December 30, 2011

Ms. Tamara Cardona-Marek
Alaska Dept. of Environmental Conservation
610 University Avenue
Fairbanks, Alaska 99709-3643

Re: North Star Terminal #2
Former Diesel Tank Site – Site History, 2009 Groundwater Data Review, Conceptual Site Model, *Cleanup Complete with Institutional Controls* Request
Fairbanks, Alaska

Dear Ms. Cardona-Marek,

On behalf of Golden Valley Electric Association (GVEA), SLR International Corp (SLR) is pleased to provide the following letter report detailing the history of the former diesel tank site at the Battery Energy Storage System (BESS) facility (Site) in Fairbanks, Alaska (Figure 1). This site is also known as North Star Terminal #2. This letter report includes a quality assurance review of Site groundwater data collected in 2009, an updated Conceptual Site Model, and a *Cleanup Complete with Institutional Controls* request for the Site. This information is provided in response to the Alaska Department of Environmental Conservation (ADEC) letter to GVEA dated February 24, 2011 (ADEC, 2011).

SITE HISTORY

Four 2,000-gallon capacity heating oil tanks were removed from the North Star Terminal #2 in May and July, 2003. Analytical soil samples were collected from the base of the tank impressions and analyzed for diesel range organics (DRO), benzene, toluene, ethylbenzene, and xylenes (BTEX). One sample from each excavation was also analyzed for volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs). Analytical results are discussed in the site characterization report prepared by Rockwell Engineering & Construction Services, Inc. (Rockwell, 2003). Diesel contamination was noted in soil samples collected from the base of Tanks 1 and 2 at a depth of approximately 8 feet to 9 feet below ground surface (bgs). Approximately 127 cubic yards of contaminated soil was removed from the excavation at Tanks 1 and 2 to a final depth of 11 feet bgs, immediately above the groundwater table, and was transported to Organic Incineration Technology (OIT) in Moose Creek for thermal treatment. DRO and BTEX compounds were not detected above Method 2 Migration to Groundwater cleanup levels in soil samples collected from the base of the impressions of Tanks 3 or 4.

A release investigation was conducted in the vicinity of the excavation for Tanks 1 and 2 that included the installation and sampling of four push point soil borings, installation of three monitoring wells, and sampling of new and existing groundwater monitoring wells in the area. Figure 2 presents former tank locations, current and historic monitoring well and soil boring locations, and indicates an estimated historic groundwater flow direction. Table 1 shows soil concentrations in soil samples collected at the base of tank impressions and from the four

boreholes installed during the release investigation for Tanks 1 and 2. Table 2 presents results of groundwater sampling at new and existing wells from 2003 through 2010. Monitoring well MW-31, located between the former location of Tanks 1 and 2, could not be located in 2009. Efforts by SLR field personnel to locate MW-31 in 2011 were not successful.

The 2009 Travis/Peterson Environmental Consulting, Inc. Groundwater Sampling Report indicated that diesel range organics (DRO) were still present above cleanup levels in monitoring wells MW-1 and MW-30 (Travis/Peterson Environmental Consulting, Inc., 2009). The DRO concentration detected in monitoring well MW-30 in 2009 was greater than previously detected levels; however, DRO concentrations in all other monitoring wells at the source area and throughout the Site, including MW-1, have decreased since monitoring began in 2003. Hydrocarbon concentrations down-gradient of the Site at MW-12 in 2009 were below the laboratory method reporting limit for all compounds. In 2009, all analytical results from groundwater samples collected from monitoring well MW-12 were below ADEC cleanup limits. The proposed alternate point of compliance well for the Site is MW-12 due to its downgradient location, proximity to the release area, and monitoring history.

2009 GROUNDWATER DATA REVIEW

Quality assurance/quality control (QA/QC) procedures were maintained throughout the 2009 sampling activities. QA procedures included the analysis of field duplicates and trip blanks, and a laboratory data QA review (QAR) by qualified SLR staff. The QAR included the completion of an ADEC Laboratory Data Review Checklist for the analytical report. QC procedures included adherence to standard sample collection methodology. SLR's QAR and the completed ADEC Laboratory Data Review Checklists are presented in Attachments 5.

During SLR's QAR, it was noted that two coolers arrived at the laboratory outside of the accepted 4 ^{o}C plus or minus 2 ^{o}C. However, all data were deemed acceptable for use and all precision, accuracy, and completeness goals were met by the analytical laboratory.

CONCEPTUAL SITE MODEL

This CSM was developed to qualitatively assess the potential exposure of human receptors to petroleum hydrocarbons in impacted soil at the Site. The Site is located in Fairbanks, Alaska in a commercial/industrial area. There are no residents at the Site. Access to the Site and surrounding area is via a city road.

This CSM describes the potential exposure scenarios for current and future Site receptors and was prepared in accordance with the ADEC Policy Guidance on Developing Conceptual Site Models (ADEC, 2010) using the ADEC Human Health CSM Scoping Form. The ADEC Human Health CSM Graphic Form was used to summarize the results of the Scoping Form. The Graphic and Scoping Form are presented in Attachment 6.

1. Impacted Media

Impacted media at the Site is the environmental substance to which a contaminant is directly released (ADEC, 2010). The USTs at the Site were removed in 2003. Analytical soil samples

were collected and impacted soil was excavated. Ground water monitoring wells were installed and have been sampled subsequently with the most recent sampling event in October 2010. For the purpose of developing this CSM, contaminant concentrations in soil are assumed to be unchanged since the time the samples were collected.

1.1 Surface Soil

Surface soil is defined as the interval from 0 feet to 2 feet below ground surface (bgs) (ADEC, 2010).

Because the Site contained USTs, it is assumed that any release that would have occurred would have been to subsurface soil rather than surface soil and thus surface soil is not considered an impacted medium. In addition, surface soil would have been removed from the tank area during excavation and inclusion of surface soil as an impacted medium would not change the overall findings of this CSM.

