Sampling and Analysis Plan

Diesel Spill – Interstate 84
Mile Mark 54
Cascade Locks, Oregon

Prepared for:

Space Age Fuels
15525 SE For Mor Ct
Clackamas, OR 97015

February 12, 2019

Prepared by:

HydroCon, LLC
314 West 15th Street, Suite 300, Vancouver, Washington 98660
p: (360) 703-6079 f: (360) 703-6086
www.hydroconllc.net

Sampling and Analysis Plan

Diesel Spill – Interstate 84
Mile Mark 54
Cascade Locks, Oregon

Prepared for:

Space Age Fuels
15525 SE For Mor Ct
Clackamas, OR 97015

HydroCon Project No: 2019-004

Prepared by:

_____
Craig Hultgren, LHG
Principal Geologist

Table of Contents

1.0 INTRODUCTION 1

1.1 Responsible Agency 1

1.2 Project Organization 1

2.0 BACKGROUND INFORMATION 2

2.1 Site Description 2

2.2 Geologic & Hydrogeologic Setting 2

3.0 SAMPLING AND ANALYSIS 3

3.1 Field Screening 3

3.2 Surface Water Sampling 3

3.3 Quality Control Samples 4

3.4 Analytical Methods 5

3.5 Sample Containers 5

3.5.1 Surface Water Samples ..... **Error! Bookmark not defined.**

3.6 Field Forms 6

3.7 Packaging and Shipping 6

3.8 Sample Chain-of-Custody Forms and Custody Seals 6

Figures

Figure 1 – Site Location Map
Figure 2 – Site Features

Tables

Table 1 – Surface Water Analytical Methods and Sample Containers

Appendices

Appendix A – Standard Operating Procedures
Appendix B – Field Forms
Appendix C – Laboratory Method Detection Limits and Method Reporting Limits
Appendix D - Quality Assurance Project Plan
Appendix E – Health & Safety Plan

Acronyms

AST	Aboveground Storage Tank
bgs	below ground surface
BNSF	Burlington Northern – Santa Fe Railroad
BTEX	benzene, toluene, ethylbenzene, and total xylenes
cPAHs	carcinogenic polynuclear aromatic hydrocarbons
COC	Chemical of Concern
CBR	Columbia River Basalt
CUL	cleanup level
DRPH	diesel range petroleum hydrocarbons
DEQ	Oregon Department of Environmental Quality
EDB	1,2-dibromoethane
EDC	1,2-dichloroethane
EDR	Environmental Data Resources
EPA	Environmental Protection Agency
EPH	Extractable Petroleum Hydrocarbons
ESA	Environmental Site Assessment
ESPR	Emergency Spill Response Plan
GRPH	gasoline range petroleum hydrocarbons
HydroCon	HydroCon Environmental LLC
µg/L	micrograms per liter
mg/Kg	milligrams per Kilogram
LNAPL	light nonaqueous-phase liquid
MTCA	Model Toxics Control Act
NRCES	NRC Environmental Services, Inc.
ORPH	oil range petroleum hydrocarbons
PID	photoionization detector
QAPP	Quality Assurance Project Plan
SAP	Sampling and Analysis Plan
TPH	total petroleum hydrocarbons
VOCs	volatile organic compounds
VPH	Volatile Petroleum Hydrocarbons

1.0 INTRODUCTION

On behalf of Space Age Fuels (Space Age) HydroCon Environmental, LLC (HydroCon) has prepared this Sampling and Analysis Plan (SAP) for the diesel spill that occurred at mile mark 54 (west bound) along Interstate 84 (I-84) near Cascade Locks, Oregon (see Figure 1). This SAP addresses sampling protocols for surface water sampling within potentially affected surface water bodies (Lindsey Lake and Columbia River) near the spill site. The sampling objective is to provide quality surface water data to determine the concentrations and spatial distributions of chemicals of potential concern affected by the release.

1.1 Responsible Agency

The Oregon Department of Environmental Quality (DEQ) is the lead regulatory agency for the cleanup action at the site as promulgated in the Oregon Spills Program. The cleanup action is being conducted as an emergency response.

1.2 Project Organization

The names and responsibilities of key project representatives and personnel involved in the cleanup action at the Property are listed below:

- Mike Greenburg, DEQs assigned Project Manager
- Richard Franklin, EPA Region 10 Project Manager
- Charlie Schwartz, ODOT Project Coordinator
- Dave Borys, HydroCon, Project Manager
- Rob Honsberger, HydroCon, Field Lead
- Kurt Johnson, APEX Laboratory, Forensic Chemist and Quality Assurance Officer

2.0 BACKGROUND INFORMATION

On February 11, 2019 a spill occurred in the west bound lane on I-84 at mile marker 54 adjacent to Lindsey Lake. A three compartment fuel trailer overturned and two of the compartments ruptured. Approximately 4,402 gallons of diesel fuel was released to the environment across the east bound lane of I-84 and the armored bank of Lindsey Lake. A hard boom and oil absorbent material was deployed in Lindsey Lake to intercept the released fuel. The containment system was completed prior to any observations of petroleum products in the surface water body. At approximately 1635 on February 11, 2019, diesel was observed in the Lindsey Lake hard boom and product recovery operations were initiated.

2.1 Site Description

The site is located in Sections 4 and 5 of Township 2 North, Range 09 East of the Willamette Meridian. The spill site is located near mile mark 54 along I-84 near Cascade Locks, Oregon. The interstate highway is a main artery for instate commerce and commuter traffic. The spill site is located near the shoreline of the Columbia River. The highway has been constructed on top of imported fill that is composed primarily of rock and granular soil. A surface water body (Lindsey Lake) is located immediately north of the release area. Lindsey Lake discharges into the Columbia River.

2.2 Geologic & Hydrogeologic Setting

The release occurred in an upland area near the shoreline of the Columbia River (Figure 1). The topography of the site slopes north towards the Columbia River. Steep slopes of the Columbia River Gorge are located south of the Property. The area is dominated by basalt lava flows of the Columbia River Basalt (CBR) Supergroup and alluvial deposits from the Columbia River and side tributaries. Lindsey Lake is located in between the spill site and the Columbia River and was created by railroad levee along the shoreline.

3.0 SAMPLING AND ANALYSIS

Surface water sampling will be performed to delineate the lateral extent of contamination and remediation progress at the site. All field operations will be supervised by personnel experienced in Site assessment and sampling activities. Field operations will be performed in accordance with the site's Health and Safety Plan.

Any necessary permits for the proposed Site investigation activities will be obtained from city, county and state jurisdictions.

3.1 Field Observations

Prior to collecting surface water samples the field technician will record the time of day, temperature, and other important information on the Daily Field Report form (Appendix B). Observations will also include distressed vegetation and wildlife, light nonaqueous phase liquid (LNAPL) or product sheen if observed.

3.2 Surface Water Sampling

Surface water samples will be collected with a low-flow peristaltic pump equipped with a new length of low-density polyethylene tubing attached to a new length of silicone tubing. The tubing intake will be placed at a specific depth at each sampling location shown on Table 1. The samples will be placed directly into labeled laboratory prepared jars and sealed with Teflon-lined lids.

Samples will be placed in uniquely labeled laboratory-prepared containers described in greater detail in Section 3.5. The sample bottles will be placed in a chilled cooler along with chain-of-custody documentation and transported to Apex Laboratory in Tigard, Oregon for 24 hour turnaround analysis.

HydroCon will establish surface water sampling locations (3 along the boom on Lindsey Lake and 1 near the outlet to the Columbia River) as shown on Figure 2. The samples will be given a unique sampling identification number which will include the sample location name followed by the numeric order in which the sample was collected. For example, the surface water samples collected along the boom in Lindsey Lake will be called LL-boom location-numeric order of the sample (e.g., LL-EB-01 will be the first sample collected at the eastern boom location in Lindsey Lake).

Field duplicate samples will be collected for QA/QC purposes. One duplicate surface water sample will be collected each day. The identification number of each duplicate sample will be different than the actual sample location. HydroCon will use the following sample nomenclature: SW-number of the duplicate sample (beginning with 01 and increasing with each subsequent duplicate sample). The sampler will document the sampling information in the field forms noting which surface water sampling

location the duplicate sample was collected from. A summary of surface sampling locations, sample identification numbering, and laboratory analysis is shown on Table 1.

Table 1 – Surface Water Sample Locations

Sample Number	Location	Depth of Sample (below water surface)	Laboratory Analysis
LL-WB-#	Western end of boom	2 feet	D, P, B
LL-CB-#	Central area of boom	4 feet	D, P, B
LL-EB-#	Eastern end of boom	4 feet	D, P, B
LL-C-#	Discharge culvert to Columbia River	0.5 feet	D, P, B
SW-#	Duplicate surface water sample	Same depth as above	D, P, B
Trip	Sample Cooler	NA	B
FB-#	Field Blank	NA	B

Notes: D = NWTPH-Dx, P = PAHs by EPA Method 8270SIM, B = BTEX by EPA Method 8260C. # = the numeric sequence of sample (e.g., LL-EB-01 is the first sample collected from the eastern boom area of Lindsey Lake). NA = not applicable.

3.3 Quality Control Samples

Quality control samples will include field split (duplicate) samples at field replicate stations (locations to be determined in the field). One replicate station will be sampled each day to provide enough sample volume for duplicate samples. Samples from replicate stations will be processed into field duplicate samples at a frequency of one sample per day collected per analyte. The laboratory will provide one 40ml VOA filled with lab-grade de-ionized water and preserved, as required for use as a Trip Blank. The Trip Blank will be analyzed for BTEX using EPA Method 8260C. A temperature blank will be placed inside each sample cooler along with the chain-of-custody documentation.

A field blank sample will be collected during sampling on the boat to assess if residual gas inside the boat and/or incomplete combustion in the outboard motor exhaust is affecting sample results. Lab-grade deionized water will be poured into a new 8 ounce jar provided by the lab. The jar will be opened inside the boat during sampling. At the conclusion of sampling the contents inside the jar will be poured into a set (3) of 40ml voas. The field blank sample will be analyzed for BTEX using EPA Method 8260C.

3.4 Analytical Methods

HydroCon will collect surface water samples for chemical analysis. The samples will be submitted to Apex laboratory (Tigard, Oregon) to be analyzed for the established COCs at the site. The laboratory's method detection limit (MDL) and method reporting limit (MRL) is provided in Appendix C.

- DRPH and ORPH will be analyzed using Northwest Method NWTPH-Dx.
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) will be analyzed using EPA Method 8260C
- Polynuclear Aromatic Hydrocarbons (PAHs) will be analyzed using EPA Method 8270SIM

3.5 Sample Containers

Containers, preservatives, and laboratory method for the COCs in surface water samples are outlined on Table 2 below.

Table 2 – Surface Water Analytical Methods and Sample Containers

Analyte(s) and Method	40 mL VOA Glass Vials (preserved with HCl)	1,000 mL Amber Glass Bottle (unpreserved)	500 mL Amber Glass Bottle (HCL)
Benzene, Toluene, Ethylbenzene, & Total Xylenes (BTEX) **EPA Method 8260C**	**3**	**-**	**-**
Oil-Range Petroleum Hydrocarbons (ORPH) and **Diesel-Range Petroleum Hydrocarbons (DRPH)** **Northwest Method NWTPH-Dx**	**-** **-**	**-** **-**	**1** **1**
Polynuclear Aromatic Hydrocarbons **EPA Method 8270SIM**	**-** **-**	**1**	**-**

HCl = hydrochloric acid; HNO3 = nitric acid; mL = milliliter; VOA = volatile organic analysis

3.6 Field Forms

HydroCon will document field activity with the following forms found in Appendix B:

- Surface Water Sample forms will be used to document sample information and observations and measurements made during surface water sampling.
- Field reports will be used to document field activity, decision making, communication and other relevant topics during each day of the field work.
- Chain-of-custody forms will be filled out to direct the analytical requirements for surface water samples collected at the site.

