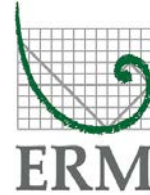


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14 November 2014

Ms. Rebekah Cadigan
Environmental Manager
Fairbanks International Airport
6450 Airport Way, Suite 1
Fairbanks, Alaska 99709



**Subject: 2013 Drainage Pond Groundwater Monitoring
Report-Final**

Dear Ms. Cadigan:

ERM Alaska, Inc. (ERM) is providing this report under the scope of work for the Former Drainage Pond Site (the Site) at Fairbanks International Airport (FIA) as shown in Figures 1 and 2. The scope of work was performed under notice-to-proceed (NTP) No. 8 of term contract 025-0-1-46. The Alaska Department of Environmental Conservation (ADEC) file number for the Drainage Pond Site is 100.38.188. Activities included in this scope of work are four field efforts between December 2013 and June 2014 and reporting. This groundwater monitoring report presents a brief background for the Site, the regulatory status, field activities, and findings. Recommendations for future sampling efforts at the Site are provided based on the conclusions presented in this report.

BACKGROUND AND REGULATORY STATUS

The Former Drainage Pond Site is located in a vegetated area northwest of the Alaska Airlines Cargo Building at FIA (Figure 3). Characterization activities were performed at the Site in 2006 and 2010, which documented that shallow soil and groundwater at the Site are contaminated by benzene, tetrachloroethene (PCE) and its degradation products trichloroethene (TCE), 1,1-dichloroethene (DCE), 1,2-cis-dichloroethene (cDCE), 1,2-trans-dichloroethene (tDCE), and vinyl chloride (VC). A 2006 soil gas survey identified a source area of PCE east of monitoring well MW-11R (Figure 4). The groundwater in MW-29R, MW-30R, MW-39, and MW-40 is perched on a silty layer that is acting as an aquitard. The groundwater elevation in these four wells is approximately 1 foot higher than the groundwater elevation in the other monitoring wells at the Site. The silty layer was not observed in MW-11R or MW-38D, suggesting that it may pinch out between MW-11R, MW-39, and MW-40 and allow groundwater to infiltrate more readily to the unconfined groundwater aquifer in the surrounding area.

In 2010, the chlorinated ethene groundwater plume was observed to extend from MW-11R, MW-39 (upgradient) through MW-40, and TW-3.

A Draft Feasibility Study was prepared in 2009 (OASIS 2009) to evaluate remedial alternatives for the Site. For groundwater remediation the preferred alternative was substrate addition. No preferred alternative was recommended for soil remediation due to the location of the contamination below the groundwater table.

The applicable 18 Alaska Administrative Code (AAC) 75 soil cleanup levels and groundwater cleanup levels for the site contaminants of potential concern (COPC) are presented below.

TABLE 1: DRAINAGE POND COPCS AND CLEANUP LEVELS

| Chemical of Potential Concern | Soil Cleanup Level (mg/kg) | Groundwater Cleanup Level (µ/L) |
|--------------------------------------|-----------------------------------|--|
| Benzene | 0.025 | 5 |
| PCE | 0.024 | 5 |
| TCE | 0.020 | 5 |
| cDCE | 0.240 | 7 |
| tDCE | 0.370 | 100 |
| VC | 0.0085 | 2 |

mg/kg - milligrams per kilograms

µg/L -micrograms per liter

FIELD ACTIVITIES

The 2013 field activities included a well integrity survey, a professional elevation survey, datalogger deployment, groundwater sampling, and waste management. Table 2 provides a summary of the field activities conducted at each monitoring location at the Site. Field activities were recorded in a log book and are presented in Attachment 1.

TABLE 2: SUMMARY OF DRAINAGE POND FIELD ACTIVITIES

| Well ID | Analytical Sample ¹ (Dec 2013) | Well Integrity Survey (Dec 2013/May 2014) | Elevation Survey (May 2014) | Install Datalogger (Dec 2013) |
|---------------------|--|---|--------------------------------|-------------------------------------|
| MW-11R | X | X | X | -- ² |
| MW-12 | -- | X | X | X |
| MW-29R ³ | -- | X | Removed ² | X |
| MW-30R | -- | X | X | -- |
| MW-34 | -- | X | X | -- |
| MW-35 | -- | X | X | X |
| MW-36 | -- | X | X | -- |
| MW-37 | -- | X | X | -- |
| MW-38S | X | X | X | -- |
| MW-38D | X | X | X | -- |
| MW-39 | -- | X | X | -- |
| MW-40 | X | X | X | -- |

¹ Analytical sample includes benzene, PCE, TCE, cDCE, tDCE, and VC.

² MW-29R was removed in April 2014 during construction activities.

-- Field activity not conducted

Well Integrity Survey

A monitoring well integrity survey was conducted at all accessible Site wells to identify those to be recommended for decommissioning due to frost jacking. The well integrity survey was initiated during the December 2013 groundwater monitoring event. However, due to difficulty of locating and recording observations of the wells in the snow, the well integrity survey was postponed and completed in May 2014.

Hydrology Assessment

The depth to groundwater was measured at locations where groundwater samples were collected in December 2013. Groundwater levels were also measured during well integrity surveys in December 2013 and May 2014.

In addition, dataloggers were installed in MW-12, MW-29R, and MW-35 in December 2013 to obtain information about seasonal variability in groundwater gradient and flow direction at the Site and document any changes in site hydrogeology due to recent area construction. Dataloggers were retrieved and downloaded in May 2014; however, the groundwater elevation datalogger and barometric pressure datalogger deployed in MW-29R were destroyed when the well was removed by construction activities. All dataloggers were also downloaded in March 2014.

Groundwater Sampling

Groundwater sampling was performed in general accordance with the *Fairbanks International Airport Drainage Pond Work Plan* (ERM 2013). Groundwater sampling was conducted on 5 December 2013. Four monitoring wells were sampled. Monitoring wells

MW-38D, MW-38S, and MW-40 were purged and sampled using low-flow methodology with a peristaltic pump and Teflon[®]-lined polyethylene tubing. MW-11R was purged using a peristaltic pump and sampled with a passive diffusion bag (PDB). Two PDBs were deployed in MW-11R to a depth of approximately 25 feet on 5 December 2013 and were retrieved on 19 December 2013. No leaks or breaks were observed in either of the PDBs. One PDB contained sufficient sample volume for all laboratory analysis. Attachment 2 contains a photo log of the PDB sampling, deployment, and retrieval.

Water quality parameters were collected at each well and included pH, temperature, conductivity, dissolved oxygen (DO), and oxidation reduction potential (ORP). The results are presented on the groundwater monitoring data sheets in Attachment 1.

Groundwater samples were collected in laboratory supplied jars and analyzed for benzene, PCE, TCE, cDCE, tDCE, and VC. Samples were submitted to SGS North America, Inc. (SGS), in Anchorage, Alaska.

Elevation Survey

A professional elevation survey was conducted by Design Alaska on 5 May 2014. Elevation survey data is presented in Attachment 3. Site monitoring wells were last professionally surveyed in 2010. Changes in elevations since 2010 ranged from 0.01 foot to 0.35 foot at the Site. Attachment 3 compares the 2010 and 2014 elevation survey results.

Waste management

Investigation derived waste consisted of purge water, decontamination water, disposable personal protective equipment (PPE), and disposable sampling materials. Purge water from the Site was placed in a 30-gallon drum. Following receipt of analytical results and confirmation that the waste was non-hazardous, arrangements were made with Emerald Alaska for transport and disposal. The waste manifest is presented in Attachment 4. Disposable PPE and sampling materials were bagged and transported to the Fairbanks North Star Borough landfill for disposal.

WORK PLAN DEVIATIONS

The following deviations from the *Fairbanks International Airport Drainage Pond Work Plan* (ERM 2013) are summarized below.

- Groundwater monitoring was expected to take place in October, but the work plan was not completed and approved until November; therefore, all field events took place later than previously scheduled.
- The well integrity survey was intended to occur during groundwater monitoring. Due to weather and field conditions, a decision was made to delay the survey to a snow-free month for ease of access and to better assess the well conditions.

- An unknown blockage was encountered in MW-30R thus a datalogger was not deployed there. MW-29R was selected as the best alternative because the geometry of MW-35 relative to MW-29R was more conducive for evaluating hydrology at the site. MW-29R was removed during April 2014 construction activities and the dataloggers destroyed. MW-29R was within an excavation area for a new building. The entire well and its surroundings were excavated. There no longer exists a conduit to the aquifer at MW-29R. Data was obtained through March 2014 at MW-29 and data was obtained through April for MW-35 and MW-12.

FINDINGS

This section discusses results from the well integrity survey, hydrology assessment, and groundwater analytical results.

Monitoring Well Integrity Survey

The well integrity survey is presented in Attachment 5 and includes photos, well details, and field observations. The well integrity survey included wells associated with the adjacent Fuel Hydrant Site. MW-29R was visited in December 2013 and March 2014. The well was removed by construction activities in late April 2014. Table 3 presents the Site wells that were found to be in poor or moderate condition. Results of the Fuel Hydrant-specific wells are discussed in the *2013 Fuel Hydrant Groundwater Monitoring Report* (ERM 2014).

TABLE 3: WELL INTEGRITY SURVEY RESULTS - DRAINAGE POND

| Well ID | Condition | Notes |
|---------|-----------|--|
| MW-30R | POOR | Blockage above water table in December 2013. Evidence of frost jacking present. Casing is slanted. |
| MW-34 | MODERATE | Well casing has frost jacked and is preventing placement of well cap. |
| MW-35 | MODERATE | Concrete monument is frost-jacked. |

Hydrology Assessment

Manual depth-to-water groundwater elevation data for the Site are presented in Table 4. Groundwater flow direction and gradient were estimated using triangulation with two different well groups consisting of three wells per group (Table 5). Well groupings used for triangulation included MW-12, MW-36, MW-37 and MW-34, MW-35, MW-36. Flow direction and gradient calculations were consistent among both groups, indicating a west-northwest groundwater flow direction with a gradient of approximately 0.0004 feet/foot (ft/ft) to the west in May 2014. Figure 5 shows the groundwater table elevation based on depth-to-groundwater measured on 5 May 2014.

Groundwater elevation data obtained from dataloggers deployed in MW-12, MW-29R, and MW-35 are presented in Attachment 6. Due to the removal of MW-29R, elevation data was not available for MW-29R for the period between March 2014 and May 2014. Datalogger elevation data indicate a gradual decrease in groundwater elevation between December 2013 and mid-April 2014 and a rapid increase during spring break up in late April 2014.

Datalogger information indicates the monitoring well integrity survey and elevation survey conducted during the May field event corresponded with rapid groundwater elevation change due to spring break up. There were several large snow storage locations which likely contributed to focused infiltration at the site. This impairs the ability to accurately determine groundwater contours. However, groundwater flow is generally consistent with regional groundwater flow west towards the Chena River.

Groundwater elevations varied approximately 1.8 feet between December 2013 and May 2014 with the lowest elevations occurring just prior to spring break up in April and the highest elevations occurring during spring break up in early May. Groundwater elevations in MW-29R were more variable than MW-12 and MW-35 likely due to disturbances from recent construction activities. MW-29R could not be resurveyed in May 2014 because it had been removed and therefore datalogger elevations may not be as accurate. The most recent survey at MW-29R occurred in 2010.

A prominent downward vertical gradient of 0.046 ft/ft was observed in May 2014 between MW-38S and MW-38D. However, data from continuous datalogger elevations recorded in 2010 (OASIS 2011) showed a negligible vertical gradient between MW-38S and MW-38D. The vertical gradient observed in 2014 is likely due to rapid changes in groundwater elevations during spring break up. A much smaller upward vertical gradient of 0.002 ft/ft was observed in December 2013 between MW-38S and MW-38D.

The 2010 finding of a perched water table in the vicinity of MW-29R, MW-30R, MW-39, and MW-40 could not be fully evaluated in May 2014 due to the lack of data at MW-29R (removed), MW-30R (frozen), and MW-39 (flooded).

Groundwater Analytical Results

Table 6 presents the 2013 groundwater analytical results which are also depicted on Figure 4. Table 7 includes current and historical groundwater analytical results. Attachment 7 contains the laboratory analytical report and Attachment 8 presents a quality assurance review and completed ADEC laboratory data checklist. The 2013 Groundwater results are summarized below.

- PCE was not detected in MW-38S, MW-38D, or MW-40. PCE was detected above the ADEC groundwater cleanup level (GCL) of 5 micrograms/Liter ($\mu\text{g/L}$) in MW-11R at a depth of approximately 25 feet with a concentration of 14.7 $\mu\text{g/L}$.
- TCE was not detected in any of the sampled wells in 2013.

- cDCE was not detected in MW-38D and was detected but was below the ADEC GCL in MW-38S. Two of the wells had concentrations above ADEC GCL of 70 µg/L; MW-11R at 1,220 µg/L and MW-40 at 872 µg/L.
- VC was not detected in MW-11R, MW-38D, or MW38S. VC was detected above the ADEC GCL of 2 µg/L in In MW-40 at 10.9 µg/L.
- Benzene was not detected in MW-38D and was detected but was below the ADEC GCL in MW-40. Benzene was detected above the ADEC GCL of 5 µg/L in MW-11R at 6.12 µg/L and MW-38S at 12.0 µg/L.
- The presence of PCE daughter products indicate natural biological degradation of PCE is taking place through the process of reductive dechlorination at the Site.

Table 6 and Figure 4 demonstrate that the chlorinated alkenes extend throughout MW-11R and MW-40. However, there were no chlorinated alkene detections in MW-38S. The screen of MW-38S is partially completed in an area of non-native sand and gravel fill (OASIS 2010). The area around MW-38S is more permeable and may allow infiltration and dilution in sample concentrations compared to wells with screens completed in native silts which have lower permeability such as MW-11R.

No contaminant concentrations exceeding ADEC GCLs were detected in MW-38D. Based on these results there is no evidence of contamination in the 30-35 ft below ground surface (bgs) groundwater interval. Furthermore, these results suggest that the elevated groundwater concentrations detected in the MW-11R may be the result of in-well mixing due to the long screened interval of 29.5 feet.

The DO readings in all of the monitoring wells were between 0.16 mg/L and 0.32 mg/L. These results are within the range that is most conducive for anaerobic degradation.

The ORP results were between -79.8 millivolts (mV) and -21 mV, indicating moderately reducing groundwater conditions that can be favorable for reductive dechlorination of PCE and TCE.

The groundwater temperature in MW-11R, MW-38S, and MW-40 ranged from 4.14°C to 5.28°C, while the groundwater temperature in MW-38D was 2.95°C.

The conductivity in monitoring wells MW-11R and MW-40 was 1.32 milliSiemens (mS) and 1.98 mS, respectively and was somewhat higher than the conductivity in MW-38S and MW-38D at 0.683 mS and 0.481 mS, respectively.

2010 Comparison

Table 7 presents current and historical groundwater analytical results. The Site wells were last sampled in 2010. In general, 2013 analytical results were similar to concentrations reported in 2010 with the exception of MW-11R where PCE, TCE, and VC decreased in 2013 compared to 2010 at the 25-foot depth interval. VC was detected in MW-11R above ADEC GCL during the previous five monitoring events between 2005 and 2010; however, VC was not detected in MW-11R in 2013. TCE was detected in

MW-11R above ADEC GCL during the previous four of five monitoring events; however, TCE was not detected in MW-11R in 2013. PCE was reduced slightly in MW-11R compared to 2010 but the 2013 level remained above ADEC GCLs. Although some MR-11R COPCs were reduced in 2013, the overall molar concentration did not decrease from previous events.

Concentrations at MW-38S, MW-38D, and MW-40 were similar concentrations to those observed in 2010. DO, ORP, temperature and conductivity results are generally consistent with 2010 data.

CONCLUSIONS

The Former Drainage Pond Site continues to exhibit groundwater concentrations above ADEC GCLs for benzene, PCE, cDCE, and VC. The presence of PCE daughter products indicate natural biological degradation of PCE is taking place through reductive dechlorination. 2013 MW-11R results exhibited a reduction in VC and TCE to below detectable limits. However, molar concentrations did not decrease from previous events. There were no exceedances of TCE or tDCE in any well sampled. There were no exceedances of ADEC GCLs in MW-38D, indicating no contamination in the 30-35 ft below ground surface (bgs) groundwater interval. These results suggest that the elevated groundwater concentrations detected in the deeper samples from MW-11R are likely the result of in-well mixing.

The groundwater plume boundaries have not been fully characterized. Groundwater chlorinated alkenes were present throughout most of the area sampled in 2013.

RECOMMENDATIONS

Groundwater should be monitored once every two years to continue to document reductive dechlorination processes and evaluate downgradient concentrations. Future monitoring should include MW-11R, MW-38S, MW-38D, MW-39, and MW-40, MW-34, and MW-35. MW-34 and MW-35 should be monitored to evaluate downgradient COPC concentrations. MW-11R should be sampled at only one interval (approximately 30 feet below top of casing) to coincide with the MW-38D screened interval. Samples should be analyzed for PCE and its daughter products. Groundwater sampling and hydrological evaluation should be conducted during the summer or fall prior to freeze up in future monitoring events.

The PVC casing in MW-34 and MW-35 should be cut down and repaired to allow room for a proper fitting well cap and monument cover. The monument at MW-35 should be reset and the PVC casing should be shortened to allow a flush mount monument and monument cover.

If you have any further questions or concerns, please feel free to contact Cody Black at (907) 264-4459 or Nellie Ballou at (907)-458-8270.

Sincerely,



Nellie Ballou
Project Manager, 907-458-8270



Tim McDougall
Senior Engineer, 907-727-4880

cc:

Robert Burgess, ADEC
Max Schwenne, Partner-in-Charge

Tables:

1. COCs and 18 AAC 75 Soil and Groundwater Cleanup Levels (in text)
2. Summary of Drainage Pond Field Activities (in text)
3. Well Integrity Survey Results - Drainage Pond (in text)
4. Cumulative Groundwater Elevations
5. Groundwater Calculations
6. 2013 Groundwater Monitoring Results
7. Cumulative Groundwater Monitoring Results.

Figures:

1. Vicinity and Site Location Map
2. Site Plan
3. Monitoring Well Locations
4. Groundwater Analytical Results December 2013
5. Groundwater Elevations

Attachments:

1. Field Notes and Data Sheets
2. Photographic Log
3. Professional Elevation Survey
4. Waste Manifest
5. Well Integrity Survey
6. Datalogger Groundwater Elevations
7. Laboratory Analytical Report
8. QAR and ADEC Laboratory Data Checklist

REFERENCES

- ERM 2013. *Fairbanks International Airport Drainage Pond Work Plan*. November.
- ERM 2014. *2013 Fuel Hydrant Groundwater Monitoring Report*. June
- OASIS 2009. *Draft Feasibility Study Former Drainage Pond, Fairbanks International Airport, Fairbanks, Alaska*. February.
- OASIS 2011. *Additional Characterization and Groundwater Monitoring, Former Drainage Pond Site, Fairbanks International Airport*. February.