1.2 Subsurface Soil

Subsurface soil is defined as the interval from 2 feet to 15 feet bgs (ADEC, 2010). Subsurface soil contamination at this Site has been confirmed in previous investigations, and the contaminant source (i.e., USTs) is located within this depth range. Subsurface soil is therefore considered an impacted medium for this CSM.

Analytical soil samples were collected from this Site in 2003. Detected compounds include DRO, xylenes, and naphthalene. Maximum detected concentrations of these compounds are 1,070 mg/kg, 2.728, and 0.0480 mg/kg, respectively. Only DRO was detected at a concentration above ADEC Method Two soil cleanup levels.

1.3 Ground Water

Ground water samples collected from the Site have contained detected concentrations of DRO and BTEX compounds in one or more events and thus ground water is considered an impacted medium for this CSM. DRO is the only contaminant detected above ADEC Table C ground water cleanup levels at a maximum concentration of 16.8 mg/L at monitoring well MW-31 in July 2003. In September, 2004, the DRO concentration in the groundwater sample collected from monitoring well MW-31 was 7.47 mg/L. Sampling personnel have not been able to locate monitoring well MW-31 for sampling since 2004.

1.4 Surface Water

Surface water has not been observed at the Site and the nearest permanent surface water bodies are the Chena River and the Tanana River, which are approximately 2.5 miles from the Site. For this CSM, surface water is not considered an impacted medium. No surface water samples have been collected from the Site.

1.5 Sediment

The distance from the Site to a permanent surface water body makes sediments an unlikely impacted media. Therefore, sediment is not considered an impacted medium. No sediment samples have been collected from this Site.

2. Transport Mechanisms and Exposure Media

Two transport mechanisms were identified as possible, resulting in the identification of three exposure media. The exposure media for this Site include soil, ground water, and air. Possible transport mechanisms and exposure media are depicted on the ADEC Draft Human Health Conceptual Site Model Graphic Form (Attachment 6).

3. Exposure Pathways

Each potential exposure pathway was evaluated using the ADEC Draft Human Health Conceptual Site Model Scoping Form (Attachment 6). Based on this evaluation, five potentially complete exposure pathways were identified:

- incidental soil ingestion;
- dermal absorption of contaminants from soil;
- ingestion of groundwater;
- inhalation of outdoor air; and
- inhalation of indoor air.

The determination of complete or incomplete exposure pathways is explained in the following sections.

3.1 Complete or Potentially Complete Exposure Pathways

The direct contact exposure pathway via incidental soil ingestion is considered potentially complete because soil contamination is present between 0 and 15 feet bgs.

The dermal absorption of contaminants from soil exposure pathway is considered potentially complete because soil contamination is present between 0 and 15 feet bgs and because naphthalene, which has the potential to permeate the skin, has been detected at the Site. This pathway is considered insignificant however as the concentration of naphthalene detected (0.0480 mg/kg) is less than one-tenth the ADEC Method Two soil cleanup level.

The ingestion of groundwater pathway is considered potentially complete because contaminants have been detected in groundwater and use of the affected groundwater cannot be ruled out as a future drinking water source.

The inhalation of outdoor air exposure pathway is considered potentially complete because of the presence of volatile contaminants (BTEX compounds) in soil between 0 and 15 feet bgs and the current and future use of the Site by human receptors.

The inhalation of indoor air exposure pathway is considered potentially complete due to the presence of an occupied building on the Site, and because xylenes have been detected in the soil adjacent to the building. Although the conditions at the BESS facility meet the criteria for a complete indoor air inhalation pathway, several factors serve to limit exposure via this pathway:

- Access to the BESS facility is controlled.
- The BESS facility is only occupied once per month for a period of two to three hours. Annual maintenance requires a crew of six workers working eight hour days for a period of one week.
- The nature of the process in the BESS facility requires an engineered, positive-pressure, heat recovery and ventilation air handling system.

Controlled personnel access, limited occupancy, and an engineered positive pressure air handling system at the BESS facility serve to limit exposure via the indoor air exposure pathway.

3.2 Incomplete Exposure Pathways

The remaining exposure pathways were determined to be incomplete based on Site data, features, or other pertinent information in accordance with the ADEC Human Health Conceptual Site Model Scoping Form (Attachment 6). These remaining pathways are discussed briefly below.

The ingestion of surface water pathway is not complete because the nearest permanent surface water is more than two miles away and is not expected to have been impacted by Site activities.

The ingestion of wild foods pathway is not complete because the Site is industrial and not expected to be used for hunting, fishing, or harvesting of wild food.

Because ADEC ground water cleanup levels are being applied to the Site, the following pathways are not considered complete: dermal absorption of contaminants in ground water and surface water, and the inhalation of volatile compounds in tap water.

The inhalation of fugitive dust pathway is not complete because ADEC Method Two soil cleanup levels are protective of this pathway for Site contaminants. In addition, any evident surface contamination associated with the USTs at the Site was removed in 1993 during tank removal operations.

The direct contact with sediment pathway is not considered complete because the nearest sediments are not expected to be impacted and no known activities would result in exposure via this pathway.

4. Current and Future Receptors

The Site is currently industrial and, as such, the following human receptors are considered to be potentially exposed to Site contaminants (both currently and in the future):

Commercial or industrial workers, and

Site visitors or trespassers.

In addition, construction workers may be future receptors if excavation activities occur on the property.

RECOMMENDATIONS

SLR recommends GVEA pursue site closure through a determination of *corrective action complete with institutional controls* (ICs). This request is appropriate given site conditions and requirements for site closure referenced in the ADEC Site Closure memo (ADEC, 2009). Site conditions as documented above indicate the following:

- The groundwater DRO plume is stable and decreasing in concentration. With the exception of the DRO result from monitoring well MW-30 in 2009, contaminant concentrations related to the source at the former location of Tanks 1 and 2 are decreasing.

