. The facility has served as a retail outlet for agrichemicals that include fertilizers, pesticides, and soil amendments.

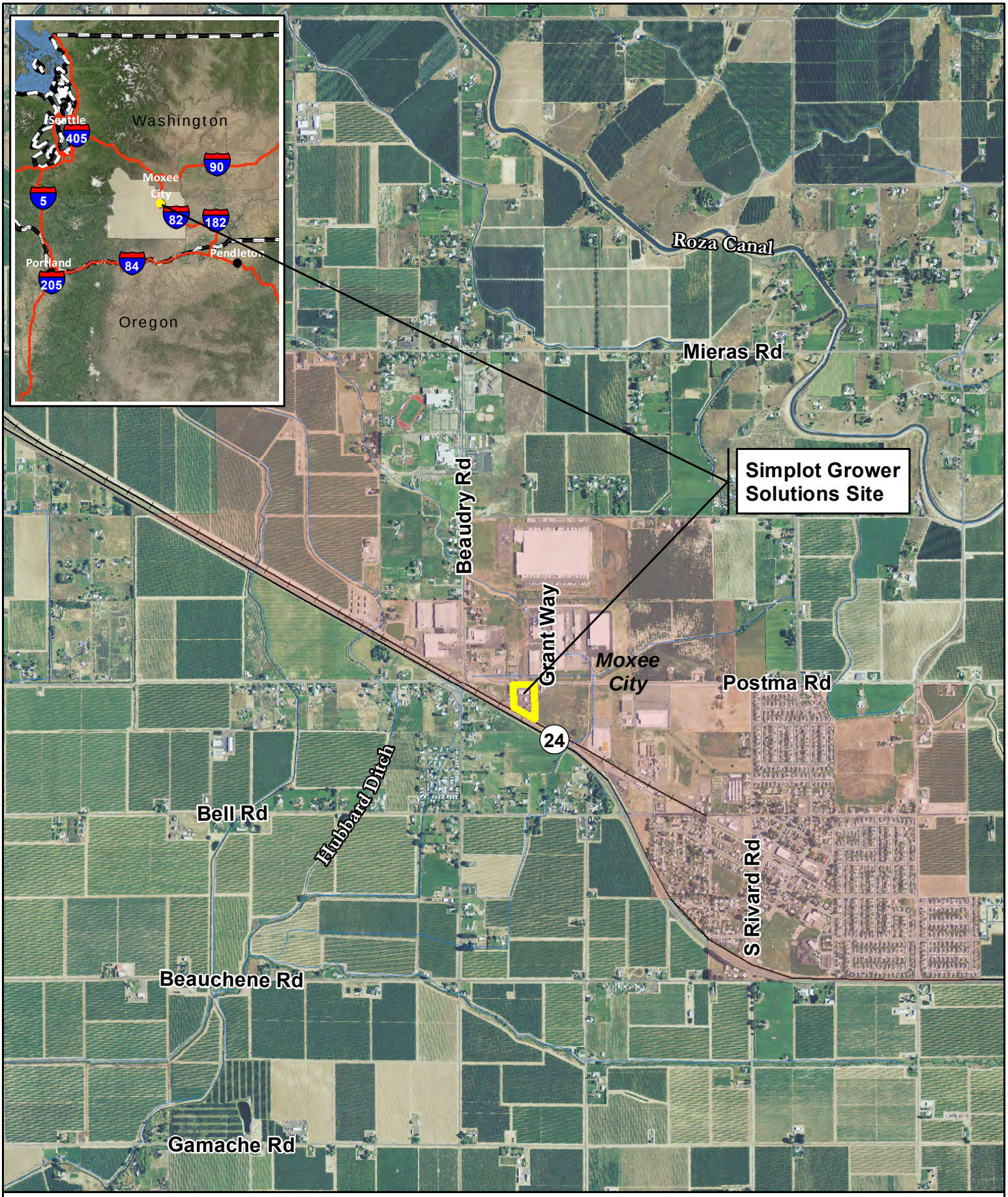

Figure 1-1: Project Vicinity
Simplot Grower Solutions, Moxee, WA

Imagery: 2013 NAIP, I meter resolution
Source: USDA/NRCS Digitatl Gateway

Map Date: 10/14/2014
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0 1,000 2,000
Feet

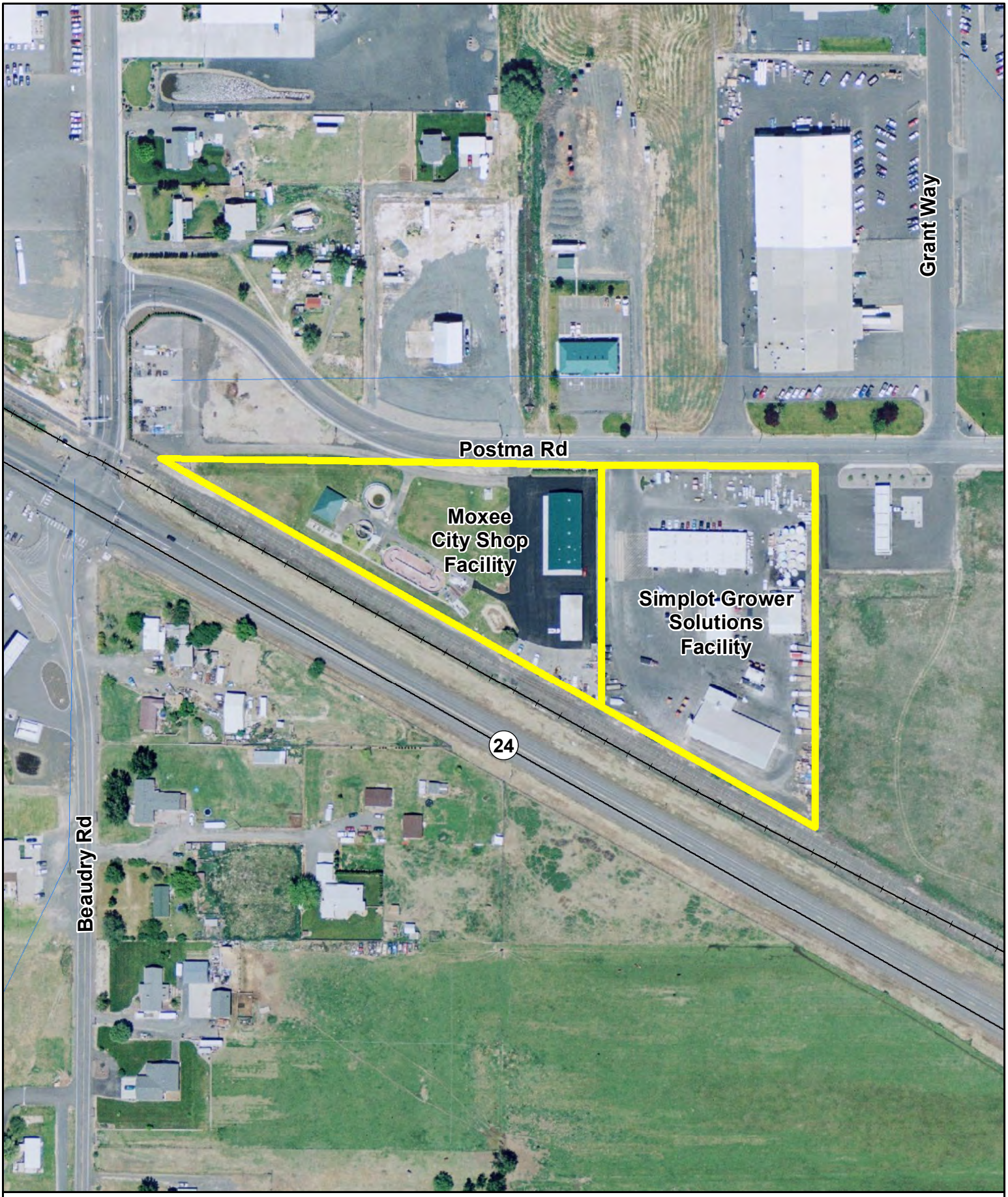

Figure 1-2: Site Map

Simplot Grower Solutions, Moxee, WA

Imagery: ESRI World Imagery, June 2011 Imagery
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Map Date: 10/14/2014
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Feet

1.2 Area Setting

The Simplot site and the City of Moxee are located in a relatively flat valley that rises in topography to Rattlesnake Hills to the south and the Yakima Ridge to the north. The elevation of the Simplot site is approximately 1,030 feet above mean sea level. The base of the Yakima Ridge is located approximately 2.5 miles to the north. The base of the Rattlesnake Hills is approximately 2.5 miles to the south. A small ditch flowing along the north side of Postma Road shows up on historical aerial photography until 1992, but was apparently abandoned, or routed underground, after the area to the north was converted from agricultural use to commercial use. A ditch 900 feet to the east of the Simplot site is still in use. The Yakima River is located 3 miles to the west.

According to the National Oceanic and Atmospheric Administration, from 1950 to 1999, the City of Moxee received an average of approximately 8.1 inches of precipitation per year. The maximum average monthly precipitation occurs in December at 1.14 inches. The driest months are July and August with an average precipitation of 0.24 inches. Minimum average temperatures occur in January, while maximum average temperatures occur in July. **Table 1-1** summarizes precipitation and temperature averages for Moxee.

Table 1-1. Summary of Climatological Characteristics for the City of Moxee

Month	Avg Min Temp (°F)	Avg Max Temp (°F)	Avg Precip (in)
January	25	38	0.91
February	27	45	0.59
March	31	55	0.67
April	35	62	0.71
May	42	71	0.79
June	48	78	0.75
July	53	87	0.24
August	53	86	0.24
September	46	77	0.39
October	37	62	0.67
November	29	47	0.98
December	22	35	1.14

°F = degrees Fahrenheit; in = inches

1.2.1 Soil

According to the Natural Resources Conservation Service (NRCS), the Simplot site and adjoining properties are mainly comprised of Umapine silt loam, making up approximately 90 percent of nearby soil composition. This soil possesses moderately high to high hydraulic conductivity (0.57 to 1.98 inches per hour), and the depth to the water table is between 24 and 48 inches. The remaining mapped soils are limited areas of other silt loams, loamy fine sand, and fine sandy loam typical of alluvial, lacustrine, and eolian deposits.

1.2.2 Soil and Groundwater Conditions

Information presented in this section is based on reports generated by GeoEngineers, Ecology's contractor who investigated the adjacent Moxee City Shop.

1.2.2.1 SOIL AND GROUNDWATER INVESTIGATIONS BY GEOENGINEERS IN 2012

GeoEngineers conducted a soil assessment and groundwater assessment for Ecology at the Moxee City Shop in March and October 2012. They advanced six, direct-push soil borings (DP-1 through DP-5 and MW-1) to depths ranging from about 8 to 12 feet and installed one monitoring well in one of the soil borings (MW-1) in March 2012 (on Moxee City Shop property only). They also advanced three hollow-stem auger soil borings to depths of approximately 12 feet in October 2012, and installed monitoring wells (MW-2, MW-3 and MW-4) in the borings (making a total of four monitoring wells in 2012, which are illustrated in Appendix A). GeoEngineers field-screened soil samples from each direct-push and hollow-stem auger boring for the presence of petroleum contamination by visual examination, headspace vapor monitoring with a photo-ionization detector (PID), and water-sheen testing. In addition, GeoEngineers submitted one soil sample each from direct-push soil borings and hollow-stem auger borings for chemical analysis. For samples from areas of suspected petroleum contamination, the analytical suite included gasoline range petroleum hydrocarbons (GRPH), benzene, toluene, ethylbenzene, and xylenes (BTEX), n-hexane, and naphthalene. Groundwater samples were also analyzed for natural attenuation parameters, including nitrate, manganese, sulfate, methane, and alkalinity.

Results of GeoEngineers' 2012 field activities are as follows (see Appendix A for maps with well and boring locations):

- During GeoEngineers' March and October 2012 investigations, petroleum compounds were not detected in soil samples at concentrations greater than Model Toxics Control Act (MTCA) Method A cleanup levels. However, GRPH were detected at concentrations greater than the applicable MTCA Method A cleanup level in the primary and duplicate groundwater samples collected from monitoring well MW-1, which was installed in boring DP-6 (see GeoEngineers Figure 2 in Appendix A). This well is hydraulically downgradient of a former underground storage tank on the city site.
- Shallow groundwater flow beneath the Moxee City Shop site was toward the southwest (November 2012). Hydraulic gradient was about 0.003 feet per foot (ft/ft).
- For natural attenuation parameters, nitrate-N concentration ranged from <0.200 milligrams per liter (mg/L) in MW-1 to 176 mg/L in MW-2. Sulfate concentration ranged from 18.3 mg/L in MW-1 to 290 mg/L in MW-2.
- As described by GeoEngineers, "nitrate concentration (176 mg/L) was observed in the groundwater sample collected from upgradient monitoring well MW-2. This observation along with the high specific conductivity (7.079 milliSiemens per centimeter [mS/cm]) and sulfate results reported for MW-2, suggests a wastewater influence could be occurring in this area" (GeoEngineers 2014).

1.2.2.2 SOIL AND GROUNDWATER INVESTIGATIONS BY GEOENGINEERS IN 2013

In 2013, GeoEngineers conducted quarterly groundwater sampling from the four on-site monitoring wells (MW-1 through MW-4) and also conducted a hydraulic test (slug test). Monitoring wells MW-5 and MW-6 were installed in December 2013. Groundwater samples were analyzed for GRPH, BTEX, naphthalene, nitrate, and sulfates.

Relative to previous site groundwater monitoring events, the groundwater elevation distribution observed during May 2013 was not consistent with previous measurements. Apparent mounded groundwater conditions near MW-1 caused interpreted groundwater flow direction to be toward

the southeast in the east portion of the site and to the southwest in the west portion of the site. During previous groundwater monitoring events in November 2012 and February 2013, interpreted groundwater flow was toward the southwest.

GeoEngineers estimated that the groundwater flow velocity within the shallow unconsolidated aquifer underlying the site is about 0.32 inches per day. The time of travel for groundwater at this velocity from monitoring well MW-1 to the south site boundary is approximately 3.6 years.