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TABLES

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FIGURES

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ATTACHMENT 1

Field Notes and Data Sheets

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ATTACHMENT 2

Photographic Log

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ATTACHMENT 3

Professional Elevation Survey

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ATTACHMENT 4

Waste Manifest

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ATTACHMENT 5

Well Integrity Survey

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ATTACHMENT 6

Datalogger Groundwater Elevations

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ATTACHMENT 7

Laboratory Analytical Report

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ATTACHMENT 8

QAR and ADEC Laboratory Data Checklist

TABLES

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**TABLE 4: CUMMULATIVE GROUNDWATER ELEVATIONS
FAIRBANKS INTERNATIONAL AIRPORT
FORMER DRAINAGE POND CONTAMINATED SITE**

| Location | Date | Top of Casing Elevation (FASL) | Depth to Groundwater below TOC (feet) | Groundwater Table Elevation (FASL) |
|----------|------------|--------------------------------|---------------------------------------|------------------------------------|
| MW-5 | 4/6/1998 | 432.1 | NA | 416.37 |
| | 8/19/1998 | 432.1 | NA | 419.64 |
| | 3/16/1999 | 432.1 | NA | 415.54 |
| | 8/5/1999 | 432.1 | 7.12 | 419.88 |
| | 9/23/1999 | 432.1 | 9.60 | 417.4 |
| | 9/27/2005 | 432.24 | 7.95 | 424.29 |
| | 5/5/2014 | 431.57 | 9.33 | 422.24 |
| MW-9 | 8/6/1999 | 435.15 | 10.28 | 419.77 |
| | 9/23/1999 | 435.15 | 12.20 | 417.85 |
| | 9/12/2000 | 435.15 | 10.07 | 419.98 |
| | 9/27/2005 | 435.21 | 10.83 | 424.38 |
| | 5/5/2014 | 435.11 | 12.91 | 422.2 |
| MW-10 | 8/8/1999 | 432.03 | 6.00 | 420.93 |
| | 9/23/1999 | 432.03 | 9.40 | 417.53 |
| | 9/27/2005 | 432.02 | 7.87 | 424.15 |
| | 11/2/2010 | 432.06 | 11.26 | 420.8 |
| | 5/5/2014 | 431.88 | 9.82 | 422.06 |
| MW-11R | 9/27/2005 | 430.9 | 6.76 | 424.14 |
| | 10/6/2007 | 430.9 | 8.28 | 422.62 |
| | 10/21/2008 | 430.9 | 9.18 | 421.72 |
| | 11/2/2010 | 430.85 | 10.04 | 420.81 |
| | 12/5/2013 | 430.74 | 9.55 | 421.19 |
| | 5/5/2014 | 430.74 | 8.67 | 422.07 |
| MW-12 | 8/9/1999 | 434.53 | 7.1 | 422.33 |
| | 9/23/1999 | 434.53 | 11.92 | 417.51 |
| | 9/12/2000 | 434.53 | 9.62 | 419.81 |
| | 9/27/2001 | 434.53 | 11.53 | 417.9 |
| | 8/14/2002 | 434.53 | 8.78 | 420.65 |
| | 8/27/2003 | 434.53 | 9.25 | 420.18 |
| | 8/27/2004 | 434.53 | 9.12 | 425.41 |
| | 9/27/2005 | 434.59 | 10.33 | 424.26 |
| | 10/7/2007 | 434.59 | 11.91 | 422.68 |
| | 10/21/2008 | 434.59 | 13.82 | 420.77 |
| | 11/2/2010 | 434.55 | 13.67 | 420.88 |
| | 12/5/2013 | 434.41 | 13.17 | 421.24 |
| | 3/11/2014 | 434.41 | 13.89 | 420.52 |
| 5/5/2014 | 434.41 | 12.51 | 421.9 | |
| MW-29R | 10/8/2007 | Not Surveyed | 8.29 | - |
| | 10/20/2008 | Not Surveyed | 9.03 | - |
| | 11/17/2010 | 432.20 | Not Measured | - |
| | 10/12/2011 | 432.20 | Not Measured | - |
| | 12/5/2013 | Not Surveyed | 10.69 | 421.51 |
| | 3/11/2014 | Not Surveyed | 10.77 | 421.43 |
| | 5/5/2014 | Well Removed April 2014 | | |

**TABLE 4: CUMMULATIVE GROUNDWATER ELEVATIONS
FAIRBANKS INTERNATIONAL AIRPORT
FORMER DRAINAGE POND CONTAMINATED SITE**

| Location | Date | Top of Casing Elevation (FASL) | Depth to Groundwater below TOC (feet) | Groundwater Table Elevation (FASL) |
|----------|------------|--------------------------------|---------------------------------------|------------------------------------|
| MW-30R | 10/7/2007 | Not Surveyed | 9.23 | - |
| | 10/20/2008 | Not Surveyed | 9.90 | - |
| | 11/6/2009 | Not Surveyed | Well frozen @ 11.11 | |
| | 10/1/2010 | 433.60 | 9.16 | 424.44 |
| | 10/12/2011 | 433.60 | 10.30 | 423.30 |
| | 10/12/2012 | 433.60 | 9.89 | 423.71 |
| | 3/21/2013 | 433.60 | 13.23 | 420.37 |
| | 5/21/2013 | 433.60 | Well frozen @ 4.13 | |
| | 6/14/2013 | 433.60 | Well frozen @ 4.13 | |
| | 12/3/2013 | 433.44 | Well frozen @ 11.02 | |
| | 3/11/2014 | 433.44 | Well frozen @ 11.02 | |
| 5/5/2014 | 433.44 | Well frozen @4.25 | | |
| MW-34 | 10/12/2011 | 429.99 | 8.46 | 421.53 |
| | 10/12/2012 | 429.99 | 8.04 | 421.95 |
| | 3/21/2013 | 429.99 | 9.66 | 420.33 |
| | 5/21/2013 | 429.99 | 8.75 | 421.24 |
| | 6/14/2013 | 429.99 | 6.40 | 423.59 |
| | 3/11/2014 | 430.00 | 9.34 | 420.66 |
| | 5/5/2014 | 430.00 | 8.94 | 421.06 |
| MW-35 | 9/27/2005 | 429.55 | 5.47 | 424.08 |
| | 10/21/2008 | 429.55 | 8.15 | 421.40 |
| | 11/2/2010 | 430.01 | 9.35 | 420.66 |
| | 11/15/2010 | 429.54 | Well casing cut down-resurveyed | |
| | 12/5/2013 | 429.89 | 8.46 | 421.43 |
| | 3/11/2014 | 429.89 | 9.38 | 420.51 |
| | 5/5/2014 | 429.89 | 8.91 | 420.98 |
| MW-36 | 10/12/2011 | 430.57 | 8.71 | 421.86 |
| | 10/12/2012 | 430.57 | 8.35 | 422.22 |
| | 3/21/2013 | 430.57 | 10.01 | 420.56 |
| | 5/21/2013 | 430.57 | 9.05 | 421.52 |
| | 6/14/2013 | 430.57 | 6.77 | 423.80 |
| | 3/11/2014 | 430.43 | 9.78 | 420.65 |
| | 5/5/2014 | 430.43 | 8.29 | 422.14 |
| MW-37 | 11/2/2010 | 429.31 | 8.66 | 420.65 |
| | 5/5/2014 | 429.20 | 7.21 | 421.99 |
| MW-38D | 11/2/2010 | 430.10 | 9.27 | 420.83 |
| | 12/5/2013 | 430.00 | 8.80 | 421.20 |
| | 5/5/2014 | 430.00 | 8.90 | 421.10 |
| MW-38S | 11/2/2010 | 430.04 | 9.23 | 420.81 |
| | 12/5/2013 | 429.93 | 8.78 | 421.15 |
| | 5/5/2014 | 429.93 | 7.85 | 422.08 |
| MW-39 | 11/2/2010 | 430.34 | 8.42 | 421.92 |
| | 12/5/2013 | 430.26 | 8.15 | 422.11 |
| | 5/5/2014 | 430.26 | Well flooded | - |
| MW-40 | 11/2/2010 | 430.70 | 8.73 | 421.97 |
| | 12/5/2013 | 430.58 | 9.24 | 421.34 |
| | 5/5/2014 | 430.58 | 9.18 | 421.40 |

Elevations are based on the NAVD '88 Datum.

**TABLE 5: GROUNDWATER CALCULATIONS
FAIRBANKS INTERNATIONAL AIRPORT
FORMER DRAINAGE POND CONTAMINATED SITE**

| Gradient Using MW-12, MW-36 and MW-37 | | | Gradient Using MW-34, MW-36 and MW-35 | | |
|---------------------------------------|-------------------------------------|--------------|---------------------------------------|-------------------------------------|--------------|
| Well | Water Table Elevation (ft. NAVD'88) | Relationship | Well | Water Table Elevation (ft. NAVD'88) | Relationship |
| MW-37 | 421.99 | mid | MW-34 | 421.06 | mid |
| MW-12 | 421.9 | low | MW-35 | 420.98 | low |
| MW-36 | 422.14 | high | MW-36 | 422.14 | high |
| distance from high to low (ft) | | 795 | distance from high to low (ft) | | 420 |
| equipotential point (ft) | | 496.87 | equipotential point (ft) | | 391.03 |
| gradient (ft/ft) | | 0.0004 | gradient (ft/ft) | | 0.0008 |
| direction | | West @ 248 | direction | | West @ 268 |

| Vertical Gradient (MW-38S to MW-38D) | | | |
|--------------------------------------|-----------|-----------------------|------------------|
| Date | Distance* | Elevation Change (ft) | Gradient (ft/ft) |
| 12/5/2014 | 21.5 | 0.05 | 0.002 |
| 5/5/2014 | 21.5 | 0.98 | 0.046 |

*Middle of screen to middle of screen
Elevations are based on the NAVD '88 Datum
ft = Feet
FASL = Feet Above Sea Level
TOC = Top of Well Casing
Elevations measured on May 5, 2014

**TABLE 6: 2013 GROUNDWATER MONITROING RESULTS
FAIRBANKS INTERNATIONAL AIRPORT
FORMER DRAINAGE POND CONTAMINATED SITE**

| Compound | Units | ADEC GCL | MW-11R | MW-38D | MW-38S | MW-40 | |
|----------------|--------------------|-------------|---------------|-----------|-----------|-------------|-------------|
| | | | 12/19/2013 | 12/5/2013 | 12/5/2013 | 12/5/2013 | |
| | | | depth = 23 ft | Primary | Primary | Primary | Duplicate |
| Benzene | µg/L | 5 | 6.12 | ND (0.5) | 12 | 2.8 | 2.78 |
| cis-1,2-DCE | µg/L | 70 | 1,220 | ND (0.5) | 20.9 | 872 | 837 |
| trans-1,2-DCE | µg/L | 100 | 9.4 | ND (0.5) | ND (0.5) | 7.85 | 7.63 |
| TCE | µg/L | 5 | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| PCE | µg/L | 5 | 14.7 | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Vinyl chloride | µg/L | 2 | ND (0.5) | ND (0.5) | ND (0.5) | 10.9 | 9.37 |
| Temperature | °C | - | 4.19 | 2.95 | 4.14 | 5.28 | |
| pH | - | - | 6.61 | 6.8 | 6.86 | 6.63 | |
| Conductivity | mS/cm ^c | - | 1.322 | 0.481 | 0.683 | 1.982 | |
| Diss. Oxygen | mg/L | - | 0.27 | 0.21 | 0.32 | 0.16 | |
| ORP | mV | - | -78.6 | -21 | -79.8 | -79.6 | |

Bold value indicates value exceeds GCL

Key:

ADEC = Alaska Department of Environmental Conservation

°C = degrees Celcius

DCE= dichloroethene

GCL= groundwater cleanup level

mg/L = milligrams per liter

mS/cm^c =microsiemens per cinetmeter corrected for temperature

mV = millivolts

ND= non-detect above method detection limit

PCE= tetrachloroethene

TCE= trichloroethene

µg/L= micrograms per liter

**TABLE 7: CUMMULATIVE GROUNDWATER MONITORING RESULTS
FAIRBANKS INTERNATIONAL AIRPORT
FORMER DRAINAGE POND CONTAMINATED SITE**

| Monitoring Well | Sample Date | Benzene (µg/L) | Vinyl Chloride (µg/L) | cis-1,2-DCE (µg/L) | trans-1,2-DCE (µg/L) | TCE (µg/L) | PCE (µg/L) | Molar Concentration of Total Chlorinated Alkenes (mol/mL) |
|---|-------------|----------------|-----------------------|--------------------|----------------------|------------|------------|---|
| MW-11 | 08/11/99 | ND (1.0) | 1.2 | 76.1 | ND (1.0) | ND (1.0) | ND (1.0) | 8.0E-04 |
| | 09/18/00 | ND (1.0) | 1.84 | 230 | 1.25 | 12.9 | 38 | 2.7E-03 |
| | 05/21/01 | 1.27 | 4.74 | 670 | 3.82 | 7.00 | 2.79 | 7.1E-03 |
| | 09/27/01 | 1.30 | 3.47 | 566 | 3.83 | 38.6 | 80.4 | 6.7E-03 |
| | 08/15/02 | 1.23 | ND (1.0) | 195 | 2.68 | 3.80 | ND (1.0) | 2.1E-03 |
| | 08/27/03 | 0.93 | 7.92 | 822 | 11.8 | 24.8 | 17.1 | 9.0E-03 |
| | 08/27/04 | 0.95 | 2.44 | 150 | 1.17 | ND (1.0) | 3.74 | 1.6E-03 |
| MW-11 drive point well replaced with MW-11R 2" PVC well with 30' screen to 34.5' bgs on August 12, 2005 | | | | | | | | |
| MW-11R @ 15' | 09/27/05 | 8.0 | 0.82 | 630 | 3.2 | 15 | 31 | 6.8E-03 |
| | 11/02/06 | 4.51 | 3.00 | 800 | 7.52 | 6.28 | 13.6 | 8.5E-03 |
| | 10/17/07 | 4.5 | 1.60 | 970 | 8.8 | 59 | 380 | 0.013 |
| | 10/21/08 | 2.63 | 6.76 | 4,680 | 30.5 | 62 | 178 | 0.050 |
| | 10/29/10 | 6.62 | 7.58 | 953 | 8.15 | 5.4 | 29.8 | 0.010 |
| MW-11R @ 25' | 09/27/05 | 9.5 | 5.3 | 630 | 3.8 | 14 | 27 | 6.9E-03 |
| | 11/02/06 | 4.3 | 2.66 | 709 | 8.28 | 6.84 | 10.5 | 7.6E-03 |
| | 10/17/07 | 5.1 | 2.4 | 650 | 4.6 | 5.5 | 25 | 7.0E-03 |
| | 10/21/08 | 4.99 | 6.14 | 2,680 | 15.8 | 11.2 | 20.1 | 0.028 |
| | 10/29/10 | 6.72 | 6.94 | 873 | 7.29 | 4.58 | 23.5 | 0.009 |
| | 12/05/13 | 6.12 | ND (0.5) | 1,220 | 9.4 | ND (0.5) | 14.7 | 0.013 |
| MW-11R @ 35' | 09/27/05 | 8.9 | 6.0 | 930 | 6.2 | 18 | 34 | 0.010 |
| | 11/02/06 | 3.44 | 1.95 | 541 | 5.36 | 4.58 | 7.81 | 5.7E-03 |
| | 10/17/07 | 4.0 | 2.6 | 520 | 4.6 | 6.0 | 18 | 5.6E-03 |
| | 10/21/08 | 4.90 | 5.95 | 2,450 | 15.2 | 10.5 | 16.3 | 0.026 |
| | 10/29/10 | 6.94 | 7.07 | 810 | 7.26 | 4.62 | 20 | 8.7E-03 |
| MW-12 | 08/11/99 | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | 2.03 | 1.2E-05 |
| | 09/18/00 | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | 2.48 | 1.5E-05 |
| | 05/21/01 | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | 1.58 | 9.5E-06 |
| | 09/27/01 | ND (0.5) | ND (2.0) | ND (1.0) | ND (1.0) | ND (1.0) | 2.29 | 1.4E-05 |
| | 08/15/02 | ND (0.5) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | 1.94 | 1.2E-05 |
| | 08/27/03 | ND (0.4) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND |
| | 08/27/04 | ND (0.4) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | 3.80 | 2.3E-05 |
| | 09/27/05 | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND |
| | 11/01/06 | 0.47 | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | 2.78 | 1.7E-05 |
| 10/07/07 | ND (2.0) | ND (2.0) | ND (2.0) | ND (2.0) | ND (2.0) | 2.8 | 1.7E-05 | |
| MW-34 | 08/27/03 | ND (0.4) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND |
| | 08/27/04 | ND (0.4) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND |
| | 09/27/05 | ND (5.0) | ND (0.5) | ND (5.0) | ND (5.0) | ND (0.5) | ND (0.5) | ND |
| | 11/02/06 | ND (0.40) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND |
| | 10/07/07 | ND (0.20) | ND (0.20) | ND (0.20) | ND (0.20) | ND (0.20) | ND (0.20) | ND |

**TABLE 7: CUMMULATIVE GROUNDWATER MONITORING RESULTS
FAIRBANKS INTERNATIONAL AIRPORT
FORMER DRAINAGE POND CONTAMINATED SITE**

| Monitoring Well | Sample Date | Benzene (µg/L) | Vinyl Chloride (µg/L) | cis-1,2-DCE (µg/L) | trans-1,2-DCE (µg/L) | TCE (µg/L) | PCE (µg/L) | Molar Concentration of Total Chlorinated Alkenes (mol/mL) |
|------------------------|-------------|----------------|-----------------------|--------------------|----------------------|--------------|-------------|---|
| MW-35 | 09/27/05 | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND |
| | 11/02/06 | 0.25 J | ND (1.0) | 0.33 J | ND (1.0) | ND (1.0) | ND (1.0) | 3.4E-06 |
| | 10/06/07 | 0.77 | ND (0.20) | 0.46 | ND (0.20) | ND (0.20) | ND (0.20) | 4.7E-06 |
| MW-36 | 10/29/06 | ND (0.40) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND |
| | 10/07/07 | ND (0.20) | ND (0.20) | ND (0.20) | ND (0.20) | ND (0.20) | ND (0.20) | ND |
| MW-37 | 11/01/06 | 0.38 J | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND |
| | 10/06/07 | 0.27 | ND (0.20) | ND (0.20) | ND (0.20) | ND (0.20) | ND (0.20) | ND |
| MW-38S | 10/29/10 | 8.92 | 1.16 | 59.7 | 0.6J | ND (0.62) | 0.54J | 0.001 |
| | 12/05/13 | 12.00 | ND (0.5) | 20.9 | ND (0.5) | ND (0.5) | ND (0.5) | 0.0002 |
| MW-38D | 10/29/10 | ND (0.62) | ND (0.62) | ND (0.62) | ND (0.62) | ND (0.62) | ND (0.62) | ND |
| | 12/05/13 | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND |
| MW-39 | 10/29/10 | 7.96 | 6.1 | 200 | 5.01 | 0.79 | 0.71 | 0.002 |
| MW-40 | 10/29/10 | 2.7 | 12.9 | 1,080 | 7.38 | 0.88 | 1.14 | 0.011 |
| | 12/05/13 | 2.80 | 10.9 | 872 | 7.85 | ND (0.5) | ND (0.5) | 0.009 |
| TW-3 | 10/12/10 | 1.10 | 19.3 | 7,130 | 91 | 10.80 | 17.4 | 0.075 |
| ADEC GCL (µg/L) | | 5 | 2 | 70 | 100 | 5 | 5 | --- |

Notes: Indicates a 2013 sample result.

Bold value indicates value exceeds GCL

Value in parenthesis is the laboratory reporting limit.

Key:

ADEC = Alaska Department of Environmental Conservation

bgs = below ground surface

GCL = groundwater cleanup level

µg/L = micrograms per liter

mol/mL = moles per milliliter

ND = non-detect

DCE = dichloroethene

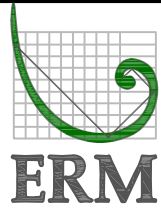
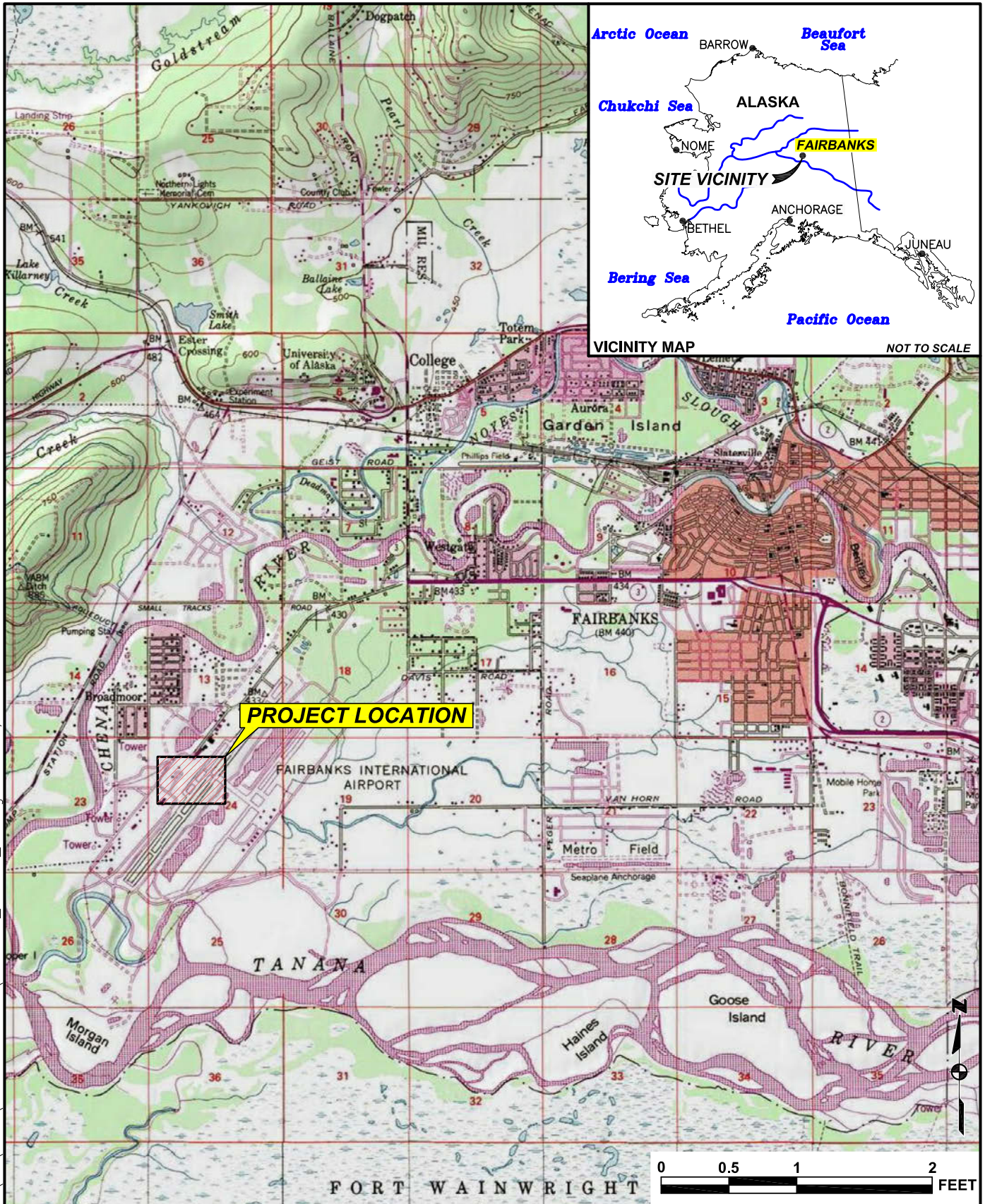
PCE = tetrachloroethene

TCE = trichloroethene

FIGURES

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V:\PROJECT_DRAWINGS\FIA\2013\DRAINAGE_POND\0219577_FIA-DP_F1.dwg Oct 09, 2013.