- Table C groundwater cleanup levels have been achieved at the proposed downgradient point of compliance well MW-12.

- Residual contaminant concentrations in soil are below exposure-based cleanup levels for completed exposure routes identified at the Site.

- Sampling indicates that a small, or deminimus, volume of soil containing DRO above Method 2 Migration to Groundwater cleanup levels remains at the Site.

- An indoor air intrusion survey form was completed for the BESS facility in August 2011 and found minimal potential for contaminant migration to indoor air (SLR, 2011).

Completion of site closure activities should include the following:

- Preparation of an exposure tracking model by ADEC for the exposure pathways identified in the CSM as “complete.”

- Removal of groundwater monitoring wells MW-30, MW31, and MW32 associated with the Site.

- The ICs for this site will not need to be robust (i.e., restrictive covenant or compliance order) because residual soil contaminant concentrations are below health-based cleanup levels appropriate for completed exposure pathways at the Site, and the City of Fairbanks has mandated the use of a public drinking water system at this property and properties downgradient of the Site. SLR recommends updates to safety procedures

currently used by GVEA to serve as ICs for excavations on GVEA property. Section 133 of the Golden Valley Safety Manual entitled "Excavations, Trenching, and Shoring" currently requires location of primary and secondary utilities prior to any excavation activity. This section should be modified to include a requirement to notify the GVEA Environment Department to determine if residual contamination may be present. Golden Valley Fire & Safety Procedures also include a procedure, Number 26, for excavation and shoring that require utility locates. Procedure Number 26 should also be modified to require the notification of the Environment Department prior to commencement of excavation activities. GVEA can document employee training regarding these procedural changes.

If you have any questions, please contact SLR at (907) 452-2252 or Kristen DuBois/GVEA at (907) 451-5627.

Sincerely,
SLR International Corp

Leslie Dupuis
Staff Scientist

Carl Benson
Principal Scientist

cc Kristen DuBois/GVEA

Attachments:
1 - Figure 1 – Site Location Map
2 - Figure 2 – Monitoring Well and Soil Boring Location Map
3 - Table 1 – Historic Soil Sample Analytical Results
4 - Table 2 – Historic Groundwater Sample Analytical Results
5 - Quality Assurance Review and ADEC Laboratory Review Checklist
6 - Conceptual Site Model Graphic and Scoping Form

References:

Alaska Department of Environmental Conservation (ADEC), 2009. Contaminated Sites Staff Site Closure Memorandum. July.

ADEC, 2010. Policy Guidance on Developing Conceptual Site Models. October.

ADEC, 2011. Letter from ADEC to GVEA requesting additional information on the Energy Coatings/North Star Terminal #2 Site. February.

Rockwell Engineering & Construction Services, Inc. 2003. Site Characterization Report, Four 2,000-gallon Buried Heating Oil Tanks, North Star Terminal, Building 23, Fairbanks, Alaska. October.

SLR International Corp (SLR), 2010. North Star Terminal #2 2010 Groundwater Monitoring Report. January.

SLR, 2011. North Star Terminal #2, Chlorinated Solvent Site – Well Search and Indoor Air Survey, Fairbanks, Alaska. October.

Travis/Peterson Environmental Consulting, Inc., 2009. GVEA North Star Terminal Building 23 Groundwater Sampling Letter Report. September.

ATTACHMENT 1

FIGURE 1 – SITE LOCATION MAP

Golden Valley Electric Association
North Star Terminal #2
Former Diesel Tank Site

December 2011

Print Form

Human Health Conceptual Site Model
Scoping Form

Site Name: North Star Terminal #2 (Diesel Site); Fairbanks, Alaska

File Number: 102.38.044

Completed by: SLR International Corp

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources *(check potential sources at the site)*

- ☒ USTs
- ☐ ASTs
- ☐ Dispensers/fuel loading racks
- ☐ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☐ Other:

Release Mechanisms *(check potential release mechanisms at the site)*

- ☒ Spills
- ☒ Leaks
- ☒ Direct discharge
- ☐ Burning
- ☐ Other:

Impacted Media *(check potentially-impacted media at the site)*

- ☐ Surface soil (0-2 feet bgs*)
- ☒ Subsurface soil (>2 feet bgs)
- ☐ Air
- ☐ Sediment
- ☒ Groundwater
- ☐ Surface water
- ☐ Biota
- ☐ Other:

Receptors *(check receptors that could be affected by contamination at the site)*

- ☐ Residents (adult or child)
- ☒ Commercial or industrial worker
- ☒ Construction worker
- ☐ Subsistence harvester (i.e. gathers wild foods)
- ☐ Subsistence consumer (i.e. eats wild foods)
- ☒ Site visitor
- ☒ Trespasser
- ☐ Recreational user
- ☐ Farmer
- ☐ Other:

* bgs - below ground surface

2. Exposure Pathways: *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☒

If the box is checked, label this pathway complete: Complete

Comments:

DRO and xylenes have been detected in soil at the site.

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Xylenes and naphthalene have been detected in soil at the site.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☒

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the ground-water is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

DRO, benzene, toluene, ethylbenzene, and xylenes have been detected in ground water at the site.

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future? ☐

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities). ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods? ☐

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)? ☒

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.) ☐

If all of the boxes are checked, label this pathway complete: Incomplete

Comments:

Naphthalene has been detected in soil at the site.

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Are the contaminants in soil volatile (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Xylenes have been detected in soil at the site.

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminted soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures) ☒

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Volatile compounds have been detected in both soil and ground water at the site in close proximity to Building 23.

3. **Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are assumed to be protective of this pathway.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Ground water exposure is not anticipated under any of the above conditions.

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are assumed to be protective of this pathway.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Volatile compounds are present in ground water, but ground water is not used for indoor household purposes at the site.