Also in 2013, GeoEngineers, conducted the following activities:

- Drilled nine direct-push borings at the Moxee City Shop site (DP-6 through DP-14 (see GeoEngineers' Figure 2 in Appendix A)) and collected continuous soil samples. Also, field-screened soil for visual observations, water sheen, and headspace vapor measurements with a PID to assess for petroleum.
- Submitted one soil sample from each boring to the laboratory for chemical analysis. In addition, collected groundwater samples from seven of the nine borings.
- Analyzed soil and groundwater samples for GRPH, BTEX, n-hexane, and naphthalene. In addition, collected and analyzed samples near MW-2 for nitrate and sulfate.
- Constructed two monitoring wells (MW-5 and MW-6) with a hollow stem auger (see map in Appendix A). Sampled all six wells on December 30, 2013.
- Advanced three borings (B-1, B-2, and B-3) with the hollow stem auger on Simplot property. Also, collected five soil samples from the borings and a groundwater sample from each boring (no wells were installed).

Data summary tables that GeoEngineers generated for soil and groundwater sampling results are presented in Appendix A.

1.2.2.2.1 Soils

In general, soil was not impacted by petroleum hydrocarbons (or was impacted to a limited extent). However, nitrate concentrations were elevated in two soil samples (borings B-1 and B-2) collected within the Simplot property, and in boring DP-10, located near the east boundary of the Moxee City Shop property. The average nitrate concentration in these three borings (68 milligrams per kilogram [mg/kg]) was over 10 times higher than the average nitrate concentration in the remaining soil samples submitted for nitrate analysis. Sulfate concentrations were elevated in all three soil samples collected within the Simplot property (borings B-1 through B-3), with an average sulfate concentration 333 mg/kg, which was over 10 times higher than the average sulfate concentration in samples collected from the Moxee City Shop property.

1.2.2.2.2 Groundwater

Groundwater flow in the shallow unconfined aquifer beneath the area bounded by the monitoring well network generally was toward the southwest on December 30, 2013. Average hydraulic gradient was about 0.004 ft/ft. This was generally consistent with previous events. However, in May 2003, groundwater flow direction was interpreted to be in a southeasterly direction near monitoring well MW-2. It was unclear whether this reflected a seasonal shift in the groundwater flow regime characteristic of spring conditions.

The concentration of nitrate in shallow groundwater beneath the project area appears to attenuate to less than 1 mg/L downgradient of the former sewage treatment plant control office. Observed nitrate concentrations increase to the north and east and generally are above the maximum contaminant level (MCL) north and east of the former sewage treatment plant control office, reaching an observed maximum of 263 mg/L (more than 26 times the MCL) in boring DP-10. The concentration of sulfate in shallow groundwater beneath the project area appears to attenuate to 10 to 50 mg/L downgradient of the former sewage treatment plant control office. Observed sulfate concentrations increase to the north and east and generally are above groundwater standards east of the former sewage treatment plant control office, reaching an observed maximum of 1,670 mg/L in boring B-2. GeoEngineers concluded that "these groundwater anion data support the suggestion that a source area exists near and east of the Moxee City Shop/Simplot property boundary and anion mobilization and downgradient transport via groundwater flow are ongoing" (GeoEngineers 2014).

1.2.2.3 SUMMARY OF SOIL AND GROUNDWATER SAMPLING ON SIMPLOT FROM MOXEE CITY SHOP STUDY

Ecology received permission from Simplot to advance three borings on the Simplot property (B-1 through B-3). The locations are illustrated in GeoEngineers' Figure 2 in Appendix A. Soil and groundwater results are summarized in **Table 1-2** and **Table 1-3**, respectively.

Table 1-2. Summary of Soil Sampling on Simplot Property Conducted by Ecology in 2013

Sample ID	Description	Nitrate-N	Sulfate
		(mg/Kg)	
B-1	Soil from B-1, 2.5 to 3.0 feet bgs	110	200
B-2	Soil from 2.5 to 3.0 feet bgs	47	440
B-3	Soil from 5.5 to-6.5 feet bgs	<2.3	360

bgs = below ground surface
mg/Kg = milligrams per kilogram

Table 1-3. Summary of Groundwater Sampling on Simplot Property Conducted by Ecology in 2013

Sample ID	Description	Nitrate-N	Sulfate
		(mg/L)	
B-1	Groundwater at 15 feet bgs	199	725
B-2	Groundwater at 15 feet bgs	94.0	1670
B-3	Groundwater at 15 feet bgs	0.17	1520

bgs = below ground surface
mg/L = milligrams per liter

Typical agricultural soil nitrate concentrations range from 5 to 40 mg/Kg, so the 110 mg/Kg measurement is slightly elevated, though in the range for agricultural soil that receives fertilizer additions. Sulfate soil concentrations appear elevated compared to typical soil levels (5 to 100 mg/Kg range). Washington's groundwater quality criteria for nitrate-N and sulfate are 10 mg/L and 250 mg/L, respectively. The groundwater concentration values in B-1 through B-3 were above the criteria, except for water sample in B-3 for nitrate-N.

In response to the Ecology letter regarding potential nitrate and sulfate sources on the Simplot property, Simplot collected two water samples from its scale drain in July 2014. This water is

associated with stormwater entering the drain. **Table 1-4** summarizes the analysis results of these samples.

Table 1-4. Summary of Scale Drain Sampling by Simplot

Description	Nitrate-N	Sulfate	Chloride
	(mg/L)		
Scale Drain	76.1	1640	187
Load Out Drain	169	1584	228

mg/L = milligrams per liter

Nitrate-N and sulfate in the two drain samples are elevated compared to typical groundwater levels and are above Washington groundwater standards.

2 Preliminary Site Investigation Activities

The objective of HDR's preliminary investigation activities was to assess the potential for elevated nitrate and sulfates in soil and groundwater beneath the Simplot Grower Solutions facility. Based on the preliminary investigation, HDR recommends further action, including installing groundwater monitoring wells as presented in Section 4. Soil samples were tested for nitrate-N, sulfate, ammonium-N, and soluble salts and groundwater samples were tested for nitrate-N, ammonia-N, sulfate, and total dissolved solids (TDS).

2.1 On-Site Investigation Activities

Prior to advancing borings, Washington Utilities Coordinating Council (Call Before You Dig, 1-800-424-5555) located public utilities. HDR contracted ULS, a utility location services company, to assess for the presence of utilities in the area of proposed borings. In the northwest corner area, ULS was not able to trace out a high pressure water line that provides water to the facility. Furthermore, Simplot did not have plan sets that showed the location of the water utility. Thus, because of uncertainty about its location, and rather than risk hitting the water line, HDR did not advance borings in the northeast area (proposed borings B6 and B7, see **Figure 2-1**). HDR recommends using potholing (vacuum truck extraction) to help locate the water lines as part of future site investigation activities (see Section 4.0).

Environmental West Exploration, Inc. provided direct push sampling services, using a GeoProbe system, while an HDR hydrogeologist provided sampling oversight. The GeoProbe operates using a truck-mounted, hydraulic push probe that collects undisturbed soil cores. In all, Environmental West Exploration advanced eight borings with the GeoProbe on August 4, 2015, in locations generally consistent with those proposed in the Work Plan. The exact location of each boring was determined in the field following consultation with the site manager, review of utility locations, and consideration of personnel safety and facility operations. **Figure 2-1** illustrates boring locations. There are seven borings along the west, south, and east perimeter of the project area. One boring is located within the site's interior. The boring locations support an assessment of up and downgradient groundwater quality conditions and provide information on soil and groundwater quality for locations where industrial activities have occurred. The groundwater quality condition of the northeast corner could not be established, because the proposed boring locations B6 and B7 were not drilled due to the previously described potential utility conflicts.

2.1.1 On-Site Soil Investigation

HDR collected three soil samples from each boring location, with the first sample collected near the surface, the second sample collected between the surface and groundwater table, and the third sample collected near the soil/groundwater interface. This approach allowed assessing constituents with depth and mapping the thickness of the soil in the area. HDR collected a total of 25 soil samples, including one duplicate soil sample to assess variability. For each soil depth, HDR placed the soil sample into a sample jar and sent it to Kuo Laboratory for analysis (see results in Section 3.3).

HDR followed the Work Plan's standard operating procedure (SOP) for GeoProbe sampling, following standard chain-of-custody procedures from the time samples were collected until the

samples arrived at the laboratory, and immediately labeled samples and placed them in a clean ice chest where they were chilled until delivery to the laboratory.

After sampling, Environmental West Exploration completed the following:

- Plugged each boring with bentonite clay.
- Containerized soil cuttings.
- Labeled each container as to its contents, including the date and the statement "Laboratory analysis pending."

2.1.2 On-Site Groundwater Investigation

After collection of soil samples, HDR used the GeoProbe system to collect groundwater grab samples in the same boring using a stainless steel screen and ¼-inch tubing equipped with a peristaltic pump to convey water to the surface. The SOP for GeoProbe sampling in the Work Plan describes groundwater sampling procedures. HDR collected samples within the upper 2 to 3 feet of the water table. At each sample location, HDR completed the following:

- Purged the sample screen by pumping approximately 2 liters of groundwater prior to collecting the sample.
- Containerized purged water.
- Labeled the container as to its contents, including the date and the statement "Laboratory analysis pending."

ESC Lab Sciences conducted water sample analysis. HDR collected groundwater samples in the ESC Lab Sciences supplied sampling bottles. In total, HDR collected 11 groundwater samples; 8 boring water samples, 1 field duplicate, 1 rinsate sample, and 1 field blank.

2.1.3 Sample Identification Protocol

Following sample identification protocol, HDR labeled the borings from B-01 through B-10, and identified samples with the boring number, followed by "S" for soil or "W" for water to identify media sampled, followed by depth of the sample. For example, a soil sample collected at borehole B-02 at a depth of 9 feet is labeled B-02-S-9. A water sample collected at borehole B-04 at a depth of 12 feet is labeled B-04-W-12.

2.1.4 Laboratory Analyses

HDR sent soil samples to Kuo Laboratory in Othello, Washington and groundwater samples to Environmental Science Corporation (ESC) Lab Sciences in Mt. Juliet, Tennessee. Kuo is a soil testing laboratory that is part of the North American Proficiency Testing Program for soils. ESC Lab Sciences is Washington-certified for analysis of air, drinking water, Resource Conservation Recovery Act, underground storage tanks, and wastewater (Certificate #C1915). Laboratory analyses conducted for soil and groundwater samples are summarized in **Table 2-1**.

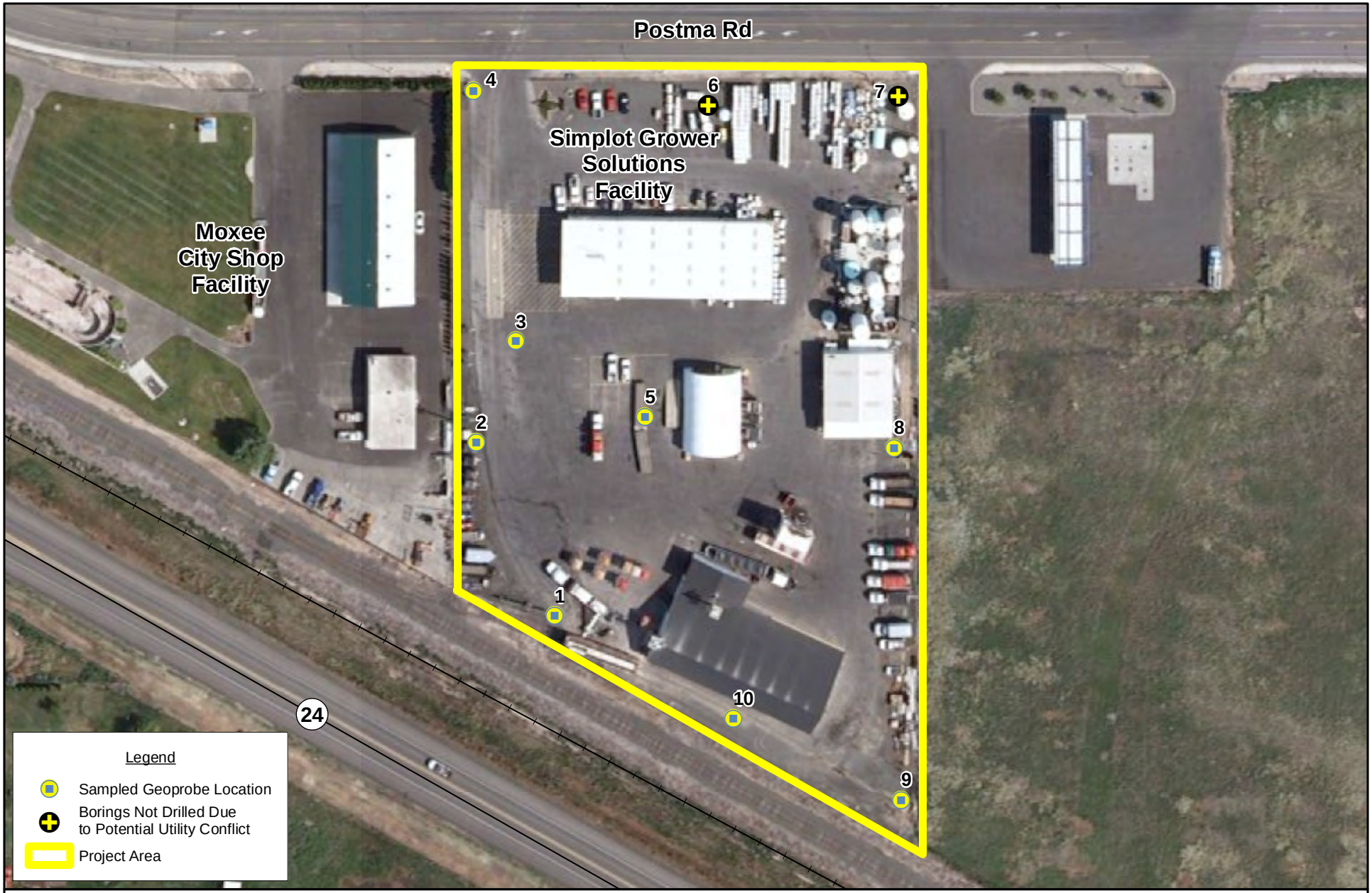

Figure 2-1. Geoprobe Sampling Locations (August 4, 2015)
Simplot Grower Solutions, Moxee, WA

Imagery: ESRI World Imagery, July 2013 Imagery Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Map Date: 9/15/2015
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0 100 200
Feet

Table 2-1. Proposed Laboratory Analyses

Analytical Parameter	Method	Preservative	Constituents of Concern Included
Soil Samples			
Nitrate-N	2M KCl Extraction[1]	None	Nitrate-Nitrogen
Ammonium-N	1N KCl Extraction	None	Ammonium-Nitrogen
Sulfate	NAPT S11.10	None	Sulfate-Sulfur
Soluble Salts	Sat. Extract	None	Soluble salts
Groundwater Samples			
Sulfate	EPA 300.0	None	Sulfate-Sulfur
Nitrate-N	EPA 353.2 or EPA 300.0	Sulfuric Acid (H_2SO_4)	Nitrate-Nitrogen
Ammonium-N	SM20 4500 NH3 D or EPA 350	Sulfuric Acid (H_2SO_4)	Ammonium-Nitrogen
TDS	SM2540D	None	Total dissolved solids

[1]Procedure and analytical methods for soil nitrate, ammonium, sulfate, and soluble salts follow the *Western States Laboratory Plant, Soil and Water Analysis Manual,* 2nd Edition, 2003.