3.7 Packaging and Shipping

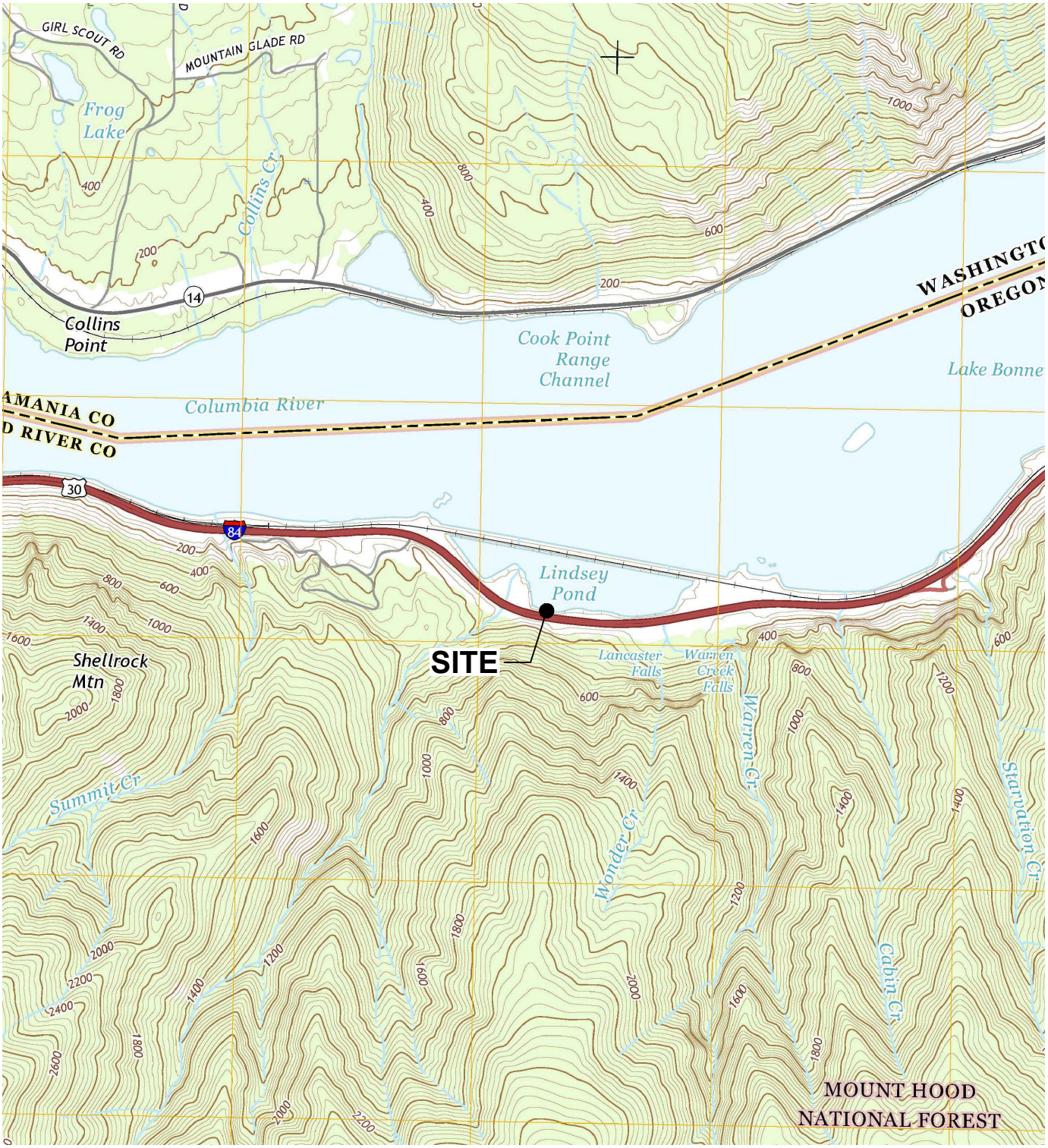
All samples shall be packaged and shipped to Apex laboratory in Tigard, Oregon according to procedures described in SOP 7 and required by the laboratory.

3.8 Sample Chain-of-Custody Forms and Custody Seals

A chain-of-custody form will be completed with all required information and accompany all samples (see Appendix B for forms). The chain of custody provides a record of the transfer of sample custody from the field sampler to the laboratory. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the chain of custody form.

Custody seals will be used on the shipping containers when samples are shipped to the laboratory to inhibit sample tampering during transportation.

FIGURES



NOTE(S):
USGS, MOUNT DEFIANCE QUADRANGLE
OREGON-WASHINGTON
7.5 MINUTE SERIES (TOPOGRAPHIC)

0 2000 4000
SCALE IN FEET
1" = 2000'

N W E S

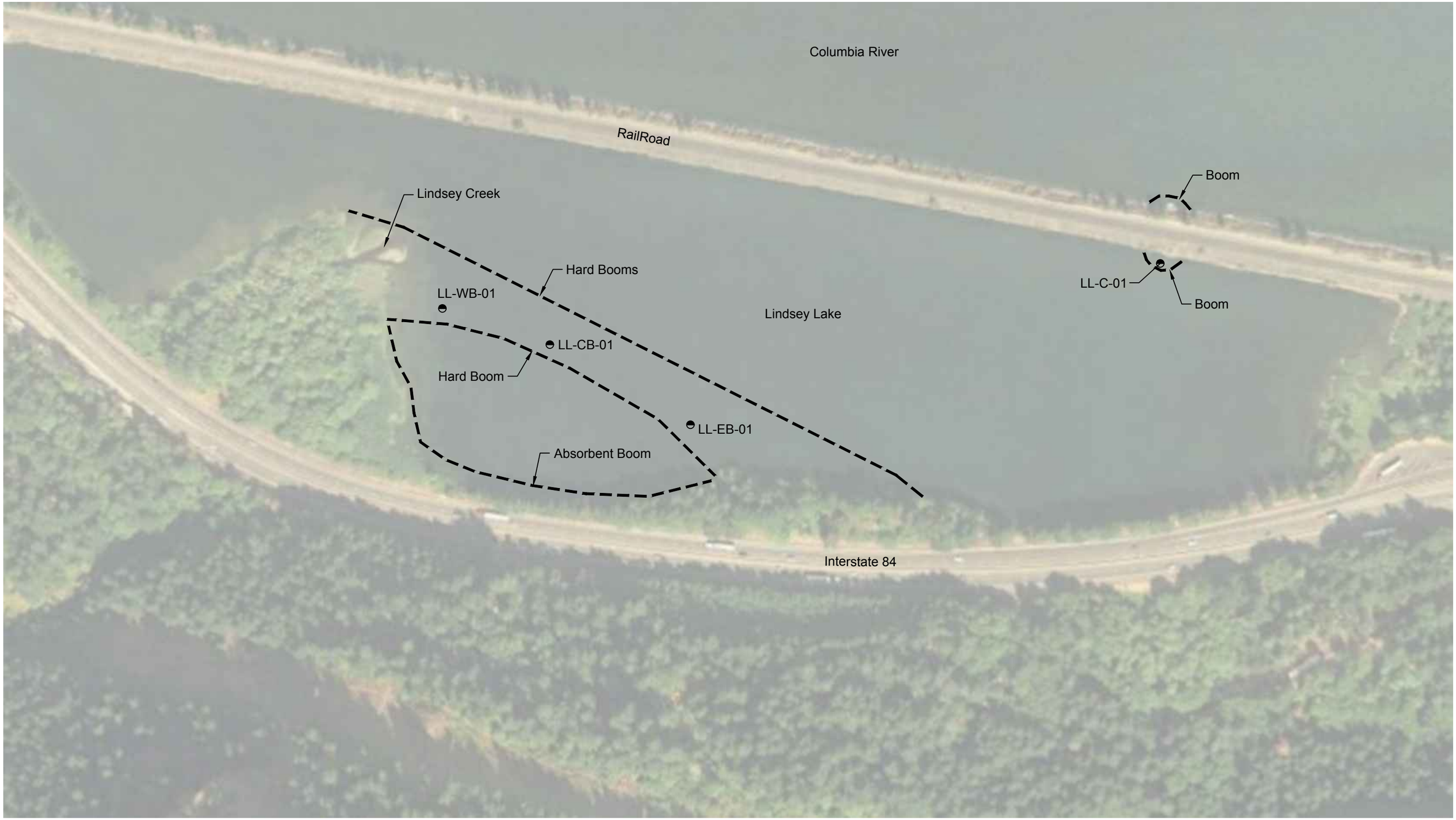
HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 2-13-19
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2019-004

FIGURE 1
SITE LOCATION MAP

SPACE AGE DIESEL SPILL
INTERSTATE 84 - MILE MARK 54
CASCADE LOCKS, OR.

C:\Users\Josh\Desktop\Autocad Files\Hydrocon-Autocad\2019-004 Space Age\2019\Feb 2019\2019-004_BM-021319.dwg



LEGEND

CR-01 Surface Water Sample Locations

Containment Boom Locations

N
W E
S

0 200 400
SCALE IN FEET
1" = 200'

510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 2/13/19
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2019-004

FIGURE 2
SITE FEATURES

SPACE AGE DIESEL SPILL
INTERSTATE 84 - MILE MARK 54
CASCADE LOCKS, OR.

C:\Users\Josh\Desktop\Autocad Files\Hydrocon-Autocad\2019-004 Space Age\2019\Feb 2019\2019-004_BM-021319.dwg

Appendix A

Standard Operating Procedures

STANDARD OPERATING PROCEDURE – SOP 7
SAMPLE PACKAGING AND SHIPPING

Specific requirements for sample packaging and shipping must be followed to ensure the proper transfer and documentation of environmental samples collected during field operations. Procedures for the careful and consistent transfer of samples from the field to the laboratory are outlined herein.

EQUIPMENT REQUIRED

Specific equipment or supplies necessary to properly pack and ship environmental samples include the following:

- Ice in sealed bags or blue ice
- Sealable airtight bags
- Plastic garbage bags
- Coolers
- Bubble wrap
- Fiber reinforced packing tape
- Scissors
- Chain-of-custody seals
- Airbills for overnight shipment
- Sample analysis request forms.

PROCEDURE

The following steps should be followed to ensure the proper transfer of samples from the field to the laboratories:

- Appropriately document all samples using the proper logbooks and tracking forms.
- Make sure all applicable laboratory quality control sample designations have been made on the sample analysis request forms. Samples that will be archived for future possible analysis should be clearly identified on the sample analysis request (chain-of-custody) form. Such samples should also be labeled on the sample analysis request form as "Do Not Analyze": Hold and archive for possible future analysis" because some laboratories interpret "archive" as meaning to continue holding the residual sample after analysis.
- Notify the laboratory contact and the project quality assurance/quality control (QA/QC) coordinator that samples will be shipped and the estimated arrival time. Send copies of all chain-of-custody, sample analysis request, and packing list forms to the laboratory *QA/QC* coordinator.
- Clean the outside of all dirty sample containers to remove any residual contamination.
- Check sample containers against the chain-of-custody forms to make sure all samples intended for shipment are accounted for.

- Store each sample container in a sealable bag that allows the sample label to be read. Volatile organic analyte (VOA) vials for a single sample must be encased in bubble wrap or foam rubber before being sealed in bags.
- Choose the appropriate size cooler (or coolers) and line with bubble wrap and a plastic garbage bag.
- Fill the cooler with the samples, separating glass containers with bubble wrap and allowing room for ice to keep the samples cold. Add enough ice or blue ice to keep the samples refrigerated overnight. Avoid separating the- samples from the ice with excess bubble wrap because it will insulate the containers from the ice. After all samples and ice have been added to the cooler, use bubble wrap to fill any empty space to keep the samples from shifting during transport.
- Remember to consolidate any VOA samples in a single cooler, and ship them with a trip blank, if the quality assurance project plan calls for one.
- Once all the samples are packed, close the plastic garbage bag and fasten it with a chain-of-custody seal.
- Store the signed chain-of-custody, sample analysis request, and packing list forms in a sealable bag and tape it to the inside of the cooler lid.
- Once the cooler is sufficiently packed to prevent shifting of the containers, close the lid and seal it shut using fiber reinforced packing tape. Also, if the cooler has a drain at the bottom, it should be taped shut.
- As security against unauthorized handling of the samples, apply one or two chain-of-custody seals across the opening of the cooler lid. Be sure the seals are properly affixed to the cooler so they are not removed during shipment.
- Label the cooler with destination and return addresses, and add other appropriate stickers, such as "This End Up," "Fragile," and "Handle With Care."
- If an overnight courier is used, fill out the airbill as required and fasten it to the top of the cooler. The identification number sticker should be taped to the lid, because tracking problems can occur if a sticker is removed during shipment.