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM_{10}). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.
- Chromium is present in soil that can be dispersed as dust particles of any size.

Generally, DEC direct contact soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because it is assumed most dust particles are incidentally ingested instead of inhaled to the lower lungs. The inhalation pathway only needs to be evaluated when very small dust particles are present (e.g., along a dirt roadway or where dusts are a nuisance). This is not true in the case of chromium. Site specific cleanup levels will need to be calculated in the event that inhalation of dust containing chromium is a complete pathway at a site.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Chromium is not a contaminant of concern at this site. DEC direct contact soil cleanup levels are protective of other contaminants.

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

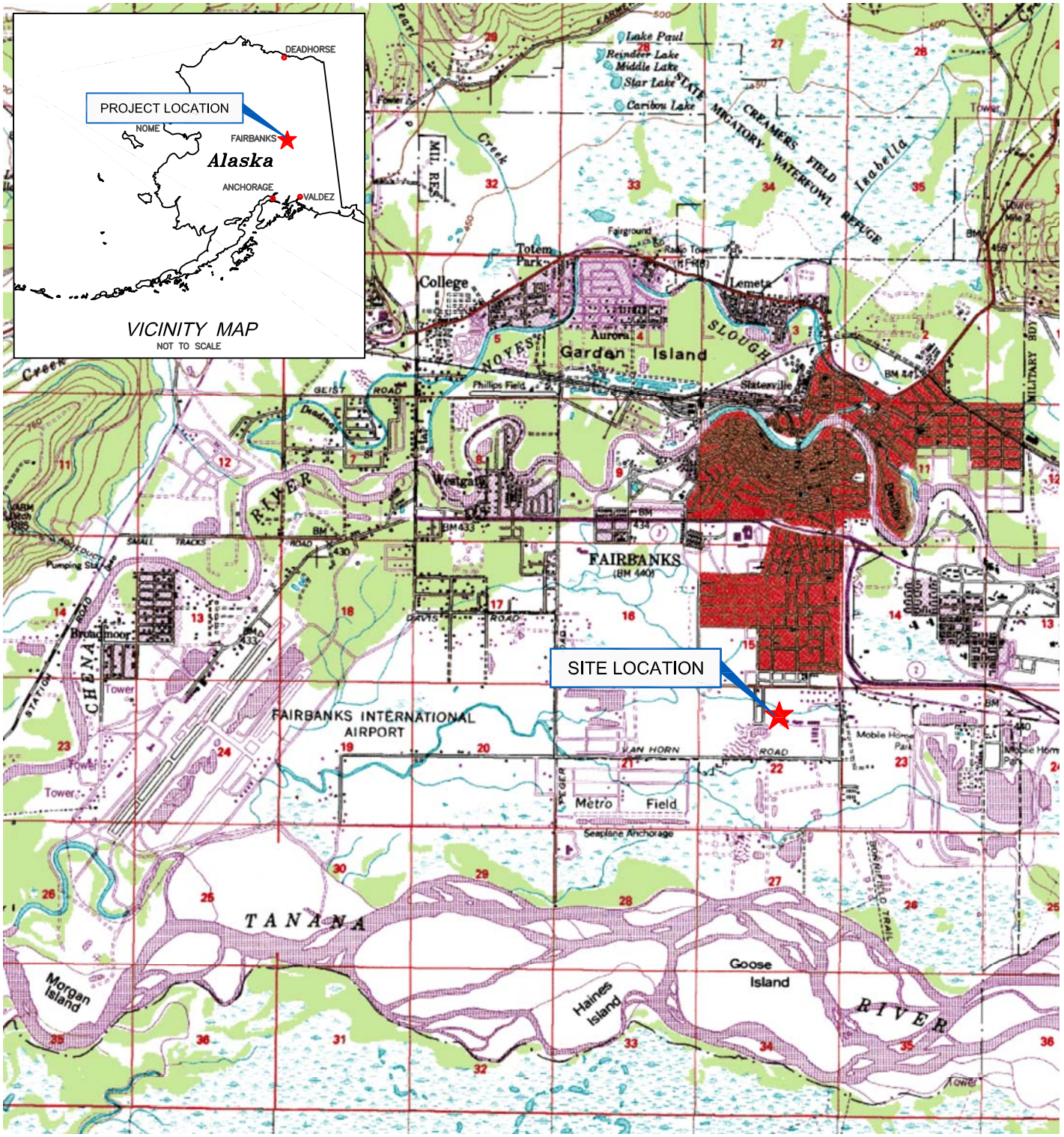
Check the box if further evaluation of this pathway is needed: ☐

Comments:

No transport mechanism to sediments was identified in the CSM.

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

Additional information is provided in the document to which this CSM is attached.