TDS = total dissolved solids; NAPT = North American Proficiency Testing;
EPA = U.S. Environmental Protection Agency

2.1.5 Quality Assurance and Quality Control

Table 2-2 summarizes the quality assurance/quality control (QA/QC) field samples that HDR collected (see the Work Plan for a description of QA/QC procedures).

Table 2-2. Quality Assurance and Quality Control Field Samples

QA/QC Type	Number of Samples	Description
Duplicate	1 soil sample 1 groundwater sample	Duplicate is collected using the same sampling technique as the original sample.
Rinsate Decon	1 water rinsate sample	Collected during decontamination of equipment. After decontamination of probe has occurred, run distilled water over the probe and collect rinsate into appropriate sample bottles.
Field Sample Blank	1 water blank sample	Pour distilled water directly into appropriate sample bottles.

In addition to the field QA/QC samples described in **Table 2-2**, Kuo Laboratory and ESC Lab Sciences followed appropriate laboratory QA/QC procedures as dictated by applicable U.S. Environmental Protection Agency (EPA) methods and/or laboratory SOPs.

3 Sampling Results

3.1 Model Toxics Control Act

The MTCA Cleanup Regulation, chapter 173-340 Washington Administrative Code (WAC), sets forth the requirements and procedures for developing soil and groundwater cleanup standards. Cleanup levels must be based on the reasonable, maximum exposure expected to occur under both current and future site conditions. The regulation allows for establishing soil cleanup levels based on two types of land use – unrestricted land use and industrial land use. HDR conservatively compared soil sampling results from the preliminary site investigation to cleanup levels for unrestricted land use. For unrestricted land use, the regulation provides two options for establishing soil cleanup levels – Method A and Method B. Method B cleanup levels are based on the reasonable maximum exposure expected to occur under residential land use conditions and may be used to establish soil cleanup levels at any site. Method B cleanup levels include those set for constituents as carcinogens and non-carcinogens. HDR chose the most restrictive level of the two for comparison in this investigation.

The establishment of groundwater cleanup levels depends on the classification of groundwater under the regulation as either potable or nonpotable. The groundwater beneath the site is expected to be classified as potable. Method B may be used to establish cleanup levels for potable groundwater at any site.

3.2 Soil Lithology

Boring logs included in Appendix B summarize soil lithology observed at each boring location. Each of the borings included a layer of fill at the ground surface up to 1.5 feet deep. Boring locations 3 and 5 are on a paved (asphalt) area. The subsurface soils were generally comprised of silt for the majority of the boring depth, to approximately 11 to 12 feet below ground surface. The silt was generally dark brown to brown and mostly uniform in color for the boring depth, except some gray silt at two boring locations. The soil was generally dry to slightly moist to a depth of 3 to 4 feet and wet from approximately 7 to 8 feet to the bottom of the boring.

3.3 Soil Sample Results

Three soil samples were collected at each boring location – one near the ground surface, one between the surface and groundwater, and another near the groundwater interface. In total, HDR collected 24 soil samples, plus 1 duplicate, and Kuo Laboratory analyzed these for ammonia, nitrate, sulfate, and soluble salts (**Table 3-1**). Laboratory reports are presented in Appendix C.

Table 3-2 compares the sample with its duplicate (Sample ID B-08S-8). The relative percent difference (RPD) is defined as follows:

$$RPD = 100 * [(\text{absolute value } (X_1-X_2))/(\text{mean } (X_1,X_2))]$$

where X_1 is the value of sample and X_2 is value of duplicate

For sample B-08S-8 and its duplicate B-11S-8, the RPD ranged from 8 to 21 percent. The RPD provides a measure of precision, where the lower the RPD, the greater the precision of sample handling and laboratory analysis. Generally, the goal for soil is a RPD of less than 30 percent.

Table 3-1. Soil Sample Results

Boring	B1	B2	B3	B4	B5	B8	B9	B10	B11[1]
Depth (ft)	0.0-1.0	0.0-1.0	1.0-2.0	1.0-2.0	2.0-3.0	1.0-2.0	1.0-2.0	0.5-1.5	
	5.0-6.0	5.0-6.0	4.0-5.0	5.0-6.0	4.0-5.0	4.0-5.0	5.5-6.5	4.5-5.5	
	9.0-10.0	8.0-9.0	7.0-8.0	7.5-10.5	7.0-8.0	6.0-7.0	7.0-8.0	7.5-8.5	7.0-8.0
Nitrate-Nitrogen and Ammonia-Nitrogen - 1N KCl Method (mg/kg)									
Nitrate-Nitrogen	52.8	21.8	7.3	6.0	171.0	71.0	616.3	28.0	
	20.0	15.3	0.8	6.5	40.3	11.5	295.0	24.0	
	10.0	15.5	11.5	4.5	27.0	5.3	67.0	37.0	33.3
Ammonia-Nitrogen	9.8	38.5	392.3	18.5	484.8	19.5	76.5	7.8	
	4.0	4.3	584.5	21.3	238.3	6.8	14.8	5.0	
	4.3	8.0	21.8	259.3	283.8	4.3	5.3	6.5	233
Sulfate – NAPT S11.10 Method (mg/kg)									
Sulfate	835	54	10	17	42	58	171	66	
	48	47	9	13	25	72	120	35	
	33	87	8	7	27	13	50	68	27
Soluble Salts –Sat. Extract Method (mmhos/cm)									
Soluble Salts	3.16	0.83	0.57	0.57	1.48	1.52	4.60	0.97	
	0.62	0.63	0.56	0.46	0.74	0.65	2.19	0.75	
	0.77	0.89	0.40	0.43	0.66	0.66	1.18	0.85	0.61

[1] Duplicate for B5 7.0-8.0.

mg/kg = milligrams per kilogram; mmhos/cm = millimhos per centimeter; NAPT = North American Proficiency Testing

Table 3-2. Comparison of Soil Sample and its Duplicate and Relative Percent Difference

Sample ID	Nitrate-N	NH4-N	Sulfate-S	Soluble Salts
	(mg/Kg)		(mmhos/cm)	
B-05S-8	27.0	283.8	27	0.66
B-11S-8 (duplicate)	33.0	233	27	0.61
RPD[1]	20.7%	19.6%	19.6%	7.87%

[1]RPD = relative percent difference = 100 * [(absolute value (X_1-X_2))/(mean (X_1,X_2))], where X_1 is the value of sample and X_2 is value of duplicate

mg/kg = milligram per kilogram; mmhos/cm = millimhos per centimeter

Nitrate-nitrogen, ammonia-nitrogen, sulfate, and soluble salts were detected in all soil samples (**Table 3-1**). None of the soil samples exceeded the MTCA Method B CUL for nitrate-nitrogen set at 8,000 mg/Kg (this threshold value does not account for groundwater protection). A CUL is not available for ammonia-nitrogen, sulfate, or soluble salts. In general, nitrate-N, ammonia, sulfate, and salt concentrations are highest at the surface sample and decreased with depth.

Table 3-3 lists nitrate, sulfate, and soluble salt test interpretation values for growing agricultural crops. Typical agricultural soil nitrate concentrations range from 5 to 40 mg/Kg. Of the 24 soil samples, 6 had nitrate-N concentrations above 40 mg/Kg. Ammonium-N concentrations are typically found in the 1 to 10 mg/Kg range for agricultural soils; 13 of the 24 samples had

concentrations greater than 10 mg/Kg. For sulfate, only 4 of the 24 soil samples had concentrations at 10 mg/Kg or less.

NRCS defines a saline soil (high salt soil) as having a saturated paste salt concentration greater than 4 millimhos per centimeter (mmhos/cm). Only 1 of the 24 samples had a salt level above 4 mmhos/cm. In general, soil samples with high salt levels correlated with high concentrations of nitrate, ammonium, and sulfate (**Table 3-1**).

Table 3-3. Soil Test Interpretation for Crop Production

Constituent	Low	Medium	High	Excessive
Nitrate-N (mg/Kg)	<10	10-20	20-30	>30
Sulfate (mg/Kg)	<2	2-10	>10 (sufficient)	-
Soluble Salts (mmhos/cm)	<1.0	1.0-2.0	>2.0	-

[1] Soil Test Interpretation Guide. Oregon State University Extension Service. 1999.

Figure 3-1 is a post plot of nitrate-nitrogen at each boring at each sampled depth. The highest soil nitrate was for boring B-9, located in the southeast corner of the facility.

3.4 Groundwater Sample Results

One groundwater sample was collected at each boring location (eight locations) and HDR sent them to ESC Lab Sciences to be analyzed for nitrate-nitrite, ammonia-N, sulfate, and TDS (**Table 3-4**). Laboratory reports are presented in Appendix C. A duplicate sample was collected from B5 and the RPD ranged 0 percent for TDS to 3.2 percent for ammonium-N (**Table 3-5**).

Nitrate-N exceeded Washington groundwater quality criteria of 10 mg/L in all samples, except B3 and B4. The highest nitrate-N concentration was in B9 at 304 mg/L (**Figure 3-2**). Boring B9 also had the highest soil nitrate concentrations measured in samples. Ammonia-N was detected in all samples with the highest concentrations in groundwater correlated with soil ammonium concentrations. The Washington groundwater quality criteria for sulfate is 250 mg/L, which was exceeded in groundwater samples collected from B1, B2, B5, B9, and B10. For TDS, all samples exceeded the groundwater quality criteria of 500 mg/L.

Figure 3-2 illustrates a post plot for nitrate-N levels in groundwater samples. The Moxee City Shop study indicated a potential groundwater flow direction toward the southwest (GeoEngineers 2014).

Figure 3-1. Post Plot Soil Nitrate-N
Simplot Grower Solutions, Moxee, WA

Imagery: ESRI World Imagery, July 2013 Imagery Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Map Date: 10/16/2015
Q:\Simplot\Moxee\map_docs\Site_LetLand.mxd

0 70 140
Feet

Table 3-4. Groundwater Sample Results

Boring:	B1	B2	B3	B4	B5	B8	B9	B10	B11[1]	Washington Groundwater Quality Criteria
Approx. Sample Depth (ft)	12	12	10	11	11	11	12	11		
Nitrate-Nitrite - EPA Method 353.2 (mg/L)										
Nitrate-N	107	65.0	9.02	6.25	211	33.1	304	144	214	10
Ammonia Nitrogen - EPA Method 350.1 (mg/L)										
Ammonia-N	0.154	0.162	73.1	38.2	184	0.117	0.163	0.420	190	N/A
Sulfate - EPA Method 9056 (mg/L)										
Sulfate	389	1500	157	69.4	381	161	763	550	384	250
Dissolved Solids – EPA Method (mg/L)										
TDS	2400	3900	670	870	2100	1100	3700	1900	2100	500

[1] Duplicate for B5

Table 3-5. Comparison of Groundwater Sample and its Duplicate and Relative Percent Difference

Sample ID	Nitrate-N	NH4-N	Sulfate-S	TDS
	(mg/L)			
B-05W-11	211	184	381	2100
B-11W-11 (duplicate)	214	190	384	2100
RPD[1]	1.4%	3.2%	0.8%	0%

[1]RPD = relative percent difference = 100 * [(absolute value (X_1-X_2))/(mean (X_1,X_2))], where X_1 is the value of sample and X_2 is value of duplicate

Figure 3-2. Post Plot Groundwater Nitrate-N
Simplot Grower Solutions, Moxee, WA

Imagery: ESRI World Imagery, July 2013 Imagery Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Map Date: 10/16/2015
Q:\Simplot\Moxee\map_docs\Site_LetLand.mxd

0 70 140
Feet

4 Findings and Conclusions

Inorganic fertilizers contain nitrogen in the nitrate and/or ammonium form. Nitrate is an anion (NO_3^-) and is readily mobile in soil systems, where soil in temperate climates is negatively charged (clay has negative charges and attracts positively charged ions). Nitrates in soil are highly susceptible to leaching. Nitrate is the form of nitrogen that is most available to plant roots (plant roots can uptake ammonium, but nitrate is the dominant form of nitrogen taken up by roots).

Ammonium (NH_4^+) is a cation, and when added to soil, ammonium is readily adsorbed by soil clay (negatively charged soil attracts the positively charged ion). The amount of ammonium that is adsorbed by soil is a function of the cation exchange capacity (CEC) of the soil. Generally, the more clay in a soil, the greater the CEC. When added to the soil, ammonium is adsorbed to the soil until the CEC is saturated (adsorption sites become full). Once full, ammonium can leach. For example, once the upper 6 inches of soil becomes saturated, the ammonium would move into the next 6 inches, where it is adsorbed by the soil. Generally, ammonium is considered immobile in soil, except when added at high concentrations such that the CEC becomes saturated. For borings B3, B4, and B5, for example, it appears that enough ammonium-based fertilizer was added to the soil to saturate the exchange sites to a depth of approximately 10 to 11 feet. Furthermore, the groundwater data suggest that ammonium has entered into the groundwater system. In groundwater, similar to soil, ammonium is not expected to be mobile because it will adsorb to the negatively charged soil particles in the aquifer.