DATE: OCT. 2013
 CHKD: N.B.
 DRAWN: D.R.F.
 PROJ. No.: 0219577
 825 W. 8th Ave., Anchorage,
 AK 99501, (907) 258-4880

VICINITY AND SITE LOCATION MAP

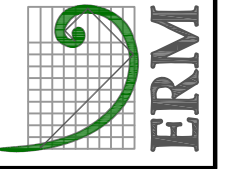
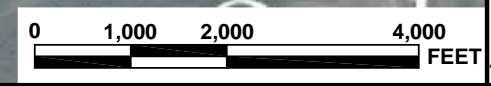
FAIRBANKS INTERNATIONAL AIRPORT
 DRAINAGE POND – CONTAMINATED SITE
 Fairbanks, Alaska

FIGURE

1

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V:\PROJECT DRAWINGS\FIA\2013\DRAINAGE_POND\0219577_FIA_DP_F2.dwg Oct 09, 2013.



DATE: OCT. 2013
CHKD: N.I.B.
DRAWN: D.R.F.
PROJ. No.: 0219577
825 W. 8th Ave., Anchorage,
AK 99501, (907) 258-4880

SITE PLAN

FAIRBANKS INTERNATIONAL AIRPORT
DRAINAGE POND – CONTAMINATED SITE
Fairbanks, Alaska

FIGURE

2

SOURCE: 2008 AERIAL PHOTOGRAPHY BY GOOGLE EARTH PROFESSIONAL.

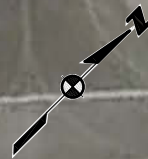
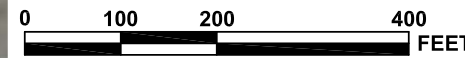
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M:\CAD\PROJECT DRAWINGS\0219577-FIA-DP\01\0219577-01_03.dwg Jun 04, 2014.



LEGEND

- MW-15 ⊕ MONITORING WELL LOCATIONS
 - MW-15 ⊕ MONITORING WELL LOCATIONS WITH WATER ELEVATION DATA LOGGERS
 - MW-15 ⊕ MONITORING WELL LOCATIONS SAMPLED
- NOTE: MUST BE PRINTED IN COLOR.



FIGURE

3

GROUNDWATER MONITORING LOCATIONS

FAIRBANKS INTERNATIONAL AIRPORT
DRAINAGE POND – CONTAMINATED SITE
Fairbanks, Alaska

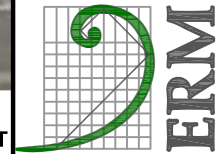
DATE: JUNE 2014

CHKD: N.I.B.

DRAWN: D.R.F.

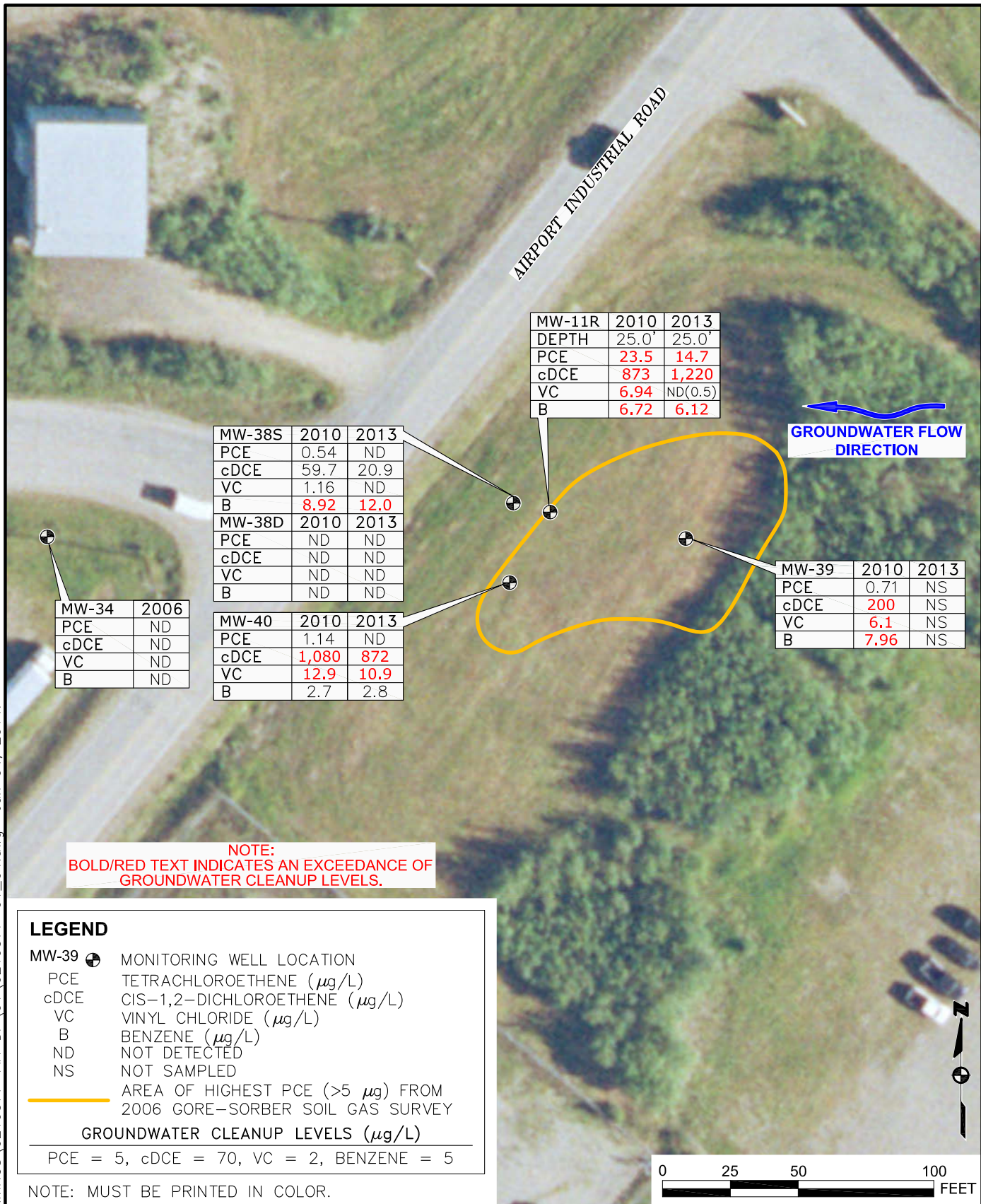
PROJ. No.: 0219577

825 W. 8th Ave., Anchorage,
AK 99501, (907) 258-4880



SOURCE: IMAGE FROM GOOGLE DIGITAL GLOBE, DATED 4/26/2010.

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NOTE:
BOLD/RED TEXT INDICATES AN EXCEEDANCE OF GROUNDWATER CLEANUP LEVELS.

LEGEND

- MW-39 MONITORING WELL LOCATION
- PCE TETRACHLOROETHENE ($\mu\text{g/L}$)
- cDCE CIS-1,2-DICHLOROETHENE ($\mu\text{g/L}$)
- VC VINYL CHLORIDE ($\mu\text{g/L}$)
- B BENZENE ($\mu\text{g/L}$)
- ND NOT DETECTED
- NS NOT SAMPLED
- AREA OF HIGHEST PCE (>5 μg) FROM 2006 GORE-SORBER SOIL GAS SURVEY

GROUNDWATER CLEANUP LEVELS ($\mu\text{g/L}$)

PCE = 5, cDCE = 70, VC = 2, BENZENE = 5

NOTE: MUST BE PRINTED IN COLOR.



DATE: JUNE 2014
 CHKD: N.B.
 DRAWN: D.R.F.
 PROJ. No.: 0219577
 825 W. 8th Ave., Anchorage, AK 99501, (907) 258-4880

GROUNDWATER RESULTS

FAIRBANKS INTERNATIONAL AIRPORT
 DRAINAGE POND – CONTAMINATED SITE
 Fairbanks, Alaska

FIGURE
4

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NOTE: MELTING OF SNOW STORAGE LOCATIONS LIKELY CONTRIBUTED TO FOCUSED INFILTRATION WHICH IMPAIRED ABILITY TO ACCURATELY DETERMINE GROUNDWATER ELEVATION CONTOURS AT THE SITE IN MAY 2014.



LEGEND

MW-15 MONITORING WELL LOCATION
 (421.48) GROUNDWATER ELEVATION (FT. NAVD'88)
 IN PARENTHESIS
 NM=NOT MEASURED
 GRADIENT MEASURED IN FT./FT.

M:\CAD\PROJECT DRAWINGS\0219577-FAA-DP\01\0219577-01_05.dwg Jun 17, 2014.



DATE: JUNE 2014
 CHKD: N.B.
 DRAWN: D.R.F.
 PROJ. No.: 0219577
 825 W. 8th Ave., Anchorage,
 AK 99501, (907) 258-4880

MAY 2014 GROUNDWATER ELEVATIONS
 FAIRBANKS INTERNATIONAL AIRPORT
 DRAINAGE POND - CONTAMINATED SITE
 Fairbanks, Alaska

FIGURE
 5

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ATTACHMENT 1

Field Notes and Data Sheets

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- 6-14-13 FIA Fuel Hydrant Rhods
- 1000 Begin locating MW-34
See data sheet for Free Product Monitoring Results.
- 1015 Complete MW-34, move to MW-30R.
- 1035 Complete MW-30R, move to Badging office to obtain Ramp pass.
- 1045 Obtain Ramp pass → head to Mail Trail Gate and on to MW-36.
- 1100 Complete MW-36, head to MW-25
- 1115 Complete MW-25, head to MW-1R
- 1125 Complete MW-1R, head to MW-15
- 1135 Complete MW-15, head to MW-18.
- 1145 Complete MW-15, head to Fire Dept Garage Bay to put decon water in floor drain/OWS.
- 1210 Rhodes off-site

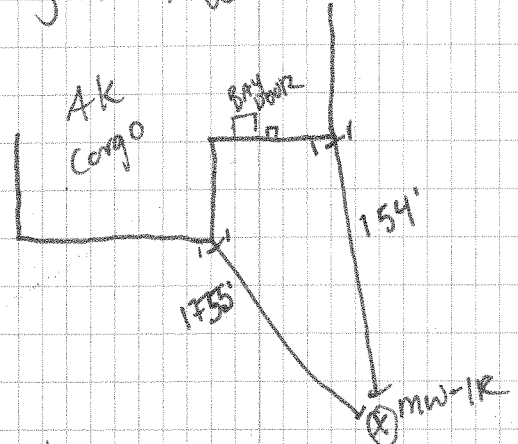
(A/1)

with Rhodes

(WR)

N. Bullou Rhodes H14 0° overcast 12.3.13

- 0915 Arrive at FIA - obtain Ramp pass from badging office.
Try to visit R. Cadigan in office. She was not there.
Meet Steve Henry. No signature required
- 1000 Locate MW-25
10: MW-25-120313 @ 1040
- 1145 Locate MW-1R
10: MW-1R-120313 @ 1205
Swing Tie MW-1R



- 1315 Locate MW-15
10: MW-15-120313 @ 1340, MS/MSD
Update swing tie book.

[Signature]

"Rite in the 4/2"

12-3-13

0° overcast

Ballou
Rhodes

1445 Locate MW-18

10: MW-18-120313 @ ^{on}+37 1525

Duplicate 10: MW-~~81~~ MW-81-120313 @ 1530

1600 Locate MW-30R.

No water present, depth is 11'. There is a blockage or well is broken. Frost-jacked. No sample collected.

1645 Locate MW-29R for reference. Will need ice hut to sample.

1700 ~~ERM~~ off site.

All Ballou

2/2

Ballou
Rhodes

Drainage Pond

12-5-13

0845 On site to conduct GW sampling at FIA drainage Pond. All wells are covered in snow. Start at MW-40

0915 Ballou off site to pick up more propane for sample hut.

1025 Sample MW-40

10: MW-40-120513 @ 1025

Duplicate 10: MW-41-120513 @ 1105.

1130 Ballou Return

1140 Locate MW-38S

10: MW-38S-120513 @ 1200

1215 Locate MW-38D

10: MW-38D-120513 @ 1245

1300 Locate MW-39, conduct well integrity survey.

1310 Locate MW-11R

Purge and collect parameters. Deploy 2 PDB @ approx. 25'. PDBs will be retrieved in approximately 2 weeks.

All Ballou

1/19

12.5.13

FAI DP
+10°FBallou
Rhodes

1420 Call Cody Black (Contract manager) @ ERM to discuss MW-29R. This well was removed from the Fuel Hydrant ROD wells because it historically had low levels. However, it was included in the 2013 Work Plan. Cody advised us to sample MW-29R to confirm results.

1430 Call R. Cadigan to request drum storage location. No answer. Call M. Schuenne. No answer.

1500 Locate ~~ER~~^{ER} MW-29R (Fuel hydrant well).

Significant draw down.

Purge dry and wait for at least 80% recharge.

10: MW-29R-120513 @ 1100

Prepare to deploy dataloggers.

Work Plan stated MW-30, MW-35,

MW-40 would receive loggers.

No water in MW-30R.

Changed location to MW-29R.

(14)

Mellison

Ballou
RhodesFAI DP
+10°F

12.5.13

Data logger Information

| Well ID | Logger SN | Time | DTW | Length |
|----------|-----------|----------|-------|--------------------------|
| MW-29R | 37387 | 1030 | 10.69 | 10.8 10.34 |
| MW-29R B | 1209187 | BARRAGOR | | |
| MW-12 | 21030050 | 1615 | 13.17 | 15.35 10.80 |
| MW-35 | 339165 | 1715 | 8.46 | 15.40 |

(15)
1645 Coordinate Fuel Hydrant waste (purge water disposal) at Maintenance shop oil-water separator drain. Dispose of \approx 8 gallons of Fuel Hydrant site water.

1725 Bring Drainage Pond non-hazardous waste drum to office because not able to make contact w/ R. Cadigan.

Drainage Pond waste drum will be stored @ ERM until results and manifest complete then delivered to Emerald Alaska.

1730 ERM off site

Return to (16)

12-5-13

Fuel/DT
+15°F

Bellan
Rhodes

Drainage Pond Sample Summary

| Sample ID/Well | Date | Time | Notes |
|----------------|----------|-------|------------------------|
| MW-40-120513 | 12/15/13 | 10:25 | |
| MW-41-120513 | ↓ | 11:05 | Dup of 40 |
| MW-38S-120513 | | 12:00 | |
| MW-39D-120513 | | 12:45 | |
| MW-11R- | - | - | PDB-sample in 2 weeks. |

All drainage Pond samples submitted for PCE, TCE, cDCE, tDCE, VC, benzene.

Fuel Hydrant Sample Summary

| MW Sample ID | Date | Time | Notes |
|---------------|---------|------|-----------|
| MW-25-120313 | 12/3/13 | 1040 | |
| MW-1R-120313 | ↓ | 1205 | |
| MW-15-120313 | | 1340 | MS/MSD |
| MW-18-120313 | | 1525 | |
| MW-81-120313 | ↓ | 1530 | Dup of 18 |
| MW-29R-120513 | 12/5/13 | 1600 | |

All Fuel Hydrant Submitted for B&TV, G&O, DCO
Well Integrity Survey Completed:
MW-40, 41, 38S, 38D, 39, 25, 1R,
15, 18, 30R, 29R, 12, 35.

Will Barn

Drainage Pond

0°F, cloudy

12-19-13

Allan
Rhodes

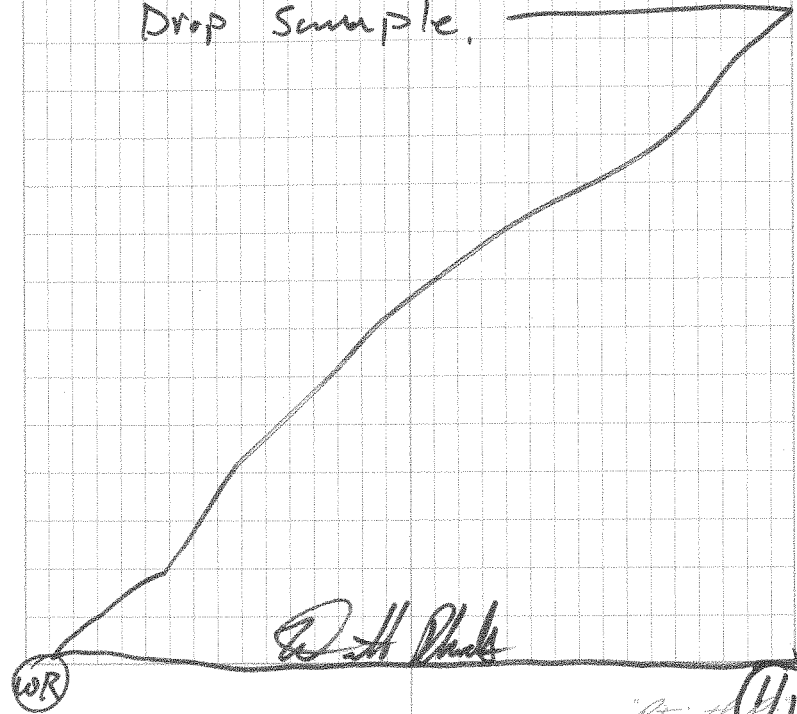
1400 CRM on-site to collect VOC Sample from PDB deployed @ MW-11R.

1430 Collect sample from upper of two PDB's deployed. Fill 3 VOA'S (40 mL)
Sample ID: MW-11R-120513

Time: 1430

Date: 12-19-13

1445 CRM off-site to SGS to Drop Sample.



Allan Rhodes

"Return to the..."

2-11-14

Ballou

1330 Emerald Alaska pick up
30-gal bung top blue drum
of purge water from
December 2013 Drainage Pond
Sampling event. Waste manifest
#212364. Signed by Rebekah
Cudigan (FIA) on Feb. 4, 2014.