REFERENCED FROM : U.S.G.S. TOPO; FAIRBANKS (D–2) QUADRANGLE, 1:63360 SERIES

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SLR

GOLDEN VALLEY ELECTRIC ASSOCIATION
P.O. BOX 71249
FAIRBANKS, ALASKA 99707

Report
NORTH STAR TERMINAL # 2 DRO SITE
2011 CLEANUP COMPLETE REQUEST

Drawing
SITE LOCATION MAP

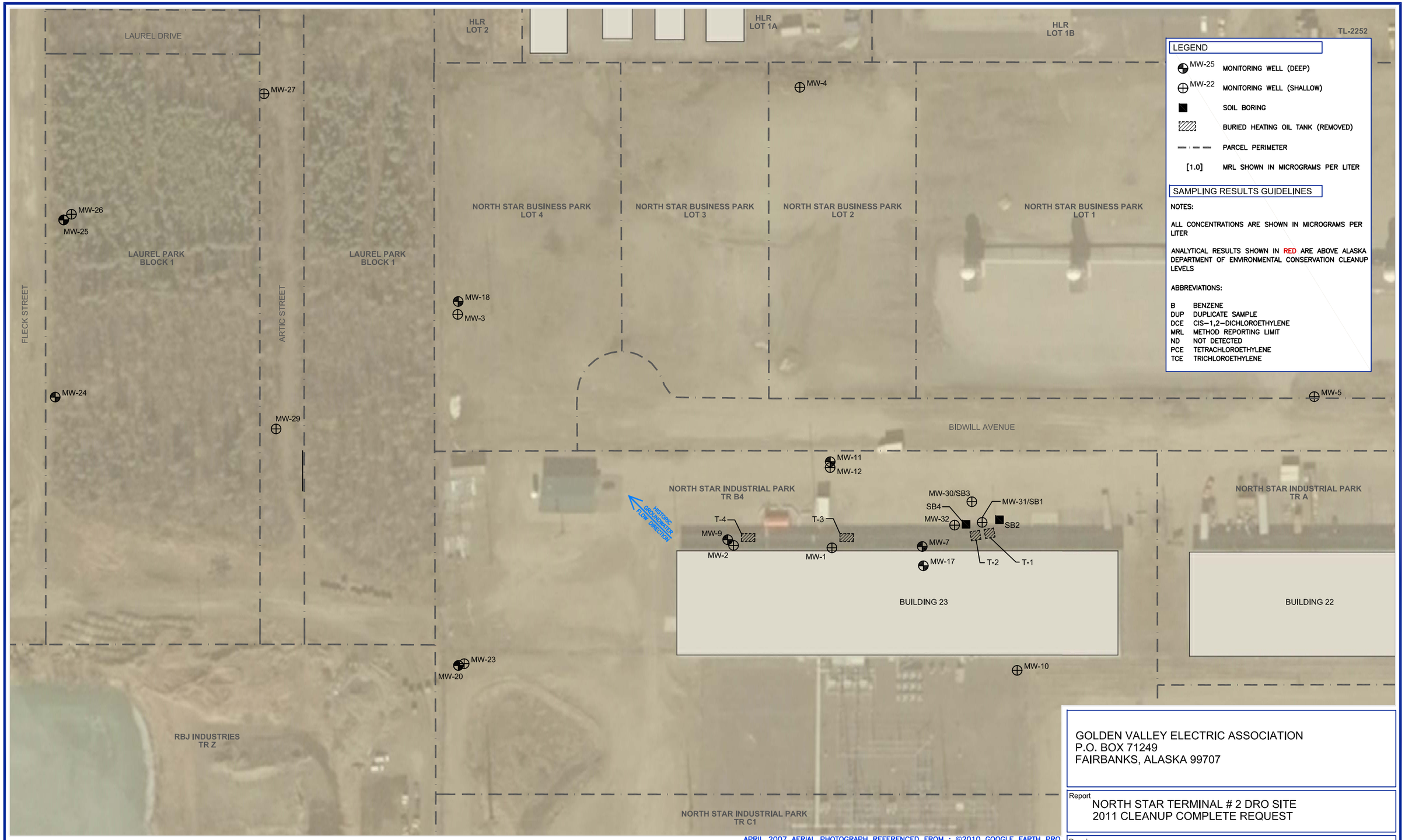
Date August 1, 2011	Scale 1" = 1 Mile	Fig. No. 1
File Name GVEA 11WP F1	Project No. 104.00367.11004	

ATTACHMENT 2

FIGURE 2 – MONITORING WELL AND SOIL BORING LOCATION MAP

Golden Valley Electric Association
North Star Terminal #2
Former Diesel Tank Site

December 2011



APRIL 2007 AERIAL PHOTOGRAPH REFERENCED FROM : ©2010 GOOGLE EARTH PRO

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GOLDEN VALLEY ELECTRIC ASSOCIATION
P.O. BOX 71249
FAIRBANKS, ALASKA 99707

Report
NORTH STAR TERMINAL # 2 DRO SITE
2011 CLEANUP COMPLETE REQUEST

Drawing
MONITORING WELL AND SOIL BORING LOCATION MAP

Date August 1, 2011	Scale 1" = 100	Fig. No. 2
File Name GVEA 11WP F2	Project No. 104.00367.11004	

ATTACHMENT 3

TABLE 1 – HISTORIC SOIL SAMPLE ANAYLTICAL RESULTS

Golden Valley Electric Association
North Star Terminal #2
Former Diesel Tank Site

December 2011

Table 1
Golden Valley Electric Association
North Star Terminal #2
Historic Soil Sample Analytical Results
(concentrations in mg/kg dry soil)

Sample Identification	Sample Location	Date Sampled	Sample Depth (ft)	DRO AK 102	BTEX (EPA Method 8021B)			
					Benzene	Toluene	Ethylbenzene	Xylenes
ADEC Soil Cleanup Level (migration to groundwater)				**250**	**0.025**	**6.5**	**6.9**	**63**
ADEC Soil Cleanup Level (direct contact)				**--**	**150**	**8,100**	**10,100**	**20,300**
ADEC Soil Cleanup Level (outdoor inhalation)				**12,500**	**11**	**220**	**110**	**63**
S1	Base of Tank 3	7/14/2003	7.5	<25.7	<0.0162	<0.0648	<0.0648	<0.0648
S2	Base of Tank 3	7/14/2003	7.5	<21.8	<0.00927	<0.371	<0.371	<0.371
S4	Base of tank 4	7/14/2003	9	<20.7	<0.00917	<0.0367	<0.0367	<0.0367
S5	Base of Tank 4	7/14/2003	9	53.6	<0.0147	<0.0589	<0.0589	<0.0589
S7	Base of Tank 1	7/14/2003	8 - 9	**7,550**	<0.123	0.814	3.1	30.8
S8	Base of Tank 1	7/14/2003	8 - 9	**5,540**	0.015	0.0969	0.581	5.82
S9	Base of Tank 2	7/14/2003	8 - 9	**4,290**	<0.0101	<0.0405	<0.0405	1.601
S10	Base of Tank 2	7/14/2003	8 - 9	**2,080**	<0.00968	<0.0387	0.107	1.36
S11	Duplicate of S10	7/14/2003	8 - 9	**2,910**	<0.00873	0.0391	0.0837	0.860
S15	MW-30/SB-3	7/16/2003	11 - 15	<33.3	<0.00752	<0.0301	<0.0301	<0.0301
S16	MW-31/SB-1	7/17/2003	9 - 15	<38.8	<0.0163	<0.0651	<0.0651	2.062
S17	SB-4	7/18/2003	11 - 15	<34.3	<0.00705	<0.0282	<0.0282	<0.0282
S18	SB-2	7/19/2003	9 - 13	**1,070**	<0.0105	<0.0420	<0.0420	2.728