In soil systems, ammonium is microbially converted to nitrate in a process called nitrification. This process requires oxygen and moisture (it is an aerobic process). Once in nitrate form, nitrate is available for plant uptake, but is also susceptible to leaching. Thus, high concentrations of ammonium in soil serve as a long-term source for nitrate, because with favorable conditions, ammonium is converted to nitrate. Once in the nitrate form, nitrate does not convert back to ammonium in soil systems. Nitrate can be lost as nitrogen gas under anoxic conditions (saturated soil conditions), which is also a microbial reaction.

The results for the limited groundwater sampling indicate that Washington's groundwater quality criteria (Table 1 in WAC 173-200-050) are exceeded for nitrate-N in six of eight samples, for sulfate in four of eight samples, and for TDS in all eight samples. As a next step, HDR recommends the following:

- Since no borings were advanced in the northeast portion of the site due to underground utility conflicts, conduct utility clearance using a vacuum truck (potholing) to locate the plastic pipe water line and also to clear areas for potential monitoring well placement and soil sampling.
- Install four monitoring wells on site:
    - MW-1 – locate in northeast corner of facility
    - MW-2 - locate in southeast corner near B9
    - MW-3 - locate in northwest corner near M4
    - MW-4 - locate in central area near B5
- To further support groundwater monitoring, Simplot should request well access permission from Ecology for Moxee City Shop wells MW-6 and MW-4. These wells

would provide coverage for the west end of the Simplot property and would be included as part of the monitoring well network. From these wells (up to six monitoring wells), groundwater flow direction can be assessed and the potential for off-site migration evaluated.

- Develop a work plan for the proposed monitoring wells and submit to Ecology.

5 References

GeoEngineeers. Data Gap Investigation Report Moxee City Shop and Former STP, Moxee, Washington for Washington State Department of Ecology. April 3, 2014.

GeoEngineers. Soil and Groundwater Assessment. City Shop and Sewage Treatment Plant Moxee, Washington for Washington Department of Ecology. May 14, 2013

GeoEngineers. Quarterly Groundwater Monitoring and Hydraulic Testing Second Quarter 2013. City Shop and Sewage Treatment Plant, Moxee, Washington for Washington Department of Ecology. August 23, 2013.

Custom Soil Resource Report for Yakima County Area, Washington Moxee Soil Map. http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm Viewed January 29, 2015.

APPENDIX A
SELECTED TABLES AND FIGURES FROM STUDIES AT MOXEE CITY SHOP

Table 1

Summary of Groundwater Level Measurements

Moxee City Shop and Former STP

Moxee, Washington

Well Number	Top of Casing Elevation [1] (feet)	Screen Elevation [1] (feet)	Date Measured	Monitoring Well Headspace [2] (ppm)	Depth to Groundwater [3] (feet)	Groundwater Elevation [1] (feet)	Change in Groundwater Elevation [4] (feet)
MW-1	1,024.95	1,011.3 to 1,023.3	11/01/12	0.0	7.35	1,017.60	NA
			02/13/13	0.0	7.55	1,017.40	-0.20
			05/27/13	0.0	2.83	1,022.12	4.72
			08/21/13	NM	5.31	1,019.64	-2.48
			12/30/13	3.9	4.70	1,020.25	0.61
MW-2	1,025.49	1,013.9 to 1,021.9	11/01/12	0.0	7.65	1,017.84	NA
			02/13/13	0.0	7.96	1,017.53	-0.31
			05/27/13	0.0	3.00	1,022.49	4.96
			08/21/13	NM	5.72	1,019.77	-2.72
			12/30/13	0.0	5.75	1,019.74	-0.03
MW-3	1,025.24	1,013.6 to 1,021.6	11/01/12	0.0	7.81	1,017.43	NA
			02/13/13	0.0	8.06	1,017.18	-0.25
			05/27/13	0.0	3.22	1,022.02	4.84
			08/21/13	NM	5.78	1,019.46	-2.56
			12/30/13	0.0	5.89	1,019.35	-0.11
MW-4	1,025.56	1,013.9 to 1,021.9	11/01/12	0.0	7.95	1,017.61	NA
			02/13/13	0.0	8.14	1,017.42	-0.19
			05/27/13	0.0	3.29	1,022.27	4.85
			08/21/13	NM	5.93	1,019.63	-2.64
			12/30/13	0.0	6.06	1,019.50	-0.13
MW-5	1,025.31	1,010.1 to 1,022.6	12/30/13	1.0	5.89	1,019.67	--
MW-6	1,025.37	1,010.4 to 1,022.9	12/30/13	1.1	5.64	1,019.92	--

Notes:

[1]Elevations are referenced to the North American Vertical Datum of 1988 (NAVD88).

[2]Well headspace measurements were obtained using a photoionization detector immediately upon removal of the well's compression cap.

[3]Depth to water measurements obtained from top of well casing. Wells are contained in flush-mounted protective steel monuments installed at or near existing grade.

[4]Change in groundwater elevation is relative to the previous measurement at the respective well location.

ppm = parts per million; NA = Not Applicable; NM = Not Measured

Table 2

Summary of Chemical Analytical Results - Soil [1,2]

Moxee City Shop and Former STP
Moxee, Washington

Boring		DP-2[4]	DP-3[4]	DP-4[4]	DP-5[4]	DP-6[4]	DP-6	DP-7	DP-8	DP-9	DP-10	DP-11	DP-12	DP-13	DP-14
Sample Depth (feet)	**Regulatory**	**4.5-5**	**4-4.5**	**4-4.5**	**4-5**	**4.5-5**	**1.5-2.5**	**1-1.8**	**1-1.8**	**1-2**	**1.3-2**	**2-2.5**	**1-2**	**1-2**	**1-2**
Date Sampled	**Levels [3]**	**03/01/12**	**03/01/12**	**03/01/12**	**03/01/12**	**03/01/12**	**11/14/13**	**11/14/13**	**11/14/13**	**11/14/13**	**11/14/13**	**11/14/13**	**11/14/13**	**11/14/13**	**11/14/13**
Method EPA 8260C - NWTPH-Gx and Volatile Organic Compounds (mg/kg)															
Gasoline-range hydrocarbons	30/100 [5]	<7.62	<7.94	37.9	<7.48	<7.74	<6.72	<6.25	<6.94	NT	NT	NT	<5.01	NT	<6.54
MTBE	0.10	<0.0457	<0.0476	<0.0425	<0.0449	<0.0464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Benzene	0.03	<0.0229	<0.0238	<0.0213	<0.0224	<0.0232	<0.00672	<0.00625	<0.00694	NT	NT	NT	<0.00501	NT	<0.00654
Ethylbenzene	6	<0.152	<0.159	<0.142	<0.150	<0.155	<0.134	<0.125	<0.139	NT	NT	NT	<0.100	NT	<0.131
Toluene	7	<0.152	<0.159	<0.142	<0.150	<0.155	<0.134	<0.125	<0.139	NT	NT	NT	<0.100	NT	<0.131
o-Xylene	9 [6]	<0.305	<0.317	<0.284	<0.299	<0.309	<0.269	<0.250	<0.278	NT	NT	NT	<0.200	NT	<0.261
m,p-Xylene	9 [6]	<0.609	<0.635	<0.567	<0.598	<0.619	<0.537	<0.500	<0.555	NT	NT	NT	<0.400	NT	<0.523
Xylenes (total)	9 [6]	<2.29	<2.38	<2.13	<2.24	<2.32	<2.02	<1.87	<2.08	NT	NT	NT	<1.50	NT	<1.96
Hexane	4,800 [7]	<0.152	<0.159	<0.142	<0.150	<0.155	<0.134	<0.125	<0.139	NT	NT	NT	<0.100	NT	<0.131
1,2-Dichloroethane (EDC)	11[8]	<0.152	<0.159	<0.142	<0.150	<0.155	NT	NT	NT	NT	NT	NT	NT	NT	NT
Method EPA 8011 (µg/kg)															
1,2-Dibromoethane (EDB)	5	<1.27	<1.31	**<12.0**	<1.19	<1.28	NT	NT	NT	NT	NT	NT	NT	NT	NT
Method EPA 8270D - Polynuclear Aromatic Compounds (PAH) by GC/MS with Selected Ion Monitoring[9] (mg/kg)															
Naphthalene	5[10]	<0.305	<0.305	<0.284	<0.309	<0.309	<0.0121	<0.0119	<0.0125	NT	NT	NT	<0.0106	NT	<0.0124
2-Methylnaphthalene	5 [10]	<0.0130	<0.0129	0.0289	<0.0127	<0.0126	<0.0121	<0.0119	<0.0125	NT	NT	NT	<0.0106	NT	<0.0124
1-Methylnaphthalene	5 [10]	<0.0130	<0.0129	0.0185	<0.0127	<0.0126	<0.0121	<0.0119	<0.0125	NT	NT	NT	<0.0106	NT	<0.0124
Method EPA 6010C (mg/kg)															
Lead	250	5.30	6.18	5.53	4.95	7.24	NT	NT	NT	NT	NT	NT	NT	NT	NT
Method EPA 300 - Anions (mg/kg)															
Nitrate	130,000 [7]	NT	NT	NT	NT	NT	NT	NT	NT	12	47	<1.6	NT	14	NT
Sulfate	RND	NT	NT	NT	NT	NT	NT	NT	NT	12	49	15	NT	21	NT

Boring	Regulatory Levels [3]	MW-2[4]	MW-3[4]	MW-4[4]	MW-5	MW-6	B-1	B-2	B-3
Sample Depth (feet)		6	6	2.5	5-5.5	5-5.5	2-2.5	2.5-3	5.5-6.5
Date Sampled		10/31/12	10/31/12	10/31/12	12/12/13	12/13/13	12/12/13	12/12/13	12/12/13
Method EPA 8260C - NWTPH-Gx and Volatile Organic Compounds (mg/kg)									
Gasoline-range hydrocarbons	30/100 [5]	73.5	<7.75	<8.18	<7.46	13.5	NT	NT	NT
MTBE	0.10	NT	NT	NT	NT	NT	NT	NT	NT
Benzene	0.03	<0.00732	<0.00775	<0.00818	<0.00746	<0.00663	NT	NT	NT
Ethylbenzene	6	<0.146	<0.155	<0.164	<0.149	<0.133	NT	NT	NT
Toluene	7	<0.146	<0.155	<0.164	<0.149	<0.133	NT	NT	NT
o-Xylene	9 [6]	<0.293	<0.310	<0.327	<0.298	<0.265	NT	NT	NT
m,p-Xylene	9 [6]	<0.586	<0.620	<0.654	<0.596	<0.530	NT	NT	NT
Xylenes (total)	9 [6]	<2.20	<2.33	<2.45	<2.24	<1.99	NT	NT	NT
Hexane	4,800 [7]	<0.146	<0.155	<0.164	<0.149	<0.133	NT	NT	NT
1,2-Dichloroethane (EDC)	11[8]	NT	NT	NT	NT	NT	NT	NT	NT
Method EPA 8011 (µg/kg)									
1,2-Dibromoethane (EDB)	5	NT	NT	NT	NT	NT	NT	NT	NT
Method EPA 8270D - Polynuclear Aromatic Compounds (PAH) by GC/MS with Selected Ion Monitoring[9] (mg/kg)									
Naphthalene	5[10]	<0.0126	<0.0129	<0.0132	<0.0161	<0.0128	NT	NT	NT
2-Methylnaphthalene	5 [10]	<0.0126	<0.0129	<0.0132	<0.0161	<0.0128	NT	NT	NT
1-Methylnaphthalene	5 [10]	<0.0126	<0.0129	<0.0132	<0.0161	<0.0128	NT	NT	NT
Method EPA 6010C (mg/kg)									
Lead	250	NT	NT	NT	NT	NT	NT	NT	NT
Method EPA 300 - Anions (mg/kg)									
Nitrate	130,000 [7]	NT	NT	NT	NT	<2.4	110	47	<2.3
Sulfate	RND	NT	NT	NT	NT	48	200	440	360

Notes:

[1] Chemical analyses conducted by TestAmerica of Spokane, Washington.

[2] All analyte concentrations presented in milligrams per kilogram (mg/kg), unless otherwise noted.

[3] Regulatory level refers to Washington State Model Toxics Control Act (MTCA) Method A cleanup level unless otherwise footnoted.

[4] Data are adapted from previous project report. Data from borings DP-2 through DP-6 were initially reported by GeoEngineers (2012B) and data from borings MW-2 to MW-4 were initially reported by GeoEngineers (2013A).

[5] Gasoline-range petroleum hydrocarbon cleanup levels in soil are 30 mg/kg when benzene is detected and 100 mg/kg when benzene is not detected.

[6] Cleanup level for total xylenes.

[7] Standard formula value for MTCA Method B, Non-Carcinogen, in Soil, as calculated by Ecology's Cleanup Levels and Risk Calculations (CLARC) database. The nitrate regulatory level is specific to ingestion. Additional evaluation would be required to determine a soil cleanup level protective of groundwater and other pathways.

[8] Standard formula value for MTCA Method B, Carcinogen, In Soil, as calculated by Ecology's CLARC database.

[9] Napthalene data for DP-2 through DP-6 were analyzed by Method EPA 8260C.

[10] Cleanup level refers to sum of naphthalenes.

mg/kg = milligrams per kilogram; µg/kg = micrograms per kilogram; EPA = Washington State Environmental Protection Agency; NT = not tested; MTBE = methyl teriary butly ether

RND = Researched-No Data under MTCA Method A and not researched under MTCA Methods B and C.