Neil Ballou

N. Ballou

FIA
LNAPL monitoring
DL Download

3-11-14

L. Davis
0900 Meet FIA Badging/Security. Tailgate Safety
0930 Locate MW-30R.
MW-30R plugged @ 11.02' #4 block
1015 Locate MW-34.
Cup needs to be replaced
DTW = 9.34' @ 1018
otherwise good condition. 1/2" bolts
1030 locate MW-35.
DTW = 9.38' @ 1033
Download datalogger - note
datalogger is not daylight
saving time (ie. DL reads 9:37)
1051 Locate MW-29R
DTW = 11.77 @ 10:53
Download datalogger
1120 Locate MW-25
update swing tie
DTW = 12.65 @ 1121
no product.
1155 Locate MW-11Z
DTW = 13.74' @ 1158
1215 Locate MW-15
DTW = 14.26' @ 1220

Neil Ballou

3.11.14

LWAPL monitoring
DL Download

N. Ballou
L. Davis

1230 Locate MW-18
Depth to product = 14.15'
Depth to water = 14.55'

1315 Locate MW-36
DTW = 9.78' @ 1318
Total depth = 20'

1332 Locate MW-12
DTW = 13.89' @ 1335
Download datalogger

1400 Return to FIA Bidding office
return vehicle permit

15-1430 ERM off site.

Mellen Ballou

N. Ballou
W. Rhodes

Elevation Survey
Well Integrity Survey

5.5.14

0830 on site. Meet Design
Alaska at bidding office.
Get vehicle permit. Tailgate
safety meeting.

930 Begin MW integrity survey
while DA gets set up.
Locate MW-5.

1000 Attempt to locate MW-33
Not able to locate MW-33
Weak metal signal very
deep. Construction area
many cars parked in area.

1015 Attempt to locate MW-29.
In construction/excavation
area. Construction foreman said
DOT removed the well.

1025 MW-12 Remove datalogger
DTW = 10.25 ft btoC.

1040 Enter secure area to conduct
survey in all side
Survey 36, 9, 18, 15, 12, 2

No survey 4, ~~2~~ 25

MW-25 was significantly frost jacked

5.5.14

Elevation Survey
Well Integrity SurveyN. Ballan
W. Rhodes

1215 leave secure area after
surveyors complete horizontal
elevation survey.

1220 Begin integrity survey out-
side secure area.

1225 retrieve data logger from
mw-35 DTW = 8.91

Continue with integrity survey
Talk with construction foreman
"Rocky" stated that mw-29 was
removed during excavations and
that DOT was ok with that.

MW-28 was located in heavy
construction area with trenching
going on. MW-28 not located.

1240 Continue with survey.

Open all monitoring wells
for surveyors.

1415 Eem off site

Murray

2/4

N. Ballan
W. Rhodes

5.5.14

| Well Location | Time | DTW | Elev. Survey |
|---------------|------|-----------------|--------------|
| MW-05 | 935 | 9.33 | ✓ |
| mw-36 | 1035 | 8.29 | ✓ |
| mw-09 | 1055 | 12.91 | ✓ |
| mw-18 | 1105 | ice plug | ✓ |
| mw-15 | 1115 | 6.82 ice plug | ✓ |
| mw-1R | 1125 | ice plug | ✓ |
| mw-12 | 1025 | 12.51 | ✓ |
| mw-04 | 1140 | — | X |
| mw-25 | 1200 | — | X |
| mw-35 | 1225 | 8.91 | ✓ |
| mw-37 | 1235 | 7.21 | ✓ |
| mw-34 | 1255 | 8.94 | ✓ |
| mw-10 | 1315 | 9.82 | ✓ |
| mw-39 | 1325 | underwater | ✓ |
| mw-40 | 1330 | 9.18 | ✓ |
| mw-38S | 1333 | 7.85 | ✓ |
| mw-39D | 1340 | 8.90 | ✓ |
| mw-11R | 1345 | 8.67 | ✓ |
| mw-30 R | 1400 | ice plug @ 4.25 | ✓ |
| mw-02 | 1205 | ice plug @ 4.47 | ✓ |

Survey total = 18 wells

See data sheets for well integrity
survey.

Murray

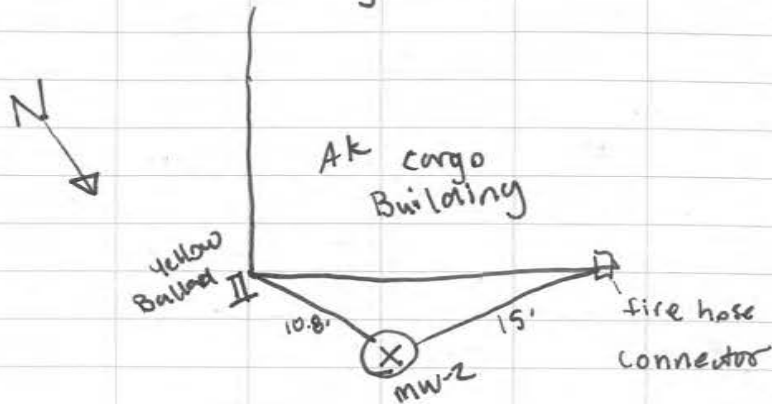
3/4

5.5.15

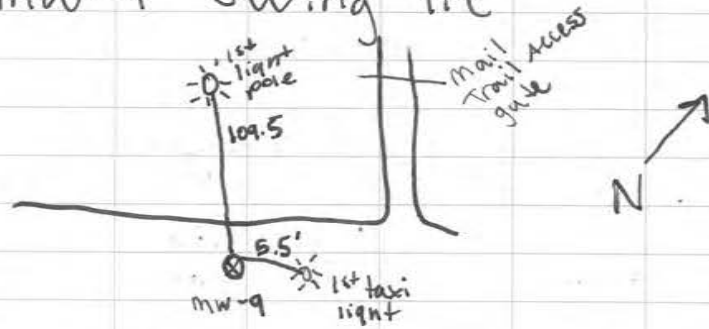
F14

N. Ballou
N. Rhodes

MW-2 Swing Tie



mw-9 Swing Tie



Nellie Ballou

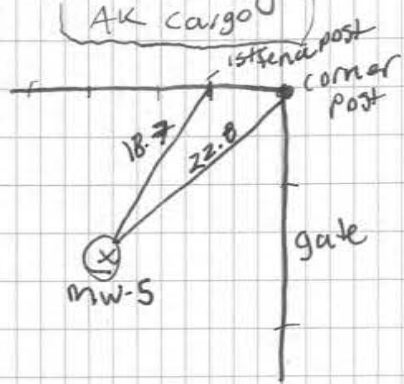
4/4

5.5.15

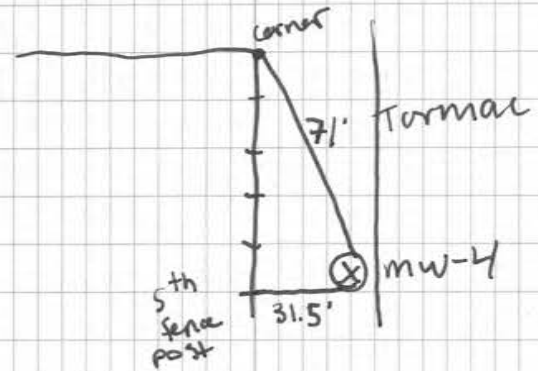
F14

N. Ballou
W. Rhodes

MW-5 Swing Tie



mw-4 Swing Tie



Nellie Ballou

1/1

Fairbanks International Airport
Work Plan

Low-Flow Groundwater Sampling with Minimal Drawdown Worksheet

Weather Conditions: 15°F, Cloudy Well ID: MW-11R
 Project #: FIA Date: 12.5.0
 Project Name: Drainage Pond Start Time: 1310
 Site: _____ End Time: 1450
 Field Team: Ballar Rhodes
 Sample ID: MW-11R-12-13 Time: _____ primary dup split ms/msd
 Sample ID: _____ Time: _____ primary dup split ms/msd
 Sample ID: _____ Time: _____ primary dup split ms/msd

Purging and Sampling Method (e.g. peristaltic, bladder, submersible): Peristaltic
 Total Volume Purged: 2400
 Depth to Top of Product (ft BTOC): — Depth to Water (ft BTOC): 9.55
 Depth to Oil/Water Interface* (ft BTOC): — Total Depth (ft BTOC): 34.1
 * Note: Same as depth to water

Criteria for Stable Parameters

| Parameter | Working Range | Stability Criteria | Notes |
|------------------|---------------|--------------------|-------|
| Temperature | >0.00 °C | ± 3% | |
| pH | 0-14 | ± 0.1 | |
| Conductivity | 0-999 mS/m | ± 3% | |
| ORP | ± 1999 mV | ± 10 mv | |
| Dissolved Oxygen | 0-19.99 mg/L | ± 10% | |
| Turbidity | 0-800 NTU | | |

Sensory Observations
 Color: Clear, Amber, Tan, Brown, Grey, Milky White, Other:
 Odor: None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
 Sheen: Present, Not Present
 Turbidity: None, Low, Medium, High, Very Turbid, Heavy Silts

Instrument Observations Flow Rate = _____

| Round | Time | Temp °C | pH | Conductivity (mS/cm) | Conductivity (uS/cm) | DO (mg/L) | ORP (mV) | Color | Odor | Sheen | Water Level (ft BTOC) | Draw-down |
|-------|------|---------|------|----------------------|----------------------|-----------|----------|-------|------|-------|-----------------------|-----------|
| 1 | 1317 | 3.97 | 6.62 | 1.287 | 770 | 6.28 | -11.8 | Clear | None | NP | 9.55 | — |
| 2 | 1320 | 4.23 | 6.61 | 1.304 | 787 | 1.27 | -47.1 | Clear | None | NP | 9.55 | — |
| 3 | 1323 | 4.13 | 6.59 | 1.333 | 802 | 0.64 | -61.5 | Clear | | | | — |
| 4 | 1326 | 4.14 | 6.59 | 1.337 | 805 | 0.40 | -70.0 | | | | | — |
| 5 | 1329 | 4.24 | 6.60 | 1.333 | 804 | 0.31 | -75.2 | | | | | — |
| 6 | 1332 | 4.19 | 6.61 | 1.322 | 797 | 0.27 | -78.6 | | | | | — |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | |

Notes: Drawdown should be less than 0.3 feet while sampling. Minimal drawdown shall be achieved and measured by pumping at a low rate (approximately 0.1 to 0.5 liter/minute) and continually measuring water levels in the well. Note that site's hydrogeology may make it difficult to achieve this specification.

| Analyses | Collected | Comments: |
|----------|-----------|--|
| | | Deployed 2 PDBs @ ± 25' bgs. Will retrieve in 2 weeks* |
| | | |
| | | |
| | | |
| | | |
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| | | |
| | | |
| | | |

Signed: Neil Bar Date: 12/5/13

Fairbanks International Airport
Work Plan

Low-Flow Groundwater Sampling with Minimal Drawdown Worksheet

Weather Conditions: +10°F Well ID: MW-385
 Project #: EIA Date: 12.5.13
 Project Name: Drainage Pond Start Time: 1140
 Site: _____ End Time: 1210
 Field Team: Buller/Rhodes
 Sample ID: MW-385-120613 Time: 1200 (primary) dup split ms/msd
 Sample ID: _____ Time: _____ primary dup split ms/msd
 Sample ID: _____ Time: _____ primary dup split ms/msd

Purging and Sampling Method (e.g. peristaltic, bladder, submersible): Peristaltic

Total Volume Purged: 2 gal

Depth to Top of Product (ft BTOC): —
 Depth to Oil/Water Interface* (ft BTOC): —

Depth to Water (ft BTOC): 8.78
 Total Depth (ft BTOC): 14.57

* Note: Same as depth to water

Criteria for Stable Parameters

| Parameter | Working Range | Stability Criteria | Notes |
|------------------|---------------|--------------------|-------|
| Temperature | >0.00 °C | ± 3% | |
| pH | 0-14 | ± 0.1 | |
| Conductivity | 0-999 mS/m | ± 3% | |
| ORP | ± 1999 mV | ± 10 mv | |
| Dissolved Oxygen | 0-19.99 mg/L | ± 10% | |
| Turbidity | 0-800 NTU | | |

Sensory Observations

Color: Clear, Amber, Tan, Brown, Grey, Milky White, Other:
 Odor: None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
 Sheen: Present, Not Present
 Turbidity: None, Low, Medium, High, Very Turbid, Heavy Silts

Instrument Observations Flow Rate = 200 mL/min

| Round | Time | Temp °C | pH | Conductivity (mS/cm) | Conductivity (uS/cm) | DO (mg/L) | ORP (mV) | Color | Odor | Sheen | Water Level (ft BTOC) | Draw-down |
|-------|------|---------|------|----------------------|----------------------|-----------|----------|-------|------|-------|-----------------------|-----------|
| 1 | 1145 | 4.20 | 6.89 | 0.674 | 407 | 3.44 | -60.0 | Amber | None | — | 8.78 | — |
| 2 | 1148 | 4.22 | 6.85 | 0.673 | 406 | 0.76 | -79.0 | ' | ' | ' | 8.70 | — |
| 3 | 1151 | 4.28 | 6.85 | 0.677 | 409 | 0.48 | -77.0 | ' | ' | ' | ' | ' |
| 4 | 1154 | 4.17 | 6.83 | 0.682 | 410 | 0.37 | -79.0 | ' | ' | ' | ' | ' |
| 5 | 1157 | 4.13 | 6.86 | 0.682 | 410 | 0.34 | -80.3 | ' | ' | ' | ' | ' |
| 6 | 1200 | 4.14 | 6.86 | 0.683 | 411 | 0.32 | -79.8 | ' | ' | ' | ' | ' |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | |

Notes: Drawdown should be less than 0.3 feet while sampling. Minimal drawdown shall be achieved and measured by pumping at a low rate (approximately 0.1 to 0.5 liter/minute) and continually measuring water levels in the well. Note that site's hydrogeology may make it difficult to achieve this specification.

| Analyses | Collected | Comments: |
|----------|-----------|-----------|
| VOC'S | | |
| | | |
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| | | |
| | | |
| | | |

Signed: [Signature]

Date: 12/5/13

Fairbanks International Airport
Work Plan

Low-Flow Groundwater Sampling with Minimal Drawdown Worksheet

Weather Conditions: 15°F, Cloudy Well ID: MW-38D
 Project #: EIA Date: 12-5-13
 Project Name: Drainage Pond Start Time: 1215
 Site: _____ End Time: 1300
 Field Team: Rhodes, Ballou
 Sample ID: MW-38D-120513 Time: 1245 primary dup split ms/msd
 Sample ID: _____ Time: _____ primary dup split ms/msd
 Sample ID: _____ Time: _____ primary dup split ms/msd

Purging and Sampling Method (e.g. peristaltic, bladder, submersible): Peristaltic
 Total Volume Purged: 1.5 gal

Depth to Top of Product (ft BTOC): - Depth to Water (ft BTOC): 8.80
 Depth to Oil/Water Interface* (ft BTOC): - Total Depth (ft BTOC): 34.27
 * Note: Same as depth to water

Criteria for Stable Parameters

| Parameter | Working Range | Stability Criteria | Notes |
|------------------|---------------|--------------------|-------|
| Temperature | >0.00 °C | ± 3% | |
| pH | 0-14 | ± 0.1 | |
| Conductivity | 0-999 mS/m | ± 3% | |
| ORP | ± 1999 mV | ± 10 mv | |
| Dissolved Oxygen | 0-19.99 mg/L | ± 10% | |
| Turbidity | 0-800 NTU | | |

Sensory Observations
 Color: Clear, Amber, Tan, Brown, Grey, Milky White, Other:
 Odor: None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
 Sheen: Present, Not Present
 Turbidity: None, Low, Medium, High, Very Turbid, Heavy Silts

Instrument Observations Flow Rate = 200 mL/min

| Round | Time | Temp °C | pH | Conductivity (mS/cm) | Conductivity (uS/cm) | DO (mg/L) | ORP (mV) | Color | Odor | Sheen | Water Level (ft BTOC) | Draw-down |
|-------|------|---------|------|----------------------|----------------------|-----------|----------|-------|------|-------|-----------------------|-----------|
| 1 | 1229 | 3.25 | 6.97 | 0.486 | 284 | 1.91 | -2.2 | Clear | None | NP | 8.80 | - |
| 2 | 1232 | 3.15 | 6.86 | 0.483 | 281 | 0.45 | -11.5 | Clear | None | NP | 8.80 | - |
| 3 | 1235 | 3.04 | 6.82 | 0.482 | 280 | 0.27 | -18.1 | Clear | | | | - |
| 4 | 1238 | 2.95 | 6.80 | 0.481 | 279 | 0.21 | -21.0 | Clear | | | | - |
| 5 | 1241 | | | | | | | | | | | - |
| 6 | | | | | | | | | | | | - |
| 7 | | | | | | | | | | | | - |
| 8 | | | | | | | | | | | | - |
| 9 | | | | | | | | | | | | - |
| 10 | | | | | | | | | | | | - |
| 11 | | | | | | | | | | | | - |
| 12 | | | | | | | | | | | | - |

Notes: Drawdown should be less than 0.3 feet while sampling. Minimal drawdown shall be achieved and measured by pumping at a low rate (approximately 0.1 to 0.5 liter/minute) and continually measuring water levels in the well. Note that site's hydrogeology may make it difficult to achieve this specification.

| Analyses | Collected | Comments: |
|----------|-----------|-----------|
| 8260 B | 3 | |
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| | | |

Signed: [Signature] Date: 12/5/13

ATTACHMENT 2

Photographic Log

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PHOTOGRAPH 1: MW-11R DEPLOYMENT OF PDB 5 DECEMBER 2013.



PHOTOGRAPH 2: MW-11R PDB RETRIEVAL 19 DECEMBER 2013.



PHOTOGRAPH 3: DECEMBER GROUNDWATER SAMPLING HUT



PHOTOGRAPH 4: MW-12 WELL INTEGRITY SURVEY AND DATALOGGER DEPLOYMENT

ATTACHMENT 3

Professional Elevation Survey

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MONITOR WELL SURVEY
Fairbanks International Airport
Fairbanks, AK

| <u>WELL ID</u> | <u>NORTHING</u> | <u>EASTING</u> | <u>PIPE ELEV.</u> |
|----------------|-----------------|----------------|-------------------|
| MW-1R | 3956397.54 | 1348654.21 | 434.65 |
| MW-2 | 3956434.55 | 1348506.51 | 435.44 |
| MW-5 | 3956251.57 | 1348495.36 | 431.57 |
| MW-9 | 3956751.72 | 1348659.70 | 435.11 |
| MW-10 | 3956276.13 | 1347793.05 | 431.88 |
| MW-11R | 3956596.76 | 1348040.27 | 430.74 |
| MW-12 | 3956035.07 | 1347941.06 | 434.41 |
| MW-15 | 3956611.52 | 1348819.43 | 435.17 |
| MW-18 | 3957036.17 | 1349176.42 | 435.15 |
| MW-30R | 3956474.17 | 1348286.87 | 433.44 |
| MW-34 | 3956587.64 | 1347854.69 | 430.00 |
| MW-35 | 3956686.01 | 1347799.89 | 429.89 |
| MW-36 | 3956780.77 | 1348201.79 | 430.43 |
| MW-37 | 3956821.73 | 1347832.76 | 429.20 |
| MW-38D | 3956600.06 | 1348026.72 | 430.00 |
| MW-38S | 3956601.31 | 1348024.43 | 429.93 |
| MW-39 | 3956587.00 | 1348090.25 | 430.26 |
| MW-40 | 3956570.78 | 1348025.36 | 430.58 |

Coordinates are Alaska State Plane, Zone 3, NAD83, U.S. Survey feet
 Elevations are NAVD88 vertical datum, feet

Wells Surveyed May 5, 2014 for ERM Alaska, Inc.