Appendix B

Field Forms

Surface Water Sample Form

360.703.6079 / Fax 360.703.6086	Project: Space Age Diesel Spill - I-84 Mile Marker 54		Date:
314 West 15th Street, Suite 300 Vancouver, Washington 98660	Project Number: 2019-004		
Prepared By:	Client:	Space Age Fuels	Page: Of
Purpose:	Location:	Interstate I-84 - Mile Marker 54 Lindsey Lake Cascade Locks, Oregon	Arrival: Departure:

Sample ID	Labatory Analysis	Time	Number and Type of Sample Containers
LL-EB-	Dx,BTEX, PAH (SIM)		
LL-CB-	Dx,BTEX, PAH (SIM)		
LL-WB-	Dx,BTEX, PAH (SIM)		
LL-C-	Dx,BTEX, PAH (SIM)		

Duplicate Sample ID	Labatory Analysis	Time	Location where duplicate sample was collected
SW-	Dx,BTEX, PAH (SIM)		

Weather Conditions

Sheen Descripton/Observation

Notes/Observations

APEX LABS

CHAIN OF CUSTODY

COC ____of____

Lab # _____

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company:	Project Mgr:	Project Name:	Project #

Address:	Phone:	Fax:	Email:

Sampled by:

Site Location: OR WA

Other: _____

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs	8270 SIM PAHs	8082 PCBs	8081 Chlor. Pest	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd Ca, Cr, Co, Cu, Fe, Pb Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn	TCLP Metals (8)	1200- COLS	1200-Z							

Normal Turn Around Time (TAT) = 7-10 Business Days

TAT Requested (circle)

24 HR **48 HR** **72 HR**

4 DAY **5 DAY** **Other: _____**

SAMPLES ARE HELD FOR 30 DAYS

SPECIAL INSTRUCTIONS:

RELINQUISHED BY:		**RECEIVED BY:**	**RELINQUISHED BY:**		**RECEIVED BY:**
Signature:	Date:	Signature:	Signature:	Date:	Signature:
Printed Name:	Time:	Printed Name:	Printed Name:	Time:	Printed Name:
Company:		Company:	Company:		Company:

DAILY FIELD REPORT

Hydro Con		Hydrocon Job Number:
	Project Name:	Date:
Phone: 360.703.6079 Fax: 360.703.6086 314 W 15th Street, Suite 300; Vancouver, WA	Client:	Page: Of
Prepared By:	Location:	Arrival: Departure:
Purpose:	Weather:	Permit:

Appendix C

Laboratory Method Detection Limits and Method Reporting Limits

Apex Laboratories - Custom Project Info

HydroCon LLC

Space Age 84 Spill

Client PM: **Dave Borys** **davidb@hydroconllc.net**

Analysis Specific DQOs

Fuels Analyses

NWTPH-Dx (Diesel/Oil) Low Level (Water)

Analyte Name	MDL/LOD	MRL/LOQ	Units	QC Limits (%)	RPD (%)
Diesel	40.0	80.0	ug/L	58 -115	30
Oil	80.0	160	ug/L	-	30
o-Terphenyl (Surr)	1.00	1.00	ug/L	50 -150	

Analysis Specific DQOs

Semivols (SIM) Analyses

8270 SIM PAH (Water)

Analyte Name	MDL/LOD	MRL/LOQ	Units	QC Limits (%)	RPD (%)
Acenaphthene	0.0200	0.0400	ug/L	47 -122	30
Acenaphthylene	0.0200	0.0400	ug/L	41 -130	30
Anthracene	0.0200	0.0400	ug/L	57 -123	30
Benz(a)anthracene	0.0200	0.0400	ug/L	58 -125	30
Benzo(a)pyrene	0.0200	0.0400	ug/L	54 -128	30
Benzo(b)fluoranthene	0.0200	0.0400	ug/L	53 -131	30
Benzo(k)fluoranthene	0.0200	0.0400	ug/L	57 -129	30
Benzo(g,h,i)perylene	0.0200	0.0400	ug/L	50 -134	30
Chrysene	0.0200	0.0400	ug/L	59 -123	30
Dibenz(a,h)anthracene	0.0200	0.0400	ug/L	51 -134	30
Dibenzofuran	0.0200	0.0400	ug/L	53 -120	30
Fluoranthene	0.0200	0.0400	ug/L	57 -128	30
Fluorene	0.0200	0.0400	ug/L	52 -124	30
Indeno(1,2,3-cd)pyrene	0.0200	0.0400	ug/L	52 -133	30
1-Methylnaphthalene	0.0400	0.0800	ug/L	41 -120	30
2-Methylnaphthalene	0.0400	0.0800	ug/L	40 -121	30
Naphthalene	0.0400	0.0800	ug/L	40 -121	30
Phenanthrene	0.0200	0.0400	ug/L	59 -120	30
Pyrene	0.0200	0.0400	ug/L	57 -126	30
2-Fluorobiphenyl (Surr)			ug/L	44 -120	
p-Terphenyl-d14 (Surr)			ug/L	50 -133	

Analysis Specific DQOs

Volatiles Analyses

8260C BTEX (Water)

Analyte Name	MDL/LOD	MRL/LOQ	Units	QC Limits (%)	RPD (%)
Benzene	0.100	0.200	ug/L	80 -120	30
Toluene	0.500	1.00	ug/L	80 -120	30
Ethylbenzene	0.250	0.500	ug/L	80 -120	30
Xylenes, total	0.750	1.50	ug/L	80 -120	30
1,4-Difluorobenzene (Surr)			ug/L	80 -120	
Toluene-d8 (Surr)			ug/L	80 -120	
4-Bromofluorobenzene (Surr)			ug/L	80 -120	

Appendix D

Quality Assurance Project Plan

Quality Assurance Project Plan

Diesel Spill – Interstate 84
Mile Mark 54
Cascade Locks, Oregon

Prepared for:

Space Age Fuels

15525 SE For Mor Ct
Clackamas, OR 97015

February 12, 2019

Prepared by:

HydroCon, LLC
314 West 15th Street, Suite 300 Vancouver, Washington 98660
p: (360) 703-6079 f: (360) 703-6086
www.hydroconllc.net

Quality Assurance Project Plan (QAPP)

Diesel Spill – Interstate 84
Mile Mark 54
Cascade Locks, Oregon

Prepared for:
Space Age Fuels
15525 SE For Mor Ct
Clackamas, OR 97015

HydroCon Project No: 2019-004

Prepared by:

_____
Craig Hultgren, LHG
Principal Geologist

Table of Contents

1.0 INTRODUCTION 1
2.0 PROJECT ORGANIZATION 1
2.1 Key Personnel 1
2.2 Responsibilities of Key Personnel 2
2.2.1 Regulatory Agency 2
2.2.2 Project Manager 2
2.2.3 Project QA/QC Officer 2
2.2.4 Project Staff 2
3.0 DATA QUALITY OBJECTIVES 2
3.1 Quantitation Limits 2
3.2 Precision 3
3.3 Accuracy 3
3.3.1 Laboratory Method Blanks 4
3.4 Representativeness 4
3.5 Completeness 4
3.6 Comparability 4
4.0 DATA COLLECTION APPROACH 4
5.0 ANALYTICAL PROCEDURES 5
6.0 DATA MANAGEMENT, REDUCTION, QUALITY ASSURANCE, REVIEW, AND REPORTING 5
6.1 Data Types 5
6.2 Data Transfer 5
6.3 Data Inventory 6
6.3.1 Document Filing and Storage 6
6.3.2 Access to Project Files 6
6.4 Independent Data Quality Review 6
6.5 Data Reduction and Analysis 6
6.5.1 Data Reporting Formats 7
6.6 Quality Control Summary Report 7
7.0 QUALITY CONTROL PROCEDURES 7
This section provides a description of the QC procedures for both field activities and laboratory analysis. The field QC procedures include standard operating procedures for sample collection and handling, equipment calibration, and field QC samples. 7
7.1 Field Quality Control 7
7.2 Laboratory Quality Control 8
7.3 Data Quality Control 8
7.4 Data Assessment Procedures 8
7.5 Quality Control Summary Report 8
8.0 PERFOMANCE AND SYSTEM AUDITS 9
9.0 PREVENTATIVE MAINTENANCE 9
10.0 CORRECTIVE ACTION 9
11.0 QUALITY ASSURANCE REPORTS 10

Figures

Figure 1 – Site Location Map
Figure 2 – Site Features

Tables

Table 1 - Analytical Methods, Container, Preservation, and Holding Time Requirements for Water

Attachments

Attachment A - Laboratory Method Detection Limits and Method Reporting Limits

Acronyms

BTEX	benzene, toluene, ethylbenzene, and total xylenes
cPAHs	carcinogenic polynuclear aromatic hydrocarbons
COC	Chemical of Concern
DQOs	data quality objectives
DRPH	diesel range petroleum hydrocarbons
EPA	Environmental Protection Agency
GRPH	gasoline range petroleum hydrocarbons
HASP	Health and Safety Plan
HydroCon	HydroCon Environmental LLC
µg/L	micrograms per liter
mg/Kg	milligrams per Kilogram
ORPH	oil range petroleum hydrocarbons
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance and quality control
SAP	Sampling and Analysis Plan

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared by HydroCon Environmental (HydroCon) on behalf of Space Age Fuels (Space Age) to provide specific requirements for quality assurance and quality control (QA/QC) procedures for the diesel fuel spill that occurred at Mile Mark 54 on Interstate Highway 84 (I-84) near Cascade Locks, Oregon (hereinafter referred to as the Site (Figure 1).

Figure 2 shows historical and current site features and sampling locations.

The purpose of the QAPP is to:

- Assist the project manager and project team to focus on the factors affecting data quality during the planning stage of the project.
- Facilitate communication among field, laboratory, and project staff as the project progresses.
- Document the planning, implementation, and assessment procedures for QA/QC activities for the project.
- Verify that the data quality objectives (DQOs) are achieved.
- Provide a record of the project to facilitate final report preparation.

The data quality objectives (DQOs) for the project include both qualitative and quantitative objectives, which define the appropriate type of data and specify the tolerable levels of potential decision errors that will be used as a basis for establishing the quality and quantity of data needed to support the remedial action. To verify that the DQOs are achieved, this QAPP details aspects of sample collection and analysis including analytical methods, QA/QC procedures, and data quality reviews. This QAPP describes both qualitative and quantitative measures of data quality to verify that the DQOs are achieved.

2.0 PROJECT ORGANIZATION

The project organization for the completion of the clean up, including identification of key personnel and their responsibilities is described below.

2.1 Key Personnel

HydroCon has been contracted by Space Age to assess the nature and extent of the diesel fuel spill and to represent Space Age in directing remedial action and regulatory agency interaction. Key personnel and their roles for the project are listed in the table below.

Name	Role	Organization	Phone
David Borys	Project Manager	HydroCon	(360) 703-6079 office (360) 719-0682 cell
Robert Honsberger	Field Manager	HydroCon	(206) 856-6679
Brian Pletcher, RG	Geologist	HydroCon	(971) 295-8848

2.2 Responsibilities of Key Personnel

The responsibilities of key personnel involved in the cleanup effort are described below.

2.2.1 Regulatory Agency

The Oregon Department of Environmental Quality (DEQ) is the lead regulatory agency for the remedial action at the Site as promulgated in the Spills Program.

2.2.2 Project Manager

The Project Manager has overall responsibility for developing the QAPP, monitoring the quality of the technical and managerial aspects of the investigation, and implementing the QAPP and corresponding corrective measures, where necessary.

2.2.3 Project QA/QC Officer

The QA/QC Officer has the responsibility to monitor and verify that the work is performed in accordance with the Sampling and Analysis Plan (SAP) and other applicable procedures. The QA/QC Officer has the responsibility to assess the effectiveness of the QA/QC program and to recommend modifications to the program when applicable. The QA/QC Officer is responsible for assuring that the personnel assigned to the project are trained relative to the requirements of the QA/QC program and for reviewing and verifying the disposition of nonconformance and corrective action reports.

2.2.4 Project Staff

Members of the project staff are responsible for understanding and implementing the QA/QC program as it relates to the remedial action objectives work plan.

3.0 DATA QUALITY OBJECTIVES

The DQOs for the remedial action will be used to develop and implement procedures to verify that data collected is of sufficient quality to adequately address the objectives of the remedial action at the Site as defined in the work plan. Observations and measurements will be made and recorded in such a manner as to yield results representative of the media and conditions observed and/or measured. Goals for representativeness will be met by verifying sampling locations are selected properly, a sufficient number of samples are collected, and field screening and laboratory analyses are conducted properly.

The quality of the laboratory data will be assessed by precision, accuracy, representativeness, completeness, and comparability. Definitions of these parameters and the applicable QC procedures are described in Subsections 3.2 through 3.6 of this QAPP. Quantitative DQOs for applicable parameters (e.g., precision, accuracy, and completeness) are provided following each definition. Laboratory DQOs have been established by the analytical laboratory.

3.1 Quantitation Limits

The specific analytes and corresponding laboratory practical quantitation limits that will be required for the remedial action are presented in Attachment A. The detection or reporting limits

for actual samples may be higher depending on the sample matrix, moisture content, and laboratory dilution factors. Laboratory control limits are also presented in Attachment A.

3.2 Precision

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of two or more measurements compared to their average values. Precision is calculated from results of duplicate sample analyses. Precision is quantitatively expressed as the relative percent difference (RPD) and is calculated as follows:

$$RPD = \frac{(C_1 - C_2)}{(C_1 - C_2)/2} \; x \; 100$$

Where:
RPD = relative percent difference
C_1 = larger of the two duplicate results (i.e., the highest dedicated concentration)
C_2 = smaller of two duplicate results (i.e., the lowest dedicated concentration)

There are no specific RPD criteria for organic chemical analyses. Quantitative RPD criteria for organic analyses will be based on laboratory-derived control limits.

3.3 Accuracy

Accuracy is a measure of the closeness (bias) of the measured value to the true value. The accuracy of chemical analytical results is assessed by “spiking” samples in the laboratory with known standards (a surrogate or matrix spike of known concentration) and determining the percent recovery (%R). The accuracy is measured as the %R and is calculated as follows:

$$\%R = \frac{(M_{sa} - M_{ua})}{C_{sa}} x \; 100$$

Where:
%R = percent recovery
M_{sa} = measured concentration in spiked aliquot
M_{ua} = measured concentration in unspiked aliquot
C_{sa} = actual concentration of spiked added

Laboratory matrix spikes and surrogates will be carried out at the analytical laboratory in accordance with the United States Environmental Protection Agency (EPA) SW-846 and Ecology methods and procedures for inorganic and organic chemical analyses. The frequency of matrix spikes and matrix spike duplicates will each be one per batch of 20 samples or less for soil and sediment samples. Quantitative percent recovery criteria for organic analyses will be based on laboratory- derived control limits for surrogate recovery and matrix spike results.

The accuracy of sample results can also be affected by the introduction of contaminants to the sample during collection, handling, or analysis. Contamination of the sample can occur because of improperly cleaned sampling equipment, exposing samples to chemical concentrations in the field or during transport to the laboratory, or because of chemical concentrations in the

laboratory. To demonstrate that the samples collected are not contaminated, laboratory method blank samples will be analyzed.

3.3.1 Laboratory Method Blanks

The laboratory will run method blanks at a minimum frequency of 5 percent or one per batch to assess potential contamination of the sample within the laboratory.

3.4 Representativeness

Representativeness is a qualitative assessment of how closely the measured results reflect the actual concentration or distribution of the constituent concentrations in the matrix sampled. The sampling plan design, sample collection techniques, sample handling protocols, sample analysis methods, and data review procedures have been developed to verify that the results obtained are representative of the Site conditions.

3.5 Completeness

Completeness is defined as the percentage of measurements judged to be valid. Results will be considered valid if they are not rejected during data validation (Section 6, Data Management, Reduction, Quality Assurance, Review, and Reporting). Completeness is calculated as follows:

$$C = \frac{(Number\ of\ Valid\ Measurements)}{(Total\ Number\ of\ Measurements)} x\ 100$$

Objectives for completeness are based, in part, on the subsequent uses of the data (i.e., the more critical the use, the greater the completeness objective). The objectives for completeness of samples are expressed as percentages, which refer to the minimum acceptable percentages of samples received at the laboratory in good condition and acceptable for analysis. The objectives of completeness for other samples are 95 percent for soil and water samples. These objectives will be met through the use of proper sample containers, proper sample packaging procedures to prevent breakage during shipment, proper sample preservation, and proper labeling and chain-of- custody procedures. A loss of 5 to 10 percent of intended samples is common, and the goals set are sufficient for intended data uses.

The objectives for completeness of chemical analyses are also expressed as percentages and refer to the percentages of analytical requests for which usable analytical data are produced. The initial objective for completeness of chemical analyses in the laboratory is 95 percent.

3.6 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. The use of standard Ecology and EPA methods and procedures for both sample collection and laboratory analysis will make the data collected comparable to both internal and other data generated.

4.0 DATA COLLECTION APPROACH

Procedures for collecting, preserving, transporting, and storing samples are described in the SAP. Sampling protocols will be performed in accordance with generally accepted

environmental practices and will meet or exceed current regulatory standards and guidelines. Sampling procedures may be modified, if necessary, to satisfy amendments to current regulations, methods, or guidelines. The data collection approach for key elements of the remedial action field program will verify the project DQOs are met or exceeded. The key elements include soil samples collected and analytical results used to demonstrate that the concentrations of chemicals of concern (COCs) at the limits of the remedial excavation are below applicable cleanup levels as defined in the SAP. The total number of samples collected and specific analyses to be performed will be based on field screening results, field observations, and analytical results for performance and confirmational monitoring.

5.0 ANALYTICAL PROCEDURES

APEX Laboratory (APEX) of Tigard, Oregon has been selected as the laboratory to conduct the analyses for COCs of the samples collected for the remedial action. APEX is certified by Ecology and meets the QA/QC requirements of both Ecology and the EPA. The contact for APEX is:

Name	Role	Organization	Phone
Kurt Johnson	Project Contact	APEX	(360) 556-6513

A *Laboratory Quality Assurance Manual* from APEX is available on file at HydroCon's office for review and reference. The manual will be followed throughout the remedial action. Access to laboratory personnel, equipment, and records pertaining to samples, collection, transportation, and analysis can be provided. A list of Analytical Methods, Container, Preservation, and Holding Time Requirements is provided in Table 1.

6.0 DATA MANAGEMENT, REDUCTION, QUALITY ASSURANCE, REVIEW, AND REPORTING

This section outlines the procedures to be followed for the inventory, control, storage, and retrieval of data collected during performance of the remedial action. The procedures contained in this QAPP are designed to verify that the integrity of the collected data is maintained for subsequent use. Moreover, project-tracking data (e.g., schedules and progress reports) will be maintained to monitor, manage, and document the progress of the remedial action.

6.1 Data Types

A variety of data will be generated by the clean up, including sampling and analytical data. The laboratory analytical data will be transmitted to HydroCon as an electronic file. This method will facilitate the subsequent validation and analysis of these data while avoiding transcription errors that may occur with computer data entry. Examples of data types include manually recorded field data, such as boring logs, and electronically reported laboratory data.

6.2 Data Transfer

Procedures controlling the receipt and distribution of incoming data packages to HydroCon and outgoing data reports from HydroCon include the following:

- Incoming documents will be date-stamped and filed. Correspondence and transmittal letters for reports, maps, and data will be filed chronologically. Data packages, such as those from field personnel, laboratories (such as soil data), and surveyors (elevation data), will be filed by project task, subject heading, and date. If distribution is required, the appropriate number of copies will be made and distributed to the appropriate persons or agencies.
- A transmittal sheet will be attached to project data and reports sent out. A copy of each transmittal sheet will be kept in the administrative file and the project file. The Project Manager, selected project team member(s) and QA/QC Officer will review outgoing reports and maps.

6.3 Data Inventory

Procedures for filing, storage, and retrieval of project data and reports are discussed below.

6.3.1 Document Filing and Storage

Project files and raw data files will be maintained at HydroCon's office. Files will be organized by project tasks or subject heading. Hard copy project files will be archived for a minimum of 3 years after completion of the project. Electronic copies of files will be maintained in a project directory and backed up on a daily, weekly, and monthly basis.

6.3.2 Access to Project Files

Access to project files will be controlled and limited to Coleman and its authorized representatives, Ecology, and HydroCon personnel. If a document is to be used for a long period, a copy will be used, and the original will be returned to the project file. Electronic access to final reports, figures, and tables will be write-protected in the project directory.

6.4 Independent Data Quality Review

Data quality review will be performed where applicable using the current EPA *National Functional Guidelines for Organic Data Review (1999)*. The following types of QC information will be reviewed, as appropriate:

- Method deviations
- Sample extraction and holding times
- Method reporting limits
- Blank samples (equipment rinsate and laboratory method)
- Duplicate samples
- Matrix spike/matrix spike duplicate samples (accuracy)
- Surrogate recoveries
- Percent completeness and RPD (precision)
- QA review of the final analytical data packages for samples collected during the clean up

6.5 Data Reduction and Analysis

The Project Manager and QA/QC Officer are responsible for data review and validation. Data validation parameters are outlined in Section 3.0, Data Quality Objectives. The particular type of analyses and presentation method selected for any given data set will depend on the type, quantity, quality, and prospective use of the data in question. The analysis of the project data

will require data reduction for the preparation of tables, charts, and maps. To verify the data are accurately transferred during the reduction process, a minimum of two data reviews will be performed, one by the QA/QC Officer or Project Manager and another by the Project Principal, prior to issuing the documents. Incorrect transfers of data will be highlighted and changed by the QA/QC Officer.

6.5.1 Data Reporting Formats

The physical and chemical characterization information developed in connection with the remedial action will be presented in the final report in the following format.

6.5.1.1 Summary Tables and Plots

The laboratory reports will be sorted according to various parameters to summarize the information for easier assimilation and presentation. Soil sampling and analysis data will be sorted several ways, including by sample point number, constituent, and date of sample collection. The parameters chosen for sorting will depend on the selection of the most appropriate format and the utility of that format in demonstrating the physical and chemical characteristics of interest.

6.5.1.2 Maps

Plan maps needed to illustrate results of the remedial action will be assembled or prepared. They may include, but are not limited to, plan maps of the Site showing confirmed and suspected sources, sampling locations, chemical concentrations for selected chemicals, the Site features and potential preferential pathways (e.g., underground utility lines), and cross section locations (if produced).

6.5.1.3 Cross Section

Vertical profiles or cross sections may be generated from field data to display the Site stratigraphy, extent of soil excavation, or other aspects of the remedial action.

6.6 Quality Control Summary Report

A QC summary report will be included in a separate section of the remedial action Report prepared by HydroCon based on the QC summary data provided by the laboratory and validation report provided by the QA/QC validator.

7.0 QUALITY CONTROL PROCEDURES

This section provides a description of the QC procedures for both field activities and laboratory analysis. The field QC procedures include standard operating procedures for sample collection and handling, equipment calibration, and field QC samples.

7.1 Field Quality Control

Field QC samples (e.g., duplicate samples) will be collected during this project; the purpose of these samples is also discussed in Section 3.0, Data Quality Objectives. In addition, standard operating procedures will be implemented during field screening activities. The procedural basis for these field data collection activities will be documented on the field report forms, as described in Section 6.0, Sample Documentation and Shipment, of the SAP. Deviations from the established protocols will be documented on the field report forms.

7.2 Laboratory Quality Control

Analytical laboratory QA/QC procedures are provided in APEX's *Laboratory Quality Assurance Manual* that is on file at HydroCon's office.

7.3 Data Quality Control

Data generated by APEX will undergo two levels of QA/QC evaluation: one by the laboratory and one by HydroCon. As specified in the *Laboratory Quality Assurance Manual for APEX*, the laboratory will perform initial data reduction, evaluation, and reporting. The analytical data will then be validated by the QA/QC Officer. The following types of QC information will be reviewed, as appropriate:

- Method deviations
- Sample transport conditions (temperature and integrity)
- Sample extraction and holding times
- Method reporting limits
- Blank samples
- Duplicate samples
- Surrogate recoveries
- Percent completeness
- RPD (precision)

HydroCon and the QA/QC Officer will review field records and results of field observations and measurements to verify procedures were properly performed and documented. The review of field procedures will include:

- Completeness and legibility of field logs.
- Preparation and frequency of field QC samples.
- Equipment calibration and maintenance.
- Sample Chain of Custody forms.

Corrective actions are described in Section 10.0, Corrective Action.

7.4 Data Assessment Procedures

The Project Manager and QA/QC Officer are responsible for data review and validation. Upon receipt of each data package from the laboratory, calculations using the equations presented for precision, accuracy, and completeness will be performed. Results will be compared to quantitative DQOs, where established, or qualitative DQOs. Data validation parameters are outlined in Section 3.0, Data Quality Objectives.

7.5 Quality Control Summary Report

A QC summary report will be prepared by HydroCon and the QA/QC Officer and included in a separate section of the remedial action Report based on the QC summary data provided by the laboratory.

8.0 PERFOMANCE AND SYSTEM AUDITS

Performance audits will be completed for both sampling and analysis work. Field performance will be monitored through regular review of Sample Chain of Custody forms, field forms, and field measurements. The Project Manager and/or the QA/QC Officer may also perform periodic review of work in progress at the Site.

Accreditations received from Ecology for each analysis by the analytical laboratory demonstrate the laboratory's ability to properly perform the requested methods. Therefore, a system audit of the analytical laboratory during the course of this project will not be conducted.

The Project Manager and/or QA/QC Officer will oversee communication with the analytical laboratory on a frequent basis while samples are being processed and analyzed at the laboratory. This will allow HydroCon to assess progress toward meeting the DQOs and to take corrective measures if problems arise.

The analytical laboratory will be responsible for identifying and correcting, as appropriate, deviations from performance standards as discussed in the laboratory QA/QC Plan. The laboratory will communicate to the Project Manager or the QA/QC Officer deviations to the performance standards and the appropriate corrective measures made during sample analysis. Corrective actions are discussed in Section 10.0.

9.0 PREVENTATIVE MAINTENANCE

Operation and maintenance manuals will accompany field parameter analysis and measurement equipment. Included in these manuals will be procedures for calibration, operation, and troubleshooting. Maintenance activities will be documented in the project field report forms and/or equipment logbooks. A schedule of preventive maintenance activities will be maintained. In addition, spare parts and tools will be included in each equipment storage case to minimize equipment downtime.

10.0 CORRECTIVE ACTION

Corrective actions will be the joint responsibility of the Project Manager and the QA/QC Officer. Corrective procedures can include:

- Identifying the source of the violation
- Re-analyzing samples, if holding time criteria permit
- Re-sampling and analyzing
- Re-measuring parameter
- Evaluating and amending sampling and analytical procedures; and/or
- Qualifying data to indicate the level of uncertainty.

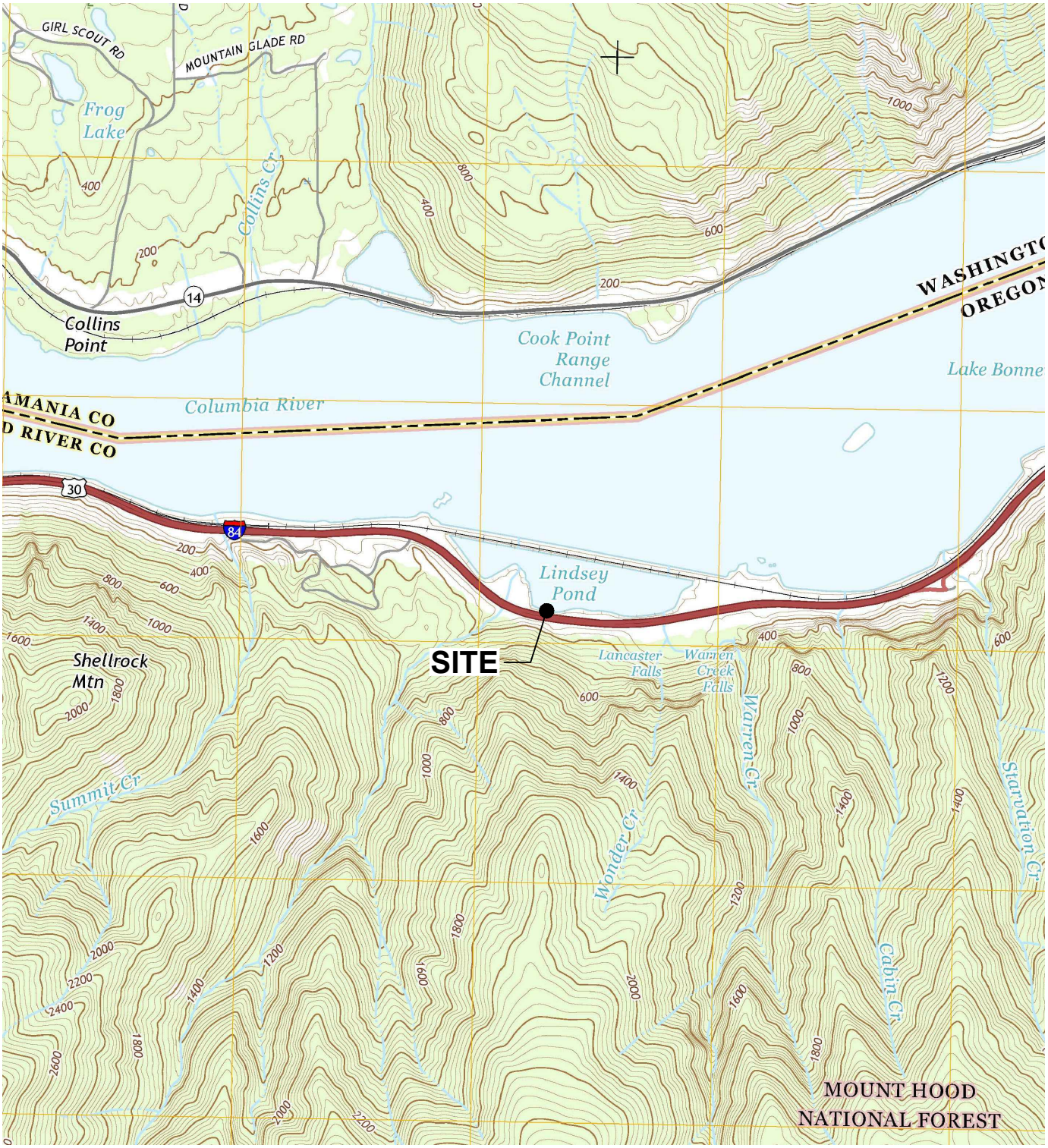
During field sampling operations, the Project Manager and field team members will be responsible for identifying and correcting protocols that may compromise the quality of the data. Corrective actions taken will be documented in the field notes.

11.0 QUALITY ASSURANCE REPORTS

The remedial action Report and the Closure Report will include a QA section that summarizes data quality information in the deliverables generated during the project. This summary will include at a minimum:

- Assessment of data accuracy and completeness.
- Results of performance and/or system audits.
- Significant QA problems and their impacts on the DQOs.

FIGURES



NOTE(S):
USGS, MOUNT DEFIANCE QUADRANGLE
OREGON-WASHINGTON
7.5 MINUTE SERIES (TOPOGRAPHIC)

0 2000 4000
SCALE IN FEET
1" = 2000'

N W E S

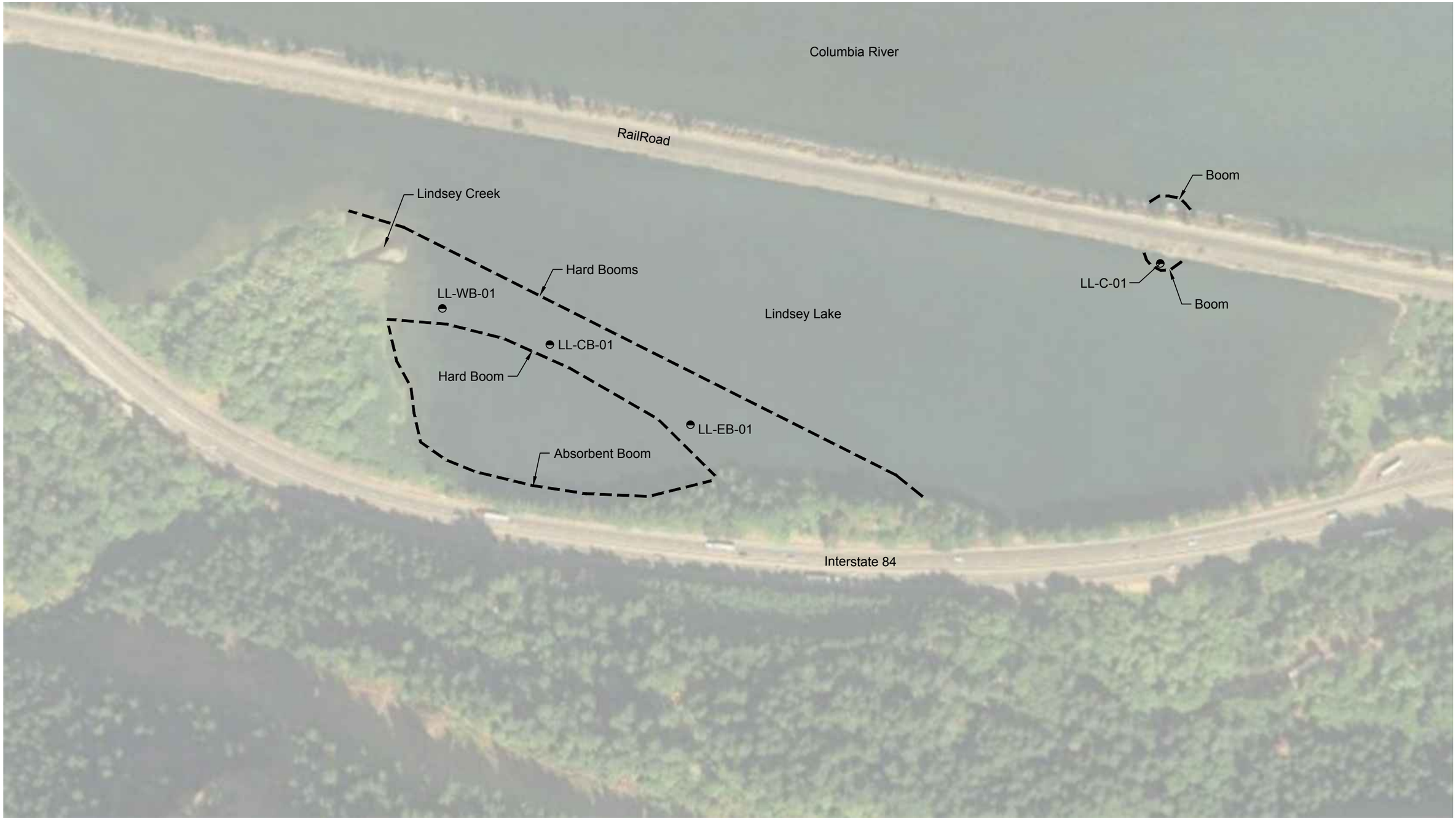
HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 2-13-19
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2019-004

FIGURE 1
SITE LOCATION MAP

SPACE AGE DIESEL SPILL
INTERSTATE 84 - MILE MARK 54
CASCADE LOCKS, OR.

C:\Users\Josh\Desktop\Autocad Files\Hydrocon-Autocad\2019-004 Space Age\2019\Feb 2019\2019-004_BM-021319.dwg



LEGEND

CR-01 Surface Water Sample Locations

Containment Boom Locations

N
W E
S

0 200 400
SCALE IN FEET
1" = 200'

510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 2/13/19
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2019-004

FIGURE 2
SITE FEATURES

SPACE AGE DIESEL SPILL
INTERSTATE 84 - MILE MARK 54
CASCADE LOCKS, OR.

C:\Users\Josh\Desktop\Autocad Files\Hydrocon-Autocad\2019-004 Space Age\2019\Feb 2019\2019-004_BM-021319.dwg

TABLES

Table 1 - Analytical Methods, Container, Preservation, and Holding Time Requirements for Surface Water Samples

Analyte(s) and Method	40 mL VOA Glass Vials (preserved with HCl)	1,000 mL Amber Glass Bottle (unpreserved)	500 mL Amber Glass Bottle (HCL)
Benzene, Toluene, Ethylbenzene, & Total Xylenes (BTEX) and naphthalene **EPA Method 8021B or 8260C**	**3**	**-**	**-**
Oil-Range Petroleum Hydrocarbons (ORPH) and	**-**	**-**	**1**
Diesel-Range Petroleum Hydrocarbons (DRPH)	**-**	**-**	**1**
Northwest Method NWTPH-Dx			
Polynuclear Aromatic Hydrocarbons **EPA Method 8270SIM**	**-**	**1**	**-**

NOTES:
HCl = hydrochloric acid
HNO3 = nitric acid
VOA = volatile organic analysis
EPA = Environmental Protection Agency

ATTACHMENT A

Laboratory Method Detection Limits and Method Reporting Limits

Apex Laboratories - Custom Project Info

HydroCon LLC

Space Age 84 Spill

Client PM: **Dave Borys** **davidb@hydroconllc.net**

Analysis Specific DQOs

Fuels Analyses

NWTPH-Dx (Diesel/Oil) Low Level (Water)

Analyte Name	MDL/LOD	MRL/LOQ	Units	QC Limits (%)	RPD (%)
Diesel	40.0	80.0	ug/L	58 -115	30
Oil	80.0	160	ug/L	-	30
o-Terphenyl (Surr)	1.00	1.00	ug/L	50 -150	

Analysis Specific DQOs

Semivols (SIM) Analyses

8270 SIM PAH (Water)

Analyte Name	MDL/LOD	MRL/LOQ	Units	QC Limits (%)	RPD (%)
Acenaphthene	0.0200	0.0400	ug/L	47 -122	30
Acenaphthylene	0.0200	0.0400	ug/L	41 -130	30
Anthracene	0.0200	0.0400	ug/L	57 -123	30
Benz(a)anthracene	0.0200	0.0400	ug/L	58 -125	30
Benzo(a)pyrene	0.0200	0.0400	ug/L	54 -128	30
Benzo(b)fluoranthene	0.0200	0.0400	ug/L	53 -131	30
Benzo(k)fluoranthene	0.0200	0.0400	ug/L	57 -129	30
Benzo(g,h,i)perylene	0.0200	0.0400	ug/L	50 -134	30
Chrysene	0.0200	0.0400	ug/L	59 -123	30
Dibenz(a,h)anthracene	0.0200	0.0400	ug/L	51 -134	30
Dibenzofuran	0.0200	0.0400	ug/L	53 -120	30
Fluoranthene	0.0200	0.0400	ug/L	57 -128	30
Fluorene	0.0200	0.0400	ug/L	52 -124	30
Indeno(1,2,3-cd)pyrene	0.0200	0.0400	ug/L	52 -133	30
1-Methylnaphthalene	0.0400	0.0800	ug/L	41 -120	30
2-Methylnaphthalene	0.0400	0.0800	ug/L	40 -121	30
Naphthalene	0.0400	0.0800	ug/L	40 -121	30
Phenanthrene	0.0200	0.0400	ug/L	59 -120	30
Pyrene	0.0200	0.0400	ug/L	57 -126	30
2-Fluorobiphenyl (Surr)			ug/L	44 -120	
p-Terphenyl-d14 (Surr)			ug/L	50 -133	

Analysis Specific DQOs

Volatiles Analyses

8260C BTEX (Water)

Analyte Name	MDL/LOD	MRL/LOQ	Units	QC Limits (%)	RPD (%)
Benzene	0.100	0.200	ug/L	80 -120	30
Toluene	0.500	1.00	ug/L	80 -120	30
Ethylbenzene	0.250	0.500	ug/L	80 -120	30
Xylenes, total	0.750	1.50	ug/L	80 -120	30
1,4-Difluorobenzene (Surr)			ug/L	80 -120	
Toluene-d8 (Surr)			ug/L	80 -120	
4-Bromofluorobenzene (Surr)			ug/L	80 -120	

Appendix E

Site Specific Health & Safety Plan

Site Specific Health and Safety Plan

Space Age Fuels
Diesel Spill – Interstate Highway 84
Mile Marker 54
HydroCon Project Number: 2019-004

Prepared for:

Space Age Fuels

15525 SE For Mor Ct
Clackamas, OR 97015

February 13, 2019

Prepared by:

HydroCon, LLC
314 West 15th Street, Suite 300 Vancouver, Washington 98660
p: (360) 703-6079 f: (360) 703-6086
www.hydroconllc.net

Emergency Phone Numbers:

Ambulance:	**911**
Hospital:	**911**
Fire Department:	**911**
Police Department:	**911**
HydroCon Office:	**360-703-6079**
Site Contact Phone Number:	**NA**
On-site Cell Number:	**Rob Honsberger** (b) (6)
Alternate On-site Cell Number:	**NA**

Table of Contents

1.0 INTRODUCTION 1
1.1 Disclaimer 1
1.2 Scope of Work 1
2.0 SITE DESCRIPTION 1
2.1 Project Personnel 1
2.2 Subcontractors 2
3.0 PERSONNEL RESPONSIBILITY 2
3.1 Project Manager 2
3.2 Health & Safety Director 2
3.3 Site Safety Representative 2
3.4 Onsite Personnel 3
4.0 SITE CONTROL 3
5.0 HAZARD ANALYSIS 4
5.1 Chemical Hazards 4
5.2 Physical Hazards 5
5.2.1 Underground Utilities 5
5.2.2 Flammability/Explosivity 6
5.2.3 Heat and Cold Stress 7
5.2.4 Trips/Falls 8
5.2.5 Confined Spaces 8
5.2.6 Noise 8
6.0 AIR MONITORING 9
6.1 Equipment and Action Levels 9
6.2 Air Monitoring Activities 9
7.0 PERSONAL PROTECTIVE EQUIPMENT 10
7.1 Routes to Exposure 11
7.2 Personnel Decontamination Procedure 11
8.0 SPILL CONTAINMENT 12

9.0 TRAINING 13
9.1 HAZWOPER Training 13
9.2 Medical Monitoring 13
10.0 EMERGENCY INFORMATION 13
11.0 DOCUMENTATION 14

Attachments

Attachment 1 – Additional Chemical Hazard Information
Attachment 2 – Safety Acknowledgement and Safety Meeting Minutes Forms
Attachment 3 – Air Monitoring Form
Attachment 4 – Route and Map to Hospital

1.0 INTRODUCTION

This site-specific Health and Safety Plan (HASP) establishes procedures and practices for employees of HydroCon Environmental, LLC (HydroCon), and its subcontractors, which are aimed at minimizing hazards posed by field activities at the site. In this HASP, measures are provided to minimize potential exposure, accidents, and physical injuries that may occur during onsite activities. Contingency arrangements are also provided for emergency situations.

1.1 Disclaimer

This HASP addresses known or suspected hazards at the site. Due to the potentially hazardous nature of this site and the activity occurring thereon, it is not possible to discover, evaluate, and provide protection for all possible hazards that may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, but not eliminate, the potential for injury and illness at this site. The health and safety guidelines in this plan were prepared specifically for this site and should not be used on any other site without prior evaluation by trained health and safety personnel.

1.2 Scope of Work

Description of proposed work:	Surface water cleanup/Spill response
Proposed work dates:	Start Date:2/11/19

2.0 SITE DESCRIPTION

Name of the site:	Space Age Fuels
Site location or address:	Interstate 84 mile marker 54
Operator:	Space Age Fuels
Current site use:	State Highway
Public Locates Number:	NR

2.1 Project Personnel

	Name/Affiliation	Work Phone	Cell Phone
Project Manager	David Borys	360-703-6079	(b) (6)
Field Team Leader	Rob Honsberger	360-703-6079	(b) (6)
Site Safety Officer	Rob Honsberger	360-703-6079	(b) (6)
Field Personnel	Rob Honsberger	360-703-6079	(b) (6)
Field Personnel			
Field Personnel			
Field Personnel			

Alternate Contact			
Site Contact			

2.2 Subcontractors

Task	Contact	Telephone
Emergency response	NW Fire Fighters	

3.0 PERSONNEL RESPONSIBILITY

3.1 Project Manager

The Project Manager (PM) is responsible for overall direction, coordination, technical consistency, and review of the entire project contract. In coordination with HydroCon's Health & Safety Director, the PM will emphasize the importance of safety and hold site personnel accountable for safe performance. The PM will enforce implementation and compliance with the HASP. Lastly, the PM will provide resources and support to the Site Superintendent for effective completion of duties.

3.2 Health & Safety Director

The Health & Safety Director is responsible for the overall health and safety of site work. They will emphasize the importance of safety and hold site personnel accountable for safe performance. In conjunction with the PM and other required personnel, they are responsible for revision of the HASP. They are also responsible for managing health and safety paperwork including daily tailgate meeting notes, incident reports, and for completing incident investigations. The Health & Safety Director may also complete unannounced site inspections at any time during the project.

3.3 Site Safety Representative

The Site Safety Representative (SSR) is the onsite health and safety representative and is present during field work activities. If the SSR must be absent from the site, the health and safety duties will be delegated to another responsible party at the site with appropriate qualifications. SSR responsibilities include:

- Maintain copies of HASP onsite during field activities
- Be on-site and present during hazardous and/or contaminated substance(s) work
- Implementation, enforcement, and monitoring of the HASP

- Conducting pre-construction training, pre-entry briefings, and other periodic training of all onsite personnel with regard to contents of the HASP and other safety requirements to be observed during construction
- Require that site personnel meet training, medical monitoring and field experience requirements
- Conduct daily tailgate meetings
- Ensure personnel work in a safe manner
- Direct decontamination procedures
- Perform and/or coordinate site exposure monitoring requirements
- Maintain project health and safety records
- Investigate incidents, accidents, and near-misses as needed

3.4 Onsite Personnel

Onsite personnel responsibilities include:

- Understand and comply with the HASP and health and safety instructions given by the SSR or other competent authority
- Observe the buddy system during work activities
- Promptly report all incidents, accidents, and near-misses
- Immediately report any unsafe work conditions, practices and violation of the HASP to the SS or SSR.

4.0 SITE CONTROL

Control boundaries on-site may include the Exclusion Zone (the contaminated area), Contamination Reduction Zone (decontamination zone), and Support Zone (clean area). Each zone will be designated on-site by the SSR and or alternate, qualified personnel. These zones will not be required to be in place at all times, but rather when site conditions dictate the need for additional safety of field personnel and/or the environment. These zones will be marked off by using highly visible banner tape.

5.0 HAZARD ANALYSIS

5.1 Chemical Hazards

Substance	Maximum Concentration [a] (ppm)	Medium	OSHA PEL (ppm)	OSHA STEL (OSHA Ceiling) (ppm)	IDLH (ppm)	IP(eV)	Carcinogen or Other Hazard
Gasoline	**NE unknown**	Soil GW	300	500	NE	NE	Flammable
Diesel	**NE unknown**	Soil GW	500	150	1,100	NE	Flammable
Benzene	**NE Unknown**	Soil GW	1	5	500 [b]	9.24	Carcinogen Flammable
Toluene	**NE Unknown**	Soil GW	200	300	500	8.82	Flammable
Ethylbenzene	**NE Unknown**	Soil GW	100	125 [b]	800 [b]	8.76	Flammable
Xylenes	**NE Unknown**	Soil GW	100	NE	900 [b]	~8.5	Flammable
Naphthalene	**NE Unknown**	Soil GW	10	15	250	8.12	
1,2,4-trimethylbenzene	**NE Unknown**	Soil GW	NE	NE	NE	NE	Flammable
1,3,5-trimethylbenzene	**NE Unknown**	Soil GW	NE	NE	NE	NE	Flammable

Notes:
[a] = See MSDS
NE = None established
ppm = Parts per million
GW = Groundwater
IP(eV) = Ionization potential
PEL = Permissible exposure level
STEL = Short-term exposure level
IDLH = Immediately dangerous to life or health
PEL, STEL, IDLH from NIOSH Pocket Guide to Chemical Hazards, 2005

Additional chemical hazard information is included as Attachment A.

5.2 Physical Hazards

	Yes	No	Proposed Safety Procedure
Flammability/Explosivity	X		No ignition sources within 50 feet of work area; see Section 5.2.2
Uneven terrain/tripping	X		Be aware of surroundings
Heat stress		X	See Section 5.2.3
Cold/hypothermia	X		See Section 5.2.3 / Drink water/ Take breaks
Drowning	X		Be aware of surroundings while near shore
Falling objects	X		Be aware of surroundings; hard hat use
Noise	X		Wear ear protection
Excavations		X	No deep excavation (> 4 feet below ground surface) is anticipated as part of HydroCon's work
Scaffolding		X	
Heavy equipment	X		Stay clear, avoid pinch points
Material handling	X		See Section 7
Compressed air equipment	X		Keep clear of air knife and lines
Confined spaces		X	See Note below
Back injury	X		Use proper lifting techniques
Electrical shock	X		Site staff to be aware of power sources (overhead & buried)
Tick bite		X	
Heavy traffic	X		Be aware of surroundings; use traffic control & barricades, as appropriate

Note:
No confined space entry is anticipated; if entry becomes necessary, an additional health and safety plan and a permit will be developed. Personnel must first obtain a confined space entry permit.

5.2.1 **Underground Utilities**

Underground utilities present a number of specialized problems. Utilities that need to be considered are:

- Natural gas – fire and explosive hazard
- Electrical – electrocution and fire hazard

- Water lines – excavation, erosion, unsafe working conditions
- Telephone – major disruption of local communication networks

Oregon Dig Law:

- **ATTENTION**: Oregon law requires you to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. You may obtain copies of the rules by calling the center. (Note: the telephone number for the Oregon Utility Notification Center is (503) 232-1987).
- Prior to notifying the Oregon Utility Notification Center, an excavator shall pre-mark with the color white the immediate area of the proposed excavation within both the public rights-of-way and underground easements.

Washington Dig Law:

- Prior to calling for a locate you must outline the area you intend to dig with white paint
- It is HydroCon's responsibility to maintain the locate marks for up to 45 days. After that time, HydroCon has to call for a new locate
- If digging within 100 feet of a transmission pipeline, HydroCon must notify the pipeline company of your intent
- No digging will take place until all known facilities are marked or HydroCon is provided information regarding underground facilities by the utility operator
- All damage to underground utilities must be reported to the Utilities Transportation Commission within 45 days of the incident

5.2.2 Flammability/Explosivity

Petroleum is highly flammable and readily vaporizes. Both liquid and vapor phases are highly mobile. Vapor mixtures are explosive. When working in the presence or suspected presence of free-phase gasoline, the following precautions should be observed within a 50 foot radius:

- NO open flames.
- NO sparks.
- NO smoking.
- Provide suitable containment and work area ventilation.
- Use explosive-proof electrical equipment, lighting and proper grounding.

5.2.3 Heat and Cold Stress

5.2.3.1 Heat Stress

"Heat stress" is a term that is used to describe progressively more serious symptoms, as follows:

- An initial rise in skin temperature due to increased blood flow to the skin (skin redness)
- Increase in heart rate, to more than 30 beats/minute above the resting level;
- Collapse, or heat exhaustion, due to inadequate blood flow to the brain;
- Dehydration, due to excessive sweating;
- Hyperventilation, resulting in a reduction of the normal blood carbon dioxide concentrations;
- Tingling around the lips, dizziness, cramping of muscles of hands and feet, and blackout;
- "Heat Stroke," characterized by unconsciousness, hot dry skin, and absence of sweating.

Control of Heat Stress

On hot, sunny days (high radiant heat load), if using impermeable work clothing, maintain appropriate work-rest cycles (progressively longer rest breaks in a cool location or the shade as temperature and work tasks increase) and drink water or electrolyte-rich fluids to minimize heat stress effects. Impermeable clothing will only be worn when absolutely necessary for control of hazardous chemicals.

Also, when ambient temperatures exceed 70° F, employees will conduct monitoring of the heart (pulse) rates, as follows:

- Each employee will check his or her own pulse rate at the beginning of each break period;
- Take the pulse at the wrist for six seconds and multiply by ten; then
- If the pulse rate exceeds 100 beats per minute, then reduce the length of the next work period by one third.

Example: After a one-hour work period at 80°F, a worker has a pulse rate of 120 beats per minute. The worker must therefore shorten the next work period by one-third, resulting in a work period of 40 minutes until the next break.

Treatment of Heat Stress

Individuals affected by mild forms of heat stress (heat exhaustion, dehydration, or cramping) should take a break in a cool or shaded location, drink liquids, and sit or lie down until feeling better. Shorter work periods should be used until temperature cools off.

Individuals affected by heat stroke are in critical condition. Summon emergency aid immediately, remove clothing, and bathe individual in cool water continually to bring down body temperature.

5.2.3.2 Cold Stress

Hypothermia can result from abnormal cooling of the core body temperature. It is caused by exposure to a cold environment, and wind-chill as well as wetness or water immersion can play a significant role. The following discusses signs and symptoms as well as treatment for hypothermia.

Typical warning signs of hypothermia include fatigue, weakness, lack of coordination, apathy, and drowsiness. A confused state is a key symptom of hypothermia. Shivering and pallor are usually absent, and the face may appear puffy and pink. Body temperatures below 90°F require immediate treatment to restore temperature to normal.

Treatment of Hypothermia

Current medical practice recommends slow re-warming as treatment for hypothermia, followed by professional medical care. This can be accomplished by moving the person into a sheltered area and wrapping with blankets in a warm room. In emergency situations where body temperature falls below 90°F and heated shelter is not available, use a sleeping bag, blankets, and/or body heat from another individual to help restore normal body temperature.

5.2.4 Trips/Falls

As with all field work sites, caution will be exercised to prevent slips on rain slick surfaces, stepping on sharp objects, etc. Work will not be performed on elevated platforms without fall protection. All excavations will be temporarily enclosed during work with barrier tape, or similar measures will be used to prevent workers from accidentally falling into an excavation.

5.2.5 Confined Spaces

Confined space entry is not anticipated for this project. Personnel will not enter any confined space, such as excavations, tanks or trenches without specific approval of the Project Manager. In addition, no entry into a confined space will be attempted until the atmosphere of the confined space is properly tested and documented by the Project Manager and a self-contained breathing apparatus is available on site. A confined space entry permit must also be issued and followed. All specified precautions must be carefully followed, including upgrading of personal protective equipment as directed by the Project Manager.

5.2.6 Noise

Appropriate hearing protection (ear muffs or ear plugs with a noise reduction rating of a least 25 dB) will be used for individuals working near an active drill rig or other high-noise generating equipment.

6.0 AIR MONITORING

Air monitoring will be conducted when entering previously uncharacterized sites, when working in the vicinity of uncontained chemicals or spills, when opening containers and well casings, and prior to opening and entering confined spaces. Air monitoring must be conducted to identify potentially hazardous environments and determine reference or background concentrations. Air monitoring will be used to define exclusion zones.

6.1 Equipment and Action Levels

The following equipment will be used to monitor air quality in the breathing zone during work activities:

Monitoring Instrument	Calibration Frequency	Parameters of Interest
PID, 11.6 eV bulb	Daily	Organic Vapors

Three levels of protection have been established and are require the following equipment:

Level D: Gloves, steel-toed boots, eye protection, hard hat, hearing protection (as necessary)

Level C: Gloves, steel-toed boots, eye protection, hard hat, hearing protection, half face or full face respirator with an organic vapor cartridge (see respirator requirements).

Level B: Gloves, steel-toed boots, eye protection, hard hat, hearing protection, positive pressure supplied air.

The following action levels have been established to determine the appropriate level of personal protection to be used during site investigation activities:

Instrument	Action Level	Action	Activity
PID 10.6 eV	<1 ppm TWA <5 ppm	Level D Level D	May proceed using Level C.
	>5 ppm , <10 ppm (not to exceed 15 minutes continuously)	Level D	
	>10 ppm sustained	Stop Work, Re-Evaluate	

6.2 Air Monitoring Activities

Work tasks under this HSP will be limited to soil and groundwater sampling with drilling equipment and limited/shallow excavation associated with remedial system installation. A PID and explosimeter may be used to measure volatile air concentrations during drilling and excavation and while sampling.

Average exposure time for site activities is estimated at 60 minutes (40 samples collected, estimated exposure time per sample: 60 to 90 seconds). Assuming the PEL of 1 ppm is achieved during the entire 60-minute exposure, the time-weighted average (TWA) exposure for benzene would be 8 ppm for an 8-hour shift.

The PID will be equipped with an 11.6 eV bulb. If PID readings are above Level D action levels, personnel will retreat in an upwind direction to an area where PID readings are less than Level D action levels. The activity will be resumed after five minutes. If PID readings are less than Level D action levels, work will proceed with PID measurements collected with a change in activity and at approximately 30-minute intervals, provided that the benzene STEL (5 ppm) is never exceeded for more than 15 minutes continuously. If PID readings are within the Level C action levels, work will proceed with respiratory protection. PID measurements will be collected continuously while in Level C PPE. If PID readings exceed Level C action levels, work will be halted and reevaluated. All PID Readings will be recorded on the Daily Air Monitoring Record (attached).

Reasons to Upgrade or Downgrade Levels of Protection	
Upgrade	**Downgrade**
Instrument action levels exceeded.	Change in site conditions that decreases hazard.
Known presence of dermal hazards.	Change in work task that will reduce contact with hazardous materials.
Likely occurrence of gas or vapor emission.	New information indicating a less hazardous situation than originally anticipated.
Change in work task that will increase contact or potential contact with hazardous materials.	
Request of individual performing task.	

7.0 PERSONAL PROTECTIVE EQUIPMENT

Based on the hazards identified above, the following personal protective equipment will be required for the following site activities (specify both an initial level of protection and a more protective level of protection in the event conditions should change).

Activities	**Level of Protection**	
	Initial	**Contingency**
Drilling/Excavation	D	C
Soil sampling	D	C
Groundwater sampling	D	C
Surface water sampling	D	C

Site inspection	D	C
Sample handling	D	C
Other activities (list): Remedial System O&M	D	C

Notes:
N/A = Not applicable

7.1 Routes to Exposure

Exposure to the site chemicals can occur from inhalation, eye contact, skin contact, and incidental ingestion of contaminated water.

Route of Exposure	First Aid to be Rendered
Inhalation:	• Remove person from exposure. • Begin rescue breathing if breathing has stopped and CPR if heart action has stopped. • Transfer promptly to a medical facility. Medical observation is recommended for 24 to 48 hours after breathing overexposure, as pulmonary edema may be delayed.
Eye Contact:	• Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. • Consult a physician if pain, redness, or irritation persists.
Skin Contact:	• Remove contaminated clothing. • Wash contaminated skin with soap and water. • Consult a physician if redness or irritation persists.
Ingestion:	• Get immediate medical attention. • Give victim water to dilute. • If the victim is unconscious, do nothing except keep victim quiet and warm.

7.2 Personnel Decontamination Procedure

To minimize the distribution of contaminants outside the exclusion zone or cross-contamination of samples, the following procedures will be used to decontaminate sampling equipment:

- Any non-dedicated disposable sampling equipment will be washed with a non-phosphatic soap and water and rinsed with distilled water then double rinsed with DI water.

To minimize the distribution of contaminants outside the exclusion zone and personal exposure to chemicals, vehicles will not be allowed inside the exclusion zone. If vehicles are required in the

exclusion zone (e.g., drill rigs), the following procedures will be used to prevent contamination or decontaminate the vehicles:

- Excavation equipment and other non-dedicated equipment used in the excavation/exclusion zone will be decontaminated using pressure washing. All wash water will be contained, profiled, and properly disposed of.

To minimize or prevent personal exposure to hazardous materials, all personnel working in the exclusion zone and contamination reduction zones will comply with the following decontamination procedures:

- Wash boots, remove gloves, wash hands, and shower as soon as possible after leaving site. Dispose of contaminated protective clothing in appropriate on-site containers.

Decontamination equipment required on site will include the following:

- Distilled water with soap to clean field equipment. Soap and water for personal use. Spray bottle to rinse off water-level probe, meters, and equipment.

Decontamination wastewater and contaminated materials will be disposed of in the following manner:

- All wash water will be contained, profiled, and properly disposed of.

The following personal hygiene practices will be used:

- Long hair will be secured away from the face so that it does not interfere with any activities.
- All personnel leaving potentially contaminated areas will wash their hands and face prior to entering any clean areas or eating areas.
- Personnel leaving potentially contaminated areas will shower (including washing hair) and change to clean clothing as soon as possible after leaving the site.
- No person will eat, drink, or chew gum or chew/smoke tobacco in potentially contaminated areas. Drink containers and drinking of replacement fluids for heat stress control will be permitted only in areas that are free from contamination.

8.0 SPILL CONTAINMENT

Provisions must be made for spill containment at any site where bulk liquids will be handled. If the proposed fieldwork includes the handling of bulk liquids, oil, and/or chemicals (other than water); the following provisions for the site will be enforced.

- Eliminate all ignition sources.
- Ground all electrical equipment.

- Stop leak if it can be done without risk.
- Do not touch or walk through spilled material.
- Prevent entry to waterways, manholes or sewer drains, basements or confined spaces.
- Isolate are until vapors are dispersed.
- Absorb or covers with dry earth, vermiculite, or other non-combustible material.

The sampling vehicle will be equipped with an oil sorbent boom, sorbent pads, and bagged vermiculite. If a spill cannot be contained with these materials, and/or the safety of persons responding to the spill cannot be adequately addressed, the site owner will be notified and 911 will be called.

9.0 TRAINING

9.1 HAZWOPER Training

All personnel working or present in the Exclusion Zone requiring chemical protective PPE must have completed hazardous waste operations (HAZWOPER) training as required by OSHA standard 29 CFR §1910.120. Required training includes:

- 40-hours of initial training and 3 days of supervised field experience applicable to the site
- 8 additional hours of training for managers/supervisors
- 8-hours of an annual refresher

Personnel working in the areas of known contamination will receive training for the on-site contaminants, exposure, and decontamination procedures.

9.2 Medical Monitoring

OSHA requires medical monitoring for personnel potentially exposed to chemical hazards in concentrations in excess of the PEL for more than 30 days per year. Also for personnel who must use respiratory protection for more than 30 days per year. HydroCon requires medical monitoring for all employees potentially exposed to chemical hazards. All HydroCon personnel working at this site will be or are currently enrolled in a medical monitoring program.

10.0 EMERGENCY INFORMATION

Local Resources	Name	Telephone	Notified Prior to Work (Yes/No)?
Fire:	Hood River Fire Dept.	911	No
Police:	Hood River Police Dept.	911	No

Ambulance:		911	No
Hospital:	Providence Hood River Memorial Hospital	911	No
Site phone:			

Directions to Hospital: **See attached map and driving directions**

11.0 DOCUMENTATION

	Attached	In File	Not Applicable
HydroCon site safety acknowledgment forms	X		
OSHA or equivalent state poster			X
Site safety meeting minutes	X		
HydroCon heat stress monitoring form		X	
HydroCon confined space entry permit			X
HydroCon confined space entry checklist			X
HydroCon air monitoring record	X		
Site map	X		
Work plan	X		
Material safety data sheets		X	
Hospital route	X		
Health and safety training records		X	
Heat stress standard operating procedure		X	
Confined space entry information			X
Equipment standard operating procedures		X	
Other:			X

ATTACHMENTS

ATTACHMENT 1
ADDITIONAL CHEMICAL HAZARD INFORMATION

COMPOUND	EXPOSURE LIMITS	ROUTE OF EXPOSURE	HEALTH EFFECTS
Asbestos	0.1 fiber/cm^3 0.2 1 fiber/cm^3 (30' excursion)	Inhalation, ingestion, skin, eye contact	Acute: eye irritation, possible skin or lung irritation Chronic: lung cancer, mesothelioma, asbestosis, other pleural diseases
Benzene	DOSH PEL: 1ppm TWA 5ppm STEL AL: 0.5 ppm TWA NIOSH REL: 0.1 ppm TWA 1ppm STEL IDLH: 500 ppm FP: 12°F LEL: 1.2%	Inhalation, ingestion, skin absorption, eye contact	Irritation of eyes, skin, nose, respiratory system; dizziness; headache; nausea (carcinogen)
Ethylbenzene	DOSH PEL: 100 ppm TWA 125 ppm STEL NIOSH REL: 50 ppm TWA 100 ppm STEL IDLH: 700 ppm FP: 55°F LEL: 0.8%	Inhalation, ingestion, skin or eye contact	Irritation of eyes, skin nose, respiratory system; dizziness; headache; drowsiness; unsteady gait; defatting; inflammation of skin; possible liver injury; reproductive effects
Lead	OSHA PEL: 0.050 mg/m^3 TWA NIOSH REL: 0.050 mg/m^3 TWA	Inhalation, ingestion, skin or eye contact	Lassitude, insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation to eyes; hypertension
Chromium	0.5 mg/m^3	Inhalation, ingestion, skin, eye contact	Acute: eye irritation, possible respiratory irritation Chronic: Skin sensitization dermatitis
Cadmium	0.005 mg/m^3	Inhalation, ingestion	Acute: lung irritation, cough, headache; ingestion – nausea, vomiting, diarrhea Chronic: respiratory irritation, kidney damage, prostate damage, blood effects, potential prostatic & lung cancer
Naphthalene	DOSH PEL: 10 ppm TWA 15 ppm STEL NIOSH REL: 10 ppm TWA 15 ppm STEL IDLH: 250 ppm LEL: 0.9%	Inhalation, ingestion, skin absorption, eye contact	Eye irritation, headache, confusion, excitement, malaise, nausea, vomiting, abdominal pain, irritable bladder, profuse sweating, jaundice, blood in urine, renal shutdown, inflammation of skin

COMPOUND	EXPOSURE LIMITS	ROUTE OF EXPOSURE	HEALTH EFFECTS
Silica	NIOSH REL: 0.05 mg/m^3 TWA	Inhalation, skin contact, eye contact	Cough, dyspnea (breathing difficulty), wheezing, decreased pulmonary function, progressive respiratory symptoms (silicosis), eye irritation, potential occupational carcinogen
Toluene	OSHA PEL: 200 ppm TWA 300 ppm C 500 ppm 10 min. max. peak NIOSH REL: 100 ppm TWA	Inhalation, skin absorption, ingestion, skin or eye contact	Eye irritation, nose irritation; lassitude, confusion, euphoria, dizziness, headache; dilated pupils, lacrimation; anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage
Trichloroethylene	100 ppm 200 ppm (C) 300 ppm (MP)	Inhalation, ingestion, skin or eye contact, skin absorption	Acute: irritation to eyes and skin, nausea, vomiting, dizziness, headache, drowsiness, arrhythmia Chronic: Live and kidney damage – potential carcinogen
TPH as Gasoline	DOSH PEL: 300 ppm TWA 500 ppm STEL FP: -45°F LEL: 1.4%	Inhalation, ingestion, skin absorption, skin or eye contact	Irritation of eyes, skin, and mucous membranes; inflammation of skin and lungs; headache; weakness; exhaustion; blurred vision; dizziness, slurred speech; confusion; convulsions; possible liver and kidney damage; potential occupational carcinogen
TPH as Diesel (petroleum distillates as a surrogate)	DOSH PEL: 100 ppm TWA 150 ppm STEL OSHA PEL: 500 ppm TWA NIOSH REL: 86 ppm TWA 444 ppm STEL IDLH: 1,100 ppm FP: -40 to -86°F LEL: 1.1%	Inhalation, ingestion, skin or eye contact	Irritation of eyes, nose, throat; dizziness; drowsiness; headache; nausea; dry cracked skin; inflammation of lungs
PAHs	0.1 mg/m^3 (total coal tar pitch volatiles)	Inhalation, skin or eye contact	Acute: eye, nose and lung irritant, possible nausea, dermatitis, bronchitis Chronic: respiratory, bladder, kidneys, skin, carcinogen
PCBs	0.001 mg/m^3	Inhalation, ingestion, skin or eye contact, skin absorption	Acute: eye irritation, headache, numbness Chronic: chloracne, liver damage, reproductive effects
Xylenes	DOSH PEL: 100 ppm TWA 150 ppm STEL NIOSH REL: 100 ppm TWA 150 ppm STEL	Inhalation, ingestion, skin absorption, skin or eye contact	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal cell debris; anorexia, nausea, vomiting, abdominal

COMPOUND	EXPOSURE LIMITS	ROUTE OF EXPOSURE	HEALTH EFFECTS
	IDLH: 900 ppm FP: 81-90°F LEL: 0.9-1.1%		pain; inflammation of skin

LEGEND:

µg/m^3:	Micrograms per cubic meter of air
mg/m^3:	Milligrams per cubic meter of air
AL:	Occupational Safety and Health Administration (OSHA) 8-hour TWA Action Level
C:	Ceiling Limit
FP:	Freezing point
IDLH:	Immediately Dangerous to Life and Health
NIOSH:	National Institutes for Occupational Safety and Health
PEL:	OSHA 8-hour TWA Permissible Exposure Limit
REL:	Recommended exposure level
STEL:	Short-term exposure limit
TLV-TWA:	American Conference of Governmental Industrial Hygienists (ACGIH) 8-hour TWA Threshold Limit Value (TLV)
TLV-STEL:	ACGIH 15-minute Short-Term Exposure Limit (STEL)
TWA:	Time Weighted Average

ATTACHMENT 2
SAFETY ACKNOWLEDGEMENT AND SAFETY MEETING MINUTES FORMS

SITE SAFETY PLAN ACKNOWLEDGMENT

I have reviewed this Site-Specific Health and Safety Plan prepared by HydroCon Environmental, LLC (HydroCon). I understand the purpose of the plan and I consent to adhere to the policies, procedures, and guidelines included herein while an employee of HydroCon or its subcontractors.

Name (Printed)	*Signature*	*Company*

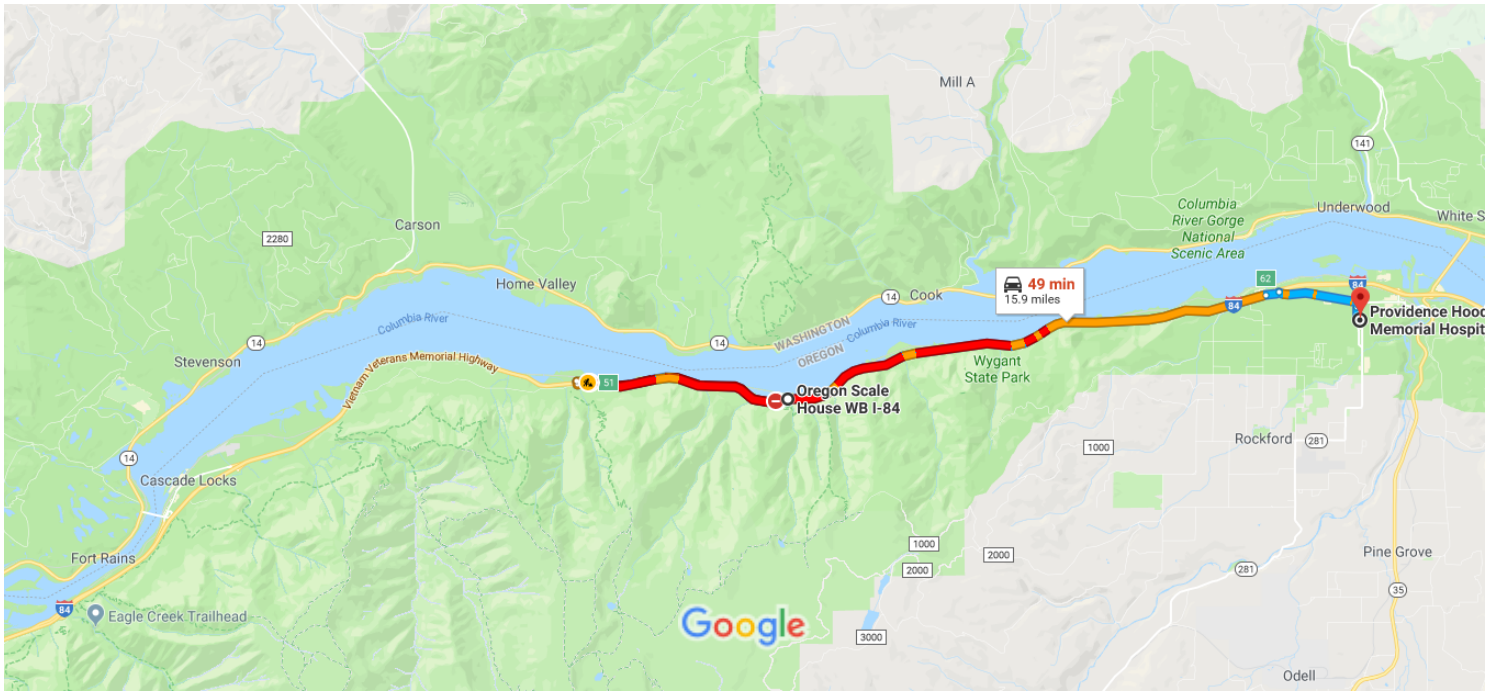
ATTACHMENT 3
AIR MONITORING FORMS

ATTACHMENT 4
ROUTE AND MAP TO HOSPITAL

Google Maps

Oregon Scale House WB I-84 to Providence Hood River Memorial Hospital: Emergency Room

Drive 15.9 miles, 49 min



Map data ©2019 Google 1 mi

Oregon Scale House WB I-84

Cascade Locks, OR 97014

1. Head west toward I-84 W

1 min (0.2 mi)

Follow I-84 W to US-30 E in Hood River. Take exit 62 from I-84 E/US-30 E

14 min (14.2 mi)

2. Merge onto I-84 W
   May be closed at certain times or days

3.0 mi

3. Take exit 51 toward Wyeth

0.2 mi

4. Turn left

243 ft

5. Turn left to merge onto I-84 E/US-30 E

10.9 mi

6. Take exit 62 for US-30/Westcliff Drive toward W Hood River

0.2 mi

Continue on US-30 E to your destination

5 min (1.5 mi)

7. Turn right onto US-30 E

1.2 mi

8. Turn right onto 13th St

397 ft

9. Keep left to stay on 13th St

0.2 mi

10. Turn left

Destination will be on the right

203 ft

Providence Hood River Memorial Hospital: Emergency Room

810 12th St, Hood River, OR 97031

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.