Table 3

Summary of Chemical Analytical Results - Groundwater Samples from Soil Borings [1]

Moxee City Shop and Former STP
Moxee, Washington

Boring	Regulatory	DP-6	DP-8	DP-9	DP-10	DP-11	DP-12	DP-13	B-1	B-2	B-3
Date Sampled	Levels [2]	11/14/13	11/14/13	11/14/13	11/14/13	11/14/13	11/14/13	11/14/13	12/12/13	12/12/13	12/12/13
Sample Depth (feet bgs)		4 to 8 [3]	4 to 8 [3]	4 to 8 [3]	4 to 8 [3]	4 to 8 [3]	4 to 8 [3]	4 to 8 [3]	15	15	15
Method EPA 8260C - NWTPH-Gx and Volatile Organic Compounds (µg/L)											
Gasoline-range hydrocarbons	1,000/800 [4]	**1,340**	<90.0	NT	NT	NT	NT [10]	NT	NT	NT	NT
Benzene	5	0.530	<0.200	NT	NT	NT	NT [10]	NT	NT	NT	NT
Toluene	1,000	<0.500	<0.500	NT	NT	NT	NT [10]	NT	NT	NT	NT
Ethylbenzene	700	<0.500	<0.500	NT	NT	NT	NT [10]	NT	NT	NT	NT
m,p-Xylene	1,000 [5]	33.4	<0.500	NT	NT	NT	NT [10]	NT	NT	NT	NT
o-Xylene	1,000 [5]	29.8	<0.500	NT	NT	NT	NT [10]	NT	NT	NT	NT
Xylenes (total)	1,000 [5]	63.2	<1.50	NT	NT	NT	NT [10]	NT	NT	NT	NT
Hexane	480 [6]	<1.00	<1.00	NT	NT	NT	NT [10]	NT	NT	NT	NT
Method EPA 8270D - Polycyclic Aromatic Compounds (PAH) by GC/MS with Selected Ion Monitoring (µg/L)											
Naphthalene	160 [7]	1.25	<0.107	NT	NT	NT	<0.0980	NT	NT	NT	NT
2-Methylnaphthalene	160 [7]	0.155	<0.107	NT	NT	NT	<0.0980	NT	NT	NT	NT
1-Methylnaphthalene	160 [7]	1.28	<0.107	NT	NT	NT	<0.0980	NT	NT	NT	NT
Method EPA 300 - Polynuclear Aromatic Compounds (PAH) by GC/MS with Selected Ion Monitoring (mg/L)											
Nitrate	10 [8]	<0.200	2.94	**99.7**	**263**	**38.5**	NT	**158**	**199**	**94.0**	0.710
Sulfate	250 [9]	105	96.2	**251**	**361**	192	NT	**329**	**735**	**1670**	**1520**

Notes:

[1] Chemical analyses conducted by TestAmerica of Spokane, Washington.

[2] Regulatory level refers to Washington State Model Toxics Control Act (MTCA) Method A cleanup level unless otherwise footnoted.

[3] To collect groundwater samples from direct-push borings, a 4-foot-long screen was placed from about 4 to 8 feet bgs. If insufficient volume was achieved at that depth, the screen was lowered to about 8 to 12 feet bgs.

[4] Gasoline-range petroleum hydrocarbon cleanup levels in groundwater are 1,000 µg/L when benzene is detected and 800 µg/L when benzene is not detected.

[5] Cleanup level for total xylenes.

[6] Standard formula value for MTCA Method B, Non-Carcinogen, in Groundwater, as calculated by Ecology's Cleanup Levels and Risk Calculations (CLARC) database.

[7] Cleanup level refers to sum of naphthalenes.

[8] Maximum contaminant level established by Title 40, Volume 19 of the Code of Federal Regulations.

[9] Secondary maximum contaminant level recommeded by the Environmental Protection Agency.

[10] The sample containers for Method EPA 8260C and associated with the groundwater sample collected from boring DP-12 broke in shipment to the analytical laboratory.

Bold indicates analyte concentration exceeds referenced Regulatory Level.

mg/L=milligrams per liter; µg/L = micrograms per liter; NT = not tested; bgs = below ground surface

Table 4

Summary of Chemical Analytical Results - Groundwater Samples from Monitoring Wells[1]

Moxee City Shop and Former STP
Moxee, Washington

	Regulatory Level[2]	Monitoring Well, Screen Depths and Date Sampled																
		MW-1						MW-2						MW-3				
		Screen: 1.8 to 11.8 feet bgs						Screen: 4.0 to 12.0 feet bgs						Screen: 4.0 to 12.0 feet bgs				
		03/01/12	11/01/12	02/13/13	05/27/13	08/21/13	12/30/13	11/01/12	02/13/13	05/27/13	08/21/13	12/30/13	Duplicate-1-123013	11/01/12	02/13/13	05/27/13	08/21/13	12/30/13
Method EPA 8260C (µg/L)																		
Gasoline-range petroleum hydrocarbons	1,000/800[3]	**1,550**	**2,500**	571	**1,440**	**1,660**	**1,690**	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0
Benzene	5	0.210	0.300	0.210	<0.200	<0.200	0.290	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200
Toluene	1,000	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Ethylbenzene	700	80.9	101	46.3	29.7	26.0	34.4	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
m,p-Xylene	1,000[4]	NT	15.5	61.0	1.67	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
o-Xylene	1,000[4]	NT	2.44	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Xylenes (total)	1,000[4]	11.1	18.0	61.3	2.00	<1.50	<1.50	<1.50	<1.50	<1.50	<1.50	<1.50	<1.50	<1.50	<1.50	<1.50	<1.50	<1.50
Hexane	480[5]	1.30	3.46	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Method EPA 8270 (µg/L)																		
Naphthalene	160[6]	9.32	4.47	2.06	1.83	0.294	1.28	<0.191	<0.0953	<0.0951	<0.0961	<0.0951	<0.103	<0.190	<0.0945	<0.0954	<0.0957	<0.0988
2-Methylnaphthalene	160[6]	0.495	0.944	<0.0946	0.110	<0.267	<0.0984	<0.191	<0.0953	<0.0951	<0.0961	<0.0951	<0.103	<0.190	<0.0945	<0.0954	<0.0957	<0.0988
1-Methylnapthalene	160[6]	4.74	7.77	2.95	4.57	0.855	5.37	<0.191	<0.0953	<0.0951	<0.0961	<0.0951	<0.103	<0.190	<0.0945	<0.0954	<0.0957	<0.0988
Method EPA 200.7 - Dissolved Metals by EPA 200 Series Methods (mg/L)																		
Manganese	2.2[5]	NT	0.943	0.582	0.683	0.608	0.863	0.678	0.256	0.293	0.442	0.306	0.311	0.178	0.0213	0.0331	0.0358	0.0224
Method RSK-175 - Dissolved Gases (GC) (mg/L)																		
Methane	NE	NT	0.0108	<0.00500	<0.00500	0.0577	0.00695	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	0.00508	<0.00500	0.0909	<0.00500
Method EPA 300.0 - Anions by EPA Method 300.0 (mg/L)																		
Nitrate-Nitrogen	10[7]	NT	<0.200	0.250	<0.200	0.200	<0.200	**176**	**123**	**119**	**143**	**125**	**113**	1.12	0.730	1.090	0.500	0.240
Sulfate	250[8]	NT	18.3	24.1	28.0	19.1	14.4	**290**	236	226	236	219	204	34.2	31.3	34.8	31.3	23.2
Method SM 2320B - Conventional Chemistry Parameters by APHA/EPA Methods (mg/L)																		
Total Alkalinity	NE	NT	480	485	570	500	445	230	255	255	235	270	265	335	325	375	405	280

	Regulatory Level[2]	MW-4 Screen: 4.0 to 12.0 feet bgs 11/01/12	MW-4 Screen: 4.0 to 12.0 feet bgs 02/13/13	MW-4 Screen: 4.0 to 12.0 feet bgs 05/27/13	MW-4 Screen: 4.0 to 12.0 feet bgs 08/21/13	MW-4 Screen: 4.0 to 12.0 feet bgs 12/30/13	MW-5 12/30/13	MW-6 12/30/13
Method EPA 8260C (µg/L)								
Gasoline-range petroleum hydrocarbons	1,000/800[3]	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0
Benzene	5	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200
Toluene	1,000	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Ethylbenzene	700	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
m,p-Xylene	1,000[4]	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
o-Xylene	1,000[4]	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Xylenes (total)	1,000[4]	<1.50	<1.50	<1.50	<1.50	<1.50	<1.50	<1.50
Hexane	480[5]	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Method EPA 8270 (µg/L)								
Naphthalene	160[6]	<0.190	<0.0952	<0.0953	<0.0954	<0.0985	<0.102	<0.0982
2-Methylnaphthalene	160[6]	<0.190	<0.0952	<0.0953	<0.0954	<0.0985	<0.102	<0.0982
1-Methylnapthalene	160[6]	<0.190	<0.0952	<0.0953	<0.0954	<0.0985	<0.102	<0.0982
Method EPA 200.7 - Dissolved Metals by EPA 200 Series Methods (mg/L)								
Manganese	2.2[5]	0.208	<0.0100	0.0201	<0.0100	<0.0100	0.120	0.414
Method RSK-175 - Dissolved Gases (GC) (mg/L)								
Methane	NE	<0.00500	<0.00500	<0.00500	0.00579	<0.00500	<0.00500	<0.00500
Method EPA 300.0 - Anions by EPA Method 300.0 (mg/L)								
Nitrate-Nitrogen	10[7]	0.420	2.81	3.14	1.41	0.950	<0.200	**158**
Sulfate	250[8]	31.7	43.0	37.9	34.2	30.7	23.0	249
Method SM 2320B - Conventional Chemistry Parameters by APHA/EPA Methods (mg/L)								
Total Alkalinity	NE	245	435	405	345	320	135	195

Notes:

[1]Chemical analyses conducted by TestAmerica Laboratories, Inc. of Spokane, Washington.

[2]Regulatory Level refers to Washington State Model Toxics Control Act (MTCA) Method A cleanup level unless otherwise footnoted.

[3]MTCA Method A cleanup level for gasoline-range petroleum hydrocarbons is 1,000 µg/l, if benzene is not detected; otherwise the cleanup level is 800 µg/l.

[4]Cleanup level for total xylenes.

[5]Standard formula value for MTCA Method B in groundwater as calculated by Ecology's Cleanup Levels and Risk Calculations (CLARC) database.

[6]Cleanup level refers to sum of naphthalenes.

[7]Maximum contaminant level established by Title 40, Volume 19 of the Code of Federal Regulations.

[8]Secondary Maximum Contaminant Level recommended by the Environmental Protection Agency.

Bold indicates analyte concentration exceeds referenced Regulatory Level.

NE = not established; µg/L = micrograms per liter; mg/L = milligrams per liter; NT = not tested; bgs = below ground surface

Table 5

Summary of Field-Measured Natural Attenuation Parameters

Moxee City Shop and Former STP

Moxee, Washington

Well Number	Date Collected	pH	Temperature (°C)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	Soluble Ferrous Iron (mg/L)
MW-1	11/01/12	7.69	19.15	0.833	0.65	-36	NT
	02/13/13	7.62	9.50	0.683	1.78	-41	<0.2
	05/27/13	8.11	15.45	0.805	1.60	-55	<0.2
	08/21/13	7.81	23.47	0.955	1.43	206	<0.2
	12/30/13	7.73	13.60	0.639	0.30	-148	0.5
MW-2	11/01/12	7.66	18.77	2.079	1.99	313	NT
	02/13/13	8.07	12.74	1.314	0.11	-49	<0.2
	05/27/13	8.04	14.46	1.296	0.13	183	<0.2
	08/21/13	7.84	18.71	1.521	0.07	406	<0.2
	12/30/13	7.94	13.86	1.234	0.09	-58	<0.2
MW-3	11/01/12	8.73	17.82	0.617	3.29	289	NT
	02/13/13	7.27	11.53	0.511	0.27	-34	<0.2
	05/27/13	9.02	14.46	0.581	0.24	288	<0.2
	08/21/13	8.65	19.56	0.674	0.03	311	<0.2
	12/30/13	9.05	14.32	0.458	0.06	-124	<0.2
MW-4	11/01/12	8.77	17.47	0.463	4.70	297	NT
	02/13/13	7.56	11.27	0.704	0.45	-41	<0.2
	05/27/13	8.58	14.41	0.663	0.41	233	<0.2
	08/21/13	8.29	19.69	0.610	1.02	364	<0.2
	12/30/13	8.45	12.68	0.531	0.19	-82	<0.2
MW-5	12/30/13	8.45	13.74	0.251	1.47	-68	<0.2
MW-6	12/30/13	7.78	13.88	1.387	2.36	-25	<0.2

Notes:

[1]Reported water quality parameters reflect stabilized conditions at the conclusion of well purging during low-flow sampling.

°C = degrees Celsius; mS/cm = millisiemens per centimeter; mg/L = milligrams per liter; mV = millivolts; NT = not tested

Approximate Direct-Push Boring Location (November 2013)

Approximate Hollow-Stem Auger Boring Location (December 2013)

Approximate Direct-Push Boring Location (March 2012)

Approximate New Monitoring Well Location (December 2013)

Approximate Existing Monitoring Well Location (March and October 2012)

Approximate Property Boundary

Approximate Location of 1996 UST Excavation

N
W E
S

0 60
Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
Data Sources: Aerial from ESRI Data Online.
Projection: NAD 1983, Washington State Plane South, feet.

Site Plan

Moxee City Shop and Former STP
Moxee, Washington

GeoEngineers

Figure 2

Office: SPOK Path: W:\Spokane\Projects\0\0504078\GIS\01\0504078O1_F2_SitePlan.mxd Map Revised: 17 February 2014 tkauhi

MW-2 (1,019.74) Approximate Monitoring Well Location and Groundwater Elevation

Approximate Location of 1996 UST Excavation

Approximate Groundwater Elevation Contour (0.2-foot interval)

Interpreted Groundwater Flow Direction

N
W E
S

60 0 60
Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. Groundwater elevations are presented in feet relative to the North American Vertical Datum of 1988 (NAVD88).
4. The groundwater elevation reported for MW-1 reflects a suspected measurement error and was not used to develop the groundwater elevation contours or interpreted flow direction.
Data Sources: Aerial from ESRI Data Online.
Projection: NAD 1983, Washington State Plane South, feet.

Groundwater Elevations
December 30, 2013

Moxee City Shop and Former STP
Moxee, Washington

GeoEngineers

Figure 3

Office: SPO Path: W:\Spokane\Projects\0\0504078\GIS\01\0504078017_F3_GW_Dec2013.mxd Map Revised: 27 March 2014 tkauhi

Approximate Direct-Push Boring Location (November 2013)

Approximate Direct Push Boring Location (March 2012)

Approximate New Monitoring Well Location (December 2013)

Approximate Existing Monitoring Well Location (March and October 2012)

Petroleum-Based Compounds Either Not Detected or Detected at Concentrations Less Than Cleanup Levels in Soil Samples

Approximate Location of 1996 UST Excavation

N
W E
S

0 40
Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3.All soil sample petroleum-based contaminant concentrations were less than applicable Model Toxics Control Act Method A or B cleanup levels, or were not detected.
4. Locations where soil samples were not collected for petroleum-based analytes are omitted from this figure.
Data Sources: Aerial from ESRI Data Online.
Projection: NAD 1983, Washington State Plane South, feet.