Notes:
Results in **bold** exceed ADEC cleanup levels.
Soil samples S3, S6, S12, S13, and S14 were stockpile samnples and are not presented here.
Abbreviations:
ADEC: Alaska Department of Environmental Conservation
DRO: diesel range organics
BTEX: benzene, ethylbenzene, toluene, and xylenes
mg/kg: milligrams per kilogram
EPA: Environmental Protection Agency

ATTACHMENT 4

TABLE 2 – HISTORIC GROUNDWATER SAMPLE ANALYTICAL RESULTS

Golden Valley Electric Association
North Star Terminal #2
Former Diesel Tank Site

December 2011

Table 2
Golden Valley Electric Association
North Star Terminal #2
Historic Ground Water Sample Analytical Results
(Units mg/L)

Well ID	Sample Identification	Date Sampled	AK102 DRO	BTEX USEPA Method 8021B			
				Benzene	Toluene	Ethylbenzene	Xylenes
ADEC Groundwater Cleanup Levels[A]			1.5	0.005	1.0	0.7	10
MW-1	W5	July 2003	**3.32**	<0.0005	<0.002	0.00694	0.0298
	MW-1	9/27/2004	**2.32**	ND	ND	0.0071	0.0262
	MW-1	9/08/2009	**2.0**	ND	ND	0.0051	0.0091
	MW-1	10/05/2010	--	ND [0.0004]	ND [0.001]	0.00336	0.00341
MW-2	W6	July 2003	<0.313	<0.0005	<0.002	<0.002	<0.002
MW-3	MW-3	October 1997	--	--	--	--	--
	MW-3	August 1999	--	--	--	--	--
	MW-3	10/04/2010	--	0.00052	ND [0.001]	ND [0.001]	ND [0.003]
MW-7	MW-7	August 2001	--	--	--	--	--
	MW-7	10/05/2010	--	ND [0.0004]	ND [0.001]	ND [0.001]	ND [0.003]
MW-12	W7	July 2003	0.579	<0.0005	<0.002	<0.002	<0.002
	MW-12	9/27/2004	ND	ND	ND	ND	ND
	MW-12	9/08/2009	ND	ND	ND	ND	ND
	MW-16*	9/8/2009	ND	ND	ND	ND	ND
MW-14	W8	July 2003	0.381	<0.0005	<0.002	<0.002	<0.002
	MW-14	9/27/2004	ND	ND	ND	ND	ND
MW-18	MW-18	August 2001	--	--	--	--	--
	MW-18	10/04/2010	--	ND [0.0004]	ND [0.001]	ND [0.001]	ND [0.003]
	MW-918*	10/04/2010		ND [0.0004]	ND [0.001]	ND [0.001]	ND [0.003]
MW-20	MW-20	October 1997	--	--	--	--	--
	MW-20	10/05/2010	--	0.00087	ND [0.001]	ND [0.001]	ND [0.003]
MW-24	MW-24	August 1999	--	--	--	--	--
	MW-24	10/04/2010	--	0.00047	ND [0.001]	ND [0.001]	ND [0.003]
MW-25	MW-25	August 2001	--	--	--	--	--
	MW-25	10/05/2010	--	0.00047	ND [0.001]	ND [0.001]	ND [0.003]
MW-29	MW-29	August 2001	--	--	--	--	--
	MW-29	10/05/2010	--	ND [0.0004]	ND [0.001]	ND [0.001]	ND [0.003]
MW-30	W1	July 2003	**2.03**	<0.0005	<0.002	<0.002	0.00318
	MW-30	9/27/2004	0.935	ND	ND	ND	ND
	MW-30	9/8/2009	**2.2**	ND	ND	ND	0.0011
MW-31	W2	July 2003	**16.8**	0.00467	0.00597	0.0143	0.255
	MW-31	9/27/2004	**7.47**	0.0012	0.00279	0.00574	0.1391
MW-32	W3	July 2003	**3.8**	0.002	<0.002	0.0341	0.043
	W4*	July 2003	**2.97**	0.00201	<0.002	0.0321	0.0411
	MW-32	9/27/2004	0.836	0.000612	ND	0.00211	ND
	MW-32	9/8/2009	0.91	ND	ND	0.0039	ND

Notes:

[A] ADEC Cleanup Levels (18 AAC 75.345, Table C) as revised on October 9, 2008

* Duplicate of preceding sample

[ ] MRL

Results in **bold** exceed ADEC cleanup levels.

-- not analyzed

Abbreviations:

ADEC: Alaska Department of Environmental Conservation

AK: Alaska

BTEX: benzene, toluene, ethylbenzene and xylenes

DRO: diesel range organics

mg/L: milligrams per liter

ND: not detected at method reporting limit (MRL)

USEPA: U.S. Environmental Protection Agency

ATTACHMENT 5

QUALITY ASSURANCE REVIEW AND ADEC LABORATORY REVIEW CHECKLIST

Golden Valley Electric Association
North Star Terminal #2
Former Diesel Tank Site

December 2011

LABORATORY DATA
QUALITY ASSURANCE SUMMARY

GOLDEN VALLEY ELECTRIC ASSOCIATION, INC.
NORTH STAR TERMINAL BUILDING 23

SLR Project Number 104.00367.11002

This report summarizes a review of analytical results for work order number 252078, for samples collected on 9/08/09. Samples were collected by Travie Peterson Environmental Consulting, Inc. (TPECI), and submitted to Pace Analytical Services, Inc., Seattle, WA. Samples were analyzed for the following parameters:

- Diesel Range Organics (DRO), using AK 102
- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), using USEPA Method SW8260

Quality Assurance Program

An ADEC Laboratory Data Review Checklist was completed by TPECI for the analytical work order. A quality assessment report was completed for the analytical work order by SLR. Any anomalies to the requirements for precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCS) are discussed below and the data were flagged where appropriate.

Data validation consisted of the following:

- Verifying that quality control (QC) blanks were properly prepared, identified, and analyzed.
- Reviewing COC records for completeness, signatures, and dates.
- Verifying that surrogate analyses are within recovery acceptance limits.
- Verifying that Laboratory Control Samples (LCS) and Laboratory Control Sample Duplicates (LCSD) are within recovery acceptance limits.
- Reviewing the Continuing Calibration Verification (CCV) recoveries are within recovery acceptance levels.
- Evaluating the result RPD between original and duplicate (QC) samples.
- Providing an overall assessment of laboratory data quality and qualifying sample results if necessary.

Data Qualifications

The comments presented in this report refer to the laboratory's performance in meeting the QC specifications. The analytic data was reviewed for consistency with *ADEC Technical Memorandum 06-002, Environmental Laboratory Data and Quality Assurance* (ADEC 2009) requirements. Standard ADEC and SW846 methods were used by Pace Analytical Services, Inc., Seattle, WA, an ADEC-certified laboratory.

Data Validation

Data Packages
The data package was checked for transcription errors, omissions, or other anomalies. There were no issues with regards to the data package.

Holding Times and Preservation
Samples were appropriately preserved upon collection and were submitted to Pace Analytical Services, Inc., Seattle, WA. Sample analyses were conducted within holding time criteria. No issues were noted in regard to sample preservation except as noted below.

- The checklist completed by TPECI states (in 3a of the checklist) that upon arrival to the laboratory, the cooler temperatures were less than 2^{o}C. Upon arrival at Alaska Analytical Laboratory on 9/9/09, the chain of custody records cooler receipt temperatures at 5.0^{o}C (cooler temp) and 4.2^{o}C (temperature blank), within ADEC acceptable limits of 4±2^{o}C. Samples were then transferred to Pace Analytical, where they were received on 9/10/09 at 0.6^{o}C, 3.0^{o}C, 0.8^{o}C, and 2.1^{o}C. As all temperatures were below 6^{o}C, and no samples were documented as frozen, data was considered not impacted.

Laboratory Method Blanks
Laboratory method blanks were analyzed at the appropriate frequencies. Analytes were not detected in method blanks at or above the Limit of Quantitation (LOQ).

Trip Blanks
Analytes were not detected at or above the LOQ for the trip blank.

Surrogate Recovery Results
Surrogate analysis was performed at the required frequencies. The results were within USEPA, ADEC, and Pace Analytical percent recovery acceptance limits.

Continuing Calibration Verification
Continuing calibration verifications (CCV) and Initial Calibration Verifications (ICV) were performed at the required frequencies. No CCV percent recoveries were noted in the laboratory report as exceeding USEPA or Pace Analytical allowed limits.

Field Duplicates
Four water samples were submitted for DRO by AK102 and BTEX by SW8260. One field duplicate was submitted blind to the laboratory for these analyses. The field duplicate sample is in compliance with regulatory requirements because a minimum of one per every ten field samples or less, for each target analyte was achieved.

The following field duplicate was collected:

- MW-16 is the duplicate to primary sample MW-12

All analytes were within the 30% RPD for duplicate and primary water samples.

Laboratory Control Samples/Laboratory Control Duplicate Samples
Laboratory Control Samples (LCS) and Laboratory Control Duplicate Samples (LCSD) were analyzed at the appropriate frequencies. All LCS/LCSD results met percent recovery acceptance limits.

Laboratory Duplicate Samples
Laboratory duplicates were not required by any methods analyzed in this work order.

Matrix Spike/Matrix Spike Duplicate Samples
No Matrix Spike (MS)/ Matrix Spike Duplicates (MSD) were analyzed in association with these samples.

Limits of Quantitation/Reporting Limits
LOQs were compared to applicable cleanup levels for the site. All analytes with results of ND had LOQs below applicable cleanup levels.

Overall Assessment

This data is judged acceptable for use, with not qualifications.

Precision, Accuracy, and Completeness

- Precision: Precision goals were met.
- Accuracy: Accuracy goals were met.
- Completeness: Completeness goals were met.

Laboratory Data Review Checklist

Completed by:	Jennifer McLean
Title:	Project Scientist
Date:	August 09, 2011
CS Report Name:	GVEA North Star Terminal Building 23
Report Date:	
Consultant Firm:	SLR International Corp
Laboratory Name:	Pace Analytical Services, Inc. - Seattle, WA
Laboratory Report Number:	252078
ADEC File Number:	102.38.044
ADEC RecKey Number:	4034

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   ● Yes ● No Comments:

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ● Yes ● No Comments:

   Samples were received at Alaska Analytical Laboratory on 9/9/09 then transferred to Pace Analytical Services, where they were received on 9/10/09. Pace Analytical Services completed all anlayses.

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?

● Yes ● No Comments:

The chain of custody (COC) with signatures "received by" Alaska Analytical Laboratory was provided in the laboratory report. The sample receipt form was provided by Pace Analytical Services, however, the COC signed "received by" Pace Analytical Services was not included in the laboraory report.

b. Correct analyses requested?

● Yes ● No Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

● Yes ● No Comments:

The checklist completed by TPECI states (in 3a of the checklist) that upon arrival to the laboratory, the cooler temperatures were less than 2oC. Upon arrival at Alaska Analytical Laboratory on 9/9/09, the chain of custody records cooler receipt temperatures at 5.0oC (cooler temp) and 4.2oC (temperature blank), within ADEC acceptable limits of 4±2oC. Samples were then transferred to Pace Analytical, where they were received on 9/10/09 at 0.6oC, 3.0oC, 0.8oC, and 2.1oC.

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

● Yes ● No Comments:

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

● Yes ● No Comments:

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

● Yes ● No Comments:

Temperatrue discrepancies were documented. It is unclear if the sample receipt temperatures upon arrival at Pace Analytical Services were cooler temperatures or temperature blank temperatures.

e. Data quality or usability affected? Explain.

Comments:

As all temperatures were below 6oC, and no samples were documented as frozen, data was considered not impacted.

4. Case Narrative

a. Present and understandable?

● Yes ● No Comments:

b. Discrepancies, errors or QC failures identified by the lab?

● Yes ● No Comments:

Not applicable.

c. Were all corrective actions documented?

● Yes ● No Comments:

None were required.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

No impact

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

● Yes ● No Comments:

BTEX by SW8021 was requested. BTEX was analyzed by SW8260.

b. All applicable holding times met?

● Yes ● No Comments:

c. All soils reported on a dry weight basis?

● Yes ● No Comments:

Not applicable

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

● Yes ● No Comments:

e. Data quality or usability affected? Explain.

Comments:

No impact

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

● Yes ● No Comments:

ii. All method blank results less than PQL?

● Yes ● No Comments:

iii. If above PQL, what samples are affected?

Comments:

Not applicable

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

● Yes ● No Comments:

Not applicable

v. Data quality or usability affected? Explain.

Comments:

No impact

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

● Yes ● No Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

● Yes ● No Comments:

Not applicable

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

● Yes ● No Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

● Yes ● No Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

Not applicable

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

● Yes ● No Comments:

Not applicable

vii. Data quality or usability affected? Explain.

Comments:

No impact

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

● Yes ● No Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

● Yes ● No Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

● Yes ● No Comments:

Not applicable

iv. Data quality or usability affected? Explain.

Comments:

No impact

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and cooler?

● Yes ● No Comments:

ii. All results less than PQL?

● Yes ● No Comments:

iii. If above PQL, what samples are affected?

Comments:

Not applicable

iv. Data quality or usability affected? Explain.

Comments:

No impact

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

● Yes ● No Comments:

ii. Submitted blind to lab?

● Yes ● No Comments:

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

● Yes ● No Comments:

iv. Data quality or usability affected? Explain.

Comments:

No impact

f. Decontamination or Equipment Blank (if applicable)

● Yes ● No ● Not Applicable

i. All results less than PQL?

● Yes ● No Comments:

Not applicable

ii. If above PQL, what samples are affected?

Comments:

Not applicable

iii. Data quality or usability affected? Explain.

Comments:

No impact

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

● Yes ● No Comments:

Not applicable

ATTACHMENT 6

CONCEPTUAL SITE MODEL GRAPHIC AND SCOPING FORM

Golden Valley Electric Association
North Star Terminal #2
Former Diesel Tank Site

December 2011

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: North Star Terminal #2 (Diesel Site); Fairbanks, Alaska
ADEC File Number; 102.38.044

Completed By: SLR International Corp
Date Completed: August 2011

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1)
Check the media that could be directly affected by the release.

(2)
For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.

(3)
Check all exposure media identified in (2).

(4)
*Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

(5)
Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.

Current & Future Receptors

Media	Transport Mechanisms	Exposure Media	Exposure Pathway/Route	Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☐ Surface Soil (0-2 ft bgs)	☐ Direct release to surface soil — check soil ☐ Migration to subsurface — check soil ☐ Migration to groundwater — check groundwater ☐ Volatilization — check air ☐ Runoff or erosion — check surface water ☐ Uptake by plants or animals — check biota ☐ Other (list):	☑ soil	☑ Incidental Soil Ingestion		F	F	F			
			☑ Dermal Absorption of Contaminants from Soil		F	F	F			
			☐ Inhalation of Fugitive Dust							
☑ Subsurface Soil (2-15 ft bgs)	☐ Direct release to subsurface soil — check soil ☑ Migration to groundwater — check groundwater ☑ Volatilization — check air ☐ Uptake by plants or animals — check biota ☐ Other (list):	☑ groundwater	☑ Ingestion of Groundwater		F	F	F			
			☐ Dermal Absorption of Contaminants in Groundwater							
			☐ Inhalation of Volatile Compounds in Tap Water							
☑ Ground-water	☐ Direct release to groundwater — check groundwater ☑ Volatilization — check air ☐ Flow to surface water body — check surface water ☐ Flow to sediment — check sediment ☐ Uptake by plants or animals — check biota ☐ Other (list):	☑ air	☑ Inhalation of Outdoor Air		C/F	C/F	C/F			
			☑ Inhalation of Indoor Air		C/F	C/F	C/F			
			☐ Inhalation of Fugitive Dust							
☐ Surface Water	☐ Direct release to surface water — check surface water ☐ Volatilization — check air ☐ Sedimentation — check sediment ☐ Uptake by plants or animals — check biota ☐ Other (list):	☐ surface water	☐ Ingestion of Surface Water							
			☐ Dermal Absorption of Contaminants in Surface Water							
			☐ Inhalation of Volatile Compounds in Tap Water							
☐ Sediment	☐ Direct release to sediment — check sediment ☐ Resuspension, runoff, or erosion — check surface water ☐ Uptake by plants or animals — check biota ☐ Other (list):	☐ sediment	☐ Direct Contact with Sediment							
		☐ biota	☐ Ingestion of Wild or Farmed Foods							

Revised, 10/01/2010