**ATTACHMENT 2: ELEVATION SURVEY COMPARISON
FAIRBANKS INTERNATIONAL AIRPORT
FUEL HYDRANT SYSTEM CONTAMINATED SITE**

| Well ID | Northing | Easting | May 2014 Pipe Elevation (ft) | Nov. 2010 Pipe Elevation (ft) | Difference in Elevation (ft) | Frost Jacking |
|---------|------------|------------|------------------------------|-------------------------------|------------------------------|---------------|
| MW-1R | 3956397.54 | 1348654.21 | 434.65 | 434.76 | -0.11 | Slight |
| MW-2 | 3956434.55 | 1348506.51 | 435.44 | Not Surveyed | NA | NA |
| MW-5 | 3956251.57 | 1348495.36 | 431.57 | Not Surveyed | NA | NA |
| MW-9 | 3956751.72 | 1348659.70 | 435.11 | Not Surveyed | NA | NA |
| MW-10 | 3956276.13 | 1347793.05 | 431.88 | 432.06 | -0.18 | Moderate |
| MW-11R | 3956596.76 | 1348040.27 | 430.74 | 430.85 | -0.11 | Slight |
| MW-12 | 3956035.07 | 1347941.06 | 434.41 | 434.55 | -0.14 | Slight |
| MW-15 | 3956611.52 | 1348819.43 | 435.17 | 435.30 | -0.13 | Slight |
| MW-18 | 3957036.17 | 1349176.42 | 435.15 | 435.26 | -0.11 | Slight |
| MW-30R | 3956474.17 | 1348286.87 | 433.44 | 433.60 | -0.16 | Moderate |
| MW-34 | 3956587.64 | 1347854.69 | 430.00 | 429.99 | 0.01 | Slight |
| MW-35 | 3956686.01 | 1347799.89 | 429.89 | 429.54 | 0.35 | Significant |
| MW-36 | 3956780.77 | 1348201.79 | 430.43 | 430.57 | -0.14 | Slight |
| MW-37 | 3956821.73 | 1347832.76 | 429.20 | 429.31 | -0.11 | Slight |
| MW-38D | 3956600.06 | 1348026.72 | 430.00 | 430.10 | -0.10 | Slight |
| MW-38S | 3956601.31 | 1348024.43 | 429.93 | 430.04 | -0.11 | Slight |
| MW-39 | 3956587.00 | 1348090.25 | 430.26 | 430.34 | -0.08 | Slight |
| MW-40 | 3956570.78 | 1348025.36 | 430.58 | 430.70 | -0.12 | Slight |
| MW-25 | 3956293.58 | 1348495.26 | Not Surveyed | 433.52 | NA | Significant* |
| MW-29R | 3956296.05 | 1348017.91 | Not Surveyed | 432.20 | NA | Removed |

Coordinates are Alaska State Plane, Zone 3, NAD83, U.S. Survey feet

Elevations are NAVD88 vertical datum, feet

Slight = <0.15' elevation difference

Moderate = >0.15', <0.20'elevation difference

Significant = >0.20' elevation difference

* MW-25 was not re-surveyed due to visible frost jacking

This table contains wells associated with the Drainage Pond and Fuel Hydrant Sites

ATTACHMENT 4

Waste Manifest

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NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

| | | | | | | |
|---|--|--|---|--|--------------------|-----------------------------|
| NON-HAZARDOUS WASTE MANIFEST | | 1. Generator's US EPA ID No. A K D 9 8 3 0 6 8 6 7 7 | | Manifest Document No. 2 1 2 3 6 A | 2. Page 1 of 1 | |
| 3. Generator's Name and Address FAIRBANKS INT'L AIRPORT 6450 AIRPORT WAY, SUITE 1 FAIRBANKS, AK 99709 | | Site Address FAIRBANKS INT'L AIRPORT 6450 AIRPORT WAY, SUITE 1 FAIRBANKS, AK 99709 | | | | |
| 4. Generator's Phone ((907) 474-2582) | | | | | | |
| 5. Transporter 1 Company Name EMERALD ALASKA, INC | | 6. US EPA ID Number A K R 0 0 0 0 0 4 1 8 4 | | A. State Transporter's ID | | |
| | | | | B. Transporter 1 Phone (907) 258-1558 | | |
| 7. Transporter 2 Company Name | | 8. US EPA ID Number | | C. State Transporter's ID | | |
| | | | | D. Transporter 2 Phone | | |
| 9. Designated Facility Name and Site Address EMERALD ALASKA, INC. 2020 VIKING DRIVE ANCHORAGE, AK 99501 | | 10. US EPA ID Number A K R 0 0 0 0 0 4 1 8 4 | | E. State Facility's ID | | |
| | | | | F. Facility's Phone (907) 258-1558 | | |
| 11. WASTE DESCRIPTION a. MATERIAL NOT REGULATED BY D.O.T. | | | Containers | | 13. Total Quantity | 14. Unit Wt./Vol. |
| | | | No. | Type | | |
| | | | 1 | DF | 30 | G |
| b. | | | | | | |
| c. | | | | | | |
| d. | | | | | | |
| G. Additional Descriptions for Materials Listed Above 1) AK02906 30 DF IDW WATER | | | H. Handling Codes for Wastes Listed Above | | | |
| 15. Special Handling Instructions and Other Information This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. | | | | | | |
| 16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations. | | | | | | |
| Printed/Typed Name Fairbanks Rebekah Cadigan for Intl Airport | | | | Signature <i>Rebekah Cadigan</i> | | Date 2 4 14 |
| 17. Transporter 1 Acknowledgement of Receipt of Materials | | | | Signature <i>William Gouney</i> | | Date 02 11 14 |
| Printed/Typed Name William Gouney | | | | Signature | | Date |
| 18. Transporter 2 Acknowledgement of Receipt of Materials | | | | Signature | | Date |
| Printed/Typed Name | | | | Signature | | Date |
| 19. Discrepancy Indication Space | | | | | | |
| 20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in item 19. | | | | | | |
| Printed/Typed Name Tawni Neeser | | | | Signature <i>Tawni Neeser</i> | | Date 2 24 14 |

NON-HAZARDOUS WASTE

GENERATOR

TRANSPORTER

FACILITY

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ATTACHMENT 5

Well Integrity Survey

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ATTACHMENT 3 WELL INTEGRITY SURVEY - WELL DETAILS
 FAIRBANKS INTERNATIONAL AIRPORT
 FUEL HYDRANT SYSTEM CONTAMINATED SITE

| Well ID | Year Installed | Screen Length (Ft) | Casing Diameter (in) | Monument Lid Diameter (in) | Bolt Size | Total Depth (ft btoc) | Casing Type | Condition | Notes |
|---------|----------------|--------------------|----------------------|----------------------------|--------------|-----------------------|-------------|-----------|--|
| MW-02 | 1997 | 10 | 2 | 10 | 1/2" | 19.6 | PVC | GOOD | |
| MW-04 | 1997 | 10 | 4 | 12" | | 17.3 | PVC | POOR | bentonite is all around the top of casing. Not a good place to take DTW. Lid is not attached to monument |
| MW-05 | 1998 | 10 | 6 | 12" | 3/4" | 17.84 | PVC | GOOD | Fuel odor |
| MW-09 | 1998 | 4.69 | 2 | 10" | bolts broken | 19.37 | PVC | GOOD | |
| MW-10 | 1999 | 10 | 1.25 | 6" | 1/2" | 17.2 | STEEL | GOOD | Located in new gravel pad, about 10-10" below grade. Marked with yellow carsonite. |
| MW-11R | 2005 | 29.5 | 2 | 6" | 1/2" | 34.1 | PVC | GOOD | |
| MW-12 | 1999 | 10.3 | 1.25 | 6" | 1/2" | 16.93 | STEEL | GOOD | Installed datalogger 12/5/13 |
| MW-15 | 1999 | 10 | 1.25 | 12" | bolts broken | 19 | STEEL | GOOD | 12" diameter monument. Lid missing bolt holes |
| MW-18 | 1999 | 10 | 1.25 | 6" | 1/2" | 18.95 | STEEL | GOOD | 6" diameter monument. Free product present |
| MW-1R | 2000 | 10 | 4 | 12" | | 18.87 | PVC | GOOD | Monument is 12" Morrison brand |
| MW-25 | 1999 | 10 | 1.25 | 6" | 1/2" | 17.9 | STEEL | POOR | Well casing has frost jacked up, lid no longer fits securely. Well still functional during Dec 2013 monitoring event |
| MW-28 | 1999 | 10 | 1.25 | NA | NA | 16.3 | NA | NA | Unable to locate due to construction |
| MW-29R | 2006 | 10 | 1.5 | 6" | 1/2" | 18.07 | PVC | MODERATE | Near Construction area. Concrete around monument is heaving slightly. Well cap is hitting monument cover due to frost jacking. Datalogger installed 12/5/13. WELL REMOVED APRIL 2014 DURING CONSTRUCTION |
| MW-30R | 1999 | 10 | 2 | 6" | 1/2" | 11.05 | PVC | POOR | blockage above water table Dec 2013. Frost jacking present. Casing is slanted |
| MW-33 | 2001 | 10 | 2 | 12" | - | 16 | PVC | NA | Unable to locate due to construction |
| MW-34 | 2003 | - | 2 | 6" | 1/2" | 13.74 | PVC | MODERATE | Well casing needs to be shortened, it is about to hit the lid. A cap can't fit inside the lid |
| MW-35 | 2005 | 10 | 2 | 6" | 1/2" | 10.31 | PVC | MODERATE | Monument surrounded by concrete which is frost-jacked, but well itself is ok. Datalogger installed 12/5/13 |
| MW-36 | 2006 | 10 | 1.5 | 6" | 1/2" | 19.5 | PVC | GOOD | |
| MW-37 | 2006 | 10 | 1.5 | 6" | 1/2" | 20.53 | PVC | GOOD | Marked with blue lath |
| MW-38D | 2010 | 5 | 2 | 12" | 15/16 | 34.27 | PVC | GOOD | white monument lid |
| MW-38S | 2010 | 10 | 2 | 8" | 1/2" | 14.57 | PVC | GOOD | brown monument lid |
| MW-39 | 2010 | 10 | 2 | 8" | 1/2" | 16.15 | PVC | GOOD | Rusty monument and lid |
| MW-40 | 2010 | 10 | 2 | 8" | 15/16 | 15.91 | PVC | GOOD | White lid |

NOTE: THIS TABLE CONTAINS WELLS ASSOCIATED WITH THE FUEL HYDRANT AND DRAINAGE POND SITES
 All completions are flush mounts



PHOTOGRAPH 1: MW-1R - GOOD CONDITION



PHOTOGRAPH 2: MW-2 - GOOD CONDITION



PHOTOGRAPH 3: MW-4 - POOR CONDITION, MONUMENT LID DOES NOT ATTACH AND BENTONITE SMEARED AROUND TOP OF CASING



PHOTOGRAPH 4: MW-5 GOOD CONDITION



PHOTOGRAPH 5: MW-5 GOOD COGNITION



PHOTOGRAPH 6: MW-9 GOOD CONDITION



PHOTOGRAPH 7: MW-10 - BURIED 12-12 INCHES ON NEWLY PLACED GRAVEL PAD



PHOTOGRAPH 8: MW-10 GOOD CONDITION



PHOTOGRAPH 9: MW-11R GOOD CONDITION



PHOTOGRAPH 10: MW-12 GOOD CONDITION



PHOTOGRAPH 11: MW-15 GOOD CONDITION



PHOTOGRAPH 12: MW-18 GOOD CONDITION



PHOTOGRAPH 13: MW-15 POOR CONDITION - MONUMENT AND CASING HAVE JACKED ABOVE GROUND. MONUMENT LID NOT ABLE TO COVER MONUMENT.



PHOTOGRAPH 14: MW-29R MODERATE CONDITION - CASING IS ALMOST TOUCHING MONUMENT LID - WELL REMOVED APRIL 2014



PHOTOGRAPH 15: MW-29R MODERATE CONDITION - CASING IS ALMOST TOUCHING MONUMENT LID - WELL REMOVED APRIL 2014



PHOTOGRAPH 16: MW-30R - MODERATE CONDITION - BLOCKAGE IN NOV. 2013 AND MINOR FROST JACKING



PHOTOGRAPH 17: MW-30R - MODERATE CONDITION - BLOCKAGE IN NOV. 2013 AND MINOR FROST JACKING



PHOTOGRAPH 18: MW-34 MODERATE CONDITION - CASING IS JACKED AND NO LONGER ABLE TO PLACE WELL CAP UNDER MONUMENT LID.



PHOTOGRAPH 19: MW-35 - MODERATE CONDITION - EVIDENCE OF FROST JACKING, CONCRETE IS NO LONGER BURIED.



PHOTOGRAPH 20: MW-36 GOOD CONDITION



PHOTOGRAPH 21: MW-37 GOOD CONDITION.



PHOTOGRAPH 22: MW-38D GOOD CONDITION



PHOTOGRAPH 23: MW-38D GOOD CONDITION



PHOTOGRAPH 24: MW-38S GOOD CONDITION



PHOTOGRAPH 25: MW-39 GOOD CONDITION



PHOTOGRAPH 26: MW-40 GOOD CONDITION.

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Fairbanks International Airport
Work Plan

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Monitoring Well Integrity Survey Data Worksheet

Site Name Fuel hydrant
 Well ID MW-325
 Date 12.6.13
 Finish type (circle one) Flush Mount Stick-up
 Total Depth of well 10.3
 Depth to Water (ft btoc) 8.4
 Casing type PVC
 Casing Diameter 2"

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|-------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | | X | | |
| Monument lid | secure? Able to keep moisture out? | ✓ | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | | | X | |
| Well Casing | cracks? Evidence of frost jacking | | X | | |
| Evidence of frost jacking? | Yes? No? | | | X | |
| Well cap | present? Cracks? | ✓ | | | |

Additional Notes: Monument is surrounded w/ concrete. Concrete has jacked out of ground. This does not look like recent activity. Well is still in moderate condition
Installed datalogger

Monitoring Well Integrity Survey Data Worksheet

Site Name Drainage Pond
 Well ID MW-112
 Date 12.6.13
 Finish type (circle one) Flush Mount Stick-up
 Total Depth of well 34.1
 Depth to Water (ft btoc) 9.55
 Casing type PVC
 Casing Diameter 2"

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|-------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | ✓ | | | |
| Monument lid | secure? Able to keep moisture out? | ✓ | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | ✓ | | | |
| Well Casing | cracks? Evidence of frost jacking | ✓ | | | |
| Evidence of frost jacking? | Yes? No? | ✓ | | | |
| Well cap | present? Cracks? | ✓ | | | |

Additional Notes:

Fairbanks International Airport
Work Plan

Monitoring Well Integrity Survey Data Worksheet

Site Name Fuel Hydrant
 Well ID 29R
 Date 12.5.13
 Finish type (circle one) Flush Mount Stick-up
 Total Depth of well 18.07
 Depth to Water (ft btoc) 10.69
 Casing type PVC
 Casing Diameter 2"

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|-----------------------------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | | X | | |
| Monument lid | secure? Able to keep moisture out? | ✓ | X | | |
| Ground surrounding monument | cracks? Bulging? Seal? | | X | X | |
| Well Casing | cracks? Evidence of frost jacking | | | | |
| Evidence of frost jacking? | Yes? No? | | | X | Crushing into monument |
| Well cap | present? Cracks? | | | X | Cracks due to frost jacking |

Additional Notes: 6" monument
concrete around monument is heaving slightly.
Well is near construction zone

Monitoring Well Integrity Survey Data Worksheet

Site Name Fuel Hydrant
 Well ID MW-12
 Date 12.5.13
 Finish type (circle one) Flush Mount Stick-up
 Total Depth of well 16.93
 Depth to Water (ft btoc) 13.17
 Casing type Steel
 Casing Diameter 1.25

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|-------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | ✓ | | | |
| Monument lid | secure? Able to keep moisture out? | ✓ | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | ✓ | | | |
| Well Casing | cracks? Evidence of frost jacking | ✓ | | | |
| Evidence of frost jacking? | Yes? No? | ✓ | | | |
| Well cap | present? Cracks? | ✓ | | | |

Additional Notes: 6" Monument
installed datalogger
0021030050
@ 1537

Fairbanks International Airport
Work Plan

Monitoring Well Integrity Survey Data Worksheet

Site Name Fuel Hydrant
 Well ID MW-25
 Date 12.3.13
 Finish type (circle one) Flush Mount ~~Stick-up~~
 Total Depth of well 17.40
 Depth to Water (ft bloc) 12.09
 Casing type Steel
 Casing Diameter 1.

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|--------------------------------------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | | | X | |
| Monument lid | secure? Able to keep moisture out? | | | X | Unable to secure lid due to jacking. |
| Ground surrounding monument | cracks? Bulging? Seal? | | | | Hard to dig - snow/ice. |
| Well Casing | cracks? Evidence of frost jacking | | X | | functional but tilted. |
| Evidence of frost jacking? | Yes? No? | | | | |
| Well cap | present? Cracks? | | | X | Broken - needs to be replaced |

Functional during event, but for long term use
 Maintenance needed.
 - New Monument, Cap.

Additional Notes:

Monitoring Well Integrity Survey Data Worksheet

Site Name Fuel Hydrant
 Well ID MW-1R
 Date 12.3.13
 Finish type (circle one) Flush Mount ~~Stick-up~~
 Total Depth of well _____
 Depth to Water (ft bloc) 13.21
 Casing type 18.87 PVC
 Casing Diameter 4"

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|---------------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | ✓ | | | Morrison |
| Monument lid | secure? Able to keep moisture out? | ✓ | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | ✓ | | | |
| Well Casing | cracks? Evidence of frost jacking | ✓ | | | Cracked @ top |
| Evidence of frost jacking? | Yes? <u>No?</u> | ✓ | | | N/A |
| Well cap | present? Cracks? | ✓ | | | |

* Monument type is
 12" monument - Morrison brand

Additional Notes:

Fairbanks International Airport
Work Plan

Monitoring Well Integrity Survey Data Worksheet

Site Name Fuel Hydrant
 Well ID 15
 Date 12.3.13
 Finish type (circle one) Flush Mount Stick-up
 Total Depth of well 19.0
 Depth to Water (ft btoc) 13.72
 Casing type Steel
 Casing Diameter 1.25

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|-------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | ✓ | | | |
| Monument lid | secure? Able to keep moisture out? | ✓ | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | ✓ | | | |
| Well Casing | cracks? Evidence of frost jacking | ✓ | | | |
| Evidence of frost jacking? | Yes? <u>No</u> | ✓ | | | |
| Well cap | present? Cracks? | ✓ | | | |

Good Condition
12" diameter monument.

Additional Notes:

Monitoring Well Integrity Survey Data Worksheet

Site Name Fuel Hydrant
 Well ID MW-18
 Date 12.3.13
 Finish type (circle one) Flush Mount Stick-up
 Total Depth of well 13.93
 Depth to Water (ft btoc) 13.89
 Casing type Steel
 Casing Diameter 1.25

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|-------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | ✓ | | | |
| Monument lid | secure? Able to keep moisture out? | ✓ | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | ✓ | | | |
| Well Casing | cracks? Evidence of frost jacking | ✓ | | | |
| Evidence of frost jacking? | Yes? <u>No</u> | ✓ | | | |
| Well cap | present? Cracks? | ✓ | | | |

13.65
13.89
6" Monument

Additional Notes:

Fairbanks International Airport
Work Plan

Monitoring Well Integrity Survey Data Worksheet

Site Name _____
Well ID _____
Date _____
Finish type (circle one) Flush Mount Stick-up
Total Depth of well _____
Depth to Water (ft bloc) _____
Casing type _____
Casing Diameter _____

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|-------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | | | | |
| Monument lid | secure? Able to keep moisture out? | | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | | | | |
| Well Casing | cracks? Evidence of frost jacking | | | | |
| Evidence of frost jacking? | Yes? No? | | | | |
| Well cap | present? Cracks? | | | | |

Additional Notes:

Monitoring Well Integrity Survey Data Worksheet

Site Name Fuel Hydrant
Well ID MW-30R
Date 12-3-13
Finish type (circle one) Flush Mount Stick-up
Total Depth of well 11.05
Depth to Water (ft bloc) N/A - Blockage
Casing type PVC
Casing Diameter 2"

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|---------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | ✓ | | | |
| Monument lid | secure? Able to keep moisture out? | ✓ | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | | | | |
| Well Casing | cracks? Evidence of frost jacking | | ✓ | | crooked |
| Evidence of frost jacking? | <u>Yes</u> ? No? | | | ✓ | |
| Well cap | present? Cracks? | ✓ | | | |

Frost Jacked (up) Total depth = 11'
install depth = 16r3

Additional Notes:

Recommend Recommendation de-commissioning.

Fairbanks International Airport
Work Plan

Monitoring Well Integrity Survey Data Worksheet

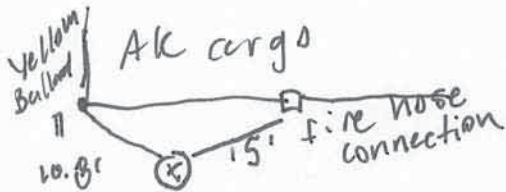
Site Name FIA
 Well ID MW-2
 Date 5.5.14
 Finish type (circle one) Flush Mount Stick-up
 Total Depth of well _____
 Depth to Water (ft btoc) 4.47
 Casing type PVC
 Casing Diameter 2"

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|-------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | ✓ | | | |
| Monument lid | secure? Able to keep moisture out? | ✓ | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | ✓ | | | |
| Well Casing | cracks? Evidence of frost jacking | ✓ | | | |
| Evidence of frost jacking? | Yes? No? | ✓ | | | |
| Well cap | present? Cracks? | ✓ | | | |

10" monument
2x 1/2" bolts

Additional Notes:

10.8' to ballard
15' to fire hose connection



Fairbanks International Airport
Work Plan

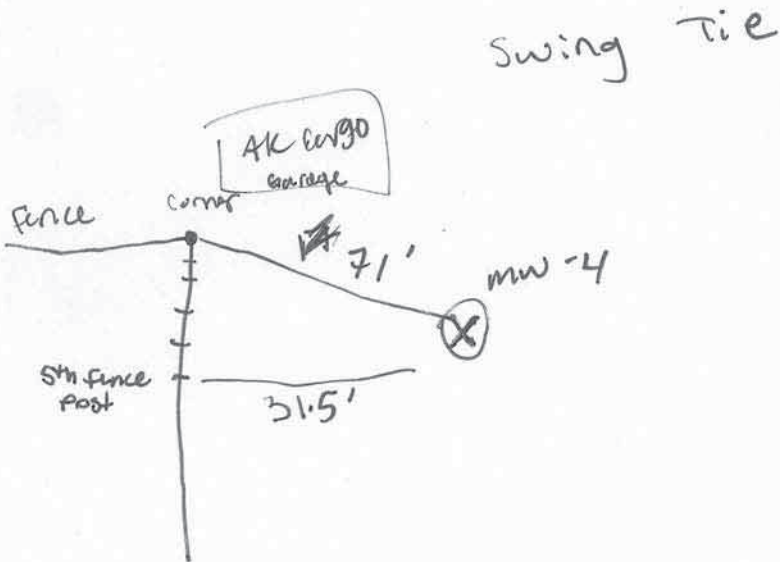
Monitoring Well Integrity Survey Data Worksheet

Site Name FIA
 Well ID MW-4
 Date 5-5-14
 Finish type (circle one) Flush Mount Stick-up
 Total Depth of well _____
 Depth to Water (ft btoc) _____
 Casing type PVC
 Casing Diameter 4"

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|---------------------------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost Jacking | X | | | |
| Monument lid | secure? Able to keep moisture out? | | | X | not connected to monument |
| Ground surrounding monument | cracks? Bulging? Seal? | X | | | |
| Well Casing | cracks? Evidence of frost Jacking | X | | | |
| Evidence of frost Jacking? | Yes? No? | - | | | |
| Well cap | present? Cracks? | | X | | |

12" diameter
 bentonite all around top of casing.

Additional Notes:



Fairbanks International Airport
Work Plan

Monitoring Well Integrity Survey Data Worksheet

Site Name FIA
 Well ID MW-5
 Date 5.5.14
 Finish type (circle one) Flush Mount Stick-up
 Total Depth of well 17.84
 Depth to Water (ft btoc) 9.33
 Casing type PVL
 Casing Diameter 6"

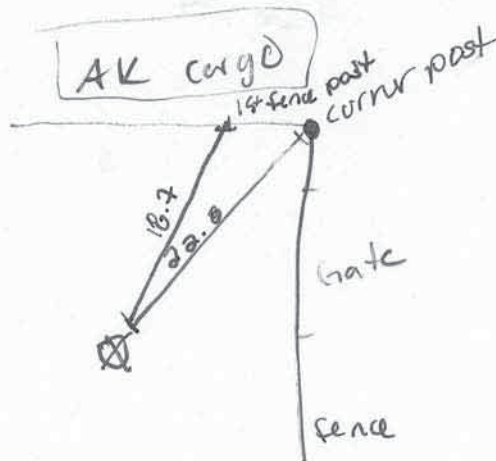
| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|-------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | ✓ | | | |
| Monument lid | secure? Able to keep moisture out? | ✓ | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | ✓ | | | |
| Well Casing | cracks? Evidence of frost jacking | ✓ | | | |
| Evidence of frost jacking? | Yes? No? | ✓ | | | |
| Well cap | present? Cracks? | ✓ | | | |

fuel odor, sheen

Additional Notes:

12" monument painted orange
 2 x 3/4" bolts

22.8
18.7



Fairbanks International Airport
Work Plan

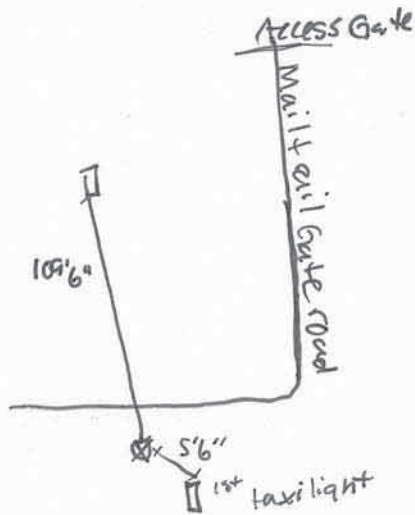
Monitoring Well Integrity Survey Data Worksheet

Site Name _____
 Well ID mw-9
 Date 5-19-37
 Finish type (circle one) Flush Mount Stick-up
 Total Depth of well 12.91 @ 10.55
 Depth to Water (ft btoc) _____
 Casing type PVC
 Casing Diameter 2"

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|---------------------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | ✓ | | | skirt pinched a bit |
| Monument lid | secure? Able to keep moisture out? | ✓ | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | ✓ | | | |
| Well Casing | cracks? Evidence of frost jacking | ✓ | | | |
| Evidence of frost jacking? | Yes? No? | ✓ | | | |
| Well cap | present? Cracks? | ✓ | | | |

10" Monument bolts are broken from lid.

Additional Notes:



5'6" from taxi
109'6" from light pole

Fairbanks International Airport
Work Plan

Monitoring Well Integrity Survey Data Worksheet

Site Name FIA
 Well ID MW-10
 Date 5-5-14
 Finish type (circle one) Flush Mount Stick-up
 Total Depth of well 17.20
 Depth to Water (ft btoc) 9.02
 Casing type Steel
 Casing Diameter 1.5" 1.25"

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|-----------------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | ✓ | | | |
| Monument lid | secure? Able to keep moisture out? | ✓ | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | ✓ | | | <u>new fill</u> |
| Well Casing | cracks? Evidence of frost jacking | ✓ | | | |
| Evidence of frost jacking? | Yes? No? | ✓ | | | |
| Well cap | present? Cracks? | ✓ | | X | |

6" monument
1/2 bolts

well cap is twisted

Additional Notes:

12" below grade. new gravel fill on top
marked w/ yellow latex

Fairbanks International Airport
Work Plan

Monitoring Well Integrity Survey Data Worksheet

Site Name FIA
 Well ID 11R
 Date 5.5.14
 Finish type (circle one) Flush Mount Stick-up
 Total Depth of well 34.15
 Depth to Water (ft btoc) 8.67 1345
 Casing type PVC
 Casing Diameter 2"

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|-------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | ✓ | | | |
| Monument lid | secure? Able to keep moisture out? | ✓ | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | ✓ | | | |
| Well Casing | cracks? Evidence of frost jacking | ✓ | | | |
| Evidence of frost jacking? | Yes? No? | ✓ | | | |
| Well cap | present? Cracks? | ✓ | | | |

6" monument

Additional Notes:

Fairbanks International Airport
Work Plan

Monitoring Well Integrity Survey Data Worksheet

Site Name FIA
 Well ID MW-34
 Date 5-5-15
 Finish type (circle one) Flush Mount Stick-up
 Total Depth of well 13.74
 Depth to Water (ft btoc) ~~8.97 @ 1250~~ 8.94 @ 1255
 Casing type PVC
 Casing Diameter 2"

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|-------------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | ✓ | | | |
| Monument lid | secure? Able to keep moisture out? | ✓ | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | ✓ | | | |
| Well Casing | cracks? Evidence of frost jacking | | ✓ | | |
| Evidence of frost jacking? | <u>Yes</u> ? No? | | | | |
| Well cap | present? Cracks? | | | - | Not present |

6" monument
1/2" bolts

MW-34 casing should be shortened.

Additional Notes:

Casing needs to be cut down
No room for lid

Fairbanks International Airport
Work Plan

Monitoring Well Integrity Survey Data Worksheet

Site Name FIA
 Well ID MW-36
 Date 5.5.14
 Finish type (circle one) (Flush Mount) Stick-up
 Total Depth of well 19.5
 Depth to Water (ft btoc) 8.29 @ 10:35
 Casing type PVC
 Casing Diameter 24 1/2

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|-------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | ✓ | | | |
| Monument lid | secure? Able to keep moisture out? | ✓ | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | ✓ | | | |
| Well Casing | cracks? Evidence of frost jacking | ✓ | | | |
| Evidence of frost jacking? | Yes? No? | — | | | |
| Well cap | present? Cracks? | ✓ | | | |

6" monument

Additional Notes:

Fairbanks International Airport
Work Plan

Monitoring Well Integrity Survey Data Worksheet

Site Name FIA
 Well ID MW-37
 Date 8.5.19
 Finish type (circle one) Flush Mount Stick-up
 Total Depth of well 7.21
 Depth to Water (ft btoc) 20.93
 Casing type 1.5"
 Casing Diameter PVC

| Component | What To Look For | Condition | | | Notes |
|-----------------------------|------------------------------------|-----------|----------|------|-------|
| | | Good | Moderate | Poor | |
| Monument | cracks? Evidence of frost jacking | ✓ | | | |
| Monument lid | secure? Able to keep moisture out? | ✓ | | | |
| Ground surrounding monument | cracks? Bulging? Seal? | ✓ | | | |
| Well Casing | cracks? Evidence of frost jacking | ✓ | | | |
| Evidence of frost jacking? | Yes? No? | | | | |
| Well cap | present? Cracks? | ✓ | | | |

6" monument
1/2" bolts

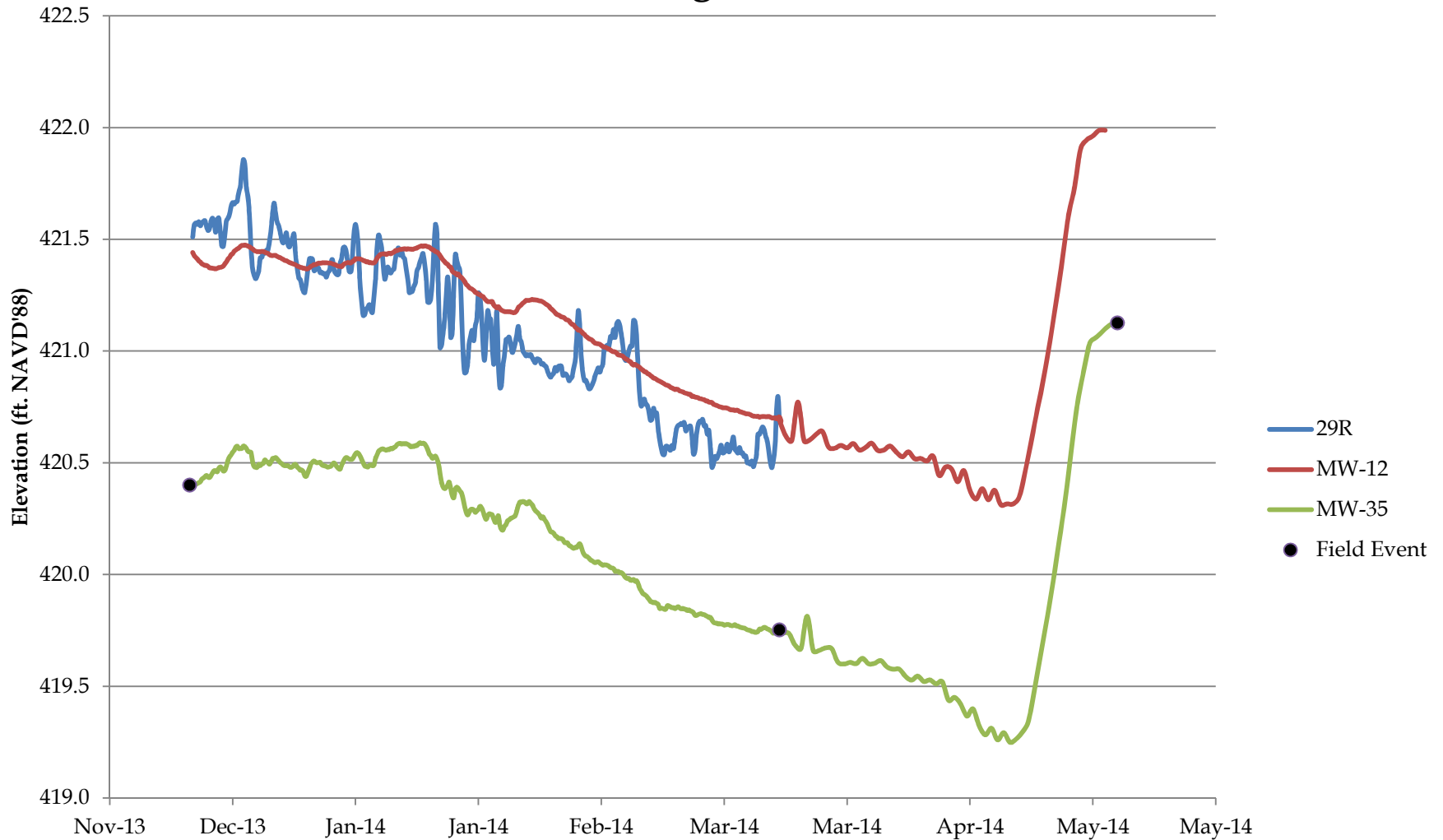
Additional Notes:

ATTACHMENT 6

Datalogger Groundwater Elevations

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Groundwater Elevation December 2013 to May 2014 FIA Drainage Pond



NOTE: The datalogger installed in MW-29R was downloaded in March 2014. The well was removed in April 2014 before the remaining data could be downloaded. MW-29R was not surveyed in 2014.

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ATTACHMENT 7

Laboratory Analytical Report

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Laboratory Report of Analysis

To: Oasis Env/ERM-West, Inc.
825 W. 8th Avenue
Anchorage, AK 99501
(907)458-8276

Report Number: **1138787**

Client Project: **0219577-2 Fairbanks Intl Ap**

Dear Nellie Ballou,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Chuck at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.



SGS North America
Environmental Services - Alaska Division
General Manager

Charles Homestead
2014.01.03 15:35:30 -09'00'

Chuck Homestead
Project Manager
Charles.Homestead@sgs.com

Date

Case Narrative

SGS Client: **Oasis Env/ERM-West, Inc.**
SGS Project: **1138787**
Project Name/Site: **0219577-2 Fairbanks Intl Ap**
Project Contact: **Nellie Ballou**

Refer to sample receipt form for information on sample condition.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

Print Date: 01/03/2014 3:01:22PM

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. If you have any questions regarding this report, or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. All work is provided under SGS general terms and conditions (<http://www.sgs.com/terms_and_conditions.htm>), unless other written agreements have been accepted by both parties.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020A, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035B, 6020, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040B, 9045C, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

| | |
|--------|--|
| * | The analyte has exceeded allowable regulatory or control limits. |
| ! | Surrogate out of control limits. |
| B | Indicates the analyte is found in a blank associated with the sample. |
| CCV | Continuing Calibration Verification |
| CL | Control Limit |
| D | The analyte concentration is the result of a dilution. |
| DF | Dilution Factor |
| DL | Detection Limit (i.e., maximum method detection limit) |
| E | The analyte result is above the calibrated range. |
| F | Indicates value that is greater than or equal to the DL |
| GT | Greater Than |
| IB | Instrument Blank |
| ICV | Initial Calibration Verification |
| J | The quantitation is an estimation. |
| JL | The analyte was positively identified, but the quantitation is a low estimation. |
| LCS(D) | Laboratory Control Spike (Duplicate) |
| LOD | Limit of Detection (i.e., 1/2 of the LOQ) |
| LOQ | Limit of Quantitation (i.e., reporting or practical quantitation limit) |
| LT | Less Than |
| M | A matrix effect was present. |
| MB | Method Blank |
| MS(D) | Matrix Spike (Duplicate) |
| ND | Indicates the analyte is not detected. |
| Q | QC parameter out of acceptance range. |
| R | Rejected |
| RPD | Relative Percent Difference |
| U | Indicates the analyte was analyzed for but not detected. |

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

Sample Summary

| <u>Client Sample ID</u> | <u>Lab Sample ID</u> | <u>Collected</u> | <u>Received</u> | <u>Matrix</u> |
|-------------------------|----------------------|------------------|-----------------|-------------------------------|
| MW-38S-120513 | 1138787001 | 12/05/2013 | 12/07/2013 | Water (Surface, Eff., Ground) |
| MW-38D-120513 | 1138787002 | 12/05/2013 | 12/07/2013 | Water (Surface, Eff., Ground) |
| MW-40-120513 | 1138787003 | 12/05/2013 | 12/07/2013 | Water (Surface, Eff., Ground) |
| MW-41-120513 | 1138787004 | 12/05/2013 | 12/07/2013 | Water (Surface, Eff., Ground) |
| Trip Blank | 1138787005 | 12/05/2013 | 12/07/2013 | Water (Surface, Eff., Ground) |
| MW-11R-120513 | 1138787006 | 12/19/2013 | 12/20/2013 | Water (Surface, Eff., Ground) |

Method

SW8260B

Method Description

Volatile Organic Compounds (W) FULL

Detectable Results Summary

Client Sample ID: **MW-38S-120513**

Lab Sample ID: 1138787001

Volatile GC/MS

| <u>Parameter</u> | <u>Result</u> | <u>Units</u> |
|------------------------|---------------|--------------|
| Benzene | 0.0120 | mg/L |
| cis-1,2-Dichloroethene | 0.0209 | mg/L |

Client Sample ID: **MW-40-120513**

Lab Sample ID: 1138787003

Volatile GC/MS

| <u>Parameter</u> | <u>Result</u> | <u>Units</u> |
|--------------------------|---------------|--------------|
| Benzene | 0.00280 | mg/L |
| cis-1,2-Dichloroethene | 0.872 | mg/L |
| trans-1,2-Dichloroethene | 0.00785 | mg/L |
| Vinyl chloride | 0.0109 | mg/L |

Client Sample ID: **MW-41-120513**

Lab Sample ID: 1138787004

Volatile GC/MS

| <u>Parameter</u> | <u>Result</u> | <u>Units</u> |
|--------------------------|---------------|--------------|
| Benzene | 0.00278 | mg/L |
| cis-1,2-Dichloroethene | 0.837 | mg/L |
| trans-1,2-Dichloroethene | 0.00763 | mg/L |
| Vinyl chloride | 0.00937 | mg/L |

Client Sample ID: **MW-11R-120513**

Lab Sample ID: 1138787006

Volatile GC/MS

| <u>Parameter</u> | <u>Result</u> | <u>Units</u> |
|--------------------------|---------------|--------------|
| Benzene | 0.00612 | mg/L |
| cis-1,2-Dichloroethene | 1.22 | mg/L |
| Tetrachloroethene | 0.0147 | mg/L |
| trans-1,2-Dichloroethene | 0.00940 | mg/L |



Results of MW-38S-120513

Client Sample ID: **MW-38S-120513**
Client Project ID: **0219577-2 Fairbanks Intl Ap**
Lab Sample ID: 1138787001
Lab Project ID: 1138787

Collection Date: 12/05/13 12:00
Received Date: 12/07/13 11:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

| Parameter | Result Qual | LOQ/CL | DL | Units | DF | Allowable Limits | Date Analyzed |
|--------------------------|-------------|----------|----------|-------|----|------------------|----------------|
| Benzene | 0.0120 | 0.000400 | 0.000120 | mg/L | 1 | | 12/09/13 14:00 |
| cis-1,2-Dichloroethene | 0.0209 | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 14:00 |
| Tetrachloroethene | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 14:00 |
| trans-1,2-Dichloroethene | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 14:00 |
| Trichloroethene | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 14:00 |
| Vinyl chloride | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 14:00 |
| Surrogates | | | | | | | |
| 1,2-Dichloroethane-D4 | 107 | 70-120 | | % | 1 | | 12/09/13 14:00 |
| 4-Bromofluorobenzene | 103 | 75-120 | | % | 1 | | 12/09/13 14:00 |
| Toluene-d8 | 99.7 | 85-120 | | % | 1 | | 12/09/13 14:00 |

Batch Information

Analytical Batch: VMS13943
Analytical Method: SW8260B
Analyst: HM
Analytical Date/Time: 12/09/13 14:00
Container ID: 1138787001-A

Prep Batch: VXX25525
Prep Method: SW5030B
Prep Date/Time: 12/09/13 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 01/03/2014 3:01:24PM



Results of **MW-38D-120513**

Client Sample ID: **MW-38D-120513**
Client Project ID: **0219577-2 Fairbanks Intl Ap**
Lab Sample ID: 1138787002
Lab Project ID: 1138787

Collection Date: 12/05/13 12:45
Received Date: 12/07/13 11:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

| Parameter | Result Qual | LOQ/CL | DL | Units | DF | Allowable Limits | Date Analyzed |
|--------------------------|-------------|----------|----------|-------|----|------------------|----------------|
| Benzene | 0.000200 U | 0.000400 | 0.000120 | mg/L | 1 | | 12/09/13 14:24 |
| cis-1,2-Dichloroethene | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 14:24 |
| Tetrachloroethene | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 14:24 |
| trans-1,2-Dichloroethene | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 14:24 |
| Trichloroethene | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 14:24 |
| Vinyl chloride | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 14:24 |
| Surrogates | | | | | | | |
| 1,2-Dichloroethane-D4 | 97.8 | 70-120 | | % | 1 | | 12/09/13 14:24 |
| 4-Bromofluorobenzene | 101 | 75-120 | | % | 1 | | 12/09/13 14:24 |
| Toluene-d8 | 99.6 | 85-120 | | % | 1 | | 12/09/13 14:24 |

Batch Information

Analytical Batch: VMS13943
Analytical Method: SW8260B
Analyst: HM
Analytical Date/Time: 12/09/13 14:24
Container ID: 1138787002-A

Prep Batch: VXX25525
Prep Method: SW5030B
Prep Date/Time: 12/09/13 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL



Results of **MW-40-120513**

Client Sample ID: **MW-40-120513**
Client Project ID: **0219577-2 Fairbanks Intl Ap**
Lab Sample ID: 1138787003
Lab Project ID: 1138787

Collection Date: 12/05/13 10:25
Received Date: 12/07/13 11:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

| Parameter | Result | Qual | LOQ/CL | DL | Units | DF | Allowable Limits | Date Analyzed |
|--------------------------|----------|------|----------|----------|-------|-----|------------------|----------------|
| Benzene | 0.00280 | | 0.000400 | 0.000120 | mg/L | 1 | | 12/09/13 14:48 |
| cis-1,2-Dichloroethene | 0.872 | | 0.100 | 0.0310 | mg/L | 100 | | 12/09/13 19:32 |
| Tetrachloroethene | 0.000500 | U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 14:48 |
| trans-1,2-Dichloroethene | 0.00785 | | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 14:48 |
| Trichloroethene | 0.000500 | U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 14:48 |
| Vinyl chloride | 0.0109 | | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 14:48 |
| Surrogates | | | | | | | | |
| 1,2-Dichloroethane-D4 | 114 | | 70-120 | | % | 1 | | 12/09/13 14:48 |
| 4-Bromofluorobenzene | 98.2 | | 75-120 | | % | 1 | | 12/09/13 14:48 |
| Toluene-d8 | 99.9 | | 85-120 | | % | 1 | | 12/09/13 14:48 |

Batch Information

Analytical Batch: VMS13943
Analytical Method: SW8260B
Analyst: HM
Analytical Date/Time: 12/09/13 14:48
Container ID: 1138787003-A

Prep Batch: VXX25525
Prep Method: SW5030B
Prep Date/Time: 12/09/13 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of MW-41-120513

Client Sample ID: **MW-41-120513**
 Client Project ID: **0219577-2 Fairbanks Intl Ap**
 Lab Sample ID: 1138787004
 Lab Project ID: 1138787

Collection Date: 12/05/13 11:05
 Received Date: 12/07/13 11:30
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Volatile GC/MS

| Parameter | Result Qual | LOQ/CL | DL | Units | DF | Allowable Limits | Date Analyzed |
|--------------------------|-------------|----------|----------|-------|-----|------------------|----------------|
| Benzene | 0.00278 | 0.000400 | 0.000120 | mg/L | 1 | | 12/09/13 15:11 |
| cis-1,2-Dichloroethene | 0.837 | 0.100 | 0.0310 | mg/L | 100 | | 12/09/13 19:55 |
| Tetrachloroethene | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 15:11 |
| trans-1,2-Dichloroethene | 0.00763 | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 15:11 |
| Trichloroethene | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 15:11 |
| Vinyl chloride | 0.00937 | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 15:11 |
| Surrogates | | | | | | | |
| 1,2-Dichloroethane-D4 | 95 | 70-120 | | % | 1 | | 12/09/13 15:11 |
| 4-Bromofluorobenzene | 99.1 | 75-120 | | % | 1 | | 12/09/13 15:11 |
| Toluene-d8 | 100 | 85-120 | | % | 1 | | 12/09/13 15:11 |

Batch Information

Analytical Batch: VMS13943
 Analytical Method: SW8260B
 Analyst: HM
 Analytical Date/Time: 12/09/13 15:11
 Container ID: 1138787004-A

Prep Batch: VXX25525
 Prep Method: SW5030B
 Prep Date/Time: 12/09/13 08:00
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL



Results of Trip Blank

Client Sample ID: **Trip Blank**
Client Project ID: **0219577-2 Fairbanks Intl Ap**
Lab Sample ID: 1138787005
Lab Project ID: 1138787

Collection Date: 12/05/13 08:00
Received Date: 12/07/13 11:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Volatile GC/MS

| <u>Parameter</u> | <u>Result Qual</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> | <u>DF</u> | <u>Allowable Limits</u> | <u>Date Analyzed</u> |
|--------------------------|--------------------|---------------|-----------|--------------|-----------|-------------------------|----------------------|
| Benzene | 0.000200 U | 0.000400 | 0.000120 | mg/L | 1 | | 12/09/13 12:26 |
| cis-1,2-Dichloroethene | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 12:26 |
| Tetrachloroethene | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 12:26 |
| trans-1,2-Dichloroethene | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 12:26 |
| Trichloroethene | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 12:26 |
| Vinyl chloride | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/09/13 12:26 |
| Surrogates | | | | | | | |
| 1,2-Dichloroethane-D4 | 99.2 | 70-120 | | % | 1 | | 12/09/13 12:26 |
| 4-Bromofluorobenzene | 96.5 | 75-120 | | % | 1 | | 12/09/13 12:26 |
| Toluene-d8 | 98.8 | 85-120 | | % | 1 | | 12/09/13 12:26 |

Batch Information

Analytical Batch: VMS13943
Analytical Method: SW8260B
Analyst: HM
Analytical Date/Time: 12/09/13 12:26
Container ID: 1138787005-A

Prep Batch: VXX25525
Prep Method: SW5030B
Prep Date/Time: 12/09/13 08:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 01/03/2014 3:01:24PM



Results of MW-11R-120513

Client Sample ID: **MW-11R-120513**
 Client Project ID: **0219577-2 Fairbanks Intl Ap**
 Lab Sample ID: 1138787006
 Lab Project ID: 1138787

Collection Date: 12/19/13 14:30
 Received Date: 12/20/13 08:01
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Volatile GC/MS

| Parameter | Result Qual | LOQ/CL | DL | Units | DF | Allowable Limits | Date Analyzed |
|--------------------------|-------------|----------|----------|-------|-----|------------------|----------------|
| Benzene | 0.00612 | 0.000400 | 0.000120 | mg/L | 1 | | 12/23/13 16:07 |
| cis-1,2-Dichloroethene | 1.22 | 0.100 | 0.0310 | mg/L | 100 | | 12/26/13 18:26 |
| Tetrachloroethene | 0.0147 | 0.00100 | 0.000310 | mg/L | 1 | | 12/23/13 16:07 |
| trans-1,2-Dichloroethene | 0.00940 | 0.00100 | 0.000310 | mg/L | 1 | | 12/23/13 16:07 |
| Trichloroethene | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/23/13 16:07 |
| Vinyl chloride | 0.000500 U | 0.00100 | 0.000310 | mg/L | 1 | | 12/23/13 16:07 |
| Surrogates | | | | | | | |
| 1,2-Dichloroethane-D4 | 107 | 70-120 | | % | 1 | | 12/23/13 16:07 |
| 4-Bromofluorobenzene | 101 | 75-120 | | % | 1 | | 12/23/13 16:07 |
| Toluene-d8 | 90.7 | 85-120 | | % | 1 | | 12/23/13 16:07 |

Batch Information

Analytical Batch: VMS13960
 Analytical Method: SW8260B
 Analyst: HM
 Analytical Date/Time: 12/23/13 16:07
 Container ID: 1138787006-A

Prep Batch: VXX25551
 Prep Method: SW5030B
 Prep Date/Time: 12/23/13 08:00
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL

Analytical Batch: VMS13966
 Analytical Method: SW8260B
 Analyst: NRB
 Analytical Date/Time: 12/26/13 18:26
 Container ID: 1138787006-B

Prep Batch: VXX25560
 Prep Method: SW5030B
 Prep Date/Time: 12/26/13 00:00
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL

Print Date: 01/03/2014 3:01:24PM

Method Blank

Blank ID: MB for HBN 1495261 [VXX/25525]
 Blank Lab ID: 1193765

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
 1138787001, 1138787002, 1138787003, 1138787004, 1138787005

Results by SW8260B

| <u>Parameter</u> | <u>Results</u> | <u>LOQ/CL</u> | <u>DL</u> | <u>Units</u> |
|--------------------------|----------------|---------------|-----------|--------------|
| Benzene | 0.000200U | 0.000400 | 0.000120 | mg/L |
| cis-1,2-Dichloroethene | 0.000500U | 0.00100 | 0.000310 | mg/L |
| Tetrachloroethene | 0.000500U | 0.00100 | 0.000310 | mg/L |
| trans-1,2-Dichloroethene | 0.000500U | 0.00100 | 0.000310 | mg/L |
| Trichloroethene | 0.000500U | 0.00100 | 0.000310 | mg/L |
| Vinyl chloride | 0.000500U | 0.00100 | 0.000310 | mg/L |
| Surrogates | | | | |
| 1,2-Dichloroethane-D4 | 104 | 70-120 | | % |
| 4-Bromofluorobenzene | 105 | 75-120 | | % |
| Toluene-d8 | 99.4 | 85-120 | | % |

Batch Information

Analytical Batch: VMS13943
 Analytical Method: SW8260B
 Instrument: HP 5890 Series II MS1 VJA
 Analyst: HM
 Analytical Date/Time: 12/9/2013 8:59:01AM

Prep Batch: VXX25525
 Prep Method: SW5030B
 Prep Date/Time: 12/9/2013 8:00:00AM
 Prep Initial Wt./Vol.: 5 mL
 Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1138787 [VXX25525]
 Blank Spike Lab ID: 1193766
 Date Analyzed: 12/09/2013 09:45

Spike Duplicate ID: LCSD for HBN 1138787 [VXX25525]
 Spike Duplicate Lab ID: 1193767
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1138787001, 1138787002, 1138787003, 1138787004, 1138787005

Results by SW8260B

| Parameter | Blank Spike (mg/L) | | | Spike Duplicate (mg/L) | | | CL | RPD (%) | RPD CL |
|--------------------------|--------------------|--------|---------|------------------------|--------|---------|------------|---------|---------|
| | Spike | Result | Rec (%) | Spike | Result | Rec (%) | | | |
| Benzene | 0.0300 | 0.0317 | 106 | 0.0300 | 0.0326 | 109 | (80-120) | 2.90 | (< 20) |
| cis-1,2-Dichloroethene | 0.0300 | 0.0286 | 95 | 0.0300 | 0.0301 | 100 | (70-125) | 5.10 | (< 20) |
| Tetrachloroethene | 0.0300 | 0.0309 | 103 | 0.0300 | 0.0341 | 114 | (45-150) | 9.90 | (< 20) |
| trans-1,2-Dichloroethene | 0.0300 | 0.0282 | 94 | 0.0300 | 0.0279 | 93 | (60-140) | 1.20 | (< 20) |
| Trichloroethene | 0.0300 | 0.0290 | 97 | 0.0300 | 0.0311 | 104 | (70-125) | 7.10 | (< 20) |
| Vinyl chloride | 0.0300 | 0.0278 | 93 | 0.0300 | 0.0289 | 96 | (50-145) | 3.80 | (< 20) |
| Surrogates | | | | | | | | | |
| 1,2-Dichloroethane-D4 | 0.0300 | 92.8 | 93 | 0.0300 | 93.8 | 94 | (70-120) | 1.10 | |
| 4-Bromofluorobenzene | 0.0300 | 101 | 101 | 0.0300 | 101 | 101 | (75-120) | 0.40 | |
| Toluene-d8 | 0.0300 | 94.1 | 94 | 0.0300 | 100 | 100 | (85-120) | 6.40 | |

Batch Information

Analytical Batch: VMS13943
 Analytical Method: SW8260B
 Instrument: HP 5890 Series II MS1 VJA
 Analyst: HM

Prep Batch: VXX25525
 Prep Method: SW5030B
 Prep Date/Time: 12/09/2013 08:00
 Spike Init Wt./Vol.: 0.0300 mg/L Extract Vol: 5 mL
 Dupe Init Wt./Vol.: 0.0300 mg/L Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1495261 [VXX] LLL1b
 Blank 3a7 ID: 119L1QQ

Ma,rti : x a,sr W(rfauscEff.cGro(nd)

CS for map els8:
 11065226

Rs8(1,8 7y SW8260B

| <u>Parap s,sr</u> | <u>Rs8(1,8</u> | <u>3OC/S3</u> | <u>D3</u> | <u>Unt,8</u> |
|-------------------------|----------------|---------------|-----------|--------------|
| Bsnzsns | 2.222] 22U | 2.222422 | 2.2221] 2 | p g/3 |
| - s,rauhloros,hsns | 2.222L22U | 2.22122 | 2.222012 | p g/3 |
| ,ran8T1q TDuhloros,hsns | 2.222L22U | 2.22122 | 2.222012 | p g/3 |
| - rtuhloros,hsns | 2.222L22U | 2.22122 | 2.222012 | p g/3 |
| Vtnyl uhlortds | 2.222L22U | 2.22122 | 2.222012 | p g/3 |
| Surrogates | | | | |
| 1q TDuhloros,hansTD4 | 124 | 52T1] 2 | | % |
| 4TBrop of(oro7snzsns | 99.L | 5LT1] 2 | | % |
| - ol(snsTdQ | 122 | QLT1] 2 | | % |

Batch Information

Analy,tual Ba,uh: VMm10962
 Analy,tual Ms,hod: mx Q 62B
 In8,r(p sn,: HP LQ92 mstrs8 II Mm1 VJA
 Analy8,: HM
 Analy,tual Da,s/- tp s: 1] /] 0] 210 Q4L:21AM

Prse Ba,uh: VXX] LLL1
 Prse Ms,hod: mx L202B
 Prse Da,s/- tp s: 1] /] 0] 210 Q22:22AM
 Prse Int,tal x ,/Vol: L p 3
 Prse Ei ,rau, Vol: L p 3

Blank Spike Summary

Blank Spike ID: LCS for HBN 1138787 [VXX25551]
 Blank Spike Lab ID: 1195189
 Date Analyzed: 12/23/13 19:08

Spike D0pli4a ID: LCSD for HBN 1138787 [VXX25551]
 Spike D0pli4a Lab ID: 119519/
 Ratio: Master 0.46 Vol, 5 L

%C for Sample: 1138787 / g

u ec0l6 bA SW8260B

| Gara) eEr | Blank Spike x) mL | | | Spike D0pli4a x) mL | | | CL | uGD xP | uGD CL |
|------------------------|-------------------|---------|--------|---------------------|---------|--------|--------|--------|--------|
| | Spike | u ec0l6 | ue4 xP | Spike | u ec0l6 | ue4 xP | | | |
| Benyene | 1,131 | 1,131 | 1/3 | 1,131 | 1,1321 | 1/7 | x8/Q2 | 3,8/ | x 2/ |
| <e0a4hloroe0hene | 1,131 | 1,1311 | 1/T | 1,131 | 1,1315 | 1/5 | xT5Q5/ | 1,1/ | x 2/ |
| 0ancQV0i4hloroe0hene | 1,131 | 1,1335 | 112 | 1,131 | 1,13T2 | 11T | xg/QT/ | 2,2/ | x 2/ |
| <ri4hloroe0hene | 1,131 | 1,1315 | 1/2 | 1,131 | 1,13/2 | 1/1 | x7/Q25 | 1,3/ | x 2/ |
| VinA 4hlorize | 1,131 | 1,1315 | 1/5 | 1,131 | 1,1328 | 1/9 | x5/QT5 | T,1/ | x 2/ |
| Surrogates | | | | | | | | | |
| 1V0i4hloroe0hane0T | 1,131 | 99,T | 99 | 1,131 | 1/T | 1/T | x7/Q2/ | T,5/ | |
| T(Bro) ofl0orobenylene | 1,131 | 91,T | 91 | 1,131 | 98,1 | 98 | x75Q2/ | 7,1/ | |
| <ol0eneQ8 | 1,131 | 9T,8 | 95 | 1,131 | 95,T | 95 | x85Q2/ | 1,g7 | |

Batch Information

Internal Batch: VMS13960
 Internal Ref: SW8260B
 Instrument: HP 5890 Series II MS1 VJA
 Internal Code: HM

Prep Batch: VXX25551
 Prep Ref: SW5030B
 Prep Date/Time: 12/23/2013 08:00
 Spike Inj Volume: 1,131 mL (Sample Volume: 5) L
 Dilute Inj Volume: 1,131 mL (Sample Volume: 5) L

Method Blank

Blank ID: MB for HBN 1495262 [VXX] 226Lb
 Blank 3a7 ID: 11926L2

Martini : x a,er V (rfauecEff.cGro(nd)

QC for Samples:
 1180505LL6

Res(l,s 7y SW8260B

| <u>Parame,er</u> | <u>Res(l,s</u> | <u>3OQ/C3</u> | <u>D3</u> | <u>Unt,s</u> |
|--------------------------|-----------------|---------------|-----------|--------------|
| utsz1 d zDtugloroe, gene | L.LLL2LLU | L.LL1LL | L.LLL81L | m-/3 |
| Surrogates | | | | |
| 1 d zDtugloroe, ganezD4 | 115 | 5Lz1] L | | h |
| 4zBromof(oro7enTene | 1L4 | 52z1] L | | h |
| %l(enezd0 | 90.4 | 02z1] L | | h |

Batch Information

Analy,tual Ba,ug: VMS18966
 Analy,tual Me,god: Sx 0] 6LB
 Ins,r(men,: HP 209L Seres II MS1 VJA
 Analys,: NRB
 Analy,tual Da,e/%me: 1] /] 6/] L18 1] :85:LLPM

Prep Ba,ug: VXX] 226L
 Prep Me,god: Sx 2L8LB
 Prep Da,e/%me: 1] /] 6/] L18 1] :LL:LLAM
 Prep Int,tal x ,/Vol.: 2 m3
 Prep Ei ,rau, Vol: 2 m3

Blank Spike Summary

Blank Spike ID: LCS for HBN 1138787 [VXX255] b9
 Blank Spike La6 ID: 11t 5] b]
 Date y nalzde/ : 12] 2b13 13:bb

Spike D4pliuAA ID: LCSD for HBN 1138787
 [VXX255] b9
 Spike D4pliuAA La6 ID: 11t 5] b7
 s aAiM x aAr W4rfaue(, ffE . ro4n/ G

g C for SaP pleR 1138787bb]

ceR4IA6z SW8260B

|) araPeAr | Blank Spike W %LG | | | Spike D4pliuAA W %LG | | | CL | c) D WnG | c) D CL |
|-----------------------|-------------------|--------|---------|----------------------|--------|---------|----------|----------|---------|
| | Spike | ceR4IA | ceU WnG | Spike | ceR4IA | ceU WnG | | | |
| uiRQ(20iu- lorioA ene | bB3bb | bB28t | t] | bB3bb | bB27] | t 2 | WbQ25 G | hBb | W 2b G |
| Surrogates | | | | | | | | | |
| 1(20iu- lorioA aneWh | bB3bb | 1b] | 1b] | bB3bb | 11b | 11b | WbQ2b G | hBb | |
| hBroP ofl4oro6endene | bB3bb | 1b3 | 1b3 | bB3bb | 1b3 | 1b3 | W5Q2b G | bB] | |
| Tol4eneQ8 | bB3bb | t 2B | t 2 | bB3bb | 88B | 8t | W85Q2b G | 3Bb | |

Batch Information

y nalzAual BaA- : VMS13966
 y nalzAual s eA o/ : SW8260B
 InR4P enA HP 5890 Series II MS1 VJA
 y nalzRA NRB

) rep BaA- : VXX25560
) rep s eA o/ : SW5030B
) rep DaAOTiPe: 12/26/2013 00:00
 Spike IniAx A0Vole bB3bb P %L , MkauAVol: 5 P L
 D4pe IniAx A0Vole bB3bb P %L , MkauAVol: 5 P L

) rinADaAe: b10b302b1h 3:b1:2t) s



1138787



SAMPLE RECEIPT FORM

| Review Criteria: | Condition: | Comments/Action Taken: |
|--|---|--|
| Study seals intact? Note # & location, if applicable. Accompanied samples? | Yes No <u>N/A</u> <u>Yes</u> No N/A | |
| Temperature blank compliant* (i.e., 0-6°C after CF)? <i>*: Exemption permitted for chilled samples collected less than 8 hours ago.</i> Cooler ID: <u>1</u> @ <u>5.5</u> w/ Therm.ID: <u>203</u> Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ <i>Note: If non-compliant, use form FS-0029 to document affected samples/analyses.</i> If samples are received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank <u>nor</u> cooler temp can be obtained, note "ambient" or "chilled." If temperature(s) <0°C, were all sample containers ice free? | Yes No <u>N/A</u> Yes No <u>N/A</u> Yes No <u>N/A</u> | |
| Delivery method (specify all that apply): <u>Client</u> USPS Alert Courier C&D Delivery <u>AK Air</u> Lynden Carlisle ERA PenAir FedEx UPS NAC Other: → For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog? | Note ABN/tracking # See Attached or N/A Yes No <u>N/A</u> | |
| → For samples received with payment, note amount (\$) and cash / check / CC (circle one) or note: → For samples received in FBKS , ANCH staff will verify all criteria are reviewed. | | SRF Initiated by: <u>JL</u> <u>N/A</u> <u>N/A</u> |
| Were samples received within hold time? <i>Note: Refer to form F-083 "Sample Guide" for hold time information.</i> Do samples match COC* (i.e., sample IDs, dates/times collected)? <i>* Note: Exemption permitted if times differ <1hr; in that case, use times on COC.</i> Were analyses requested unambiguous? | <u>Yes</u> No N/A <u>Yes</u> No N/A <u>Yes</u> No N/A | |
| Were samples in good condition (no leaks/cracks/breakage)? Packing material used (specify all that apply): <u>Bubble Wrap</u> Separate plastic bags Vermiculite Other: | <u>Yes</u> No N/A | |
| Were all VOA vials free of headspace (i.e., bubbles ≤6 mm)? Were all soil VOAs field extracted with MeOH+BFB? | <u>Yes</u> No N/A Yes No <u>N/A</u> | |
| Were proper containers (type/mass/volume/preservative*) used? <i>* Note: Exemption permitted for waters to be analyzed for metals.</i> Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples? | <u>Yes</u> No N/A <u>Yes</u> No N/A | |
| For special handling (e.g., "MI" or foreign soils, lab filter, limited volume, Ref Lab), were bottles/paperwork flagged (e.g., sticker)? | Yes No <u>N/A</u> | |
| For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was pH verified and compliant ? If pH was adjusted, were bottles flagged (i.e., stickers)? | Yes No <u>N/A</u> Yes No <u>N/A</u> | |
| For RUSH/SHORT Hold Time , were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable? | Yes No <u>N/A</u> | |
| For SITE-SPECIFIC QC , e.g. BMS/BMSD/BDUP, were containers / paperwork flagged accordingly? | Yes No <u>N/A</u> | |
| For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)? | Yes No <u>N/A</u> | SRF Completed by: <u>SLC 12/7/13</u> PM = N/A |
| Was PEER REVIEW of sample numbering/labeling completed ? | Yes No <u>N/A</u> | Peer Reviewed by: N/A |

Additional notes (if applicable):
* Keep WO open for about 2 weeks. -JAB-

Note to Client: Any "no" circled above indicates non-compliance with standard procedures and may impact data quality.



SAMPLE RECEIPT FORM

| Review Criteria: | Condition: | Comments/Action Taken: |
|---|---|--|
| Were custody seals intact? Note # & location, if applicable. COC accompanied samples? | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A | IF |
| Temperature blank compliant* (i.e., 0-6°C after CF)? <i>* Note: Exemption permitted for chilled samples collected less than 8 hours ago.</i> Cooler ID: <u>1</u> @ <u>1.6</u> w/ Therm.ID: <u>203</u> Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ <i>Note: If non-compliant, use form FS-0029 to document affected samples/analyses.</i> If samples are received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank <u>nor</u> cooler temp can be obtained, note "ambient" or "chilled." | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A | |
| If temperature(s) <0°C, were all sample containers ice free? | Yes No <input checked="" type="radio"/> N/A | |
| Delivery method (specify all that apply): <u>Client</u> USPS Alert Courier C&D Delivery AK Air Lynden Carlile ERA PenAir FedEx UPS NAC Other: → For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog? | Note ABN/ tracking # See Attached or N/A Yes No <input checked="" type="radio"/> N/A | |
| → For samples received with payment, note amount (\$) and cash / check / CC (circle one) or note: → For samples received in FBKS , ANCH staff will verify all criteria are reviewed. | | SRF Initiated by: <u>JD</u> <input checked="" type="radio"/> N/A |
| Were samples received within hold time? <i>Note: Refer to form F-083 "Sample Guide" for hold time information.</i> Do samples match COC* (i.e., sample IDs, dates/times collected)? <i>* Note: Exemption permitted if times differ <1hr; in that case, use times on COC.</i> Were analyses requested unambiguous? | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A | |
| Were samples in good condition (no leaks/cracks/breakage)? Packing material used (specify all that apply): <u>Bubble Wrap</u> Separate plastic bags Vermiculite Other: | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A | |
| Were all VOA vials free of headspace (i.e., bubbles ≤6 mm)? Were all soil VOAs field extracted with MeOH+BFB? | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A | |
| Were proper containers (type/mass/volume/preservative*) used? <i>* Note: Exemption permitted for waters to be analyzed for metals.</i> Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples? | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A | |
| For special handling (e.g., "MI" or foreign soils, lab filter, limited volume, Ref Lab), were bottles/paperwork flagged (e.g., sticker)? | Yes No <input checked="" type="radio"/> N/A | client did not want a TB with sample. -JABD- |
| For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was pH verified and compliant ? If pH was adjusted, were bottles flagged (i.e., stickers)? | Yes No <input checked="" type="radio"/> N/A Yes No <input checked="" type="radio"/> N/A | |
| For RUSH/SHORT Hold Time , were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable? | Yes No <input checked="" type="radio"/> N/A | |
| For SITE-SPECIFIC QC , e.g. BMS/BMSD/BDUP, were containers / paperwork flagged accordingly? | Yes No <input checked="" type="radio"/> N/A | |
| For any question answered "No," has the PM been notified and the problem resolved (or paperwork put in their bin)? | Yes No <input checked="" type="radio"/> N/A | SRF Completed by: <u>SLC 12-20-13</u> PM = N/A |
| Was PEER REVIEW of <i>sample numbering/labeling completed</i> ? | Yes No <input checked="" type="radio"/> N/A | Peer Reviewed by: N/A |
| Additional notes (if applicable): | | |

Note to Client: Any "no" circled above indicates non-compliance with standard procedures and may impact data quality.

| <u>Container Id</u> | <u>Preservative</u> | <u>Container Condition</u> | <u>Container Id</u> | <u>Preservative</u> | <u>Container Condition</u> |
|---------------------|---------------------|----------------------------|---------------------|---------------------|----------------------------|
| 1138787001-A | HCL to pH < 2 | OK | | | |
| 1138787001-B | HCL to pH < 2 | OK | | | |
| 1138787001-C | HCL to pH < 2 | OK | | | |
| 1138787002-A | HCL to pH < 2 | OK | | | |
| 1138787002-B | HCL to pH < 2 | OK | | | |
| 1138787002-C | HCL to pH < 2 | OK | | | |
| 1138787003-A | HCL to pH < 2 | OK | | | |
| 1138787003-B | HCL to pH < 2 | OK | | | |
| 1138787003-C | HCL to pH < 2 | OK | | | |
| 1138787004-A | HCL to pH < 2 | OK | | | |
| 1138787004-B | HCL to pH < 2 | OK | | | |
| 1138787004-C | HCL to pH < 2 | OK | | | |
| 1138787005-A | HCL to pH < 2 | OK | | | |
| 1138787005-B | HCL to pH < 2 | OK | | | |
| 1138787005-C | HCL to pH < 2 | OK | | | |
| 1138787006-A | HCL to pH < 2 | OK | | | |
| 1138787006-B | HCL to pH < 2 | OK | | | |
| 1138787006-C | HCL to pH < 2 | OK | | | |

Container Condition Glossary

OK - The container was received at an acceptable pH for the analysis requested.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

BU - The container was received with headspace greater than 6mm.

ATTACHMENT 8

QAR and ADEC Laboratory Data Checklist

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Laboratory Data Review Checklist

| | | | |
|-------------------|--|---------------------------|--------------|
| Completed by: | Melissa Pike | | |
| Title: | Environmental Scientist | Date: | Jan 7, 2014 |
| CS Report Name: | Fairbanks Airport – Drainage Pond Report | Report Date: | January 2014 |
| Consultant Firm: | ERM Alaska, Inc. | | |
| Laboratory Name: | SGS North America | Laboratory Report Number: | 1138787 |
| ADEC File Number: | | ADEC RecKey Number: | |

1. Laboratory

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

Yes No NA (Please explain.) 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 NA (Please explain) Comments:

Samples were transferred from SGS Fairbanks to SGS Anchorage.

2. Chain of Custody (COC)

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

Yes No NA (Please explain) Comments:

b. Correct analyses requested?

Yes No NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?

Yes No NA (Please explain) Comments:

Sample coolers were received at 5.5°C, 3.6°C and 1.6°C. No qualifications due to temperature.

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

Yes No NA (Please explain) Comments:

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

Yes No NA (Please explain) Comments:

Samples arrived in good condition.

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

Yes No NA (Please explain) Comments:

There were no discrepancies.

e. Data quality or usability affected? (Please explain)

Comments:

Data quality and usability was not affected with respect to the laboratory sample receipt documentation.

4. Case Narrative

a. Present and understandable?

Yes No NA (Please explain) Comments:

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

Yes No NA (Please explain) Comments:

c. Were all corrective actions documented?

Yes No NA (Please explain) Comments:

There were no corrective actions.

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

Comments:

Data quality and usability is not affected with respect to the case narrative.

5. Samples Results

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

Yes No NA (Please explain)

Comments:

b. All applicable holding times met?

Yes No NA (Please explain)

Comments:

c. All soils reported on a dry weight basis?

Yes No NA (Please explain)

Comments:

There were no soil samples submitted.

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

Yes No NA (Please explain)

Comments:

Lab report uses LOQ terminology. All PQLs/LOQs were less than or equal to cleanup levels.

e. Data quality or usability affected? (Please explain)

Comments:

Data quality and usability is not affected with respect to the reported sample results.

6. QC Samples

a. Method Blank

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

Yes No NA (Please explain)

Comments:

ii. All method blank results less than PQL?

Yes No NA (Please explain)

Comments:

iii. If above PQL, what samples are affected?

Comments:

NA. All results are <PQL.

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

Yes No NA (Please explain) Comments:

NA. All results are <PQL.

v. Data quality or usability affected? (Please explain)

Comments:

Data quality and usability is not affected.

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 NA (Please explain) Comments:

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

Yes No NA (Please explain) Comments:

There are no inorganic or metal analysis.

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 NA (Please explain) 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/DMSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes No NA (Please explain) Comments:

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

Comments:

NA, all LCS/LCSD %R and RPDs were within limits.

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

Yes No NA (Please explain) Comments:

NA, all LCS/LCSD %R and RPDs were within limits.

vii. Data quality or usability affected? (Please explain)

Comments:

Data quality and usability is not affected.

c. Surrogates - Organics Only

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

Yes No NA (Please explain) 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 NA (Please explain) Comments:

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

Yes No NA (Please explain) Comments:

NA. All %R were within limits.

iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

Data quality and usability is not affected with respect to the reported surrogate results.

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

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes No NA (Please explain.) Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes No NA (Please explain.) Comments:

iii. All results less than PQL?

Yes No NA (Please explain.)

Comments:

iv. If above PQL, what samples are affected?

Comments:

NA. All trip blank results were less than PQL.

v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected.

e. Field Duplicate

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

Yes No NA (Please explain)

Comments:

primary MW-40-120513 with duplicate MW-41-200513

ii. Submitted blind to lab?

Yes No NA (Please explain.)

Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

Yes No NA (Please explain)

Comments:

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Yes No NA (Please explain)

Comments:

Data quality and usability is not affected with respect to the reported field duplicate results.

f. Decontamination or Equipment Blank (if applicable)

Yes No NA (Please explain)

Comments:

Decontamination or Equipment blanks were not required. All sampling equipment was disposable.

i. All results less than PQL?

Yes No NA (Please explain)

Comments:

Decontamination or Equipment blanks were not required. All sampling equipment was disposable.

ii. If above PQL, what samples are affected?

Comments:

NA. Decontamination or Equipment blanks were not required. All sampling equipment was disposable.

iii. Data quality or usability affected? (Please explain.)

Comments:

NA. Decontamination or Equipment blanks were not required. All sampling equipment was disposable.

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

a. Defined and appropriate?

Yes No NA (Please explain)

Comments:

Refer to laboratory data qualifiers section.

Reset Form

1. QUALITY ASSURANCE REVIEW

Laboratory QA/QC data associated with the analysis of project samples has been reviewed to evaluate the integrity of the analytical data generated during the December 2013 water sampling events at the Fairbanks International Airport Drainage Pond Site, Fairbanks, Alaska. Samples were collected, reported, and shipped in general accordance with the ADEC-approved work plan (ERM 2013).

All data were reviewed in accordance with appropriate EPA procedural guidance documents (EPA 2009) and ADEC regulatory guidance documents (ADEC 2009; 2012). An ADEC laboratory checklist was performed (ADEC 2010). This data review focuses on criteria for the following QA/QC parameters and their effect on the quality of data and usability: sample handling and chain-of-custody (CoC) documentation; holding time compliance; field QA/QC (trip blanks, field duplicate) results; laboratory QA/QC (method blanks, laboratory control samples, surrogates, matrix spike duplicate [MS/MSD]); results and analytical methods; method reporting limits; precision and accuracy; and completeness.

The details of this review and qualification of the data are summarized in the following sections

1.1. Sample Handling and Chain of Custody

Water samples were delivered to SGS in Fairbanks, Alaska and transferred to SGS in Anchorage, Alaska for analysis. Samples were analyzed for volatile organic compounds (VOC) by EPA Method 8260B.

SGS analytical results were reported in one sample delivery group (SDG), 1138787.

All sample coolers were shipped with custody seals intact. CoC forms, laboratory sample receipt forms, and case narratives were reviewed to evaluate the integrity of the samples and the quality of the associated data.

All sample containers in the sample coolers were received at the laboratory intact and within the specified temperature range of 4°C +/- 2°C, with the following exception. Sample MW-11R-1201513 collected on 12/19/2013 was received by SGS in Fairbanks at 1.6°C. No results were qualified due to temperature.

1.2. Holding Time Compliance

All samples were extracted, digested and analyzed within the holding time criteria for the applicable analytical methods and in accordance with work plan specifications.

1.3. Field QA/QC

Field QA/QC protocols are designed to measure for potential sample bias as a result of sampling procedures and possible contamination during collection and transport of samples. Collection and analysis of field duplicates facilitates an evaluation of precision that takes into account potential variables associated with sampling procedures, site

heterogeneity and laboratory analyses. Trip blanks are used to monitor sample containers and possible cross-contamination of samples. For this project, both trip blanks and field duplicates were submitted.

1.3.1. Trip Blanks

Trip blanks were prepared by the laboratory, shipped to the site with the empty sample bottles/containers, stored with sample containers during the field event, and transported with the collected samples back to the laboratory for analysis.

Trip blanks were placed in the cooler with associated matrix-specific volatile organics samples. All analytes detected in the trip blanks were below the detection limit (DL) for all analytes.

1.3.2. Field Duplicates

Out of a total of 4 primary water samples submitted, there was 1 field duplicate sample submitted – primary MW-40-120513 with duplicate MW-41-200513.

When analytes were detected in both duplicate pairs above the RL, the relative percent differences (RPDs) between the analytes were calculated. All RPDs between primary and duplicate met the ADEC recommended limit of RPDs <30% for water samples.

1.4. Laboratory QA/QC

1.4.1. Laboratory Blanks

Laboratory/ Method blanks were analyzed concurrent with an analytical batch of 20 or fewer primary samples for each of the analytical methods performed on project samples. Target analytes were not detected (U) in any laboratory blanks.

1.4.2. Surrogates

System Monitoring Compounds (surrogates) are specified for organic chromatographic analytical procedures. Surrogates are compounds similar to target analytes and are added to each sample prior to collection or extraction. Subsequent surrogate recovery indicates overall method performance. Surrogate recoveries were within prescribed control limits for all primary samples, method blanks, LCS/LCSD, MS/MSD and other QA/QC samples.

1.4.3. Laboratory Control Samples

The laboratory monitors internal precision and accuracy for each analytical batch with a set of laboratory control samples and laboratory control sample duplicate (LCS/LCSD). Two sample aliquots of the same sample are taken in the analytical laboratory and analyzed separately with identical procedures. Analyses of the sample and duplicate give a measure of the precision associated with laboratory procedures but not with sample collection, preservation or storage procedures. A known quantity of target analytes are added to blank laboratory control samples prior to extraction and analysis and recoveries are calculated. Acceptable recovery criteria vary with each analytical

method and matrix. All LCS/LCSD samples met laboratory and project QC goals for target analytes in all SDGs.

1.4.4. Matrix Spikes

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed. Matrix spikes have a known quantity of target analytes added (spiked) to field samples. Spike recoveries are calculated and are used to evaluate both site conditions and laboratory quality control. Matrix spikes met recovery percentages (%R) and relative percent difference (RPD) limits.

1.4.5. Detection Limits (Sensitivity)

Sample results that were between the DL and the Limit of Quantitation (LOQ) were qualified as estimated (J). Sample results that were below the DL were qualified as not detected (ND) at the Limit of Detection (LOD), which is one half the LOQ. The laboratory established DL were below the ADEC cleanup levels.

1.5. Precision and Accuracy

Precision criteria monitor analytical reproducibility. Accuracy criteria monitor agreement of measured results with "true values" established by spiking applicable samples with a known quantity of analyte or surrogate. Precision and accuracy were evaluated by comparing LCS/LCSDs MS/MSDs and field duplicate pairs for this project. Field duplicates and MS/MSD samples were collected in accordance with work plan specifications. Field duplicate RPDs met applicable control limits. Recoveries and RPDs for all LCS/LCSD and MS/MSD samples were within required limits except as noted in Laboratory QC section.

1.5.1. Completeness

Data completeness is defined as the percentage of usable data (usable data divided by the total possible data). The overall project completeness goal is 90%:

$$\% \text{ completeness} = \frac{\text{number of valid (i.e., non-R flagged) results}}{\text{number of possible results}}$$

All requested analyses were performed in accordance with Work Plan specifications. No samples were qualified as unusable (i.e., "R"). Completeness for this project is 100.0%.

1.5.2. Representativeness

Data representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or environmental condition. The number and selection of samples were specified in the work plan and verified in the field to account accurately for site variations and sample matrices. The data quality objective (DQO) for representativeness was met.

1.5.3. Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. Data produced for this project followed applicable field sampling techniques and specific analytical methodology. The DQO for comparability was met.

1.6. Data Summary

In general, the overall quality of the data was acceptable. The data quality was determined as acceptable or estimated. Acceptable data are associated with QC data that meet all QC criteria or with QC samples that did not meet QC criteria but data quality objectives were not affected. Estimated J results are considered inaccurate or estimated QC acceptance criteria which were not met. No results were rejected. The EPA National Functional Guidelines (EPA 2008) were used to evaluate the acceptability of the data.

Data quality meets established DQO established for this project. With the exceptions noted above, all data are suitable for their intended use.

2. REFERENCES

- ADEC. 2009. Technical Memorandum: Environmental Laboratory Data and Quality Assurance Requirements. March.
- ADEC. 2010. Laboratory Data Review Checklist. Version 2.7. January.
- ADEC. 2012. Technical Memorandum: Guidelines for Data Reporting, Data Reduction, and Treatment of Non-detect Values. June.
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