Sampling Locations - Petroleum-Based Compounds in Soil

Moxee City Shop and Former STP
Moxee, Washington

GeoEngineers

Figure 4

Office: SPO Path: W:\Spokane\Projects\0\0504078\GIS\01\0504078 01_F4_Soils_PH_Dec2013.mxd Map Revised: 27 March 2014 tkauhi

B-1 110 — Approximate Boring Location and Soil Nitrate Concentration (mg/kg)

MW-6 <2.4 — Approximate Monitoring Well Location and Soil Nitrate Concentration (mg/kg)

Approximate Location of 1996 UST Excavation

N W E S

40 0

Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. Locations where soil samples were not collected for nitrate analysis were omitted from this figure.
4. mg/kg = milligrams per kilograms

Data Sources: Aerial from ESRI Data Online.
Projection: NAD 1983, Washington State Plane South, feet.

Nitrate Concentrations in Soil

Moxee City Shop and Former STP
Moxee, Washington

GeoEngineers

Figure 5

Office: SPO Path: W:\Spokane\Projects\0\0504078\GIS\01\0504078 01_F5_Soil_Nitrate.mxd Map Revised: 25 March 2014 tkauhi

B-1 200 — Approximate Boring Location and Soil Sulfate Concentration (mg/kg)

MW-6 48 — Approximate Monitoring Well Location and Soil Sulfate Concentration (mg/kg)

Approximate Location of 1996 UST Excavation

N
W E
S

40 0
Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. Locations where soil samples were not collected for sulfate analysis were omitted from this figure.
4. mg/kg = milligrams per kilograms

Data Sources: Aerial from ESRI Data Online.
Projection: NAD 1983, Washington State Plane South, feet.

Sulfate Concentrations in Soil

Moxee City Shop and Former STP
Moxee, Washington

GeoEngineers

Figure 6

Office: SPO Path: W:\Spokane\Projects\0\0504078\GIS\01\0504078 01_F6_Soil_Sulfate.mxd Map Revised: 27 March 2014 tkauhi

DP-6 1,340 — Approximate Direct-Push Boring Location and Groundwater GRPH Concentration (µg/l) during November 2013

MW-1 1,690 — Approximate Monitoring Well Location and Groundwater GRPH Concentration (µg/l) during December 2013

Interpreted Limits of Petroleum-Based Groundwater Contamination in Excess of Cleanup Levels

Petroleum-Based Compounds Either Not Detected or Detected at Concentrations Less Than Cleanup Levels in Project Groundwater Sample(s)

Petroleum-Based Compounds Detected at Concentrations Greater Than Cleanup Levels in Project Groundwater Sample(s)

Approximate Location of 1996 UST Excavation

N W E S

0 60

Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. Groundwater sample contaminant concentrations are referenced to Model Toxics Control Act Method A or B cleanup levels, depending on analyte.
4. Soil borings where groundwater samples were not collected for petroleum-based analysis are omitted from this figure.
5. µg/l = micrograms per liter; GRPH = gasoline-range petroleum hydrocarbons

Data Sources: Aerial from ESRI Data Online.
Projection: NAD 1983, Washington State Plane South, feet.

Cleanup Level Exceedances - Petroleum-Based Compounds in Groundwater

Moxee City Shop and Former STP
Moxee, Washington

GeoEngineers

Figure 7

Office: SPO Path: W:\Spokane\Projects\0\0504078\GIS\01\0504078 01_F7_GW_PH_Dec2013.mxd Map Revised: 25 March 2014 tkauhi

B-1 199 — Approximate Boring Location and Groundwater Nitrate Concentration (mg/L)

MW-1 <0.200 — Approximate Monitoring Well Location and Groundwater Nitrate Concentration (mg/L)

1 — Approximate Groundwater Nitrate Concentration Contour (mg/L; variable interval)

Nitrate Detected at Concentrations Greater than the MCL in Groundwater Sample(s)

Nitrate Either Not Detected or Detected at Concentrations Less than the MCL in Groundwater Sample(s)

Approximate Location of 1996 UST Excavation

N W E S

40 0

Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. Groundwater sample nitrate concentrations are specific to November or December 2013 referenced to the Maximum Containment Level (MCL) of 10 milligrams per liter (mg/L).
4. Locations where groundwater samples were not collected for nitrate analysis were omitted from this figure.
Data Sources: Aerial from ESRI Data Online.
Projection: NAD 1983, Washington State Plane South, feet.

Nitrate Concentrations and MCL Exceedances in Groundwater

Moxee City Shop and Former STP
Moxee, Washington

GeoEngineers

Figure 8

Office: SPOK Path: W:\Spokane\Projects\0\0504078\GIS\01\0504078 01_F8_GW_NitrateMCL.mxd Map Revised: 25 March 2014 tkauhi

B-1 785 — Approximate Boring Location and Groundwater Sulfate Concentration (mg/L)

MW-1 14.4 — Approximate Monitoring Well Location and Groundwater Sulfate Concentration (mg/L)

100 — Approximate Groundwater Sulfate Concentration Contour (mg/L; variable interval)

Sulfate Either Not Detected or Detected at Concentrations Less than the Secondary MCL in Groundwater Sample(s)

Sulfate Detected at Concentrations Greater than the Secondary MCL in Groundwater Sample(s)

Approximate Location of 1996 UST Excavation

N W E S

40 0

Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. Groundwater sample sulfate concentrations are specific to November or December 2013 referenced to the secondary Maximum Containment Level (MCL) of 250 milligrams per liter (mg/L).
4. Locations where groundwater samples were not collected for sulfate analysis were omitted from this figure.
Data Sources: Aerial from ESRI Data Online.
Projection: NAD 1983, Washington State Plane South, feet.

Sulfate Concentrations and Secondary MCL Exceedances in Groundwater

Moxee City Shop and Former STP
Moxee, Washington

GeoEngineers

Figure 9

Office: SPOK Path: W:\Spokane\Projects\0\05040781\GIS\01\05040781_F9_GW_SulfateMCL.mxd Map Revised: 25 March 2014 tkauhi

APPENDICES

GeoEngineers

APPENDIX B
BORING LOGS

Boring Log

Site Name: Simplot Grower Solutions Boring Number B-01

Site Address: 7528 Postma Road, Moxee, WA

Boring Location: UTM Coordinates (map datum WGS 84, unless otherwise specified)

Lat/Long Coordinates

Other

G.S. Elevation (AMSL):

Drilling Subcontractor Environmental West Exploration, Spokane WA

Hole Size: 2" Drill Make & Model: Geoprobe 5400 truck mounted

Date: 8/4/15 Time 0730 Weather: Sunny Clear 80°s

Depth (ft)	SPT Blow Count 6"—6"—6" Recovery	Description (waste type/general lithology, discontinuity, color, texture, mositer, sampling method, etc.)	Sample Number
			Soil
0-4	4.0 / 4.0'	0.0-0.2 Fill crushed gravel	B-01S-1
		0.2-4.0 Silt ML dk. brown	(0.0-1.0)
		dry to moist at 3.0' soft	@ 0800
4-8	4.0 / 4.0'	4.0-8.0 Asgaboro Silt	B-01S-6
		wet at 7.5'	(5.0-6.0)
			@ 0810
8-12	4.0 / 4.0'	8.0-12.0 As above Silt wet	B-01S-10
			(9.0-10.0)
		TD 12.0'	@ 0820
			Water
		Screen set 9-12'	Sample
			B-01W-12
			(9.0-12.0)

Comments: Back filled with 1/2 Bag (50lbs) Holeplug 3/8" bentonite chips. Hole collasped to 10.0'

Staff Name(s) DR

Boring Log

Site Name: Simplot Grower Solutions Boring Number B-02

Site Address: 7528 Postma Road, Moxee WA

Boring Location: UTM Coordinates (map datum WGS 84, unless otherwise specified)

Lat/Long Coordinates

Other

G.S. Elevation (AMSL):

Drilling Subcontractor Environmental West Exploration, Spokane WA

Hole Size: 2" Drill Make & Model: Geoprobe 5400 truck mounted

Date: 8/4/15 Time 0845 Weather: Sunny Clear 80's

Depth (ft)	SPT Blow Count 6"—6"—6" Recovery	Description (waste type/general lithology, discontinuity, color, texture, mositer, sampling method, etc.)	Sample Number
0-4	4.0/4.0'	0.0-0.2 Fill crushed gravel	Soil
		0.2-4.0 Silt ML dk. brown, dry to 2.0' moist to 4.0'	B-02S-1 (0.0-1.0) @ 0840
4-8	4.0/4.0'	4.0-8.0 As above silt Lt. gray from 6.0-8.0' moist to wet	B-02S-6 (5.0-6.0) @ 0850
8-12	4.0/4.0'	8.0-12.0' As above silt wet	B-02S-9 (8.0-9.0) @ 0900
		TD 12.0	water
		Screen set 8-12'	B-02W-12 (8.0-12.0) @ 0915

Comments: Back filled with 1/2 Bag (50lbs) Holeplug 3/8" bentonite chips Hole collapsed to 9'.

Staff Name(s) DR

Boring Log

Site Name: Simplot Grower Solutions Boring Number B-03

Site Address: 7528 Postma Road, Moxee WA

Boring Location: UTM Coordinates (map datum WGS 84, unless otherwise specified)

Lat/Long Coordinates

Other

G.S. Elevation (AMSL):

Drilling Subcontractor Environmental West Exploration, Spokane WA

Hole Size: 2" Drill Make & Model: Geoprobe 5400 truck mount

Date: 8/4/15 Time 0945 Weather: Sunny clear 80's

Depth (ft)	SPT Blow Count 6"—6"—6" Recovery	Description (waste type/general lithology, discontinuity, color, texture, mositer, sampling method, etc.)	Sample Number
0-4	4.0/4.0'	0.0-0.5 Asphalt	Soil
		0.5-1.0 Fill	B-03S-2
		1.0-4.0 Silt ML dk. br. dry to sl. moist.	(1.0-2.0) @ 0930
4-8	4.0/4.0'	4.0-8.0 As above silt moist to wet	B-03S-5 (4.0-5.0) @ 0940
8-11	3.0/3.0'	8.0-11.0 As above Silt wet	B-03S-8 (7.0-8.0) @ 0950
		TD 11.0	Water
		Screen set 7.0-10.0	B-03W-10 (7-10) @ 1020

Comments: Hole back filled with 1/2 of 50lb bag of Holeplug 3/8" chips. Aspalt cold patch used on surface. Hole collapsed at 10'.

Staff Name(s) DR

Boring Log

Site Name: Simplot Grower Solutions Boring Number B-04

Site Address: 7528 Postma Road, Moxee, WA

Boring Location: UTM Coordinates (map datum WGS 84, unless otherwise specified)

Lat/Long Coordinates

Other

G.S. Elevation (AMSL):

Drilling Subcontractor Environmental West Exploration, Spokan WA

Hole Size: 2" Drill Make & Model: Geoprobe 5400 Truck mount

Date: 8/4/15 Time 1055 Weather: Sunny Hot 80's

Depth (ft)	SPT Blow Count 6"—6"—6" Recovery	Description (waste type/general lithology, discontinuity, color, texture, mositer, sampling method, etc.)	Sample Number
0-4	4.0/4.0'	0.0-1.5 Fill / crushed gravel	Soil
		1.5-4.0 Silt ML dk. Brown	B-04S-2
		sl. moist.	(1.0-2.0)
			@ 1030
4-8	4.0/4.0'	4.0-5.0 Slutt from above	B-04S-6
		5.0-8.0 As above silt moist	(5.0-6.0)
			@ 1040
8-11.0	3.0/3.0'	8.0-11.0 As above Silt wet	B-04S-10
			(9.0-10.0)
			@ 1050
		TD 11.0	water
			B-04W-11
		Screen set 7.5-10.5	(7.5-10.5)
			@ 1120

Comments: Hole back filled with 1/3 of a 50lb bag of Holeplug 3/8" bentonite chips. Hole collapsed to 9'.

