Advanced Remediation Technologies, Inc
690 NW 1st AVENUE, SUITE 104
CANBY, OREGON 97013 503-266-2122

July 20, 2015

Mr. Kenneth Thiessen, CEG
Oregon Department of Environmental Quality
2020 Fourth Street
Suite 400
Portland, Oregon 97201

RE: Response to Review Letter of Summary Report

Dear Ken:

On behalf of the Portland Fuel Facility Corporation (PFFC), Advanced Remediation Technologies, (ART) has prepared this response letter to your review of the Summary Report of ASIG's Bulk Fuel Facility, ECSI No. 1832/5848; Taxiway F, ECSI No. 2240/5849; South Cargo Reload Rack, ESCI No. 5524; and Taxiway T, ESCI No. 5846.

Presented below are responses, clarification, and corrections to DEQ's comments for the Summary Report of ASIG's Group Bulk Fuel Storage Facility Portland International Airport, dated March 13, 2015. The comments, clarification, and suggestions follow the specific comments in italics from the Letter.

DEQ Conceptual Site Model for Bulk Fuel Facility

1. *Problem:*

DEQ notes that five Jet-A fuel releases contribute to soil and groundwater contamination at or near the Bulk Fuel Facility. These releases are associated with three USTs, one 2000 gallon surface release, and an associated buried pipeline release. The locality of facility for the site resulting from these releases has not been determined.
The Summary Report does not provide a comprehensive environmental site history of fuel releases, spill responses, site investigations, cleanup actions, product recovery, DEQ involvement, environmental media affected, and residual product estimates remaining at the site resulting from pipeline leaks, UST releases, and surface releases.
DEQ Position:
The direction of groundwater gradient and flow at the Bulk Fuel Facility is to the west. Previous site investigation work did not include this area. A deep drainage ditch, also to the west, dewaters the near-surface aquifer and appears to control local groundwater gradient. No information is available on the effects of Bulk Fuel Facility releases to soil or groundwater west of the facility or to surface water, sediment, or aquatic

receptors.
Decision Point:
Determine the nature and extent of the cumulative jet fuel contaminant plume at the Bulk Fuel Facility, with particular focus on the down-gradient westerly direction. Screen subsurface soil and groundwater analytical data against DEQ RBCs for site/utility/utility workers and ecological (aquatic) risk-based screening values. Per DEQ guidance, delineation is complete when the contaminant values are equal to or below applicable RBCs or ecological screening values. Completion of delineation work will address one of DEQ's 2002 concerns:

The delineation of the releases at the PFFC Bulk Fuel Storage facility have been defined through historical investigations (Riedel 1989, EMCON 1992, PNE 1995, and ART 2014). Additionally, numerous groundwater monitoring events data reported from 1992 through 2014 indicate that groundwater impacts are localized to the area near the former UST. Groundwater gradient changes from a southwesterly to a northwesterly direction depending on time of the year. Data also suggest that the plume associated with the UST has stabilized and decreased over the monitoring period such that no further action status should be issued. DEQ was provided these reports with data on delineation on the CD.

2. *Problem:*

Separate phase hydrocarbons are still present on groundwater at-the site (i.e. MW-2 Dec. 2012). Other wells recorded petroleum sheens during the same sampling event.
DEQ Position:
The presence of separate phase hydrocarbons supersedes use of DEQ RBCs to determine risk of dissolved contaminants at a site. Site monitoring wells may not be constructed with slots high enough to allow entry and measurement of separate phase hydrocarbons during seasonal high water table conditions. Thus, well observations may not be representative of separate phase hydrocarbons present at the site. Well construction details are not included with the Summary Report. As well, subsurface soil samples used to characterize site conditions may have been collected at depths too deep to represent worst-case capillary fringe conditions.
Decision Point:
DEQ requires that efforts be made to remove separate phase hydrocarbons and source soils prior to evaluation of risk and consideration of risk-based site closure.

Groundwater monitoring events reported from 1992 through 2014 indicate that no measurable light non-aqueous phase liquids (LNAPL) have been observed or

measured within the wells. Even initial measurement and observation indicated no LNAPL was present, only a sheen was report after years of observations which may be associated with stagnation of these associated wells. Analytical lab results do not support LNAPL presence.

3. Problem:

The site catch basins, storm sewer system, possible French drains, outfalls and subsurface utilities may facilitate transport of leachate from residual soil contaminants and contaminated groundwater to points off-site or to the deep drainage ditch west of the Bulk Fuel Facility.

DEO Position:

The workplan prepared for the late 2012 site investigation work included plans to evaluate buried utilities but this work was not reported in the Summary Report. Facilitated transport of site contaminants to other media and locations can complicate site investigations and eventual site closure.

Decision Point:

Identification of catch basins, sewers dewatering infrastructure, outfalls and buried utilities are necessary to complete site investigation work. Evaluate facilitated pathways and provide representative data screened against SLVs to determine next steps. A complete evaluation of possible facilitated contamination pathways is a key to determining eligibility of the site for a no further action determination.

According to existing civil drawings for the facility there are no catch basins within the area of concern. There are secondary containment drains that discharge to an oil/water separator that discharges to a drainage ditch to the west of the facility. The secondary containment drains have normally closed valves for releasing stormwater within the secondary containment. The containments are observed for leak and/or releases from the bulk fuel storage tanks before the valves can be opened.

There is a sanitary sewer that is connected to a restroom located within the fuel quality control lab that may be located at depth. Monitoring wells are located within close proximity of the sewer and do not indicate plume migration. There are no other utilities within the former UST area that would be at a depth that could act as a conduit. The main bulk fuel supply pipeline is operated by Kinder Morgan (formerly Chevron) and has also been investigated for releases (Riedel. 1989). It appears that the pipeline enters the subsurface at a point outside of the area of concern for the UST to act as a conduit.

General comments:

The Summary Report recommends that DEQ provide a No Further Action

determination based on data submitted in the Summary Report. However, the summary document does not provide adequate information for DEQ to support this recommendation. DEQ has provided guidance to achieve generic as well as site-specific closure determinations at this link: http://www.deg.state.or.us/lq/pubs/docs/RBDMGuidance.pdf. Information on use of the Generic Remedy for Simple Risk-Based Cleanups can be found in Section 4, of the document.

The Port of Portland has developed a comprehensive document entitled Land and Beneficial Water Use Survey Update, Portland International Airport, Portland, Oregon (APEX 2012). This document includes the area of ASIG Bulk Fuel Storage Facility. This document should be used to prepare a site-specific Land and Beneficial Water Use Survey for the project site in a revised Summary Report. This document was used by DEQ in preparation of these comments.

General Hydrogeology Comments:
From the Land and Beneficial Water Use Survey (p. 23), typical groundwater gradient within the surficial fill material at Portland International Airport (PDX) ranges from 0.001to 0.006. The groundwater gradient calculated for the Bulk Fuel Storage Facility by DEQ using Summary Report Figure 3 data for 12/27/2012 is 0.015. This gradient of 0.015 is 2.5 to 15 times greater than what is expected at PDX. The groundwater flow direction is generally northerly or southerly at PDX while it flows to the west at the Bulk Fuel Storage Facility. This comparison appears to indicate that groundwater flow at the Bulk Fuel Storage Facility is strongly influenced by the deep drainage ditch 200 feet west of the site (see attached aerial photo and APEX 2012, Fig. 2). This drainage ditch appears to control unconfined aquifer groundwater flow in the project area. It is also possible that French drains or other dewatering controls may contribute to the westward groundwater gradient in this area. Include this ditch and any dewatering controls and other utilities on revised site figures.

If the ditch controls or strongly influences the groundwater gradient at the PFFC Bulk Fuel Facility, then the gradient should be exactly opposite that which has been measured in the field as indicated by data reported. The historical groundwater gradient measurements have indicated a localized mound in the former excavation of the UST, which is not uncommon. This is most likely the result of backfilling with 3-inch minus and ¾ minus rock which is more transmissive than the sandy silt encountered at the site and what surrounds the former UST excavation.

Specific Comments:

Fuel Releases:

- *Determine if the pre-1989 Jet-A UST release is the same release as file number DEQ LUST #26-89-0012 for two USTs at the site.*

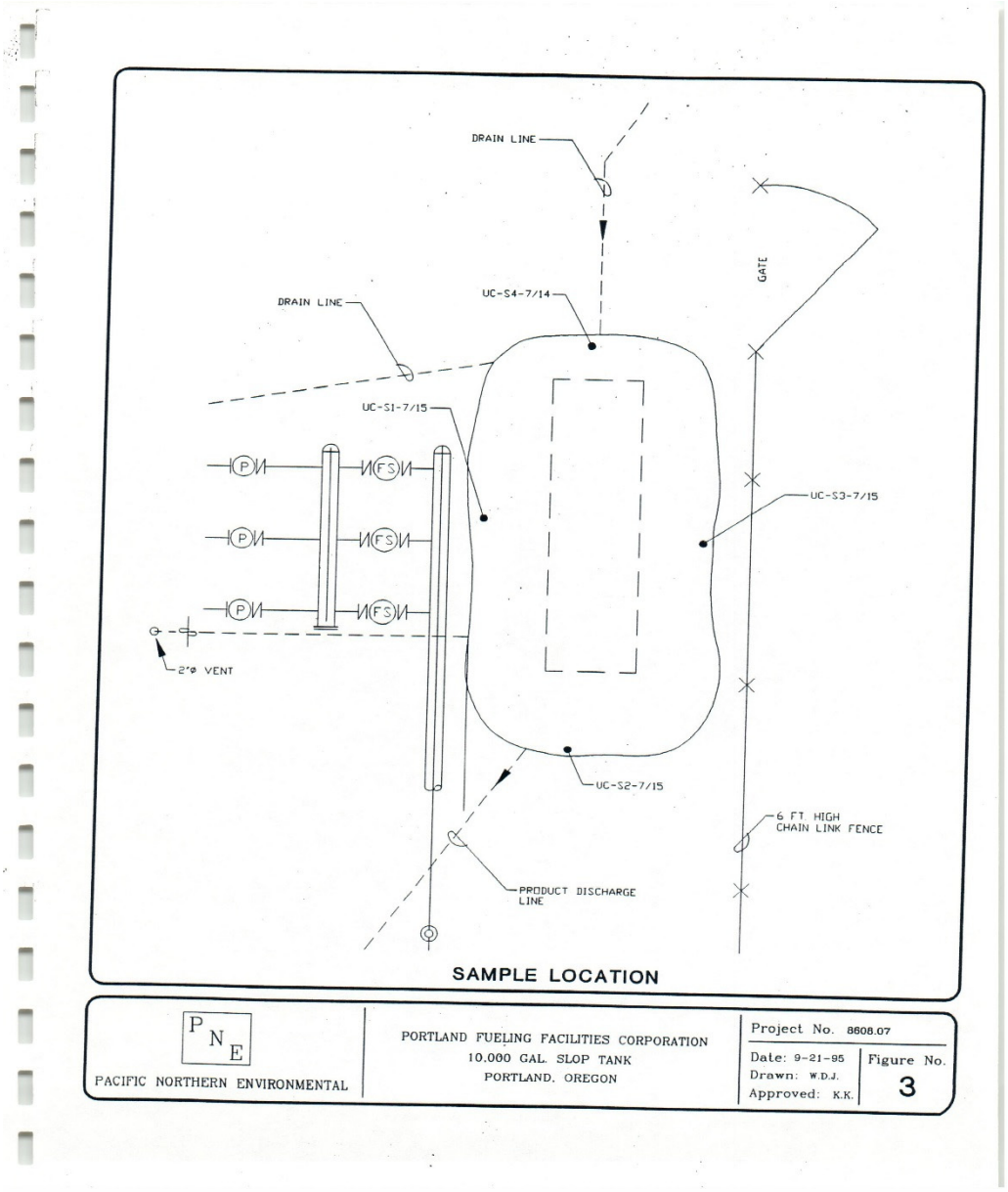
It is our understanding that the 1989 investigation was associated with the pipeline that supplies the Bulk Fuel Facility. Only one UST has ever been present at the Bulk Fuel Storage Facility which was associated with the 1995 decommissioning.

- *Indicate on a figure where the pre-1989 release occurred, the UST locations, the nature and extent of the release, and remediation performed.*

This was associated with a pipeline, which is still in service. There was no indication of nature of the release nor extent as reported by Riedel.

- *Show the location of the UST decommissioned in 1995 with associated remedial extent on a site map.*

Inserted is a figure from the PNE report showing the UST location, extent of removal, and sample locations.



- *Provide data from observations of separate phase hydrocarbons on groundwater.*

No measureable light non-aqueous phase liquids (LNAPL) have been recorded at the site in the existing monitoring wells. The historical and most recent reports indicating this data have been provided to DEQ as mentioned above. On occasion field sampling data sheets have reported a sheen, but no measureable LNAPL has been recorded at the site, even during initial monitoring.

In 1992, a 2000-gallonjet fuel surface release occurred between the two eastern ASTs. In response, EMCON installed five borings positioned in a

manner that assumes the site groundwater flow direction to be northerly. No monitoring wells are located down gradient (west) of the 1992 surface spill location. Provide a summary of product recovery actions and site investigation activities performed in response to this surface fuel release and next steps required to evaluate its downgradient effects.

<u>Page 3.</u> From the Summary Report; in 1995 Pacific Northern Environmental decommissioned one 10,000 gallon slop-fuel UST. Indicate if this is the UST mapped at the north end of the facility on Figure 3 and indicate the spatial relationship between this UST decommissioning in 1995 and the UST investigation performed by Riedel in 1989.

See comments above regarding investigations and location of the UST.

In 1995, Pacific Northern Environmental removed 196 tons of petroleum-contaminated soil to a depth of at least 15 feet below ground surface (bgs). Excavation confirmation sidewall samples were collected from between 10 and 15 feet bgs with a maximum concentration of 31,000 mg/kg as jet fuel. The depth to groundwater in nearby MW-2 was 5.72 feet BGS in November 1995. DEQ does not agree that confirmation soil samples collected at between 5 and 10 below: the water table provide representative information on residual soil contamination associated with this excavation. From 2012 Geoprobe data collected adjacent to this UST excavation, GP-2A soil samples collected at 4.5-5.0 feet and 9.0-9.5 feet produced diesel range organics (DRO) of 5400 and 24.0 PPM, respectively. DEQ considers soil associated with this UST location a likely residual contaminant source to groundwater.

ART agrees that there is residual soil contamination within the sidewall of the UST excavation that most likely contributed to groundwater concentrations. Review of the PNE reports indicate that excavation was stopped due to instability of existing structures. Prior to backfilling the excavation PNE added microbial solutions used for degradation of petroleum hydrocarbons. The PNE report also indicated that the majority of the excavation was filled with 3-inch minus rock and capped off with ¾ minus gravel and compacted. The former excavation area is an area of groundwater mounding as indicated in historical groundwater monitoring reports. As stated the risk for this site is low and a no further action status is appropriate.

<u>Page 4</u>
The first bullet states that December 2012 fieldwork included purging and sampling of 6 of 9 site monitoring wells. Monitoring wells 5, 7, and 8 were reportedly not sampled. In contrast the first full paragraph on page 4 text states that all nine wells were purged and sampled which is

corroborated by the field sampling data sheets in Appendix C. Please make corrections.

Corrected as noted.

Page 4 Site Hydrogeology Section Comments
From Appendix C field notes, the depth to groundwater on 12/27/2012 ranged from 2.26 to 5.94 feet below top of casing. Please change the second sentence of the first paragraph of this section to reflect these depth-to-water findings. As well the last sentence of this paragraph must be updated to reflect relative groundwater elevations based on these correct depth to water (DTW) data.

Corrected as noted.

Referring to Figure 3, it appears that the six 1989 site monitoring wells were positioned assuming that groundwater flow was either to the north or to the south. From Chevron 1990 and ART 2012 analysis of groundwater elevation data, groundwater flow direction is to the west. DEQ checked the groundwater gradient calculations using data from Table 3 and field notes and agrees with the westerly flow direction. However, DEQ found that the groundwater gradient is 0.015, not 0.01 as stated in the text. Please make necessary corrections.

DEQ requests that two corrections be made to the last paragraph of page 4. In the first sentence change "Table l" to "Table 3". Change the fourth sentence to read: "Groundwater trends to the west at a gradient of 0.015."

Corrected as noted.

Page 5 Results
Rewrite the first sentience to read: "Analytical results for the ·2012 slop tank subsurface investigation are as follows:"

Corrected as noted.

Page 5 Five bulleted items. DEQ finds that risk screening using 2012 soil boring data exceeds RBC s for the direct contact construction worker pathway for diesel-range organics and benzo(a)pyrene. As well, DEQ finds that risk is exceeded for the occupational worker direct contact pathway RBC for diesel-range organics, naphthalene, benzo(b)fluoranthene, benzo(a)anthracene, benzo(a)pyrene, and ideno(l,2,3-cd)pyrene. Update the revised summary Report to provide

corrected risk screening results.

DRO is the only soil data exceeding the RBC. Please note that soil results for PAHs are in µg/Kg whereas the RBC's are in mg/Kg. None of the PAHs exceed RBC's.

Conclusions and Recommendations
Indicate that DRO as well as benzo(a)pyrene exceed the RBC for a construction worker receptor. Include in the conclusions statement RBC exceedances for direct contact to occupational site workers from various soil analytes.

See previous comment above.

Table 1.
Indicate the soil sampling date on a revised Table. Where possible, indicate the detection limits used to determine the ND status of an analyte.

Indicate on a revised table where soil analytical results exceed DEQ Risk-Based Concentrations for ingestion/contact/inhalation to construction and excavation workers as well as direct contact for occupational site workers.

See previous comment above.

Tables 2 and 3.
Indicate, where appropriate, if groundwater samples were not collected due to the presence of separate phase hydrocarbons in the monitoring wells and product thicknesses measured. Provide references as footnotes to laboratory codes included within the tables.

Appendix C.
From field data sheets, of the nine wells monitored and sampled in December 2012, only two (MW-7 and MW-9) had depth to water measurements greater than 5 feet below ground surface (BGS). Conventional monitoring well construction typically includes well slots starting below five feet. If this is the case at this site, petroleum product may not be observable on groundwater closer to the surface than five feet. Please evaluate monitoring well as-built diagrams for the site to determine if this is the case and include these as-built diagrams with the revised Summary Report.

Inserted are figures from the Reidel and EMCON reports, respectively, showing the monitoring well construction. Based on these logs of the monitoring wells, the wells were constructed with the top of screen approximately 3-feet below ground surface

and extending to the completed depth. If LNAPL was present at the site it would have been easily measured or evident and observed during monitoring events. The field sampling data sheets do not indicate the present of LNAPL.

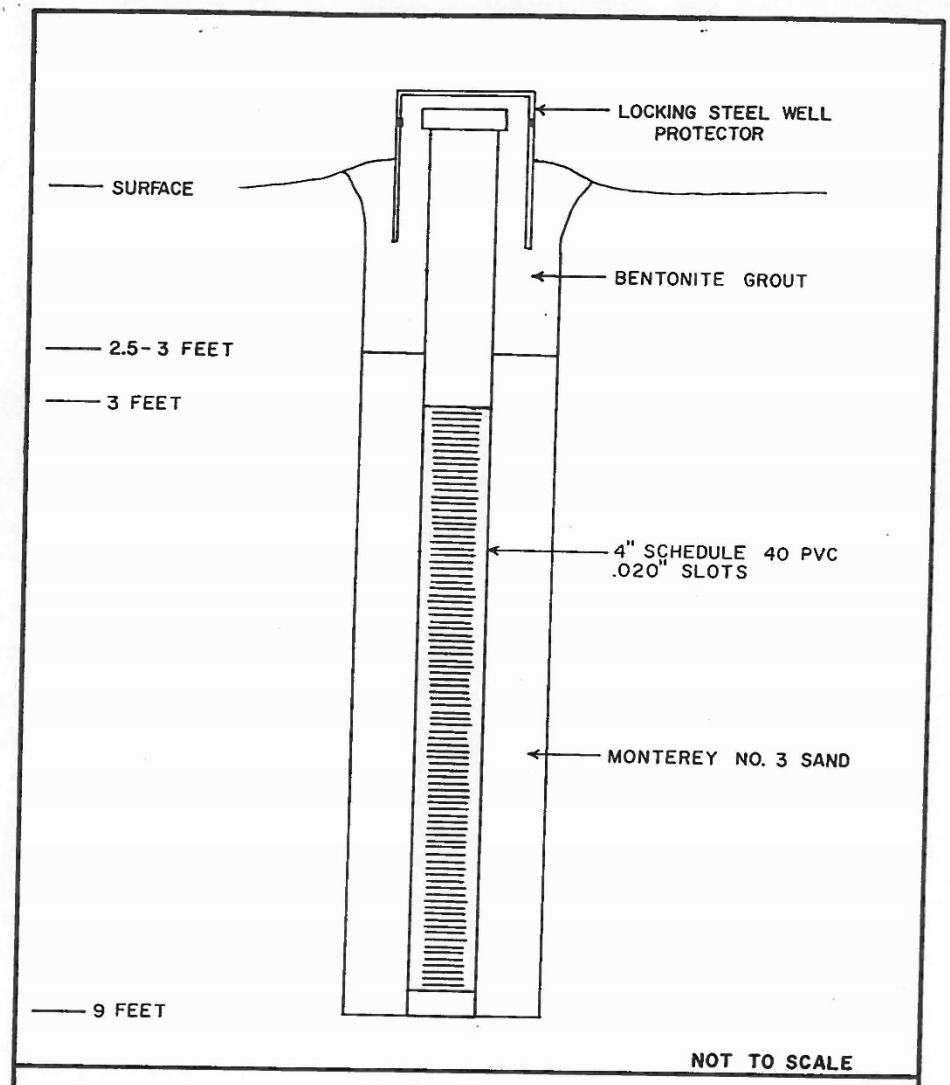


FIGURE 2
TYPICAL MONITORING WELL CONSTRUCTION
PORTLAND INTERNATIONAL AIRPORT
JET FUEL TERMINAL

6

LOG OF EXPLORATORY BORING

PROJECT NAME	CHEVRON FUEL TERMINAL	BORING NO.	B-3/MW-7
LOCATION	Portland, Oregon	PAGE	1 OF 1
DRILLED BY	GeoTech Explorations	REFERENCE ELEV.	+
DRILL METHOD	Hollow Stem Auger	TOTAL DEPTH	8.00'
LOGGED BY	Liz Hearn	DATE COMPLETED	2/19/92

SAMPLE NUMBER	FID (ppm) HEADSPACE	BLOW COUNTS (N COMP)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
								0-3.0 feet: SILTY SAND, grayish brown (2.5Y, 5/2), 10-30% silt and clay, fine grained, trace black organic matter, very dense, damp to moist.
B-3-2.5-3	<1	7-20-21 (41)						
B-3-4-4.5	<1	6-19-20 (39)	▽ 4.5	5				**3.0-5.5 feet: SAND,** olive gray (5Y, 4/2), trace clay and silt, fine to medium subangular to subrounded sand, trace fine, subangular gravel, dense, moist to very moist. @ 4.5 feet: wet. @ 5.0 feet: strong brown (7.5YR, 5/6).
B-3-6-6.5	90	3-4-5 (9)						**5.5-8.0 feet: SILT,** olive gray (5Y, 4/2) locally with strong brown (7.5YR, 5/6) mottling, firm, trace wood and black organic matter, moist to very moist, petroleum odor.
B-3-7.5-8	NR	NR						Bottom of boring at 8.0 feet below ground surface.
				10				
				15				
				20				

REMARKS

1) Well constructed as shown using 4-inch diameter PVC casing with 0.020-inch machine-slotted screen. 2)Protected at surface with steel casing and 3 steel posts mounted in concrete.

EMCON Northwest, Inc.

Y1801.01.Y1801.VC\1.2-27-92

LOG OF EXPLORATORY BORING

PROJECT NAME	CHEVRON FUEL TERMINAL	BORING NO.	B-4/MW-8
LOCATION	Portland, Oregon	PAGE	1 OF 1
DRILLED BY	GeoTech Explorations	REFERENCE ELEV.	+
DRILL METHOD	Hollow Stem Auger	TOTAL DEPTH	8.00'
LOGGED BY	Liz Hearn	DATE COMPLETED	2/19/92

SAMPLE NUMBER	FID (ppm) HEADSPACE	BLOW COUNTS (N COMP)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
								0-1.0-feet: SILTY SAND, dark grayish brown (2.5Y, 4/2), 10-20% silt and clay, fine grained, trace medium to coarse sand, trace fine to coarse subangular to subrounded gravel, medium dense, damp to moist.
B-4-2-3	0	9-10-13 (23)						**1.0-5.5-feet: SAND,** olive gray (5Y, 4/2).
B-4-4-4.5	0	8-8-14 (22)	▽ 4.5	5				@ 4.5 feet: wet.
B-4-5-5.5	0	NR						**5.4-8.0-feet: SILT,** olive gray (5Y, 4/2), trace wood and organic matter, hard to soft, moist to wet. @ 6.5-8.0 feet: petroleum odor.
B-4-7.5-8	500	2-2-3 (5)		10				Bottom of boring at 8.0 feet below ground surface.
				15				
				20				

REMARKS

1) Well constructed as shown using 4-inch diameter PVC casing with 0.020-inch machine-slotted screen. 2)Protected at surface with steel casing and 3 steel posts mounted in concrete.

EMCON Northwest, Inc.

Y1801.01.Y1801.VC\1.2-27-92

LOG OF EXPLORATORY BORING

PROJECT NAME	CHEVRON FUEL TERMINAL	BORING NO.	B-5/MW-9
LOCATION	Portland, Oregon	PAGE	1 OF 1
DRILLED BY	GeoTech Explorations	REFERENCE ELEV.	+
DRILL METHOD	Hollow Stem Auger	TOTAL DEPTH	8.00'
LOGGED BY	Liz Hearn	DATE COMPLETED	2/20/92

SAMPLE NUMBER	FID (ppm) HEADSPACE	BLOW COUNTS (N COMP)	LITHOLOGIC DESCRIPTION
			0-1.2-feet: SILTY SAND, dark grayish brown (10YR, 4/2), 20-30% silt and clay, fine grained, medium dense, moist.
B-5-2.5-3	0	8-18-19 (37)	1.2-6.0-feet: SAND, olive gray (5Y, 4/2), trace clay and silt, fine to medium grained, subangular to subrounded, trace coarse sand, trace fine gravel, dense, moist.
B-5-4-4.5	0	NR	@ 3.5 feet: very moist.
B-5-5.5-6	22	NR	@ 5.0 feet: wet.
			6.0-8.0-feet: SILT, olive gray (5Y/ 4/2), trace organic matter, soft to firm, moist to very moist, slight chemical odor.
B-5-7.5-8	300	NR	Bottom of boring at 8.0 feet below ground surface.

GROUND WATER LEVELS: ▽ 5

DEPTH IN FEET: 5, 10, 15, 20

WELL DETAILS / LITHO-LOGIC COLUMN

REMARKS

1)Boring converted to monitoring well as shown, using 4-inch diameter PVC casing with 0.020-inch machine-slotted screen.
2)Protected at surface with steel casing and 3 steel posts mounted in concrete.

EMCON Northwest, Inc.

Y1801.01.Y1801.VC\1.2-27-92

We appreciate the opportunity to assist you with this project. Please call if you have questions or if we can be of further assistance.

Sincerely,

Lance A. Downs PE, GE

Digitally signed by Lance A. Downs PE, GE
DN: cn=Lance A. Downs PE, GE, o=Advanced Remediaiton Technologies, ou, email=Advremtech@canby.com, c=US
Date: 2015.07.20 16:56:31 -07'00'

Lance Downs P.E., G.E.
Sr. Principal Engineer

Attach:

Corrected page 4 of Summary Report
Corrected page 5 of Summary Report
Figure of underground utilities at Bulk Fuel Storage Facility
Table 1 with MRLs

- Purged and sampled nine monitoring wells (MW-1 through MW-9). Purge and decontamination wash water was disposed by ASIG.
- Coordinated chemical analysis of groundwater samples for TPH concentrations by Northwest Method TPH-Dx, benzene, toluene, ethyl benzene, and total xylenes using USEPA Method 8260C and for polynuclear aromatic hydrocarbons by USEPA Method 8270 SIM.
- Evaluated the monitoring data and prepared this report.

On December 27, 2012 ART personnel gauged nine wells (MW-1 through MW-9) for depth-to-groundwater, depth-to-LNAPL (as appropriate), and thickness of LNAPL (as appropriate). ART personnel followed standard field methods for recording measurements, purging, and sample collection. Following depth-to-groundwater measurements, wells MW-1 through MW-9 were purged through a low-flow cell which enabled monitoring of groundwater water-quality indicator parameters (temperature, conductivity, pH, and dissolved oxygen). Once the groundwater parameters stabilized, ART personnel collect samples from the monitoring wells. Temperature, conductivity, and pH were measured during purging and recorded on field sampling data sheets (see Appendix C).

Samples were collected with disposable Teflon tubing and discharged into laboratory prepared sample containers, using a nonaerating low-flow pump. The groundwater samples were submitted, following standard chain-of-custody procedures to CAS, in Kelso, Washington. Copies of the laboratory reports, quality control data, and chain-of-custody records are found in Appendix B.

Chemical Analysis

Ten (10) groundwater samples included one (1) duplicate sample were submitted for analysis for diesel range organics (DRO) and residual range organics (RRO) by NWTPH-Dx, BTEX compounds by EPA Method 8260C and PAHs compounds by EPA Method 8270D-SIM. Table 2 and 3 shows a summary of groundwater monitoring results for BTEX, PAHs and TPH.

Site Hydrogeology

Data from vertical and horizontal control survey conducted by Compass Corporation were used to convert depth-to-groundwater measurements to groundwater elevations based on a relative site base datum. Depth to groundwater on December 27, 2012 ranged from 2.26 to 5.64 feet below the tops of well casings. Relative groundwater elevations ranged from 94.13 to 97.47 feet.

Table 3 shows a summary of groundwater monitoring results for elevation and BTEX. Table 2 shows a summary of groundwater monitoring results for PAH’s and TPH. Figure 3 shows groundwater contours and inferred gradient for December 27, 2012 elevation data. Groundwater tends to the west and north-northeast with a gradient of approximately 0.015. This data is consistent with groundwater flow directions reported by previous monitoring events.

Results

Analytical results for the 2012 slop tank subsurface investigation are as follows:

- Four soil samples were analyzed for NWTPH-Dx. Four samples had positive detection for DRO hydrocarbons compared the Jet-A standard. NWTPH-Dx indicated a range of 36 to 5,400 ppm for DRO hydrocarbons. One sample had a positive detection of RRO at 180 ppm. Results were well below generic diesel and generic mineral insulating oil Risk-Based Concentration (RBC) for construction worker and excavation worker soil ingestion, dermal contact and inhalation (*Risk-Based Decision Making for Remediation of Petroleum-Contaminated Sites*, DEQ, dated Sept. 22, 2003, revised June 2012)

- BTEX constituents were not detected at or above their respective method reporting limits in soil samples collected

- PAHs were detected in soil samples collected. Results were well below generic RBC for construction worker and excavation worker for soil ingestion, dermal contact and inhalation.

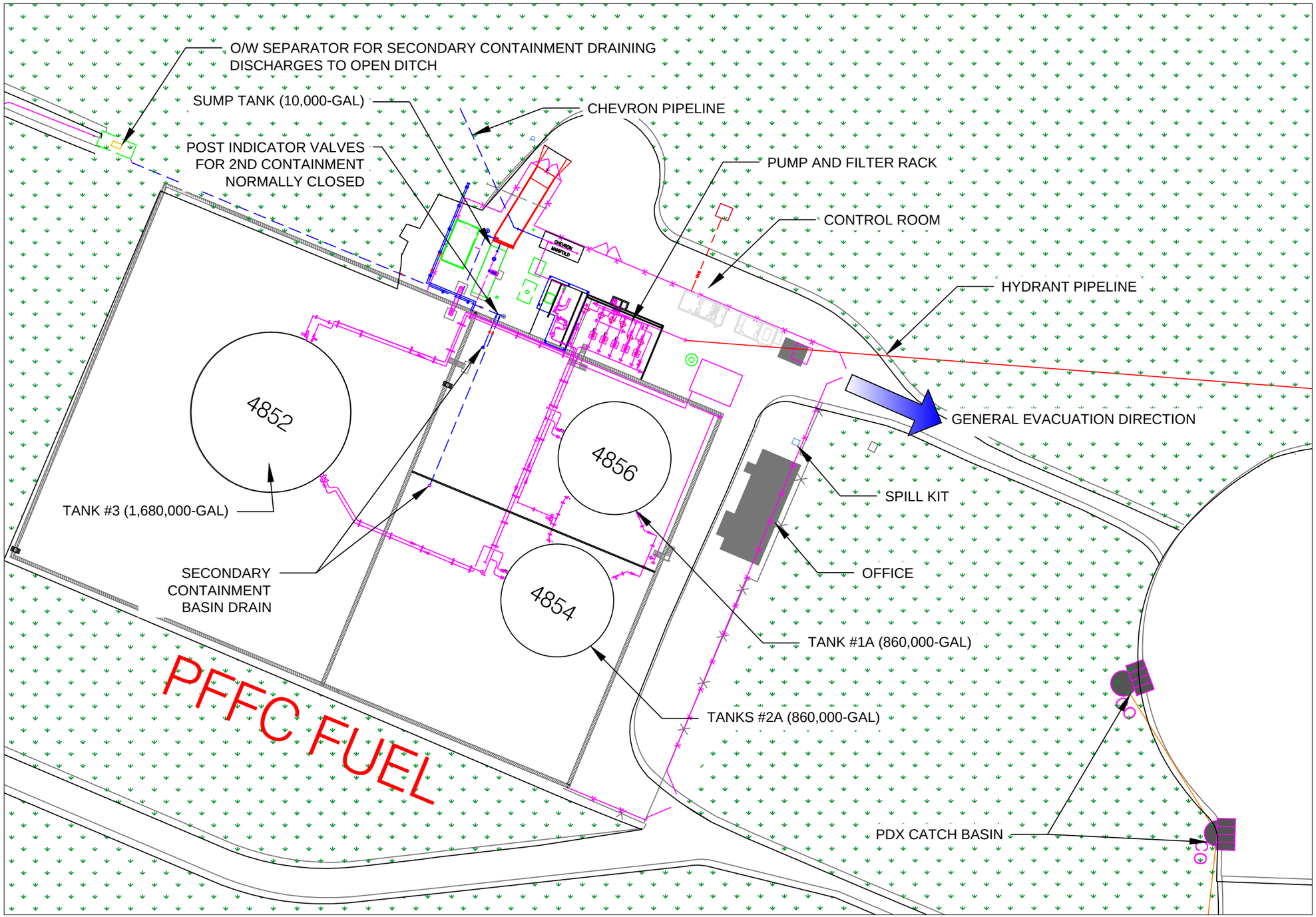
- BTEX constituents (primarily toluene) were detected in the groundwater samples collected from the monitoring wells during the most recent monitoring event. Results were well below generic RBC for groundwater in an excavation where construction worker and excavation worker have risk of exposure.

- PAHs constituents (primarily naphthalene) were detected in the groundwater samples collected during the most recent monitoring event. Results were well below generic RBC for groundwater in an excavation where construction worker and excavation worker have risk of exposure.

CONCLUSION AND RECOMMENDATIONS

Field readings and observations did indicate contamination to be localized near the former decommissioned UST. Concentrations of petroleum hydrocarbons in the DRO ranged from 36 to 5,400 ppm in soil. Detections were typically found at depths (5.0 to 9.5 feet bgs) immediately above first encountered groundwater.

Groundwater sample results indicate the presence of low concentrations of BTEX and PAHs constituents in groundwater, although levels are well below RBCs. DRO in soil was the only constituent to be at or exceed a RBC. The completed exposure path is for construction workers that would handle the soil as shown in the conceptual site model below.



REVISION INFORMATION

MILESTONE	DATE	REVIEWING AGENCY
ICP UPDATE	10/30/10	CLIENT

"PARTNERS IN SERVICE"

Advanced Remediation Technologies Co.
690 NW 1ST AVE. STE. 104, CANBY, OREGON 97013
PHONE: (503) 266-2122 fax: (503) 266-4724

AIRCRAFT SERVICE INTL GROUP
PORTLAND INTERNATIONAL AIRPORT
PORTLAND, OREGON

JET A TANK FARM, FACILITY PLAN, FIG 3-2A

DATE	10/30/10
DRAWN	LAD
DESIGN	LAD
CHECK	KAD
SCALE	1"=70'

SITE PLAN

SHEET 1 OF 1

Table 1
Soil Analytical Results
UST Decomissioning Investigation
Bulk Fuel Storage Facility

			Analytical Method																		
			NWTPH-DX		EPA Method 8260C (mg/Kg)				EPA Method 8270D SIM (ug/Kg)												
Sample Name	Date	Depth	DRO	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	Acenaphthene	Fluorene	Anthracene	Fluoranthene	Pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benz(a)anthracene	Chrysene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene
GP-1A-9.5	11/26/2012	9 -9.5'	36	ND	ND	ND	ND	ND	ND	ND	7.4	ND	14	15	12	ND	6.0	10	12	14	ND
GP-2A- 5.0	11/26/2012	4.5 -5'	5,400	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.2	9.4	8.7	ND	ND	6.8	7	12	ND
GP-2A-9.5	11/26/2012	9 -9.5'	240	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.3	8.8	6.1	ND	ND	ND	7.5	5.1	ND
GP-3A-9.5	11/26/2012	9 -9.5'	4,600	180	ND	ND	ND	ND	24	53	230	ND	19	27	ND	ND	7.4	8.0	12	12	ND
		MRL	25	120	0.068	0.068	0.068	0.068	5	5	5	5	5	5	5	5	5	5	5	5	5
			RBC Occupational (mg/Kg)																		
RBCss			14,000	36,000	34	77,000	140	25,000	23	61,000	41,000	310,000	29,000	21,000	2.7	27.0	2.7	250	0.27	3	0.27
RBCss (Const)			4,600	11,000	340	24,000	1,600	19,000	580	19,000	12,000	93,000	8,900	6,700	21	210	21	2,100	2.1	21	2.1
RBCss (Excav)			>Max	>Max	9,500	680,000	44,000	540,000	16,000	520,000	340,000	>Max	250,000	190,000	590	5,900	590	57,000	59	590	59
RBCso			>Max	>Max	50	>Csat	160	>Csat	99	>Max	>Max	>Max	>Max	-	>Csat	NV	NV	>Csat	NV	NV	NV
RBCsi			>Max	>Max	1.20	>Csat	12	>Csat	99	>Max	>Max	>Max	>Max	-	>Csat	NV	NV	>Csat	NV	NV	NV
RBCsw			>Max	>Max	0.042	>Csat	0.90	100	0.44	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat	>Csat

NOTE:

ND = not detected at or above analytical method reporting limit (MRL).

RBC = Risk Based Concentration; ss - ingestion/dermal contact/inhalation so - volatilization to outdoor air, si - vapor intrusion inside, sw - leaching to groundwater

— = not applicable.

>Max = RBC exceeds 1,000,000 mg/kg

>Csat = chemical exceeds limit of three-phase equilibrium partitioning

NV = chemical is considered nonvolatile for exposure calculations