Staff Name(s) DR

Boring Log

Site Name: Simplot Grower Solutions Boring Number B-05

Site Address: 7528 Postma Road, Mokee WA

Boring Location: UTM Coordinates (map datum WGS 84, unless otherwise specified)

Lat/Long Coordinates

Other

G.S. Elevation (AMSL):

Drilling Subcontractor Environmental West Exploration, Spokane, WA

Hole Size: 2" Drill Make & Model: Geoprobe 5400 truck mounted

Date: 8/4/15 Time 1125 Weather: Sunny Hot 80°s

Depth (ft)	SPT Blow Count 6"—6"—6" Recovery	Description (waste type/general lithology, discontinuity, color, texture, mositer, sampling method, etc.)	Sample Number
0-4	4.0/4.0'	0.0-0.5 Asphalt	Soil
		0.5-1.0 Fill	B-05 S-3
		1.0-4.0 Silt ML dk. brown	(2.0-3.0)
			@ 1130
4-8	4.0/4.0'	4.0-8.0 As above Silt moist	
		wet at 8.0'	B-05S-5
			(4.0-5.0)
8-11	3.0/3.0'	8.0-11.0 As above Silt wet	@ 1140
			B-05S-8
			(7.0-8.0)
			@ 1150
		TD 11.0	
			Water
		Screen set 8.0-11.0	B-05W-11
			(8.0-11.0)
			@ 1215

Comments: Hole back filled with 1/3 of a 50lb bag of Holeplug 3/8" bentonite chips

* Duplicate samples B-1W-11 @ 1800 & B-05W-11
B-11S-8 @ 1700 & B-05S-8

Staff Name(s) DR

Boring Log

Site Name: Simplot Grower Solutions Boring Number B-08

Site Address: 7528 Postma Road, Moxee, WA

Boring Location: UTM Coordinates (map datum WGS 84, unless otherwise specified)

Lat/Long Coordinates

Other

G.S. Elevation (AMSL):

Drilling Subcontractor Environmental West Exploration, Spokane, WA

Hole Size: 2" Drill Make & Model: Geoprobe 5400 truck mount

Date: 8/4/15 Time 1240 Weather: Sunny Hot 90's

Depth (ft)	SPT Blow Count 6"—6"—6" Recovery	Description (waste type/general lithology, discontinuity, color, texture, mositer, sampling method, etc.)	Sample Number
0-4	3.5/4.0	0.0-0.5 Fill	Soil
		0.5-3.5 Silt ML dk brown dry to sl. moist	B-08S-2 (1.0-2.0) @ 1230
		3.5-4.0 core loss	
4-8	4.0/4.0	4.0-8.0 Silt ML moist, wet at 7.0 gray color 7.0-8.0	B-08S-5 (4.0-5.0) @ 1240
8-11	3.0/3.0	8.0-11.0 As above ML wet	B-08S-7 (6.0-7.0) @ 1250
		TD 11.0 screen set 7.0-11.0	Water B-08W-11 (7.0-11.0) @ 1310
		Rinsate Sample Rinsate Decon @ 1330	

Comments: Hole back filled with 1/2 of a 50lb bag of Hole plug 3/8" bentonite chips

Staff Name(s) DR

Boring Log

Site Name: Simplot Grower Solutions Boring Number B-09

Site Address: 7528 Postma Road, Moxee, WA

Boring Location: UTM Coordinates (map datum WGS 84, unless otherwise specified)

Lat/Long Coordinates

Other

G.S. Elevation (AMSL):

Drilling Subcontractor Environmental West Exploration, Spokane WA

Hole Size: 2" Drill Make & Model: Geoprobe 5400 truck mounted

Date: 8/4/15 Time 1345 Weather: Sunny Hot 90's

Depth (ft)	SPT Blow Count 6"—6"—6" Recovery	Description (waste type/general lithology, discontinuity, color, texture, mositer, sampling method, etc.)	Sample Number
0-4	3.5/4.0	0.0-0.5 Fill	Soil
		0.5-3.5 Silt ML dr. brown dry to moist	B-09S-2
		3.5-4.0 Core Loss	(1.0-2.0)
			@ 1330
4-8	2.5/4.0	4.0-6.5 Silt ML as above moist	
		6.5-8.0 Core Loss	B-09S-6.5
			(5.5-6.5)
8-12	4.0/4.0	8.0-12.0 Silt ML wet	@ 1340
			B-09S-8
		TD 12.0	(7.0-8.0)
		Screen set 8.0-12.0	@ 1350
			Water
			B-09W-12
			(8.0-12.0)
			@ 1415

Comments: Hole back filled with 1/3 of a 50 lb bag of Holeplug 3/8" bentonite chips

Staff Name(s) DR

Boring Log

Site Name: Simplot Grower Solution Boring Number B-10

Site Address: 7528 Postma Road, Moxee, WA

Boring Location: UTM Coordinates (map datum WGS 84, unless otherwise specified)

Lat/Long Coordinates

Other

G.S. Elevation (AMSL):

Drilling Subcontractor Environmental West Exploration

Hole Size: 2" Drill Make & Model: Geoprobe 5400 truck mount.

Date: 8/4/15 Time 1445 Weather: Sunny Hot 90°s

Depth (ft)	SPT Blow Count 6"—6"—6" recovery	Description (waste type/general lithology, discontinuity, color, texture, mositer, sampling method, etc.)	Sample Number
0-4	4.0/4.8	0.0-0.5 Fill	Soil
		0.5-4.0 Silt ML dk brown, dry to sl. moist	B-10S-1.5 (0.5-1.5) @1430
4-8	4.0/4.0	4.0-8.0 As above Silt sl. moist to moist	B-10S-5.5 (4.5-5.5)
8-11	3.0/3.0	8.0-11.0 As above silt wet at 8.5	@ 1440
			B-10S-8.5 (7.5-8.5)
		TD 11.0	@ 1450
		Screen set 8.0-11.0	
			Water
			B-10W-11
		Field Blanks Sample @ 1530	(8.0-11.0) @ 1515

Comments: Hole back filled with 1/3 of a 50lb bag of Holeplug 3/8" bentonit chips.

Staff Name(s) DR

Note: 1 Drum soil cuttings = 10gal
1 Drum Purge & Decon water 20gal.
Label "Pending Analyses"

APPENDIX C
LABORATORY REPORTS

Date: 08/06/15

Report No: S45330

Grower:

Client: HDR Engineering

Sampler: Dale Roynolds

Field ID: ***B-01S-1, etc.***

Project:

Crop:

Kuo Testing Labs, Inc.

337 South 1st

Othello, Washington 99344

(509) 488-0112; Fax (509) 488-0118

Email: kuotest@gmail.com

Web: www.kuotesting.com

SOIL ANALYSIS REPORT

Lab #	Depth	Crop Sample ID	NO3-N	NO3-N	NH4-N	NH4-N	SO4 -S	SS
	ft		#/AC	ppm	#/Ac	ppm	ppm	mmho/ cm
9773	1	***B-01S-1***	211	*52.8*	39	*9.8*	835	3.16
9774	1	***B-01S-6***	80	*20.0*	16	*4.0*	48	0.62
9775	1	***B-01S-10***	40	*10.0*	17	*4.3*	33	0.77
9776	1	***B-02S-1***	87	*21.8*	154	*38.5*	54	0.83
9777	1	***B-02S-6***	61	*15.3*	17	*4.3*	47	0.63
9778	1	***B-02S-9***	62	*15.5*	32	*8.0*	87	0.89
9779	1	***B-03S-2***	29	*7.3*	1569	*392.3*	10	0.57
9780	1	***B-03S-5***	3	*0.8*	2338	*584.5*	9	0.56
9781	1	***B-03S-8***	46	*11.5*	87	*21.8*	8	0.40
9782	1	***B-04S-2***	24	*6.0*	74	*18.5*	17	0.57
9783	1	***B-04S-6***	26	*6.5*	85	*21.3*	13	0.46
9784	1	***B-04S-10***	18	*4.5*	1037	*259.3*	7	0.43
9785	1	***B-05S-3***	684	*171.0*	1939	*484.8*	42	1.48
9786	1	***B-05S-5***	161	*40.3*	953	*238.3*	25	0.74
9787	1	***B-05S-8***	108	*27.0*	1135	*283.8*	27	0.66
9788	1	***B08S-2***	284	*71.0*	78	*19.5*	58	1.52
9789	1	***B-08S-5***	46	*11.5*	27	*6.8*	72	0.65
9790	1	***B-08S-7***	21	*5.3*	17	*4.3*	13	0.66
9791	1	***B-09S-2***	2465	*616.3*	306	*76.5*	171	4.60
9792	1	***B-09S-6.5***	1180	*295.0*	59	*14.8*	120	2.19
9793	1	***B-09S-8***	268	*67.0*	21	*5.3*	50	1.18
9794	1	***B-10S-1.5***	112	*28.0*	31	*7.8*	66	0.97
9795	1	***B-10S-5.5***	96	*24.0*	20	*5.0*	35	0.75
9796	1	***B-10S-8.5***	148	*37.0*	26	*6.5*	68	0.85
9797	1	***B-011S-8***	133	*33.3*	932	*233.0*	27	0.61

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Est. 1970

Dale Reynolds, Mike Murray
HDR - Boise, ID
412 E. Park Center Blvd, Ste 100
Boise, ID 83706

Report Summary

Monday August 17, 2015

Report Number: L781386
Samples Received: 08/07/15
Client Project: SIMPLOT MOXEE WA

Description: Simplot- Sunnyside, WA

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

Entire Report Reviewed By:

Jarred Willis , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197, FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704/BIO041, ND - R-140. NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1, TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364, EPA - TN002

Accreditation is only applicable to the test methods specified on each scope of accreditation held by 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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REPORT OF ANALYSIS

Dale Reynolds, Mike Murray
HDR - Boise, ID
412 E. Park Center Blvd, Ste 100
Boise, ID 83706

August 17, 2015

Date Received : August 07, 2015
Description : Simplot Moxie

Sample ID : B-01W-12

Collected By : Dale Reynolds
Collection Date : 08/04/15 08:30

ESC Sample # : L781386-01

Site ID : SUNNYSIDE, WA

Project # : SIMPLOT MOXEE WA

Parameter	Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Sulfate	389.	0.774	50.0	mg/l		9056	08/13/15	10
Ammonia Nitrogen	0.154	0.0380	0.250	mg/l	JJ4	350.1	08/13/15	1
Nitrate-Nitrite	107.	0.394	2.00	mg/l		353.2	08/12/15	20
Dissolved Solids	2400	2.8	10.	mg/l		2540 C-	08/11/15	1

U = ND (Not Detected)
MDL = Minimum Detection Limit = LOD = TRRP SDL
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
Note:
The reported analytical results relate only to the sample submitted.

.
Reported: 08/17/15 17:07 Printed: 08/17/15 17:08

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REPORT OF ANALYSIS

Dale Reynolds, Mike Murray
HDR - Boise, ID
412 E. Park Center Blvd, Ste 100
Boise, ID 83706

August 17, 2015

Date Received : August 07, 2015
Description : Simplot Moxie

Sample ID : B-02W-12

Collected By : Dale Reynolds
Collection Date : 08/04/15 09:15

ESC Sample # : L781386-02

Site ID : SUNNYSIDE, WA

Project # : SIMPLOT MOXEE WA

Parameter	Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Sulfate	1500	3.87	250.	mg/l		9056	08/14/15	50
Ammonia Nitrogen	0.162	0.0380	0.250	mg/l	JJ4	350.1	08/13/15	1
Nitrate-Nitrite	65.0	0.197	1.00	mg/l		353.2	08/12/15	10
Dissolved Solids	3900	2.8	10.	mg/l		2540 C-	08/11/15	1

U = ND (Not Detected)
MDL = Minimum Detection Limit = LOD = TRRP SDL
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
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Dale Reynolds, Mike Murray
HDR - Boise, ID
412 E. Park Center Blvd, Ste 100
Boise, ID 83706

August 17, 2015

Date Received : August 07, 2015
Description : Simplot Moxie

Sample ID : B-03W-10

Collected By : Dale Reynolds
Collection Date : 08/04/15 10:20

ESC Sample # : L781386-03

Site ID : SUNNYSIDE, WA

Project # : SIMPLOT MOXEE WA

Parameter	Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Sulfate	157.	0.387	25.0	mg/l		9056	08/14/15	5
Ammonia Nitrogen	73.1	0.380	2.50	mg/l	J4	350.1	08/13/15	10
Nitrate-Nitrite	9.02	0.0394	0.200	mg/l		353.2	08/12/15	2
Dissolved Solids	670	2.8	10.	mg/l		2540 C-	08/11/15	1

U = ND (Not Detected)
MDL = Minimum Detection Limit = LOD = TRRP SDL
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
Note:
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REPORT OF ANALYSIS

Dale Reynolds, Mike Murray
HDR - Boise, ID
412 E. Park Center Blvd, Ste 100
Boise, ID 83706

August 17, 2015

ESC Sample # : L781386-04

Date Received : August 07, 2015
Description : Simplot Moxie

Site ID : SUNNYSIDE, WA

Sample ID : B-04W-11

Project # : SIMPLOT MOXEE WA

Collected By : Dale Reynolds
Collection Date : 08/04/15 11:20

Parameter	Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Sulfate	69.4	0.0774	5.00	mg/l		9056	08/14/15	1
Ammonia Nitrogen	38.2	0.190	1.25	mg/l	J4	350.1	08/13/15	5
Nitrate-Nitrite	6.25	0.0394	0.200	mg/l		353.2	08/12/15	2
Dissolved Solids	870	2.8	10.	mg/l		2540 C-	08/11/15	1

U = ND (Not Detected)
MDL = Minimum Detection Limit = LOD = TRRP SDL
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
Note:
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REPORT OF ANALYSIS

Dale Reynolds, Mike Murray
HDR - Boise, ID
412 E. Park Center Blvd, Ste 100
Boise, ID 83706

August 17, 2015

Date Received : August 07, 2015
Description : Simplot Moxie

Sample ID : B-05W-11

Collected By : Dale Reynolds
Collection Date : 08/04/15 12:15

ESC Sample # : L781386-05

Site ID : SUNNYSIDE, WA

Project # : SIMPLOT MOXEE WA

Parameter	Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Sulfate	381.	0.387	25.0	mg/l		9056	08/14/15	5
Ammonia Nitrogen	184.	3.80	25.0	mg/l	J4	350.1	08/13/15	100
Nitrate-Nitrite	211.	1.97	10.0	mg/l		353.2	08/12/15	100
Dissolved Solids	2100	2.8	10.	mg/l		2540 C-	08/11/15	1

U = ND (Not Detected)
MDL = Minimum Detection Limit = LOD = TRRP SDL
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
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HDR - Boise, ID
412 E. Park Center Blvd, Ste 100
Boise, ID 83706

August 17, 2015

Date Received : August 07, 2015
Description : Simplot Moxie

Sample ID : B-08W-11

Collected By : Dale Reynolds
Collection Date : 08/04/15 13:10

ESC Sample # : L781386-06

Site ID : SUNNYSIDE, WA

Project # : SIMPLOT MOXEE WA

Parameter	Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Sulfate	161.	0.387	25.0	mg/l		9056	08/14/15	5
Ammonia Nitrogen	0.117	0.0380	0.250	mg/l	JJ4	350.1	08/13/15	1
Nitrate-Nitrite	33.1	0.985	5.00	mg/l		353.2	08/12/15	50
Dissolved Solids	1100	2.8	10.	mg/l		2540 C-	08/11/15	1

U = ND (Not Detected)
MDL = Minimum Detection Limit = LOD = TRRP SDL
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
Note:
The reported analytical results relate only to the sample submitted.

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REPORT OF ANALYSIS

Dale Reynolds, Mike Murray
HDR - Boise, ID
412 E. Park Center Blvd, Ste 100
Boise, ID 83706

August 17, 2015

ESC Sample # : L781386-07

Date Received : August 07, 2015
Description : Simplot Moxie

Site ID : SUNNYSIDE, WA

Sample ID : RINSATE DECON

Project # : SIMPLOT MOXEE WA

Collected By : Dale Reynolds
Collection Date : 08/04/15 13:30

Parameter	Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Sulfate	U	0.0774	5.00	mg/l		9056	08/14/15	1
Ammonia Nitrogen	0.143	0.0380	0.250	mg/l	JJ4	350.1	08/13/15	1
Nitrate-Nitrite	U	0.0394	0.200	mg/l		353.2	08/12/15	2
Dissolved Solids	U	2.8	10.	mg/l		2540 C-	08/11/15	1

U = ND (Not Detected)
MDL = Minimum Detection Limit = LOD = TRRP SDL
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
Note:
The reported analytical results relate only to the sample submitted.

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Reported: 08/17/15 17:07 Printed: 08/17/15 17:08

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REPORT OF ANALYSIS

Dale Reynolds, Mike Murray
HDR - Boise, ID
412 E. Park Center Blvd, Ste 100
Boise, ID 83706

August 17, 2015

Date Received : August 07, 2015
Description : Simplot Moxie

Sample ID : B-09W-12

Collected By : Dale Reynolds
Collection Date : 08/04/15 14:15

ESC Sample # : L781386-08

Site ID : SUNNYSIDE, WA

Project # : SIMPLOT MOXEE WA

Parameter	Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Sulfate	763.	3.87	250.	mg/l		9056	08/14/15	50
Ammonia Nitrogen	0.163	0.0380	0.250	mg/l	JJ4	350.1	08/13/15	1
Nitrate-Nitrite	304.	1.97	10.0	mg/l		353.2	08/12/15	100
Dissolved Solids	3700	2.8	10.	mg/l		2540 C-	08/11/15	1

U = ND (Not Detected)
MDL = Minimum Detection Limit = LOD = TRRP SDL
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
Note:
The reported analytical results relate only to the sample submitted.

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REPORT OF ANALYSIS

Dale Reynolds, Mike Murray
HDR - Boise, ID
412 E. Park Center Blvd, Ste 100
Boise, ID 83706

August 17, 2015

ESC Sample # : L781386-09

Date Received : August 07, 2015
Description : Simplot Moxie

Site ID : SUNNYSIDE, WA

Sample ID : B-10W-11

Project # : SIMPLOT MOXEE WA

Collected By : Dale Reynolds
Collection Date : 08/04/15 15:15

Parameter	Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Sulfate	550.	0.774	50.0	mg/l		9056	08/14/15	10
Ammonia Nitrogen	0.420	0.0380	0.250	mg/l	J4	350.1	08/13/15	1
Nitrate-Nitrite	144.	1.97	10.0	mg/l		353.2	08/12/15	100
Dissolved Solids	1900	2.8	10.	mg/l		2540 C-	08/11/15	1

U = ND (Not Detected)
MDL = Minimum Detection Limit = LOD = TRRP SDL
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
Note:
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Reported: 08/17/15 17:07 Printed: 08/17/15 17:08

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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Dale Reynolds, Mike Murray
HDR - Boise, ID
412 E. Park Center Blvd, Ste 100
Boise, ID 83706

August 17, 2015

ESC Sample # : L781386-10

Date Received : August 07, 2015
Description : Simplot Moxie

Site ID : SUNNYSIDE, WA

Sample ID : B-11W-11

Project # : SIMPLOT MOXEE WA

Collected By : Dale Reynolds
Collection Date : 08/04/15 18:00

Parameter	Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Sulfate	384.	0.387	25.0	mg/l		9056	08/14/15	5
Ammonia Nitrogen	190.	3.80	25.0	mg/l		350.1	08/14/15	100
Nitrate-Nitrite	214.	1.97	10.0	mg/l		353.2	08/12/15	100
Dissolved Solids	2100	2.8	10.	mg/l		2540 C-	08/11/15	1

U = ND (Not Detected)
MDL = Minimum Detection Limit = LOD = TRRP SDL
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
Note:
The reported analytical results relate only to the sample submitted.

.
Reported: 08/17/15 17:07 Printed: 08/17/15 17:08

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

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REPORT OF ANALYSIS

Dale Reynolds, Mike Murray
HDR - Boise, ID
412 E. Park Center Blvd, Ste 100
Boise, ID 83706

August 17, 2015

Date Received : August 07, 2015
Description : Simplot Moxie

Sample ID : FIELD BLANK

Collected By : Dale Reynolds
Collection Date : 08/04/15 15:30

ESC Sample # : L781386-11

Site ID : SUNNYSIDE, WA

Project # : SIMPLOT MOXEE WA

Parameter	Result	MDL	RDL	Units	Qual	Method	Date	Dil.
Sulfate	U	0.0774	5.00	mg/l		9056	08/14/15	1
Ammonia Nitrogen	0.175	0.0380	0.250	mg/l	J	350.1	08/14/15	1
Nitrate-Nitrite	U	0.0985	0.500	mg/l		353.2	08/12/15	5
Dissolved Solids	U	2.8	10.	mg/l		2540 C-	08/11/15	1

U = ND (Not Detected)
MDL = Minimum Detection Limit = LOD = TRRP SDL
RDL = Reported Detection Limit = LOQ = PQL = EQL = TRRP MQL
Note:
The reported analytical results relate only to the sample submitted.

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Reported: 08/17/15 17:07 Printed: 08/17/15 17:08

Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L781386-01	WG808526	SAMP	Ammonia Nitrogen	R3061667	JJ4
L781386-02	WG808526	SAMP	Ammonia Nitrogen	R3061667	JJ4
L781386-03	WG808526	SAMP	Ammonia Nitrogen	R3061667	J4
L781386-04	WG808526	SAMP	Ammonia Nitrogen	R3061667	J4
L781386-05	WG808526	SAMP	Ammonia Nitrogen	R3061667	J4
L781386-06	WG808526	SAMP	Ammonia Nitrogen	R3061667	JJ4
L781386-07	WG808526	SAMP	Ammonia Nitrogen	R3061667	JJ4
L781386-08	WG808526	SAMP	Ammonia Nitrogen	R3061667	JJ4
L781386-09	WG808526	SAMP	Ammonia Nitrogen	R3061667	J4
L781386-11	WG808880	SAMP	Ammonia Nitrogen	R3062166	J

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J	(EPA) - Estimated value below the lowest calibration point. Confidence correlates with concentration.
J4	The associated batch QC was outside the established quality control range for accuracy.

Qualifier Report Information

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

Definitions

Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.

Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Differrence.

Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromotography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.

TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

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Quality Assurance Report
Level II

L781386

August 17, 2015

Laboratory Blank

Analyte	Result	Units	% Rec	Limit	Batch	Date Analyzed
Dissolved Solids	< 10	mg/l			WG807735	08/11/15 12:02
Dissolved Solids	< 10	mg/l			WG807736	08/11/15 15:10
Nitrate-Nitrite	< .1	mg/l			WG808095	08/12/15 16:43
Ammonia Nitrogen	< .25	mg/l			WG808526	08/13/15 14:14
Sulfate	< 5	mg/l			WG809174	08/14/15 08:22
Ammonia Nitrogen	< .25	mg/l			WG808880	08/14/15 08:54
Sulfate	< 5	mg/l			WG808657	08/13/15 15:38

Duplicate

Analyte	Units	Result	Duplicate	RPD	Limit	Ref Samp	Batch
Dissolved Solids	mg/l	284.	287.	1.05	5	L780754-01	WG807735
Dissolved Solids	mg/l	4030	3940	2.26	5	L781386-02	WG807736
Nitrate-Nitrite	mg/l	0.688	0.684	1.00	20	L781226-01	WG808095
Nitrate-Nitrite	mg/l	0.00	0.117	22.0*	20	L781513-01	WG808095
Ammonia Nitrogen	mg/l	0.425	0.420	1.00	20	L781386-09	WG808526
Ammonia Nitrogen	mg/l	25.7	26.0	1.00	20	L781358-13	WG808526
Ammonia Nitrogen	mg/l	0.00	0.106	0.00	20	L781407-02	WG808880
Ammonia Nitrogen	mg/l	0.00	0.146	0.00	20	L781574-02	WG808880
Sulfate	mg/l	1120	1100	2.00	20	L781279-01	WG808657
Sulfate	mg/l	12.0	11.6	4.00	20	L781437-25	WG808657
Sulfate	mg/l	0.00	0.00	0.00	20	L781386-11	WG809174

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
Dissolved Solids	mg/l	8800	8820	100.	85-115	WG807735
Dissolved Solids	mg/l	8800	8650	98.3	85-115	WG807736
Nitrate-Nitrite	mg/l	5	4.69	94.0	90-110	WG808095

* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

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1-800-767-5859
Fax (615) 758-5859

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Quality Assurance Report
Level II

L781386

August 17, 2015

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
Ammonia Nitrogen	mg/l	7.5	6.75	90.0	90-110	WG808526
Sulfate	mg/l	40	41.6	104.	90-110	WG809174
Ammonia Nitrogen	mg/l	7.5	7.21	96.0	90-110	WG808880
Sulfate	mg/l	40	39.9	100.	90-110	WG808657

Laboratory Control Sample Duplicate

Analyte	Units	Result	Ref	%Rec	Limit	RPD	Limit	Batch
Dissolved Solids	mg/l	8780	8820	100.	85-115	0.455	5	WG807735
Dissolved Solids	mg/l	8560	8650	97.0	85-115	1.05	5	WG807736
Nitrate-Nitrite	mg/l	4.82	4.69	96.0	90-110	3.00	20	WG808095
Ammonia Nitrogen	mg/l	6.98	6.64	698*	90-110	5.00	20	WG808526
Sulfate	mg/l	40.7	41.6	102.	90-110	2.00	20	WG809174
Ammonia Nitrogen	mg/l	7.39	7.21	98.0	90-110	3.00	20	WG808880
Sulfate	mg/l	40.0	39.9	100.	90-110	0.00	20	WG808657

Matrix Spike

Analyte	Units	MS Res	Ref Res	TV	% Rec	Limit	Ref Samp	Batch
Nitrate-Nitrite	mg/l	6.23	1.34	5	98.0	90-110	L781339-01	WG808095
Ammonia Nitrogen	mg/l	10.3	0.616	10	96.0	90-110	L781358-14	WG808526
Ammonia Nitrogen	mg/l	10.7	0.562	10	102.	90-110	L781407-03	WG808880
Sulfate	mg/l	116.	73.0	50	87.0	80-120	L781301-04	WG808657
Sulfate	mg/l	93.7	44.7	50	98.0	80-120	L781301-01	WG809174

Matrix Spike Duplicate

Analyte	Units	MSD	Ref	%Rec	Limit	RPD	Limit	Ref Samp	Batch
Nitrate-Nitrite	mg/l	6.16	6.23	96.3	90-110	1.00	20	L781339-01	WG808095
Ammonia Nitrogen	mg/l	9.86	10.3	92.5	90-110	4.00	20	L781358-14	WG808526

* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

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Boise, ID 83706

Quality Assurance Report
Level II

L781386

August 17, 2015

		Matrix Spike Duplicate							
Analyte	Units	MSD	Ref	%Rec	Limit	RPD	Limit	Ref Samp	Batch
Ammonia Nitrogen	mg/l	10.5	10.7	99.8	90-110	2.00	20	L781407-03	WG808880
Sulfate	mg/l	117.	116.	87.2	80-120	0.00	20	L781301-04	WG808657
Sulfate	mg/l	92.2	93.7	95.0	80-120	2.00	20	L781301-01	WG809174

Batch number /Run number / Sample number cross reference

WG807735: R3059845: L781386-01
WG807736: R3060101: L781386-02 03 04 05 06 07 08 09 10 11
WG808095: R3061139: L781386-01 02 03 04 05 06 07 08 09 10 11
WG808526: R3061667: L781386-01 02 03 04 05 06 07 08 09
WG809174: R3062060: L781386-02 03 04 05 06 07 08 09 10 11
WG808880: R3062165 R3062166: L781386-10 11
WG808657: R3062400: L781386-01

* * Calculations are performed prior to rounding of reported values.
* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

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Quality Assurance Report
Level II

L781386

August 17, 2015

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

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

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

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

Company Name/Address:
HDR Engineering
ATTN: Dale Reynolds
412 E. Parkcenter Blvd.
Boise, Idaho 83706

Billing Information:

Report to: **Dale Reynolds**

Email To: mike.murray@hdrinc.com, **dale.reynolds@hdrinc.com**

Project Description: **Simplot Moxie**

City/State Collected: Moxee, WA

Phone: 208-387-7000
Fax:

Client Project # Simplot MoxeeWA

Lab Project #

Collected by (print): Dale Reynolds

Site/Facility ID #

P.O. #

Collected by (signature): Dale Reynolds

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day 200%
___ Next Day 100%
___ Two Day 50%
___ Three Day 25%

Date Results Needed

Email? ___No ___Yes
FAX? ___No ___Yes

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	NO3+NO2, NH3 - 125ml HDPE H2SO4 <2	SO4, TDS - 250ml HDPE No Pres	Rem./Contaminant	Sample # (lab only)
B-01W-12		GW		8/4/15	0830	2	X	X		01
B-02W-12		GW			0915	2	X	X		02
B-03W-10		GW			1020	2	X	X		03
B-04W-11		GW			1120	2	X	X		04
B-05W-11		GW			1215	2	X	X		05
B-08W-11		GW			1310	2	X	X		06
Rinsate Decon		GW			1330	2	X	X		07
B-09W-12		GW			1415	2	X	X		08
B-10W-11		GW			1515	2	X	X		09
B-11W-11		GW			1800	2	X	X		10
Field Blank		GW		8/4/15	1530	2	X	X		11

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

Remarks: 6361 0200 2495

pH _____ Temp _____
Flow _____ Other _____

Chain of Custody Page ___ of ___

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Mount Juliet, TN 37122
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Fax: 615-758-5859

L# 781786
A158
Acctnum: **HDRBID**
Template:
Prelogin:
TSR:
Cooler:
Shipped Via:

Hold #

Condition: (lab use only) JW10

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Dale Reynolds (HDR)	8/5/15	1450	Jennifer Balonne
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Samples returned via: ☐ UPS ☑ FedEx ☐ Courier ☐ _____
Temp: 3.1 °C Bottles Received: 22
Date: 8/7/15 Time: 0900

COC Seal Intact: ___Y ___N ___NA
pH Checked: <2 NCF: