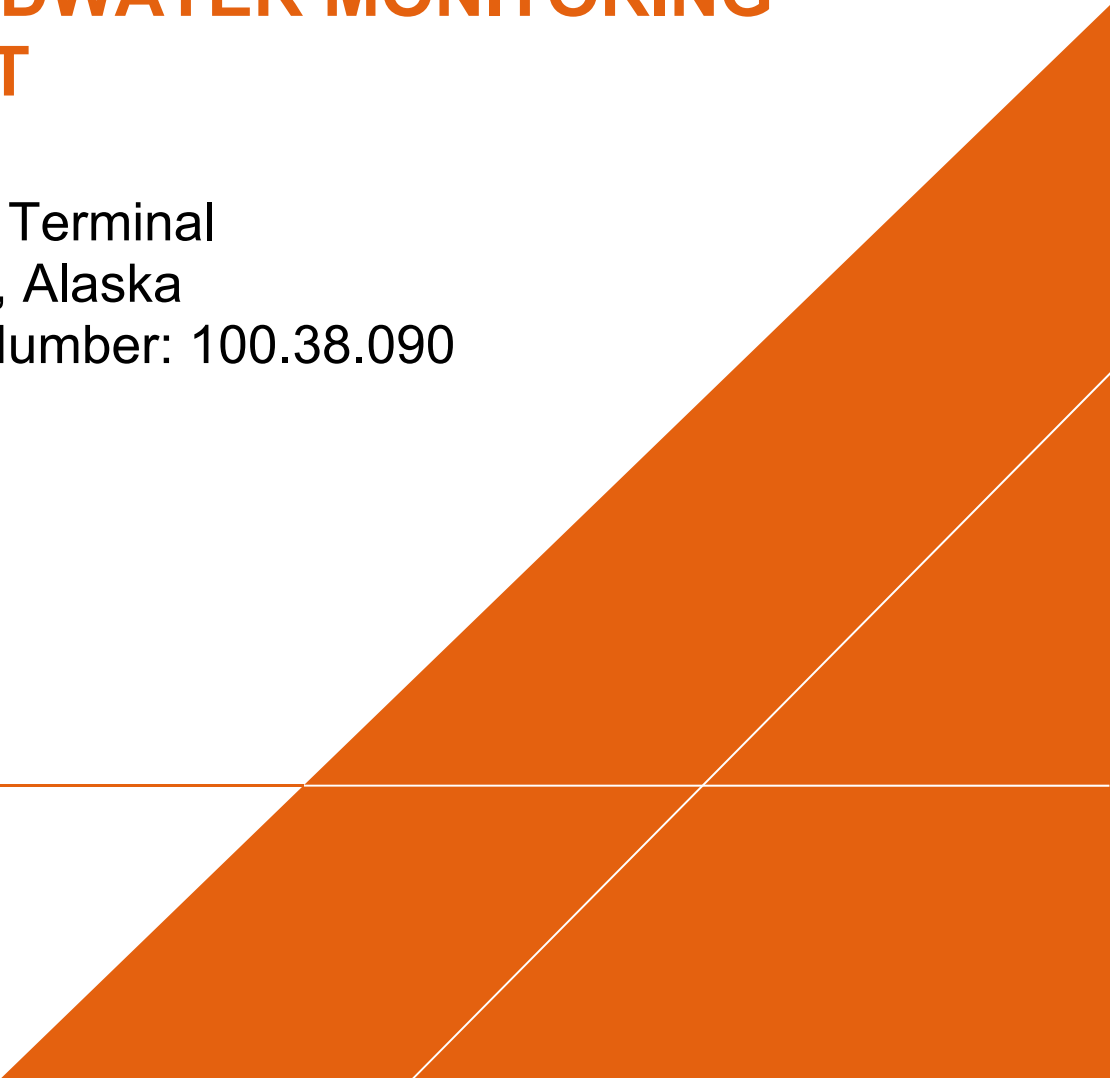


Flint Hills Resources Alaska, LLC

SECOND SEMIANNUAL 2017 ONSITE GROUNDWATER MONITORING REPORT

North Pole Terminal
North Pole, Alaska
DEC File Number: 100.38.090

February 8, 2018

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**SECOND SEMIANNUAL
2017 ONSITE
GROUNDWATER
MONITORING REPORT**

North Pole Terminal
North Pole, Alaska
DEC File Number: 100.38.090



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ACRONYMS AND ABBREVIATIONS

2017 LTM Plan	Long-Term Monitoring Plan – 2017 Update
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
Arcadis	Arcadis U.S., Inc.
Barr	Barr Engineering Company
BTEX	benzene, toluene, ethylbenzene, and xylenes
bwt	below the water table
COC	constituent of concern
DRO	diesel-range organics
FHRA	Flint Hills Resources Alaska, LLC
g/day	grams per day
GAC East	original treatment system
GAC West	expanded groundwater recovery and treatment system
gpm	gallons per minute
GRO	gasoline-range organics
GRTS	groundwater remediation and treatment system
lb/day	pound per day
LNAPL	light nonaqueous phase liquid
NSZD	natural source zone depletion
OCP	Final Onsite Cleanup Plan
OMM Plan	Operations, Maintenance, and Monitoring Plan – 2016 Update
Onsite RSAP	Revised Onsite Sampling and Analysis Plan
Onsite SCR – 2013	Onsite Site Characterization Report – 2013 Addendum
PFC	perfluorinated compound
POC	point of compliance
report	Second Semiannual 2017 Onsite Groundwater Monitoring Report
reporting period	third and fourth quarters of 2017
ROCP	Revised Onsite Cleanup Plan
SGP	South Gravel Pit

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site	Flint Hills Resources Alaska, LLC North Pole Terminal, located on H and H Lane in North Pole, Alaska
SOP	standard operating procedure
SWI	Shannon & Wilson, Inc.
VPT	vertical profile transect
µg/L	micrograms per liter

1 INTRODUCTION

On behalf of Flint Hills Resources Alaska, LLC (FHRA), Arcadis U.S., Inc. (Arcadis) prepared this Second Semiannual 2017 Onsite Groundwater Monitoring Report (report) for the FHRA North Pole Terminal, located on H and H Lane in North Pole, Alaska (site). This report summarizes onsite field activities completed during the third and fourth quarters of 2017 (reporting period) as described in Section 3 and in Table 1-1.

The data, analyses, and conclusions presented in this report are the product of a collaborative effort among FHRA's consulting team members. The team includes qualified professionals in a variety of technical disciplines from three environmental consulting firms: Arcadis, Shannon & Wilson, Inc. (SWI), and Barr Engineering Company (Barr). FHRA engaged these consulting firms to perform various tasks for the project. Pursuant to 18 Alaska Administrative Code (AAC) 75.335(c)(1), this report was prepared and submitted by Qualified Environmental Professionals. Samples were collected and analyzed in accordance with 18 AAC 75.355(a). The sampling and analyses for this reporting period were completed in accordance with the following documents, which were prepared by Qualified Environmental Professionals and approved by the Alaska Department of Environmental Conservation (ADEC):

- Revised Onsite Cleanup Plan (ROCP; Arcadis 2017b).
- Long-Term Monitoring Plan – 2017 Update (2017 LTM Plan; provided as Appendix A to the ROCP [Arcadis 2017b])
- Revised Onsite Sampling and Analysis Plan (Onsite RSAP; provided as Appendix A to the Second Semiannual 2016 Onsite Groundwater Monitoring Report [Arcadis 2017a])
- Operations, Maintenance, and Monitoring Plan – 2016 Update (OMM Plan; Barr 2016)

The site, offsite area, and the site's physical setting are described in the conceptual site model, which was presented as Appendix A of the Onsite Site Characterization Report – 2013 Addendum (Onsite SCR – 2013; Arcadis 2013). The site is shown on Figure 1-1. Current site features are shown on Figure 1-2 and an onsite site plan is presented on Figure 1-3.

2 CURRENT GROUNDWATER MONITORING PROGRAM AND METHODS

Monitoring conducted during the reporting period was based on the following networks included in the 2017 LTM Plan (Arcadis 2017b):

- Groundwater elevation
- Light nonaqueous phase liquid (LNAPL) migration monitoring.
- Groundwater sampling and analysis of sulfolane
- Groundwater sampling and analysis of other constituents of concern (COCs) (benzene, toluene, ethylbenzene, and xylenes [BTEX]; gasoline-range organics [GRO]; and diesel range organics [DRO]).

The ROCP (Arcadis 2017b) was submitted and approved by ADEC in February 2017. In accordance with the ROCP (Arcadis 2017b), in third quarter 2017 the groundwater remediation and treatment system (GRTS) was shut down and the updated sampling program defined under the ROCP was implemented (Arcadis 2017b). The ROCP describes a detailed evaluation of GRTS shutdown effects that will be presented in the Short-Term Monitoring Program Evaluation in August 2018 (Arcadis 2017b).

Table 1-1 summarizes the field activities completed during the reporting period. Monitoring methods and well construction details are summarized in the Onsite RSAP (Arcadis 2017a). The following deviations from the 2017 LTM Plan (Arcadis 2017b) were noted during the reporting period:

- LNAPL was encountered in MW-334-15, O-2, R-21, R-25R, RR-39, and R-40 during planned monitoring events in the reporting period; therefore, samples were not collected from these wells for BTEX, GRO, and DRO analyses.

3 GROUNDWATER MONITORING RESULTS

Groundwater impacts have been characterized and continue to be monitored through the analysis of water-level gauging data and groundwater samples collected from onsite monitoring wells. This section presents the results of water-level gauging and groundwater analyses of onsite well samples. Data are summarized in Tables 3-1 through 3-8.

Historical groundwater elevation and LNAPL thickness measurements, and BTEX, GRO, DRO, sulfolane, and geochemical analytical results are included as Appendix A. Analytical laboratory reports are included as Appendix B. A data quality evaluation including ADEC quality assurance/quality control checklists is included as Appendix C. Field data sheets are included as Appendix D.

3.1 Groundwater Elevation

Depth to water measurements were collected from monitoring wells on September 21, 2017 during third quarter 2017. Potentiometric maps are included for each monitoring zone: water table, 10 to 55 feet below the water table (bwt), 55 to 90 feet bwt, and 90 to 160 feet bwt (Figures 3-1 through 3-4). During the reporting period, the general direction of the horizontal hydraulic gradient was interpreted to be to the north-northwest, which is consistent with historical groundwater data. Groundwater elevations and horizontal hydraulic gradients were within the range of historical groundwater data.

Groundwater well field parameters and elevations are summarized in Tables 3-1 and 3-2, respectively.

In addition to manual water-level measurements, automated measurements were collected with transducers from selected onsite wells and well nests. Data from the well nests were used to calculate horizontal hydraulic gradients and differences in groundwater elevations between wells screened at various depths within the suprapermafrost aquifer. Groundwater elevation hydrographs were prepared in accordance with the standard operating procedure (SOP; SWI 2013) using the most recent survey data. Error ranges, calculated in accordance with the method outlined in the SOP (SWI 2013), are shown on the well nest hydrographs presented in Appendix E. A detailed evaluation of transducer data and hydraulic gradients through 2013 is provided in Appendix 6-B of the Onsite SCR – 2013 (Arcadis 2013) and updated in Appendix F.

Measurements were recorded from gauging points located at the North Gravel Pit and South Gravel Pit (SGP) on September 21, 2017. Data are summarized in Table 3-2 and on Figures 3-1 through 3-4. Historical gauging data are summarized in Appendix A.

3.2 Light Nonaqueous Phase Liquid Monitoring Results

LNAPL migration observations were collected from a network of monitoring, observation, and recovery wells screened across the water table according to the 2017 LTM Plan (Arcadis 2017b). Additionally, LNAPL was gauged throughout the reporting period during monitoring events outside of the LNAPL migration networks. A comprehensive LNAPL gauging table is presented in Appendix G.

3.2.1 Light Nonaqueous Phase Liquid Extent

Per the 2017 LTM Plan (Arcadis 2017b), LNAPL migration observations were made from wells along the perimeter of the LNAPL plume. During the reporting period, LNAPL was observed in LNAPL migration monitoring wells MW-334-15, O-2, O-7, O-11, O-27, O-31, and R-21; and sheen was observed in LNAPL migration wells R-35R and R-40. Results are summarized in Table 3-3, and maximum thickness data measured during the reporting period are presented on Figures 3-5 and 3-6. Additionally, LNAPL was gauged during the following monitoring events throughout the reporting period: groundwater elevation monitoring, groundwater sampling and field parameter collection, vertical gradient monitoring, hydraulic capture monitoring, and FHRA operator gauging (through July 8). A comprehensive table including gauging data from each monitoring event conducted at the site during the reporting period is included in Appendix G.

LNAPL thickness measurements were similar to historical results; significant changes in LNAPL thicknesses resulting from shutdown of the GRTS system were not apparent during this reporting period. LNAPL recovery is discussed in Section 4.3.

3.2.2 Natural Source Zone Depletion Assessment Results

Thirteen monitoring wells were sampled for natural source zone depletion (NSZD) parameters to evaluate the potential for NSZD to occur at the site. Sample locations are defined in the 2017 LTM Plan (Arcadis 2017b). LNAPL was not present in any of the NSZD monitoring wells. Field parameters were collected from 13 monitoring wells and are presented in Table 3-1. Natural attenuation parameters (iron, manganese, sulfate, and methane), GRO, and DRO are presented in Table 3-4 and on Figures 3-7 and 3-8.

Biodegradation and dissolution of the submerged portion of the LNAPL can be assessed by comparing the chemical composition of groundwater upgradient from the source zone with groundwater immediately downgradient. Biodegradation of petroleum hydrocarbons results in a decrease in electron acceptor concentrations and a corresponding increase in biodegradation transformation products between upgradient and within and/or downgradient from the LNAPL plume. The NSZD process is further discussed in the Onsite SCR – 2013 (Arcadis 2013).

A comparison of the upgradient and source zone/downgradient data indicates the following:

- Sulfate concentrations decrease from upgradient monitoring locations to the source zone monitoring locations, indicating sulfate reduction from anaerobic degradation.
- Dissolved iron increases from upgradient monitoring locations to the source zone monitoring locations, indicating iron reduction from anaerobic degradation.
- Dissolved manganese generally increases from upgradient monitoring locations to the source zone monitoring locations, indicating manganese reduction from anaerobic degradation.
- The methane concentration increased from upgradient locations to the source zone monitoring locations, indicating carbon dioxide reduction or organic acid fermentation from anaerobic degradation.

This spatial comparison of upgradient and source zone natural attenuation parameters shows a clear decreasing trend in electron acceptor concentrations and an increasing trend in biodegradation transformation products, which indicates that biodegradation of LNAPL is occurring in the submerged portion of the LNAPL body. Downgradient parameters do not continue to show this trend, because concentrations appear to have reached background conditions in downgradient wells due to distance from the source zone. Dissolved oxygen was measured at nominal levels from 0.05 to 1.76 milligrams per liter in the NSZD network monitoring wells, indicating that oxygen was not readily available as an electron acceptor and the aquifer in the area is generally anoxic.

3.3 Onsite Monitoring Well Sampling

Onsite wells included in the other COCs monitoring network in the 2017 LTM Plan (Arcadis 2017b) were sampled for BTEX. Additionally, select monitoring wells were sampled for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and 1-methylnaphthalene during the reporting period. Results are summarized in Table 3-5. Figures 3-9 and 3-10 present analytical results for benzene.

Nine monitoring wells were sampled for perfluorinated compounds (PFCs) in accordance with the 2017 LTM Plan (Arcadis 2017b). Results are summarized in Table 3-6 and on Figure 3-11.

Analyses for sulfolane were completed on groundwater samples collected from the wells identified in the 2017 LTM Plan (Arcadis 2017b), including wells that were on a monthly performance monitoring schedule for the post-GRTS shutoff, as described in the ROCP (Arcadis 2017b). Sulfolane analytical results are summarized in Table 3-7 and on Figures 3-12 through 3-17. In accordance with the updated sampling schedule (Arcadis 2017b), no data were collected during the third and fourth quarters in 2017 at the 90 to 160 feet bwt interval.

Groundwater samples were collected from the point of compliance (POC) wells to evaluate the vertical distribution of sulfolane concentrations. Sulfolane concentrations for the POC, which includes well nests MW-358, MW-359, MW-360, MW-362, MW-364, and MW-149A-15, are summarized in Table 3-8. Sulfolane concentrations across the VPT are shown on Figures 3-18 and 3-19. Sulfolane concentrations generally continue to decline along the VPT and the POC. A more detailed discussion of sulfolane trends, post GRTS shutdown, is included in Section 5.

3.4 Sulfolane Mass Flux

In accordance with the ROCP (Arcadis 2017b), mass flux evaluations have previously been performed annually (Arcadis 2017a), with the next calculation to be completed as part of the Short-Term Monitoring Program Evaluation in August 2018.

3.5 Statistical Analysis of Benzene and Sulfolane Data

A statistical and graphical evaluation of benzene and sulfolane concentration trends using a Mann-Kendall trend analysis is conducted semiannually during the first and third quarters at monitoring and observation wells to evaluate plume migration and stability, and remedial action effectiveness; and to identify relationships between concentrations, groundwater elevations, and flow directions. Use of the Monitoring and Remediation Optimization System for Mann-Kendall trend analysis was applied to

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groundwater monitoring data collected since 2006 from monitoring and observation wells. Wells with LNAPL were excluded from evaluation of the benzene statistical trend. Section 5 describes an additional evaluation of the sulfolane and benzene concentration trends since 2010 at individual network monitoring wells identified in the 2017 LTM Plan (Arcadis 2017b) and OMM Plan (Barr 2016) to determine the effects of source controls, enhanced groundwater remediation prior to GAC West and GRTS shutdowns, and rebound effects since the shutdowns

The analysis trends are expressed as probably increasing, increasing, probably decreasing, decreasing, stable, or no trend. Results of the Mann-Kendall trend analysis for the reporting period are presented in Tables 1 and 2, and on Figures 1A through 2C of Appendix H, and are summarized in the table below.

Parameter Trend	Third Quarter	
	Benzene	Sulfolane
Number of wells	30	77
All results nondetect ¹	13	5
Insufficient data points ¹	0	2
Probably decreasing	0	3
Decreasing	4	51
Probably increasing	1	0
Increasing	2	4
Stable	2	6
No trend	8	6

Note:

¹Wells with insufficient data points for the statistical analysis (less than four points), but with all results less than detection limits, are listed under "all results nondetect."

The results of the Mann-Kendall trend analyses are discussed below. More detailed discussions on trends based on visual assessment of results are included in Section 5.

3.5.1 Benzene Statistical Evaluation

The Mann-Kendall trend analysis indicated an increasing or probably increasing benzene concentration trend in wells MW-130-25, MW-321-15, and O-24 during the reporting period, as seen on the benzene time series plots included as Attachment 1 in Appendix H. Monitoring well MW-130-25 is within the detectable benzene plume at the site, near the downgradient extent. Although the Mann-Kendall analysis indicates an overall increasing trend in this well, concentrations have generally been decreasing since first quarter 2016. MW-321-15 is within the detectable benzene plume at the site at the western extent and has exhibited seasonal variation in 2016 and 2017. Well O-24 is within the detectable benzene plume at the site, near the downgradient extent. Some seasonal variation is evident in this well.

In general, the results of the Mann-Kendall analysis for benzene concentrations were consistent with previous evaluations, with no unexpected trend variations resulting from shutdown of the GRTS system apparent.

3.5.2 Sulfolane Statistical Evaluation

The Mann-Kendall trend analysis indicated an increasing sulfolane concentration trend in wells MW-330-20, MW-345-55, MW-372-15, and O-2 during the reporting period, as seen on the sulfolane time series plots (Attachment 1 of Appendix H). Monitoring well MW-330-20 is within the detectable sulfolane plume within the site, near the western extent, and concentrations have remained less than 1,000 micrograms per Liter ($\mu\text{g/L}$). MW-345-55 is within the detectable sulfolane plume at the site, near the center, and concentrations have remained less than 60 $\mu\text{g/L}$. MW-372-15 is within the detectable sulfolane plume at the site, near the western extent, and concentrations have remained less than 2,000 $\mu\text{g/L}$. Well O-2 is within the detectable sulfolane plume at the site, near the eastern extent, and concentrations have remained less than 300 $\mu\text{g/L}$, with a decrease in concentrations noted during third quarter 2017. MW-330-20 and MW-372-15 are located downgradient of the soil excavation completed in the Southwest Area in 2015 as described in Section 5.1.

In general, the results of the Mann-Kendall analysis for sulfolane concentrations were consistent with previous evaluations, with no unexpected trend variations resulting from shutdown of the GRTS system apparent.

3.6 Nonroutine Activities

No non-routine activities were conducted this reporting period.

4 GROUNDWATER REMEDIATION AND TREATMENT SYSTEM RESULTS AND EVALUATION

This section discusses operating results for the existing GRTS for the reporting period. The ROCP (Arcadis 2017b) was submitted and approved by ADEC in February 2017. Under the ROCP (Arcadis 2017b), the GRTS was shut down on July 10, 2017. For the first 10 days of the reporting period, ongoing remediation efforts at the site included groundwater recovery and treatment, and LNAPL recovery and recycling, as described in Sections 4.2 and 4.3, respectively. The GRTS layout is shown on Figure 4-1 and the process flow diagram for the original treatment system (GAC East) is shown on Figure 4-2. The GRTS remains in place, in mothball condition, following shutdown.

4.1 Associated Permits

Treated groundwater from GAC East was discharged at the SGP in accordance with wastewater disposal permit 2005-DB0012 issued by ADEC (with subsequent ADEC-approved revisions) through July 10, 2017. Groundwater withdrawal for the purpose of groundwater recovery and treatment was completed in accordance with Temporary Water Use Authorization A2016-41 issued by the Alaska Department of Natural Resources.

4.2 Groundwater Recovery and Treatment

The average groundwater recovery rate for the GRTS during operation was 341 gallons per minute (gpm) during the reporting period. This rate is consistent with target recovery rates for the GRTS established in the OMM Plan (Barr 2016). The system operated for 223 hours during the reporting period prior to shutdown on July 10, 2017. Each active recovery well maintained 100 percent runtime during the planned operation period. Active recovery wells during the reporting period included R-21, R-35R, R-40, R-42, R-43, R-44, R-45, and R-46.

4.2.1 Cumulative Groundwater Recovery

Table 4-1 summarizes the volume and rate of groundwater recovered monthly from 2009 through the end of the reporting period. Approximately 4,580,000 gallons of recovered groundwater were remediated during the reporting period.

4.2.2 Groundwater Treatment Performance Evaluation – GAC East

In accordance with the OCP (Arcadis 2014) and the wastewater disposal permit for GAC East, FHRA conducted monthly monitoring of the GAC East effluent through shutdown on July 10, 2017. As noted above, the GRTS was shut down on July 10, 2017; one monitoring event was completed during the reporting period. Results for the monthly monitoring event are summarized in Tables 4-2a, 4-2b, and 4-2c.

The sulfolane concentration measured in the GAC East final effluent was less than the detection limit during the monitoring event completed during the reporting period (Table 4-2a).

BTEX and semivolatile organic compound concentrations measured at the GAC East final effluent were less than the discharge limits for the system during the monitoring event (Tables 4-2b and 4-2c). Analytical laboratory reports are provided in Appendix B.

4.3 Light Nonaqueous Phase Liquid Recovery Rates and Recycling

Prior to shutdown of the GRTS on July 10, 2017, FHRA performed LNAPL recovery via a skimmer system when adequate LNAPL was consistently present, and/or conducted manual recovery using a vacuum truck or portable LNAPL pump at the wells shown on Figure 4-1. LNAPL recovered from the skimmer systems and from manual recovery activities is stored onsite until it is recycled. During the reporting period and prior to GRTS shutdown, minimal LNAPL was present and recovery via a skimmer system was briefly performed only at R-21.

LNAPL recovery for 2017 is summarized in Table 4-3; historical LNAPL recovery at the site since 1986 is summarized in Table 4-4. From 1986 to present, approximately 398,318 gallons of LNAPL were recovered. LNAPL gauging data collected as part of the operations and maintenance of the LNAPL recovery efforts are included in Appendix G.

4.4 Benzene, Toluene, Ethylbenzene, and Xylenes Mass Recovery

FHRA monitored the BTEX concentrations in recovered groundwater prior to shutdown to calculate mass removal rates (Table 4-5). Based on the monitoring results, BTEX mass removal averaged 0.89 lb/day during the reporting period while in operation and totalled approximately 8 pounds during the reporting period.

4.5 Sulfolane Mass Recovery

FHRA monitored the sulfolane concentration in recovered groundwater at each active recovery well prior to shutdown; mass recovery rates for each well are summarized in Table 4-6 for GAC East. During the active operation period during the reporting period, the highest average mass recovery rate was measured in well R-21 (0.09 lb/day; Table 4-6). Well R-46 had no measurable recovery of sulfolane and is outside the sulfolane plume (Table 4-6).

Table 4-7 summarizes the overall sulfolane mass recovery for the groundwater recovery system. The rate was calculated from the sulfolane concentration measured prior to shutdown in the GRTS influent. The sulfolane mass removal averaged 0.21 lb/day prior to shutdown and, based on the system runtime, totalled approximately 2 pounds during the reporting period.

4.6 Summary of Routine and Nonroutine Repairs, Changes, and Maintenance

As previously noted, the GRTS was shut down on July 10, 2017. Prior to shutdown, the GRTS maintained continuous runtime at the individual recovery wells. Following shutdown, the treatment system gallery pond was thoroughly cleaned and media were removed from the air strippers, sand filters, and granular

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activated carbon vessels and properly disposed. The GRTS equipment remains in place in a mothball state.

As further described in Section 5, results of the hydraulic capture events and continued overall declines in concentration in the sulfolane and BTEX plumes north of the GRTS capture zone indicated the effectiveness of the GRTS during the reporting period and preceding quarters. Thus, operation of the GRTS met the performance goals while in operation.

5 CONCENTRATION TREND MONITORING

The monitoring results presented in this section are based on sulfolane and benzene data gathered in accordance with the 2017 LTM Plan (Arcadis 2017b) and the OMM Plan (Barr 2016). The objectives of the monitoring are to:

- Monitor the nature and extent of COCs onsite.
- Evaluate the potential exposure to COCs.
- Evaluate contaminant trends and groundwater modeling predictions.

As noted in Section 4, the GRTS was shut down on July 10, 2017, under the ROCP (Arcadis 2017b). The GRTS at that time consisted of the GAC East treatment system and recovery wells listed in Section 4.2. As discussed in a previous semiannual groundwater monitoring report (Arcadis 2017a), the expanded groundwater recovery and treatment system (GAC West) and recovery wells R-47 and R-48 were shut down on August 31, 2016. Influences of these events and source control measures are discussed below. A key piece of the shutdown is a monitoring program to analyze impacts of the shutdown on the migration of constituents within and/or from the site and to assure offsite migration of sulfolane is limited to levels below 400 µg/L. A detailed evaluation of GRTS shutdown effects will be presented in the Short-Term Monitoring Program Evaluation in August 2018 in accordance with the ROCP (Arcadis 2017b). The timing of this deliverable was developed with the objective of allowing subsurface conditions time to equilibrate sufficiently prior to performing detailed evaluation and avoid drawing premature conclusions on data trends.

5.1 Sulfolane

This section summarizes FHRA's interpretation of sulfolane concentration trends since 2010 at individual network monitoring wells identified in the 2017 LTM Plan (Arcadis 2017b) and OMM Plan (Barr 2016) to determine the effects of source controls, enhanced groundwater remediation prior to GAC West and GRTS shutdowns, and rebound effects since the shutdowns. The results are reasonable, within expected ranges, and support the cleanup objective presented in the ROCP (Arcadis 2017b) that sulfolane concentrations at the POC will not exceed 400 µg/L. As noted below, exceedance of 400 µg/L sulfolane at the VPT wells is not considered likely based the monitoring results through the reporting period.

The monitoring wells are categorized in the following discussion based on location relative to the former treatment zone; each area is summarized below:

- *Upgradient.* Sulfolane concentration trends for monitoring wells located upgradient from the former GRTS treatment zone are generally decreasing or stable, with the exception of monitoring wells MW-330-20 and MW-372-15, which are located downgradient of a soil excavation performed in the Southwest Former Wash Area during 2015. It is likely that the upgradient locations were minimally influenced by operation of the GRTS; these trends are believed to primarily be the result of a decreasing stored sulfolane mass in upgradient source areas.
- *Within the former treatment zone.* Sulfolane concentration trends for monitoring wells located within the treatment zone are decreasing or stable, with the following exceptions:

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- MW-186A-15, MW-345-15, O-2 had been stable until concentrations increased during the reporting period, likely due to GRTS shutdown. Concentrations in samples from these wells since GRTS shutdown range from 173 to 277 µg/L. With the exception of a concentration of 559 µg/L in MW-186A-15 in May of 2012, the maximum historical concentration of any sample from these wells is 374 µg/L.
- Concentrations in R-21 and R-40 had been decreasing, likely due to dilution as the recovery wells were drawing groundwater from deeper zones with lower sulfolane concentrations. Concentrations increased during the reporting period, as this diluting effect ceased with GRTS shutdown. The maximum concentration in R-21 and R-40 during the reporting period were 328 and 86.4 µg/L, respectively. Concentrations in samples from R-21 that were not flagged as estimates have been below 400 µg/L since September of 2012. The maximum concentrations in samples from R-40 prior to the decline observed from 2012 through to the GRTS shutdown was 69.2 µg/L.
- MW-345-55 has shown seasonal variation with an overall increase from 19.3 µg/L in January 2014 to 49.6 µg/L in October 2017.
- *Between the former treatment zone and VPT.* Sulfolane concentration trends for monitoring wells located downgradient from the former treatment zone are decreasing or stable, many at concentrations below the limit of detection, with the following exceptions:
 - Concentrations in well MW-371-15 had declined from a maximum concentration of 71 µg/L in July 2014, then increased and subsequently stabilized, likely due to the shutdown of GAC West in third quarter 2016. The result from MW-371-15 during the reporting period was 18.9 µg/L.
 - Concentrations in wells MW-139-25, MW-154B-95, and O-27 had been stable or decreasing until they increased during the reporting period, likely due to GRTS shutdown. The maximum concentration in any of these wells during the reporting period was 83.2 µg/L. Concentrations in samples from MW-139-25 have been below 400 µg/L since November 2010. The maximum historical concentration for wells MW-154B-95 and O-27 are 103 and 160 µg/L, respectively.
 - Concentrations continue to fluctuate (exhibit seasonal variation) at O-27-65, which may be due to the location of the well screen near the base of the plume. The result from O-27-65 during the report period was 7.37J µg/L. The maximum concentration from O-27-65 is 19.1 µg/L in October 2016.
- *VPT.* As noted above, the ROCP identifies contingencies if a sulfolane concentrations in a VPT monitoring well exceed 400 µg/L. The maximum concentration recorded in a VPT well was 412 µg/L in MW-304-15 in April 2012. Concentrations in MW-304-15 have decreased steadily to 8.09J in April 2017. Likewise, mass flux across the entire VPT has decreased steadily from 86 g/day in November 2011 to 4 g/day the last time the mass flux was calculated (third quarter 2016; Arcadis, 2017a).

The maximum concentration in any VPT well during the reporting period was 12.8 µg/L. Sulfolane concentrations in monitoring wells located along the VPT are decreasing or stable, most at concentrations below the limit of detection, with the following exceptions:

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- Concentrations in well MW-302-CMT-20 increased in 2017 to a maximum value of 12.8 µg/L, likely due to the shutdown of GAC West in third quarter 2016. The maximum historical concentration any well in the MW-302 nest, was 76.2 µg/L in November of 2011.
- Concentrations in wells MW-303-CMT-19, MW-303-CMT-39, and MW-303-CMT-59 had been decreasing, but increased slightly during the reporting period, which may be due to shutdown of GAC West in third quarter 2016. The maximum concentration in any of these wells during the reporting period was 10.8 µg/L. The maximum historical concentration in any well in the MW-303 nest was 97.8 µg/L in MW-303-CMT-19 in April of 2012.
- *Downgradient of the VPT.* Sulfolane concentrations in monitoring wells located between the VPT and the property boundary are decreasing or stable, most at concentrations below the limit of detection with the following exceptions:
 - Concentrations in wells MW-358-20 and MW-358-60 had been decreasing, but increased slightly during the reporting period, which may be due to the shutdown of GAC West in third quarter 2016. The maximum concentration in either of these wells during the reporting period was 7.81J µg/L. The maximum historical concentration in the MW-358 nest was 39 µg/L in MW-358-40 in October 2013.

In summary, the maximum sulfolane concentrations during the reporting period in the zones described above that were influenced by the GRTS are:

- Former treatment zone: 328 µg/L
- Between the former treatment zone and the VPT: 129 µg/L
- VPT: 12.8 µg/L.
- Downgradient of the VPT (including the POC wells): 14.2 µg/L.

The latest sample collection date during the reporting period was 108 days after GRTS shutdown. The monitoring results through the reporting period do not indicate that exceedance of 400 µg/L sulfolane is likely at the VPT or POC. As noted above, a more extensive evaluation of the effects of GRTS shutdown will be performed in August 2018.

5.2 Benzene

Monitoring for benzene occurred during third quarter 2017, with the exceptions noted in Section 2. This section summarizes FHRA's interpretation of benzene concentration trends since 2010 in individual monitoring wells identified in the 2017 LTM Plan (Arcadis 2017b) and OMM Plan (Barr 2016) to determine the effects of enhanced groundwater remediation prior to GRTS shutdown and rebound effects since shutdown. The results are as expected and support the cleanup objectives presented in the ROCP (Arcadis 2017b). The monitoring wells are categorized based on location relative to the former treatment zone; each area is summarized below:

- *Upgradient.* Monitoring wells MW-135-20 and MW-321-25 located upgradient of the former treatment zone have decreasing concentrations. No trend has been established at the third upgradient well, MW-176A-15, since the reporting period sample is the first collected since 2013 due to the presence of LNAPL.

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- *Within the treatment zone.* Benzene concentration trends for monitoring wells located within the treatment zone are decreasing or stable, with the following exceptions:
 - Benzene concentrations in wells MW-137-20, MW-345-15, O-3, and R-35R had been stable or decreasing until they increased during the reporting period, likely due to GRTS shutdown.
- *Downgradient of the former treatment zone.* Benzene concentration trends for monitoring wells located downgradient of the treatment zone are decreasing or stable, with the exception of O-24 and S-9, at which concentrations increased during the reporting period.
- *VPT.* Benzene concentrations in monitoring wells located along the VPT are decreasing or stable; all results during the reporting period are nondetect.
- *Downgradient of the VPT.* Benzene concentrations in monitoring wells located between the VPT and the property boundary are stable; all results are nondetect.

6 CONCLUSIONS

Groundwater monitoring and sampling events were conducted during this reporting period in accordance with the 2017 LTM Plan (Arcadis 2017b), OMM Plan (Barr 2016), and Onsite RSAP (Arcadis 2017a). The latest sample collection date during the reporting period was 108 days after GRTS shutdown. The monitoring results through the reporting period do not indicate that exceedance of 400 µg/L sulfolane is likely at the VPT or POC. As previously noted, a more extensive evaluation of the effects of GRTS shutdown will be performed in August 2018.

The following summarizes conclusions based on results of the onsite field activities conducted during the reporting period:

- Groundwater monitoring data collected during the reporting period are within expected ranges, and support the cleanup objective presented in the ROCP (Arcadis 2017b) that sulfolane concentrations at the POC will not exceed 400 µg/L.
- Slight increases in sulfolane and benzene concentrations were noted in wells downgradient of the former treatment systems. These concentration increases were expected and support the cleanup objectives presented in the ROCP.
- The statistical analyses included in Appendix H show that sulfolane concentrations in 51 wells and benzene concentrations in five wells across the plume are decreasing or probably decreasing, while sulfolane concentrations in four wells and benzene concentrations in three wells across the plume are increasing or probably increasing.
- Sulfolane concentrations and trends generally continue to decrease in the onsite areas near the downgradient site boundary.
- BTEX concentrations are consistent with historical detections and the core of the BTEX plume appears to be stable. BTEX concentrations continue to be limited to the developed area onsite.

7 REFERENCES

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Farhat, S., C. Newell, and E. Nichols. 2006. Mass Flux Toolkit to Evaluate Groundwater Impacts, Attenuation, and Remediation Alternatives. User's Manual. Version 1.0. March.

SWI. 2013. Standard Operating Procedure for Groundwater Elevation Monitoring.

TABLES



**Table 1-1
Field Activities**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Activity	Frequency
Groundwater Elevation Monitoring	Semiannual
Data Loggers	Downloaded quarterly (hourly measurements)
LNAPL Migration Monitoring	Monthly through October
LNAPL Transmissivity Testing	Discontinued
Sulfolane Network Sampling	Throughout the reporting period
Other Constituents of Concern Network Sampling	Throughout the reporting period
Perfluorinated Compound Network Sampling	Throughout Third Quarter 2017
Natural Source Zone Depletion Network Sampling	Quarterly
Hydraulic Capture Performance Monitoring Network Groundwater Elevations	Not conducted; recovery wells no longer active.
Interim Recovery Well Rehabilitation Services	Not conducted; recovery wells no longer active.
Monitoring Well Repair and Maintenance	No major well repairs. Maintenance activities included cutting casings.
Wells Installed	None
Wells Developed	None

General Notes:

Third Quarter 2017 activities were completed from July 1, 2017 through September 30, 2017.

Fourth Quarter 2017 activities were completed from October 1, 2017 through December 31, 2017.

Other Constituents of Concern includes BTEX, GRO, DRO, 1-Methylnaphthalene, 1,2,4-Trimethylbenzene, and 1,3,5-Trimethylbenzene

Acronyms and Abbreviations:

BTEX= Benzene, Toluene, Ethylbenzene, and Xylenes

DRO = Diesel Range Organics

GRO = Gasoline Range Organics

LNAPL = Light Non-Aqueous Phase Liquid

Table 3-1
Groundwater Well Field Parameters

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Well ID	Sample Name	Date	Analysis	Depth to Ice (feet)	Depth to Water (feet)	Depth to LNAPL (feet)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS/cm)	pH	ORP (mV)	Water Clarity	Sample Collection Notes
MW-101A-25	MW-101A-25	8/7/2017	COC, NSZD	--	9.91	--	4.9	1.39	226.3	7.21	-30.1	Clear	Parameters Stabilized
MW-101A-25	MW-101A-25	11/15/2017	NSZD	--	11.43	--	4.7	0.06	234.2	6.98	-28.5	Clear	> 3 Well Volumes
MW-116-15	MW-116-15	8/31/2017	NSZD	--	9.50	Sheen	Product present - no parameters collected						> 1 Well Volume
MW-116-15	MW-116-15	11/15/2017	NSZD	--	10.35	--	5.8	0.87	328.0	6.71	-89.9	Clear	Parameters Stabilized
MW-125-25	MW-125-25	8/7/2017	NSZD	--	10.32	--	3.7	1.11	240.3	7.28	-103.1	Clear	Parameters Stabilized
MW-125-25	MW-125-25	8/15/2017	BTEX	--	10.26	--	4.0	0.12	238.8	7.38	-111.8	Clear	Parameters Stabilized
MW-125-25	MW-125-25	11/16/2017	NSZD	--	11.65	--	5.9	0.43	245.0	6.79	-113.7	Clear	> 3 Well Volumes
MW-127-25	MW-127-25	8/2/2017	S	--	11.55	--	3.7	1.08	231.4	7.12	-57.9	Clear	Parameters Stabilized
MW-127-25	MW-127-25	10/19/2017	S	--	12.70	--	6.3	2.46	262.6	7.01	-91.9	Clear	> 3 Well Volumes
MW-130-25	MW-130-25	8/3/2017	S, COC, NSZD	--	10.90	--	4.1	0.36	294.0	6.81	-69.6	Clear	Parameters Stabilized
MW-130-25	MW-130-25	10/20/2017	S	--	12.31	--	6.3	0.15	349.7	6.63	-92.3	Clear	Parameters Stabilized
MW-130-25	MW-130-25	11/15/2017	NSZD	--	12.37	--	6.1	0.26	209.0	6.55	-186.9	Clear	Parameters Stabilized
MW-131-25	MW-131-25	7/14/2017	COC	--	10.73	--	3.7	0.03	270.5	6.89	-21.5	Clear	Parameters Stabilized
MW-135-20	MW-135-20	7/24/2017	COC, NSZD	--	11.11	--	Well known to contain product - no parameters collected						> 1 Well Volume
MW-135-20	--	8/31/2017	--	--	11.62	Sheen	No sample, presence of free-phase product prevented sampling for COC analytes						
MW-135-20	--	9/19/2017	--	--	12.20	Sheen	No sample, presence of free-phase product prevented sampling for COC analytes						
MW-135-20	MW-135-20	10/24/2017	--	--	12.55	Sheen	Sheen observed on interface probe. No sample collected						
MW-135-20	MW-135-20	11/16/2017	NSZD	--	12.32	--	6.4	0.31	185.0	6.49	-108.1	Clear	> 3 Well Volumes
MW-137-20	MW-137-20	8/2/2017	COC+	--	11.45	--	3.6	0.89	328.2	6.86	-72.4	Clear	Parameters Stabilized
MW-139-25	MW-139-25	7/14/2017	S, COC+	--	11.78	--	2.6	0.02	236.8	6.93	-96.5	Clear	Parameters Stabilized
MW-139-25	MW-139-25	10/20/2017	S, COC	--	13.22	--	5.7	0.09	292.6	7.01	-87.8	Clear	Parameters Stabilized
MW-140-25	MW-140-25	7/24/2017	COC	--	9.64	--	2.6	0.28	256.9	6.89	6.1	Clear	Parameters Stabilized
MW-142-20	MW-142-20	8/9/2017	S, COC+, NSZD	--	10.60	--	3.5	1.55	242.6	7.13	-93.6	Clear	Parameters Stabilized
MW-142-20	MW-142-20	11/16/2017	NSZD	--	11.90	--	5.1	0.09	291.7	6.87	-90.0	Clear	Parameters Stabilized
MW-143-20	MW-143-20	8/1/2017	COC	--	9.88	--	4.3	1.50	224.6	7.03	29.6	Clear	Parameters Stabilized
MW-144A-25	MW-144A-25	7/14/2017	COC	--	9.78	--	2.6	0.14	245.5	6.68	9.0	Clear	Parameters Stabilized
MW-145-20	MW-145-20	8/10/2017	S, COC+, NSZD	--	9.87	--	4.6	1.31	476.4	6.72	37.4	Clear	Parameters Stabilized
MW-145-20	MW-145-20	11/16/2017	NSZD	--	11.12	--	5.1	0.37	421.0	6.60	-27.0	Clear	> 3 Well Volumes
MW-148A-15	MW-148A-15	7/10/2017	S	--	9.38	--	2.8	1.15	189.8	6.52	83.6	Slightly red	> 3 Well Volumes
MW-148B-30	MW-148B-30	7/10/2017	S	--	9.09	--	3.0	0.19	268.5	7.16	69.6	Clear	Parameters Stabilized
MW-148C-55	MW-148C-55	7/10/2017	S	--	9.55	--	3.9	0.09	245.0	7.23	-28.8	Clear	Parameters Stabilized
MW-148-80	MW-148-80	7/12/2017	S	--	9.25	--	4.6	0.02	190.5	7.24	-63.5	Clear	Parameters Stabilized
MW-149A-15	MW-149A-15	7/10/2017	S, COC	--	9.80	--	3.3	8.03	86.0	6.23	2.4	Clear	> 3 Well Volumes
MW-154B-95	MW-154B-95	7/25/2017	S	--	12.49	--	4.1	0.06	205.0	7.26	-92.1	Clear	Parameters Stabilized
MW-154B-95	MW-154B-95	10/20/2017	S	--	13.85	--	4.6	0.07	225.6	7.48	-97.2	Light turbidity	Parameters Stabilized
MW-176A-15	MW-176A-15	7/13/2017	S, COC	--	10.24	--	Well known to contain product - no parameters collected						> 1 Well Volume
MW-180A-15	MW-180A-15	8/10/2017	NSZD	--	10.01	--	9.2	1.03	246.9	6.89	-36.3	Clear	Parameters Stabilized
MW-180A-15	MW-180A-15	8/16/2017	BTEX	--	9.79	--	8.9	0.92	247.5	6.65	-83.4	Clear	> 3 Well Volumes
MW-180A-15	MW-180A-15	11/15/2017	NSZD	--	11.63	--	4.8	0.43	206.0	6.09	-49.8	Clear	Parameters Stabilized
MW-186A-15	MW-186A-15	7/13/2017	S	--	10.24	--	Well known to contain product - no parameters collected						> 1 Well Volume
MW-186A-15	MW-186A-15	10/18/2017	S	--	11.50	0	Product present - no parameters collected						> 1 Well Volume
MW-186B-60	MW-186B-60	7/12/2017	S	--	10.14	--	4.4	0.12	205.1	7.16	20.0	Clear	Parameters Stabilized
MW-186E-75	MW-186E-75	8/3/2017	S	--	10.04	--	4.7	0.10	198.2	7.43	122.9	Clear	Parameters Stabilized
MW-186E-75	MW-186E-75	10/19/2017	S	--	11.39	--	4.2	1.21	224.4	7.12	33.5	Clear	Parameters Stabilized
MW-192A-15	MW-192A-15	8/10/2017	NSZD	--	8.19	--	6.8	1.76	245.5	6.93	140.5	Clear	Parameters Stabilized
MW-192A-15	MW-192A-15	8/16/2017	BTEX	--	7.96	--	6.8	1.44	247.0	6.89	58.9	Clear	Parameters Stabilized
MW-192A-15	MW-192A-15	11/15/2017	NSZD	--	9.86	--	5.4	0.12	242.0	6.72	35.5	Clear	Parameters Stabilized
MW-301-CMT-20	MW-301-CMT-20	7/26/2017	S	--	7.55	--	8.0	1.80	266.3	7.10	-84.3	Clear	Parameters Stabilized
MW-301-CMT-20	MW-301-CMT-20	10/16/2017	S	--	8.82	--	7.4	0.12	248.6	7.04	-62.4	Clear	Parameters Stabilized
MW-301-60	MW-301-60	7/14/2017	S	--	7.56	--	6.9	0.02	233.1	7.19	7.3	Clear	Parameters Stabilized
MW-301-60	MW-301-60	10/16/2017	S	--	8.91	--	6.2	0.06	228.2	7.11	-15.3	Clear	Parameters Stabilized

Table 3-1
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Well ID	Sample Name	Date	Analysis	Depth to Ice (feet)	Depth to Water (feet)	Depth to LNAPL (feet)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS/cm)	pH	ORP (mV)	Water Clarity	Sample Collection Notes
MW-302-CMT-20	MW-302-CMT-20	7/31/2017	S	--	9.27	--	5.3	1.18	228.6	7.23	12.9	Clear	Parameters Stabilized
MW-302-CMT-20	MW-302-CMT-20	10/17/2017	S	--	10.37	--	5.4	0.16	233.9	7.31	68.2	Clear	Parameters Stabilized
MW-302-CMT-50	MW-302-CMT-50	7/31/2017	S	--	9.41	--	6.5	1.27	224.2	7.29	-23.1	Clear	Parameters Stabilized
MW-302-CMT-50	MW-302-CMT-50	10/17/2017	S	--	10.38	--	5.0	0.18	217.9	7.34	4.2	Clear	Parameters Stabilized
MW-302-80	MW-302-80	8/1/2017	S	--	8.46	--	5.7	0.88	215.9	7.23	63.1	Clear	Parameters Stabilized
MW-302-80	MW-302-80	10/16/2017	S	--	9.64	--	5.4	0.02	219.9	7.17	59.2	Clear	Parameters Stabilized
MW-303-CMT-19	MW-303-CMT-19	7/28/2017	S, COC	--	10.75	--	4.4	1.08	230.1	7.22	-72.0	Clear	Parameters Stabilized
MW-303-CMT-19	MW-303-CMT-19	10/17/2017	S	--	11.87	--	5.1	0.10	240.6	7.28	-57.7	Clear	Parameters Stabilized
MW-303-CMT-39	MW-303-CMT-39	7/28/2017	S	--	10.75	--	5.8	1.01	218.2	7.35	-77.3	Clear	Parameters Stabilized
MW-303-CMT-39	MW-303-CMT-39	10/17/2017	S	--	11.88	--	4.4	0.07	216.7	7.39	-82.8	Clear	Parameters Stabilized
MW-303-CMT-59	MW-303-CMT-59	7/28/2017	S	--	10.76	--	6.1	0.97	219.1	7.38	-101.1	Clear	Parameters Stabilized
MW-303-CMT-59	MW-303-CMT-59	10/17/2017	S	--	11.89	--	4.6	0.09	217.3	7.40	-94.1	Clear	Parameters Stabilized
MW-303-80	MW-303-80	8/1/2017	S	--	6.87	--	5.1	0.93	202.7	7.26	75.8	Clear	Parameters Stabilized
MW-303-80	MW-303-80	10/16/2017	S	--	7.72	--	4.9	0.06	207.9	7.20	70.3	Clear	Parameters Stabilized
MW-304-CMT-20	MW-304-CMT-20	7/28/2017	S, COC	--	12.56	--	4.4	1.33	410.9	6.90	-50.6	Clear	Parameters Stabilized
MW-304-CMT-20	MW-304-CMT-20	10/17/2017	S	--	13.62	--	4.3	0.15	436.0	6.91	-52.3	Clear	Parameters Stabilized
MW-304-CMT-40	MW-304-CMT-40	7/28/2017	S	--	12.61	--	5.5	1.25	221.2	7.29	-49.4	Clear	Parameters Stabilized
MW-304-CMT-40	MW-CMT-304-40	10/17/2017	S	--	13.65	--	3.9	0.06	219.1	7.39	-81.9	Clear	Parameters Stabilized
MW-304-CMT-60	MW-304-CMT-60	7/28/2017	S	--	12.32	--	6.3	1.15	211.5	7.19	22.0	Clear	Parameters Stabilized
MW-304-CMT-60	MW-304-CMT-60	10/17/2017	S	--	13.68	--	4.0	0.09	202.7	7.37	-74.5	Clear	Parameters Stabilized
MW-304-80	MW-304-80	7/25/2017	S	--	11.61	--	4.7	0.08	197.6	7.17	194.5	Clear	Parameters Stabilized
MW-304-80	MW-304-80	10/16/2017	S	--	12.75	--	4.3	0.06	206.0	7.18	82.9	Clear	Parameters Stabilized
MW-305-CMT-28	MW-305-CMT-28	7/27/2017	S, COC	--	11.36	--	4.8	7.30	224.6	7.19	7.3	Clear	Parameters Stabilized
MW-305-CMT-28	MW-305-CMT-28	10/17/2017	S	--	12.40	--	4.4	0.09	226.9	7.31	-57.3	Clear	Parameters Stabilized
MW-305-CMT-48	MW-305-CMT-48	7/27/2017	S	--	11.41	--	5.6	6.90	213.5	7.31	-26.1	Clear	Parameters Stabilized
MW-305-CMT-48	MW-305-CMT-48	10/17/2017	S	--	12.40	--	4.1	0.14	210.7	7.34	-59.3	Clear	Parameters Stabilized
MW-309-15	MW-309-15	8/8/2017	S, PFC	--	8.99	--	3.9	0.91	270.9	7.06	-52.9	Clear	Parameters Stabilized
MW-310-15	MW-310-15	7/10/2017	S	--	8.72	--	5.1	0.16	332.1	6.50	-22.3	Clear	Parameters Stabilized
MW-321-15	MW-321-15	8/8/2017	COC, NSZD, PFC	--	9.25	--	4.9	1.13	318.4	6.87	-91.2	Clear	Parameters Stabilized
MW-321-15	MW-321-15	11/15/2017	NSZD	--	10.45	--	5.1	0.12	347.7	6.81	-89.6	Clear	> 3 Well Volumes
MW-330-20	MW-330-20	7/10/2017	S	--	13.70	--	4.4	0.38	275.9	6.52	42.6	Clear	Parameters Stabilized
MW-334-15	MW-334-15	7/25/2017	S, COC	--	11.21	--	Well known to contain product - no parameters collected					Clear	> 1 Well Volume
MW-334-15	MW-334-15	8/31/2017	S	--	11.89	11.77	Product present - no parameters collected					Clear	> 1 Well Volume
MW-334-15	MW-334-15	9/20/2017	S	--	12.51	12.40	Product present - no parameters collected					Clear	> 1 Well Volume
MW-334-15	MW-334-15	10/25/2017	S	--	13.11	12.71	Product present - no parameters collected, COC not collected					Clear	> 1 Well Volume
MW-334-65	MW-334-65	8/3/2017	S	--	10.03	--	4.5	0.11	198.4	7.38	130.3	Clear	Parameters Stabilized
MW-334-65	MW-334-65	10/19/2017	S	--	11.36	--	3.9	1.00	228.0	7.18	28.2	Clear	Parameters Stabilized
MW-336-20	MW-336-20	8/15/2017	S, NSZD	--	5.74	--	5.2	0.11	368.2	6.73	-86.0	Clear	Parameters Stabilized
MW-336-20	MW-336-20	11/15/2017	NSZD	--	7.48	--	6.1	0.33	336.0	6.53	-157.5	Clear	Parameters Stabilized
MW-344-15	MW-344-15	7/24/2017	S, COC	--	7.76	--	4.9	0.39	259.7	6.59	82.3	Clear	> 3 Well Volumes
MW-344-15	MW-344-15	8/29/2017	S	--	8.33	--	6.6	2.23	242.2	6.82	1.7	Clear	> 3 Well Volumes
MW-344-15	MW-344-15	9/19/2017	S	--	9.04	--	6.4	0.49	272.2	6.82	15.4	Clear	Parameters Stabilized
MW-344-15	MW-344-15	10/24/2017	S	--	9.41	--	5.5	0.24	274.3	6.67	65.1	Clear	Parameters Stabilized
MW-345-15	MW-345-15	7/24/2017	S, COC	--	9.84	--	4.3	0.41	265.4	6.74	-41.9	Clear	Parameters Stabilized
MW-345-15	MW-345-15	8/29/2017	S	--	10.43	--	7.3	0.64	333.3	7.02	-99.7	Clear	Parameters Stabilized
MW-345-15	MW-345-15	9/20/2017	S	--	11.07	--	7.0	0.45	379.7	7.12	-87.2	Clear	Parameters Stabilized
MW-345-15	MW-345-15	10/24/2017	S, COC	--	11.40	--	6.4	0.06	374.2	7.11	-115.6	Clear	Parameters Stabilized
MW-345-55	MW-345-55	7/14/2017	S	--	10.18	--	4.8	0.09	217.1	7.18	-25.7	Clear	Parameters Stabilized
MW-345-55	MW-345-55	10/20/2017	S	--	11.67	--	4.4	0.09	213.8	7.39	-70.0	Clear	Parameters Stabilized
MW-351-15	MW-351-15	8/1/2017	COC	--	8.06	--	5.5	2.60	232.0	6.70	245.5	Clear	Parameters Stabilized
MW-354-35	MW-354-35	7/12/2017	S	--	10.23	--	3.2	0.05	230.4	7.17	-73.0	Clear	Parameters Stabilized

Table 3-1
Groundwater Well Field Parameters

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Sample Name	Date	Analysis	Depth to Ice (feet)	Depth to Water (feet)	Depth to LNAPL (feet)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS/cm)	pH	ORP (mV)	Water Clarity	Sample Collection Notes
MW-358-15	MW-358-15	8/1/2017	COC	--	10.65	--	6.9	1.52	311.8	6.46	70.8	Clear	Parameters Stabilized
MW-358-20	MW-358-20	8/8/2017	S, PFC	--	10.69	--	4.8	0.83	241.4	6.91	-1.4	Clear	Parameters Stabilized
MW-358-40	MW-358-40	7/11/2017	S	--	10.80	--	4.6	0.07	229.2	7.06	28.4	Clear	Parameters Stabilized
MW-358-60	MW-358-60	7/11/2017	S	--	10.76	--	5.7	0.08	225.4	7.19	17.0	Clear	Parameters Stabilized
MW-359-15	MW-359-15	8/8/2017	S, PFC	--	10.39	--	6.6	1.01	259.0	6.46	44.3	Clear	Parameters Stabilized
MW-359-35	MW-359-35	8/8/2017	S, PFC	--	10.19	--	4.0	0.89	231.7	7.22	-24.2	Clear	Parameters Stabilized
MW-359-60	MW-359-60	7/11/2017	S	--	10.32	--	4.6	0.12	212.0	7.17	-34.8	Clear	Parameters Stabilized
MW-359-80	MW-359-80	7/11/2017	S	--	10.38	--	4.9	0.08	206.7	7.18	-10.9	Clear	Parameters Stabilized
MW-360-15	MW-360-15	7/11/2017	S, COC	--	10.52	--	2.5	0.45	378.5	6.53	-32.7	Clear	Parameters Stabilized
MW-360-35	MW-360-35	7/11/2017	S	--	10.50	--	3.4	0.07	259.0	6.98	-66.2	Clear	Parameters Stabilized
MW-360-50	MW-360-50	7/11/2017	S	--	10.53	--	4.1	0.10	266.1	7.01	-71.5	Clear	Parameters Stabilized
MW-360-80	MW-360-80	7/11/2017	S	--	10.36	--	4.6	0.18	198.7	7.16	43.3	Clear	Parameters Stabilized
MW-362-15	MW-362-15	8/8/2017	S, PFC	--	10.38	--	9.1	0.63	275.7	6.97	43.7	Clear	Parameters Stabilized
MW-362-25	MW-362-25	8/9/2017	PFC	--	10.69	--	6.4	1.12	243.9	7.06	48.1	Clear	Parameters Stabilized
MW-362-50	MW-362-50	7/12/2017	S	--	10.14	--	7.0	0.03	248.0	7.20	18.0	Clear	Parameters Stabilized
MW-364-15	MW-364-15	8/8/2017	S, PFCs	--	9.82	--	5.4	0.71	174.3	6.66	42.1	Clear	Parameters Stabilized
MW-364-30	MW-364-30	8/8/2017	S, PFC	--	10.18	--	3.4	0.94	203.1	7.15	26.7	Clear	Parameters Stabilized
MW-364-65	MW-364-65	7/12/2017	S	--	9.52	--	4.4	0.05	204.1	7.18	15.3	Clear	Parameters Stabilized
MW-364-90	MW-364-90	7/12/2017	S	--	10.53	--	4.6	0.10	194.1	7.17	-0.1	Clear	Parameters Stabilized
MW-369-16	MW-369-16	8/9/2017	NSZD	--	12.19	--	5.7	1.24	304.3	6.82	-28.0	Clear	Parameters Stabilized
MW-369-16	MW-369-16	8/16/2017	BTEX	--	12.05	--	5.4	0.80	296.3	6.79	-35.1	Clear	Parameters Stabilized
MW-369-16	MW-369-16	11/15/2017	NSZD	--	13.86	--	6.1	0.05	291.3	6.35	1.3	Clear	> 3 Well Volumes
MW-371-15	MW-371-15	7/11/2017	S	--	10.72	--	4.0	0.06	240.0	6.97	-34.4	Clear	Parameters Stabilized
MW-372-15	MW-372-15	7/10/2017	S	--	13.95	--	3.4	0.18	412.6	6.65	40.3	Clear	Parameters Stabilized
O-1	O-1	7/12/2017	S	--	10.08	--	3.8	0.22	268.2	7.14	-88.5	Clear	Parameters Stabilized
O-2	O-2	7/24/2017	S, COC	--	11.49	--	Well known to contain product - no parameters collected						> 1 Well Volume
O-2	O-2	8/29/2017	S	--	11.96	11.95	Product present - no parameters collected						> 1 Well Volume
O-2	O-2	9/20/2017	S	--	12.68	12.66	Product present - no parameters collected						> 1 Well Volume
O-2	O-2	10/25/2017	S	--	13.17	13.00	Product present - no parameters collected, COC not collected					Clear	> 1 Well Volume
O-3	O-3	8/2/2017	COC	--	12.32	--	5.9	1.09	662.0	6.92	-76.6	Clear	Parameters Stabilized
O-4	O-4	7/14/2017	COC	--	10.88	--	3.9	0.05	224.7	6.68	6.3	Clear	Parameters Stabilized
O-11	O-11	8/2/2017	S	--	12.39	--	Well known to contain product - no parameters collected						> 1 Well Volume
O-11	O-11	10/18/2017	S	--	13.60	0	Product present - no parameters collected						> 1 Well Volume
O-12	O-12	8/2/2017	S	--	10.84	--	4.7	1.03	350.1	6.80	-89.6	Clear	Parameters Stabilized
O-12	O-12	10/19/2017	S	--	12.60	--	6.6	1.69	347.0	6.83	-101.7	Clear	> 3 Well Volumes
O-13	O-13	8/2/2017	S	--	9.98	9.83	Product present - no parameters collected						> 1 Well Volume
O-13	O-13	10/18/2017	S	--	11.22	10.97	Product present - no parameters collected						> 1 Well Volume
O-15	O-15	8/10/2017	NSZD	--	10.96	--	5.4	1.33	256.7	6.60	50.9	Clear	Parameters Stabilized
O-15	O-15	8/16/2017	BTEX	--	10.77	--	5.6	0.95	256.2	6.56	20.0	Clear	Parameters Stabilized
O-15	O-15	11/16/2017	NSZD	--	12.11	--	5.5	0.09	249.1	6.56	65.6	Clear	> 3 Well Volumes
O-19	O-19	7/13/2017	S	--	10.55	--	Well known to contain product - no parameters collected						> 1 Well Volume
O-19	O-19	10/18/2017	S	--	11.83	11.81	Product present - no parameters collected						> 1 Well Volume
O-19-90	O-19-90	8/3/2017	S	--	10.10	--	4.6	0.12	195.4	7.44	128.7	Clear	Parameters Stabilized
O-19-90	O-19-90	10/19/2017	S	--	11.46	--	4.4	0.89	226.1	7.23	46.6	Clear	Parameters Stabilized
O-24	O-24	7/10/2017	S, COC	--	11.63	--	3.8	0.13	472.5	6.40	-72.3	Clear	Parameters Stabilized
O-26	O-26	7/10/2017	S	--	11.66	--	2.9	0.27	301.4	6.92	-59.7	Clear	Parameters Stabilized
O-26-65	O-26-65	7/10/2017	S	--	11.31	--	4.5	0.05	203.5	7.23	-35.5	Clear	Parameters Stabilized

Table 3-1
Groundwater Well Field Parameters

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Sample Name	Date	Analysis	Depth to Ice (feet)	Depth to Water (feet)	Depth to LNAPL (feet)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS/cm)	pH	ORP (mV)	Water Clarity	Sample Collection Notes
O-27	O-27	7/13/2017	S	--	11.37	--	Well known to contain product - no parameters collected						> 1 Well Volume
O-27	O-27	10/18/2017	S	--	12.86	12.60	Product present - no parameters collected						> 1 Well Volume
O-27-65	O-27-65	7/10/2017	S	--	12.00	--	4.9	0.02	212.1	7.13	-21.3	Clear	Parameters Stabilized
O-31	O-31	7/13/2017	S	--	10.59	10.54	Product present - no parameters collected						> 1 Well Volume
O-31	O-31	10/18/2017	S	--	12.20	11.70	Product present - no parameters collected						> 1 Well Volume
O-34	O-34	7/13/2017	S	--	9.75	Sheen	Product present - no parameters collected						> 1 Well Volume
R-21	R-21	7/26/2017	S	--	9.65	9.62	Product present - no parameters collected						> 1 Well Volume
R-21	R-21	8/29/2017	S	--	10.21	10.19	Product present - no parameters collected						> 1 Well Volume
R-21	R-21	9/19/2017	S	--	10.92	10.87	Product present - no parameters collected						> 1 Well Volume
R-21	R-21	10/20/2017	--	--	11.10	11.05	Dedicated pump did not work. Needs to be replaced. Sample not collected on this day.						
R-21	R-21	10/26/2017	S	--	11.39	11.32	Product present - no parameters collected, COC not collected						> 1 Well Volume
R-35R	R-35R	7/27/2017	S, COC	--	8.01	--	Well known to contain product - no parameters collected						> 1 Well Volume
R-35R	R-35R	8/30/2017	S	--	8.55	Sheen	Product present - no parameters collected						> 1 Well Volume
R-35R	R-35R	9/20/2017	S	--	9.24	Sheen	Product present - no parameters collected						> 1 Well Volume
R-35R	R-35R	10/20/2017	--	--	9.39	9.39	Dedicated pump did not work. Needs to be replaced. Sample not collected on this day.						
R-35R	R-35R	10/25/2017	S	--	9.67	9.67	Product present - no parameters collected, COC not collected				Clear		> 1 Well Volume
R-39	--	7/26/2017	--	--	9.18	Sheen	No sample, presence of free-phase product prevented sampling for COC analytes						> 1 Well Volume
R-39	--	8/31/2017	--	--	9.88	Sheen	No sample, presence of free-phase product prevented sampling for COC analytes						
R-39	--	9/19/2017	--	--	10.36	Sheen	No sample, presence of free-phase product prevented sampling for COC analytes						
R-39	R-39	10/19/2017	--	--	10.49	Sheen	No sample, presence of free-phase product prevented sampling for COC analytes						
R-40	R-40	8/15/2017	S	--	8.55	Sheen	Product present - no parameters collected						> 1 Well Volume
R-40	R-40	10/20/2017	S	--	10.10	--	Very strong fuel odor. No parameters taken. COC not collected.						> 1 Well Volume
S-9	S-9	8/2/2017	COC	--	9.81	--	3.9	0.87	247.6	7.16	-91.8	Clear	Parameters Stabilized
S-51	S-51	7/13/2017	S	--	9.96	9.95	Product present - no parameters collected						> 1 Well Volume
S-51	S-51	10/18/2017	S	--	11.28	11.24	Product present - no parameters collected						> 1 Well Volume

General Notes:

Third Quarter 2017 represents July 1, 2017 through September 30, 2017.
Fourth Quarter 2017 represents October 1, 2017 through December 31, 2017.
MW-148 nest is located offsite near the property boundary, but is being monitored and reported as part of the onsite groundwater monitoring program.

Acronyms and Abbreviations:

- = not applicable
> = greater than
BTEX = benzene, toluene, ethylbenzene, xylenes
°C = degrees Celsius
CMT = continuous multichannel tubing
COC = contaminants of concern (BTEX, GRO, DRO)
COC+ = contaminants of concern (BTEX, GRO, DRO, 1-Methylnaphthalene, 1,2,4-Trimethylbenzene, and 1,3,5-Trimethylbenzene)
DRO = diesel range organics
GRO = gasoline range organics
LNAPL = light-nonaqueous-phase liquid
- mg/L = milligrams per liter
mV = millivolts
MW = monitoring well
NSZD = natural source zone depletion (BTEX, GRO, DRO, oxygen, sulfate, dissolved iron, dissolved manganese, and methane)
ORP = oxidation-reduction potential
PFC = perfluorinated compounds (perfluorooctane sulfonate and perfluorooctanoic acid)
S = sulfolane
µS/cm = microsiemens per centimeter

Table 3-2
Groundwater Elevation, Surface Water Elevation, and Depth to LNAPL Monitoring Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Riser Elevation (MSL feet)	Depth to LNAPL (feet)	Depth to Water (feet)	Corrected Water Table Elevation (MSL feet)
MW-104-65	10-55	9/21/2017	496.03	--	12.12	483.91
MW-142-20	Water Table	9/21/2017	495.89	--	11.87	484.02
MW-144BR-90	55-90	9/21/2017	495.02	--	10.64	484.38
MW-145-20	Water Table	9/21/2017	495.64	--	11.00	484.64
MW-149A-15	Water Table	9/21/2017	493.22	--	10.20	483.02
MW-173B-150	90-160	9/21/2017	496.41	--	11.90	484.51
MW-174-15	Water Table	9/21/2017	494.4	--	9.43	484.97
MW-174A-50	10-55	9/21/2017	493.67	--	8.69	484.98
MW-174B-90	55-90	9/21/2017	493.58	--	8.68	484.90
MW-176A-15	Water Table	9/21/2017	497.22	11.20	13.15	485.66
MW-176B-50	10-55	9/21/2017	497.03	--	11.32	485.71
MW-186A-15	Water Table	9/21/2017	495.98	11.46	11.47	484.52
MW-186B-60	10-55	9/21/2017	495.95	--	11.33	484.62
MW-192A-15	Water Table	9/21/2017	496.34	--	9.76	486.58
MW-192B-55	10-55	9/21/2017	495.65	--	9.06	486.59
MW-198-150	90-160	9/21/2017	493.16	--	7.36	485.80
MW-300-150	90-160	9/21/2017	496.03	--	10.15	485.88
MW-301-60	10-55	9/21/2017	492.87	--	8.99	483.88
MW-302-CMT-50	10-55	9/21/2017	494.16	--	10.41	483.75
MW-302-80	55-90	9/21/2017	493.67	--	9.68	483.99
MW-303-CMT-59	10-55	9/21/2017	495.7	--	11.93	483.77
MW-303-80	55-90	9/21/2017	491.62	--	7.80	483.82
MW-306-80	55-90	9/21/2017	496.54	--	12.82	483.72
MW-309-15	Water Table	9/21/2017	494.77	--	10.37	484.40
MW-310-15	Water Table	9/21/2017	494.16	--	9.95	484.21
MW-310-110	90-160	9/21/2017	493.83	--	9.45	484.38
MW-321-15	Water Table	9/21/2017	495.54	--	10.29	485.25
MW-334-15	Water Table	9/21/2017	497.01	12.41	12.51	484.58
MW-336-20	Water Table	9/21/2017	493.33	--	7.23	486.10
MW-358-20	Water Table	9/21/2017	495.58	--	12.02	483.56
MW-358-40	10-55	9/21/2017	495.25	--	11.71	483.54
MW-358-60	10-55	9/21/2017	495.52	--	12.00	483.52
MW-359-15	Water Table	9/21/2017	495.2	--	11.66	483.54
MW-359-60	10-55	9/21/2017	495.06	--	11.49	483.57

Table 3-2
Groundwater Elevation, Surface Water Elevation, and Depth to LNAPL Monitoring Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Riser Elevation (MSL feet)	Depth to LNAPL (feet)	Depth to Water (feet)	Corrected Water Table Elevation (MSL feet)
MW-359-80	55-90	9/21/2017	495.06	--	11.55	483.51
MW-360-15	Water Table	9/21/2017	495.02	--	11.55	483.47
MW-360-50	10-55	9/21/2017	494.94	--	11.54	483.40
MW-360-80	55-90	9/21/2017	494.53	--	11.12	483.41
MW-360-150	90-160	9/21/2017	494.66	--	11.23	483.43
MW-362-15	Water Table	9/21/2017	495.24	--	11.51	483.73
MW-362-50	10-55	9/21/2017	495.16	--	11.40	483.76
MW-362-150	90-160	9/21/2017	495.43	--	11.77	483.66
MW-364-15	Water Table	9/21/2017	494.16	--	11.00	483.16
MW-364-65	10-55	9/21/2017	494.07	--	10.89	483.18
MW-364-90	55-90	9/21/2017	494.25	--	11.07	483.18
MW-366-15	Water Table	9/21/2017	493.59	7.36	7.60	486.18
North Gravel Pit	Surface Water	9/21/2017	492.78	--	8.64	484.14
O-34	Water Table	9/21/2017	496.52	Sheen	11.03	485.49

General Notes:

If LNAPL is present, the water table elevation is corrected according to the following formula (riser elevation - depth to water) + (0.8 x LNAPL thickness)

Only monitoring wells scheduled for gauging per Table 3-1 of the Long-Term Monitoring Plan - 2017 Update are shown here (Arcadis. 2017. Long-Term Monitoring Plan – 2017 Update. February).

Acronyms and Abbreviations:

- = a water sounder was used. The well was not checked with an interface probe for the presence of LNAPL.

LNAPL = Light Non-Aqueous Phase Liquid

MSL = mean sea level

Sheen = an interface probe was used. A measurable thickness of LNAPL was not present but LNAPL was observed visually

**Table 3-3
LNAPL Migration Monitoring**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Date	Event	Month	Top of Riser Elevation (MSL feet)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Corrected Water Table Elevation (feet MSL)
MW-139-25	11/1/2017	Annual	November	497.31	No LNAPL	13.55	0.00	483.76
MW-142-20	11/1/2017	Annual	November	495.89	No LNAPL	12.38	0.00	483.51
MW-145-20	11/1/2017	Annual	November	495.64	No LNAPL	11.51	0.00	484.13
MW-334-15	7/27/2017	Monthly	July	497.01	No LNAPL	11.22	0.00	485.79
MW-334-15	8/28/2017	Monthly	August	497.01	11.71	11.85	0.14	485.27
MW-334-15	9/21/2017	Monthly	September	497.01	12.41	12.51	0.10	484.58
MW-334-15	11/1/2017	Quarterly	November	497.01	12.85	13.28	0.43	484.07
MW-345-15	7/28/2017	Quarterly	July	495.54	No LNAPL	9.90	0.00	485.64
MW-345-15	11/1/2017	Quarterly	November	495.55	No LNAPL	11.62	0.00	483.93
O-2	7/27/2017	Quarterly	July	497.15	No LNAPL	11.46	0.00	485.69
O-2	11/1/2017	Quarterly	November	497.15	13.15	13.31	0.16	483.97
O-4	11/1/2017	Annual	November	496.58	No LNAPL	12.74	0.00	483.84
O-5	11/3/2017	Annual	November	495.77	No LNAPL	11.81	0.00	483.96
O-7	11/1/2017	Annual	November	496.48	11.86	11.88	0.02	484.62
O-11	11/1/2017	Annual	November	497.92	14.05	14.16	0.11	483.85
O-12	11/1/2017	Annual	November	496.39	No LNAPL	12.56	0.00	483.83
O-24	11/1/2017	Annual	November	497.09	No LNAPL	13.15	0.00	483.94
O-25	11/1/2017	Annual	November	497.85	No LNAPL	14.62	0.00	483.23
O-26	11/1/2017	Annual	November	496.98	No LNAPL	13.22	0.00	483.76
O-27	11/1/2017	Annual	November	496.97	12.91	13.99	1.08	483.88
O-31	7/27/2017	Monthly	July	496.14	10.48	10.76	0.28	485.60
O-31	8/28/2017	Monthly	August	496.14	10.96	11.36	0.40	485.10
O-31	9/21/2017	Monthly	September	496.15	11.64	12.08	0.44	484.42
O-31	11/1/2017	Quarterly	November	496.15	12.12	12.51	0.39	483.95
R-21	7/27/2017	Monthly	July	495.54	9.68	9.70	0.02	485.86
R-21	8/28/2017	Monthly	August	495.54	10.25	10.27	0.02	485.29
R-21	9/21/2017	Monthly	September	495.55	10.91	10.94	0.03	484.63
R-21	11/1/2017	Quarterly	November	495.55	11.42	11.47	0.05	484.12
R-35R	7/28/2017	Quarterly	July	494.14	No LNAPL	8.05	0.00	486.09
R-35R	11/1/2017	Quarterly	November	494.12	Sheen	9.76	Sheen	484.36
R-40	7/27/2017	Monthly	July	494.48	No LNAPL	8.65	0.00	485.83
R-40	8/28/2017	Monthly	August	494.48	No LNAPL	9.15	0.00	485.33

**Table 3-3
LNAPL Migration Monitoring**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Date	Event	Month	Top of Riser Elevation (MSL feet)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Corrected Water Table Elevation (feet MSL)
R-40	9/21/2017	Monthly	September	494.47	Sheen	9.83	Sheen	484.64
R-40	11/1/2017	Quarterly	November	494.47	Sheen	10.35	Sheen	484.12

General Notes:

If LNAPL is present, the water table elevation is corrected according to the following formula (riser elevation - depth to water) + (0.8 x LNAPL thickness)
Only monitoring wells scheduled for gauging per Table 3-2 of the Long-Term Monitoring Plan - 2017 Update are shown here (Arcadis. 2017. Long-Term Monitoring Plan – 2017 Update. February). A comprehensive LNAPL gauging table is included in Appendix G.

Acronyms and Abbreviations:

LNAPL = Light Non-Aqueous Phase Liquid

MSL = mean sea level

No LNAPL = an interface probe was used to measure depth to water, LNAPL was not observed

Sheen = LNAPL thickness was less than 0.01' and was not detected with an air/product/water interface probe; product was detected visually.

Table 3-4
Natural Source Zone Depletion Monitoring Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Sample Name	Dup	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	o-Xylene (µg/L)	P & M -Xylene (µg/L)	Total Xylenes (µg/L)	Dissolved Iron (mg/L)	Dissolved Manganese (mg/L)	Gasoline Range Organics (mg/L)	Diesel Range Organics (mg/L)	Sulfate (mg/L)	Methane (mg/L)
MW-101A-25	10-55	MW-101A-25		8/7/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	0.629	1.95	<0.0500	<0.288	32.5	0.0461
MW-101A-25	10-55	MW-101A-25		11/15/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	0.636	1.88	<0.0500	<0.283	31.4	0.011
MW-116-15	Water Table	MW-116-15		8/31/2017	8,910	<50.0	508	14.0	4,210	4,230	62.4	0.261	28.1	7.30	<0.500	14.5
MW-116-15	Water Table	MW-216-15	DUP	8/31/2017	9,310	<50.0	558	16.3	4,460	4,480	77.2	0.332	28.8	8.77	<0.500	14.1
MW-116-15	Water Table	MW-116-15		11/15/2017	9,060	<5.00	576	108	4,230	4,340	57.8	5.56	24.0	5.00	1.13 JH*	4.5
MW-125-25	10-55	MW-125-25		8/15/2017	2.10	<0.500	<0.500	<0.500	1.29 J	1.29 J	5.50	3.94	<0.0500	0.179 J	29.0	0.400
MW-125-25	10-55	MW-125-25		11/16/2017	366 JH*	<1.27 B*	133	9.42 JH*	722	731	8.56	6.02	4.84	<0.923 B*	<0.368 B*	0.53
MW-130-25	10-55	MW-130-25		8/3/2017	217	178	137	272	861	1,130	45.8	7.86	4.17	4.41	2.98	4.16
MW-130-25	10-55	MW-130-25		11/15/2017	<124 B*	129	102	228	626	853	42.7	7.31	3.91 JH*	2.89	5.03	0.93
MW-135-20	Water Table	MW-135-20		7/24/2017	695	5,710	1,810	4,900	10,200	15,100	38.8	15.9	42.4	4.28	3.75	0.101
MW-135-20	Water Table	MW-135-20		11/16/2017	957	9,080	1,890	5,200	10,800	16,000	42.5	9.43	50.1	4.09	1.61	<0.0079 B*
MW-142-20	Water Table	MW-142-20		8/9/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	11.2	7.31	<0.0500	<0.283	29.3	0.254
MW-142-20	Water Table	MW-242-20	DUP	8/9/2017	--	--	--	--	--	--	12.3	8.05	<0.0500	<0.283	29.4	0.202
MW-142-20	Water Table	MW-142-20		11/16/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	12.9	7.94	<0.0500	0.231 J	21.1	0.20
MW-145-20	Water Table	MW-145-20		8/10/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	1.92	3.05	<0.0500	<0.288	26.4	0.0391
MW-145-20	Water Table	MW-145-20		11/16/2017	<0.860 B*	7.21	<1.45 B*	<3.54 B*	<7.56 B*	<11.1 B*	1.82	2.95	<0.0500	<0.283	15.4	<0.011 B*
MW-180A-15	Water Table	MW-180A-15		8/16/2017	1.55	<0.500	3.07	1.57	6.08	7.65	4.73	1.46	0.0806 J	0.204 J	32.5	0.0110
MW-180A-15	Water Table	MW-180A-15		11/15/2017	1.51	<0.500	11.1	3.25	20.1	23.3	2.64	1.78	0.273	0.469 J	34.1	0.0032
MW-192A-15	Water Table	MW-192A-15		8/16/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.125	0.170	<0.0500	<0.288	37.6	0.00550
MW-192A-15	Water Table	MW-192A-15		11/15/2017	<0.200J*	<0.500 J*	<0.500 J*	<0.500 J*	<1.00 J*	<1.50 J*	<0.125	0.421	<0.0500	<0.283	35.9	0.0085
MW-321-15	Water Table	MW-321-15		8/8/2017	140	0.880 J	<0.500	<0.500	1.09 J	1.09 J	18.9	6.30	0.352	0.561 J	0.715 J	1.03
MW-321-15	Water Table	MW-321-15		11/15/2017	181	<0.500	<0.500	<0.500	2.08	2.08 J	16.5	6.36	0.389	0.277 J	0.689	0.30
MW-336-20	Water Table	MW-336-20		8/15/2017	16,400	3,840	672	3,370	7,450	10,800	21.6	3.66	51.0	9.60	1.27	10.0
MW-336-20	Water Table	MW-436-20	DUP	8/15/2017	16,300	3,810	676	3,350	7,460	10,800	21.0	3.59	53.1	7.96	1.10	9.18
MW-336-20	Water Table	MW-336-20		11/15/2017	18,700	152	394	758	5,880	6,640	21.8	3.94	43.0	10.8	1.50	3.8
MW-369-16	Water Table	MW-369-16		8/16/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	4.14	3.21	<0.0500	<0.288	35.5	0.0495
MW-369-16	Water Table	MW-369-16		11/15/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	3.51	2.52	<0.0500	0.191 J	32.9	0.025
MW-369-16	Water Table	MW-469-16	DUP	11/15/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	3.36	2.40	<0.0500	<0.294	32.7	0.023
O-15	Water Table	O-15		8/16/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.125	0.619	<0.0500	<0.294	40.6	0.00990
O-15	Water Table	O-15		11/16/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.125	0.676	<0.0500	<0.300	38.8	0.0069

General Notes:

Third Quarter 2017 represents July 1, 2017 through September 30, 2017.

Fourth Quarter 2017 represents October 1, 2017 through December 31, 2017.

Samples were analyzed for BTEX by EPA method SW8260B, for GRO by Alaska Method AK101, for DRO by Alaska Method AK102, for Dissolved Iron and Dissolved Manganese by EPA method 200.8, for Sulfate by EPA method 300.0, and for methane by RSKSOP 147/175.

Total xylenes are calculated by Shannon & Wilson, Inc. as the sum of o-, p- and m-xylenes

Only monitoring wells scheduled for sampling per Table 3-6 of the Long-Term Monitoring Plan - 2017 Update are shown here (Arcadis. 2017. Long-Term Monitoring Plan – 2017 Update. February). Additional constituents of concern (COC) sampling data are included on Table 3-5.

Acronyms and Abbreviations:

--- = information not provided, sample was not collected

< = not detected, limit of detection (LOD) listed, except where noted below. Flag applied by laboratory.

BTEX = benzene, ethylbenzene, toluene, xylenes

DRO = diesel range organics

DUP = field duplicate sample

EPA = Environmental Protection Agency

GRO = gasoline range organics

J = estimated concentration, detected above the detection limit (DL) and below the limit of quantitation (LOQ), flag applied by laboratory

J* = result is considered estimated (no direction of bias) due to QC failures or sample-handling anomalies, flag applied by Shannon & Wilson, Inc.

JH* = result is considered estimated, biased high, due to QC failures, flag applied by Shannon & Wilson, Inc.

mg/L = milligrams per liter

UB* = Result is considered not detected at the limit of quantitation (LOQ) or reported concentration (higher value), due to contamination identified in a blank QC sample. Flag is reported as <...B*. Flag applied by Shannon & Wilson, Inc.

µg/L = micrograms per liter

Table 3-5
Constituents of Concern Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Sample Name	Dup	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	o-Xylene (µg/L)	P & M -Xylene (µg/L)	Total Xylenes (µg/L)	Gasoline Range Organics (mg/L)	Diesel Range Organics (mg/L)	1-Methylnaphthalene (µg/L)	1,2,4- Trimethylbenzene (µg/L)	1,3,5- Trimethylbenzene (µg/L)
MW-101A-25	10-55	MW-101A-25		8/7/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.0500	<0.288	--	--	--
MW-101A-25 ^a	10-55	MW-101A-25		11/15/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.0500	<0.283	--	--	--
MW-106-25	10-55	MW-106-25		8/30/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	--	--	--	--	--
MW-130-25	10-55	MW-130-25		8/3/2017	217	178	137	272	861	1,130	4.17	4.41	--	--	--
MW-130-25	10-55	MW-130-25		10/20/2017	185	310	182	443	1,000	1,450	5.80	5.13	--	--	--
MW-130-25 ^a	10-55	MW-130-25		11/15/2017	<124 B*	129	102	228	626	853	3.91 JH*	2.89	--	--	--
MW-131-25	10-55	MW-131-25		7/14/2017	<1.01 B*	<0.500	<0.500	<0.500	<2.00 B*	<1.50	<0.0500	<0.278	--	--	--
MW-135-20	Water Table	MW-135-20		7/24/2017	695	5,710	1,810	4,900	10,200	15,100	42.4	4.28	--	--	--
MW-135-20	Water Table	--		8/31/2017	Product present, no sample collected								--	--	--
MW-135-20	Water Table	--		9/16/2017	Product present, no sample collected								--	--	--
MW-135-20	Water Table	--		10/24/2017	Product present, no sample collected								--	--	--
MW-135-20 ^a	Water Table	MW-135-20		11/16/2017	957	9,080	1,890	5,200	10,800	16,000	50.1	4.09	--	--	--
MW-137-20	Water Table	MW-137-20		8/2/2017	150	93.4	128	192	434	626	2.12 JH*	0.873	1.98	80.7	17.6
MW-137-20	Water Table	MW-237-20	DUP	8/2/2017	140	87.9	123	191	436	627	2.14 JH*	1.00	1.61	81.1	17.3
MW-139-25	10-55	MW-139-25		7/14/2017	<5.43 B*	<0.500	6.66	0.450 J	12.3	12.7	0.125 JH*	0.561 J	2.77 JL*	17.2	0.680 J
MW-139-25	10-55	MW-139-25		10/20/2017	11.3	<1.00	44.0	1.92 J*	302	304	1.04 JH*	1.69	--	--	--
MW-139-25	10-55	MW-239-25	DUP	10/20/2017	11.1	<1.00	44.2	1.38 J*	296	298	1.10 JH*	1.57	--	--	--
MW-140-25	Water Table	MW-140-25		7/24/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	0.0722 J	<0.273	--	--	--
MW-141-20	Water Table	MW-141-20		8/30/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	--	--	--	--	--
MW-142-20	Water Table	MW-142-20		8/9/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.0500	<0.283	<0.0236	<0.500	<0.500
MW-142-20	Water Table	MW-242-20	DUP	8/9/2017	--	--	--	--	--	--	<0.0500	<0.283	--	--	--
MW-142-20 ^a	Water Table	MW-142-20		11/16/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.0500	0.231 J	--	--	--
MW-143-20	Water Table	MW-143-20		8/1/2017	<0.200	0.380 J	<0.500	<0.500	<1.00	<1.50	<0.0500	<0.283	--	--	--
MW-144A-25	10-55	MW-144A-25		7/14/2017	<0.600 B*	<0.500	<0.500	<0.500	<2.00 B*	1.11 J	<0.0500	<0.283	--	--	--
MW-144A-25	10-55	MW-244A-25	DUP	7/14/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.0500	<0.283	--	--	--
MW-145-20	Water Table	MW-145-20		8/10/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.0500	<0.288	<0.0252	<0.500	<0.500
MW-145-20 ^a	Water Table	MW-145-20		11/16/2017	<0.860 B*	7.21	<1.45 B*	<3.54 B*	<7.56 B*	<11.1 B*	<0.0500	<0.283	--	--	--
MW-149A-15	Water Table	MW-149A-15		7/10/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.0500	<0.305	--	--	--
MW-176A-15	Water Table	MW-176A-15		7/13/2017	139	7.61	28.7	38.5	125	164	1.14	4.67	--	--	--
MW-303-CMT-19	Water Table	MW-303-CMT-19		7/28/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.0500	<0.294	--	--	--
MW-304-CMT-20	Water Table	MW-304-CMT-20		7/28/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.0500	<0.294	--	--	--
MW-305-CMT-28	Water Table	MW-305-CMT-28		7/27/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.0500	<0.308	--	--	--
MW-321-15	Water Table	MW-321-15		8/8/2017	140	0.880 J	<0.500	<0.500	1.09 J	1.09 J	0.352	0.561 J	--	--	--
MW-321-15 ^a	Water Table	MW-321-15		11/15/2017	181	<0.500	<0.500	<0.500	2.08	2.08 J	0.389	0.277 J	--	--	--
MW-334-15	Water Table	MW-334-15		7/25/2017	854	2,800	814	1,440	3,570	5,010	13.4	5.01	--	--	--
MW-334-15	Water Table	--		10/25/2017	Product present, no sample collected								--	--	--
MW-344-15	Water Table	MW-344-15		7/24/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	0.0538 J	0.391 J	--	--	--
MW-345-15	Water Table	MW-345-115	DUP	7/24/2017	133	14.6	20.4	35.4	88.0	123	0.472	0.371 J	--	--	--
MW-345-15	Water Table	MW-345-15		7/24/2017	150	15.8	18.6	31.7	78.4	110	0.554	0.541 J	--	--	--
MW-345-15	Water Table	MW-345-15		10/24/2017	950	0.640 J	155	174	450	624	3.27	1.51	--	--	--
MW-351-15	Water Table	MW-351-15		8/1/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.0500	<0.278	--	--	--
MW-358-15	Water Table	MW-358-15		8/1/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.0500	0.224 J	--	--	--
MW-360-15	Water Table	MW-360-15		7/11/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.0500	<0.288	--	--	--
MW-360-15	Water Table	MW-460-15	DUP	7/11/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.0500	<0.288	--	--	--
O-2	Water Table	O-2		7/24/2017	58.1	0.570 J	78.1	76.2	349	426	2.40 JH*	2.07	--	--	--
O-2	Water Table	--		10/25/2017	Product present, no sample collected								--	--	--
O-3	Water Table	O-3		8/2/2017	1.41	<0.500	<0.500	<0.500	1.34 J	1.34 J	<0.0500	<0.318	--	--	--
O-4	Water Table	O-4		7/14/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	<0.0500	<0.278	--	--	--
O-24	Water Table	O-24		7/10/2017	58.5	<0.500	<0.500	<0.500	<1.00	<1.50	0.0728 J	<0.283	--	--	--
R-21	Water Table	R-21		7/6/2017	69.5	29.6	25.6	35.0	165	200	--	--	--	--	--
R-21	Water Table	R-121	DUP	7/6/2017	68.1	24.2	23.7	31.0	155	186	--	--	--	--	--
R-21	Water Table	--		7/26/2017	Product present, no sample collected								--	--	--
R-21	Water Table	--		10/26/2017	Product present, no sample collected								--	--	--
R-35R	Water Table	R-35R		7/6/2017	32.3	9.44	18.8	5.17	58.4	63.5	--	--	--	--	--

Table 3-5
Constituents of Concern Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Sample Name	Dup	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	o-Xylene (µg/L)	P & M -Xylene (µg/L)	Total Xylenes (µg/L)	Gasoline Range Organics (mg/L)	Diesel Range Organics (mg/L)	1-Methylnaphthalene (µg/L)	1,2,4- Trimethylbenzene (µg/L)	1,3,5- Trimethylbenzene (µg/L)
R-35R	Water Table	R-35R		7/27/2017	72.5	1.93	37.1	5.41	87.3	92.7	<1.37 B*	0.853	--	--	--
R-35R	Water Table	--		10/25/2017	Product present, no sample collected								--	--	--
R-39	Water Table	--		7/26/2017	Product present, no sample collected								--	--	--
R-39	Water Table	--		8/31/2017	Product present, no sample collected								--	--	--
R-39	Water Table	--		9/19/2017	Product present, no sample collected								--	--	--
R-39	Water Table	--		10/19/2017	Product present, no sample collected								--	--	--
R-40	Water Table	R-40		7/6/2017	84.7	119	67.0	83.5	255	339	--	--	--	--	--
R-40	Water Table	--		8/15/2017	Product present, no sample collected								--	--	--
R-40	Water Table	--		10/20/2017	Product present, no sample collected								--	--	--
R-42	Water Table	R-42		7/6/2017	<0.200	<0.500	<0.500	<0.500	<1.00	<1.50	--	--	--	--	--
R-43	Water Table	R-43		7/6/2017	39.3	9.02	6.40	9.62	25.9	35.5	--	--	--	--	--
R-44	Water Table	R-44		7/6/2017	3.04	<0.500	1.76	0.511 J	4.38	4.89	--	--	--	--	--
R-45	Water Table	R-45		7/6/2017	293	243	58.8	97.9	211	309	--	--	--	--	--
R-46	Water Table	R-46		7/6/2017	37.2	61.3	26.7	47.4	162	209	--	--	--	--	--
S-9	Water Table	S-9		8/2/2017	7.34	<0.500	<0.500	<0.500	0.760 J	<1.50	0.0353 J	<0.294	--	--	--

General Notes:

Third Quarter 2017 represents July 1, 2017 through September 30, 2017.
Fourth Quarter 2017 represents October 1, 2017 through December 31, 2017.
Samples were analyzed for BTEX by EPA method SW8260B, for GRO by Alaska Method AK101, and for DRO by Alaska Method AK102.
Total xylenes are calculated by Shannon & Wilson, Inc. as the sum of o-, p- and m-xylenes
Only monitoring wells scheduled for sampling per Table 3-4 of the Long-Term Monitoring Plan - 2017 Update are shown here (Arcadis. 2017. Long-Term Monitoring Plan – 2017 Update. February). Additional constituents of concern (COC) data collected as part of the natural source zone depletion (NSZD) sampling are included on Table 3-4.

Acronyms and Abbreviations:

--- = information not provided, sample was not collected, refer to the comments for details
< = not detected, limit of detection (LOD) listed, except where noted below. Flag applied by laboratory.
a = Additional COC data was collected as part of the NSZD sampling, see Table 3-4
BTEX = benzene, ethylbenzene, toluene, xylenes
DRO = diesel range organics
DUP = field duplicate sample
EPA = Environmental Protection Agency
GRO = gasoline range organics
J = estimated concentration, detected above the detection limit (DL) and below the limit of quantitation (LOQ), flag applied by laboratory
J* = estimated concentration due to quality control failures, flag applied by Shannon & Wilson, Inc.
JH* = result is considered estimated, biased high, due to QC failures, flag applied by Shannon & Wilson, Inc.
JL* = result is considered estimated, biased low, due to QC failures, flag applied by Shannon & Wilson, Inc.
mg/L = milligrams per liter
UB* = Result is considered not detected at the limit of quantitation (LOQ) or reported concentration (higher value), due to contamination identified in a blank QC sample. Flag is reported as <...B*. Flag applied by Shannon & Wilson, Inc.
µg/L = micrograms per liter

**Table 3-6
PFC Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Zone	Sample Name	Dup	Date	Perfluorooctane Sulfonate (µg/L)	Perfluorooctanoic Acid (µg/L)
MW-309-15	Water Table	MW-309-15		8/8/2017	0.147	0.112
MW-321-15	Water Table	MW-321-15		8/8/2017	1.94	0.527
MW-321-15	Water Table	MW-421-15	DUP	8/8/2017	2.54	0.610
MW-358-20	Water Table	MW-358-20		8/8/2017	0.0263	0.0248
MW-359-15	Water Table	MW-359-15		8/8/2017	0.0104 J	0.00739 J
MW-359-15	Water Table	MW-459-15	DUP	8/8/2017	0.0102 J	0.00752 J
MW-359-35	Water Table	MW-359-35		8/8/2017	0.0208	0.00999 J
MW-362-15	Water Table	MW-362-15		8/8/2017	0.0346	0.0308
MW-362-25	Water Table	MW-362-25		8/9/2017	0.0360	0.0336
MW-364-15	Water Table	MW-364-15		8/8/2017	<0.00620	<0.00620
MW-364-30	Water Table	MW-364-30		8/8/2017	0.00485 J	<0.00620

General Notes:

Sampled were analyzed for Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA) by EPA method 537 modified. Only monitoring wells scheduled for sampling per Table 3-5 of the Long-Term Monitoring Plan - 2017 Update are shown here (Arcadis. 2017. Long-Term Monitoring Plan – 2017 Update. February).

Acronyms and Abbreviations:

< = not detected, limit of detection (LOD) listed. Flag applied by laboratory.

DUP = field duplicate sample

EPA = Environmental Protection Agency

J = estimated concentration, detected above the detection limit (DL) and below the limit of quantitation (LOQ), flag applied by laboratory.

PFC = Perfluorinated Compounds

µg/L = micrograms per liter

**Table 3-7
Onsite Sulfolane Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Zone	Sample Name	Dup	Date	Sulfolane (µg/L)
MW-127-25	10-55	MW-127-25		8/2/2017	<5.05
MW-127-25	10-55	MW-227-25	DUP	8/2/2017	<5.05
MW-127-25	10-55	MW-127-25		10/19/2017	6.16 J
MW-127-25	10-55	MW-227-25	DUP	10/19/2017	7.04 J
MW-130-25	10-55	MW-130-25		8/3/2017	134
MW-130-25	10-55	MW-130-25		10/20/2017	77.3
MW-139-25	10-55	MW-139-25		7/14/2017	25.9
MW-139-25	10-55	MW-139-25		10/20/2017	55.8
MW-142-20	Water Table	MW-142-20		8/9/2017	15.5
MW-142-20	Water Table	MW-242-20	DUP	8/9/2017	15.8
MW-145-20	Water Table	MW-145-20		8/10/2017	<5.20
MW-148A-15	Water Table	MW-148A-15		7/10/2017	14.2
MW-148B-30	Water Table	MW-148B-30		7/10/2017	11.0
MW-148C-55	Water Table	MW-148C-55		7/10/2017	8.43 J
MW-148-80	55-90	MW-148-80		7/12/2017	<5.30
MW-149A-15	Water Table	MW-149A-15		7/10/2017	<5.25
MW-154B-95	55-90	MW-154B-95		7/25/2017	18.8
MW-154B-95	55-90	MW-154B-95		10/20/2017	83.2
MW-176A-15	Water Table	MW-176A-15		7/13/2017	1,540
MW-186A-15	Water Table	MW-186A-15		7/13/2017	155
MW-186A-15	Water Table	MW-186A-15		10/18/2017	237
MW-186B-60	Water Table	MW-186B-60		7/12/2017	12.7
MW-186E-75	Water Table	MW-186E-75		8/3/2017	7.17 J
MW-186E-75	Water Table	MW-186E-75		10/19/2017	15.2
MW-301-CMT-20	Water Table	MW-301-CMT-20		7/26/2017	<5.40
MW-301-CMT-20	Water Table	MW-301-CMT-20		10/16/2017	<5.15
MW-301-60	10-55	MW-301-60		7/14/2017	<5.05
MW-301-60	10-55	MW-301-60		10/16/2017	<5.05
MW-302-CMT-20	Water Table	MW-302-CMT-20		7/31/2017	12.7
MW-302-CMT-20	Water Table	MW-402-CMT-20	DUP	7/31/2017	12.8
MW-302-CMT-20	Water Table	MW-302-CMT-20		10/17/2017	11.6
MW-302-CMT-50	Water Table	MW-302-CMT-50		7/31/2017	4.46 J
MW-302-CMT-50	Water Table	MW-302-CMT-50		10/17/2017	4.70 J
MW-302-80	55-90	MW-302-80		8/1/2017	3.86 J
MW-302-80	55-90	MW-302-80		10/16/2017	3.20 J
MW-303-CMT-19	Water Table	MW-303-CMT-19		7/28/2017	9.82 J
MW-303-CMT-19	Water Table	MW-303-CMT-19		10/17/2017	10.8
MW-303-CMT-19	Water Table	MW-403-CMT-19	DUP	10/17/2017	10.1 J
MW-303-CMT-39	Water Table	MW-303-CMT-39		7/28/2017	4.25 J
MW-303-CMT-39	Water Table	MW-303-CMT-39		10/17/2017	9.67 J
MW-303-CMT-59	Water Table	MW-303-CMT-59		7/28/2017	<5.30
MW-303-CMT-59	Water Table	MW-403-CMT-59	DUP	7/28/2017	<5.45
MW-303-CMT-59	Water Table	MW-303-CMT-59		10/17/2017	9.38 J
MW-303-80	55-90	MW-303-80		8/1/2017	<5.05
MW-303-80	55-90	MW-303-80		10/16/2017	<5.10
MW-304-CMT-20	Water Table	MW-304-CMT-20		7/28/2017	10.5
MW-304-CMT-20	Water Table	MW-304-CMT-20		10/17/2017	8.34 J
MW-304-CMT-40	Water Table	MW-304-CMT-40		7/28/2017	<5.40
MW-304-CMT-40	Water Table	MW-304-CMT-40		10/17/2017	<5.15
MW-304-CMT-60	Water Table	MW-304-CMT-60		7/28/2017	<5.45
MW-304-CMT-60	Water Table	MW-304-CMT-60		10/17/2017	<5.15

**Table 3-7
Onsite Sulfolane Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Zone	Sample Name	Dup	Date	Sulfolane (µg/L)
MW-304-80	55-90	MW-304-80		7/25/2017	<5.20 J*
MW-304-80	55-90	MW-304-80		10/16/2017	<5.10
MW-305-CMT-28	Water Table	MW-305-CMT-28		7/27/2017	<5.25
MW-305-CMT-28	Water Table	MW-305-CMT-28		10/17/2017	<5.10
MW-305-CMT-48	Water Table	MW-305-CMT-48		7/27/2017	<5.30
MW-305-CMT-48	Water Table	MW-305-CMT-48		10/17/2017	<5.05
MW-309-15	Water Table	MW-309-15		8/8/2017	31.2
MW-310-15	Water Table	MW-310-15		7/10/2017	158
MW-330-20	Water Table	MW-330-20		7/10/2017	473
MW-330-20	Water Table	MW-430-20	DUP	7/10/2017	448
MW-334-15	Water Table	MW-334-15		7/25/2017	126
MW-334-15	Water Table	MW-334-15		8/31/2017	181
MW-334-15	Water Table	MW-334-15		9/20/2017	149
MW-334-15	Water Table	MW-334-15		10/25/2017	121
MW-334-65	Water Table	MW-334-65		8/3/2017	5.32 J
MW-334-65	Water Table	MW-434-65	DUP	8/3/2017	5.17 J
MW-334-65	Water Table	MW-334-65		10/19/2017	7.14 J
MW-336-20	Water Table	MW-336-20		8/15/2017	10,400 JL*
MW-344-15	Water Table	MW-344-15		7/24/2017	17.8
MW-344-15	Water Table	MW-344-15		8/29/2017	11.4
MW-344-15	Water Table	MW-344-15		9/19/2017	18.9
MW-344-15	Water Table	MW-344-15		10/24/2017	18.8
MW-344-15	Water Table	MW-444-15	DUP	10/24/2017	20.6
MW-345-15	Water Table	MW-345-15		7/24/2017	61.0
MW-345-15	Water Table	MW-345-15		8/29/2017	172
MW-345-15	Water Table	MW-445-15	DUP	8/29/2017	173
MW-345-15	Water Table	MW-345-15		9/20/2017	252
MW-345-15	Water Table	MW-445-15	DUP	9/20/2017	237
MW-345-15	Water Table	MW-345-15		10/24/2017	256
MW-345-55	Water Table	MW-345-55		7/14/2017	28.7
MW-345-55	Water Table	MW-345-55		10/20/2017	49.6
MW-354-35	Water Table	MW-354-35		7/12/2017	371
MW-358-20	Water Table	MW-358-20		8/8/2017	7.81 J
MW-358-40	Water Table	MW-358-40		7/11/2017	<5.15
MW-358-60	Water Table	MW-358-60		7/11/2017	7.09 J
MW-359-15	Water Table	MW-359-15		8/8/2017	5.36 J
MW-359-35	Water Table	MW-359-35		8/8/2017	13.8
MW-359-60	Water Table	MW-359-60		7/11/2017	7.20 J
MW-359-80	Water Table	MW-359-80		7/11/2017	<5.10
MW-360-15	Water Table	MW-360-15		7/11/2017	<5.15
MW-360-35	Water Table	MW-360-35		7/11/2017	5.97 J
MW-360-50	Water Table	MW-360-50		7/11/2017	7.55 J
MW-360-80	Water Table	MW-360-80		7/11/2017	3.13 J
MW-362-15	Water Table	MW-362-15		8/8/2017	<5.10
MW-362-50	Water Table	MW-362-50		7/12/2017	<5.25
MW-362-50	Water Table	MW-462-50	DUP	7/12/2017	<5.20
MW-364-15	Water Table	MW-364-15		8/8/2017	<5.15
MW-364-30	Water Table	MW-364-30		8/8/2017	<5.00
MW-364-65	Water Table	MW-364-65		7/12/2017	3.46 J
MW-364-90	Water Table	MW-364-90		7/12/2017	3.62 J
MW-371-15	Water Table	MW-371-15		7/11/2017	18.9

**Table 3-7
Onsite Sulfolane Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Zone	Sample Name	Dup	Date	Sulfolane (µg/L)
MW-372-15	Water Table	MW-372-15		7/10/2017	1,510
O-1	Water Table	O-1		7/12/2017	1,990
O-2	Water Table	O-2		7/24/2017	199
O-2	Water Table	O-2		8/29/2017	277
O-2	Water Table	O-2		9/20/2017	253
O-2	Water Table	O-2		10/25/2017	238
O-11	Water Table	O-11		8/2/2017	52.0
O-11	Water Table	O-11		10/18/2017	129
O-12	Water Table	O-12		8/2/2017	<5.20
O-12	Water Table	O-12		10/19/2017	<10.4
O-13	Water Table	O-13		8/2/2017	29.5
O-13	Water Table	O-13		10/18/2017	23.8 JL*
O-19	Water Table	O-19		7/13/2017	337
O-19	Water Table	O-19		10/18/2017	295
O-19-90	Water Table	O-19-90		8/3/2017	<5.10
O-19-90	Water Table	O-19-90		10/19/2017	<10.4
O-24	Water Table	O-24		7/10/2017	<5.30
O-26	Water Table	O-26		7/10/2017	11.5
O-26-65	Water Table	O-26-165	DUP	7/10/2017	<5.00
O-26-65	Water Table	O-26-65		7/10/2017	<5.30
O-27	Water Table	O-27		7/13/2017	15.5 J*
O-27	Water Table	O-27		10/18/2017	61.7 JL*
O-27-65	Water Table	O-27-65		7/10/2017	7.37 J
O-31	Water Table	O-31		7/13/2017	<5.20
O-31	Water Table	O-31		10/18/2017	<10.5
O-34	Water Table	O-134	DUP	7/13/2017	501
O-34	Water Table	O-34		7/13/2017	511
R-21	Water Table	R-21		7/6/2017	189
R-21	Water Table	R-121	DUP	7/6/2017	194
R-21	Water Table	R-21		7/26/2017	328
R-21	Water Table	R-21		8/29/2017	236
R-21	Water Table	R-21		9/19/2017	328
R-21	Water Table	R-21		10/26/2017	279
R-21	Water Table	R-121	DUP	10/26/2017	271
R-35R	Water Table	R-35R		7/6/2017	25.9
R-35R	Water Table	R-35R		7/27/2017	28.9
R-35R	Water Table	R-35R		8/30/2017	9.71 J
R-35R	Water Table	R-35R		9/20/2017	13.5
R-35R	Water Table	R-35R		10/25/2017	9.14 J
R-40	Water Table	R-40		7/6/2017	15.2
R-40	Water Table	R-40		8/15/2017	52.9
R-40	Water Table	R-40		10/20/2017	86.4
R-42	Water Table	R-42		7/6/2017	15.6
R-43	Water Table	R-43		7/6/2017	73.6
R-44	Water Table	R-44		7/6/2017	27.4
R-45	Water Table	R-45		7/6/2017	29.3
R-46	Water Table	R-46		7/6/2017	<5.20

**Table 3-7
Onsite Sulfolane Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Zone	Sample Name	Dup	Date	Sulfolane (µg/L)
S-51	Water Table	S-51		7/13/2017	460
S-51	Water Table	S-51		10/18/2017	299

General Notes:

Third Quarter 2017 represents July 1, 2017 through September 30, 2017.

Fourth Quarter 2017 represents October 1, 2017 through December 31, 2017.

MW-148 nest is located offsite near the property boundary, but is being monitored and reported as part of the onsite groundwater monitoring program.

Samples were analyzed by EPA1625B with isotope dilution.

Only monitoring wells scheduled for sampling per Table 3-3 of the Long-Term Monitoring Plan - 2017 Update are shown here (Arcadis. 2017. Long-Term Monitoring Plan – 2017 Update. February).

Acronyms and Abbreviations:

< = not detected; limit of detection (LOD) listed

DUP = field duplicate sample

EPA = Environmental Protection Agency

J = estimated concentration detected below the laboratory limit of quantitation (LOQ), flag applied by laboratory

J* = estimated concentration due to quality control (QC) failures, flag applied by Shannon & Wilson, Inc.

JL* = estimated concentration, biased low due to quality control failures, flag applied by Shannon & Wilson, Inc.

µg/L = micrograms per liter

Table 3-8
Sulfolane Analytical Results - Point of Compliance

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Sample Name	Dup	Date	Sulfolane (µg/L)
MW-149A-15	Water Table	MW-149A-15		7/10/2017	<5.25
MW-358-20	Water Table	MW-358-20		8/8/2017	7.81 J
MW-358-40	Water Table	MW-358-40		7/11/2017	<5.15
MW-358-60	Water Table	MW-358-60		7/11/2017	7.09 J
MW-359-15	Water Table	MW-359-15		8/8/2017	5.36 J
MW-359-35	Water Table	MW-359-35		8/8/2017	13.8
MW-359-60	Water Table	MW-359-60		7/11/2017	7.20 J
MW-359-80	Water Table	MW-359-80		7/11/2017	<5.10
MW-360-15	Water Table	MW-360-15		7/11/2017	<5.15
MW-360-35	Water Table	MW-360-35		7/11/2017	5.97 J
MW-360-50	Water Table	MW-360-50		7/11/2017	7.55 J
MW-360-80	Water Table	MW-360-80		7/11/2017	3.13 J
MW-362-15	Water Table	MW-362-15		8/8/2017	<5.10
MW-362-50	Water Table	MW-362-50		7/12/2017	<5.25
MW-362-50	Water Table	MW-462-50	DUP	7/12/2017	<5.20
MW-364-15	Water Table	MW-364-15		8/8/2017	<5.15
MW-364-30	Water Table	MW-364-30		8/8/2017	<5.00
MW-364-65	Water Table	MW-364-65		7/12/2017	3.46 J
MW-364-90	Water Table	MW-364-90		7/12/2017	3.62 J

General Notes:

Third Quarter 2017 represents July 1, 2017 through September 30, 2017.

Fourth Quarter 2017 represents October 1, 2017 through December 31, 2017.

Samples were analyzed by EPA1625B with isotope dilution.

Only monitoring wells identified as Point of Compliance Wells per Section 4 of the Long-Term Monitoring Plan - 2017 Update are shown here (Arcadis, 2017. Long-Term Monitoring Plan – 2017 Update. February).

Acronyms and Abbreviations:

< = not detected; limit of detection (LOD) listed

DUP = field duplicate sample

EPA = Environmental Protection Agency

J = estimated concentration detected below the laboratory limit of quantitation (LOQ), flag applied by laboratory

µg/L = micrograms per liter

**Table 4-1
Remediation System Operation - Groundwater Recovery**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Date	Monthly Total (gallons)	Monthly Average (gallons / day)	Monthly Average (gallons / minute)
January 2009	5,637,292	181,848	126
February 2009	4,965,414	177,336	123
March 2009	5,673,504	183,016	127
April 2009	5,845,823	194,861	135
May 2009	6,430,915	207,449	144
June 2009	6,229,883	207,663	144
July 2009	6,316,965	203,773	142
August 2009	6,243,319	201,397	140
September 2009	10,634,423	354,481	246
October 2009	5,114,811	164,994	115
November 2009	0	0	0
December 2009	6,153,173	198,489	138
January 2010	8,676,601	279,890	194
February 2010	9,185,582	328,057	228
March 2010	9,424,363	304,012	211
April 2010	9,914,262	330,475	229
May 2010	9,812,735	316,540	220
June 2010	9,282,464	309,415	215
July 2010	9,325,475	300,822	209
August 2010	9,872,250	318,460	221
September 2010	9,122,386	304,080	211
October 2010	7,700,526	248,404	173
November 2010	7,489,601	249,653	173
December 2010	7,279,463	234,821	163
January 2011	8,605,402	277,594	193
February 2011	7,409,928	264,640	184
March 2011	7,144,062	230,454	160
April 2011	8,034,008	267,800	186
May 2011	8,076,367	260,528	181
June 2011	9,735,245	324,508	225
July 2011	11,838,286	381,880	265
August 2011	12,119,042	390,937	271
September 2011	15,458,620	515,287	358
October 2011	15,492,362	499,754	347
November 2011	16,279,722	542,657	377
December 2011	16,711,381	539,077	374
January 2012	15,645,486	504,381	350
February 2012	15,936,577	515,987	358
March 2012	16,390,112	530,180	368
April 2012	16,010,934	514,711	357
May 2012	14,639,653	472,247	328
June 2012	14,109,044	451,769	314
July 2012	16,721,808	540,994	376
August 2012	16,256,379	523,831	364
September 2012	15,402,121	515,527	358
October 2012	16,377,507	527,101	366
November 2012	15,069,768	503,018	349
December 2012	15,740,566	507,135	352
January 2013	15,663,097	505,261	357
February 2013	14,380,130	513,576	323
March 2013	14,398,601	464,471	352

**Table 4-1
Remediation System Operation - Groundwater Recovery**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Date	Monthly Total (gallons)	Monthly Average (gallons / day)	Monthly Average (gallons / minute)
April 2013	15,168,307	505,610	351
May 2013	15,887,224	512,491	356
June 2013	18,656,997	621,900	432
July 2013	20,702,663	667,828	464
August 2013	20,456,333	659,882	458
September 2013	19,538,981	651,299	452
October 2013	19,438,949	627,063	435
November 2013	13,057,783	435,259	302
December 2013	13,466,226	434,394	302
January 2014	17,443,790	562,703	391
February 2014	15,155,194	541,257	376
March 2014	14,278,904	460,610	320
April 2014	11,616,666	387,222	269
May 2014	18,097,092	583,777	405
June 2014	14,544,845	469,189	326
July 2014	24,418,890	787,706	547
August 2014	22,678,723	731,572	508
September 2014	24,862,849	802,027	557
October 2014	25,828,347	833,172	579
November 2014	23,907,788	771,219	536
December 2014	24,515,399	790,819	549
January 2015	25,569,160	824,812	573
February 2015	22,691,540	810,412	563
March 2015	25,079,442	809,014	562
April 2015	23,835,264	794,509	552
May 2015	25,560,499	824,532	573
June 2015	24,365,449	812,182	564
July 2015	26,243,058	846,550	588
August 2015	25,518,123	823,165	572
September 2015	22,357,602	745,253	518
October 2015	23,877,038	770,227	535
November 2015	21,849,568	728,319	506
December 2015	24,476,154	789,553	548
January 2016	24,175,565	779,857	542
February 2016	21,802,867	751,823	522
March 2016	25,079,442	809,014	562
April 2016	19,986,668	666,222	463
May 2016	23,805,158	767,908	533
June 2016	23,167,211	772,240	536
July 2016	22,832,725	736,540	511
August 2016	22,618,085	729,616	507
September 2016	11,023,282	367,443	255
October 2016	15,512,443	500,401	348
November 2016	14,948,767	498,292	346
December 2016	15,312,324	493,946	343
January 2017	15,429,387	497,722	346
February 2017	14,030,617	501,093	348
March 2017	15,312,801	493,961	343
April 2017	14,993,931	499,798	347
May 2017	15,324,688	494,345	343
June 2017	14,731,108	491,037	341

Table 4-1
Remediation System Operation - Groundwater Recovery

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Date	Monthly Total (gallons)	Monthly Average (gallons / day)	Monthly Average (gallons / minute)
July 2017	4,580,211	152,674	106
August 2017	0	0	0
September 2017	0	0	0
October 2017	0	0	0
November 2017	0	0	0
December 2017	0	0	0

General Notes:

The Groundwater Remediation and Treatment System was shut down on July 10, 2017.

Table 4-2a
Remediation System Operation - GAC East Treatment System Performance - Sulfolane

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Location	Date	Dup	Sulfolane (µg/L)
COMBINED INFLUENT	7/06/2017		53.3
GAC VESSEL B-OUTLET	7/06/2017		<5.05
LEAD VESSEL INLET	7/06/2017		29.1
LEAD VESSEL INLET	7/06/2017	DUP	27.4
R-21	7/06/2017		189
R-21	7/06/2017	DUP	194
R-35R	7/06/2017		25.9
R-40	7/06/2017		15.2
R-42	7/06/2017		15.6
R-43	7/06/2017		73.6
R-44	7/06/2017		27.4
R-45	7/06/2017		29.3
R-46	7/06/2017		<5.20
TRMT SYS EFFLUENT	7/06/2017		<5.10

General Notes:

The Groundwater Remediation and Treatment System was shut down on July 10, 2017.

Acronyms and Abbreviations:

< = not detected; limit of detection (LOD) listed, flag applied by laboratory

DUP = field duplicate sample

GAC = granular activated carbon

µg/L = micrograms per liter

Table 4-2b
Remediation System Operation - GAC East Treatment System Performance - BTEX

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Location	Date	Dup	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene, m & p (µg/L)	Xylene, o (µg/L)	Xylene, total (µg/L)
AIR STRIPPER EFFLUENT C	7/06/2017		0.249 J	0.373 J	<0.500	<1.00	0.334 J	<1.50
AIR STRIPPER EFFLUENT D	7/06/2017		0.667	0.715 J	<0.500	1.29 J	0.766 J	2.06 J
COMBINED INFLUENT	7/06/2017		57.3	39.9	18.3	81.7	24.4	106
LEAD VESSEL INLET	7/06/2017		0.301 J	0.345 J	<0.500	<1.00	0.401 J	<1.50
LEAD VESSEL INLET	7/06/2017	DUP	0.302 J	0.392 J	<0.500	<1.00	0.374 J	<1.50
MW-106-25	8/30/2017		<0.200	<0.500	<0.500	<1.00	<0.500	<1.50
MW-141-20	8/30/2017		<0.200	<0.500	<0.500	<1.00	<0.500	<1.50
R-21	7/06/2017		69.5	29.6	25.6	165	35.0	200
R-21	7/06/2017	DUP	68.1	24.2	23.7	155	31.0	186
R-35R	7/06/2017		32.3	9.44	18.8	58.4	5.17	63.5
R-40	7/06/2017		84.7	119	67.0	255	83.5	339
R-42	7/06/2017		<0.200	<0.500	<0.500	<1.00	<0.500	<1.50
R-43	7/06/2017		39.3	9.02	6.40	25.9	9.62	35.5
R-44	7/06/2017		3.04	<0.500	1.76	4.38	0.511 J	4.89
R-45	7/06/2017		293	243	58.8	211	97.9	309
R-46	7/06/2017		37.2	61.3	26.7	162	47.4	209
TRMT SYS EFFLUENT	7/06/2017		<0.200	<0.500	<0.500	<1.00	<0.500	<1.50

General Notes:

The Groundwater Remediation and Treatment System was shut down on July 10, 2017.

Acronyms and Abbreviations:

< = not detected; limit of detection (LOD) listed, flag applied by laboratory

BTEX = benzene, toluene, ethylbenzene, xylenes

DUP = field duplicate sample

J = estimated concentration detected above the detection limit (DL) and below the limit of quantitation (LOQ), flag applied by laboratory

µg/L = micrograms per liter

Table 4-2c
Remediation System Operation - GAC East Treatment System Performance - SVOCs

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Location	Date	Dup	Acenaphthene (µg/L)	Acenaphthylene (µg/L)	Anthracene (µg/L)	Benz(a) anthracene (µg/L)	Benzo(a) pyrene (µg/L)	Benzo(b) fluoranthene (µg/L)	Benzo(g,h,i) perylene (µg/L)	Benzo(k) fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a,h) anthracene (µg/L)	Fluoranthene (µg/L)	Fluorene (µg/L)	Indeno(1,2,3-cd) pyrene (µg/L)	Naphthalene (µg/L)	Phenanthrene (µg/L)	Pyrene (µg/L)
MW-106-25	8/30/2017		<0.0236	<0.0236	<0.0236	<0.0236	<0.00945	<0.0236	<0.0236	<0.0236	<0.0236	<0.00945	<0.0236	<0.0236	<0.0236	<0.0471	<0.0236	<0.0236
MW-141-20	8/30/2017		<0.0245	<0.0245	<0.0245	<0.0245	<0.00980	<0.0245	<0.0245	<0.0245	<0.0245	<0.00980	<0.0245	<0.0245	<0.0245	<0.0490	<0.0245	<0.0245
TRMT SYS EFFLUENT	7/06/2017		<0.0240	<0.0240	<0.0240	<0.0240	<0.00960	<0.0240	<0.0240	<0.0240	<0.0240	<0.00960	<0.0240	<0.0240	<0.0240	<0.0481	<0.0240	<0.0240

General Notes:
The Groundwater Remediation and Treatment System was shut down on July 10, 2017.

Acronyms and Abbreviations:
< = not detected; limit of detection (LOD) listed, flag applied by laboratory
DUP = field duplicate sample
SVOCs = semi volatile organic compounds
µg/L = micrograms per liter

**Table 4-3
2017 LNAPL Recovery**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

2017	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
MW-115-15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
MW-138-20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
MW-176A-15	0.7	3.7	0.8	0.7	1.2	0.9	0.0	NA	NA	NA	NA	NA	7.8
MW-186A-15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
MW-334-15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
MW-366-15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
O-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
O-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
O-11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
O-13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
O-19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
O-21	0.0	0.0	0.3	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.3
O-27	0.0	0.0	0.2	0.1	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.3
O-31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
O-33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
O-34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
O-37	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
O-38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
S-21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
S-22	0.0	0.0	0.4	0.5	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.9
S-39	0.0	0.0	0.3	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.3
S-44	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
S-50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
S-51	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
R-14A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
R-18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
R-20R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
R-21	0.0	0.0	0.0	0.0	0.0	18.5	**	NA	NA	NA	NA	NA	18.5
R-32	0.0	0.0	0.3	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.3
R-32R	0.0	0.0	5.0	4.5	0.0	0.0	0.0	NA	NA	NA	NA	NA	9.5
R-34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
R-35R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
R-40	0.0	0.0	0.0	0.0	0.0	5.2	0.0	NA	NA	NA	NA	NA	5.2
R-44	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0
R-45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	NA	NA	0.0

**Table 4-3
2017 LNAPL Recovery**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

2017	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Coalescer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0
TOTAL	0.7	3.7	7.4	5.7	1.2	24.6	0.0	0.0	0.0	0.0	0.0	0.0	43.2

General Notes:

All units are in gallons.

This summary includes only product that has been recovered for recycling. Product that has been recovered but has not yet been removed from the storage tank for recycling is not included in the table.

The Groundwater Remediation and Treatment System was shut down on July 10, 2017 and the coalescer was offline for all of 2017.

Acronyms and Abbreviations:

** = LNAPL recovery was conducted for a short-period prior to the shutdown of the groundwater remediation and treatment system, but the final recovered LNAPL was recycled without recording the total volume.

LNAPL = Light Non-Aqueous Phase Liquid

NA = not applicable

Table 4-4
Annual LNAPL Recovery

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Well Total (gallons)
O-2	Installed September 2010																							0	176	0.1	0	0	0	0	0.2	0	176
O-9	Installed September 2011																							0	0	0	0.4	0	0	0			
O-10	Installed September 2011																							0	12	10	2.5	0	8	0	32		
O-11	Installed September 2011																							0	0.6	0.1	0.1	3	0.2	0	4		
O-13	Installed September 2011																							0	2	0	0.8	0	3	0	7		
O-19	Installed October 2011																							0	0.3	0	0.4	2	2.1	0	4		
O-21	Installed October 2011																							0	0	0	0	1	0.8	0.3	2		
O-27	Installed November 2011																							0	0.2	0.3	0	0	0.3	0.3	1		
O-31	Installed September 2013																										1	2.5	23	29	0	55	
O-33	Installed September 2013																										1	1.7	2	6	0	11	
O-34	Installed September 2013																										6	5.8	3	17	0	32	
O-37	Installed November 2011																							0	0	0	0	0	0.01	0	0.01		
O-38	Installed September 2013																										0	0.5	4	7	0	12	
Coalescer	Installed December 2009																							0	264	355	38	18	19	0	0	0	694
Annual Total	62,815	101,038	95,611	7,684	12,342	14,059	14,298	17,008	17,562	6,342	4,573	4,111	5,972	1,505	703	537	393	583	1,854	2,150	1,767	7,201	3,345	635	3,634	3,603	2,625	804	1,595	669	1,257	43	398,318

General Notes:
All units in gallons

Table 4-5
Groundwater Recovery System - BTEX Mass Recovery

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Date	GAC East Groundwater Recovery (gpm)	Recovered Benzene Concentration (µg/L)	Benzene Mass Recovery (lb/day)	Recovered Toluene Concentration (µg/L)	Toluene Mass Recovery (lb/day)	Recovered Ethylbenzene Concentration (µg/L)	Ethylbenzene Mass Recovery (lb/day)	Recovered Total Xylene Concentration (µg/L)	Total Xylene Mass Recovery (lb/day)	Total BTEX Mass Recovered Per Month (lbs) ¹
7/6/2017 ²	333.5	57.3	0.23	39.9	0.16	18.3	0.07	106	0.42	8.3
Third Quarter 2017 Average			0.23	Third Quarter 2017 Average	0.16	Third Quarter 2017 Average	0.07	Third Quarter 2017 Average	0.42	
Total BTEX Third Quarter 2017 Average (lb/day)									0.89	
Total BTEX Removal Third Quarter 2017 (lbs)									8.3	

General Notes:
The Groundwater Remediation and Treatment System was shut down on July 10, 2017.

- Footnotes:**
- 1. Total mass recovered based on measured recovery rate at time of sampling and average runtime for each quarter.
 - 2. BTEX concentrations reported and mass removed calculations based on sampling at Combined Influent.

Acronyms and Abbreviations:
BTEX = benzene, toluene, ethylbenzene, xylenes
gpm = gallons per minute
lbs = pounds
lb/day = pounds per day
µg/L = micrograms per liter

Table 4-6
Groundwater Recovery System - Sulfolane Mass Recovery GAC East Recovery Wells

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Date	R-21			R-35R			R-40			R-42		
	Groundwater Recovery (gpm)	Recovered Sulfolane Concentration (µg/L)	Sulfolane Mass Recovery (lb/day)	Groundwater Recovery (gpm)	Recovered Sulfolane Concentration (µg/L)	Sulfolane Mass Recovery (lb/day)	Groundwater Recovery (gpm)	Recovered Sulfolane Concentration (µg/L)	Sulfolane Mass Recovery (lb/day)	Groundwater Recovery (gpm)	Recovered Sulfolane Concentration (µg/L)	Sulfolane Mass Recovery (lb/day)
7/06/2017	40	189	0.09	50	25.9	0.02	15	15.2	0.003	60	15.6	0.01

Third Quarter 2017 Average	0.09	Third Quarter 2017 Average	0.02	Third Quarter 2017 Average	0.003	Third Quarter 2017 Average	0.01

Date	R-43			R-44			R-45			R-46		
	Groundwater Recovery (gpm)	Recovered Sulfolane Concentration (µg/L)	Sulfolane Mass Recovery (lb/day)	Groundwater Recovery (gpm)	Recovered Sulfolane Concentration (µg/L)	Sulfolane Mass Recovery (lb/day)	Groundwater Recovery (gpm)	Recovered Sulfolane Concentration (µg/L)	Sulfolane Mass Recovery (lb/day)	Groundwater Recovery (gpm)	Recovered Sulfolane Concentration (µg/L)	Sulfolane Mass Recovery (lb/day)
7/06/2017	60	73.6	0.05	60	27.4	0.02	34	29.3	0.01	30	<5.20	0.00

Third Quarter 2017 Average	0.05	Third Quarter 2017 Average	0.02	Third Quarter 2017 Average	0.01	Third Quarter 2017 Average	0.00

General Notes:

The Groundwater Remediation and Treatment System was shut down on July 10, 2017.

Acronyms and Abbreviations:

gpm = gallons per minute
lb/day = pounds per day
µg/L = micrograms per liter

Table 4-7
Overall Groundwater Recovery System - Sulfolane Mass Recovery

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Date	GAC East Groundwater Recovery (gpm)	GAC East Recovered Sulfolane Concentration (µg/L)*	Sulfolane Mass Recovery Rate (lb/day)	Sulfolane Mass Recovery (lbs) ¹
7/06/2017	333.5	53.3	0.21	1.9

Total Sulfolane Third Quarter 2017 Average (lb/day)	0.21
Total Sulfolane Removal Third Quarter 2017 Total ¹ (lbs)	1.9

General Notes:

The Groundwater Remediation and Treatment System was shut down on July 10, 2017.

Footnote:

1. Mass recovered based on measured recovery rate and runtime for each month.

Acronyms and Abbreviations:

* = as measured at the combined air stripper influent

gpm = gallons per minute

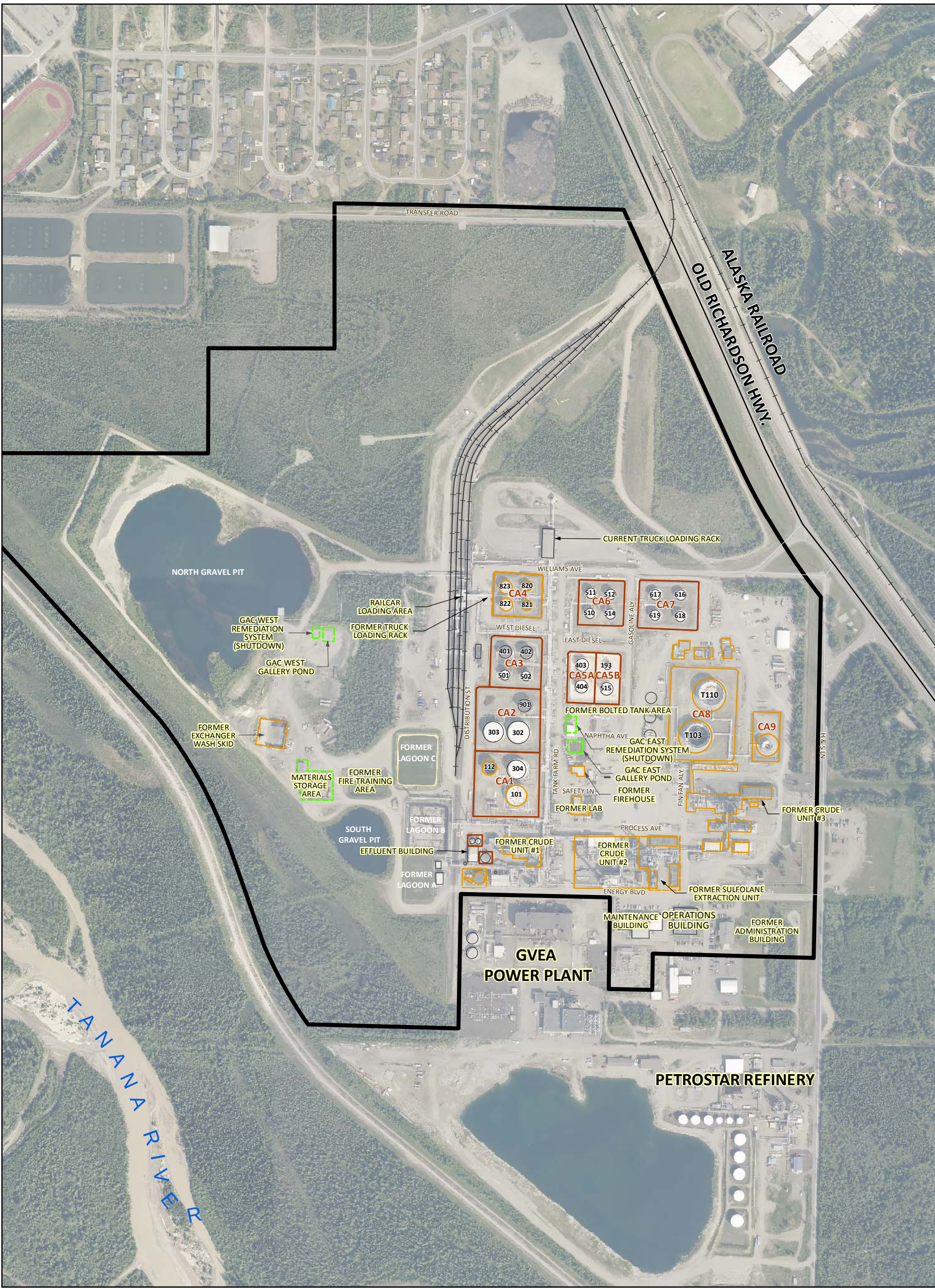
lbs = pounds

lb/day = pounds per day

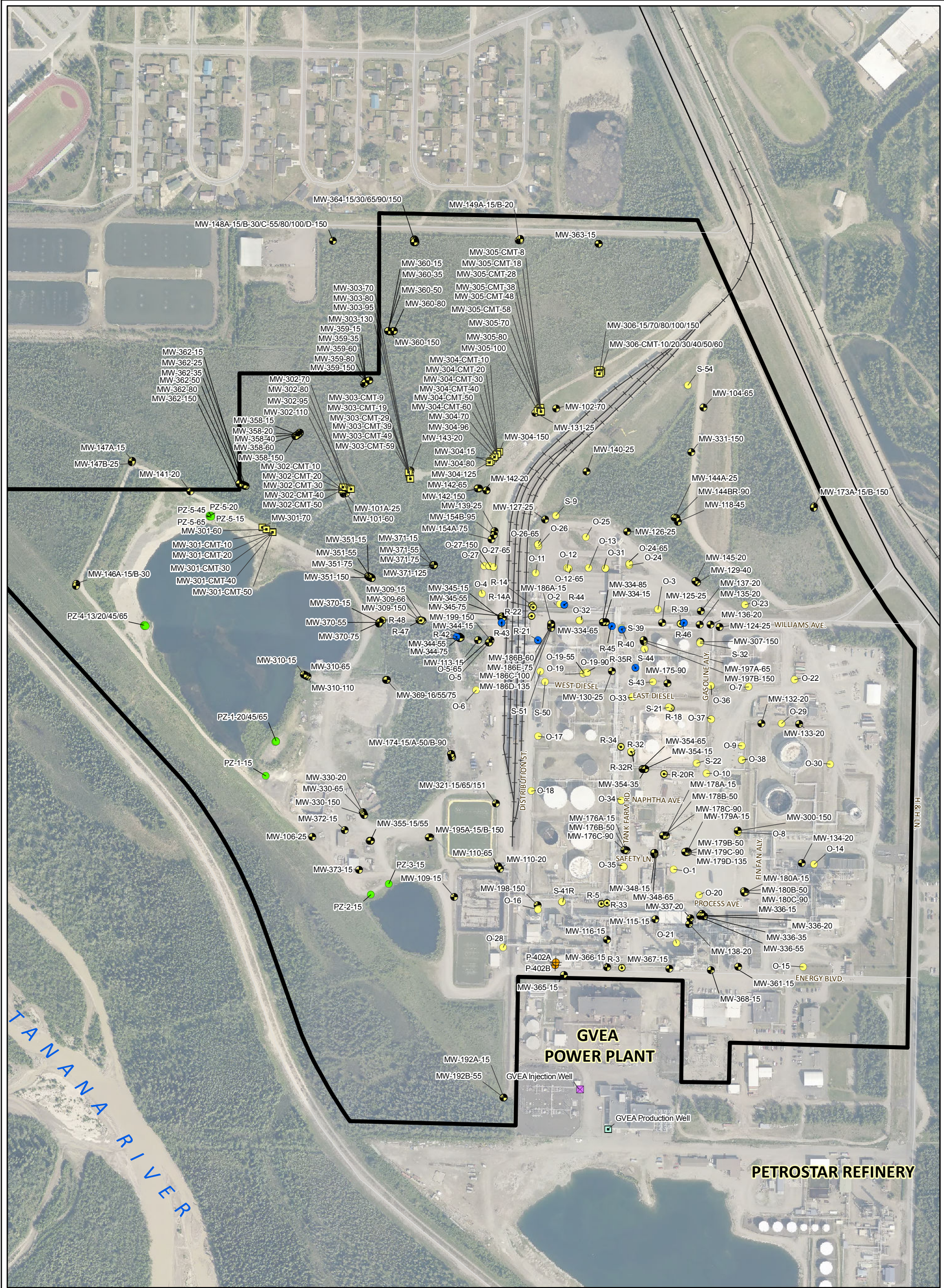
µg/L = micrograms per liter

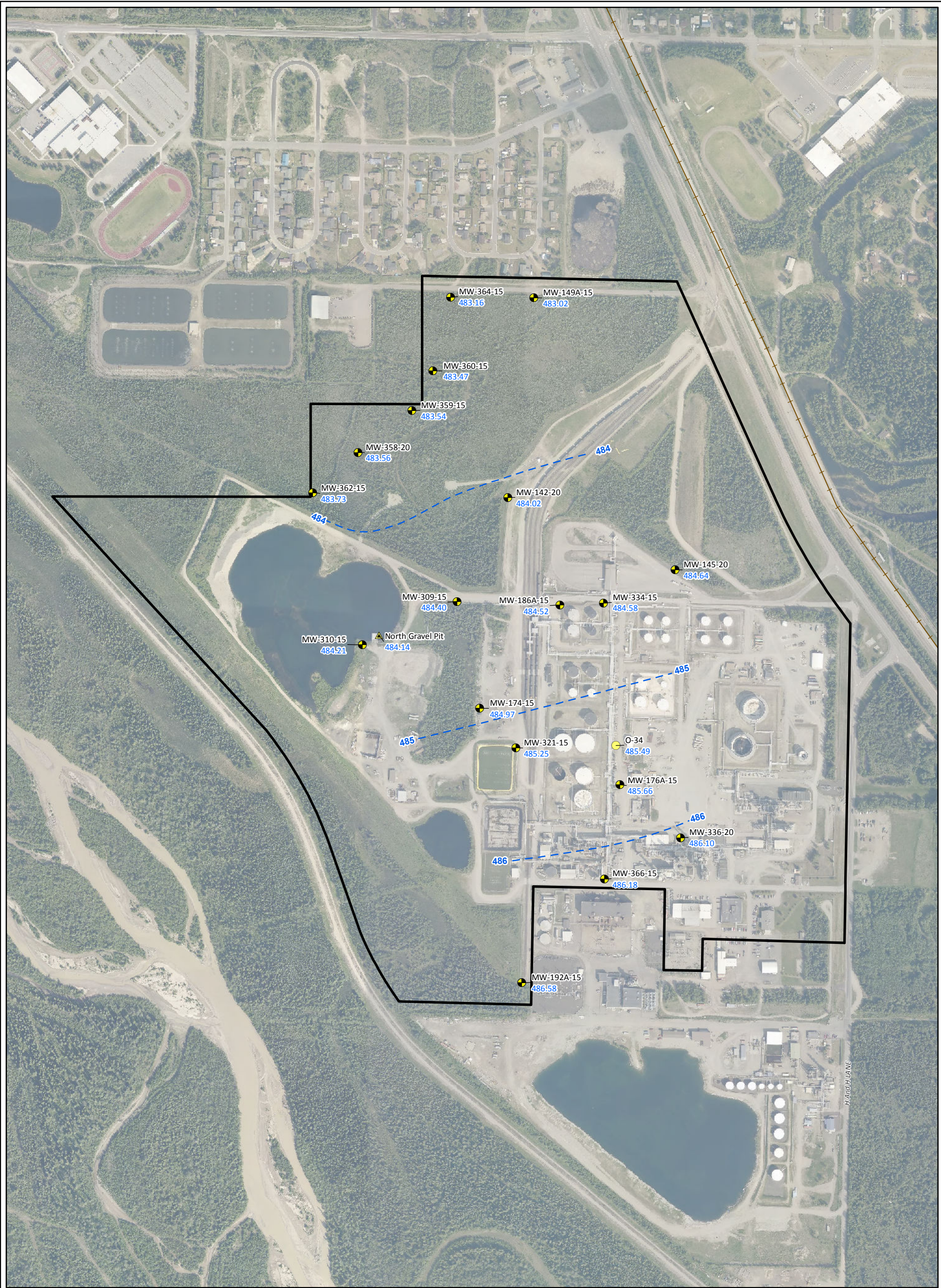
FIGURES





Legend - Bermed Containment Areas (CA) - Approximate Area - FHRA Property Boundary - Structure Demolished Notes: - GAC: Granular Activated Carbon - GVEA: Golden Valley Electrical Authority -Image provided courtesy of Pictometry International 2012	FLINT HILLS RESOURCES ALASKA, LLC NORTH POLE TERMINAL, NORTH POLE, ALASKA SECOND SEMIANNUAL 2017 ONSITE GROUNDWATER MONITORING REPORT SITE FEATURES FIGURE 1-2 ARCADIS





Legend

- Monitoring Well
- Observation Well
- Surface Water
- FHRA Property Boundary
- Groundwater Elevation Contours in Feet Above Mean Sea Level (Dashed where Inferred)

Notes:

- Wells were gauged in September 2017
- Only monitoring wells scheduled for gauging per Table 3-1 of the Long Term Monitoring Plan - 2017 Update are shown on the figure.
- Vertical gradient data are evaluated in more detail in Appendix F of the Second Semiannual 2017 Onsite Groundwater Monitoring Report
- Image provided courtesy of Pictometry International 2012

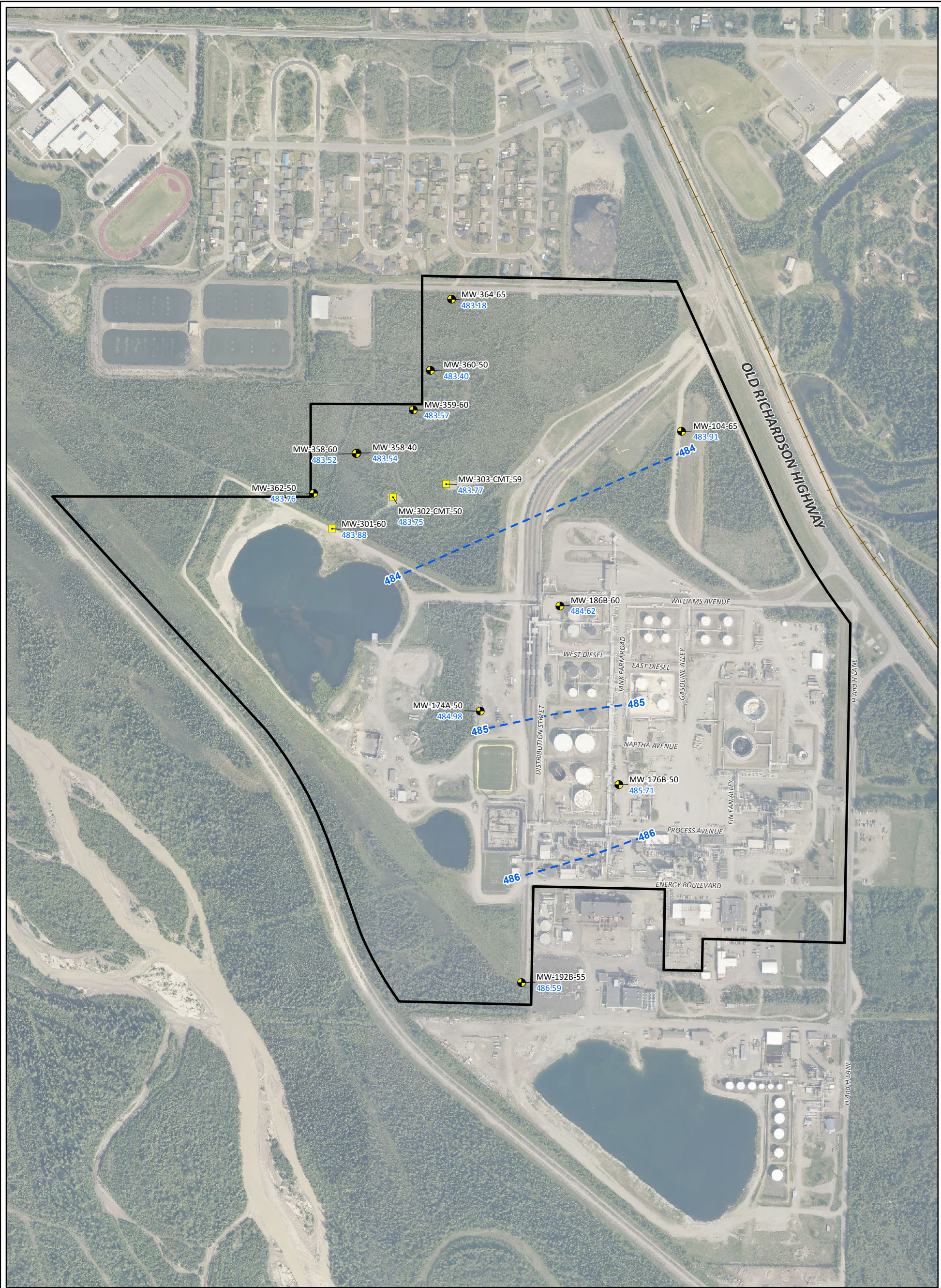
0 500 1,000

SCALE IN FEET

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA
**SECOND SEMIANNUAL 2017 ONSITE
GROUNDWATER MONITORING REPORT**
**THIRD QUARTER 2017 GROUNDWATER
CONTOUR MAP- ONSITE WELLS
AT WATER TABLE**

FIGURE
3-1

ARCADIS



Legend

- Vertical Profile Transect Well
- Monitoring Well
- FHRA Property Boundary

Groundwater Elevation Contours in Feet Above Mean Sea Level (Dashed where Inferred)

485

Notes:

- Wells were gauged in September 2017
- Only monitoring wells scheduled for gauging per Table 3-1 of the Long Term Monitoring Plan - 2017 Update are shown on the figure.
- Vertical gradient data are evaluated in more detail in Appendix F of the Second Semiannual 2017 Onsite Groundwater Monitoring Report
- Image provided courtesy of Pictometry International 2012

0 500 1,000

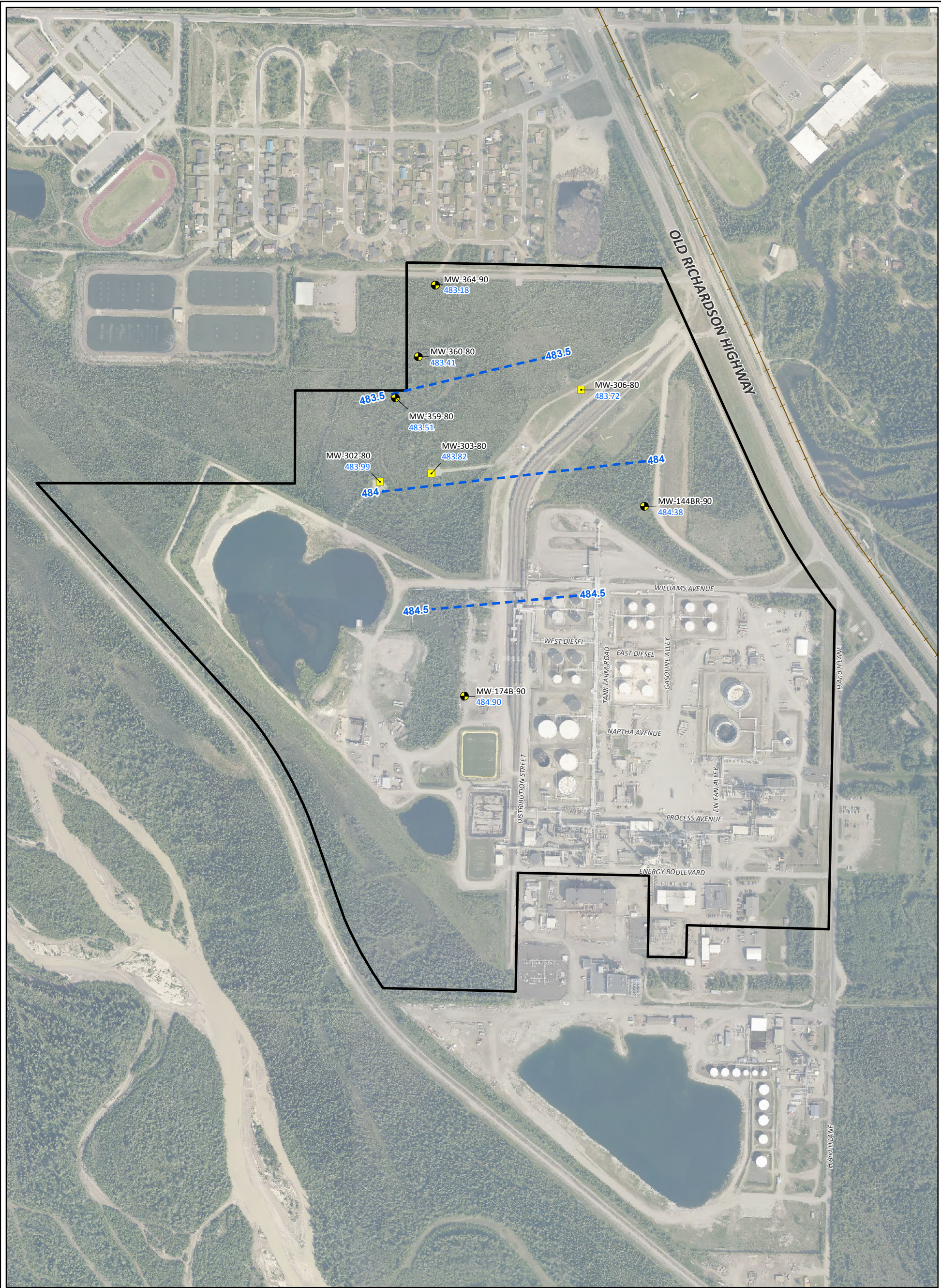
SCALE IN FEET

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA
**SECOND SEMIANNUAL 2017 ONSITE
GROUNDWATER MONITORING REPORT**
**THIRD QUARTER 2017 GROUNDWATER
CONTOUR MAP - ONSITE WELLS 10 TO 55 FEET
BELOW WATER TABLE**

FIGURE

3-2

ARCADIS



Legend

- Vertical Profile Transect Well
- Monitoring Well
- FHRA Property Boundary
- Groundwater Elevation Contours in Feet Above Mean Sea Level (Dashed where Inferred)

Notes:

- Wells were gauged in September 2017
- Only monitoring wells scheduled for gauging per Table 3-1 of the Long Term Monitoring Plan - 2017 Update are shown on the figure.
- Vertical gradient data are evaluated in more detail in Appendix F of the Second Semiannual 2017 Onsite Groundwater Monitoring Report
- Image provided courtesy of Pictometry International 2012

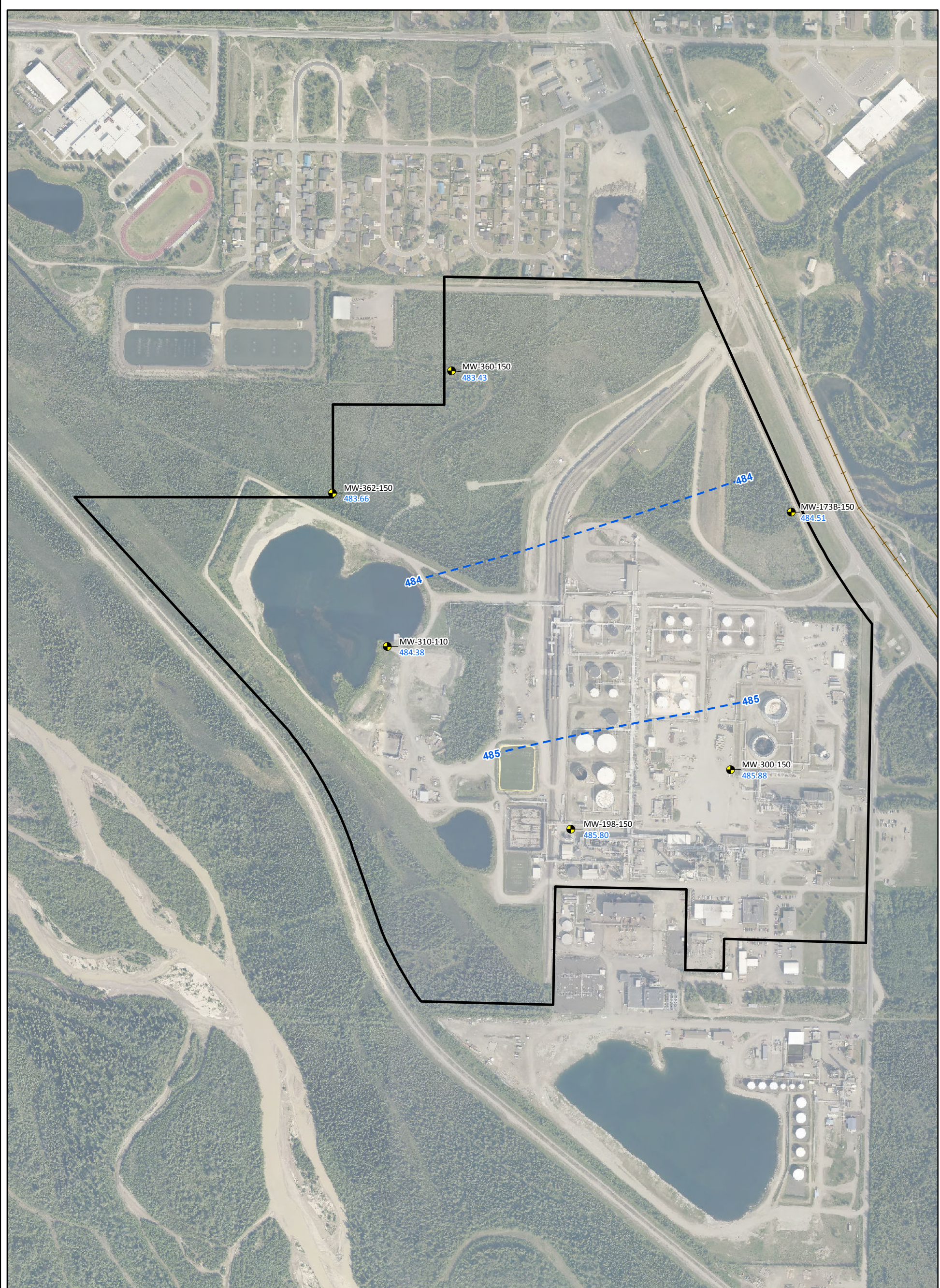
0 500 1,000

SCALE IN FEET

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA
**SECOND SEMIANNUAL 2017 ONSITE
GROUNDWATER MONITORING REPORT**
**THIRD QUARTER 2017 GROUNDWATER
CONTOUR MAP - ONSITE WELLS 55 TO 90 FEET
BELOW WATER TABLE**

FIGURE
3-3

ARCADIS



Legend

Monitoring Well

FHRA Property Boundary

Groundwater Elevation Contours in Feet Above Mean Sea Level (Dashed where Inferred)

Notes:

- Wells were gauged in September 2017
- Only monitoring wells scheduled for gauging per Table 3-1 of the Long Term Monitoring Plan - 2017 Update are shown on the figure.
- Vertical gradient data are evaluated in more detail in Appendix F of the Second Semiannual 2017 Onsite Groundwater Monitoring Report.
- Image provided courtesy of Pictometry International 2012

0 500 1,000

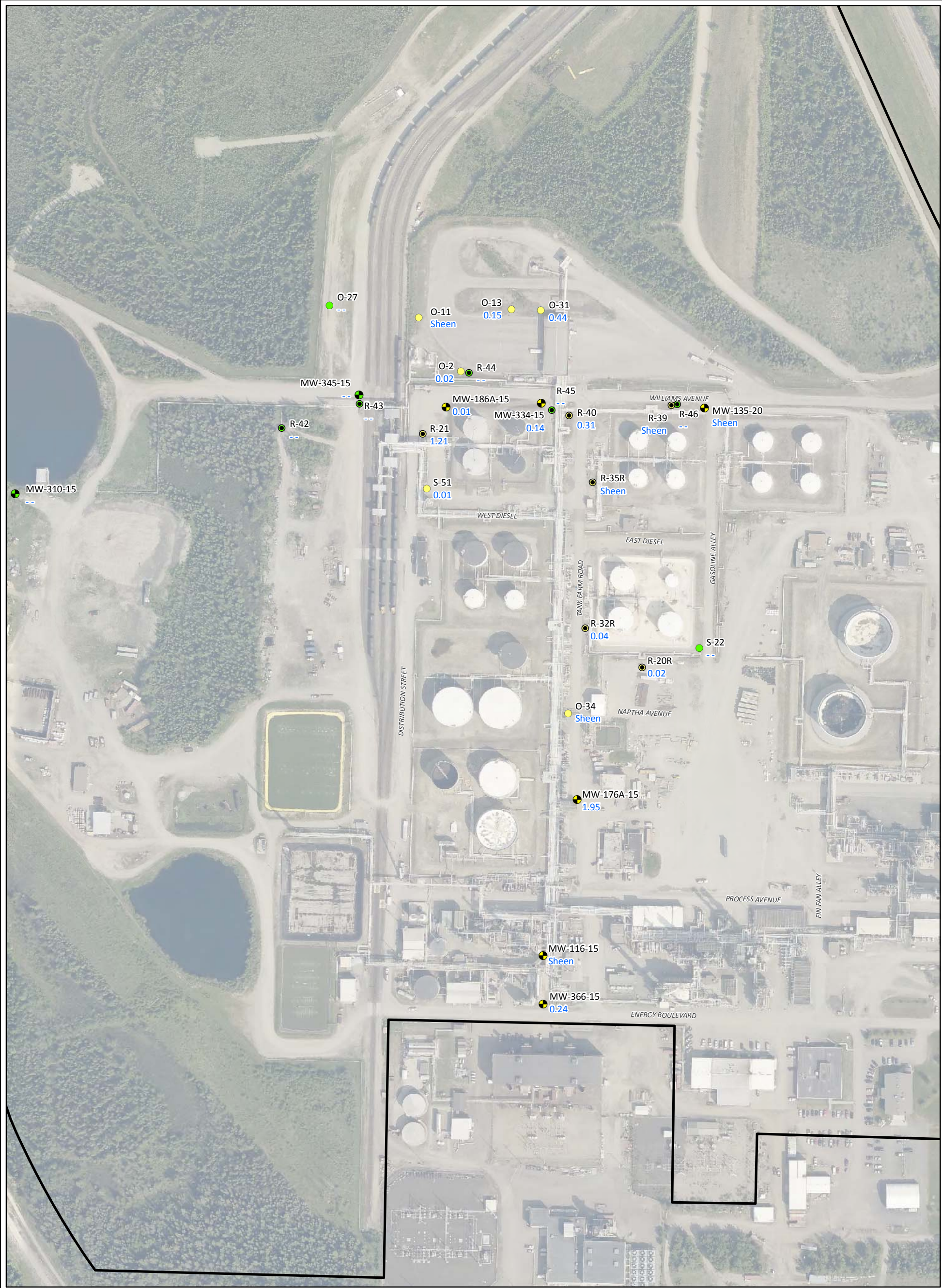
SCALE IN FEET

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA
**SECOND SEMIANNUAL 2017 ONSITE
GROUNDWATER MONITORING REPORT**
**THIRD QUARTER 2017 GROUNDWATER
CONTOUR MAP - ONSITE WELLS 90 TO 160 FEET
BELOW WATER TABLE**

FIGURE

3-4

ARCADIS



Legend

No LNAPL or Sheen Observed	LNAPL or Sheen Observed	FWRA Property Boundary
Monitoring Well	Monitoring Well	LNAPL Thickness (feet)
Observation Well	Observation Well	An interface probe was used. No measurable LNAPL was present, but LNAPL sheen was observed visually.
Recovery Well	Recovery Well	No LNAPL measured or sheen observed

Notes:
LNAPL = Light Nonaqueous Phase Liquid
LNAPL results posted on figure are in feet.
-The maximum LNAPL thickness for wells gauged as part of the Long Term Monitoring Plan – 2017 Update and the FWRA Operator Gauging are shown on this figure. A comprehensive gauging table is included in Appendix G.
-Image provided courtesy of Pictometry International 2012.

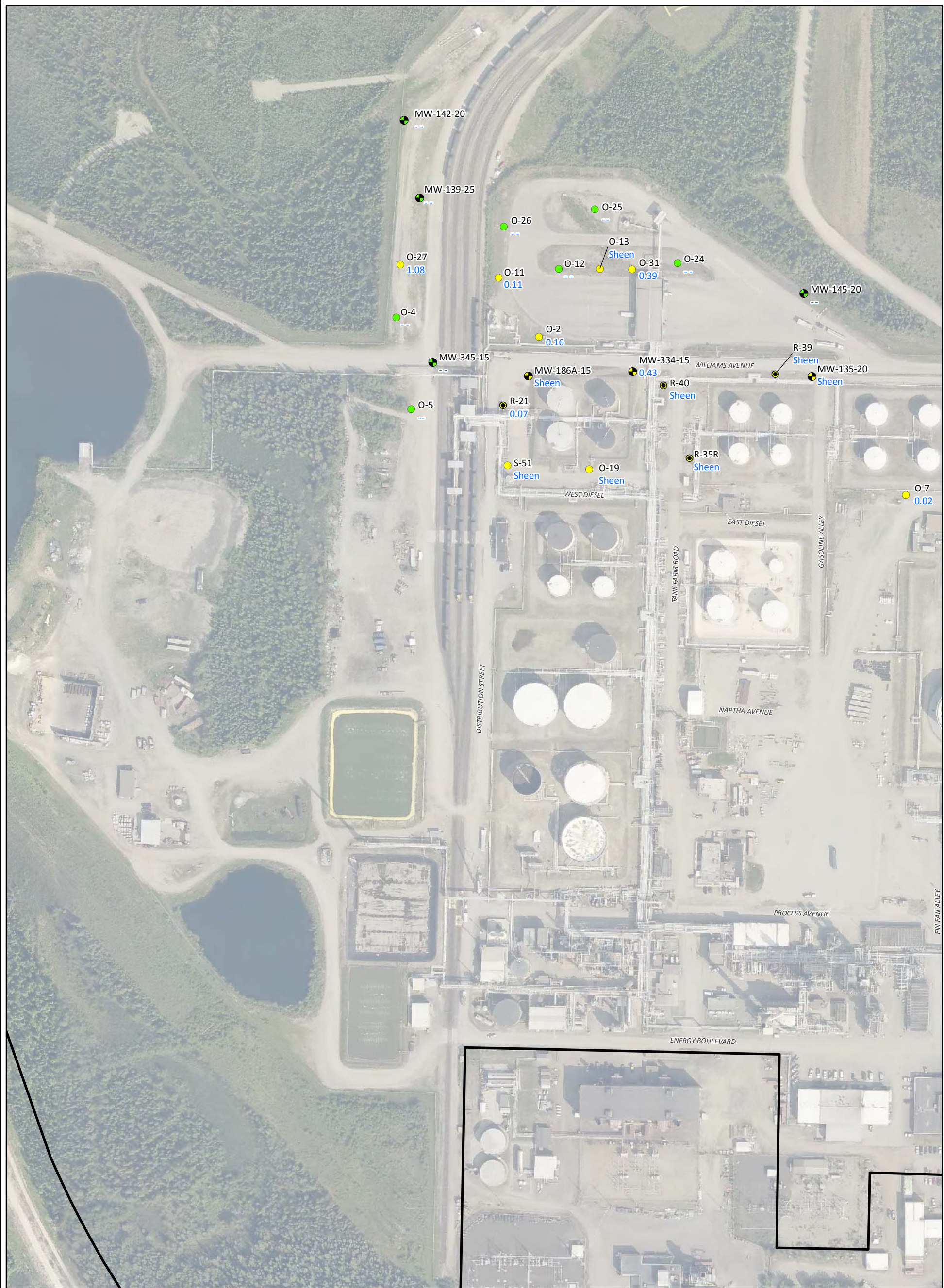
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SECOND SEMIANNUAL 2017 ONSITE
GROUNDWATER MONITORING REPORT**

**THIRD QUARTER 2017
LNAPL MONITORING DATA**

FIGURE
3-5

ARCADIS

0 230 460
SCALE IN FEET



Legend

No LNAPL or Sheen Observed	LNAPL or Sheen Observed	FHRA Property Boundary
Monitoring Well	Monitoring Well	1.10 LNAPL Thickness (feet)
Observation Well	Observation Well	Sheen An interface probe was used. No measurable LNAPL was present, but LNAPL sheen was observed visually.
Recovery Well	Recovery Well	-- No LNAPL measured or sheen observed

Notes:
LNAPL = Light Nonaqueous Phase Liquid
LNAPL results posted on figure are in feet.
-The maximum LNAPL thickness for wells gauged as part of the Long Term Monitoring Plan - 2017 Update and the FHRA Operator Gauging are shown on the figure. A comprehensive gauging table is included in Appendix G.
-Image provided courtesy of Pictometry International 2012

0 210 420

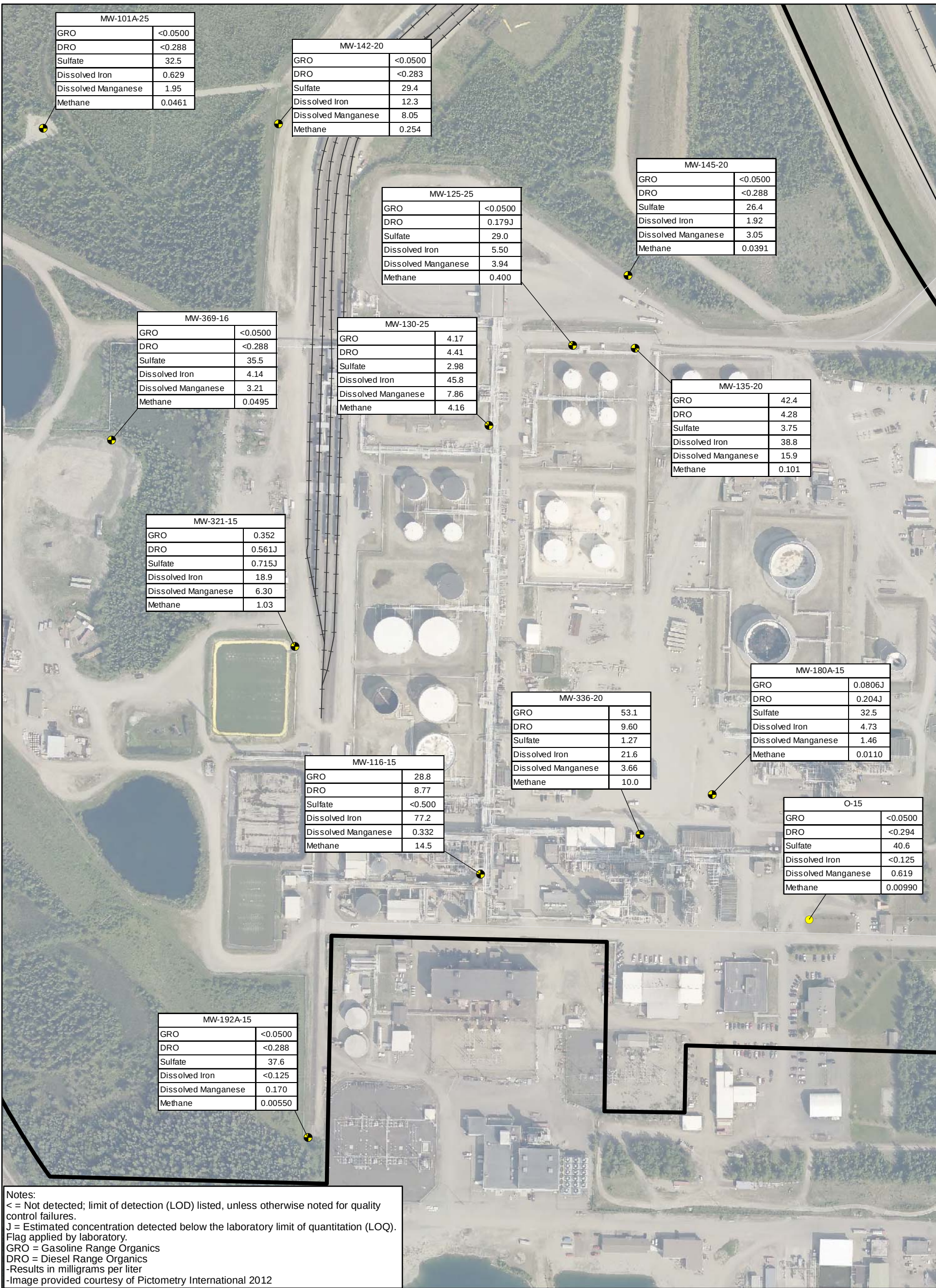
SCALE IN FEET

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**FOURTH QUARTER 2017
LNAPL MONITORING DATA**

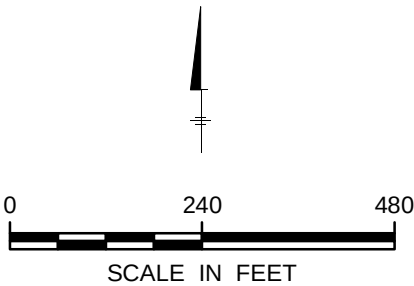
FIGURE
3-6

ARCADIS



Legend

- Monitoring Well
- Observation Well
- FHRA Property Boundary

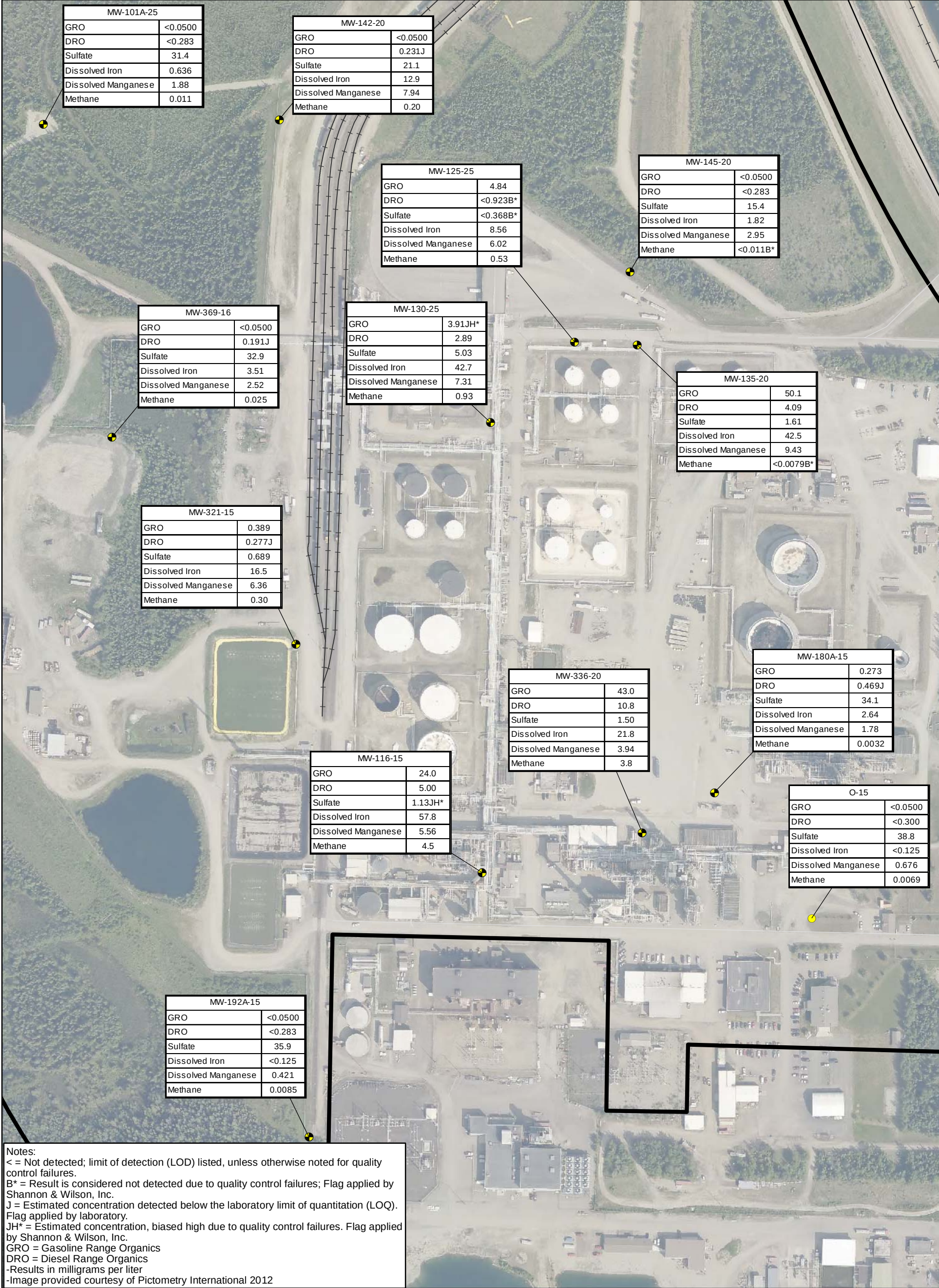


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THIRD QUARTER 2017
NATURAL SOURCE ZONE DEPLETION
MONITORING RESULTS



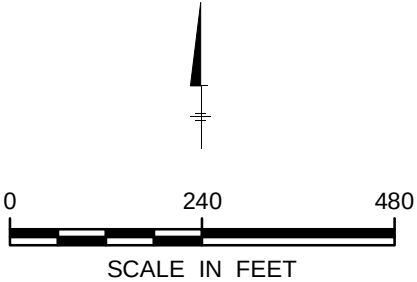
FIGURE

3-7



Legend

- Monitoring Well
- Observation Well
- FHRA Property Boundary

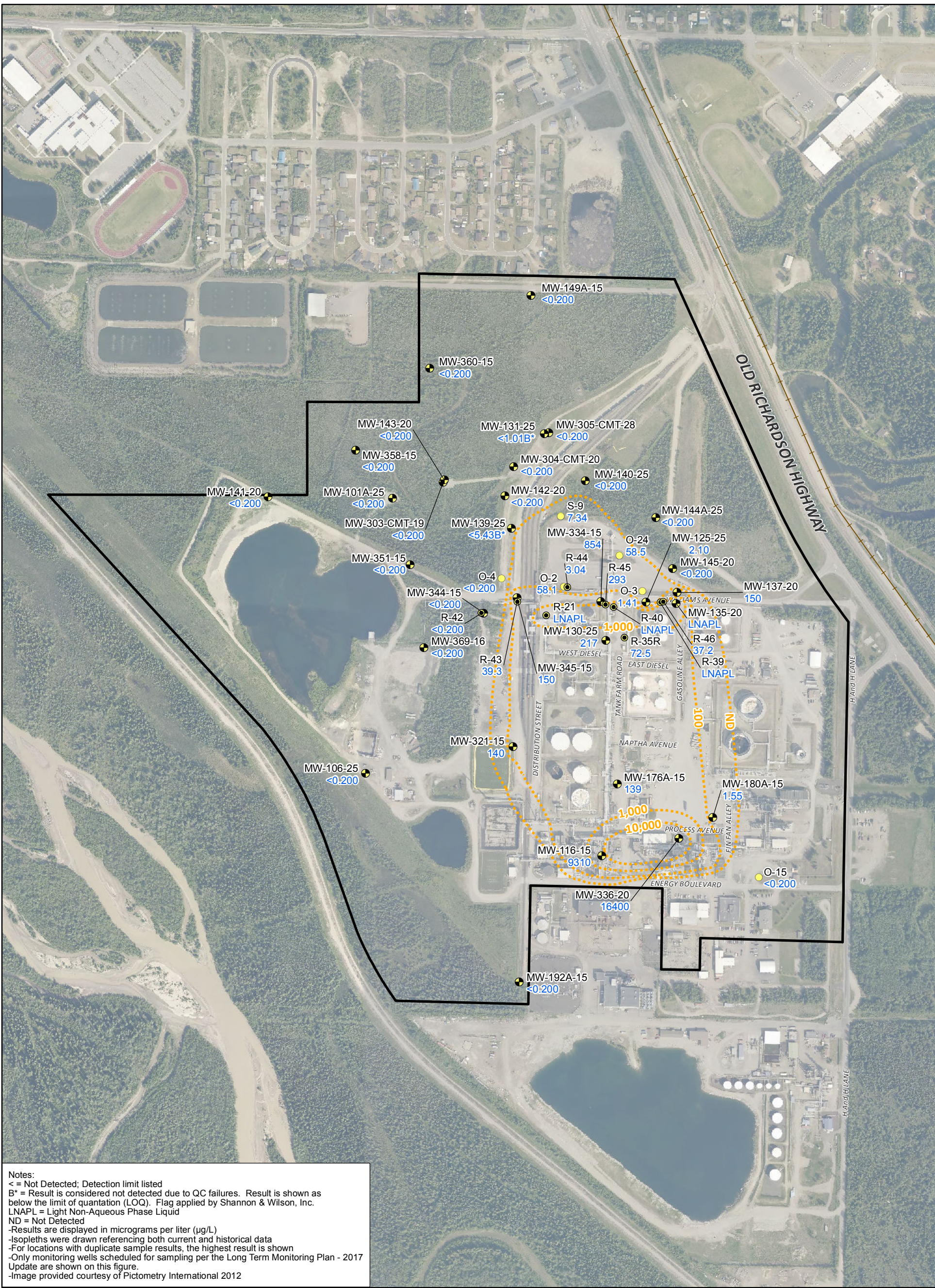


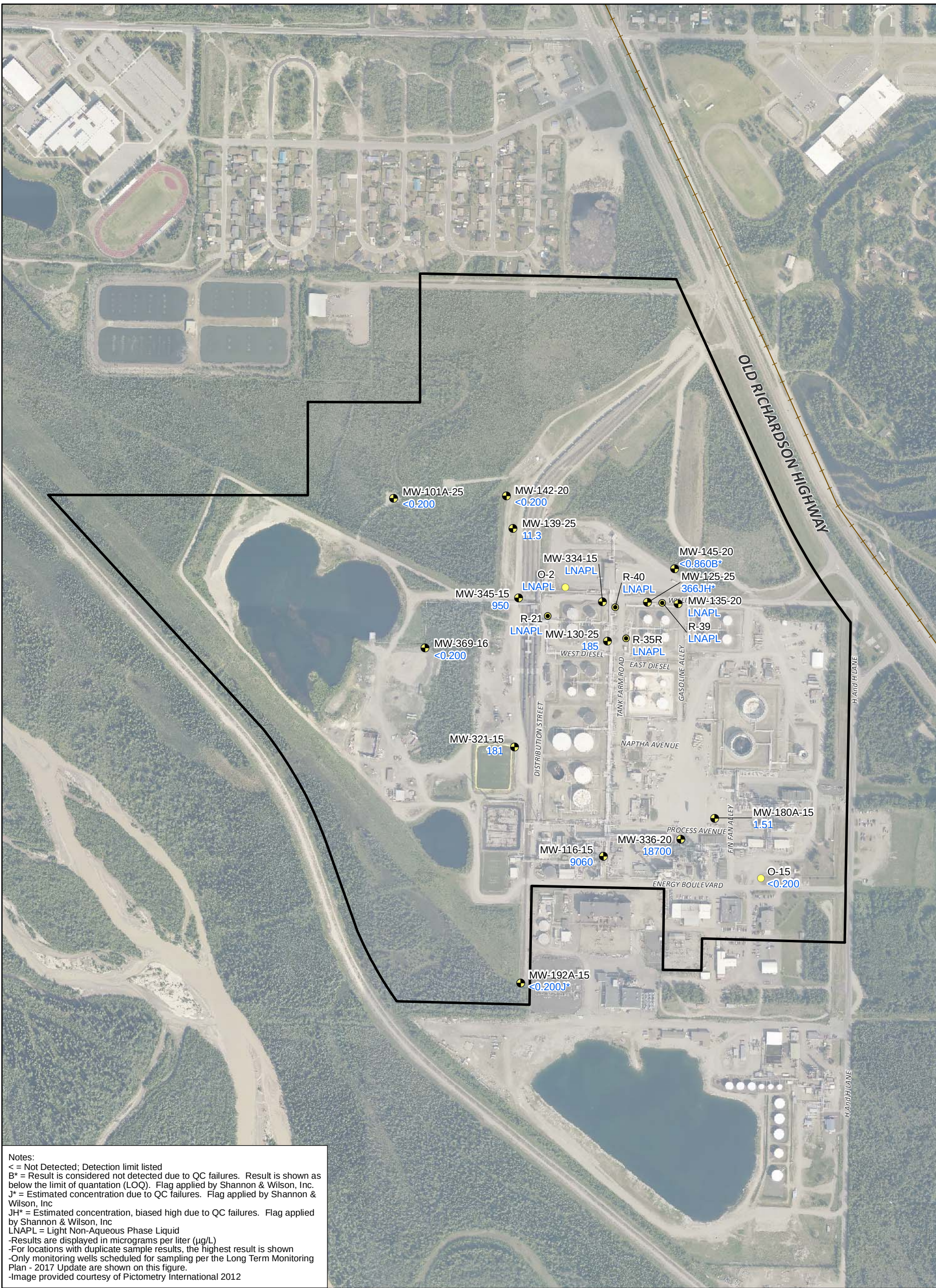
FLINT HILLS RESOURCES ALASKA, LLC
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SECOND SEMIANNUAL 2017 ONSITE
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FOURTH QUARTER 2017
NATURAL SOURCE ZONE DEPLETION
MONITORING RESULTS



FIGURE

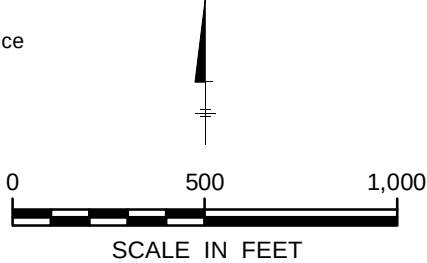
3-8





Legend:

- Monitoring Well
- Observation Well
- Recovery Well
- FHRA Property Boundary
- LNAPL Well not sampled due to LNAPL presence

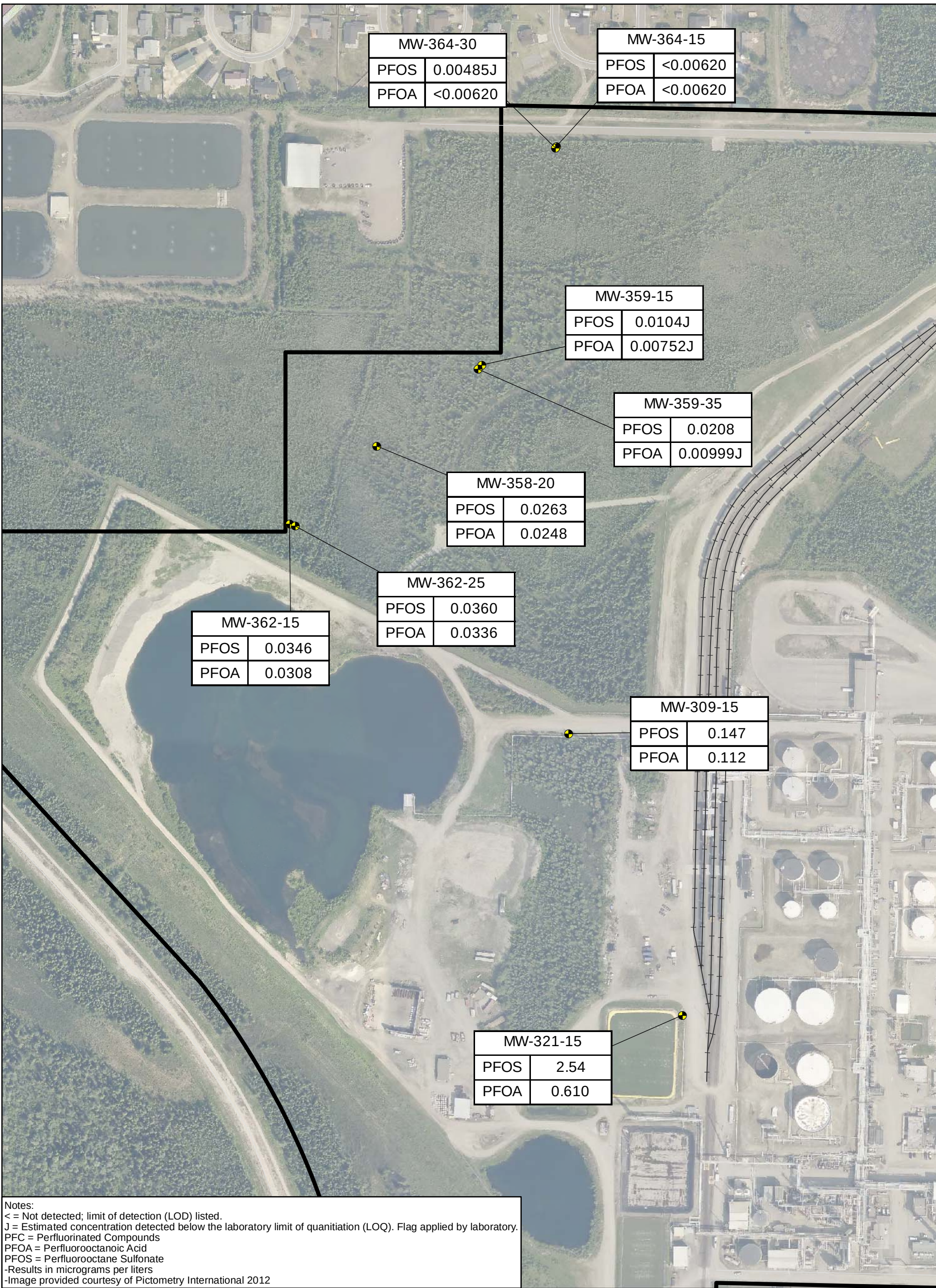


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**ONSITE BENZENE GROUNDWATER
ANALYTICAL RESULTS**



FIGURE

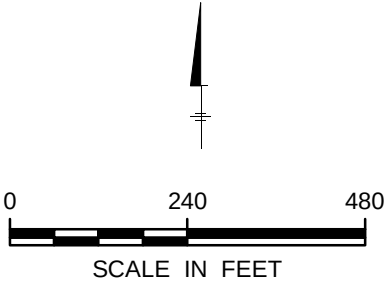
3-10



Legend

Monitoring Well

FHRA Property Boundary

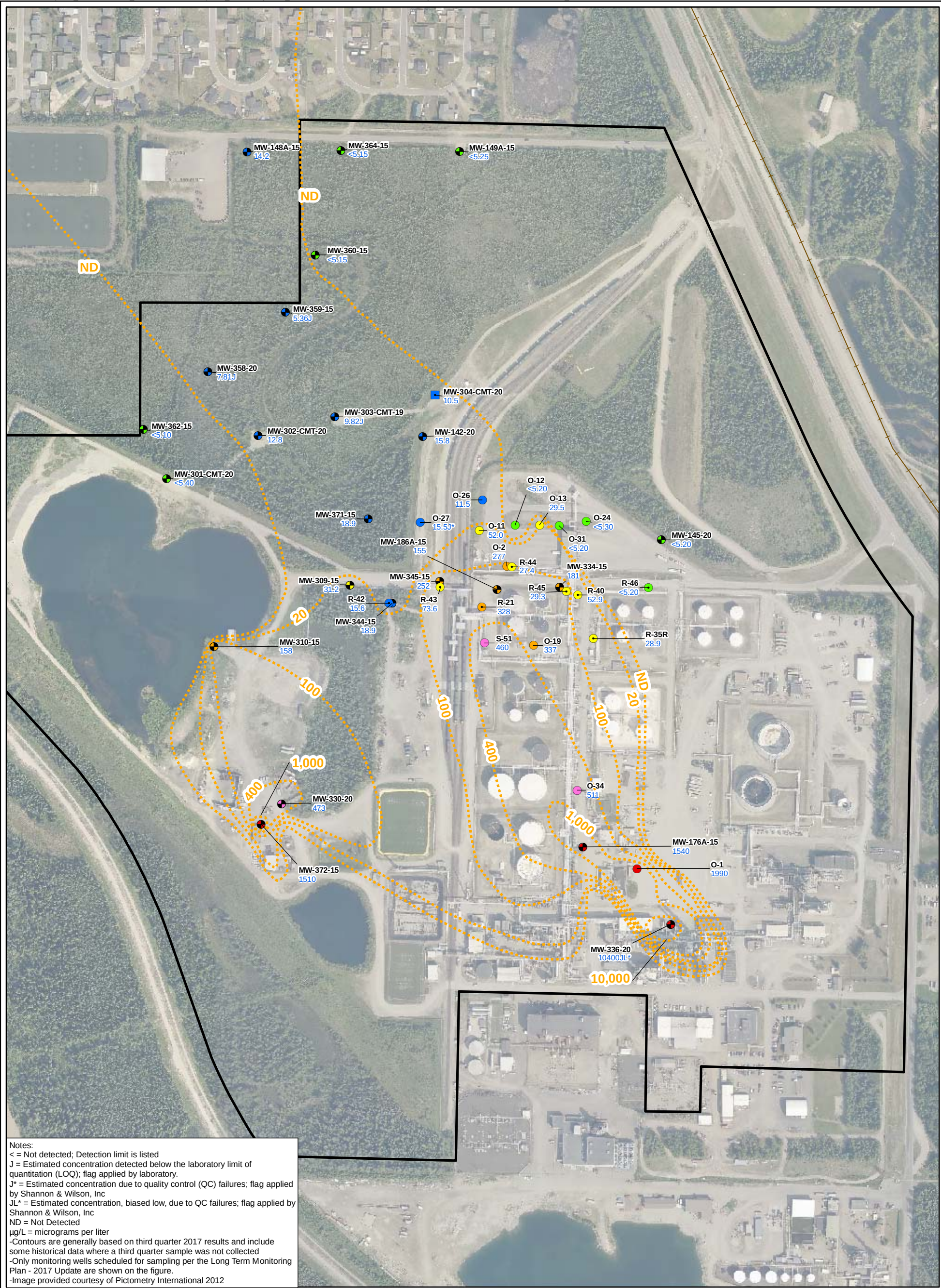


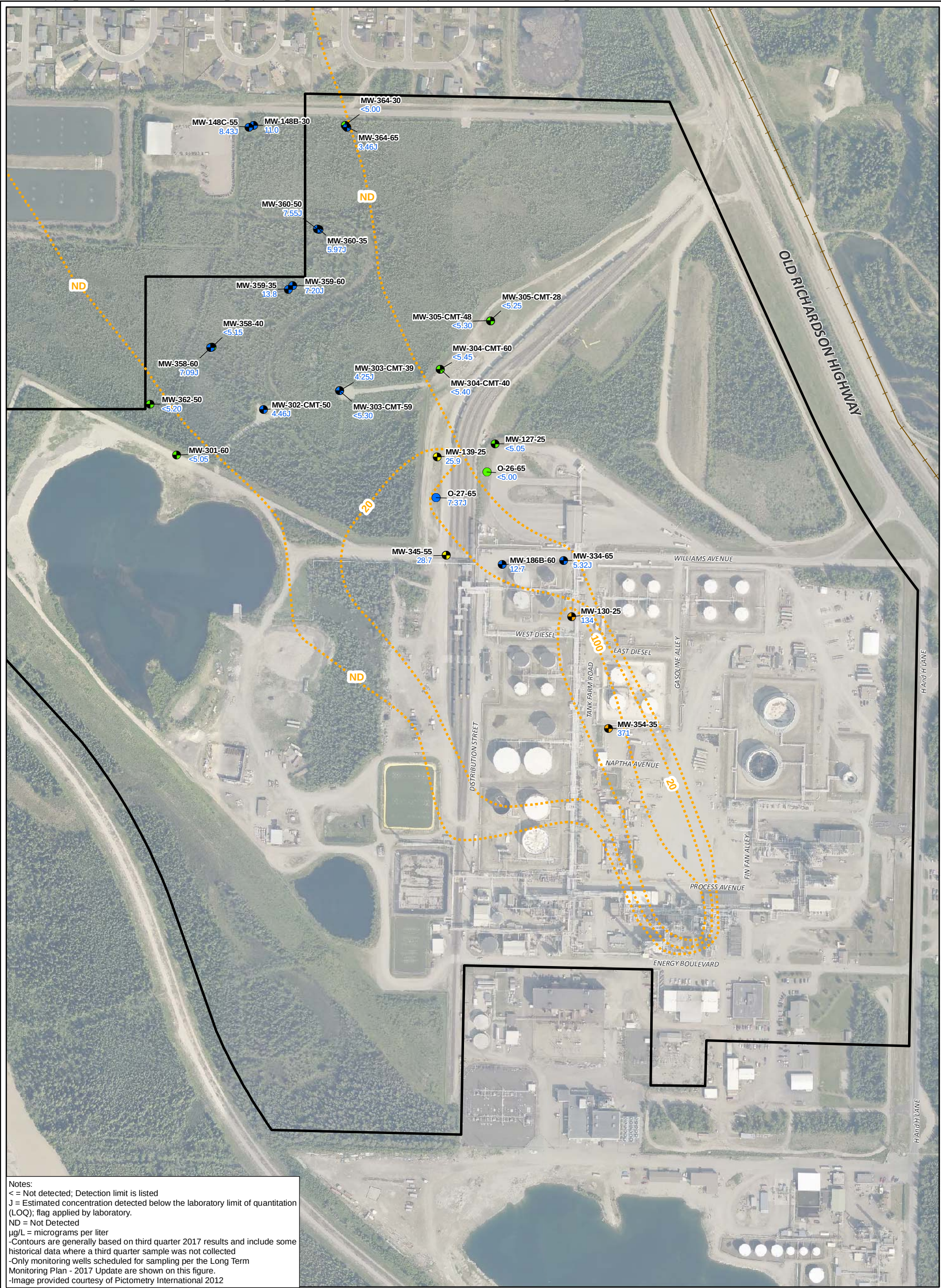
FLINT HILLS RESOURCES ALASKA, LLC
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**THIRD QUARTER 2017 ONSITE PFC
GROUNDWATER ANALYTICAL RESULTS**



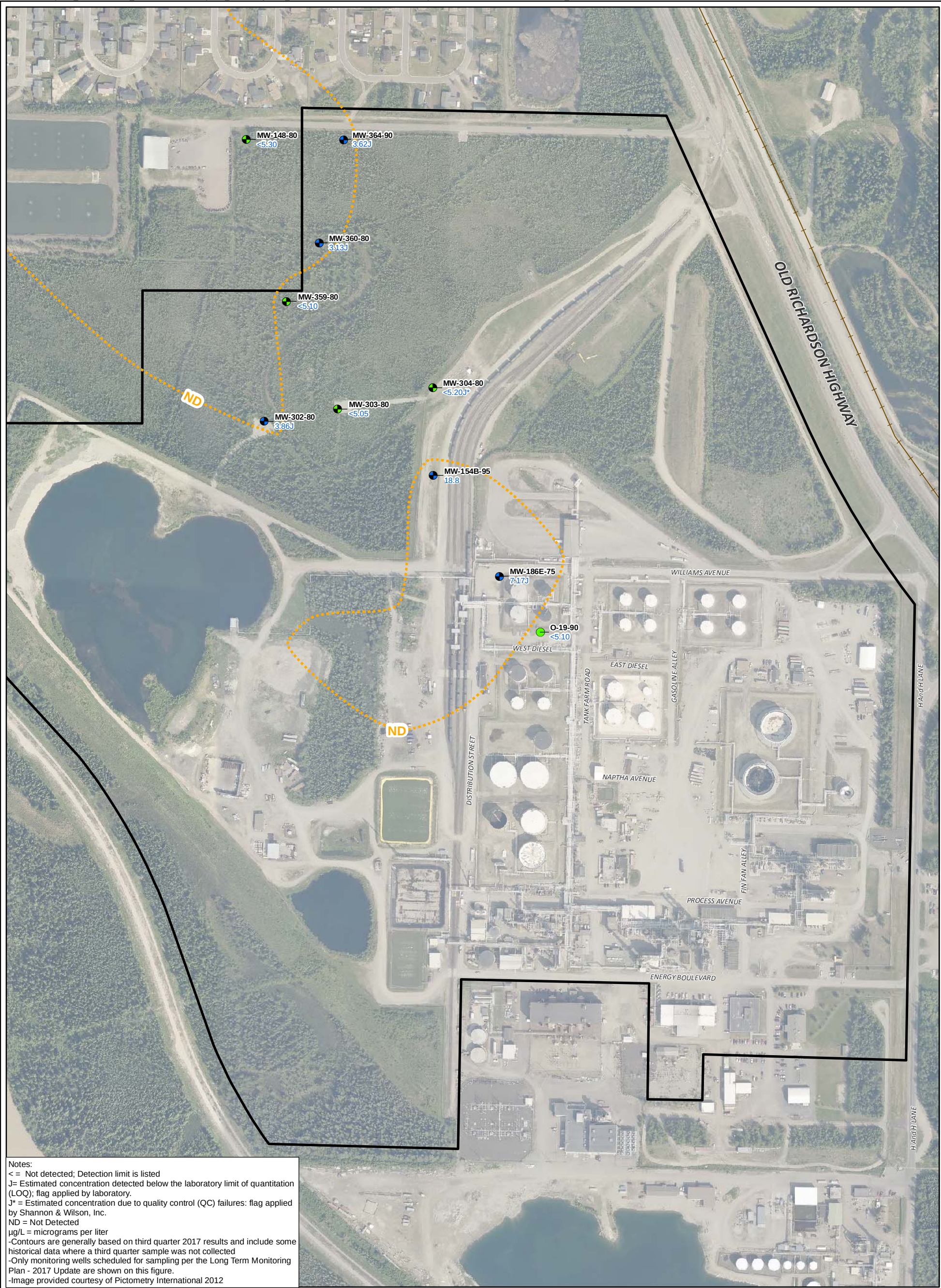
FIGURE
3-11

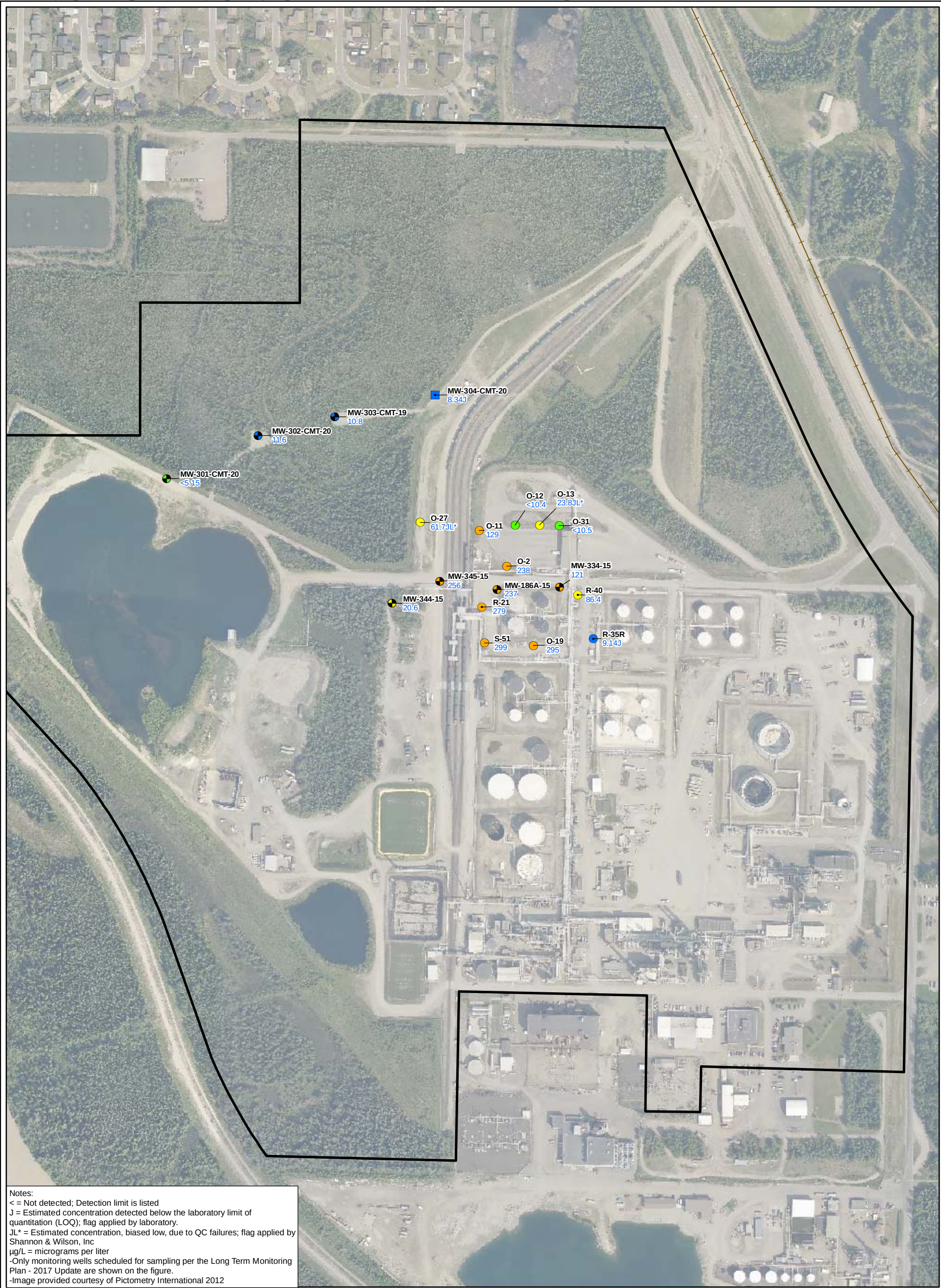




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THIRD QUARTER 2017 ONSITE SULFOLANE
GROUNDWATER ANALYTICAL RESULTS -
10 TO 55 FEET BELOW WATER TABLE







Legend

- Monitoring Well
- Observation Well
- Recovery Well
- Vertical Profile Transect Well
- FHRA Property Boundary

Sulfolane Results

- Not Detected
- 3.14 - Less Than 20 µg/L
- 20 - 100 µg/L
- 100 - 400 µg/L

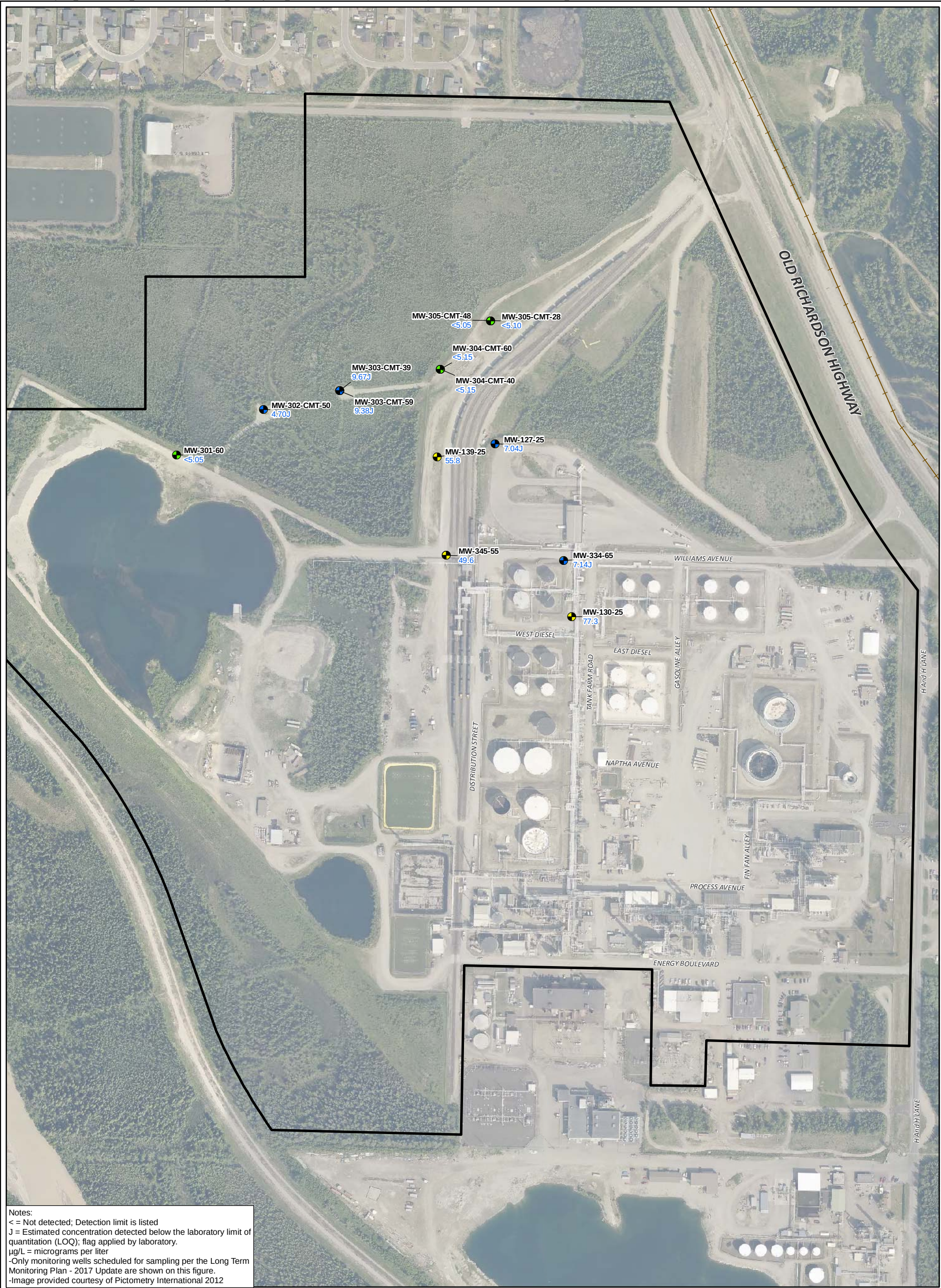
0 350 700

SCALE IN FEET

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA
**SECOND SEMI-ANNUAL 2017 ONSITE
GROUNDWATER MONITORING REPORT**
**FOURTH QUARTER 2017 ONSITE SULFOLANE
GROUNDWATER ANALYTICAL RESULTS -
WATER TABLE**

FIGURE
3-15

ARCADIS



Legend

- Monitoring Well
- Observation Well
- FHRA Property Boundary

Sulfolane Results

- Not Detected
- 3.14 - Less Than 20 µg/L
- 20 - 100 µg/L

0 350 700

SCALE IN FEET

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**FOURTH QUARTER 2017 ONSITE SULFOLANE
GROUNDWATER ANALYTICAL RESULTS -
10 TO 55 FEET BELOW WATER TABLE**

FIGURE

ARCADIS

3-16



Notes:
< = Not detected; Detection limit is listed
J= Estimated concentration detected below the laboratory limit of quantitation (LOQ); flag applied by laboratory.
µg/L = micrograms per liter
-Only monitoring wells scheduled for sampling per the Long Term Monitoring Plan - 2017 Update are shown on this figure.
-Image provided courtesy of Pictometry International 2012

Legend

- Monitoring Well
- Observation Well
- FHRA Property Boundary

Sulfolane Results

- Not Detected
- 3.14 - Less Than 20 µg/L
- 20 - 100 µg/L

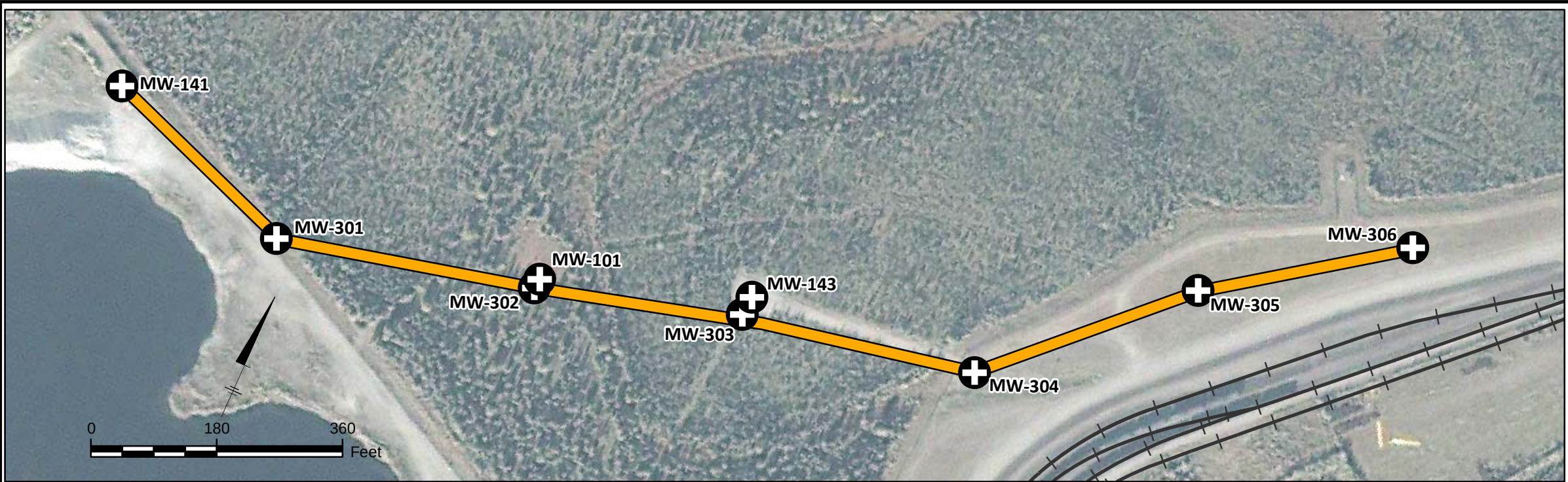
SCALE IN FEET

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GROUNDWATER MONITORING REPORT**
**FOURTH QUARTER 2017 ONSITE SULFOLANE
GROUNDWATER ANALYTICAL RESULTS -
55 TO 90 FEET BELOW WATER TABLE**

FIGURE
 ARCADIS

3-17

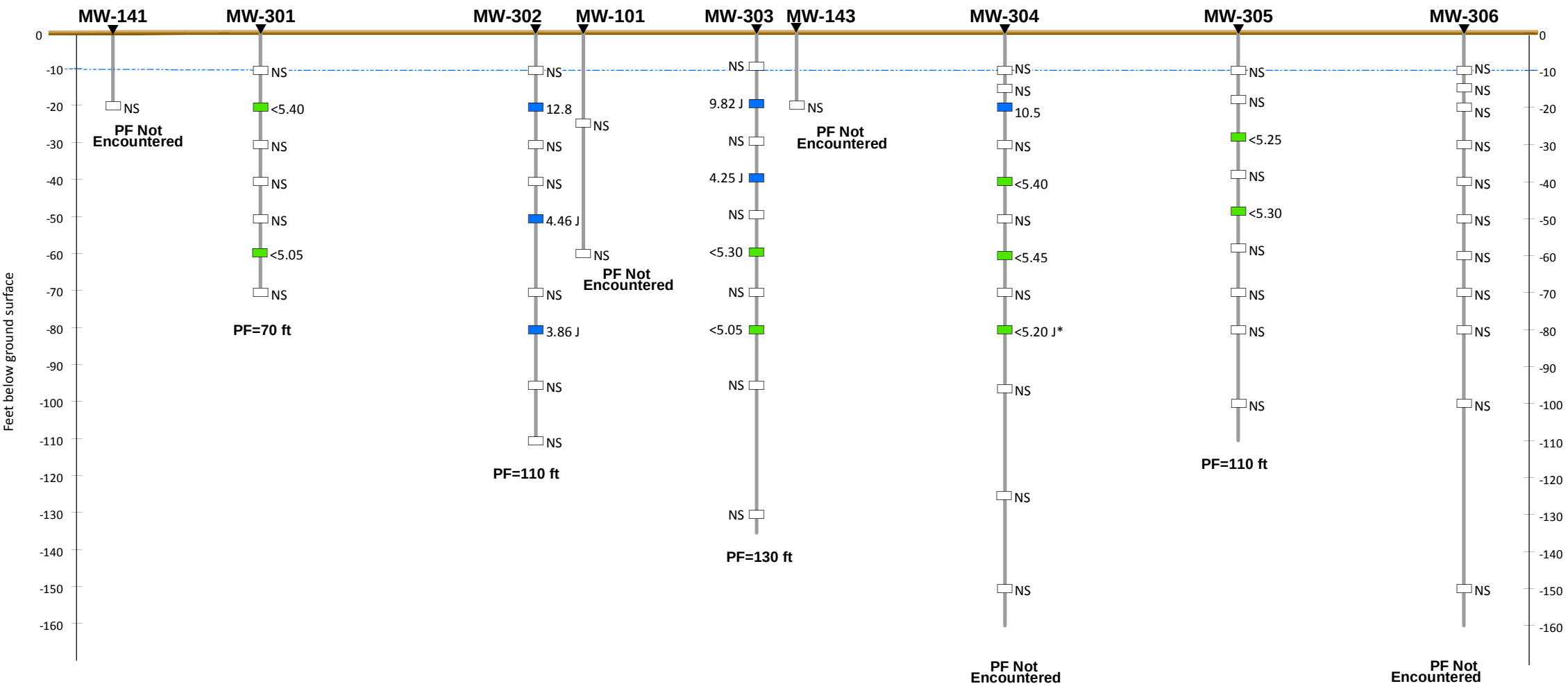
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Path: Z:\GIS\Projects\ENW\FHR\FHR_AK\NorthPoleRefinery\GW_Monitoring\2017_Q4\MXD\2017FirstSemiAnnual\OnSite\Fig 3-18 3Q17 Sulfolane_VPT_Profile.mxd Date: 2/5/2018 Time: 9:47:34 AM



Legend:

Sulfolane Results

- Not Detected
- 3.14 - Less Than 20 µg/L
- Ground Surface
- Approximate Groundwater Surface
- Well Profile

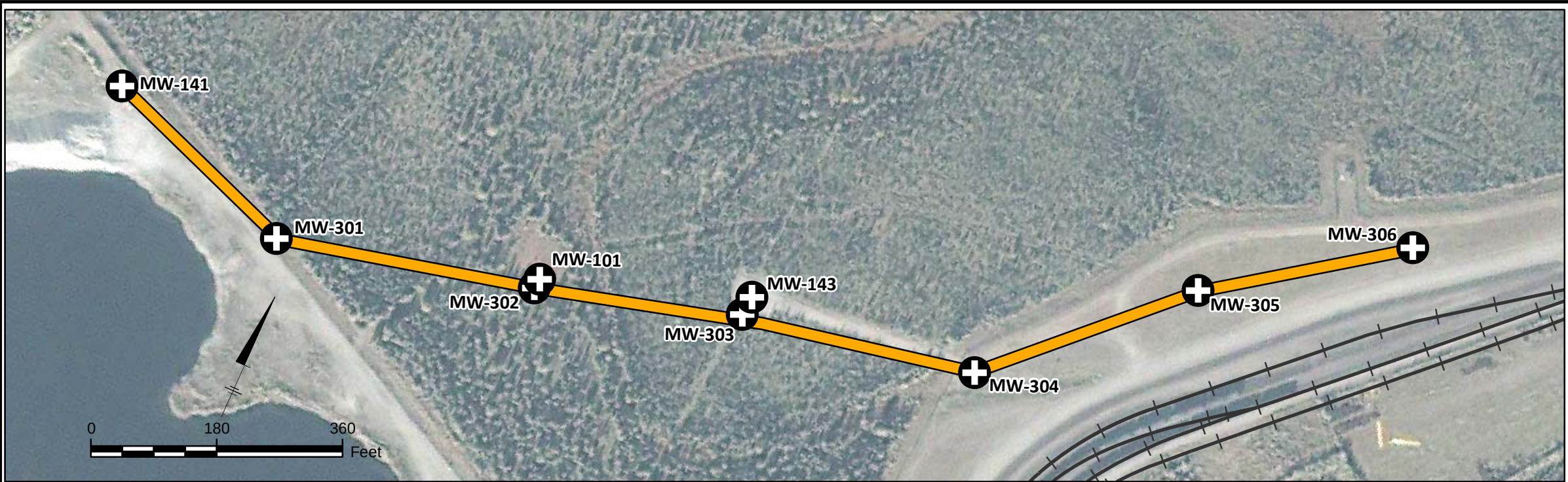


NOTES:
J = Estimated concentration detected below the laboratory limit of quantitation (LOQ). Flag applied by laboratory.
J* = Estimated concentration due to quality control (QC) failures. Flag applied by Shannon & Wilson, Inc.
NS = Not sampled per Long-Term Monitoring Plan (LTM)
< = Not detected; Detection limit listed
PF= Permafrost encountered at bottom of boring.
ft = feet
µg/L = micrograms per liter
- For locations with duplicate sample results, the highest value is shown
- Profile has a vertical exaggeration of 5x

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THIRD QUARTER 2017
SULFOLANE AT THE
VERTICAL PROFILING TRANSECT

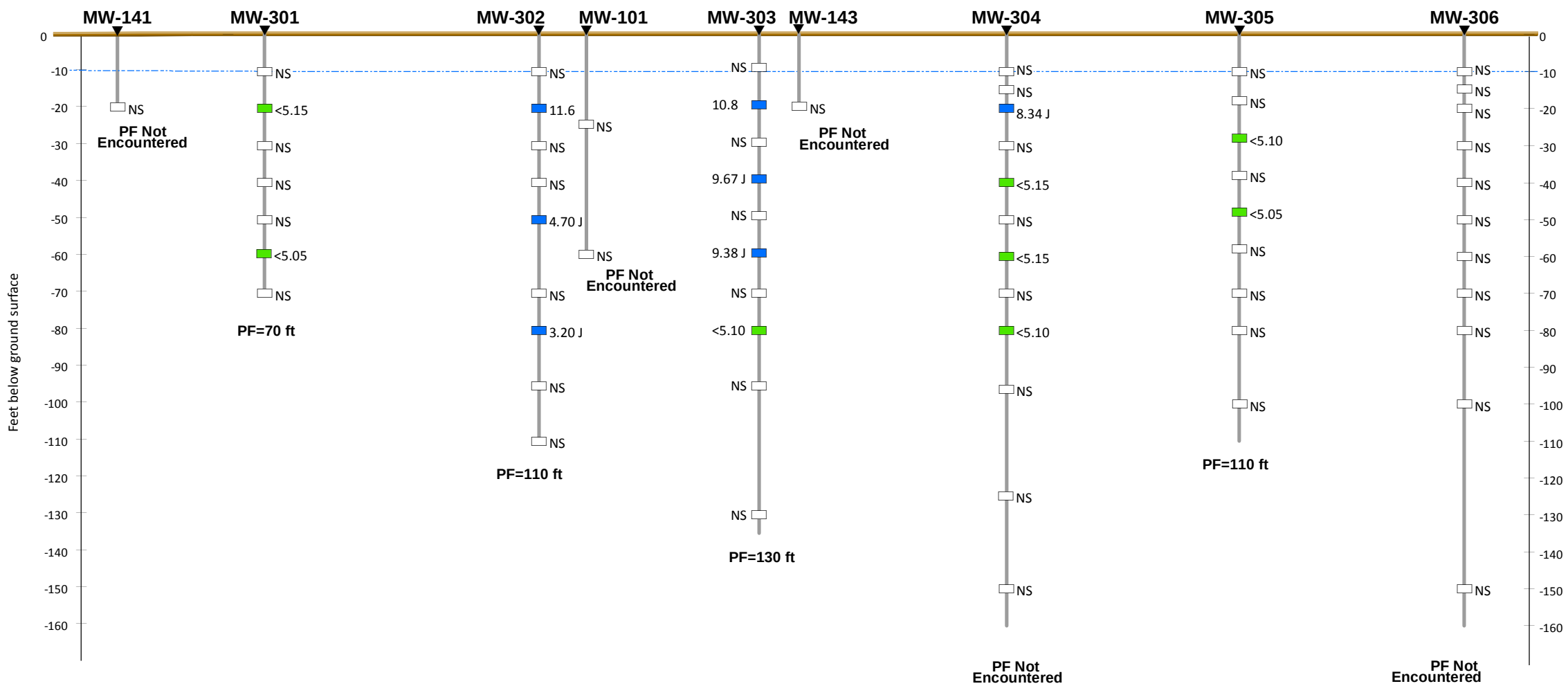
CITY: Citrix DIV/GROUP: IM/DV DB: K Sinsabaugh LD: G FRANCE
Path: Z:\GIS\Projects\ENW\FHR\FHR_AK\NorthPoleRefinery\GW_Monitoring\2017_Q4\MXD\2017FirstSemiAnnualOnSite\Fig 3-19 4Q17 Sulfolane_VPT_Profile.mxd Date: 2/5/2018 Time: 9:48:35 AM



Legend:

Sulfolane Results

- Not Detected
- 3.14 - Less Than 20 µg/L
- Ground Surface
- Approximate Groundwater Surface
- Well Profile



NOTES:
J = Estimated concentration detected below the laboratory limit of quantitation (LOQ). Flag applied by laboratory.
NS = Not sampled per Long-Term Monitoring Plan (LTM)
< = Not detected; Detection limit listed
PF= Permafrost encountered at bottom of boring.
ft = feet
µg/L = micrograms per liter
- For locations with duplicate sample results, the highest value is shown
- Profile has a vertical exaggeration of 5x

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FOURTH QUARTER 2017
SULFOLANE AT THE
VERTICAL PROFILING TRANSECT

ARCADIS

FIGURE
3-19

Legend

- Monitoring Well
- Observation Well
- Recovery Well
- Installed Product Recovery System (Idle After July 10, 2017)

FHRA Property Boundary
 GAC West Groundwater Remediation and Treatment System Piping (Mothball Condition)
 GAC East Groundwater Remediation and Treatment System Piping (Mothball Condition)

SCALE IN FEET

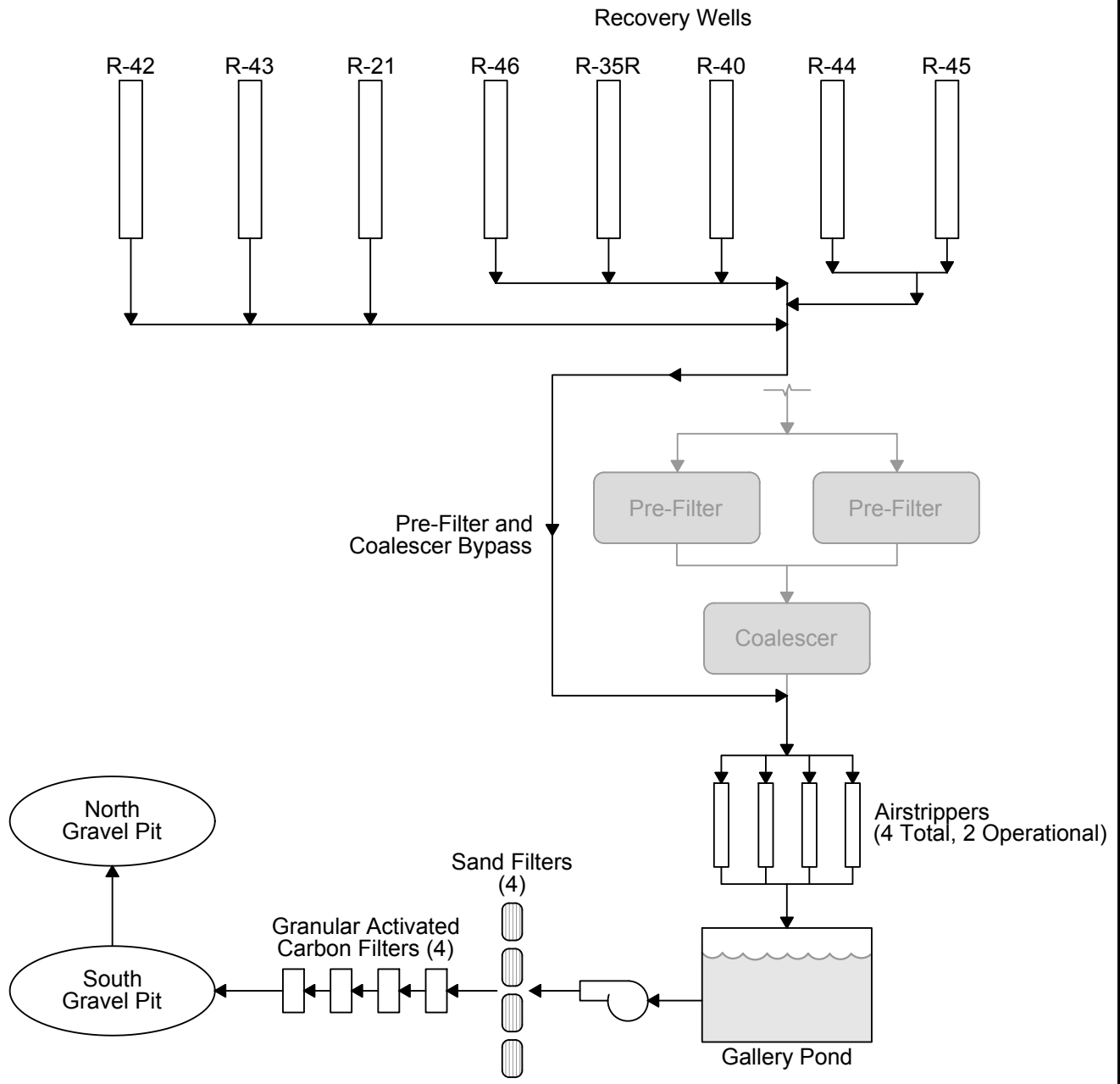
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GROUNDWATER MONITORING REPORT**

**GROUNDWATER REMEDIATION
AND TREATMENT SYSTEM**

FIGURE

4-1



NOTES:

1. WATER FROM RECOVERY WELL R-42 CAN FLOW TO EITHER THE GAC EAST OR GAC WEST GROUNDWATER REMEDIATION AND TREATMENT SYSTEMS.
2. GAC = GRANULAR ACTIVATED CARBON
3. DUE TO FOULING ISSUES WITHIN THE WELL CASING OF RECOVERY WELL R-45, R-40 WAS RETURNED TO SERVICE ON DECEMBER 23, 2014.
4. THE PRE-FILTERS AND COALESCER REMAIN IN PLACE, BUT ARE NO LONGER IN SERVICE AND ARE CURRENTLY BYPASSED AS SHOWN.
5. GAC EAST TREATMENT SYSTEM AND WELLS R-21, R-35R, R-40, R-42, R-43, R-44, R-45, AND R-46 WERE IDLE AFTER JULY 10, 2017. EQUIPMENT IS IN MOTHBALL CONDITION.

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CURRENT PROCESS FLOW DIAGRAM- GAC EAST

APPENDIX A

Historical Data Tables for Groundwater Elevation and LNAPL Thickness, BTEX, Sulfolane, Geochemical Parameters, and COCs



Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-101A-25	8/18/2009	495.84	--	10.60	--	485.24	
MW-101A-25	8/1/2010	495.84	--	11.49	--	484.35	
MW-101A-25	10/1/2010	495.84	--	12.09	--	483.75	
MW-101A-25	11/1/2010	495.84	--	12.83	--	483.01	
MW-101A-25	2/25/2011	495.84	--	12.05	--	483.79	
MW-101A-25	4/12/2011	495.84	--	12.06	--	483.78	
MW-101A-25	10/21/2011	495.84	--	12.92	--	482.92	
MW-101A-25	2/15/2012	496.03	--	12.79	--	483.24	
MW-101A-25	4/20/2012	496.03	--	12.06	--	483.97	
MW-101A-25	11/1/2012	496.03	--	11.13	--	484.90	
MW-101A-25	1/24/2013	495.01	--	11.02	--	483.99	
MW-101A-25	4/24/2013	495.01	--	11.40	--	483.61	
MW-101A-25	8/1/2013	495.01	--	9.85	--	485.16	
MW-101A-25	10/1/2013	495.01	No LNAPL	11.18	0.00	483.83	
MW-101A-25	3/18/2014	495.01	--	11.87	--	483.14	
MW-101A-25	6/11/2014	495.08	--	11.40	--	483.68	
MW-101A-25	9/9/2014	495.08	--	9.99	--	485.09	
MW-101A-25	11/20/2014	495.08	--	11.10	--	483.98	
MW-101A-25	3/19/2015	495.08	--	11.61	--	483.47	
MW-101A-25	6/10/2015	495.08	--	11.12	--	483.96	
MW-101A-25	8/12/2015	495.12	--	10.06	--	485.06	
MW-101A-25	11/19/2015	495.12	--	11.20	--	483.92	
MW-101A-25	7/19/2016	495.13	--	9.40	--	485.73	
MW-101A-25	8/7/2017	495.13	--	9.91	--	485.22	
MW-101A-25	11/15/2017	495.13	--	11.43	--	483.70	
MW-101-60	8/18/2009	494.56	--	9.35	--	485.21	
MW-101-60	10/1/2010	494.56	--	10.71	--	483.85	
MW-101-60	2/9/2011	494.56	--	10.47	--	484.09	
MW-101-60	4/12/2011	494.56	No LNAPL	10.60	0.00	483.96	
MW-101-60	7/14/2011	494.56	No LNAPL	9.33	0.00	485.23	
MW-101-60	10/21/2011	494.56	--	11.43	--	483.13	
MW-101-60	2/15/2012	494.56	--	11.27	--	483.29	
MW-101-60	4/20/2012	494.56	--	10.54	--	484.02	
MW-101-60	7/31/2012	494.56	--	9.40	--	485.16	
MW-101-60	11/1/2012	494.56	--	10.73	--	483.83	
MW-101-60	1/24/2013	494.59	--	10.37	--	484.22	
MW-101-60	4/24/2013	494.59	--	10.81	--	483.78	
MW-101-60	8/1/2013	494.59	--	9.33	--	485.26	
MW-101-60	10/1/2013	494.59	No LNAPL	10.74	0.00	483.85	
MW-101-60	3/18/2014	494.59	--	11.23	--	483.36	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-101-60	6/11/2014	494.49	--	10.89	--	483.60	
MW-101-60	9/9/2014	494.49	--	9.44	--	485.05	
MW-101-60	11/20/2014	494.27	--	10.27	--	484.00	
MW-101-60	3/19/2015	494.27	--	10.72	--	483.55	
MW-101-60	6/10/2015	494.27	--	10.29	--	483.98	
MW-101-60	8/12/2015	494.27	--	9.22	--	485.05	
MW-101-60	11/19/2015	494.27	--	10.36	--	483.91	
MW-101-60	3/22/2016	494.27	No LNAPL	11.09	0.00	483.18	
MW-101-60	7/14/2016	494.27	--	9.04	--	485.23	
MW-101-60	9/13/2016	494.27	--	9.59	--	484.68	
MW-101-60	3/15/2017	494.27	--	10.55	--	483.72	
MW-102-70	8/18/2009	496.00	--	11.03	--	484.97	
MW-102-70	10/1/2010	496.00	--	12.86	--	483.14	
MW-102-70	4/25/2011	496.00	--	11.84	--	484.16	
MW-102-70	7/14/2011	496.00	No LNAPL	11.08	0.00	484.92	
MW-102-70	10/21/2011	496.00	--	12.85	--	483.15	
MW-102-70	2/16/2012	495.94	--	12.76	--	483.18	
MW-102-70	4/19/2012	495.94	--	12.16	--	483.78	
MW-102-70	7/30/2012	495.94	No LNAPL	11.00	0.00	484.94	
MW-102-70	11/1/2012	495.94	--	12.29	--	483.65	
MW-102-70	1/24/2013	496.02	--	12.12	--	483.90	
MW-102-70	4/24/2013	496.02	--	12.43	--	483.59	
MW-102-70	8/1/2013	496.02	--	11.07	--	484.95	
MW-102-70	10/1/2013	496.02	No LNAPL	12.25	0.00	483.77	
MW-102-70	3/18/2014	496.02	--	12.83	--	483.19	
MW-102-70	6/11/2014	496.09	--	12.10	--	483.99	
MW-102-70	9/9/2014	496.09	--	11.21	--	484.88	
MW-102-70	11/20/2014	496.09	No LNAPL	12.12	0.00	483.97	
MW-102-70	3/19/2015	496.09	--	12.62	--	483.47	
MW-102-70	6/10/2015	496.09	--	12.20	--	483.89	
MW-102-70	8/12/2015	496.16	--	11.24	--	484.92	
MW-102-70	11/19/2015	496.16	--	12.31	--	483.85	
MW-102-70	3/22/2016	496.16	No LNAPL	13.02	0.00	483.14	
MW-102-70	9/13/2016	496.15	--	11.49	--	484.66	
MW-102-70	3/14/2017	496.15	--	12.51	--	483.64	
MW-104-65	8/18/2009	496.21	--	11.23	--	484.98	
MW-104-65	2/8/2011	496.21	--	10.41	--	485.80	
MW-104-65	4/25/2011	496.21	--	12.40	--	483.81	
MW-104-65	10/21/2011	496.21	--	12.84	--	483.37	
MW-104-65	2/15/2012	496.01	--	12.74	--	483.27	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-104-65	4/19/2012	496.01	--	12.14	--	483.87	
MW-104-65	7/30/2012	496.01	No LNAPL	11.07	0.00	484.94	
MW-104-65	11/1/2012	496.01	No LNAPL	12.30	0.00	483.71	
MW-104-65	1/24/2013	496.02	--	12.11	--	483.91	
MW-104-65	4/24/2013	496.02	--	12.30	--	483.72	
MW-104-65	8/1/2013	496.02	--	11.03	--	484.99	
MW-104-65	10/1/2013	496.02	--	12.11	--	483.91	
MW-104-65	3/18/2014	496.02	--	12.75	--	483.27	
MW-104-65	6/11/2014	496.02	--	12.29	--	483.73	
MW-104-65	9/9/2014	496.02	--	10.98	--	485.04	
MW-104-65	11/20/2014	496.02	--	11.97	--	484.05	
MW-104-65	3/18/2015	496.02	--	12.44	--	483.58	
MW-104-65	6/11/2015	496.02	--	12.04	--	483.98	
MW-104-65	8/12/2015	496.02	--	11.10	--	484.92	
MW-104-65	11/19/2015	496.02	--	12.14	--	483.88	
MW-104-65	3/22/2016	496.02	No LNAPL	12.79	0.00	483.23	
MW-104-65	9/13/2016	496.04	--	11.24	--	484.80	
MW-104-65	3/14/2017	496.04	--	12.24	--	483.80	
MW-104-65	9/21/2017	496.03	--	12.12	--	483.91	
MW-105A-25	8/18/2009	499.20	--	10.52	--	488.68	
MW-105A-25	10/1/2010	499.20	--	12.25	--	486.95	
MW-105A-25	4/18/2011	499.20	--	11.90	--	487.30	
MW-105A-25	2/16/2012	499.19	--	12.88	--	486.31	
MW-105A-25	4/19/2012	499.19	No LNAPL	12.21	0.00	486.98	
MW-105A-25	7/30/2012	499.19	--	9.06	--	490.13	
MW-105A-25	11/1/2012	499.19	No LNAPL	12.32	0.00	486.87	
MW-105A-25	1/24/2013	499.21	--	12.30	--	486.91	
MW-105A-25	4/24/2013	499.21	No LNAPL	12.68	0.00	486.53	
MW-105A-25	8/1/2013	499.21	No LNAPL	10.89	0.00	488.32	
MW-105A-25	10/1/2013	499.21	No LNAPL	12.41	0.00	486.80	
MW-105A-25	3/18/2014	499.21	No LNAPL	13.09	0.00	486.12	
MW-105A-25	6/11/2014	499.40	No LNAPL	12.60	0.00	486.80	
MW-105A-25	9/9/2014	499.40	No LNAPL	11.23	0.00	488.17	
MW-105A-25	11/20/2014	499.40	No LNAPL	12.00	0.00	487.40	
MW-105A-25	3/18/2015	499.40	No LNAPL	12.47	0.00	486.93	
MW-105A-25	6/10/2015	499.40	No LNAPL	12.00	0.00	487.40	
MW-105A-25	8/12/2015	499.19	--	10.63	--	488.56	
MW-105A-25	11/19/2015	499.19	--	11.91	--	487.28	
MW-105A-25	3/22/2016	499.19	No LNAPL	12.82	0.00	486.37	
MW-105A-25	7/26/2016	499.19	--	9.60	--	489.59	

Appendix A-1
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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-105A-25	9/12/2016	499.19	--	10.88	--	488.31	
MW-105A-25	3/15/2017	499.19	--	11.90	--	487.29	
MW-105-65	8/18/2009	497.65	--	8.89	--	488.76	
MW-105-65	10/1/2010	497.65	--	10.43	--	487.22	
MW-105-65	4/18/2011	497.65	--	10.27	--	487.38	
MW-105-65	2/16/2012	497.64	--	11.26	--	486.38	
MW-105-65	4/19/2012	497.64	No LNAPL	10.58	0.00	487.06	
MW-105-65	7/30/2012	497.64	--	10.71	--	486.93	
MW-105-65	11/1/2012	497.64	No LNAPL	10.68	0.00	486.96	
MW-105-65	1/24/2013	497.66	--	10.56	--	487.10	
MW-105-65	4/24/2013	497.66	No LNAPL	10.86	0.00	486.80	
MW-105-65	8/1/2013	497.66	No LNAPL	9.05	0.00	488.61	
MW-105-65	10/1/2013	497.66	No LNAPL	10.61	0.00	487.05	
MW-105-65	3/18/2014	497.66	No LNAPL	11.28	0.00	486.38	
MW-105-65	6/11/2014	497.65	No LNAPL	10.79	0.00	486.86	
MW-105-65	9/9/2014	497.65	No LNAPL	9.41	0.00	488.24	
MW-105-65	11/20/2014	497.65	No LNAPL	10.17	0.00	487.48	
MW-105-65	3/18/2015	497.65	No LNAPL	10.65	0.00	487.00	
MW-105-65	6/10/2015	497.65	No LNAPL	10.17	0.00	487.48	
MW-105-65	8/12/2015	497.65	--	9.03	--	488.62	
MW-105-65	11/19/2015	497.65	--	10.28	--	487.37	
MW-105-65	3/22/2016	497.65	No LNAPL	11.19	0.00	486.46	
MW-105-65	7/26/2016	497.63	--	7.95	--	489.68	
MW-105-65	9/12/2016	497.63	--	9.24	--	488.39	
MW-105-65	3/15/2017	497.63	--	10.28	--	487.35	
MW-106-25	8/18/2009	499.04	--	12.46	--	486.58	
MW-106-25	2/24/2011	499.04	--	13.98	--	485.06	
MW-106-25	4/15/2011	499.04	--	14.01	--	485.03	
MW-106-25	7/14/2011	499.04	No LNAPL	12.54	0.00	486.50	
MW-106-25	10/21/2011	499.04	--	15.01	--	484.03	
MW-106-25	2/16/2012	499.21	--	14.79	--	484.42	
MW-106-25	4/19/2012	499.21	--	14.11	--	485.10	
MW-106-25	7/30/2012	499.21	--	12.67	--	486.54	
MW-106-25	11/1/2012	499.21	No LNAPL	14.07	0.00	485.14	
MW-106-25	1/24/2013	499.28	--	14.16	--	485.12	
MW-106-25	4/24/2013	499.28	--	14.52	--	484.76	
MW-106-25	8/1/2013	499.28	--	12.73	--	486.55	
MW-106-25	10/1/2013	499.28	--	14.38	--	484.90	
MW-106-25	3/19/2014	499.28	--	14.89	--	484.39	
MW-106-25	4/25/2014	499.39	--	13.99	--	485.40	

Appendix A-1
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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-106-25	5/20/2014	499.42	--	14.37	--	485.05	
MW-106-25	6/4/2014	499.43	--	14.57	--	484.86	
MW-106-25	6/11/2014	499.43	--	14.48	--	484.95	
MW-106-25	9/9/2014	499.46	--	13.37	--	486.09	
MW-106-25	11/20/2014	499.46	--	14.02	--	485.44	
MW-106-25	3/18/2015	499.40	No LNAPL	14.61	0.00	484.79	
MW-106-25	6/11/2015	499.40	No LNAPL	14.21	0.00	485.19	
MW-106-25	8/12/2015	499.54	--	12.98	--	486.56	
MW-106-25	11/19/2015	499.47	--	14.19	--	485.28	
MW-106-25	3/22/2016	499.47	No LNAPL	15.09	0.00	484.38	
MW-106-25	7/20/2016	499.58	--	12.22	--	487.36	
MW-106-25	7/27/2016	499.58	--	12.00	--	487.58	
MW-106-25	9/13/2016	499.58	--	13.53	--	486.05	
MW-106-25	3/14/2017	499.48	--	14.44	--	485.04	
MW-109-15	8/18/2009	495.15	--	7.99	--	487.16	
MW-109-15	10/1/2010	495.15	--	9.88	--	485.27	
MW-109-15	2/10/2011	495.15	--	9.30	--	485.85	
MW-109-15	4/8/2011	495.15	--	Frozen	--	---	Frozen at 14.96 ft BTOC
MW-109-15	7/14/2011	495.15	No LNAPL	7.89	0.00	487.26	
MW-109-15	10/21/2011	495.15	--	10.49	--	484.66	
MW-109-15	4/24/2013	495.20	--	9.85	--	485.35	
MW-109-15	8/1/2013	495.16	--	7.91	--	487.25	
MW-109-15	10/1/2013	495.16	--	9.56	--	485.60	
MW-109-15	3/20/2014	495.16	--	10.17	--	484.99	
MW-109-15	6/11/2014	495.12	--	9.67	--	485.45	
MW-109-15	9/9/2014	495.12	--	8.47	--	486.65	
MW-109-15	11/20/2014	495.12	--	9.13	--	485.99	
MW-109-15	3/19/2015	495.12	No LNAPL	9.70	0.00	485.42	
MW-109-15	6/11/2015	495.17	No LNAPL	9.21	0.00	485.96	
MW-109-15	8/12/2015	495.17	--	8.25	--	486.92	
MW-109-15	11/19/2015	495.17	--	9.27	--	485.90	
MW-109-15	3/22/2016	495.17	No LNAPL	10.09	0.00	485.08	
MW-109-15	7/20/2016	495.16	--	10.22	--	484.94	
MW-109-15	9/13/2016	495.16	--	8.43	--	486.73	
MW-109-15	3/14/2017	495.16	--	9.34	--	485.82	
MW-110-20	8/18/2009	496.58	--	9.79	--	486.79	
MW-110-20	8/1/2010	496.58	--	9.77	--	486.81	
MW-110-20	10/1/2010	496.58	--	11.72	--	484.86	
MW-110-20	11/1/2010	496.58	--	12.08	--	484.50	
MW-110-20	2/10/2011	496.58	--	11.06	--	485.52	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-110-20	4/8/2011	496.58	--	Frozen	--	—	Frozen at 10.93 ft BTOC
MW-110-20	7/14/2011	496.58	No LNAPL	9.80	0.00	486.78	
MW-110-20	10/21/2011	496.58	--	12.21	--	484.37	
MW-110-20	11/1/2012	496.64	No LNAPL	11.42	0.00	485.22	
MW-110-20	1/24/2013	496.73	--	11.36	--	485.37	
MW-110-20	4/24/2013	496.73	--	Frozen	--	—	Frozen at 11.26 ft BTOC
MW-110-20	8/1/2013	496.73	--	9.94	--	486.79	
MW-110-20	10/1/2013	496.73	--	10.47	--	486.26	
MW-110-20	3/18/2014	496.73	--	12.09	--	484.64	
MW-110-20	6/11/2014	496.76	--	11.64	--	485.12	
MW-110-20	9/9/2014	496.76	--	10.42	--	486.34	
MW-110-20	11/20/2014	496.50	--	10.84	--	485.66	
MW-110-20	3/19/2015	496.50	No LNAPL	11.39	0.00	485.11	
MW-110-20	6/11/2015	496.50	No LNAPL	10.96	0.00	485.54	
MW-110-20	8/12/2015	496.55	--	9.80	--	486.75	
MW-110-20	11/19/2015	496.55	--	11.01	--	485.54	
MW-110-20	3/22/2016	496.55	No LNAPL	11.85	0.00	484.70	
MW-110-20	8/9/2016	496.58	--	8.94	--	487.64	
MW-110-20	9/13/2016	496.58	--	10.19	--	486.39	
MW-110-20	10/20/2016	496.58	--	11.38	--	485.20	
MW-110-20	3/14/2017	496.58	--	11.16	--	485.42	
MW-110-65	3/18/2014	496.38	--	11.69	--	484.69	
MW-110-65	6/11/2014	496.34	--	11.24	--	485.10	
MW-110-65	9/9/2014	496.34	--	10.05	--	486.29	
MW-110-65	11/20/2014	496.34	--	10.81	--	485.53	
MW-110-65	3/19/2015	496.34	No LNAPL	11.39	0.00	484.95	
MW-110-65	6/11/2015	496.34	No LNAPL	10.96	0.00	485.38	
MW-110-65	8/12/2015	496.49	--	9.80	--	486.69	
MW-110-65	11/19/2015	496.49	--	11.00	--	485.49	
MW-110-65	3/22/2016	496.49	No LNAPL	11.86	0.00	484.63	
MW-110-65	8/9/2016	496.53	--	8.94	--	487.59	
MW-110-65	9/13/2016	496.53	--	10.22	--	486.31	
MW-110-65	3/14/2017	496.53	--	11.25	--	485.28	
MW-113-15	8/18/2009	494.72	--	8.90	--	485.82	
MW-113-15	10/1/2010	494.72	--	10.25	--	484.47	
MW-113-15	2/8/2011	494.72	--	9.59	--	485.13	
MW-113-15	3/25/2011	494.72	--	9.82	--	484.90	
MW-113-15	4/14/2011	494.72	--	9.81	--	484.91	
MW-113-15	7/14/2011	494.72	No LNAPL	8.50	0.00	486.22	
MW-113-15	10/21/2011	494.72	No LNAPL	10.71	0.00	484.01	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-113-15	1/10/2012	494.38	No LNAPL	10.68	0.00	483.70	
MW-113-15	2/15/2012	494.38	No LNAPL	10.72	0.00	483.66	
MW-113-15	4/19/2012	494.38	--	10.07	--	484.31	
MW-113-15	7/30/2012	494.38	No LNAPL	8.48	0.00	485.90	
MW-113-15	11/1/2012	494.38	--	10.11	--	484.27	
MW-113-15	1/24/2013	494.44	--	10.11	--	484.33	
MW-113-15	4/24/2013	494.51	--	10.37	--	484.14	
MW-113-15	7/23/2013	494.52	--	8.95	--	485.57	
MW-113-15	8/1/2013	494.52	--	8.90	--	485.62	
MW-113-15	8/21/2013	494.52	No LNAPL	8.85	0.00	485.67	
MW-113-15	10/1/2013	494.50	--	10.27	--	484.23	
MW-113-15	1/9/2014	494.51	--	10.41	--	484.10	
MW-113-15	2/5/2014	494.49	--	10.55	--	483.94	
MW-113-15	3/18/2014	494.53	--	10.76	--	483.77	
MW-113-15	3/24/2014	494.53	--	10.76	--	483.77	
MW-113-15	4/18/2014	494.52	--	10.64	--	483.88	
MW-113-15	5/15/2014	494.52	--	10.22	--	484.30	
MW-113-15	6/11/2014	494.53	--	10.33	--	484.20	
MW-113-15	6/19/2014	494.53	--	9.95	--	484.58	
MW-113-15	7/15/2014	494.51	--	8.29	--	486.22	
MW-113-15	8/26/2014	494.54	--	8.98	--	485.56	
MW-113-15	9/9/2014	494.54	--	9.26	--	485.28	
MW-113-15	9/24/2014	494.51	--	9.57	--	484.94	
MW-113-15	10/21/2014	494.51	--	10.51	--	484.00	
MW-113-15	11/19/2014	494.50	--	10.09	--	484.41	
MW-113-15	12/16/2014	494.51	--	10.30	--	484.21	
MW-113-15	1/21/2015	494.53	--	10.50	--	484.03	
MW-113-15	2/25/2015	494.56	--	Frozen	--	—	
MW-113-15	3/18/2015	494.55	--	Frozen	--	—	
MW-113-15	3/19/2015	494.55	—	Frozen	—	—	Frozen with datalogger; no depth to ice measurement possible.
MW-113-15	3/26/2015	494.55	--	Frozen	--	—	
MW-113-15	4/16/2015	494.57	--	10.39	--	484.18	
MW-113-15	5/21/2015	494.57	--	10.15	--	484.42	
MW-113-15	6/10/2015	494.55	No LNAPL	10.19	0.00	484.36	
MW-113-15	8/12/2015	494.56	--	9.06	--	485.50	
MW-113-15	8/19/2015	494.56	--	9.38	--	485.18	
MW-113-15	10/6/2015	494.56	--	9.74	--	484.82	
MW-113-15	11/19/2015	494.55	--	10.24	--	484.31	
MW-113-15	1/19/2016	494.18	--	10.39	--	483.79	
MW-113-15	3/22/2016	494.18	No LNAPL	10.65	0.00	483.53	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-113-15	5/26/2016	494.21	--	10.00	--	484.21	
MW-113-15	8/8/2016	494.19	--	7.93	--	486.26	
MW-113-15	9/9/2016	494.21	--	8.85	--	485.36	
MW-113-15	9/13/2016	494.21	--	8.97	--	485.24	
MW-113-15	10/20/2016	494.19	--	10.13	--	484.06	
MW-113-15	11/15/2016	494.19	--	9.44	--	484.75	
MW-113-15	2/8/2017	494.24	--	9.92	--	484.32	
MW-113-15	3/14/2017	494.26	--	10.01	--	484.25	
MW-113-15	6/13/2017	494.27	--	9.27	--	485.00	
MW-115-15	8/25/2009	495.84	8.70	8.98	0.28	487.10	
MW-115-15	7/26/2010	495.84	8.12	8.85	0.73	487.62	
MW-115-15	10/1/2010	495.84	--	10.95	--	484.89	
MW-115-15	10/14/2010	495.84	10.05	10.95	0.90	485.66	
MW-115-15	4/14/2011	495.84	9.84	9.89	0.05	485.99	
MW-115-15	5/6/2011	495.84	9.21	9.25	0.04	486.62	
MW-115-15	5/16/2011	495.84	--	10.01	--	485.83	
MW-115-15	5/24/2011	495.84	--	10.01	--	485.83	
MW-115-15	6/21/2011	495.84	9.32	9.47	0.15	486.50	
MW-115-15	7/14/2011	495.84	8.40	8.70	0.30	487.40	
MW-115-15	8/23/2011	495.84	8.77	9.11	0.34	487.02	
MW-115-15	9/22/2011	495.84	10.03	10.49	0.46	485.74	
MW-115-15	10/21/2011	495.84	10.84	10.92	0.08	484.99	
MW-115-15	10/15/2015	495.87	9.75	9.97	0.22	486.13	
MW-115-15	3/4/2016	495.87	10.48	10.61	0.13	485.42	
MW-115-15	8/17/2016	495.85	8.10	8.20	0.10	487.74	
MW-115-15	10/13/2016	495.85	9.85	9.89	0.04	485.99	
MW-115-15	10/19/2016	495.85	10.03	10.10	0.07	485.76	0.01 gallons of LNAPL recovered during well redevelopment
MW-115-15	3/1/2017	495.85	9.62	Frozen	0.01	—	Frozen at 9.63 ft BTOC
MW-116-15	8/25/2009	496.19	--	9.21	--	486.98	
MW-116-15	7/26/2010	496.19	--	8.56	--	487.63	
MW-116-15	10/1/2010	496.19	--	11.84	--	484.35	
MW-116-15	4/14/2011	496.19	--	10.24	--	485.95	
MW-116-15	5/24/2011	496.19	—	—	—	—	No access due to work being conducted in area
MW-116-15	6/21/2011	496.19	--	9.72	--	486.47	
MW-116-15	7/14/2011	496.19	No LNAPL	8.78	0.00	487.41	
MW-116-15	8/23/2011	496.19	No LNAPL	9.21	0.00	486.98	
MW-116-15	9/22/2011	496.19	No LNAPL	10.46	0.00	485.73	
MW-116-15	10/21/2011	496.19	No LNAPL	11.25	0.00	484.94	
MW-116-15	8/16/2016	496.20	--	8.44	--	487.76	
MW-116-15	8/31/2017	496.20	Sheen	9.50	Sheen	486.70	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-116-15	11/15/2017	496.20	--	10.35	--	485.85	
MW-118-45	8/18/2009	495.55	--	11.29	--	484.26	
MW-118-45	10/1/2010	495.55	--	13.08	--	482.47	
MW-118-45	4/25/2011	495.55	--	12.15	--	483.40	
MW-118-45	10/21/2011	495.55	--	13.31	--	482.24	
MW-124-25	8/25/2009	497.12	--	11.38	--	485.74	
MW-124-25	8/1/2010	497.12	--	11.39	--	485.73	
MW-124-25	10/1/2010	497.12	--	12.56	--	484.56	
MW-124-25	11/1/2010	497.12	--	13.29	--	483.83	
MW-124-25	2/24/2011	497.12	--	12.55	--	484.57	
MW-124-25	4/25/2011	497.12	Sheen	Frozen	Sheen	—	Frozen at 12.50 ft BTOC
MW-124-25	6/1/2011	497.12	--	Frozen	--	—	Frozen at 12.50 ft BTOC
MW-124-25	7/14/2011	497.12	No LNAPL	11.37	0.00	485.75	
MW-124-25	10/21/2011	497.12	--	13.37	--	483.75	
MW-124-25	8/15/2016	497.57	--	11.24	--	486.33	
MW-125-25	8/20/2009	497.01	--	11.24	--	485.77	
MW-125-25	10/1/2010	497.01	--	12.59	--	484.42	
MW-125-25	2/18/2011	497.01	--	12.36	--	484.65	
MW-125-25	4/5/2011	497.01	--	12.70	--	484.31	
MW-125-25	10/21/2011	497.01	--	13.56	--	483.45	
MW-125-25	2/16/2012	497.15	No LNAPL	13.51	0.00	483.64	
MW-125-25	4/19/2012	497.15	No LNAPL	12.86	0.00	484.29	
MW-125-25	7/30/2012	497.15	No LNAPL	11.64	0.00	485.51	
MW-125-25	11/1/2012	497.15	No LNAPL	12.97	0.00	484.18	
MW-125-25	1/24/2013	496.16	--	11.79	--	484.37	
MW-125-25	4/24/2013	496.16	No LNAPL	12.04	0.00	484.12	
MW-125-25	7/23/2013	496.20	--	10.60	--	485.60	
MW-125-25	8/1/2013	496.20	--	10.49	--	485.71	
MW-125-25	8/21/2013	496.20	No LNAPL	10.47	0.00	485.73	
MW-125-25	9/30/2013	496.19	No LNAPL	11.63	0.00	484.56	
MW-125-25	1/9/2014	496.18	No LNAPL	11.93	0.00	484.25	
MW-125-25	2/5/2014	496.19	No LNAPL	12.07	0.00	484.12	
MW-125-25	3/18/2014	496.19	No LNAPL	12.30	0.00	483.89	
MW-125-25	3/24/2014	496.19	No LNAPL	12.33	0.00	483.86	
MW-125-25	4/18/2014	496.20	No LNAPL	12.14	0.00	484.06	
MW-125-25	5/15/2014	496.20	--	11.66	--	484.54	
MW-125-25	6/11/2014	496.21	No LNAPL	11.89	0.00	484.32	
MW-125-25	6/19/2014	496.21	No LNAPL	11.54	0.00	484.67	
MW-125-25	7/15/2014	496.20	No LNAPL	9.75	0.00	486.45	
MW-125-25	8/26/2014	496.21	No LNAPL	10.38	0.00	485.83	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-125-25	9/9/2014	496.21	No LNAPL	10.60	0.00	485.61	
MW-125-25	9/24/2014	496.22	No LNAPL	10.96	0.00	485.26	
MW-125-25	10/21/2014	496.20	No LNAPL	11.87	0.00	484.33	
MW-125-25	11/19/2014	496.18	No LNAPL	11.52	0.00	484.66	
MW-125-25	12/16/2014	496.19	No LNAPL	11.68	0.00	484.51	
MW-125-25	12/29/2014	496.19	No LNAPL	11.81	0.00	484.38	
MW-125-25	1/21/2015	496.20	No LNAPL	11.89	0.00	484.31	
MW-125-25	2/25/2015	496.22	No LNAPL	12.01	0.00	484.21	
MW-125-25	3/18/2015	496.21	No LNAPL	12.03	0.00	484.18	
MW-125-25	3/26/2015	496.21	No LNAPL	11.95	0.00	484.26	
MW-125-25	4/16/2015	496.22	--	11.82	--	484.40	
MW-125-25	5/21/2015	496.24	No LNAPL	11.59	0.00	484.65	
MW-125-25	6/10/2015	496.24	No LNAPL	11.63	0.00	484.61	
MW-125-25	8/12/2015	496.23	--	10.57	--	485.66	
MW-125-25	8/19/2015	496.23	No LNAPL	10.83	0.00	485.43	
MW-125-25	10/6/2015	496.23	No LNAPL	11.11	0.00	485.13	
MW-125-25	11/19/2015	496.23	--	11.70	--	484.53	
MW-125-25	1/19/2016	496.22	--	12.17	--	484.01	
MW-125-25	3/22/2016	496.22	No LNAPL	12.43	0.00	483.79	
MW-125-25	5/26/2016	496.24	No LNAPL	11.82	0.00	484.44	
MW-125-25	8/18/2016	496.21	--	10.17	--	486.04	
MW-125-25	9/9/2016	496.25	No LNAPL	10.70	0.00	485.59	
MW-125-25	9/12/2016	496.25	--	10.73	--	485.52	
MW-125-25	11/15/2016	496.21	No LNAPL	11.34	0.00	484.97	
MW-125-25	2/8/2017	496.21	No LNAPL	11.76	0.00	484.52	
MW-125-25	3/14/2017	496.21	--	11.80	--	484.41	
MW-125-25	6/13/2017	496.23	No LNAPL	11.11	0.00	485.17	
MW-125-25	8/7/2017	496.23	--	10.32	--	485.91	
MW-125-25	8/15/2017	496.23	--	10.26	--	485.97	
MW-125-25	11/16/2017	496.23	--	11.65	--	484.58	
MW-126-25	8/20/2009	495.55	--	10.07	--	485.48	
MW-126-25	10/1/2010	495.55	--	11.34	--	484.21	
MW-126-25	2/10/2011	495.55	--	11.11	--	484.44	
MW-126-25	4/8/2011	495.55	--	11.27	--	484.28	
MW-126-25	7/14/2011	495.55	No LNAPL	10.09	0.00	485.46	
MW-126-25	10/21/2011	495.55	--	12.05	--	483.50	
MW-126-25	8/10/2016	495.68	--	9.51	--	486.17	
MW-127-25	8/20/2009	496.36	--	10.97	--	485.39	
MW-127-25	10/1/2010	496.36	--	12.34	--	484.02	
MW-127-25	3/9/2011	496.36	--	12.27	--	484.09	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-127-25	4/13/2011	496.36	--	12.24	--	484.12	
MW-127-25	7/14/2011	496.36	No LNAPL	11.07	0.00	485.29	
MW-127-25	10/21/2011	496.36	--	13.06	--	483.30	
MW-127-25	8/15/2016	496.75	--	10.95	--	485.80	
MW-127-25	10/21/2016	496.75	--	12.81	--	483.94	
MW-127-25	8/2/2017	496.75	--	11.55	--	485.20	
MW-127-25	10/19/2017	496.75	--	12.70	--	484.05	
MW-129-40	10/18/2006	495.95	--	11.24	--	484.71	
MW-129-40	4/18/2007	495.95	--	11.09	--	484.86	
MW-129-40	8/20/2009	496.06	--	10.31	--	485.75	
MW-129-40	2/10/2011	496.06	--	11.35	--	484.71	
MW-129-40	4/7/2011	496.06	--	11.52	--	484.54	
MW-129-40	10/21/2011	496.06	--	12.32	--	483.74	
MW-129-40	2/16/2012	496.06	No LNAPL	12.19	0.00	483.87	
MW-129-40	4/19/2012	496.06	No LNAPL	11.55	0.00	484.51	
MW-129-40	7/30/2012	496.06	No LNAPL	10.38	0.00	485.68	
MW-129-40	11/1/2012	496.06	No LNAPL	11.73	0.00	484.33	
MW-129-40	1/24/2013	496.05	--	11.53	--	484.52	
MW-129-40	4/24/2013	496.05	No LNAPL	11.77	0.00	484.28	
MW-129-40	8/1/2013	496.05	No LNAPL	10.36	0.00	485.69	
MW-129-40	9/30/2013	496.05	No LNAPL	11.55	0.00	484.50	
MW-129-40	3/18/2014	496.05	No LNAPL	12.17	0.00	483.88	
MW-129-40	6/11/2014	496.06	No LNAPL	11.73	0.00	484.33	
MW-129-40	9/9/2014	496.06	No LNAPL	10.42	0.00	485.64	
MW-129-40	11/20/2014	496.06	No LNAPL	11.34	0.00	484.72	
MW-129-40	3/19/2015	496.06	No LNAPL	11.83	0.00	484.23	
MW-129-40	6/10/2015	496.06	No LNAPL	11.42	0.00	484.64	
MW-129-40	8/12/2015	496.06	--	10.40	--	485.66	
MW-129-40	11/19/2015	496.06	--	11.51	--	484.55	
MW-129-40	3/22/2016	496.06	No LNAPL	12.25	0.00	483.81	
MW-129-40	8/10/2016	496.07	--	10.91	--	485.16	
MW-129-40	9/12/2016	496.07	--	10.53	--	485.54	
MW-129-40	3/14/2017	496.07	--	11.62	--	484.45	
MW-130-25	8/20/2009	496.79	--	10.75	--	486.04	
MW-130-25	10/1/2010	496.79	--	12.20	--	484.59	
MW-130-25	2/10/2011	496.79	--	11.54	--	485.25	
MW-130-25	4/6/2011	496.79	--	12.06	--	484.73	
MW-130-25	7/14/2011	496.79	No LNAPL	10.87	0.00	485.92	
MW-130-25	10/21/2011	496.79	--	13.02	--	483.77	
MW-130-25	2/16/2012	496.82	No LNAPL	12.91	0.00	483.91	

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Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-130-25	4/19/2012	496.82	No LNAPL	12.24	0.00	484.58	
MW-130-25	7/30/2012	496.82	No LNAPL	10.99	0.00	485.83	
MW-130-25	11/1/2012	496.82	No LNAPL	12.42	0.00	484.40	
MW-130-25	1/24/2013	496.88	--	12.25	--	484.63	
MW-130-25	4/24/2013	496.88	No LNAPL	12.52	0.00	484.36	
MW-130-25	7/23/2013	496.91	--	11.11	--	485.80	
MW-130-25	8/1/2013	496.91	--	10.98	--	485.93	
MW-130-25	8/21/2013	496.91	No LNAPL	11.00	0.00	485.91	
MW-130-25	9/30/2013	496.92	No LNAPL	12.27	0.00	484.65	
MW-130-25	1/9/2014	496.91	No LNAPL	12.49	0.00	484.42	
MW-130-25	2/5/2014	496.92	No LNAPL	12.63	0.00	484.29	
MW-130-25	3/18/2014	496.92	No LNAPL	12.87	0.00	484.05	
MW-130-25	3/24/2014	496.92	No LNAPL	12.90	0.00	484.02	
MW-130-25	4/18/2014	496.94	No LNAPL	12.73	0.00	484.21	
MW-130-25	5/15/2014	496.95	--	12.25	--	484.70	
MW-130-25	6/11/2014	496.94	No LNAPL	12.45	0.00	484.49	
MW-130-25	6/19/2014	496.94	No LNAPL	12.11	0.00	484.83	
MW-130-25	7/15/2014	496.95	No LNAPL	10.28	0.00	486.67	
MW-130-25	8/26/2014	496.96	No LNAPL	10.94	0.00	486.02	
MW-130-25	9/9/2014	496.96	No LNAPL	11.21	0.00	485.75	
MW-130-25	9/24/2014	496.93	No LNAPL	11.53	0.00	485.40	
MW-130-25	10/21/2014	496.93	No LNAPL	12.46	0.00	484.47	
MW-130-25	11/19/2014	496.92	No LNAPL	12.06	0.00	484.86	
MW-130-25	12/16/2014	496.93	No LNAPL	12.24	0.00	484.69	
MW-130-25	12/29/2014	496.93	No LNAPL	12.36	0.00	484.57	
MW-130-25	1/21/2015	496.93	No LNAPL	12.42	0.00	484.51	
MW-130-25	2/25/2015	496.95	No LNAPL	12.55	0.00	484.40	
MW-130-25	3/18/2015	496.92	No LNAPL	12.58	0.00	484.34	
MW-130-25	3/26/2015	496.92	No LNAPL	12.51	0.00	484.41	
MW-130-25	4/16/2015	496.94	--	12.36	--	484.58	
MW-130-25	5/21/2015	496.96	No LNAPL	12.11	0.00	484.85	
MW-130-25	6/10/2015	496.98	No LNAPL	12.15	0.00	484.83	
MW-130-25	8/12/2015	496.97	--	11.04	--	485.93	
MW-130-25	8/19/2015	496.97	No LNAPL	11.35	0.00	485.65	
MW-130-25	10/6/2015	496.96	No LNAPL	11.68	0.00	485.29	
MW-130-25	11/19/2015	496.96	--	12.26	--	484.70	
MW-130-25	1/19/2016	496.96	--	12.75	--	484.17	
MW-130-25	3/22/2016	496.96	No LNAPL	13.02	0.00	483.94	
MW-130-25	5/26/2016	496.99	No LNAPL	12.39	0.00	484.62	
MW-130-25	8/18/2016	496.96	--	10.68	--	486.28	

Appendix A-1
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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-130-25	9/9/2016	496.99	No LNAPL	11.25	0.00	485.78	
MW-130-25	9/12/2016	496.99	--	11.30	--	485.69	
MW-130-25	10/20/2016	496.96	--	12.48	--	484.48	
MW-130-25	11/15/2016	496.96	No LNAPL	11.86	0.00	485.20	
MW-130-25	2/8/2017	496.98	No LNAPL	12.33	0.00	484.72	
MW-130-25	2/15/2017	496.98	No LNAPL	12.33	0.00	484.70	
MW-130-25	3/14/2017	496.98	--	12.37	--	484.61	
MW-130-25	6/13/2017	497.02	No LNAPL	11.68	0.00	485.39	
MW-130-25	8/3/2017	497.02	--	10.90	--	486.12	
MW-130-25	10/20/2017	497.02	--	12.31	--	484.71	
MW-130-25	11/15/2017	497.02	--	12.37	--	484.65	
MW-131-25	8/18/2009	495.95	--	10.95	--	485.00	
MW-131-25	8/1/2010	495.95	--	10.89	--	485.06	
MW-131-25	10/1/2010	495.95	--	12.03	--	483.92	
MW-131-25	11/1/2010	495.95	--	12.58	--	483.37	
MW-131-25	3/9/2011	495.95	--	11.83	--	484.12	
MW-131-25	4/8/2011	495.95	--	11.81	--	484.14	
MW-131-25	7/14/2011	495.95	No LNAPL	10.64	0.00	485.31	
MW-131-25	10/21/2011	495.95	--	12.59	--	483.36	
MW-131-25	2/16/2012	495.69	--	12.48	--	483.21	
MW-131-25	4/19/2012	495.69	--	11.84	--	483.85	
MW-131-25	7/31/2012	495.69	--	10.70	--	484.99	
MW-131-25	11/1/2012	495.69	--	12.02	--	483.67	
MW-131-25	1/24/2013	495.75	--	11.84	--	483.91	
MW-131-25	4/24/2013	495.75	--	12.07	--	483.68	
MW-131-25	8/1/2013	495.75	--	10.71	--	485.04	
MW-131-25	10/1/2013	495.75	No LNAPL	11.90	0.00	483.85	
MW-131-25	3/18/2014	495.75	--	12.49	--	483.26	
MW-131-25	6/11/2014	495.73	--	12.45	--	483.28	
MW-131-25	9/9/2014	495.73	--	10.87	--	484.86	
MW-131-25	11/20/2014	495.73	No LNAPL	11.76	0.00	483.97	
MW-131-25	3/19/2015	495.73	--	12.23	--	483.50	
MW-131-25	6/10/2015	495.73	--	11.81	--	483.92	
MW-131-25	8/12/2015	495.77	--	10.83	--	484.94	
MW-131-25	11/19/2015	495.77	--	11.89	--	483.88	
MW-131-25	7/28/2016	495.77	--	9.98	--	485.79	
MW-131-25	7/14/2017	495.77	--	10.73	--	485.04	
MW-132-20	8/20/2009	499.44	--	12.84	--	486.60	
MW-132-20	3/4/2010	499.44	--	14.09	--	485.35	
MW-132-20	4/6/2010	499.44	--	14.09	--	485.35	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-132-20	10/1/2010	499.44	--	14.35	--	485.09	
MW-132-20	11/1/2010	499.44	--	14.09	--	485.35	
MW-132-20	2/18/2011	499.44	--	14.06	--	485.38	
MW-132-20	4/11/2011	499.44	--	14.09	--	485.35	
MW-132-20	7/14/2011	499.44	No LNAPL	12.91	0.00	486.53	
MW-132-20	10/21/2011	499.44	No LNAPL	14.99	0.00	484.45	
MW-132-20	8/15/2016	499.45	--	12.37	--	487.08	
MW-133-20	8/20/2009	498.36	--	11.78	--	486.58	
MW-133-20	2/18/2011	498.36	--	13.00	--	485.36	
MW-133-20	4/11/2011	498.36	--	13.01	--	485.35	
MW-133-20	10/21/2011	498.36	--	13.88	--	484.48	
MW-133-20	2/16/2012	498.32	No LNAPL	13.77	0.00	484.55	
MW-133-20	4/19/2012	498.32	No LNAPL	13.13	0.00	485.19	
MW-133-20	7/30/2012	498.32	No LNAPL	11.87	0.00	486.45	
MW-133-20	11/1/2012	498.32	No LNAPL	13.31	0.00	485.01	
MW-133-20	1/24/2013	498.34	--	13.13	--	485.21	
MW-133-20	4/24/2013	498.34	No LNAPL	13.37	0.00	484.97	
MW-133-20	8/1/2013	498.34	No LNAPL	11.87	0.00	486.47	
MW-133-20	10/1/2013	498.34	No LNAPL	13.10	0.00	485.24	
MW-133-20	3/18/2014	498.34	No LNAPL	13.76	0.00	484.58	
MW-133-20	6/11/2014	498.37	No LNAPL	13.32	0.00	485.05	
MW-133-20	9/9/2014	498.37	No LNAPL	11.96	0.00	486.41	
MW-133-20	11/20/2014	498.37	No LNAPL	12.87	0.00	485.50	
MW-133-20	3/18/2015	498.37	No LNAPL	13.36	0.00	485.01	
MW-133-20	6/11/2015	498.37	No LNAPL	12.95	0.00	485.42	
MW-133-20	8/12/2015	498.42	--	11.58	--	486.84	
MW-133-20	11/19/2015	498.42	--	13.02	--	485.40	
MW-133-20	3/22/2016	498.42	No LNAPL	13.78	0.00	484.64	
MW-133-20	8/15/2016	498.38	--	11.32	--	487.06	
MW-133-20	9/12/2016	498.38	--	11.99	--	486.39	
MW-133-20	3/15/2017	498.38	--	13.08	--	485.30	
MW-134-20	10/18/2006	497.76	--	11.63	--	486.13	
MW-134-20	10/19/2006	497.76	--	11.63	--	486.13	
MW-134-20	4/1/2008	497.76	--	Frozen	--	—	Frozen
MW-134-20	9/4/2008	497.76	--	10.49	--	487.27	
MW-134-20	4/10/2009	497.76	--	Frozen	--	—	Frozen
MW-134-20	8/25/2009	497.79	--	10.70	--	487.09	
MW-134-20	9/3/2009	497.79	--	10.80	--	486.99	
MW-134-20	4/6/2010	497.79	--	Frozen	--	—	Frozen
MW-134-20	9/1/2010	497.79	--	10.91	--	486.88	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-134-20	4/8/2011	497.79	--	Frozen	--	—	Frozen at 10.9 ft BTOC
MW-134-20	7/14/2011	497.79	No LNAPL	10.51	0.00	487.28	
MW-134-20	10/21/2011	497.79	No LNAPL	12.71	0.00	485.08	
MW-134-20	8/17/2016	497.53	--	9.80	--	487.73	
MW-135-20	8/20/2009	496.95	11.10	11.11	0.01	485.85	
MW-135-20	8/1/2010	496.95	--	11.25	--	485.70	
MW-135-20	10/1/2010	496.95	--	12.36	--	484.59	
MW-135-20	11/1/2010	496.95	--	13.14	--	483.81	
MW-135-20	4/5/2011	496.95	--	Frozen	--	—	Frozen at 12.06 ft BTOC
MW-135-20	5/24/2011	496.95	--	Frozen	--	—	Frozen at 12.05 ft BTOC
MW-135-20	6/21/2011	496.95	--	11.90	--	485.05	
MW-135-20	7/14/2011	496.95	No LNAPL	11.20	0.00	485.75	
MW-135-20	8/23/2011	496.95	No LNAPL	11.51	0.00	485.44	
MW-135-20	9/22/2011	496.95	No LNAPL	12.51	0.00	484.44	
MW-135-20	10/21/2011	496.95	No LNAPL	13.24	0.00	483.71	
MW-135-20	2/16/2012	496.93	13.06	13.15	0.09	483.85	
MW-135-20	4/19/2012	496.93	13.11	Frozen	0.10	—	Frozen at 13.21 ft BTOC
MW-135-20	7/30/2012	496.93	11.23	11.30	0.07	485.69	
MW-135-20	11/1/2012	496.93	12.62	12.68	0.06	484.30	
MW-135-20	1/24/2013	496.94	12.42	12.48	0.06	484.51	
MW-135-20	4/24/2013	496.94	No LNAPL	Frozen	0.00	—	Frozen at 12.54 ft BTOC
MW-135-20	7/23/2013	496.94	11.31	11.33	0.02	485.63	
MW-135-20	8/1/2013	496.94	11.22	11.24	0.02	485.72	
MW-135-20	8/21/2013	496.94	11.17	11.19	0.02	485.77	
MW-135-20	9/30/2013	496.93	12.28	12.30	0.02	484.65	
MW-135-20	1/9/2014	496.94	12.65	12.66	0.01	484.29	
MW-135-20	2/5/2014	496.94	12.79	12.80	0.01	484.15	
MW-135-20	3/18/2014	496.94	13.02	13.03	0.01	483.92	
MW-135-20	3/24/2014	496.94	13.04	13.05	0.01	483.90	
MW-135-20	4/18/2014	496.94	12.60	12.61	0.01	484.34	
MW-135-20	5/15/2014	496.95	Sheen	12.36	Sheen	484.59	
MW-135-20	6/11/2014	496.95	Sheen	12.59	Sheen	484.36	
MW-135-20	6/19/2014	496.95	12.25	12.26	0.01	484.70	
MW-135-20	7/15/2014	496.95	10.43	10.44	0.01	486.52	
MW-135-20	8/26/2014	496.95	Sheen	11.05	Sheen	485.90	
MW-135-20	9/9/2014	496.95	Sheen	11.28	Sheen	485.67	
MW-135-20	9/24/2014	496.95	No LNAPL	11.64	0.00	485.31	
MW-135-20	10/21/2014	496.95	No LNAPL	12.55	0.00	484.40	
MW-135-20	11/19/2014	496.94	Sheen	12.20	Sheen	484.74	
MW-135-20	12/16/2014	496.94	Sheen	12.41	Sheen	484.53	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-135-20	12/29/2014	496.94	Sheen	12.47	Sheen	484.47	
MW-135-20	1/21/2015	496.93	Sheen	12.52	Sheen	484.41	
MW-135-20	2/25/2015	496.94	Sheen	12.64	Sheen	484.30	
MW-135-20	3/10/2015	496.93	Sheen	Frozen	Sheen	—	Depth to ice = 12.52 feet
MW-135-20	3/18/2015	496.93	Sheen	Frozen	Sheen	—	Depth to ice = 12.52 feet
MW-135-20	3/26/2015	496.93	Sheen	12.59	Sheen	484.34	
MW-135-20	4/16/2015	496.94	Sheen	12.42	Sheen	484.52	
MW-135-20	5/21/2015	496.95	Sheen	12.24	Sheen	484.71	
MW-135-20	6/10/2015	496.95	No LNAPL	12.26	0.00	484.69	
MW-135-20	8/12/2015	496.95	No LNAPL	11.24	0.00	485.75	
MW-135-20	8/19/2015	496.95	No LNAPL	11.48	0.00	485.50	
MW-135-20	10/6/2015	496.94	No LNAPL	11.73	0.00	485.22	
MW-135-20	10/15/2015	496.94	Sheen	12.15	Sheen	484.79	DTW with IPB=12.19 feet
MW-135-20	11/19/2015	496.94	No LNAPL	12.40	0.00	484.54	
MW-135-20	1/19/2016	496.93	No LNAPL	12.87	0.00	484.06	
MW-135-20	3/4/2016	496.93	No LNAPL	12.96	0.00	483.97	
MW-135-20	3/22/2016	496.93	Sheen	13.08	Sheen	483.85	
MW-135-20	5/26/2016	496.94	No LNAPL	12.47	0.00	484.49	
MW-135-20	8/18/2016	496.93	Sheen	10.85	Sheen	486.08	
MW-135-20	9/9/2016	496.94	No LNAPL	11.32	0.00	485.66	
MW-135-20	9/12/2016	496.94	No LNAPL	11.40	0.00	485.54	
MW-135-20	10/13/2016	496.94	Sheen	12.32	Sheen	484.62	
MW-135-20	11/15/2016	496.93	No LNAPL	11.97	0.00	485.06	
MW-135-20	2/8/2017	496.92	No LNAPL	12.40	0.00	484.59	
MW-135-20	3/1/2017	496.92	No LNAPL	12.44	0.00	484.48	
MW-135-20	3/14/2017	496.92	Sheen	12.46	Sheen	484.46	
MW-135-20	6/13/2017	496.93	No LNAPL	11.76	0.00	485.22	
MW-135-20	7/24/2017	496.93	Sheen	11.11	Sheen	485.82	
MW-135-20	8/31/2017	496.93	Sheen	11.62	Sheen	485.31	
MW-135-20	9/19/2017	496.93	Sheen	12.20	Sheen	484.73	
MW-135-20	10/24/2017	496.93	Sheen	12.55	Sheen	484.38	
MW-135-20	11/16/2017	496.93	--	12.32	--	484.61	
MW-136-20	8/20/2009	496.93	11.04	11.05	0.01	485.89	
MW-136-20	8/1/2010	496.93	--	11.31	--	485.62	
MW-136-20	10/1/2010	496.93	--	12.48	--	484.45	
MW-136-20	4/5/2011	496.93	--	Frozen	--	—	Frozen at 11.93 ft BTOC
MW-136-20	7/14/2011	496.93	No LNAPL	11.11	0.00	485.82	
MW-136-20	7/23/2013	496.91	--	11.22	--	485.69	
MW-136-20	8/1/2013	496.91	Sheen	11.12	Sheen	485.79	
MW-136-20	8/21/2013	496.91	Sheen	11.08	Sheen	485.83	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-136-20	1/9/2014	496.91	Sheen	12.57	Sheen	484.34	
MW-136-20	2/5/2014	496.91	Sheen	12.72	Sheen	484.19	
MW-136-20	3/24/2014	496.91	Sheen	12.96	Sheen	483.95	
MW-136-20	4/18/2014	496.92	Sheen	12.59	Sheen	484.33	
MW-136-20	5/15/2014	496.93	Sheen	12.28	Sheen	484.65	
MW-136-20	6/19/2014	496.92	No LNAPL	12.19	0.00	484.73	
MW-136-20	7/15/2014	496.93	Sheen	10.38	Sheen	486.55	
MW-136-20	8/26/2014	496.93	No LNAPL	10.98	0.00	485.95	
MW-136-20	9/24/2014	496.92	No LNAPL	11.59	0.00	485.33	
MW-136-20	10/21/2014	496.93	No LNAPL	12.47	0.00	484.46	
MW-136-20	11/19/2014	496.90	No LNAPL	12.13	0.00	484.77	
MW-136-20	12/16/2014	496.91	Sheen	12.28	Sheen	484.63	
MW-136-20	12/29/2014	496.91	No LNAPL	12.39	0.00	484.52	
MW-136-20	1/21/2015	496.89	Sheen	12.44	Sheen	484.45	
MW-136-20	2/25/2015	496.91	Sheen	12.56	Sheen	484.35	
MW-136-20	3/18/2015	496.90	Sheen	Frozen	Sheen	—	
MW-136-20	3/26/2015	496.90	No LNAPL	12.50	0.00	484.40	
MW-136-20	4/16/2015	496.91	No LNAPL	12.34	0.00	484.57	
MW-136-20	5/21/2015	496.93	Sheen	12.13	Sheen	484.80	
MW-136-20	6/10/2015	496.93	Sheen	12.17	Sheen	484.76	
MW-136-20	8/19/2015	496.94	Sheen	11.40	Sheen	485.57	
MW-136-20	10/6/2015	496.92	Sheen	11.65	Sheen	485.28	
MW-136-20	1/19/2016	496.90	Sheen	12.78	Sheen	484.12	
MW-136-20	5/26/2016	496.91	Sheen	12.39	Sheen	484.54	
MW-136-20	8/18/2016	496.90	Sheen	10.78	Sheen	486.12	
MW-136-20	9/9/2016	496.92	No LNAPL	11.23	0.00	485.73	
MW-136-20	11/15/2016	496.90	Sheen	11.89	Sheen	485.11	
MW-136-20	2/8/2017	496.88	No LNAPL	12.30	0.00	484.65	
MW-136-20	3/1/2017	496.88	Sheen	12.36	Sheen	484.52	
MW-136-20	6/13/2017	496.90	No LNAPL	11.67	0.00	485.28	
MW-137-20	8/20/2009	497.45	--	11.63	--	485.82	
MW-137-20	8/1/2010	497.45	--	11.92	--	485.53	
MW-137-20	10/1/2010	497.45	--	12.45	--	485.00	
MW-137-20	11/1/2010	497.45	--	13.16	--	484.29	
MW-137-20	4/7/2011	497.45	--	12.52	--	484.93	
MW-137-20	7/14/2011	497.45	No LNAPL	11.38	0.00	486.07	
MW-137-20	10/21/2011	497.45	No LNAPL	13.36	0.00	484.09	
MW-137-20	7/23/2013	497.41	--	11.70	--	485.71	
MW-137-20	8/1/2013	497.41	--	11.62	--	485.79	
MW-137-20	8/21/2013	497.41	No LNAPL	11.61	0.00	485.80	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-137-20	1/9/2014	497.43	No LNAPL	13.12	0.00	484.31	
MW-137-20	2/5/2014	497.47	No LNAPL	13.27	0.00	484.20	
MW-137-20	3/24/2014	497.48	No LNAPL	13.57	0.00	483.91	
MW-137-20	4/18/2014	497.51	No LNAPL	13.33	0.00	484.18	
MW-137-20	5/15/2014	497.50	--	12.89	--	484.61	
MW-137-20	6/19/2014	497.23	No LNAPL	12.55	0.00	484.68	Cut casing prior to survey
MW-137-20	7/15/2014	497.25	No LNAPL	10.73	0.00	486.52	
MW-137-20	8/26/2014	497.25	No LNAPL	11.31	0.00	485.94	
MW-137-20	9/24/2014	497.24	No LNAPL	11.90	0.00	485.34	
MW-137-20	10/21/2014	497.23	No LNAPL	12.79	0.00	484.44	
MW-137-20	11/19/2014	497.25	No LNAPL	12.51	0.00	484.74	
MW-137-20	12/16/2014	497.34	No LNAPL	12.74	0.00	484.60	
MW-137-20	12/29/2014	497.34	No LNAPL	12.87	0.00	484.47	
MW-137-20	1/21/2015	497.39	No LNAPL	12.96	0.00	484.43	
MW-137-20	2/25/2015	497.41	No LNAPL	13.11	0.00	484.30	
MW-137-20	3/18/2015	497.42	No LNAPL	13.13	0.00	484.29	
MW-137-20	3/26/2015	497.42	No LNAPL	13.06	0.00	484.36	
MW-137-20	4/16/2015	497.42	--	12.89	--	484.53	
MW-137-20	5/21/2015	497.43	No LNAPL	12.68	0.00	484.75	
MW-137-20	6/10/2015	497.42	No LNAPL	12.71	0.00	484.71	
MW-137-20	8/19/2015	497.43	No LNAPL	11.94	0.00	485.52	
MW-137-20	10/6/2015	497.44	--	12.19	--	485.26	
MW-137-20	1/19/2016	497.44	--	13.29	--	484.11	
MW-137-20	5/26/2016	497.50	No LNAPL	12.62	0.00	484.90	
MW-137-20	8/15/2016	497.13	--	10.85	--	486.28	
MW-137-20	9/9/2016	497.12	No LNAPL	11.47	0.00	485.69	
MW-137-20	11/15/2016	497.13	No LNAPL	12.14	0.00	485.09	
MW-137-20	2/8/2017	497.28	No LNAPL	12.70	0.00	484.65	
MW-137-20	6/13/2017	497.29	No LNAPL	12.07	0.00	485.27	
MW-137-20	8/2/2017	497.29	--	11.45	--	485.84	
MW-138-20	8/17/2009	—	8.83	8.92	0.09	—	
MW-138-20	7/26/2010	496.37	8.65	8.83	0.18	487.69	
MW-138-20	10/13/2010	496.37	10.45	11.15	0.70	485.80	
MW-138-20	3/18/2011	496.37	10.30	10.48	0.18	486.04	
MW-138-20	4/8/2011	496.37	10.17	10.29	0.12	486.18	
MW-138-20	5/6/2011	496.37	--	9.61	--	486.76	
MW-138-20	5/16/2011	496.37	10.42	10.44	0.02	485.95	
MW-138-20	5/24/2011	496.37	—	—	—	—	No access due to work being conducted in area
MW-138-20	6/21/2011	496.37	—	—	—	—	Pump obstructing measurement
MW-138-20	7/14/2011	496.37	8.87	8.89	0.02	487.50	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-138-20	8/23/2011	496.37	9.21	9.41	0.20	487.13	
MW-138-20	9/22/2011	496.37	10.41	10.73	0.32	485.91	
MW-138-20	10/21/2011	496.37	11.14	12.07	0.93	485.07	
MW-138-20	12/7/2011	496.34	—	—	—	—	Access unavailable per NPT operator
MW-138-20	2/17/2012	496.34	11.15	11.18	0.03	485.18	
MW-138-20	3/15/2012	496.34	11.23	11.24	0.01	485.11	
MW-138-20	4/12/2012	496.34	11.03	11.04	0.01	485.31	
MW-138-20	5/14/2012	496.34	11.00	11.02	0.02	485.34	
MW-138-20	6/13/2012	496.34	Sheen	9.76	Sheen	486.58	
MW-138-20	7/18/2012	496.34	9.38	9.49	0.11	486.94	
MW-138-20	8/21/2012	496.34	8.01	8.02	0.01	488.33	
MW-138-20	9/18/2012	496.34	10.53	10.58	0.05	485.80	
MW-138-20	10/15/2012	496.34	10.46	10.54	0.08	485.87	
MW-138-20	11/29/2012	496.34	10.07	10.09	0.02	486.27	
MW-138-20	12/28/2012	496.34	10.45	10.52	0.07	485.88	
MW-138-20	2/26/2013	496.34	10.53	10.71	0.18	485.78	
MW-138-20	3/28/2013	496.34	10.69	10.80	0.11	485.63	R-35R, R-39, and R-40 were offline on this date
MW-138-20	4/24/2013	496.34	10.67	10.68	0.01	485.67	
MW-138-20	5/31/2013	496.34	9.39	9.40	0.01	486.95	
MW-138-20	6/24/2013	496.34	9.40	9.49	0.09	486.92	
MW-138-20	7/23/2013	496.34	9.10	9.11	0.01	487.24	
MW-138-20	8/21/2013	496.34	8.90	8.95	0.05	487.43	
MW-138-20	9/25/2013	496.34	10.08	10.19	0.11	486.24	
MW-138-20	10/29/2013	496.34	11.12	11.41	0.29	485.17	
MW-138-20	11/19/2013	496.34	10.55	10.56	0.01	485.79	
MW-138-20	12/20/2013	496.34	10.38	10.39	0.01	485.96	
MW-138-20	1/14/2014	496.34	10.74	10.92	0.18	485.57	
MW-138-20	2/25/2014	496.34	11.11	11.75	0.64	485.12	
MW-138-20	3/24/2014	496.34	11.17	11.47	0.30	485.12	
MW-138-20	4/14/2014	496.32	11.54	11.55	0.01	484.78	
MW-138-20	5/29/2014	496.32	10.70	10.95	0.25	485.58	
MW-138-20	6/20/2014	496.32	9.53	9.72	0.19	486.76	
MW-138-20	8/28/2014	496.32	8.90	9.33	0.43	487.35	
MW-138-20	9/29/2014	496.32	9.80	10.02	0.22	486.48	
MW-138-20	10/16/2014	496.32	10.39	10.57	0.18	485.90	
MW-138-20	3/10/2015	496.32	10.41	Frozen	0.08	—	Depth to ice = 10.49 feet
MW-138-20	5/21/2015	496.32	Sheen	9.36	Sheen	486.96	
MW-138-20	8/12/2015	496.37	8.97	9.10	0.13	487.42	
MW-138-20	10/15/2015	496.37	10.15	10.33	0.18	486.23	
MW-138-20	3/4/2016	496.37	Sheen	Frozen	Sheen	—	Ice at 10.80 feet

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-138-20	6/14/2016	496.37	9.81	9.95	0.14	486.54	
MW-138-20	8/17/2016	496.34	8.46	8.78	0.32	487.83	
MW-138-20	8/18/2016	496.37	8.51	8.82	0.31	487.81	
MW-138-20	10/13/2016	496.34	10.22	10.35	0.13	486.10	
MW-138-20	10/26/2016	496.34	10.63	10.80	0.17	485.68	
MW-138-20	3/1/2017	496.34	Sheen	Frozen	Sheen	—	Ice at 9.99 ft BTOC
MW-138-20	6/6/2017	496.34	Sheen	Frozen	Sheen	—	DTW = 8.30 feet BTOC. Depth to ice not recorded
MW-139-25	8/18/2009	497.16	--	11.64	--	485.52	
MW-139-25	8/1/2010	497.16	--	11.82	--	485.34	
MW-139-25	10/1/2010	497.16	--	13.10	--	484.06	
MW-139-25	11/1/2010	497.16	--	13.76	--	483.40	
MW-139-25	2/9/2011	497.16	--	12.80	--	484.36	
MW-139-25	4/11/2011	497.16	--	12.98	--	484.18	
MW-139-25	7/14/2011	497.16	No LNAPL	11.72	0.00	485.44	
MW-139-25	10/21/2011	497.16	--	13.80	--	483.36	
MW-139-25	1/10/2012	497.18	No LNAPL	13.67	0.00	483.51	
MW-139-25	2/6/2012	497.18	No LNAPL	13.76	0.00	483.42	
MW-139-25	3/13/2012	497.18	No LNAPL	13.70	0.00	483.48	
MW-139-25	4/10/2012	497.18	No LNAPL	13.60	0.00	483.58	
MW-139-25	5/8/2012	497.18	No LNAPL	13.39	0.00	483.79	
MW-139-25	6/12/2012	497.18	No LNAPL	12.52	0.00	484.66	
MW-139-25	7/17/2012	497.18	No LNAPL	12.11	0.00	485.07	
MW-139-25	8/21/2012	497.18	No LNAPL	12.54	0.00	484.64	
MW-139-25	9/18/2012	497.18	No LNAPL	13.17	0.00	484.01	
MW-139-25	10/16/2012	497.18	No LNAPL	13.18	0.00	484.00	
MW-139-25	11/29/2012	497.25	No LNAPL	12.72	0.00	484.53	
MW-139-25	12/27/2012	497.25	No LNAPL	13.04	0.00	484.21	
MW-139-25	1/23/2013	497.25	No LNAPL	13.00	0.00	484.25	
MW-139-25	2/26/2013	497.25	No LNAPL	13.16	0.00	484.09	
MW-139-25	3/28/2013	497.25	No LNAPL	13.32	0.00	483.93	R-35R, R-39, and R-40 were offline on this date
MW-139-25	4/24/2013	497.25	No LNAPL	13.30	0.00	483.95	
MW-139-25	5/30/2013	497.25	No LNAPL	12.15	0.00	485.10	
MW-139-25	6/25/2013	497.25	No LNAPL	12.21	0.00	485.04	
MW-139-25	10/29/2013	497.25	No LNAPL	13.85	0.00	483.40	
MW-139-25	11/19/2013	497.25	No LNAPL	13.21	0.00	484.04	
MW-139-25	12/20/2013	497.25	No LNAPL	13.11	0.00	484.14	
MW-139-25	3/10/2015	497.28	No LNAPL	13.37	0.00	483.91	
MW-139-25	10/15/2015	497.29	No LNAPL	12.99	0.00	484.30	
MW-139-25	3/4/2016	497.29	No LNAPL	13.73	0.00	483.56	
MW-139-25	7/21/2016	497.29	--	11.10	--	486.19	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-139-25	10/13/2016	497.29	No LNAPL	13.15	0.00	484.14	
MW-139-25	10/14/2016	497.29	--	13.14	--	484.15	
MW-139-25	3/1/2017	497.29	No LNAPL	13.26	0.00	484.03	
MW-139-25	7/14/2017	497.29	--	11.78	--	485.51	
MW-139-25	10/20/2017	497.31	--	13.22	--	484.09	
MW-139-25	11/1/2017	497.31	No LNAPL	13.55	0.00	483.76	
MW-140-25	8/20/2009	494.88	--	9.54	--	485.34	
MW-140-25	10/1/2010	494.88	--	11.00	--	483.88	
MW-140-25	2/24/2011	494.88	--	10.79	--	484.09	
MW-140-25	4/7/2011	494.88	--	12.84	--	482.04	
MW-140-25	7/14/2011	494.88	No LNAPL	9.59	0.00	485.29	
MW-140-25	10/21/2011	494.88	--	11.60	--	483.28	
MW-140-25	2/6/2012	494.85	No LNAPL	11.51	0.00	483.34	
MW-140-25	2/15/2012	494.85	No LNAPL	11.44	0.00	483.41	
MW-140-25	4/10/2012	494.85	No LNAPL	11.35	0.00	483.50	
MW-140-25	4/19/2012	494.85	--	10.81	--	484.04	
MW-140-25	7/17/2012	494.85	No LNAPL	9.91	0.00	484.94	
MW-140-25	7/30/2012	494.85	No LNAPL	9.65	0.00	485.20	
MW-140-25	8/21/2012	494.85	No LNAPL	10.33	0.00	484.52	
MW-140-25	9/18/2012	494.85	No LNAPL	10.94	0.00	483.91	
MW-140-25	10/16/2012	494.85	No LNAPL	10.93	0.00	483.92	
MW-140-25	11/1/2012	494.85	No LNAPL	10.94	0.00	483.91	
MW-140-25	11/29/2012	494.90	No LNAPL	10.54	0.00	484.36	
MW-140-25	12/27/2012	494.90	No LNAPL	10.82	0.00	484.08	
MW-140-25	1/24/2013	494.90	No LNAPL	10.76	0.00	484.14	
MW-140-25	2/26/2013	494.90	No LNAPL	10.90	0.00	484.00	
MW-140-25	4/24/2013	494.90	No LNAPL	11.01	0.00	483.89	
MW-140-25	8/2/2013	494.90	No LNAPL	9.63	0.00	485.27	
MW-140-25	10/1/2013	494.90	--	10.79	--	484.11	
MW-140-25	10/29/2013	494.90	No LNAPL	11.55	0.00	483.35	
MW-140-25	3/18/2014	494.90	--	11.41	--	483.49	
MW-140-25	6/11/2014	494.86	--	11.01	--	483.85	
MW-140-25	9/9/2014	494.86	--	9.75	--	485.11	
MW-140-25	11/20/2014	494.86	--	10.64	--	484.22	
MW-140-25	3/18/2015	494.86	--	11.15	--	483.71	
MW-140-25	6/11/2015	494.86	--	10.76	--	484.10	
MW-140-25	8/12/2015	494.87	--	9.72	--	485.15	
MW-140-25	10/15/2015	494.87	No LNAPL	10.65	0.00	484.22	
MW-140-25	11/19/2015	494.87	--	10.82	--	484.05	
MW-140-25	3/22/2016	494.87	No LNAPL	11.51	0.00	483.36	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-140-25	7/21/2016	494.88	--	8.89	--	485.99	
MW-140-25	9/13/2016	494.88	--	9.96	--	484.92	
MW-140-25	3/14/2017	494.88	--	10.94	--	483.94	
MW-140-25	7/24/2017	494.88	--	9.64	--	485.24	
MW-141-20	10/19/2006	492.34	--	8.44	--	483.90	
MW-141-20	4/17/2007	492.34	--	8.18	--	484.16	
MW-141-20	4/1/2008	492.34	--	8.60	--	483.74	
MW-141-20	9/4/2008	492.34	--	7.36	--	484.98	
MW-141-20	4/8/2009	492.34	--	8.34	--	484.00	
MW-141-20	8/18/2009	492.39	--	7.38	--	485.01	
MW-141-20	9/3/2009	492.39	--	7.71	--	484.68	
MW-141-20	3/4/2010	492.39	--	8.66	--	483.73	
MW-141-20	4/2/2010	492.39	--	8.66	--	483.73	
MW-141-20	9/1/2010	492.39	--	7.91	--	484.48	
MW-141-20	10/1/2010	492.39	--	8.78	--	483.61	
MW-141-20	2/9/2011	492.39	--	8.41	--	483.98	
MW-141-20	4/15/2011	492.39	--	8.52	--	483.87	
MW-141-20	7/14/2011	492.39	No LNAPL	7.24	0.00	485.15	
MW-141-20	10/21/2011	492.39	--	9.41	--	482.98	
MW-141-20	2/15/2012	492.39	--	9.23	--	483.16	
MW-141-20	4/19/2012	492.39	--	8.54	--	483.85	
MW-141-20	7/31/2012	492.39	--	7.28	--	485.11	
MW-141-20	11/1/2012	492.39	No LNAPL	8.59	0.00	483.80	
MW-141-20	1/24/2013	492.38	--	8.45	--	483.93	
MW-141-20	4/24/2013	492.38	--	8.77	--	483.61	
MW-141-20	8/1/2013	492.38	--	7.17	--	485.21	
MW-141-20	10/1/2013	492.38	--	8.66	--	483.72	
MW-141-20	3/18/2014	492.94	--	9.77	--	483.17	
MW-141-20	4/25/2014	493.00	--	8.83	--	484.17	
MW-141-20	5/20/2014	492.98	--	9.32	--	483.66	
MW-141-20	6/4/2014	492.99	--	9.51	--	483.48	
MW-141-20	6/11/2014	492.99	--	9.44	--	483.55	
MW-141-20	9/9/2014	492.98	--	8.34	--	484.64	
MW-141-20	11/20/2014	492.98	--	9.08	--	483.90	
MW-141-20	3/18/2015	492.86	--	9.63	--	483.23	
MW-141-20	6/11/2015	493.12	--	8.87	--	484.25	
MW-141-20	8/12/2015	493.12	--	7.77	--	485.35	
MW-141-20	11/19/2015	492.78	--	8.88	--	483.90	
MW-141-20	3/22/2016	492.65	No LNAPL	9.65	0.00	483.00	
MW-141-20	8/4/2016	492.72	--	6.74	--	485.98	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-141-20	9/13/2016	492.76	--	8.20	--	484.56	
MW-141-20	3/14/2017	492.64	--	9.17	--	483.47	
MW-142-150	7/15/2016	493.35	--	8.02	--	485.33	
MW-142-20	8/18/2009	496.01	--	10.79	--	485.22	
MW-142-20	8/1/2010	496.01	--	10.84	--	485.17	
MW-142-20	10/1/2010	496.01	--	12.08	--	483.93	
MW-142-20	11/1/2010	496.01	--	12.80	--	483.21	
MW-142-20	3/9/2011	496.01	--	12.06	--	483.95	
MW-142-20	4/8/2011	496.01	--	12.40	--	483.61	
MW-142-20	7/14/2011	496.01	No LNAPL	10.81	0.00	485.20	
MW-142-20	10/21/2011	496.01	--	12.85	--	483.16	
MW-142-20	2/6/2012	496.08	No LNAPL	12.80	0.00	483.28	
MW-142-20	4/10/2012	496.08	No LNAPL	12.66	0.00	483.42	
MW-142-20	7/17/2012	496.08	--	11.20	--	484.88	
MW-142-20	8/21/2012	496.08	--	11.62	--	484.46	
MW-142-20	9/18/2012	496.08	--	12.23	--	483.85	
MW-142-20	10/16/2012	496.08	--	12.24	--	483.84	
MW-142-20	11/29/2012	496.17	--	11.80	--	484.37	
MW-142-20	12/27/2012	496.17	--	12.12	--	484.05	
MW-142-20	1/23/2013	496.17	--	12.09	--	484.08	
MW-142-20	2/26/2013	496.17	No LNAPL	12.23	0.00	483.94	
MW-142-20	4/24/2013	496.17	No LNAPL	12.36	0.00	483.81	
MW-142-20	10/29/2013	495.73	No LNAPL	12.46	0.00	483.27	
MW-142-20	10/15/2015	495.84	No LNAPL	11.68	0.00	484.16	
MW-142-20	8/9/2016	495.84	--	9.89	--	485.95	
MW-142-20	10/13/2016	495.84	No LNAPL	11.88	0.00	483.96	
MW-142-20	10/14/2016	495.84	--	11.87	--	483.97	
MW-142-20	3/1/2017	495.84	No LNAPL	12.00	0.00	483.84	
MW-142-20	8/9/2017	495.84	--	10.60	--	485.24	
MW-142-20	9/21/2017	495.89	--	11.87	--	484.02	
MW-142-20	11/1/2017	495.89	No LNAPL	12.38	0.00	483.51	
MW-142-20	11/16/2017	495.89	--	11.90	--	483.99	
MW-142-65	7/15/2016	493.21	--	7.95	--	485.26	
MW-143-20	8/18/2009	495.23	--	10.03	--	485.20	
MW-143-20	8/1/2010	495.23	--	9.87	--	485.36	
MW-143-20	10/1/2010	495.23	--	11.13	--	484.10	
MW-143-20	11/1/2010	495.23	--	11.82	--	483.41	
MW-143-20	3/9/2011	495.23	--	11.28	--	483.95	
MW-143-20	4/8/2011	495.23	--	11.24	--	483.99	
MW-143-20	7/14/2011	495.23	No LNAPL	10.00	0.00	485.23	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-143-20	10/21/2011	495.23	--	12.05	--	483.18	
MW-143-20	2/15/2012	495.30	--	12.07	--	483.23	
MW-143-20	4/20/2012	495.30	--	11.35	--	483.95	
MW-143-20	7/31/2012	495.30	--	10.17	--	485.13	
MW-143-20	11/1/2012	495.30	--	11.52	--	483.78	
MW-143-20	1/24/2013	495.37	--	11.52	--	483.85	
MW-143-20	4/24/2013	495.37	--	11.80	--	483.57	
MW-143-20	8/1/2013	495.37	--	10.14	--	485.23	
MW-143-20	10/1/2013	495.37	No LNAPL	11.48	0.00	483.89	
MW-143-20	3/18/2014	495.37	--	12.02	--	483.35	
MW-143-20	6/11/2014	495.28	--	11.67	--	483.61	
MW-143-20	9/9/2014	495.28	--	10.03	--	485.25	
MW-143-20	11/20/2014	494.91	--	10.88	--	484.03	
MW-143-20	3/19/2015	494.91	--	11.38	--	483.53	
MW-143-20	6/10/2015	494.91	--	10.92	--	483.99	
MW-143-20	8/12/2015	494.93	--	9.90	--	485.03	
MW-143-20	11/19/2015	494.93	--	11.01	--	483.92	
MW-143-20	7/18/2016	494.92	--	9.51	--	485.41	
MW-143-20	8/1/2017	494.92	--	9.88	--	485.04	
MW-144A-25	8/18/2009	496.81	--	10.06	--	486.75	
MW-144A-25	10/1/2010	496.81	--	10.75	--	486.06	
MW-144A-25	2/8/2011	496.81	--	10.67	--	486.14	
MW-144A-25	3/25/2011	496.81	--	10.97	--	485.84	
MW-144A-25	4/25/2011	496.81	--	10.45	--	486.36	
MW-144A-25	7/14/2011	496.81	No LNAPL	9.74	0.00	487.07	
MW-144A-25	10/21/2011	496.81	--	11.68	--	485.13	
MW-144A-25	2/6/2012	495.25	No LNAPL	11.78	0.00	483.47	
MW-144A-25	2/15/2012	495.25	No LNAPL	11.72	0.00	483.53	
MW-144A-25	4/10/2012	495.25	No LNAPL	11.62	0.00	483.63	
MW-144A-25	4/19/2012	495.25	--	11.09	--	484.16	
MW-144A-25	7/17/2012	495.25	No LNAPL	10.16	0.00	485.09	
MW-144A-25	7/30/2012	495.25	No LNAPL	9.92	0.00	485.33	
MW-144A-25	8/21/2012	495.25	No LNAPL	10.59	0.00	484.66	
MW-144A-25	9/18/2012	495.25	No LNAPL	11.18	0.00	484.07	
MW-144A-25	10/16/2012	495.25	No LNAPL	11.19	0.00	484.06	
MW-144A-25	11/1/2012	495.25	No LNAPL	11.24	0.00	484.01	
MW-144A-25	11/29/2012	495.35	No LNAPL	10.81	0.00	484.54	
MW-144A-25	12/27/2012	495.35	No LNAPL	11.17	0.00	484.18	
MW-144A-25	1/23/2013	495.35	No LNAPL	11.13	0.00	484.22	
MW-144A-25	2/26/2013	495.35	No LNAPL	11.28	0.00	484.07	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-144A-25	4/24/2013	495.35	No LNAPL	11.42	0.00	483.93	
MW-144A-25	8/2/2013	495.35	No LNAPL	10.03	0.00	485.32	
MW-144A-25	10/1/2013	495.35	--	10.97	--	484.38	
MW-144A-25	10/29/2013	495.35	No LNAPL	11.73	0.00	483.62	
MW-144A-25	3/18/2014	495.35	--	11.65	--	483.70	
MW-144A-25	6/11/2014	495.31	--	11.20	--	484.11	
MW-144A-25	9/9/2014	495.31	--	9.89	--	485.42	
MW-144A-25	11/20/2014	495.31	--	10.83	--	484.48	
MW-144A-25	3/18/2015	495.31	--	11.33	--	483.98	
MW-144A-25	6/11/2015	495.31	--	10.93	--	484.38	
MW-144A-25	8/12/2015	495.31	--	9.95	--	485.36	
MW-144A-25	10/15/2015	495.31	No LNAPL	10.80	0.00	484.51	
MW-144A-25	11/19/2015	495.31	--	11.01	--	484.30	
MW-144A-25	3/22/2016	495.31	No LNAPL	11.72	0.00	483.59	
MW-144A-25	7/21/2016	495.31	--	9.16	--	486.15	
MW-144A-25	9/13/2016	495.31	--	10.08	--	485.23	
MW-144A-25	3/14/2017	495.31	--	11.10	--	484.21	
MW-144A-25	7/14/2017	495.31	--	9.78	--	485.53	
MW-144BR-90	10/21/2011	---	--	11.40	--	---	New well
MW-144BR-90	2/15/2012	494.99	No LNAPL	11.31	0.00	483.68	
MW-144BR-90	4/19/2012	494.99	--	10.69	--	484.30	
MW-144BR-90	7/30/2012	494.99	No LNAPL	9.52	0.00	485.47	
MW-144BR-90	11/1/2012	494.99	No LNAPL	10.81	0.00	484.18	
MW-144BR-90	1/24/2013	494.98	--	10.69	--	484.29	
MW-144BR-90	4/24/2013	494.98	--	10.92	--	484.06	
MW-144BR-90	8/1/2013	494.98	--	9.52	--	485.46	
MW-144BR-90	10/1/2013	494.98	--	10.70	--	484.28	
MW-144BR-90	3/18/2014	494.98	--	11.33	--	483.65	
MW-144BR-90	6/11/2014	495.00	--	10.89	--	484.11	
MW-144BR-90	9/9/2014	495.00	--	9.60	--	485.40	
MW-144BR-90	11/20/2014	495.00	--	10.50	--	484.50	
MW-144BR-90	3/18/2015	495.00	--	11.03	--	483.97	
MW-144BR-90	6/11/2015	495.00	--	10.62	--	484.38	
MW-144BR-90	8/12/2015	495.00	--	9.60	--	485.40	
MW-144BR-90	11/19/2015	495.00	--	10.67	--	484.33	
MW-144BR-90	3/22/2016	495.00	No LNAPL	11.39	0.00	483.61	
MW-144BR-90	7/21/2016	495.02	--	8.82	--	486.20	
MW-144BR-90	9/13/2016	495.02	--	9.80	--	485.22	
MW-144BR-90	3/14/2017	495.02	--	10.81	--	484.21	
MW-144BR-90	9/21/2017	495.02	--	10.64	--	484.38	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-145-20	4/1/2008	495.44	--	10.95	--	484.49	
MW-145-20	9/4/2008	495.44	--	9.87	--	485.57	
MW-145-20	4/10/2009	495.44	--	10.84	--	484.60	
MW-145-20	8/20/2009	495.61	--	9.84	--	485.77	
MW-145-20	9/3/2009	495.61	--	10.27	--	485.34	
MW-145-20	3/4/2010	495.61	--	11.11	--	484.50	
MW-145-20	4/6/2010	495.61	--	11.11	--	484.50	
MW-145-20	9/1/2010	495.61	--	10.38	--	485.23	
MW-145-20	10/1/2010	495.61	--	11.13	--	484.48	
MW-145-20	2/10/2011	495.61	--	10.92	--	484.69	
MW-145-20	4/7/2011	495.61	--	11.06	--	484.55	
MW-145-20	7/14/2011	495.61	No LNAPL	9.94	0.00	485.67	
MW-145-20	10/21/2011	495.61	--	11.90	--	483.71	
MW-145-20	1/10/2012	495.62	No LNAPL	11.78	0.00	483.84	
MW-145-20	2/6/2012	495.62	No LNAPL	11.86	0.00	483.76	
MW-145-20	2/16/2012	495.62	No LNAPL	11.78	0.00	483.84	
MW-145-20	3/13/2012	495.62	No LNAPL	11.75	0.00	483.87	
MW-145-20	4/10/2012	495.62	No LNAPL	11.68	0.00	483.94	
MW-145-20	4/19/2012	495.62	No LNAPL	11.13	0.00	484.49	
MW-145-20	5/8/2012	495.62	No LNAPL	11.41	0.00	484.21	
MW-145-20	6/13/2012	495.62	No LNAPL	10.54	0.00	485.08	
MW-145-20	7/17/2012	495.62	No LNAPL	10.21	0.00	485.41	
MW-145-20	7/30/2012	495.62	No LNAPL	9.96	0.00	485.66	
MW-145-20	8/21/2012	495.62	No LNAPL	10.64	0.00	484.98	
MW-145-20	9/18/2012	495.62	No LNAPL	11.25	0.00	484.37	
MW-145-20	10/16/2012	495.62	No LNAPL	11.25	0.00	484.37	
MW-145-20	11/1/2012	495.62	No LNAPL	11.32	0.00	484.30	
MW-145-20	11/29/2012	495.61	No LNAPL	10.83	0.00	484.78	
MW-145-20	12/27/2012	495.61	No LNAPL	11.16	0.00	484.45	
MW-145-20	1/23/2013	495.61	No LNAPL	11.11	0.00	484.50	
MW-145-20	2/26/2013	495.61	No LNAPL	11.25	0.00	484.36	
MW-145-20	3/29/2013	495.61	No LNAPL	11.40	0.00	484.21	R-35R, R-39, and R-40 were offline on this date
MW-145-20	4/24/2013	495.61	No LNAPL	11.38	0.00	484.23	
MW-145-20	5/31/2013	495.61	No LNAPL	10.15	0.00	485.46	
MW-145-20	6/25/2013	495.61	No LNAPL	10.24	0.00	485.37	
MW-145-20	8/2/2013	495.61	No LNAPL	9.93	0.00	485.68	
MW-145-20	10/1/2013	495.61	No LNAPL	11.13	0.00	484.48	
MW-145-20	10/29/2013	495.61	No LNAPL	11.86	0.00	483.75	
MW-145-20	11/19/2013	495.61	No LNAPL	11.30	0.00	484.31	
MW-145-20	12/20/2013	495.61	No LNAPL	11.17	0.00	484.44	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-145-20	3/18/2014	495.61	No LNAPL	11.74	0.00	483.87	
MW-145-20	6/11/2014	495.63	—	—	—	—	Well is obstructed
MW-145-20	9/9/2014	495.63	No LNAPL	10.00	0.00	485.63	
MW-145-20	11/20/2014	495.63	No LNAPL	10.93	0.00	484.70	
MW-145-20	3/10/2015	495.63	No LNAPL	11.31	0.00	484.32	
MW-145-20	3/19/2015	495.63	No LNAPL	11.41	0.00	484.22	
MW-145-20	5/18/2015	495.63	No LNAPL	10.95	0.00	484.68	
MW-145-20	6/10/2015	495.63	No LNAPL	11.00	0.00	484.63	
MW-145-20	8/12/2015	495.64	No LNAPL	10.01	0.00	485.67	
MW-145-20	10/15/2015	495.64	No LNAPL	10.92	0.00	484.72	
MW-145-20	11/19/2015	495.64	--	11.07	--	484.57	
MW-145-20	3/22/2016	495.64	No LNAPL	11.85	0.00	483.79	
MW-145-20	8/10/2016	495.64	--	9.20	--	486.44	
MW-145-20	9/12/2016	495.64	--	10.10	--	485.54	
MW-145-20	3/14/2017	495.64	--	11.18	--	484.46	
MW-145-20	8/10/2017	495.64	--	9.87	--	485.77	
MW-145-20	9/21/2017	495.64	--	11.00	--	484.64	
MW-145-20	11/1/2017	495.64	No LNAPL	11.51	0.00	484.13	
MW-145-20	11/16/2017	495.64	--	11.12	--	484.52	
MW-146A-15	1/15/2009	—	--	11.15	--	—	
MW-146A-15	8/18/2009	495.60	--	10.29	--	485.31	
MW-146A-15	10/1/2010	495.60	--	11.50	--	484.10	
MW-146A-15	4/25/2011	495.60	--	10.62	--	484.98	
MW-146A-15	7/14/2011	495.60	No LNAPL	9.68	0.00	485.92	
MW-146A-15	10/21/2011	495.60	--	11.97	--	483.63	
MW-146A-15	2/15/2012	495.07	--	11.72	--	483.35	
MW-146A-15	4/19/2012	495.07	--	11.03	--	484.04	
MW-146A-15	7/30/2012	495.07	--	9.70	--	485.37	
MW-146A-15	11/1/2012	495.07	--	11.04	--	484.03	
MW-146A-15	1/24/2013	495.09	--	10.96	--	484.13	
MW-146A-15	4/24/2013	495.09	--	11.31	--	483.78	
MW-146A-15	8/1/2013	495.09	--	9.60	--	485.49	
MW-146A-15	10/1/2013	495.09	--	11.27	--	483.82	
MW-146A-15	3/18/2014	495.07	--	11.68	--	483.39	
MW-146A-15	4/25/2014	495.10	--	10.73	--	484.37	
MW-146A-15	5/20/2014	495.08	--	11.27	--	483.81	
MW-146A-15	6/4/2014	495.07	--	11.45	--	483.62	
MW-146A-15	6/11/2014	495.07	--	11.39	--	483.68	
MW-146A-15	9/9/2014	495.06	--	10.42	--	484.64	
MW-146A-15	11/20/2014	495.06	--	11.01	--	484.05	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-146A-15	3/18/2015	495.06	--	11.60	--	483.46	
MW-146A-15	6/11/2015	495.22	--	11.16	--	484.06	
MW-146A-15	8/12/2015	495.22	--	9.93	--	485.29	
MW-146A-15	11/19/2015	495.17	--	11.12	--	484.05	
MW-146A-15	9/13/2016	495.19	--	10.54	--	484.65	
MW-146A-15	3/14/2017	495.19	--	11.41	--	483.78	
MW-146B-30	1/15/2009	—	--	10.54	--	—	
MW-146B-30	8/18/2009	494.95	--	9.73	--	485.22	
MW-146B-30	10/1/2010	494.95	--	12.68	--	482.27	
MW-146B-30	4/25/2011	494.95	--	10.50	--	484.45	
MW-146B-30	7/14/2011	494.95	No LNAPL	9.56	0.00	485.39	
MW-146B-30	10/21/2011	494.95	--	11.85	--	483.10	
MW-146B-30	2/15/2012	494.95	--	11.59	--	483.36	
MW-146B-30	4/19/2012	494.95	--	10.90	--	484.05	
MW-146B-30	7/30/2012	494.95	--	9.56	--	485.39	
MW-146B-30	11/1/2012	494.95	--	10.87	--	484.08	
MW-146B-30	1/24/2013	494.98	--	10.82	--	484.16	
MW-146B-30	4/24/2013	494.98	--	11.15	--	483.83	
MW-146B-30	8/1/2013	494.98	--	9.45	--	485.53	
MW-146B-30	10/1/2013	494.98	--	11.11	--	483.87	
MW-146B-30	3/18/2014	494.93	--	11.58	--	483.35	
MW-146B-30	4/25/2014	494.96	--	10.59	--	484.37	
MW-146B-30	5/20/2014	494.94	--	11.12	--	483.82	
MW-146B-30	6/4/2014	494.92	--	11.30	--	483.62	
MW-146B-30	6/11/2014	494.92	--	11.21	--	483.71	
MW-146B-30	9/9/2014	494.92	--	10.35	--	484.57	
MW-146B-30	11/20/2014	494.92	--	10.83	--	484.09	
MW-146B-30	3/18/2015	494.92	--	11.41	--	483.51	
MW-146B-30	6/11/2015	495.06	--	11.01	--	484.05	
MW-146B-30	8/12/2015	495.06	--	9.78	--	485.28	
MW-146B-30	11/19/2015	495.01	--	10.94	--	484.07	
MW-147A-15	1/15/2009	—	--	7.75	--	—	
MW-147A-15	8/18/2009	491.85	--	6.91	--	484.94	
MW-147A-15	10/1/2010	491.85	--	8.53	--	483.32	
MW-147A-15	4/25/2011	491.85	--	7.80	--	484.05	
MW-147A-15	7/14/2011	491.85	No LNAPL	6.90	0.00	484.95	
MW-147A-15	10/21/2011	491.85	--	9.07	--	482.78	
MW-147A-15	4/25/2014	491.95	--	7.87	--	484.08	
MW-147A-15	5/20/2014	491.93	--	8.40	--	483.53	
MW-147A-15	6/4/2014	491.92	--	8.58	--	483.34	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-147B-25	1/15/2009	—	--	8.55	--	—	
MW-147B-25	8/18/2009	492.59	--	7.76	--	484.83	
MW-147B-25	10/1/2010	492.59	--	9.28	--	483.31	
MW-147B-25	2/24/2011	492.59	--	8.95	--	483.64	
MW-147B-25	5/18/2011	492.59	--	9.23	--	483.36	
MW-147B-25	7/14/2011	492.59	No LNAPL	7.59	0.00	485.00	
MW-147B-25	10/21/2011	492.59	--	9.76	--	482.83	
MW-147B-25	2/15/2012	492.57	--	9.53	--	483.04	
MW-147B-25	4/19/2012	492.57	--	8.86	--	483.71	
MW-147B-25	7/31/2012	492.57	--	7.61	--	484.96	
MW-147B-25	11/1/2012	492.57	No LNAPL	8.91	0.00	483.66	
MW-147B-25	1/24/2013	492.59	--	8.77	--	483.82	
MW-147B-25	4/24/2013	492.59	--	9.09	--	483.50	
MW-147B-25	8/1/2013	492.59	--	7.51	--	485.08	
MW-147B-25	10/1/2013	492.59	--	9.06	--	483.53	
MW-147B-25	3/18/2014	492.54	--	9.47	--	483.07	
MW-147B-25	4/25/2014	492.59	--	8.52	--	484.07	
MW-147B-25	5/20/2014	492.55	--	9.05	--	483.50	
MW-147B-25	6/4/2014	492.56	--	9.23	--	483.33	
MW-147B-25	6/11/2014	492.56	--	9.18	--	483.38	
MW-147B-25	9/9/2014	492.55	--	8.15	--	484.40	
MW-147B-25	11/20/2014	492.55	--	8.80	--	483.75	
MW-147B-25	3/18/2015	492.43	--	9.40	--	483.03	
MW-147B-25	6/11/2015	492.69	--	8.98	--	483.71	
MW-147B-25	8/12/2015	492.69	--	7.80	--	484.89	
MW-147B-25	11/19/2015	492.67	--	8.85	--	483.82	
MW-147B-25	7/20/2016	492.54	--	7.03	--	485.51	
MW-148A-15	1/15/2009	—	--	9.88	--	—	
MW-148A-15	8/18/2009	493.26	--	9.04	--	484.22	
MW-148A-15	8/1/2010	493.26	--	8.84	--	484.42	
MW-148A-15	10/1/2010	493.26	--	10.23	--	483.03	
MW-148A-15	11/1/2010	493.26	--	10.41	--	482.85	
MW-148A-15	3/7/2011	493.26	--	10.30	--	482.96	
MW-148A-15	4/8/2011	493.26	--	10.34	--	482.92	
MW-148A-15	7/14/2011	493.26	--	9.15	--	484.11	
MW-148A-15	10/21/2011	493.26	--	10.48	--	482.78	
MW-148A-15	2/15/2012	492.99	--	10.74	--	482.25	
MW-148A-15	4/19/2012	492.99	--	10.12	--	482.87	
MW-148A-15	7/30/2012	492.99	--	9.05	--	483.94	
MW-148A-15	11/1/2012	492.99	--	10.43	--	482.56	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-148A-15	1/24/2013	493.33	--	10.47	--	482.86	
MW-148A-15	4/19/2013	493.69	--	10.78	--	482.91	
MW-148A-15	4/24/2013	493.69	--	10.70	--	482.99	
MW-148A-15	5/20/2013	493.68	--	10.43	--	483.25	
MW-148A-15	6/19/2013	493.07	--	9.04	--	484.03	
MW-148A-15	7/25/2013	493.07	--	8.86	--	484.21	
MW-148A-15	8/1/2013	493.07	--	8.77	--	484.30	
MW-148A-15	8/20/2013	493.07	--	8.84	--	484.23	
MW-148A-15	10/1/2013	493.07	--	9.94	--	483.13	
MW-148A-15	1/21/2014	493.29	--	10.45	--	482.84	
MW-148A-15	2/24/2014	493.39	--	10.77	--	482.62	
MW-148A-15	3/19/2014	493.43	--	10.90	--	482.53	
MW-148A-15	4/25/2014	493.44	--	9.97	--	483.47	
MW-148A-15	5/20/2014	493.45	--	10.36	--	483.09	
MW-148A-15	6/9/2014	493.38	--	10.43	--	482.95	
MW-148A-15	6/11/2014	493.38	--	10.40	--	482.98	
MW-148A-15	7/21/2014	492.88	--	8.06	--	484.82	
MW-148A-15	8/28/2014	492.88	--	8.59	--	484.29	
MW-148A-15	9/9/2014	492.88	--	8.70	--	484.18	
MW-148A-15	9/26/2014	492.89	--	9.14	--	483.75	
MW-148A-15	10/27/2014	492.89	--	10.12	--	482.77	
MW-148A-15	11/25/2014	493.03	--	9.96	--	483.07	
MW-148A-15	12/17/2014	493.14	--	10.13	--	483.01	
MW-148A-15	1/28/2015	493.27	--	10.53	--	482.74	
MW-148A-15	2/17/2015	493.32	--	10.60	--	482.72	
MW-148A-15	3/18/2015	493.31	--	10.55	--	482.76	
MW-148A-15	4/14/2015	493.31	--	10.38	--	482.93	
MW-148A-15	5/18/2015	493.31	--	10.05	--	483.26	
MW-148A-15	6/11/2015	493.33	--	Frozen	--	—	
MW-148A-15	7/22/2015	492.93	--	8.90	--	484.03	
MW-148A-15	8/12/2015	492.92	--	8.76	--	484.16	
MW-148A-15	9/30/2015	492.94	--	9.29	--	483.65	
MW-148A-15	10/22/2015	492.93	No LNAPL	9.85	0.00	483.08	
MW-148A-15	11/19/2015	492.93	--	9.83	--	483.10	
MW-148A-15	11/25/2015	492.93	No LNAPL	9.70	0.00	483.23	
MW-148A-15	12/11/2015	493.00	--	9.94	--	483.06	
MW-148A-15	1/26/2016	493.21	--	10.63	--	482.58	
MW-148A-15	3/22/2016	493.21	--	10.90	--	482.31	
MW-148A-15	7/25/2016	492.87	--	7.69	--	485.18	
MW-148A-15	9/13/2016	493.33	--	8.98	--	484.35	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-148A-15	3/14/2017	493.33	--	10.41	--	482.92	
MW-148A-15	7/10/2017	493.26	--	9.38	--	483.88	
MW-148B-30	1/15/2009	—	--	9.85	--	—	
MW-148B-30	8/18/2009	493.31	--	9.04	--	484.27	
MW-148B-30	8/1/2010	493.31	--	9.15	--	484.16	
MW-148B-30	10/1/2010	493.31	--	11.33	--	481.98	
MW-148B-30	11/1/2010	493.31	--	10.70	--	482.61	
MW-148B-30	3/7/2011	493.31	--	10.17	--	483.14	
MW-148B-30	4/8/2011	493.31	--	10.15	--	483.16	
MW-148B-30	7/14/2011	493.31	--	9.01	--	484.30	
MW-148B-30	10/21/2011	493.31	--	10.91	--	482.40	
MW-148B-30	2/15/2012	493.25	--	10.80	--	482.45	
MW-148B-30	4/19/2012	493.25	--	10.11	--	483.14	
MW-148B-30	7/30/2012	493.25	--	9.03	--	484.22	
MW-148B-30	11/1/2012	493.25	--	9.80	--	483.45	
MW-148B-30	1/24/2013	492.78	--	9.63	--	483.15	
MW-148B-30	4/19/2013	492.83	--	9.93	--	482.90	
MW-148B-30	4/24/2013	492.83	--	9.88	--	482.95	
MW-148B-30	5/20/2013	492.83	--	9.62	--	483.21	
MW-148B-30	6/19/2013	492.86	--	8.83	--	484.03	
MW-148B-30	7/25/2013	492.86	--	8.65	--	484.21	
MW-148B-30	8/1/2013	492.86	--	8.57	--	484.29	
MW-148B-30	8/20/2013	492.85	--	8.62	--	484.23	
MW-148B-30	10/1/2013	492.86	--	9.80	--	483.06	
MW-148B-30	1/21/2014	492.93	--	10.09	--	482.84	
MW-148B-30	2/24/2014	492.98	--	10.37	--	482.61	
MW-148B-30	3/19/2014	492.97	--	10.45	--	482.52	
MW-148B-30	4/25/2014	492.98	--	9.51	--	483.47	
MW-148B-30	5/20/2014	492.99	--	9.93	--	483.06	
MW-148B-30	6/9/2014	493.01	--	10.09	--	482.92	
MW-148B-30	6/11/2014	493.01	--	10.05	--	482.96	
MW-148B-30	7/21/2014	493.03	--	8.26	--	484.77	
MW-148B-30	8/28/2014	493.04	--	8.79	--	484.25	
MW-148B-30	9/9/2014	493.04	--	8.93	--	484.11	
MW-148B-30	9/26/2014	493.04	--	9.34	--	483.70	
MW-148B-30	10/27/2014	493.04	--	10.29	--	482.75	
MW-148B-30	11/20/2014	493.02	--	9.82	--	483.20	
MW-148B-30	11/25/2014	493.02	--	9.96	--	483.06	
MW-148B-30	12/17/2014	493.02	--	10.02	--	483.00	
MW-148B-30	1/28/2015	493.00	--	10.28	--	482.72	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-148B-30	2/17/2015	493.02	--	10.31	--	482.71	
MW-148B-30	3/18/2015	493.01	--	10.29	--	482.72	
MW-148B-30	4/14/2015	493.02	--	10.09	--	482.93	
MW-148B-30	5/18/2015	493.03	--	9.78	--	483.25	
MW-148B-30	6/11/2015	493.05	--	9.63	--	483.42	
MW-148B-30	7/22/2015	493.05	--	9.02	--	484.03	
MW-148B-30	8/12/2015	493.05	--	8.90	--	484.15	
MW-148B-30	9/30/2015	493.07	--	9.54	--	483.53	
MW-148B-30	10/22/2015	493.06	No LNAPL	9.99	0.00	483.07	
MW-148B-30	11/19/2015	493.04	--	10.01	--	483.03	
MW-148B-30	11/25/2015	493.04	No LNAPL	9.80	0.00	483.24	
MW-148B-30	12/11/2015	493.06	--	10.02	--	483.04	
MW-148B-30	1/26/2016	493.03	--	10.45	--	482.58	
MW-148B-30	7/25/2016	493.04	--	7.94	--	485.10	
MW-148B-30	7/10/2017	493.04	--	9.09	--	483.95	
MW-148C-55	2/15/2012	493.05	--	10.50	--	482.55	Installed 9/27/11
MW-148C-55	4/19/2012	493.05	--	10.12	--	482.93	
MW-148C-55	7/30/2012	493.05	--	8.75	--	484.30	
MW-148C-55	11/1/2012	493.05	--	9.96	--	483.09	
MW-148C-55	1/24/2013	493.29	--	10.26	--	483.03	
MW-148C-55	4/19/2013	493.64	--	10.69	--	482.95	
MW-148C-55	4/24/2013	493.64	--	10.64	--	483.00	
MW-148C-55	5/20/2013	493.64	--	10.40	--	483.24	
MW-148C-55	6/19/2013	493.66	--	9.60	--	484.06	
MW-148C-55	7/25/2013	493.33	--	9.09	--	484.24	
MW-148C-55	8/1/2013	493.33	--	8.99	--	484.34	
MW-148C-55	8/20/2013	493.33	--	9.05	--	484.28	
MW-148C-55	10/1/2013	493.33	--	10.21	--	483.12	
MW-148C-55	1/21/2014	493.32	--	10.46	--	482.86	
MW-148C-55	2/24/2014	493.40	--	10.75	--	482.65	
MW-148C-55	3/19/2014	493.51	--	10.92	--	482.59	
MW-148C-55	4/25/2014	493.54	--	10.03	--	483.51	
MW-148C-55	5/20/2014	493.54	--	10.44	--	483.10	
MW-148C-55	6/9/2014	493.54	--	10.58	--	482.96	
MW-148C-55	6/11/2014	493.54	--	10.54	--	483.00	
MW-148C-55	7/21/2014	493.47	--	8.66	--	484.81	
MW-148C-55	8/28/2014	493.46	--	9.18	--	484.28	
MW-148C-55	9/9/2014	493.46	--	9.38	--	484.08	
MW-148C-55	9/26/2014	493.47	--	9.74	--	483.73	
MW-148C-55	10/27/2014	493.47	--	10.70	--	482.77	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-148C-55	11/20/2014	493.47	--	10.25	--	483.22	
MW-148C-55	11/25/2014	493.47	--	10.38	--	483.09	
MW-148C-55	12/17/2014	493.54	--	10.50	--	483.04	
MW-148C-55	1/28/2015	493.71	--	10.94	--	482.77	
MW-148C-55	2/17/2015	493.82	--	11.07	--	482.75	
MW-148C-55	3/18/2015	493.86	--	11.07	--	482.79	
MW-148C-55	4/14/2015	493.90	--	10.93	--	482.97	
MW-148C-55	5/18/2015	493.90	--	10.60	--	483.30	
MW-148C-55	6/11/2015	493.91	--	10.45	--	483.46	
MW-148C-55	7/22/2015	493.55	--	9.05	--	484.50	
MW-148C-55	8/12/2015	493.12	--	8.94	--	484.18	
MW-148C-55	9/30/2015	493.14	--	9.58	--	483.56	
MW-148C-55	10/22/2015	493.12	No LNAPL	10.03	0.00	483.09	
MW-148C-55	11/19/2015	493.11	--	10.01	--	483.10	
MW-148C-55	11/25/2015	493.11	No LNAPL	9.84	0.00	483.27	
MW-148C-55	12/11/2015	493.16	--	10.06	--	483.10	
MW-148C-55	1/26/2016	493.38	--	10.76	--	482.62	
MW-148C-55	3/22/2016	493.38	--	11.12	--	482.26	
MW-148C-55	7/25/2016	493.38	--	8.45	--	484.93	
MW-148C-55	9/13/2016	493.38	--	9.76	--	483.62	
MW-148C-55	3/14/2017	493.38	--	11.16	--	482.22	
MW-148C-55	7/10/2017	493.38	--	9.55	--	483.83	
MW-148-80	1/21/2014	493.01	--	10.18	--	482.83	
MW-148-80	2/24/2014	493.02	--	10.38	--	482.64	
MW-148-80	3/19/2014	493.01	--	10.47	--	482.54	
MW-148-80	4/25/2014	493.02	--	9.54	--	483.48	
MW-148-80	5/20/2014	493.02	--	9.96	--	483.06	
MW-148-80	6/9/2014	493.03	--	10.10	--	482.93	
MW-148-80	6/11/2014	493.03	--	10.10	--	482.93	
MW-148-80	7/21/2014	493.04	--	8.29	--	484.75	
MW-148-80	8/28/2014	493.05	--	8.80	--	484.25	
MW-148-80	9/9/2014	493.05	--	8.97	--	484.08	
MW-148-80	9/26/2014	493.05	--	9.36	--	483.69	
MW-148-80	10/27/2014	493.06	--	10.32	--	482.74	
MW-148-80	11/20/2014	493.06	--	9.86	--	483.20	
MW-148-80	11/25/2014	493.06	--	9.99	--	483.07	
MW-148-80	12/17/2014	493.06	--	10.05	--	483.01	
MW-148-80	1/28/2015	493.06	--	10.30	--	482.76	
MW-148-80	2/17/2015	493.17	--	10.45	--	482.72	
MW-148-80	3/18/2015	493.17	--	10.41	--	482.76	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-148-80	4/14/2015	493.16	--	10.24	--	482.92	
MW-148-80	5/18/2015	493.16	--	9.91	--	483.25	
MW-148-80	6/11/2015	493.16	--	9.76	--	483.40	
MW-148-80	7/22/2015	493.17	--	9.13	--	484.04	
MW-148-80	8/12/2015	493.17	--	9.02	--	484.15	
MW-148-80	9/30/2015	493.18	--	9.66	--	483.52	
MW-148-80	10/22/2015	493.17	No LNAPL	10.12	0.00	483.05	
MW-148-80	11/19/2015	493.17	--	10.07	--	483.10	
MW-148-80	11/25/2015	493.17	No LNAPL	9.92	0.00	483.25	
MW-148-80	12/11/2015	493.22	--	10.14	--	483.08	
MW-148-80	1/26/2016	493.49	--	10.90	--	482.59	
MW-148-80	3/22/2016	493.49	--	11.30	--	482.19	
MW-148-80	7/25/2016	493.49	--	8.58	--	484.91	
MW-148-80	9/13/2016	493.49	--	9.93	--	483.56	
MW-148-80	3/14/2017	493.49	--	10.48	--	483.01	
MW-148-80	7/12/2017	493.49	--	9.25	--	484.24	
MW-148-100	1/21/2014	493.17	--	10.32	--	482.85	
MW-148-100	2/24/2014	493.18	--	10.53	--	482.65	
MW-148-100	3/19/2014	493.17	--	10.61	--	482.56	
MW-148-100	4/25/2014	493.18	--	9.68	--	483.50	
MW-148-100	5/20/2014	493.18	--	10.09	--	483.09	
MW-148-100	6/9/2014	493.19	--	10.25	--	482.94	
MW-148-100	6/11/2014	493.19	--	10.21	--	482.98	
MW-148-100	7/21/2014	493.21	--	8.43	--	484.78	
MW-148-100	8/28/2014	493.20	--	8.94	--	484.26	
MW-148-100	9/9/2014	493.20	--	9.13	--	484.07	
MW-148-100	9/26/2014	493.21	--	9.50	--	483.71	
MW-148-100	10/27/2014	493.22	--	10.46	--	482.76	
MW-148-100	11/20/2014	493.21	--	9.98	--	483.23	
MW-148-100	11/25/2014	493.21	--	10.12	--	483.09	
MW-148-100	12/17/2014	493.22	--	10.19	--	483.03	
MW-148-100	1/28/2015	493.20	--	10.43	--	482.77	
MW-148-100	2/17/2015	493.22	--	10.47	--	482.75	
MW-148-100	3/18/2015	493.21	--	10.43	--	482.78	
MW-148-100	4/14/2015	493.22	--	10.25	--	482.97	
MW-148-100	5/18/2015	493.21	--	9.93	--	483.28	
MW-148-100	6/11/2015	493.21	--	9.79	--	483.42	
MW-148-100	7/22/2015	493.23	--	9.16	--	484.07	
MW-148-100	8/12/2015	493.22	--	9.04	--	484.18	
MW-148-100	9/30/2015	493.23	--	9.69	--	483.54	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-148-100	10/22/2015	493.22	No LNAPL	10.15	0.00	483.07	
MW-148-100	11/19/2015	493.22	--	10.09	--	483.13	
MW-148-100	11/25/2015	493.22	No LNAPL	9.94	0.00	483.28	
MW-148-100	12/11/2015	493.23	--	10.16	--	483.07	
MW-148-100	1/26/2016	493.21	--	10.60	--	482.61	
MW-148-100	3/22/2016	493.21	--	10.74	--	482.47	
MW-148-100	7/25/2016	493.21	--	8.05	--	485.16	
MW-148-100	9/13/2016	493.21	--	9.39	--	483.82	
MW-148-100	3/14/2017	493.21	--	10.29	--	482.92	
MW-148D-150	2/15/2012	493.32	--	10.78	--	482.54	Installed 9/26/11
MW-148D-150	4/19/2012	493.32	--	9.83	--	483.49	
MW-148D-150	7/30/2012	493.32	--	9.05	--	484.27	
MW-148D-150	11/1/2012	493.32	--	10.23	--	483.09	
MW-148D-150	1/24/2013	493.02	--	10.14	--	482.88	
MW-148D-150	4/19/2013	493.37	--	10.42	--	482.95	
MW-148D-150	4/24/2013	493.37	--	10.36	--	483.01	
MW-148D-150	5/20/2013	493.35	--	10.13	--	483.22	
MW-148D-150	6/19/2013	493.37	--	9.32	--	484.05	
MW-148D-150	7/25/2013	493.36	--	9.12	--	484.24	
MW-148D-150	8/1/2013	493.36	--	9.03	--	484.33	
MW-148D-150	8/20/2013	493.35	--	9.08	--	484.27	
MW-148D-150	10/1/2013	493.36	--	10.26	--	483.10	
MW-148D-150	1/21/2014	493.33	--	10.46	--	482.87	
MW-148D-150	2/24/2014	493.34	--	10.69	--	482.65	
MW-148D-150	3/19/2014	493.33	--	10.77	--	482.56	
MW-148D-150	4/25/2014	493.35	--	9.84	--	483.51	
MW-148D-150	5/20/2014	493.35	--	10.26	--	483.09	
MW-148D-150	6/9/2014	493.36	--	10.41	--	482.95	
MW-148D-150	6/11/2014	493.36	--	10.38	--	482.98	
MW-148D-150	7/21/2014	493.38	--	8.59	--	484.79	
MW-148D-150	8/28/2014	493.38	--	9.11	--	484.27	
MW-148D-150	9/9/2014	493.38	--	9.28	--	484.10	
MW-148D-150	9/26/2014	493.38	--	9.67	--	483.71	
MW-148D-150	10/27/2014	493.39	--	10.62	--	482.77	
MW-148D-150	11/20/2014	493.36	--	10.16	--	483.20	
MW-148D-150	11/25/2014	493.36	--	10.26	--	483.10	
MW-148D-150	12/17/2014	493.37	--	10.33	--	483.04	
MW-148D-150	1/28/2015	493.35	--	10.57	--	482.78	
MW-148D-150	2/17/2015	493.37	--	10.67	--	482.70	
MW-148D-150	3/18/2015	493.35	--	10.59	--	482.76	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-148D-150	4/14/2015	493.37	--	10.40	--	482.97	
MW-148D-150	5/18/2015	493.37	--	10.09	--	483.28	
MW-148D-150	6/11/2015	493.39	--	9.95	--	483.44	
MW-148D-150	7/22/2015	493.39	--	9.32	--	484.07	
MW-148D-150	8/12/2015	493.38	--	9.21	--	484.17	
MW-148D-150	9/30/2015	493.03	--	9.51	--	483.52	
MW-148D-150	10/22/2015	493.03	No LNAPL	9.96	0.00	483.07	
MW-148D-150	11/19/2015	493.02	--	9.93	--	483.09	
MW-148D-150	11/25/2015	493.02	No LNAPL	9.74	0.00	483.28	
MW-148D-150	12/11/2015	493.03	--	9.94	--	483.09	
MW-148D-150	1/26/2016	493.01	--	10.40	--	482.61	
MW-148D-150	3/22/2016	493.00	--	10.52	--	482.48	
MW-148D-150	7/25/2016	493.00	--	7.88	--	485.12	
MW-148D-150	9/13/2016	493.00	--	9.19	--	483.81	
MW-148D-150	3/14/2017	493.00	--	10.09	--	482.91	
MW-149A-15	1/15/2009	—	--	10.85	--	—	
MW-149A-15	8/18/2009	493.92	--	10.12	--	483.80	
MW-149A-15	8/1/2010	493.92	--	9.75	--	484.17	
MW-149A-15	10/1/2010	493.92	--	11.35	--	482.57	
MW-149A-15	11/1/2010	493.92	--	11.24	--	482.68	
MW-149A-15	3/7/2011	493.92	--	10.75	--	483.17	
MW-149A-15	3/25/2011	493.92	--	10.78	--	483.14	
MW-149A-15	4/18/2011	493.92	--	10.71	--	483.21	
MW-149A-15	7/14/2011	493.92	--	9.62	--	484.30	
MW-149A-15	10/21/2011	493.92	--	11.36	--	482.56	
MW-149A-15	2/15/2012	493.65	--	11.37	--	482.28	
MW-149A-15	4/19/2012	493.65	--	10.74	--	482.91	
MW-149A-15	7/30/2012	493.65	--	9.70	--	483.95	
MW-149A-15	11/1/2012	493.65	--	10.87	--	482.78	
MW-149A-15	1/24/2013	493.68	--	10.85	--	482.83	
MW-149A-15	4/24/2013	493.68	--	10.90	--	482.78	
MW-149A-15	8/1/2013	493.72	--	9.62	--	484.10	
MW-149A-15	10/1/2013	493.72	--	10.61	--	483.11	
MW-149A-15	3/18/2014	493.65	--	11.17	--	482.48	
MW-149A-15	6/11/2014	493.65	--	10.75	--	482.90	
MW-149A-15	9/9/2014	493.65	--	9.51	--	484.14	
MW-149A-15	11/20/2014	493.65	--	10.52	--	483.13	
MW-149A-15	3/18/2015	493.65	--	10.94	--	482.71	
MW-149A-15	6/11/2015	493.65	--	10.55	--	483.10	
MW-149A-15	8/12/2015	493.65	--	9.63	--	484.02	Casing will need cutting

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-149A-15	11/19/2015	493.65	--	10.61	--	483.04	
MW-149A-15	3/22/2016	493.65	--	11.21	--	482.44	
MW-149A-15	7/25/2016	493.67	--	8.61	--	485.06	
MW-149A-15	9/13/2016	493.67	--	9.81	--	483.86	
MW-149A-15	3/14/2017	493.67	--	10.81	--	482.86	
MW-149A-15	7/10/2017	493.67	--	9.80	--	483.87	
MW-149A-15	9/21/2017	493.22	--	10.20	--	483.02	
MW-149B-20	1/15/2009	—	--	10.64	--	—	
MW-149B-20	8/18/2009	493.76	--	9.00	--	484.76	
MW-149B-20	8/1/2010	493.76	--	9.44	--	484.32	
MW-149B-20	10/1/2010	493.76	--	11.31	--	482.45	
MW-149B-20	11/1/2010	493.76	--	10.60	--	483.16	
MW-149B-20	3/25/2011	493.76	--	10.48	--	483.28	
MW-149B-20	4/18/2011	493.76	--	10.39	--	483.37	
MW-149B-20	7/14/2011	493.76	--	9.33	--	484.43	
MW-149B-20	10/21/2011	493.76	--	11.01	--	482.75	
MW-149B-20	2/15/2012	493.34	--	11.03	--	482.31	
MW-149B-20	3/18/2014	493.45	--	10.99	--	482.46	
MW-149B-20	6/11/2014	493.45	--	10.56	--	482.89	
MW-149B-20	9/9/2014	493.45	--	9.35	--	484.10	
MW-149B-20	11/20/2014	493.45	--	10.33	--	483.12	
MW-149B-20	3/18/2015	493.45	--	10.73	--	482.72	
MW-149B-20	6/11/2015	493.45	--	10.36	--	483.09	
MW-149B-20	8/12/2015	493.46	--	9.44	--	484.02	
MW-149B-20	11/19/2015	493.46	--	10.41	--	483.05	
MW-149B-20	7/25/2016	493.46	--	8.44	--	485.02	
MW-154A-75	2/17/2010	497.98	--	13.83	--	484.15	
MW-154A-75	3/17/2010	497.98	--	13.94	--	484.04	
MW-154A-75	4/30/2010	497.98	--	14.03	--	483.95	
MW-154A-75	8/1/2010	497.98	--	12.61	--	485.37	
MW-154A-75	10/1/2010	497.98	--	13.94	--	484.04	
MW-154A-75	11/1/2010	497.98	--	14.60	--	483.38	
MW-154A-75	1/1/2011	497.98	--	13.55	--	484.43	
MW-154A-75	4/25/2011	497.98	--	13.36	--	484.62	
MW-154A-75	7/14/2011	497.98	--	12.55	--	485.43	
MW-154A-75	10/21/2011	497.98	--	14.63	--	483.35	
MW-154A-75	2/15/2012	497.99	No LNAPL	14.50	0.00	483.49	
MW-154A-75	4/19/2012	497.99	--	13.86	--	484.13	
MW-154A-75	7/30/2012	497.99	No LNAPL	12.63	0.00	485.36	
MW-154A-75	11/1/2012	497.99	No LNAPL	13.96	0.00	484.03	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-154A-75	1/24/2013	498.04	--	13.82	--	484.22	
MW-154A-75	4/24/2013	498.04	--	14.11	--	483.93	
MW-154A-75	8/1/2013	498.04	--	12.53	--	485.51	
MW-154A-75	10/1/2013	498.04	--	13.93	--	484.11	
MW-154A-75	3/18/2014	498.04	--	14.51	--	483.53	
MW-154A-75	6/11/2014	498.10	--	14.10	--	484.00	
MW-154A-75	9/9/2014	498.10	--	12.94	--	485.16	
MW-154A-75	11/20/2014	498.10	--	13.78	--	484.32	
MW-154A-75	3/18/2015	498.10	--	14.28	--	483.82	
MW-154A-75	6/11/2015	498.10	--	13.85	--	484.25	
MW-154A-75	8/12/2015	498.10	--	12.72	--	485.38	
MW-154A-75	11/19/2015	498.10	--	13.91	--	484.19	
MW-154A-75	3/22/2016	498.10	No LNAPL	14.66	0.00	483.44	
MW-154A-75	7/29/2016	498.10	--	11.93	--	486.17	
MW-154A-75	9/13/2016	498.10	--	13.09	--	485.01	
MW-154A-75	10/18/2016	498.10	--	14.11	--	483.99	
MW-154A-75	3/14/2017	498.10	--	14.03	--	484.07	
MW-154B-95	3/17/2010	—	--	13.66	--	—	
MW-154B-95	4/30/2010	497.67	--	13.76	--	483.91	
MW-154B-95	8/1/2010	497.67	--	12.34	--	485.33	
MW-154B-95	10/1/2010	497.67	--	13.77	--	483.90	
MW-154B-95	11/1/2010	497.67	--	14.31	--	483.36	
MW-154B-95	4/25/2011	497.67	--	13.10	--	484.57	
MW-154B-95	7/14/2011	497.67	--	12.29	--	485.38	
MW-154B-95	10/21/2011	497.67	--	14.35	--	483.32	
MW-154B-95	7/29/2016	497.88	--	11.69	--	486.19	
MW-154B-95	10/18/2016	497.88	--	13.88	--	484.00	
MW-154B-95	7/25/2017	497.89	--	12.49	--	485.40	
MW-154B-95	10/20/2017	497.89	--	13.85	--	484.04	
MW-173A-15	8/1/2010	—	--	10.55	--	—	
MW-173A-15	10/1/2010	496.00	--	11.75	--	484.25	
MW-173A-15	11/1/2010	496.00	--	12.37	--	483.63	
MW-173A-15	2/8/2011	496.00	--	11.65	--	484.35	
MW-173A-15	4/1/2011	496.00	--	11.86	--	484.14	
MW-173A-15	7/14/2011	496.00	No LNAPL	10.44	0.00	485.56	
MW-173A-15	10/21/2011	496.00	--	12.54	--	483.46	
MW-173A-15	2/15/2012	496.16	--	12.55	--	483.61	
MW-173A-15	4/19/2012	496.16	--	12.02	--	484.14	
MW-173A-15	7/30/2012	496.16	No LNAPL	10.88	0.00	485.28	
MW-173A-15	11/1/2012	496.16	No LNAPL	12.14	0.00	484.02	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-173A-15	1/24/2013	496.28	--	12.06	--	484.22	
MW-173A-15	4/24/2013	496.28	--	12.32	--	483.96	
MW-173A-15	8/1/2013	496.10	--	10.65	--	485.45	
MW-173A-15	10/1/2013	496.10	--	11.69	--	484.41	
MW-173A-15	3/18/2014	496.10	--	Frozen	--	—	Frozen; depth to ice not recorded.
MW-173A-15	6/11/2014	496.18	--	12.03	--	484.15	
MW-173A-15	9/9/2014	496.18	--	10.60	--	485.58	
MW-173A-15	11/20/2014	496.18	--	11.68	--	484.50	
MW-173A-15	3/18/2015	496.18	--	12.30	--	483.88	
MW-173A-15	6/11/2015	496.18	--	11.79	--	484.39	
MW-173A-15	8/12/2015	496.11	--	10.65	--	485.46	
MW-173A-15	11/19/2015	496.11	--	11.72	--	484.39	
MW-173A-15	3/22/2016	496.11	No LNAPL	12.53	0.00	483.58	
MW-173A-15	7/27/2016	496.20	--	9.95	--	486.25	
MW-173A-15	9/13/2016	496.20	--	10.86	--	485.34	
MW-173A-15	3/14/2017	496.20	--	12.08	--	484.12	
MW-173B-150	8/1/2010	—	--	10.85	--	—	
MW-173B-150	10/1/2010	496.41	--	12.00	--	484.41	
MW-173B-150	11/1/2010	496.41	--	12.71	--	483.70	
MW-173B-150	2/8/2011	496.41	--	11.92	--	484.49	
MW-173B-150	4/13/2011	496.41	--	12.11	--	484.30	
MW-173B-150	7/14/2011	496.41	No LNAPL	10.89	0.00	485.52	
MW-173B-150	10/21/2011	496.41	--	12.72	--	483.69	
MW-173B-150	2/15/2012	496.40	--	12.68	--	483.72	
MW-173B-150	4/19/2012	496.40	--	12.11	--	484.29	
MW-173B-150	7/30/2012	496.40	No LNAPL	10.91	0.00	485.49	
MW-173B-150	11/1/2012	496.40	No LNAPL	12.15	0.00	484.25	
MW-173B-150	1/24/2013	496.40	--	12.04	--	484.36	
MW-173B-150	4/24/2013	496.40	--	11.34	--	485.06	
MW-173B-150	8/1/2013	496.41	--	10.84	--	485.57	
MW-173B-150	10/1/2013	496.41	--	11.96	--	484.45	
MW-173B-150	3/18/2014	496.41	--	12.69	--	483.72	
MW-173B-150	6/11/2014	496.47	--	12.17	--	484.30	
MW-173B-150	9/9/2014	496.47	--	10.76	--	485.71	
MW-173B-150	11/20/2014	496.47	--	11.78	--	484.69	
MW-173B-150	3/18/2015	496.47	--	12.37	--	484.10	
MW-173B-150	6/11/2015	496.47	--	11.89	--	484.58	
MW-173B-150	8/12/2015	496.43	--	10.93	--	485.50	
MW-173B-150	11/19/2015	496.43	--	11.95	--	484.48	
MW-173B-150	3/22/2016	496.43	No LNAPL	12.76	0.00	483.67	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-173B-150	7/29/2016	496.41	--	10.13	--	486.28	
MW-173B-150	9/13/2016	496.41	--	11.02	--	485.39	
MW-173B-150	3/14/2017	496.41	--	12.14	--	484.27	
MW-173B-150	9/21/2017	496.41	--	11.90	--	484.51	
MW-174-15	8/1/2013	494.66	--	8.32	--	486.34	
MW-174-15	1/9/2014	494.69	--	10.01	--	484.68	
MW-174-15	2/5/2014	494.76	--	10.20	--	484.56	
MW-174-15	3/18/2014	494.89	--	10.56	--	484.33	
MW-174-15	3/24/2014	494.89	--	10.90	--	483.99	
MW-174-15	4/18/2014	494.89	--	10.38	--	484.51	
MW-174-15	5/15/2014	494.37	--	9.93	--	484.44	
MW-174-15	6/11/2014	494.38	--	9.67	--	484.71	
MW-174-15	6/19/2014	494.38	--	9.20	--	485.18	
MW-174-15	7/15/2014	494.40	--	7.39	--	487.01	
MW-174-15	8/26/2014	494.40	--	8.14	--	486.26	
MW-174-15	9/9/2014	494.40	--	8.40	--	486.00	
MW-174-15	9/24/2014	494.36	--	8.80	--	485.56	
MW-174-15	10/21/2014	494.37	--	9.75	--	484.62	
MW-174-15	11/19/2014	494.45	--	9.37	--	485.08	
MW-174-15	12/16/2014	494.54	--	9.66	--	484.88	
MW-174-15	12/29/2014	494.54	No LNAPL	9.82	0.00	484.72	
MW-174-15	1/21/2015	494.65	--	9.94	--	484.71	
MW-174-15	2/25/2015	494.75	--	10.11	--	484.64	
MW-174-15	3/18/2015	494.76	--	10.18	--	484.58	
MW-174-15	3/26/2015	494.76	--	10.10	--	484.66	
MW-174-15	4/16/2015	494.81	--	9.96	--	484.85	
MW-174-15	5/21/2015	494.81	--	9.69	--	485.12	
MW-174-15	6/10/2015	494.54	--	9.42	--	485.12	
MW-174-15	8/12/2015	494.51	--	8.33	--	486.18	
MW-174-15	8/19/2015	494.51	--	8.58	--	485.93	
MW-174-15	10/6/2015	494.53	--	9.05	--	485.48	
MW-174-15	11/19/2015	494.53	--	9.52	--	485.01	
MW-174-15	1/19/2016	494.64	--	10.21	--	484.43	
MW-174-15	3/22/2016	494.64	No LNAPL	10.58	0.00	484.06	
MW-174-15	5/26/2016	494.30	--	9.40	--	484.90	
MW-174-15	7/20/2016	494.32	--	7.34	--	486.98	
MW-174-15	9/9/2016	494.29	No LNAPL	8.34	0.00	485.95	
MW-174-15	9/13/2016	494.29	--	8.47	--	485.82	
MW-174-15	11/15/2016	494.32	--	8.94	--	485.38	
MW-174-15	2/8/2017	494.52	--	9.59	--	484.93	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-174-15	2/15/2017	494.52	--	9.62	--	484.90	
MW-174-15	3/14/2017	494.52	--	9.73	--	484.79	
MW-174-15	6/13/2017	494.35	--	8.61	--	485.74	
MW-174-15	9/21/2017	494.40	--	9.43	--	484.97	
MW-174A-50	1/1/2011	493.92	--	8.61	--	485.31	
MW-174A-50	7/14/2011	493.92	No LNAPL	7.62	0.00	486.30	
MW-174A-50	10/21/2011	493.92	--	9.94	--	483.98	
MW-174A-50	2/15/2012	494.16	No LNAPL	10.11	0.00	484.05	
MW-174A-50	4/19/2012	494.16	--	9.46	--	484.70	
MW-174A-50	7/30/2012	494.16	--	7.88	--	486.28	
MW-174A-50	11/1/2012	494.16	--	9.29	--	484.87	
MW-174A-50	1/24/2013	494.25	--	9.60	--	484.65	
MW-174A-50	4/24/2013	494.25	--	10.00	--	484.25	
MW-174A-50	8/1/2013	494.40	--	8.07	--	486.33	
MW-174A-50	10/1/2013	494.40	--	9.53	--	484.87	
MW-174A-50	1/9/2014	494.39	--	9.69	--	484.70	
MW-174A-50	2/5/2014	494.41	--	9.83	--	484.58	
MW-174A-50	3/18/2014	494.53	--	10.22	--	484.31	
MW-174A-50	3/24/2014	494.53	--	10.25	--	484.28	
MW-174A-50	4/18/2014	494.54	--	10.02	--	484.52	
MW-174A-50	5/15/2014	494.00	--	9.57	--	484.43	
MW-174A-50	6/11/2014	494.00	--	9.30	--	484.70	
MW-174A-50	6/19/2014	494.00	--	8.90	--	485.10	
MW-174A-50	7/15/2014	494.03	--	7.06	--	486.97	
MW-174A-50	8/26/2014	494.02	--	7.77	--	486.25	
MW-174A-50	9/9/2014	494.02	--	8.12	--	485.90	
MW-174A-50	9/24/2014	493.98	--	8.42	--	485.56	
MW-174A-50	10/21/2014	493.99	--	9.35	--	484.64	
MW-174A-50	11/19/2014	494.08	--	8.97	--	485.11	
MW-174A-50	12/16/2014	494.18	--	9.28	--	484.90	
MW-174A-50	1/21/2015	494.29	--	9.58	--	484.71	
MW-174A-50	2/25/2015	494.36	--	9.72	--	484.64	
MW-174A-50	3/18/2015	494.39	--	9.82	--	484.57	
MW-174A-50	3/26/2015	494.39	--	9.72	--	484.67	
MW-174A-50	4/16/2015	494.43	--	9.59	--	484.84	
MW-174A-50	5/21/2015	494.45	--	9.32	--	485.13	
MW-174A-50	6/10/2015	494.40	--	9.34	--	485.06	
MW-174A-50	8/12/2015	494.14	--	7.95	--	486.19	
MW-174A-50	8/19/2015	494.14	--	8.21	--	485.93	
MW-174A-50	10/6/2015	494.15	--	8.67	--	485.48	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-174A-50	11/19/2015	494.15	--	9.12	--	485.03	
MW-174A-50	1/19/2016	494.29	--	9.86	--	484.43	
MW-174A-50	3/22/2016	494.29	No LNAPL	10.25	0.00	484.04	
MW-174A-50	5/26/2016	494.40	--	9.37	--	485.03	
MW-174A-50	7/20/2016	494.33	--	7.31	--	487.02	
MW-174A-50	9/9/2016	494.26	--	8.28	--	485.98	
MW-174A-50	9/13/2016	494.26	--	8.43	--	485.83	
MW-174A-50	11/15/2016	494.33	--	8.92	--	485.41	
MW-174A-50	2/8/2017	494.57	--	9.62	--	484.95	
MW-174A-50	3/14/2017	494.57	--	9.75	--	484.82	
MW-174A-50	6/13/2017	494.65	--	9.00	--	485.65	
MW-174A-50	9/21/2017	493.67	--	8.69	--	484.98	
MW-174B-90	11/1/2010	493.15	--	8.79	--	484.36	
MW-174B-90	1/1/2011	493.15	--	7.93	--	485.22	
MW-174B-90	7/14/2011	493.15	No LNAPL	6.94	0.00	486.21	
MW-174B-90	10/21/2011	493.15	--	9.23	--	483.92	
MW-174B-90	2/15/2012	493.28	No LNAPL	9.14	0.00	484.14	
MW-174B-90	4/19/2012	493.28	--	8.50	--	484.78	
MW-174B-90	7/30/2012	493.28	--	7.14	--	486.14	
MW-174B-90	11/1/2012	493.28	--	8.56	--	484.72	
MW-174B-90	1/24/2013	493.37	--	8.56	--	484.81	
MW-174B-90	4/24/2013	493.37	--	8.92	--	484.45	
MW-174B-90	8/1/2013	493.53	--	7.25	--	486.28	
MW-174B-90	10/1/2013	493.53	--	8.74	--	484.79	
MW-174B-90	1/9/2014	493.51	--	8.88	--	484.63	
MW-174B-90	2/5/2014	493.51	--	9.02	--	484.49	
MW-174B-90	3/18/2014	493.51	--	9.28	--	484.23	
MW-174B-90	3/24/2014	493.51	--	9.37	--	484.14	
MW-174B-90	4/18/2014	493.51	--	9.07	--	484.44	
MW-174B-90	5/15/2014	493.52	--	8.66	--	484.86	
MW-174B-90	6/11/2014	493.51	--	8.88	--	484.63	
MW-174B-90	6/19/2014	493.51	--	8.49	--	485.02	
MW-174B-90	7/15/2014	493.55	--	6.63	--	486.92	
MW-174B-90	8/26/2014	493.53	--	7.36	--	486.17	
MW-174B-90	9/9/2014	493.53	--	7.72	--	485.81	
MW-174B-90	9/24/2014	493.50	--	8.01	--	485.49	
MW-174B-90	10/21/2014	493.50	--	8.95	--	484.55	
MW-174B-90	11/19/2014	493.50	--	8.47	--	485.03	
MW-174B-90	12/16/2014	493.51	--	8.67	--	484.84	
MW-174B-90	1/21/2015	493.51	--	8.88	--	484.63	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-174B-90	2/25/2015	493.55	--	8.97	--	484.58	
MW-174B-90	3/18/2015	493.54	--	9.05	--	484.49	
MW-174B-90	3/26/2015	493.54	--	8.95	--	484.59	
MW-174B-90	4/16/2015	493.58	--	8.81	--	484.77	
MW-174B-90	5/21/2015	493.58	--	8.55	--	485.03	
MW-174B-90	6/10/2015	493.54	--	8.56	--	484.98	
MW-174B-90	8/12/2015	493.55	--	7.46	--	486.09	
MW-174B-90	8/19/2015	493.55	--	7.72	--	485.83	
MW-174B-90	10/6/2015	493.55	--	8.16	--	485.39	
MW-174B-90	11/19/2015	493.55	--	8.81	--	484.74	
MW-174B-90	1/19/2016	493.55	--	9.20	--	484.35	
MW-174B-90	3/22/2016	493.55	No LNAPL	9.42	0.00	484.13	
MW-174B-90	5/26/2016	493.55	--	8.74	--	484.81	
MW-174B-90	8/9/2016	493.54	--	6.58	--	486.96	
MW-174B-90	9/9/2016	493.55	--	7.67	--	485.88	
MW-174B-90	9/13/2016	493.55	--	7.81	--	485.74	
MW-174B-90	11/15/2016	493.54	--	8.22	--	485.32	
MW-174B-90	2/8/2017	493.52	--	8.66	--	484.86	
MW-174B-90	3/14/2017	493.52	--	8.75	--	484.77	
MW-174B-90	6/13/2017	493.54	--	7.97	--	485.57	
MW-174B-90	9/21/2017	493.58	--	8.68	--	484.90	
MW-175-90	11/1/2010	496.80	--	8.40	--	488.40	
MW-175-90	7/15/2011	496.80	No LNAPL	10.82	0.00	485.98	
MW-175-90	10/21/2011	496.80	--	12.89	--	483.91	
MW-175-90	2/16/2012	496.90	No LNAPL	12.81	0.00	484.09	
MW-175-90	4/19/2012	496.90	No LNAPL	12.16	0.00	484.74	
MW-175-90	7/30/2012	496.90	No LNAPL	10.91	0.00	485.99	
MW-175-90	11/1/2012	496.90	No LNAPL	12.28	0.00	484.62	
MW-175-90	1/24/2013	497.06	--	12.26	--	484.80	
MW-175-90	4/24/2013	497.04	No LNAPL	12.53	0.00	484.51	
MW-175-90	7/23/2013	497.09	--	11.14	--	485.95	
MW-175-90	8/1/2013	497.09	--	11.00	--	486.09	
MW-175-90	8/21/2013	497.09	No LNAPL	10.99	0.00	486.10	
MW-175-90	9/30/2013	497.09	No LNAPL	12.26	0.00	484.83	
MW-175-90	1/9/2014	497.08	No LNAPL	12.51	0.00	484.57	
MW-175-90	2/5/2014	497.11	No LNAPL	12.67	0.00	484.44	
MW-175-90	3/18/2014	497.15	No LNAPL	12.96	0.00	484.19	
MW-175-90	3/24/2014	497.15	No LNAPL	12.98	0.00	484.17	
MW-175-90	4/18/2014	497.16	No LNAPL	12.80	0.00	484.36	
MW-175-90	5/15/2014	497.15	--	12.32	--	484.83	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-175-90	6/11/2014	497.15	No LNAPL	12.49	0.00	484.66	
MW-175-90	6/19/2014	497.15	No LNAPL	12.16	0.00	484.99	
MW-175-90	7/15/2014	497.16	No LNAPL	10.35	0.00	486.81	
MW-175-90	8/26/2014	497.16	No LNAPL	10.97	0.00	486.19	
MW-175-90	9/9/2014	497.16	No LNAPL	11.24	0.00	485.92	
MW-175-90	9/24/2014	497.16	No LNAPL	11.59	0.00	485.57	
MW-175-90	10/21/2014	497.14	No LNAPL	12.50	0.00	484.64	
MW-175-90	11/19/2014	497.13	No LNAPL	12.12	0.00	485.01	
MW-175-90	12/16/2014	497.13	No LNAPL	12.31	0.00	484.82	
MW-175-90	12/29/2014	497.13	No LNAPL	12.43	0.00	484.70	
MW-175-90	1/21/2015	497.14	No LNAPL	12.50	0.00	484.64	
MW-175-90	2/25/2015	497.18	No LNAPL	12.63	0.00	484.55	
MW-175-90	3/18/2015	497.19	No LNAPL	12.68	0.00	484.51	
MW-175-90	3/26/2015	497.19	No LNAPL	12.60	0.00	484.59	
MW-175-90	4/16/2015	497.21	--	12.45	--	484.76	
MW-175-90	5/21/2015	497.22	No LNAPL	12.20	0.00	485.02	
MW-175-90	6/10/2015	497.19	No LNAPL	12.22	0.00	484.97	
MW-175-90	8/12/2015	497.20	--	11.17	--	486.03	
MW-175-90	8/19/2015	497.20	No LNAPL	11.43	0.00	485.80	
MW-175-90	10/6/2015	496.93	No LNAPL	11.48	0.00	485.46	Casing was cut down 0.28 feet on 10-1-15
MW-175-90	11/19/2015	496.91	--	12.03	--	484.88	
MW-175-90	1/19/2016	496.90	--	12.51	--	484.35	
MW-175-90	3/22/2016	496.94	No LNAPL	12.82	0.00	484.12	
MW-175-90	5/26/2016	496.94	No LNAPL	12.16	0.00	484.80	
MW-175-90	8/19/2016	496.93	--	10.55	--	486.38	
MW-175-90	9/9/2016	496.93	No LNAPL	11.03	0.00	485.94	
MW-175-90	9/12/2016	496.94	--	11.09	--	485.85	
MW-175-90	11/15/2016	496.93	No LNAPL	11.65	0.00	485.38	
MW-175-90	2/8/2017	497.04	No LNAPL	12.20	0.00	484.91	
MW-175-90	3/14/2017	497.04	--	12.27	--	484.77	
MW-175-90	6/13/2017	497.06	No LNAPL	11.52	0.00	485.59	
MW-176A-15	11/1/2010	496.99	--	12.82	--	484.17	
MW-176A-15	3/25/2011	496.99	--	15.25	--	481.74	
MW-176A-15	4/6/2011	496.99	11.08	12.84	1.76	485.58	
MW-176A-15	7/15/2011	496.99	No LNAPL	9.99	0.00	487.00	
MW-176A-15	10/21/2011	496.99	11.69	15.41	3.72	484.61	
MW-176A-15	2/16/2012	496.99	11.51	15.51	4.00	484.74	
MW-176A-15	4/12/2012	496.99	11.32	15.72	4.40	484.85	
MW-176A-15	5/7/2012	496.99	11.27	14.75	3.48	485.07	
MW-176A-15	5/11/2012	496.99	11.73	13.04	1.31	485.02	Initial levels of first May 2012 baildown test

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-176A-15	5/31/2012	496.99	11.15	11.80	0.65	485.72	Initial levels of second May 2012 baildown test
MW-176A-15	7/18/2012	496.99	10.38	11.09	0.71	486.48	
MW-176A-15	8/21/2012	496.99	10.53	12.77	2.24	486.04	
MW-176A-15	9/19/2012	496.99	11.14	14.03	2.89	485.31	
MW-176A-15	10/15/2012	496.99	11.17	13.67	2.50	485.36	
MW-176A-15	10/26/2012	496.99	11.63	14.57	2.94	484.81	Initial levels of first October 2012 baildown test
MW-176A-15	10/29/2012	496.99	11.71	14.40	2.69	484.78	Initial levels of second October 2012 baildown test
MW-176A-15	11/29/2012	497.02	10.96	12.23	1.27	485.82	
MW-176A-15	12/28/2012	497.02	11.23	13.21	1.98	485.42	
MW-176A-15	2/26/2013	497.02	10.99	15.06	4.07	485.27	
MW-176A-15	3/28/2013	497.02	11.19	14.90	3.71	485.14	R-35R, R-39, and R-40 were offline on this date
MW-176A-15	4/24/2013	497.02	11.11	15.09	3.98	485.17	
MW-176A-15	7/23/2013	497.02	Sheen	10.21	Sheen	486.81	
MW-176A-15	10/29/2013	497.02	11.80	14.92	3.12	484.64	
MW-176A-15	1/14/2014	497.02	11.58	13.61	2.03	485.06	
MW-176A-15	2/24/2014	497.02	11.73	14.31	2.58	484.81	
MW-176A-15	3/18/2014	497.02	11.60	15.36	3.76	484.72	
MW-176A-15	4/14/2014	497.07	No LNAPL	Frozen	0.00	—	Frozen at 7.02 feet below the measuring point
MW-176A-15	5/16/2014	497.07	11.36	12.48	1.12	485.50	
MW-176A-15	6/11/2014	497.07	11.45	13.41	1.96	485.26	
MW-176A-15	7/19/2014	497.07	9.41	10.28	0.87	487.50	
MW-176A-15	9/9/2014	497.07	10.34	11.46	1.12	486.52	
MW-176A-15	10/16/2014	497.07	11.39	12.69	1.30	485.44	
MW-176A-15	11/20/2014	497.07	11.16	12.09	0.93	485.74	
MW-176A-15	3/10/2015	497.07	11.42	13.08	1.66	485.34	
MW-176A-15	3/19/2015	497.07	11.54	13.36	1.82	485.19	
MW-176A-15	5/18/2015	497.07	11.15	Frozen	0.52	—	Well was frozen; depth to ice = 11.67 feet
MW-176A-15	6/11/2015	497.07	11.28	12.03	0.75	485.65	
MW-176A-15	8/12/2015	497.11	10.24	10.25	0.01	486.91	
MW-176A-15	10/15/2015	497.11	11.15	12.76	1.61	485.70	
MW-176A-15	11/19/2015	497.11	11.29	12.44	1.15	485.61	
MW-176A-15	3/4/2016	497.11	11.65	14.93	3.28	484.90	
MW-176A-15	3/22/2016	497.11	11.78	15.15	3.37	484.70	
MW-176A-15	6/14/2016	497.11	11.19	11.38	0.19	485.88	
MW-176A-15	7/2/2016	497.11	No LNAPL	10.69	0.00	486.42	
MW-176A-15	7/9/2016	497.11	No LNAPL	10.14	0.00	486.97	
MW-176A-15	8/16/2016	497.17	9.77	9.95	0.18	487.37	
MW-176A-15	8/18/2016	497.11	9.81	9.85	0.04	487.29	
MW-176A-15	9/12/2016	497.17	10.38	11.47	1.09	486.59	
MW-176A-15	10/13/2016	497.17	11.40	12.38	0.98	485.59	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-176A-15	10/15/2016	497.17	12.70	13.20	0.50	484.38	
MW-176A-15	10/22/2016	497.17	11.50	13.14	1.64	485.36	
MW-176A-15	10/26/2016	497.17	11.72	12.85	1.13	485.24	
MW-176A-15	10/28/2016	497.17	11.57	12.57	1.00	485.41	
MW-176A-15	11/5/2016	497.17	10.85	11.05	0.20	486.28	
MW-176A-15	11/12/2016	497.17	10.90	11.30	0.40	486.20	
MW-176A-15	11/19/2016	497.17	10.92	11.33	0.41	486.17	
MW-176A-15	11/26/2016	497.17	11.10	11.85	0.75	485.93	
MW-176A-15	12/3/2016	497.17	11.30	12.20	0.90	485.70	
MW-176A-15	12/10/2016	497.17	11.25	12.00	0.75	485.78	
MW-176A-15	12/17/2016	497.17	11.25	11.99	0.74	485.78	
MW-176A-15	12/24/2016	497.17	11.30	11.90	0.60	485.76	
MW-176A-15	12/31/2016	497.17	11.30	11.90	0.60	485.76	
MW-176A-15	1/7/2017	497.17	11.60	12.05	0.45	485.49	
MW-176A-15	1/15/2017	497.17	11.30	12.11	0.81	485.72	
MW-176A-15	1/21/2017	497.17	11.32	12.10	0.78	485.70	
MW-176A-15	1/28/2017	497.17	11.31	12.30	0.99	485.68	
MW-176A-15	2/4/2017	497.17	11.60	13.20	1.60	485.27	
MW-176A-15	2/11/2017	497.17	11.11	13.55	2.44	485.61	
MW-176A-15	2/18/2017	497.17	11.06	14.18	3.12	485.53	
MW-176A-15	2/25/2017	497.17	11.15	13.88	2.73	485.51	
MW-176A-15	3/2/2017	497.17	11.29	13.26	1.97	485.51	
MW-176A-15	3/4/2017	497.17	11.20	13.38	2.18	485.56	
MW-176A-15	3/11/2017	497.17	11.40	12.80	1.40	485.51	
MW-176A-15	3/15/2017	497.17	11.40	Frozen	0.70	—	Depth to ice = 12.10 feet
MW-176A-15	3/18/2017	497.17	11.35	Frozen	0.86	—	Depth to ice = 12.21 feet
MW-176A-15	3/24/2017	497.17	11.34	Frozen	0.66	—	Depth to ice = 12.00 feet
MW-176A-15	4/1/2017	497.17	11.33	12.30	0.97	485.66	
MW-176A-15	4/8/2017	497.17	11.45	12.15	0.70	485.59	
MW-176A-15	4/15/2017	497.17	11.55	Frozen	0.75	—	Depth to ice = 12.3 feet
MW-176A-15	4/22/2017	497.17	11.56	12.20	0.64	485.49	
MW-176A-15	4/29/2017	497.17	11.50	Frozen	0.50	—	Depth to ice = 12 ft BTOC
MW-176A-15	5/6/2017	497.17	11.48	12.28	0.80	485.54	
MW-176A-15	5/13/2017	497.17	11.48	Frozen	0.74	—	Ice or obstruction at 12.22 feet
MW-176A-15	5/20/2017	497.17	11.50	Frozen	0.50	—	Frozen. DTW recorded to the nearest foot on field sheet as "12~?".
MW-176A-15	5/27/2017	497.17	11.40	12.50	1.10	485.57	
MW-176A-15	6/3/2017	497.17	11.20	12.20	1.00	485.78	
MW-176A-15	6/6/2017	497.17	11.37	Frozen	0.91	—	Ice at 12.28 ft BTOC
MW-176A-15	6/10/2017	497.17	11.45	Frozen	0.82	—	Depth to ice = 12.27 feet
MW-176A-15	6/16/2017	497.17	No LNAPL	10.67	0.00	486.50	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-176A-15	6/24/2017	497.17	10.60	11.00	0.40	486.50	
MW-176A-15	7/1/2017	497.17	10.78	10.81	0.03	486.38	
MW-176A-15	7/8/2017	497.17	No LNAPL	10.42	0.00	486.75	
MW-176A-15	7/13/2017	497.17	Sheen	10.24	Sheen	486.93	
MW-176A-15	9/21/2017	497.22	11.20	13.15	1.95	485.66	
MW-176B-50	11/1/2010	496.94	--	11.92	--	485.02	
MW-176B-50	1/1/2011	496.94	--	11.01	--	485.93	
MW-176B-50	4/6/2011	496.94	--	Frozen	--	—	Frozen at 11.16 ft BTOC
MW-176B-50	6/1/2011	496.94	--	Frozen	--	—	Frozen at 11.15 ft BTOC
MW-176B-50	7/15/2011	496.94	No LNAPL	9.93	0.00	487.01	
MW-176B-50	10/21/2011	496.94	Sheen	12.25	Sheen	484.69	
MW-176B-50	2/16/2012	496.92	Sheen	12.08	Sheen	484.84	
MW-176B-50	4/19/2012	496.92	No LNAPL	Frozen	0.00	—	Frozen at 12.08 ft BTOC
MW-176B-50	7/30/2012	496.92	Sheen	10.00	Sheen	486.92	
MW-176B-50	11/1/2012	496.92	No LNAPL	11.47	0.00	485.45	
MW-176B-50	1/24/2013	496.93	--	11.37	--	485.56	
MW-176B-50	4/24/2013	496.93	No LNAPL	11.41	0.00	485.52	
MW-176B-50	8/1/2013	496.93	No LNAPL	9.97	0.00	486.96	
MW-176B-50	10/1/2013	496.93	No LNAPL	11.44	0.00	485.49	
MW-176B-50	3/18/2014	496.93	No LNAPL	12.06	0.00	484.87	
MW-176B-50	6/11/2014	496.96	No LNAPL	11.61	0.00	485.35	
MW-176B-50	9/9/2014	496.96	No LNAPL	10.35	0.00	486.61	
MW-176B-50	11/20/2014	496.96	No LNAPL	11.14	0.00	485.82	
MW-176B-50	3/19/2015	496.96	No LNAPL	Frozen	0.00	—	Depth to ice = 11.51 feet
MW-176B-50	6/11/2015	496.96	No LNAPL	11.23	0.00	485.73	
MW-176B-50	8/12/2015	496.97	--	10.09	--	486.88	
MW-176B-50	11/19/2015	496.97	--	11.27	--	485.70	
MW-176B-50	3/22/2016	496.97	No LNAPL	12.12	0.00	484.85	
MW-176B-50	8/15/2016	497.00	--	9.54	--	487.46	
MW-176B-50	9/12/2016	497.00	--	10.35	--	486.65	
MW-176B-50	3/15/2017	497.00	--	Frozen	--	—	Depth to ice = 11.35 feet
MW-176B-50	9/21/2017	497.03	--	11.32	--	485.71	
MW-176C-90	11/1/2010	496.89	--	12.53	--	484.36	
MW-176C-90	4/6/2011	496.89	--	Frozen	--	—	Frozen at 11.04 ft BTOC
MW-176C-90	6/1/2011	496.89	--	Frozen	--	—	Frozen at 11.00 ft BTOC
MW-176C-90	7/15/2011	496.89	No LNAPL	9.85	0.00	487.04	
MW-176C-90	10/21/2011	496.89	--	12.13	--	484.76	
MW-176C-90	2/16/2012	496.84	No LNAPL	11.91	0.00	484.93	
MW-176C-90	4/19/2012	496.84	—	Frozen	—	—	Frozen w/dedicated pump
MW-176C-90	7/30/2012	496.84	--	9.90	--	486.94	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-176C-90	11/1/2012	496.84	No LNAPL	11.35	0.00	485.49	
MW-176C-90	1/24/2013	496.86	--	11.25	--	485.61	
MW-176C-90	4/24/2013	496.86	—	Frozen	—	—	Frozen w/dedicated pump
MW-176C-90	8/1/2013	496.86	No LNAPL	9.86	0.00	487.00	
MW-176C-90	10/1/2013	496.86	No LNAPL	11.33	0.00	485.53	
MW-176C-90	3/18/2014	496.86	No LNAPL	11.93	0.00	484.93	
MW-176C-90	6/11/2014	496.86	No LNAPL	11.49	0.00	485.37	
MW-176C-90	9/9/2014	496.86	No LNAPL	10.24	0.00	486.62	
MW-176C-90	11/20/2014	496.86	No LNAPL	11.00	0.00	485.86	
MW-176C-90	3/19/2015	496.86	No LNAPL	Frozen	0.00	—	Depth to ice = 11.33 feet
MW-176C-90	6/11/2015	496.86	No LNAPL	11.10	0.00	485.76	
MW-176C-90	8/12/2015	496.86	--	9.97	--	486.89	
MW-176C-90	11/19/2015	496.86	--	11.10	--	485.76	
MW-176C-90	3/22/2016	496.86	—	Frozen	—	—	Frozen with dedicated pump
MW-176C-90	8/15/2016	496.86	--	9.35	--	487.51	
MW-176C-90	9/12/2016	496.86	--	10.06	--	486.80	
MW-176C-90	3/15/2017	496.86	--	Frozen	--	—	Depth to ice = 11.20 feet
MW-177-90	11/1/2010	497.91	--	12.21	--	485.70	
MW-177-90	4/13/2011	497.91	--	Frozen	--	—	Frozen at 10.90 ft BTOC
MW-177-90	6/1/2011	497.91	--	Frozen	--	—	Frozen at 10.70 ft BTOC
MW-177-90	7/14/2011	497.91	No LNAPL	9.46	0.00	488.45	
MW-177-90	10/21/2011	497.91	--	11.99	--	485.92	
MW-177-90	2/16/2012	497.90	--	Frozen	--	—	Frozen at 11.82 ft BTOC
MW-177-90	4/19/2012	497.90	—	Frozen	—	—	Frozen w/dedicated pump
MW-177-90	7/30/2012	497.90	--	9.61	--	488.29	
MW-177-90	11/1/2012	497.90	No LNAPL	11.20	0.00	486.70	
MW-177-90	1/24/2013	497.92	--	11.10	--	486.82	
MW-177-90	4/24/2013	497.92	No LNAPL	Frozen	0.00	—	Frozen at 11.14 ft BTOC
MW-177-90	8/1/2013	497.92	No LNAPL	9.59	0.00	488.33	
MW-177-90	10/1/2013	497.92	No LNAPL	11.15	0.00	486.77	
MW-177-90	8/10/2016	497.92	--	8.66	--	489.26	
MW-178A-15	11/1/2010	496.51	--	11.39	--	485.12	
MW-178A-15	1/1/2011	496.51	--	10.55	--	485.96	
MW-178A-15	4/8/2011	496.51	--	Frozen	--	—	Frozen at 10.90 ft BTOC
MW-178A-15	6/1/2011	496.51	--	Frozen	--	—	Frozen at 10.60 ft BTOC
MW-178A-15	7/15/2011	496.51	No LNAPL	9.51	0.00	487.00	
MW-178A-15	10/21/2011	496.51	No LNAPL	11.77	0.00	484.74	
MW-178A-15	1/11/2012	496.48	No LNAPL	11.63	0.00	484.85	
MW-178A-15	2/7/2012	496.48	No LNAPL	Frozen	0.00	—	Frozen at 11.97 ft BTOC
MW-178A-15	2/16/2012	496.48	No LNAPL	Frozen	0.00	—	Frozen at 11.67 ft BTOC

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MW-178A-15	4/10/2012	496.48	No LNAPL	Frozen	0.00	—	Frozen at 11.67 ft BTOC
MW-178A-15	7/18/2012	496.48	No LNAPL	9.96	0.00	486.52	
MW-178A-15	8/21/2012	496.48	No LNAPL	10.34	0.00	486.14	
MW-178A-15	9/18/2012	496.48	No LNAPL	11.07	0.00	485.41	
MW-178A-15	10/16/2012	496.48	No LNAPL	11.08	0.00	485.40	
MW-178A-15	11/29/2012	496.48	No LNAPL	10.58	0.00	485.90	
MW-178A-15	12/27/2012	496.48	No LNAPL	10.95	0.00	485.53	
MW-178A-15	1/24/2013	496.48	No LNAPL	Frozen	0.00	—	Frozen at 10.91 ft BTOC
MW-178A-15	2/26/2013	496.48	No LNAPL	Frozen	0.00	—	Frozen at 10.91 ft BTOC
MW-178A-15	4/24/2013	496.48	No LNAPL	Frozen	0.00	—	Frozen at 10.89 ft BTOC
MW-178A-15	10/29/2013	496.48	No LNAPL	11.74	0.00	484.74	
MW-178A-15	10/15/2015	496.50	No LNAPL	10.72	0.00	485.78	
MW-178A-15	8/12/2016	496.50	--	8.87	--	487.63	
MW-178A-15	10/13/2016	496.50	No LNAPL	10.85	0.00	485.65	
MW-178A-15	3/1/2017	496.50	No LNAPL	Frozen	0.00	—	Ice at 10.75 ft BTOC
MW-178B-50	11/1/2010	496.12	--	10.99	--	485.13	
MW-178B-50	1/1/2011	496.12	--	10.13	--	485.99	
MW-178B-50	4/8/2011	496.12	--	Frozen	--	—	Frozen
MW-178B-50	6/1/2011	496.12	--	Frozen	--	—	Frozen at 10.25 ft BTOC
MW-178B-50	7/15/2011	496.12	No LNAPL	9.11	0.00	487.01	
MW-178B-50	10/21/2011	496.12	--	11.36	--	484.76	
MW-178B-50	2/16/2012	496.09	No LNAPL	Frozen	0.00	—	Frozen at 11.26 ft BTOC
MW-178B-50	8/12/2016	496.11	--	8.47	--	487.64	
MW-178B-50	10/20/2016	496.11	--	10.65	--	485.46	
MW-178C-90	11/1/2010	497.30	--	12.23	--	485.07	
MW-178C-90	4/8/2011	497.30	--	Frozen	--	—	Frozen at 11.51 ft BTOC
MW-178C-90	6/1/2011	497.30	--	Frozen	--	—	Frozen at 11.55 ft BTOC
MW-178C-90	7/15/2011	497.30	No LNAPL	10.20	0.00	487.10	
MW-178C-90	10/21/2011	497.30	--	12.57	--	484.73	
MW-178C-90	2/16/2012	497.26	—	Frozen	—	—	Frozen w/dedicated pump
MW-178C-90	4/19/2012	497.26	—	Frozen	—	—	Frozen w/dedicated pump
MW-178C-90	7/30/2012	497.26	No LNAPL	10.33	0.00	486.93	
MW-178C-90	11/1/2012	497.26	No LNAPL	11.80	0.00	485.46	
MW-178C-90	1/24/2013	497.27	—	Frozen	—	—	Frozen w/dedicated pump
MW-178C-90	4/24/2013	497.27	—	Frozen	—	—	Frozen w/dedicated pump
MW-178C-90	8/1/2013	497.27	No LNAPL	10.30	0.00	486.97	
MW-178C-90	10/1/2013	497.27	No LNAPL	11.76	0.00	485.51	
MW-178C-90	3/18/2014	497.27	No LNAPL	12.34	0.00	484.93	
MW-178C-90	6/11/2014	497.29	No LNAPL	12.91	0.00	484.38	
MW-178C-90	9/9/2014	497.29	No LNAPL	10.65	0.00	486.64	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-178C-90	11/20/2014	497.29	No LNAPL	11.40	0.00	485.89	
MW-178C-90	3/19/2015	497.29	—	Frozen	—	—	Frozen with dedicated pump; no depth to ice measurement possible
MW-178C-90	6/11/2015	497.29	No LNAPL	11.63	0.00	485.66	
MW-178C-90	8/12/2015	497.29	--	10.39	--	486.90	
MW-178C-90	11/19/2015	497.29	--	11.52	--	485.77	
MW-178C-90	8/12/2016	497.30	--	9.85	--	487.45	
MW-179A-15	11/1/2010	496.96	--	11.75	--	485.21	
MW-179A-15	4/1/2011	496.96	--	Frozen	--	—	Frozen at 10.30 ft BTOC
MW-179A-15	6/1/2011	496.96	--	Frozen	--	—	Frozen at 11.34 ft BTOC
MW-179A-15	7/15/2011	496.96	No LNAPL	9.91	0.00	487.05	
MW-179A-15	10/21/2011	496.96	No LNAPL	12.17	0.00	484.79	
MW-179A-15	1/11/2012	496.94	No LNAPL	12.03	0.00	484.91	
MW-179A-15	2/7/2012	496.94	No LNAPL	Frozen	0.00	—	Frozen at 12.08 ft BTOC
MW-179A-15	2/16/2012	496.94	No LNAPL	Frozen	0.00	—	Frozen at 12.10 ft BTOC
MW-179A-15	4/10/2012	496.94	No LNAPL	Frozen	0.00	—	Frozen at 12.09 ft BTOC
MW-179A-15	4/19/2012	496.94	No LNAPL	Frozen	0.00	—	Frozen at 12.06 ft BTOC
MW-179A-15	7/18/2012	496.94	No LNAPL	10.37	0.00	486.57	
MW-179A-15	7/30/2012	496.94	No LNAPL	9.96	0.00	486.98	
MW-179A-15	8/21/2012	496.94	No LNAPL	10.76	0.00	486.18	
MW-179A-15	9/18/2012	496.94	No LNAPL	11.46	0.00	485.48	
MW-179A-15	10/16/2012	496.94	No LNAPL	11.47	0.00	485.47	
MW-179A-15	11/1/2012	496.94	No LNAPL	11.46	0.00	485.48	
MW-179A-15	11/29/2012	496.96	No LNAPL	10.98	0.00	485.98	
MW-179A-15	12/27/2012	496.96	—	Frozen	—	—	Frozen w/data logger
MW-179A-15	1/24/2013	496.96	—	Frozen	—	—	Frozen w/data logger
MW-179A-15	2/26/2013	496.96	—	Frozen	—	—	Frozen w/data logger
MW-179A-15	4/24/2013	496.96	—	Frozen	—	—	Frozen w/data logger
MW-179A-15	5/20/2013	496.96	—	Frozen	—	—	Frozen w/data logger
MW-179A-15	6/25/2013	496.96	—	Frozen	—	—	Frozen w/data logger
MW-179A-15	8/1/2013	496.96	No LNAPL	9.95	0.00	487.01	
MW-179A-15	10/1/2013	496.96	No LNAPL	11.38	0.00	485.58	
MW-179A-15	10/29/2013	496.96	No LNAPL	12.14	0.00	484.82	
MW-179A-15	3/18/2014	496.98	—	Frozen	—	—	The well was frozen with a data logger installed-- no measurement possible
MW-179A-15	6/11/2014	496.97	—	Frozen	—	—	The well was frozen with a data logger installed-- no measurement possible
MW-179A-15	9/9/2014	496.97	No LNAPL	10.24	0.00	486.73	
MW-179A-15	11/20/2014	496.97	No LNAPL	11.05	0.00	485.92	
MW-179A-15	3/19/2015	496.97	—	Frozen	—	—	Frozen with datalogger; no depth to ice measurement possible
MW-179A-15	6/11/2015	496.97	—	Frozen	—	—	Datalogger present, no measurements possible
MW-179A-15	8/12/2015	496.97	--	9.99	--	486.98	
MW-179A-15	10/15/2015	496.97	No LNAPL	11.11	0.00	485.86	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-179A-15	11/19/2015	496.97	--	11.19	--	485.78	
MW-179A-15	8/12/2016	496.98	--	9.25	--	487.73	
MW-179B-50	11/1/2010	496.75	--	11.53	--	485.22	
MW-179B-50	4/1/2011	496.75	--	Frozen	--	—	Frozen at 10.10 ft BTOC
MW-179B-50	6/1/2011	496.75	--	Frozen	--	—	Frozen at 10.85 ft BTOC
MW-179B-50	7/15/2011	496.75	No LNAPL	9.68	0.00	487.07	
MW-179B-50	10/21/2011	496.75	--	11.94	--	484.81	
MW-179B-50	2/16/2012	496.74	No LNAPL	Frozen	0.00	—	Frozen at 11.84 ft BTOC
MW-179B-50	4/19/2012	496.74	No LNAPL	Frozen	0.00	—	Frozen at 11.64 ft BTOC
MW-179B-50	7/30/2012	496.74	No LNAPL	9.73	0.00	487.01	
MW-179B-50	11/1/2012	496.74	No LNAPL	11.21	0.00	485.53	
MW-179B-50	1/24/2013	496.75	—	Frozen	—	—	Frozen w/data logger
MW-179B-50	4/24/2013	496.75	—	Frozen	—	—	Frozen w/data logger
MW-179B-50	8/1/2013	496.75	No LNAPL	9.71	0.00	487.04	
MW-179B-50	10/1/2013	496.75	No LNAPL	11.15	0.00	485.60	
MW-179B-50	3/18/2014	496.75	—	Frozen	—	—	The well was frozen with a data logger installed-- no measurement possible
MW-179B-50	6/11/2014	496.76	—	Frozen	—	—	The well was frozen with a data logger installed-- no measurement possible
MW-179B-50	9/9/2014	496.76	No LNAPL	10.02	0.00	486.74	
MW-179B-50	11/20/2014	496.76	No LNAPL	10.82	0.00	485.94	
MW-179B-50	3/19/2015	496.76	—	Frozen	—	—	Frozen with datalogger; no depth to ice measurement possible
MW-179B-50	6/11/2015	496.76	--	Frozen	--	—	Datalogger present, no measurements possible
MW-179B-50	8/12/2015	496.76	--	9.78	--	486.98	
MW-179B-50	11/19/2015	496.76	--	10.97	--	485.79	
MW-179B-50	8/12/2016	496.76	--	9.03	--	487.73	
MW-179C-90	11/1/2010	497.27	--	12.06	--	485.21	
MW-179C-90	4/1/2011	497.27	--	Frozen	--	—	Frozen at 10.60 ft BTOC
MW-179C-90	6/1/2011	497.27	--	Frozen	--	—	Frozen at 11.15 ft BTOC
MW-179C-90	7/15/2011	497.27	No LNAPL	10.19	0.00	487.08	
MW-179C-90	10/21/2011	497.27	--	12.49	--	484.78	
MW-179C-90	2/16/2012	497.25	—	Frozen	—	—	Frozen w/dedicated pump
MW-179C-90	4/19/2012	497.25	—	Frozen	—	—	Frozen w/dedicated pump
MW-179C-90	7/30/2012	497.25	No LNAPL	10.25	0.00	487.00	
MW-179C-90	11/1/2012	497.25	No LNAPL	11.73	0.00	485.52	
MW-179C-90	1/24/2013	497.06	—	Frozen	—	—	Frozen w/data logger
MW-179C-90	4/24/2013	497.27	—	Frozen	—	—	Frozen w/data logger
MW-179C-90	8/1/2013	497.26	No LNAPL	10.24	0.00	487.02	
MW-179C-90	10/1/2013	497.26	No LNAPL	11.67	0.00	485.59	
MW-179C-90	3/18/2014	497.26	—	Frozen	—	—	The well was frozen with a data logger installed-- no measurement possible
MW-179C-90	6/11/2014	497.28	—	Frozen	—	—	The well was frozen with a data logger installed-- no measurement possible
MW-179C-90	9/9/2014	497.28	No LNAPL	10.54	0.00	486.74	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-179C-90	11/20/2014	497.28	No LNAPL	11.34	0.00	485.94	
MW-179C-90	3/19/2015	497.28	—	Frozen	—	—	Frozen with datalogger; no depth to ice measurement possible
MW-179C-90	6/11/2015	497.28	—	Frozen	—	—	Datalogger present, no measurements possible
MW-179C-90	8/12/2015	497.28	--	10.31	--	486.97	
MW-179C-90	11/19/2015	497.28	--	11.46	--	485.82	
MW-179C-90	8/12/2016	497.28	--	9.57	--	487.71	
MW-179D-135	2/16/2012	—	No LNAPL	Frozen	0.00	—	Frozen at 12.17 ft BTOC
MW-179D-135	4/19/2012	—	No LNAPL	Frozen	0.00	—	Frozen at 12.16 ft BTOC
MW-179D-135	7/30/2012	—	No LNAPL	10.06	0.00	—	
MW-179D-135	11/1/2012	—	No LNAPL	11.53	0.00	—	
MW-179D-135	1/24/2013	—	—	Frozen	—	—	Frozen w/data logger
MW-179D-135	4/24/2013	497.07	—	Frozen	—	—	Frozen w/data logger
MW-179D-135	8/1/2013	497.06	No LNAPL	10.03	0.00	487.03	
MW-179D-135	10/1/2013	497.06	No LNAPL	11.48	0.00	485.58	
MW-179D-135	3/18/2014	497.06	—	Frozen	—	—	The well was frozen with a data logger installed-- no measurement possible
MW-179D-135	6/11/2014	497.07	—	Frozen	—	—	The well was frozen with a data logger installed-- no measurement possible
MW-179D-135	9/9/2014	497.07	No LNAPL	10.35	0.00	486.72	
MW-179D-135	11/20/2014	497.07	No LNAPL	11.14	0.00	485.93	
MW-179D-135	3/19/2015	497.07	—	Frozen	—	—	Frozen with datalogger; no depth to ice measurement possible
MW-179D-135	6/11/2015	497.07	—	Frozen	—	—	Datalogger present, no measurements possible
MW-179D-135	8/12/2015	497.06	--	10.40	--	486.66	
MW-179D-135	11/19/2015	497.06	--	11.26	--	485.80	
MW-180A-15	11/1/2010	497.43	--	12.15	--	485.28	
MW-180A-15	1/1/2011	497.43	--	11.15	--	486.28	
MW-180A-15	4/1/2011	497.43	--	Frozen	--	—	Frozen at 11.39 ft BTOC
MW-180A-15	6/1/2011	497.43	--	Frozen	--	—	Frozen at 11.6 ft BTOC
MW-180A-15	7/15/2011	497.43	No LNAPL	10.10	0.00	487.33	
MW-180A-15	10/21/2011	497.43	No LNAPL	12.36	0.00	485.07	
MW-180A-15	2/7/2012	497.40	No LNAPL	12.27	0.00	485.13	
MW-180A-15	2/16/2012	497.40	No LNAPL	Frozen	0.00	—	Frozen at 12.24 ft BTOC
MW-180A-15	4/10/2012	497.40	No LNAPL	Frozen	0.00	—	Frozen at 12.24 ft BTOC
MW-180A-15	7/18/2012	497.40	No LNAPL	10.55	0.00	486.85	
MW-180A-15	8/21/2012	497.40	No LNAPL	10.95	0.00	486.45	
MW-180A-15	9/18/2012	497.40	No LNAPL	11.65	0.00	485.75	
MW-180A-15	10/16/2012	497.40	No LNAPL	11.66	0.00	485.74	
MW-180A-15	11/29/2012	497.42	No LNAPL	11.20	0.00	486.22	
MW-180A-15	12/27/2012	497.42	No LNAPL	11.54	0.00	485.88	
MW-180A-15	1/24/2013	497.42	No LNAPL	Frozen	0.00	—	Frozen at 11.53 ft BTOC
MW-180A-15	2/26/2013	497.42	No LNAPL	Frozen	0.00	—	Frozen at 11.48 ft BTOC
MW-180A-15	4/24/2013	497.42	No LNAPL	Frozen	0.00	—	Frozen at 11.48 ft BTOC

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-180A-15	10/29/2013	497.42	No LNAPL	12.33	0.00	485.09	
MW-180A-15	10/15/2015	497.43	No LNAPL	11.27	0.00	486.16	
MW-180A-15	8/12/2016	497.42	--	9.41	--	488.01	
MW-180A-15	10/13/2016	497.42	No LNAPL	11.37	0.00	486.05	
MW-180A-15	3/1/2017	497.42	No LNAPL	11.39	0.00	486.03	
MW-180A-15	8/10/2017	497.42	--	10.01	--	487.41	
MW-180A-15	8/16/2017	497.42	--	9.79	--	487.63	
MW-180A-15	11/15/2017	497.42	--	11.63	--	485.79	
MW-180B-50	11/1/2010	496.89	--	11.55	--	485.34	
MW-180B-50	1/1/2011	496.89	--	10.61	--	486.28	
MW-180B-50	4/1/2011	496.89	--	Frozen	--	—	Frozen at 10.58 ft BTOC
MW-180B-50	6/1/2011	496.89	--	Frozen	--	—	Frozen at 11.20 ft BTOC
MW-180B-50	7/15/2011	496.89	No LNAPL	9.59	0.00	487.30	
MW-180B-50	10/21/2011	496.89	--	11.86	--	485.03	
MW-180B-50	2/16/2012	496.86	No LNAPL	Frozen	0.00	—	Frozen at 11.74 ft BTOC
MW-180B-50	4/19/2012	496.86	No LNAPL	Frozen	0.00	—	Frozen at 11.74 ft BTOC
MW-180B-50	7/30/2012	496.86	No LNAPL	9.64	0.00	487.22	
MW-180B-50	11/1/2012	496.86	No LNAPL	11.14	0.00	485.72	
MW-180B-50	1/24/2013	496.87	--	Frozen	--	—	Frozen at 11.09 ft BTOC
MW-180B-50	4/24/2013	496.87	No LNAPL	Frozen	0.00	—	Frozen at 11.02 ft BTOC
MW-180B-50	8/1/2013	496.87	No LNAPL	9.64	0.00	487.23	
MW-180B-50	10/1/2013	496.87	No LNAPL	11.06	0.00	485.81	
MW-180B-50	3/18/2014	496.87	No LNAPL	11.67	0.00	485.20	
MW-180B-50	6/11/2014	496.91	No LNAPL	11.22	0.00	485.69	
MW-180B-50	9/9/2014	496.91	No LNAPL	9.91	0.00	487.00	
MW-180B-50	11/20/2014	496.91	No LNAPL	10.72	0.00	486.19	
MW-180B-50	3/19/2015	496.91	--	11.20	--	485.71	
MW-180B-50	6/10/2015	496.91	No LNAPL	10.75	0.00	486.16	
MW-180B-50	8/12/2015	496.90	--	9.67	--	487.23	
MW-180B-50	11/19/2015	496.90	--	10.81	--	486.09	
MW-180B-50	3/22/2016	496.90	No LNAPL	Frozen	0.00	—	Ice at 11.57 feet
MW-180B-50	8/12/2016	496.88	--	8.94	--	487.94	
MW-180B-50	9/12/2016	496.88	--	9.87	--	487.01	
MW-180B-50	3/14/2017	496.88	--	10.83	--	486.05	
MW-180C-90	11/1/2010	497.06	--	11.70	--	485.36	
MW-180C-90	1/1/2011	497.06	--	10.77	--	486.29	
MW-180C-90	4/1/2011	497.06	—	Frozen	—	—	Frozen w/dedicated pump
MW-180C-90	6/1/2011	497.06	--	10.65	--	486.41	
MW-180C-90	7/14/2011	497.06	No LNAPL	9.74	0.00	487.32	
MW-180C-90	10/21/2011	497.06	--	12.02	--	485.04	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-180C-90	2/16/2012	497.05	—	Frozen	—	—	Frozen w/dedicated pump
MW-180C-90	4/19/2012	497.05	—	Frozen	—	—	Frozen w/dedicated pump
MW-180C-90	7/30/2012	497.05	No LNAPL	9.80	0.00	487.25	
MW-180C-90	11/1/2012	497.05	No LNAPL	11.29	0.00	485.76	
MW-180C-90	1/24/2013	497.05	—	Frozen	—	—	Frozen w/dedicated pump
MW-180C-90	4/24/2013	497.05	—	Frozen	—	—	Frozen w/dedicated pump
MW-180C-90	8/1/2013	497.05	No LNAPL	9.80	0.00	487.25	
MW-180C-90	10/1/2013	497.05	No LNAPL	11.23	0.00	485.82	
MW-180C-90	3/18/2014	497.05	No LNAPL	11.84	0.00	485.21	
MW-180C-90	6/11/2014	497.09	No LNAPL	11.40	0.00	485.69	
MW-180C-90	9/9/2014	497.09	No LNAPL	10.08	0.00	487.01	
MW-180C-90	11/20/2014	497.09	No LNAPL	10.87	0.00	486.22	
MW-180C-90	3/19/2015	497.09	--	11.35	--	485.74	
MW-180C-90	6/10/2015	497.09	No LNAPL	10.93	0.00	486.16	
MW-180C-90	8/12/2015	497.08	--	9.83	--	487.25	
MW-180C-90	11/19/2015	497.08	--	10.98	--	486.10	
MW-180C-90	3/22/2016	497.08	—	Frozen	—	—	Frozen with dedicated pump
MW-180C-90	8/12/2016	497.07	--	9.09	--	487.98	
MW-180C-90	9/12/2016	497.07	--	10.02	--	487.05	
MW-180C-90	3/14/2017	497.07	--	11.04	--	486.03	
MW-186A-15	11/1/2010	496.00	--	12.37	--	483.63	
MW-186A-15	3/25/2011	496.00	--	11.95	--	484.05	
MW-186A-15	7/14/2011	496.00	10.19	10.51	0.32	485.75	
MW-186A-15	8/23/2011	496.00	10.49	10.73	0.24	485.47	
MW-186A-15	9/22/2011	496.00	11.59	11.93	0.34	484.35	
MW-186A-15	10/21/2011	496.00	12.28	12.67	0.39	483.65	
MW-186A-15	12/2/2011	495.95	11.95	12.64	0.69	483.87	
MW-186A-15	1/10/2012	495.95	12.08	12.78	0.70	483.74	
MW-186A-15	2/19/2012	495.95	12.04	12.76	0.72	483.78	
MW-186A-15	3/15/2012	495.95	12.08	12.84	0.76	483.73	
MW-186A-15	4/12/2012	495.95	11.94	12.75	0.81	483.86	
MW-186A-15	4/19/2012	495.95	11.36	12.26	0.90	484.42	
MW-186A-15	5/7/2012	495.95	11.70	12.50	0.80	484.10	
MW-186A-15	6/12/2012	495.95	11.01	11.12	0.11	484.92	
MW-186A-15	7/18/2012	495.95	10.67	10.73	0.06	485.27	
MW-186A-15	7/30/2012	495.95	10.30	10.31	0.01	485.65	
MW-186A-15	8/21/2012	495.95	10.91	11.74	0.83	484.89	
MW-186A-15	9/19/2012	495.95	11.61	12.22	0.61	484.23	
MW-186A-15	10/15/2012	495.95	11.56	12.09	0.53	484.29	
MW-186A-15	10/17/2012	495.95	11.65	12.17	0.52	484.20	Initial levels of first October 2012 baildown test

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-186A-15	10/18/2012	495.95	11.70	12.08	0.38	484.18	Initial levels of second October 2012 baildown test
MW-186A-15	11/1/2012	495.95	11.61	12.17	0.56	484.24	
MW-186A-15	11/29/2012	495.95	11.16	11.52	0.36	484.72	
MW-186A-15	12/27/2012	495.95	11.48	11.96	0.48	484.38	
MW-186A-15	1/24/2013	495.95	11.45	11.93	0.48	484.41	
MW-186A-15	2/26/2013	495.95	11.59	12.07	0.48	484.27	
MW-186A-15	3/21/2013	495.91	11.71	12.04	0.33	484.14	
MW-186A-15	3/29/2013	495.91	11.74	12.16	0.42	484.09	R-35R, R-39, and R-40 were offline on this date
MW-186A-15	4/19/2013	495.95	11.73	12.33	0.60	484.11	
MW-186A-15	4/24/2013	495.95	11.67	12.25	0.58	484.17	
MW-186A-15	5/20/2013	495.96	11.49	12.00	0.51	484.38	
MW-186A-15	6/19/2013	495.97	10.85	10.91	0.06	485.11	
MW-186A-15	6/24/2013	495.97	10.80	11.13	0.33	485.11	
MW-186A-15	7/23/2013	496.00	10.53	10.73	0.20	485.43	
MW-186A-15	7/25/2013	496.00	10.58	10.78	0.20	485.38	
MW-186A-15	8/1/2013	495.97	10.51	10.55	0.04	485.45	
MW-186A-15	8/20/2013	495.97	10.52	10.78	0.26	485.40	
MW-186A-15	8/21/2013	495.97	10.45	10.52	0.07	485.51	
MW-186A-15	9/30/2013	495.96	11.57	12.30	0.73	484.25	
MW-186A-15	10/22/2013	495.97	12.25	12.64	0.39	483.65	
MW-186A-15	11/26/2013	495.96	11.33	11.87	0.54	484.53	
MW-186A-15	12/18/2013	495.96	11.61	12.28	0.67	484.23	
MW-186A-15	1/9/2014	495.96	11.83	12.40	0.57	484.02	
MW-186A-15	1/30/2014	495.96	11.84	12.31	0.47	484.03	
MW-186A-15	2/5/2014	495.96	11.98	12.50	0.52	483.88	
MW-186A-15	2/24/2014	495.96	12.12	12.51	0.39	483.77	
MW-186A-15	3/14/2014	495.96	12.23	12.60	0.37	483.66	
MW-186A-15	3/18/2014	495.96	12.20	12.59	0.39	483.69	
MW-186A-15	3/24/2014	495.96	12.27	12.64	0.37	483.62	
MW-186A-15	4/18/2014	495.95	12.15	12.53	0.38	483.73	
MW-186A-15	5/15/2014	495.96	11.67	12.17	0.50	484.20	
MW-186A-15	5/16/2014	495.96	11.70	12.22	0.52	484.16	
MW-186A-15	5/20/2014	495.97	11.79	12.32	0.53	484.08	
MW-186A-15	6/10/2014	495.98	11.82	12.23	0.41	484.08	
MW-186A-15	6/11/2014	495.98	11.80	12.22	0.42	484.10	
MW-186A-15	6/19/2014	495.97	11.45	11.82	0.37	484.45	
MW-186A-15	7/15/2014	495.98	No LNAPL	9.78	0.00	486.20	
MW-186A-15	8/26/2014	495.98	No LNAPL	10.44	0.00	485.54	
MW-186A-15	9/9/2014	495.98	No LNAPL	10.70	0.00	485.28	
MW-186A-15	9/24/2014	495.96	Sheen	11.00	Sheen	484.96	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-186A-15	10/21/2014	495.97	11.93	11.97	0.04	484.03	
MW-186A-15	11/19/2014	495.96	11.50	11.75	0.25	484.41	
MW-186A-15	12/16/2014	495.98	11.70	12.04	0.34	484.22	
MW-186A-15	12/29/2014	495.98	11.81	12.18	0.37	484.10	
MW-186A-15	1/21/2015	495.96	11.84	12.27	0.43	484.04	
MW-186A-15	2/25/2015	495.94	11.94	12.26	0.32	483.94	
MW-186A-15	3/10/2015	495.92	11.83	12.17	0.34	484.03	
MW-186A-15	3/18/2015	495.92	11.93	12.28	0.35	483.92	
MW-186A-15	3/26/2015	495.92	11.88	12.25	0.37	483.97	
MW-186A-15	4/16/2015	495.93	11.75	12.05	0.30	484.12	
MW-186A-15	5/21/2015	495.95	11.54	11.68	0.14	484.38	
MW-186A-15	6/10/2015	495.98	11.57	11.80	0.23	484.37	
MW-186A-15	7/22/2015	495.97	Sheen	10.66	Sheen	485.33	
MW-186A-15	8/12/2015	495.97	Sheen	10.54	Sheen	485.47	
MW-186A-15	8/19/2015	495.97	No LNAPL	10.81	0.00	485.19	
MW-186A-15	9/30/2015	495.96	11.30	11.43	0.13	484.68	
MW-186A-15	10/6/2015	495.96	11.13	11.24	0.11	484.85	
MW-186A-15	10/15/2015	495.97	11.50	11.85	0.35	484.44	
MW-186A-15	10/22/2015	495.97	11.74	11.96	0.22	484.24	
MW-186A-15	11/19/2015	495.98	11.64	11.95	0.31	484.28	
MW-186A-15	11/25/2015	495.98	11.41	11.64	0.23	484.56	
MW-186A-15	12/11/2015	495.96	11.65	11.88	0.23	484.30	
MW-186A-15	1/19/2016	495.98	12.15	12.45	0.30	483.77	
MW-186A-15	1/26/2016	495.98	12.19	12.50	0.31	483.77	
MW-186A-15	3/4/2016	495.98	12.24	12.53	0.29	483.74	
MW-186A-15	3/22/2016	495.98	12.35	12.72	0.37	483.56	
MW-186A-15	3/24/2016	495.98	12.32	12.65	0.33	483.60	Baildown testing not conducted- insufficient LNAPL thickness
MW-186A-15	3/25/2016	495.98	12.30	12.67	0.37	483.61	Baildown testing not conducted- insufficient LNAPL thickness
MW-186A-15	3/31/2016	495.98	12.16	12.50	0.34	483.76	Baildown testing not conducted- insufficient LNAPL thickness
MW-186A-15	5/26/2016	495.97	11.72	12.03	0.31	484.21	
MW-186A-15	8/18/2016	495.97	10.16	10.17	0.01	485.81	
MW-186A-15	9/9/2016	495.97	No LNAPL	10.65	0.00	485.36	
MW-186A-15	9/12/2016	495.97	No LNAPL	10.69	0.00	485.28	
MW-186A-15	10/13/2016	495.97	11.67	11.68	0.01	484.30	
MW-186A-15	10/25/2016	495.97	12.05	12.06	0.01	483.92	
MW-186A-15	11/15/2016	495.97	Sheen	11.28	Sheen	484.73	
MW-186A-15	2/8/2017	495.94	11.67	11.88	0.21	484.30	
MW-186A-15	2/15/2017	495.94	11.69	11.95	0.26	484.23	
MW-186A-15	3/1/2017	495.94	11.71	11.97	0.26	484.18	
MW-186A-15	3/10/2017	495.94	11.73	12.00	0.27	484.16	Baildown testing not conducted- insufficient LNAPL thickness

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-186A-15	3/14/2017	495.94	11.72	12.06	0.34	484.16	
MW-186A-15	6/13/2017	495.97	No LNAPL	11.04	0.00	484.99	
MW-186A-15	7/13/2017	495.97	No LNAPL	10.24	0.00	485.73	
MW-186A-15	9/21/2017	495.98	11.46	11.47	0.01	484.52	
MW-186A-15	10/18/2017	495.98	Sheen	11.50	Sheen	484.48	
MW-186B-60	11/1/2010	495.82	--	11.93	--	483.89	
MW-186B-60	3/25/2011	495.82	--	11.32	--	484.50	
MW-186B-60	7/14/2011	495.82	No LNAPL	9.97	0.00	485.85	
MW-186B-60	8/23/2011	495.82	--	10.25	--	485.57	
MW-186B-60	9/22/2011	495.82	--	11.36	--	484.46	
MW-186B-60	10/21/2011	495.82	--	12.10	--	483.72	
MW-186B-60	1/10/2012	495.77	No LNAPL	11.96	0.00	483.81	
MW-186B-60	2/16/2012	495.77	No LNAPL	11.99	0.00	483.78	
MW-186B-60	4/19/2012	495.77	No LNAPL	11.32	0.00	484.45	
MW-186B-60	7/30/2012	495.77	No LNAPL	10.04	0.00	485.73	
MW-186B-60	11/1/2012	495.77	No LNAPL	11.46	0.00	484.31	
MW-186B-60	1/24/2013	495.80	--	11.35	--	484.45	
MW-186B-60	3/21/2013	495.83	No LNAPL	11.61	0.00	484.22	
MW-186B-60	4/19/2013	495.88	No LNAPL	11.67	0.00	484.21	
MW-186B-60	4/24/2013	495.88	No LNAPL	11.58	0.00	484.30	Not specified as a vertical gradient well in the 2013 SAP
MW-186B-60	5/20/2013	495.88	--	11.36	--	484.52	
MW-186B-60	6/19/2013	495.84	--	10.51	--	485.33	
MW-186B-60	7/23/2013	495.87	--	10.23	--	485.64	
MW-186B-60	7/25/2013	495.87	--	10.28	--	485.59	
MW-186B-60	8/1/2013	495.83	No LNAPL	10.14	0.00	485.69	
MW-186B-60	8/20/2013	495.84	--	10.20	--	485.64	
MW-186B-60	8/21/2013	495.84	No LNAPL	10.11	0.00	485.73	
MW-186B-60	9/30/2013	495.84	No LNAPL	11.42	0.00	484.42	
MW-186B-60	1/9/2014	495.87	No LNAPL	11.65	0.00	484.22	
MW-186B-60	1/30/2014	495.87	--	11.76	--	484.11	
MW-186B-60	2/5/2014	495.87	No LNAPL	11.80	0.00	484.07	
MW-186B-60	2/24/2014	495.89	--	11.97	--	483.92	
MW-186B-60	3/14/2014	495.90	--	12.04	--	483.86	
MW-186B-60	3/18/2014	495.90	No LNAPL	12.03	0.00	483.87	
MW-186B-60	3/24/2014	495.90	No LNAPL	12.07	0.00	483.83	
MW-186B-60	4/18/2014	495.88	No LNAPL	11.91	0.00	483.97	
MW-186B-60	5/15/2014	495.87	--	11.45	--	484.42	
MW-186B-60	5/20/2014	495.88	--	11.53	--	484.35	
MW-186B-60	6/10/2014	495.88	--	11.62	--	484.26	
MW-186B-60	6/11/2014	495.88	No LNAPL	11.61	0.00	484.27	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-186B-60	6/19/2014	495.87	No LNAPL	11.24	0.00	484.63	
MW-186B-60	7/15/2014	495.88	--	9.47	--	486.41	
MW-186B-60	8/26/2014	495.88	No LNAPL	10.14	0.00	485.74	
MW-186B-60	9/9/2014	495.88	No LNAPL	10.41	0.00	485.47	
MW-186B-60	9/24/2014	495.87	No LNAPL	10.74	0.00	485.13	
MW-186B-60	10/21/2014	495.88	No LNAPL	11.65	0.00	484.23	
MW-186B-60	11/19/2014	495.87	No LNAPL	11.27	0.00	484.60	
MW-186B-60	12/16/2014	495.92	No LNAPL	11.48	0.00	484.44	
MW-186B-60	12/29/2014	495.92	No LNAPL	11.63	0.00	484.29	
MW-186B-60	1/21/2015	495.91	No LNAPL	11.67	0.00	484.24	
MW-186B-60	2/25/2015	495.92	No LNAPL	11.78	0.00	484.14	
MW-186B-60	3/18/2015	495.89	--	11.81	--	484.08	
MW-186B-60	3/26/2015	495.89	No LNAPL	11.74	0.00	484.15	
MW-186B-60	4/16/2015	495.90	--	11.58	--	484.32	
MW-186B-60	5/21/2015	495.89	--	11.31	--	484.58	
MW-186B-60	6/10/2015	495.89	No LNAPL	11.35	0.00	484.54	
MW-186B-60	7/22/2015	495.89	--	10.37	--	485.52	
MW-186B-60	8/12/2015	495.89	--	10.31	--	485.58	
MW-186B-60	8/19/2015	495.89	No LNAPL	10.55	0.00	485.37	
MW-186B-60	9/30/2015	495.88	--	11.04	--	484.84	
MW-186B-60	10/6/2015	495.88	No LNAPL	10.89	0.00	485.00	
MW-186B-60	10/22/2015	495.91	No LNAPL	11.51	0.00	484.40	
MW-186B-60	11/19/2015	495.90	--	11.42	--	484.48	
MW-186B-60	11/25/2015	495.90	No LNAPL	11.21	0.00	484.72	
MW-186B-60	12/11/2015	495.90	--	11.42	--	484.48	
MW-186B-60	1/19/2016	495.92	--	11.93	--	483.95	
MW-186B-60	1/26/2016	495.92	--	11.99	--	483.93	
MW-186B-60	3/22/2016	495.92	No LNAPL	12.22	0.00	483.70	
MW-186B-60	5/26/2016	495.91	No LNAPL	11.55	0.00	484.38	
MW-186B-60	8/12/2016	495.91	--	9.58	--	486.33	
MW-186B-60	9/9/2016	495.92	No LNAPL	10.46	0.00	485.50	
MW-186B-60	9/12/2016	495.92	--	10.48	--	485.44	
MW-186B-60	10/20/2016	495.91	--	11.68	--	484.23	
MW-186B-60	11/15/2016	495.91	No LNAPL	11.07	0.00	484.94	
MW-186B-60	2/8/2017	495.97	No LNAPL	11.56	0.00	484.48	
MW-186B-60	2/15/2017	495.97	No LNAPL	11.59	0.00	484.43	
MW-186B-60	3/14/2017	495.97	--	11.90	--	484.07	
MW-186B-60	6/13/2017	495.95	No LNAPL	10.84	0.00	485.16	
MW-186B-60	7/12/2017	495.95	--	10.14	--	485.81	
MW-186B-60	9/21/2017	495.95	--	11.33	--	484.62	

Appendix A-1
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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-186E-75	11/1/2012	495.73	No LNAPL	11.38	0.00	484.35	
MW-186E-75	1/24/2013	495.71	--	11.25	--	484.46	
MW-186E-75	3/21/2013	495.76	No LNAPL	11.52	0.00	484.24	
MW-186E-75	4/19/2013	495.80	No LNAPL	11.58	0.00	484.22	
MW-186E-75	4/24/2013	495.80	No LNAPL	11.51	0.00	484.29	Not specified as a vertical gradient well in the 2013 SAP
MW-186E-75	5/20/2013	495.79	--	11.26	--	484.53	
MW-186E-75	6/19/2013	495.78	--	10.40	--	485.38	
MW-186E-75	7/23/2013	495.81	--	10.13	--	485.68	
MW-186E-75	7/25/2013	495.81	--	10.16	--	485.65	
MW-186E-75	8/1/2013	495.78	No LNAPL	10.03	0.00	485.75	
MW-186E-75	8/20/2013	495.78	--	10.07	--	485.71	
MW-186E-75	8/21/2013	495.78	No LNAPL	10.01	0.00	485.77	
MW-186E-75	9/30/2013	495.77	No LNAPL	11.31	0.00	484.46	
MW-186E-75	1/9/2014	495.79	No LNAPL	11.53	0.00	484.26	
MW-186E-75	1/30/2014	495.79	--	11.57	--	484.22	
MW-186E-75	2/5/2014	495.79	No LNAPL	11.67	0.00	484.12	
MW-186E-75	2/24/2014	495.78	--	11.84	--	483.94	
MW-186E-75	3/14/2014	495.78	--	11.90	--	483.88	
MW-186E-75	3/18/2014	495.78	No LNAPL	11.89	0.00	483.89	
MW-186E-75	3/24/2014	495.78	No LNAPL	11.92	0.00	483.86	
MW-186E-75	4/18/2014	495.76	No LNAPL	11.75	0.00	484.01	
MW-186E-75	5/15/2014	495.77	--	11.30	--	484.47	
MW-186E-75	5/20/2014	495.78	--	11.40	--	484.38	
MW-186E-75	6/10/2014	495.79	--	11.50	--	484.29	
MW-186E-75	6/11/2014	495.79	No LNAPL	11.50	0.00	484.29	
MW-186E-75	6/19/2014	495.78	No LNAPL	11.13	0.00	484.65	
MW-186E-75	7/15/2014	495.79	--	9.36	--	486.43	
MW-186E-75	8/26/2014	495.79	--	10.02	--	485.77	
MW-186E-75	9/9/2014	495.79	No LNAPL	10.28	0.00	485.51	
MW-186E-75	9/24/2014	495.79	No LNAPL	10.62	0.00	485.17	
MW-186E-75	10/21/2014	495.78	No LNAPL	11.52	0.00	484.26	
MW-186E-75	11/19/2014	495.78	No LNAPL	11.14	0.00	484.64	
MW-186E-75	12/16/2014	495.82	No LNAPL	11.35	0.00	484.47	
MW-186E-75	12/29/2014	495.82	No LNAPL	11.46	0.00	484.36	
MW-186E-75	1/21/2015	495.80	No LNAPL	11.52	0.00	484.28	
MW-186E-75	2/25/2015	495.77	No LNAPL	11.63	0.00	484.14	
MW-186E-75	3/18/2015	495.76	--	11.65	--	484.11	
MW-186E-75	3/26/2015	495.76	No LNAPL	11.57	0.00	484.19	
MW-186E-75	4/16/2015	495.78	--	11.43	--	484.35	
MW-186E-75	5/21/2015	495.78	--	11.17	--	484.61	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-186E-75	6/10/2015	495.79	No LNAPL	11.20	0.00	484.59	
MW-186E-75	7/22/2015	495.79	--	10.23	--	485.56	
MW-186E-75	8/12/2015	495.80	--	10.17	--	485.63	
MW-186E-75	8/19/2015	495.80	No LNAPL	10.41	0.00	485.42	
MW-186E-75	9/30/2015	495.78	--	10.91	--	484.87	
MW-186E-75	10/6/2015	495.79	No LNAPL	10.75	0.00	485.05	
MW-186E-75	10/22/2015	495.79	No LNAPL	11.37	0.00	484.42	
MW-186E-75	11/19/2015	495.79	--	11.27	--	484.52	
MW-186E-75	11/25/2015	495.79	No LNAPL	11.05	0.00	484.77	
MW-186E-75	12/11/2015	495.79	--	11.29	--	484.50	
MW-186E-75	1/19/2016	495.82	--	11.79	--	483.99	
MW-186E-75	1/26/2016	495.82	--	11.85	--	483.97	
MW-186E-75	3/22/2016	495.82	No LNAPL	12.06	0.00	483.76	
MW-186E-75	5/26/2016	495.82	No LNAPL	11.43	0.00	484.41	
MW-186E-75	8/12/2016	495.81	--	9.37	--	486.44	
MW-186E-75	9/9/2016	495.82	No LNAPL	10.33	0.00	485.53	
MW-186E-75	9/12/2016	495.82	--	10.37	--	485.45	
MW-186E-75	10/20/2016	495.81	--	11.55	--	484.26	
MW-186E-75	11/15/2016	495.81	No LNAPL	10.94	0.00	484.97	
MW-186E-75	2/8/2017	495.85	No LNAPL	11.42	0.00	484.50	
MW-186E-75	2/15/2017	495.85	No LNAPL	11.45	0.00	484.45	
MW-186E-75	3/14/2017	495.85	--	11.47	--	484.38	
MW-186E-75	6/13/2017	495.87	No LNAPL	10.75	0.00	485.17	
MW-186E-75	8/3/2017	495.87	--	10.04	--	485.83	
MW-186E-75	10/19/2017	495.87	--	11.39	--	484.48	
MW-186C-100	11/1/2010	495.76	--	11.80	--	483.96	
MW-186C-100	3/25/2011	495.76	--	11.20	--	484.56	
MW-186C-100	7/15/2011	495.76	No LNAPL	9.89	0.00	485.87	
MW-186C-100	8/23/2011	495.76	--	10.18	--	485.58	
MW-186C-100	9/22/2011	495.76	--	11.28	--	484.48	
MW-186C-100	10/21/2011	495.76	--	11.99	--	483.77	
MW-186C-100	1/10/2012	495.72	No LNAPL	11.81	0.00	483.91	
MW-186C-100	3/21/2013	495.75	No LNAPL	11.48	0.00	484.27	
MW-186C-100	4/19/2013	495.80	No LNAPL	11.55	0.00	484.25	
MW-186C-100	4/24/2013	495.80	No LNAPL	11.48	0.00	484.32	
MW-186C-100	5/20/2013	495.78	--	11.21	--	484.57	
MW-186C-100	6/19/2013	495.76	--	10.30	--	485.46	
MW-186C-100	7/25/2013	495.79	--	10.06	--	485.73	
MW-186C-100	8/1/2013	495.75	No LNAPL	9.95	0.00	485.80	
MW-186C-100	8/20/2013	495.76	--	9.99	--	485.77	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-186C-100	9/30/2013	495.76	No LNAPL	11.24	0.00	484.52	
MW-186C-100	1/9/2014	495.76	No LNAPL	11.45	0.00	484.31	
MW-186C-100	1/30/2014	495.76	--	11.47	--	484.29	
MW-186C-100	2/5/2014	495.76	No LNAPL	11.60	0.00	484.16	
MW-186C-100	2/24/2014	495.78	--	11.77	--	484.01	
MW-186C-100	3/14/2014	495.78	--	11.85	--	483.93	
MW-186C-100	3/18/2014	495.78	No LNAPL	11.85	0.00	483.93	
MW-186C-100	3/24/2014	495.78	No LNAPL	11.87	0.00	483.91	
MW-186C-100	4/18/2014	495.77	No LNAPL	11.68	0.00	484.09	
MW-186C-100	5/15/2014	495.76	--	11.23	--	484.53	
MW-186C-100	5/20/2014	495.78	--	11.33	--	484.45	
MW-186C-100	6/10/2014	495.78	--	11.43	--	484.35	
MW-186C-100	6/11/2014	495.78	No LNAPL	11.44	0.00	484.34	
MW-186C-100	6/19/2014	495.76	No LNAPL	11.08	0.00	484.68	
MW-186C-100	7/15/2014	495.77	--	9.27	--	486.50	
MW-186C-100	8/26/2014	495.78	--	9.94	--	485.84	
MW-186C-100	9/9/2014	495.78	No LNAPL	10.21	0.00	485.57	
MW-186C-100	9/24/2014	495.77	No LNAPL	10.55	0.00	485.22	
MW-186C-100	10/21/2014	495.77	No LNAPL	11.48	0.00	484.29	
MW-186C-100	11/19/2014	495.75	No LNAPL	11.07	0.00	484.68	
MW-186C-100	12/16/2014	495.80	No LNAPL	11.26	0.00	484.54	
MW-186C-100	12/29/2014	495.80	No LNAPL	11.39	0.00	484.41	
MW-186C-100	1/21/2015	495.79	No LNAPL	11.46	0.00	484.33	
MW-186C-100	2/25/2015	495.78	No LNAPL	11.57	0.00	484.21	
MW-186C-100	3/18/2015	495.76	--	11.59	--	484.17	
MW-186C-100	3/26/2015	495.76	No LNAPL	11.52	0.00	484.24	
MW-186C-100	4/16/2015	495.77	--	11.38	--	484.39	
MW-186C-100	5/21/2015	495.75	--	11.12	--	484.63	
MW-186C-100	6/10/2015	495.77	No LNAPL	11.12	0.00	484.65	
MW-186C-100	7/22/2015	495.77	--	10.25	--	485.52	
MW-186C-100	8/12/2015	495.77	--	10.11	--	485.66	
MW-186C-100	8/19/2015	495.77	No LNAPL	10.34	0.00	485.46	
MW-186C-100	9/30/2015	495.76	--	10.84	--	484.92	
MW-186C-100	10/6/2015	495.76	No LNAPL	10.68	0.00	485.09	
MW-186C-100	10/22/2015	495.78	No LNAPL	11.29	0.00	484.49	
MW-186C-100	11/19/2015	495.77	--	11.23	--	484.54	
MW-186C-100	11/25/2015	495.77	No LNAPL	10.96	0.00	484.84	
MW-186C-100	12/11/2015	495.77	--	11.20	--	484.57	
MW-186C-100	1/19/2016	495.78	--	11.71	--	484.03	
MW-186C-100	1/26/2016	495.78	--	11.76	--	484.02	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-186C-100	5/26/2016	495.77	No LNAPL	11.34	0.00	484.45	
MW-186C-100	8/12/2016	495.76	--	9.37	--	486.39	
MW-186C-100	9/9/2016	495.78	No LNAPL	10.26	0.00	485.56	
MW-186C-100	11/15/2016	495.76	No LNAPL	10.84	0.00	485.02	
MW-186C-100	2/8/2017	495.78	No LNAPL	11.31	0.00	484.54	
MW-186C-100	2/15/2017	495.78	No LNAPL	11.33	0.00	484.50	
MW-186C-100	6/13/2017	495.79	No LNAPL	10.60	0.00	485.24	
MW-186D-135	2/16/2012	495.13	No LNAPL	11.24	0.00	483.89	
MW-186D-135	4/19/2012	495.13	No LNAPL	10.58	0.00	484.55	
MW-186D-135	7/30/2012	495.13	No LNAPL	9.28	0.00	485.85	
MW-186D-135	11/1/2012	495.13	No LNAPL	11.29	0.00	483.84	
MW-186D-135	1/24/2013	495.72	--	11.17	--	484.55	
MW-186D-135	4/19/2013	495.81	No LNAPL	11.50	0.00	484.31	
MW-186D-135	4/24/2013	495.81	No LNAPL	11.42	0.00	484.39	Not specified as a vertical gradient well in the 2013 SAP
MW-186D-135	5/20/2013	495.77	--	11.17	--	484.60	
MW-186D-135	6/19/2013	495.75	--	10.23	--	485.52	
MW-186D-135	7/25/2013	495.77	--	10.00	--	485.77	
MW-186D-135	8/1/2013	495.75	No LNAPL	9.88	0.00	485.87	
MW-186D-135	8/20/2013	495.76	--	9.92	--	485.84	
MW-186D-135	9/30/2013	495.75	No LNAPL	11.18	0.00	484.57	
MW-186D-135	1/9/2014	495.77	No LNAPL	11.40	0.00	484.37	
MW-186D-135	1/30/2014	495.77	--	11.45	--	484.32	
MW-186D-135	2/5/2014	495.77	No LNAPL	11.54	0.00	484.23	
MW-186D-135	2/24/2014	495.78	--	11.72	--	484.06	
MW-186D-135	3/14/2014	495.78	--	11.80	--	483.98	
MW-186D-135	3/18/2014	495.78	No LNAPL	11.80	0.00	483.98	
MW-186D-135	3/24/2014	495.78	No LNAPL	11.83	0.00	483.95	
MW-186D-135	4/18/2014	495.77	No LNAPL	11.63	0.00	484.14	
MW-186D-135	5/15/2014	495.78	--	11.18	--	484.60	
MW-186D-135	5/20/2014	495.78	--	11.27	--	484.51	
MW-186D-135	6/10/2014	495.78	--	11.39	--	484.39	
MW-186D-135	6/11/2014	495.78	No LNAPL	11.39	0.00	484.39	
MW-186D-135	6/19/2014	495.77	No LNAPL	11.03	0.00	484.74	
MW-186D-135	7/15/2014	495.78	--	9.22	--	486.56	
MW-186D-135	8/26/2014	495.79	--	9.89	--	485.90	
MW-186D-135	9/9/2014	495.79	No LNAPL	10.17	0.00	485.62	
MW-186D-135	9/24/2014	495.78	No LNAPL	10.50	0.00	485.28	
MW-186D-135	10/21/2014	495.78	No LNAPL	11.41	0.00	484.37	
MW-186D-135	11/19/2014	495.77	No LNAPL	11.01	0.00	484.76	
MW-186D-135	12/16/2014	495.82	No LNAPL	11.22	0.00	484.60	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-186D-135	12/29/2014	495.82	No LNAPL	11.35	0.00	484.47	
MW-186D-135	1/21/2015	495.81	No LNAPL	11.42	0.00	484.39	
MW-186D-135	2/25/2015	495.80	No LNAPL	11.52	0.00	484.28	
MW-186D-135	3/18/2015	495.78	--	11.55	--	484.23	
MW-186D-135	3/26/2015	495.78	No LNAPL	11.47	0.00	484.31	
MW-186D-135	4/16/2015	495.80	--	11.33	--	484.47	
MW-186D-135	5/21/2015	495.77	--	11.04	--	484.73	
MW-186D-135	6/10/2015	495.79	No LNAPL	11.08	0.00	484.71	
MW-186D-135	7/22/2015	495.79	--	10.09	--	485.70	
MW-186D-135	8/12/2015	495.79	--	10.01	--	485.78	
MW-186D-135	8/19/2015	495.79	No LNAPL	10.29	0.00	485.53	
MW-186D-135	9/30/2015	495.77	--	10.79	--	484.98	
MW-186D-135	10/6/2015	495.78	No LNAPL	10.63	0.00	485.16	
MW-186D-135	10/22/2015	495.79	No LNAPL	11.25	0.00	484.54	
MW-186D-135	11/19/2015	495.78	--	11.15	--	484.63	
MW-186D-135	11/25/2015	495.78	No LNAPL	10.92	0.00	484.89	
MW-186D-135	12/11/2015	495.78	--	11.15	--	484.63	
MW-186D-135	1/19/2016	495.79	--	11.65	--	484.10	
MW-186D-135	1/26/2016	495.79	--	11.70	--	484.09	
MW-186D-135	3/22/2016	495.79	No LNAPL	11.97	0.00	483.82	
MW-186D-135	5/26/2016	495.78	No LNAPL	11.27	0.00	484.53	
MW-186D-135	9/9/2016	495.80	No LNAPL	10.17	0.00	485.67	
MW-186D-135	9/12/2016	495.80	--	10.24	--	485.56	
MW-186D-135	11/15/2016	495.78	No LNAPL	10.79	0.00	485.09	
MW-186D-135	2/8/2017	495.82	No LNAPL	11.27	0.00	484.62	
MW-186D-135	2/15/2017	495.82	No LNAPL	11.29	0.00	484.58	
MW-186D-135	3/14/2017	495.82	--	11.30	--	484.52	
MW-186D-135	6/13/2017	495.80	No LNAPL	10.54	0.00	485.31	
MW-192A-15	10/21/2011	—	--	10.46	--	—	New well
MW-192A-15	2/16/2012	495.86	--	10.20	--	485.66	
MW-192A-15	4/19/2012	495.86	--	9.47	--	486.39	
MW-192A-15	7/30/2012	495.86	--	7.95	--	487.91	
MW-192A-15	11/1/2012	495.86	No LNAPL	9.46	0.00	486.40	
MW-192A-15	1/24/2013	495.90	--	9.60	--	486.30	
MW-192A-15	4/24/2013	495.90	--	9.46	--	486.44	
MW-192A-15	8/1/2013	495.90	--	8.05	--	487.85	
MW-192A-15	10/1/2013	495.90	--	9.80	--	486.10	
MW-192A-15	3/18/2014	495.90	--	10.37	--	485.53	
MW-192A-15	6/11/2014	496.11	--	9.91	--	486.20	
MW-192A-15	9/9/2014	496.11	--	8.71	--	487.40	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-192A-15	11/20/2014	496.11	No LNAPL	9.31	0.00	486.80	
MW-192A-15	3/19/2015	496.11	--	9.89	--	486.22	
MW-192A-15	6/11/2015	496.11	No LNAPL	9.51	0.00	486.60	
MW-192A-15	8/12/2015	496.19	--	8.20	--	487.99	
MW-192A-15	11/19/2015	496.19	--	9.46	--	486.73	
MW-192A-15	3/22/2016	496.19	No LNAPL	10.45	0.00	485.74	
MW-192A-15	7/26/2016	496.25	--	7.12	--	489.13	
MW-192A-15	9/13/2016	496.25	--	8.71	--	487.54	
MW-192A-15	3/14/2017	496.25	--	9.72	--	486.53	
MW-192A-15	8/10/2017	496.25	--	8.19	--	488.06	
MW-192A-15	8/16/2017	496.25	--	7.96	--	488.29	
MW-192A-15	9/21/2017	496.34	--	9.76	--	486.58	
MW-192A-15	11/15/2017	496.34	--	9.86	--	486.48	
MW-192B-55	10/21/2011	—	--	9.99	--	—	New well
MW-192B-55	2/16/2012	495.42	--	9.76	--	485.66	
MW-192B-55	4/19/2012	495.42	--	9.02	--	486.40	
MW-192B-55	7/30/2012	495.42	--	7.51	--	487.91	
MW-192B-55	11/1/2012	495.42	No LNAPL	9.02	0.00	486.40	
MW-192B-55	1/24/2013	495.47	--	9.13	--	486.34	
MW-192B-55	4/24/2013	495.47	--	9.97	--	485.50	
MW-192B-55	8/1/2013	495.47	--	7.75	--	487.72	
MW-192B-55	10/1/2013	495.47	--	9.30	--	486.17	
MW-192B-55	3/18/2014	495.47	--	9.84	--	485.63	
MW-192B-55	6/11/2014	495.59	--	9.93	--	485.66	
MW-192B-55	9/9/2014	495.59	--	8.20	--	487.39	
MW-192B-55	11/20/2014	495.59	No LNAPL	8.78	0.00	486.81	
MW-192B-55	3/19/2015	495.59	--	9.31	--	486.28	
MW-192B-55	6/11/2015	495.59	No LNAPL	8.98	0.00	486.61	
MW-192B-55	8/12/2015	495.64	--	7.70	--	487.94	
MW-192B-55	11/19/2015	495.64	--	8.91	--	486.73	
MW-192B-55	3/22/2016	495.64	No LNAPL	9.80	0.00	485.84	
MW-192B-55	7/26/2016	495.66	--	6.50	--	489.16	
MW-192B-55	9/13/2016	495.66	--	8.11	--	487.55	
MW-192B-55	3/14/2017	495.66	--	9.00	--	486.66	
MW-192B-55	9/21/2017	495.65	--	9.06	--	486.59	
MW-195A-15	2/7/2012	495.98	No LNAPL	11.62	0.00	484.36	
MW-195A-15	2/15/2012	495.98	No LNAPL	11.54	0.00	484.44	
MW-195A-15	4/10/2012	495.98	No LNAPL	11.44	0.00	484.54	
MW-195A-15	4/19/2012	495.98	--	10.86	--	485.12	
MW-195A-15	7/17/2012	495.98	No LNAPL	9.83	0.00	486.15	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-195A-15	7/30/2012	495.98	--	9.46	--	486.52	
MW-195A-15	8/21/2012	495.98	No LNAPL	10.27	0.00	485.71	
MW-195A-15	9/18/2012	495.98	No LNAPL	11.04	0.00	484.94	
MW-195A-15	10/16/2012	495.98	No LNAPL	11.06	0.00	484.92	
MW-195A-15	11/1/2012	495.98	No LNAPL	10.90	0.00	485.08	
MW-195A-15	11/29/2012	496.10	No LNAPL	10.55	0.00	485.55	
MW-195A-15	12/27/2012	496.10	No LNAPL	10.98	0.00	485.12	
MW-195A-15	1/23/2013	496.10	No LNAPL	10.94	0.00	485.16	
MW-195A-15	2/26/2013	496.10	No LNAPL	11.13	0.00	484.97	
MW-195A-15	4/24/2013	496.10	No LNAPL	11.25	0.00	484.85	
MW-195A-15	8/2/2013	496.10	No LNAPL	9.43	0.00	486.67	
MW-195A-15	10/1/2013	496.10	--	11.08	--	485.02	
MW-195A-15	10/29/2013	496.10	No LNAPL	11.83	0.00	484.27	
MW-195A-15	3/18/2014	496.10	--	11.76	--	484.34	
MW-195A-15	6/11/2014	496.32	--	11.35	--	484.97	
MW-195A-15	9/9/2014	496.32	--	10.18	--	486.14	
MW-195A-15	11/20/2014	496.32	No LNAPL	10.94	0.00	485.38	
MW-195A-15	3/19/2015	496.32	--	11.55	--	484.77	
MW-195A-15	6/11/2015	496.32	No LNAPL	11.13	0.00	485.19	
MW-195A-15	8/12/2015	496.43	--	9.77	--	486.66	
MW-195A-15	10/15/2015	496.43	No LNAPL	11.05	0.00	485.38	
MW-195A-15	11/19/2015	496.43	--	11.01	--	485.42	
MW-195A-15	3/22/2016	496.43	No LNAPL	11.94	0.00	484.49	
MW-195A-15	7/20/2016	496.49	--	9.15	--	487.34	
MW-195A-15	9/13/2016	496.49	--	10.31	--	486.18	
MW-195A-15	10/19/2016	496.49	--	11.45	--	485.04	
MW-195A-15	3/14/2017	496.49	--	10.97	--	485.52	
MW-195B-150	2/15/2012	496.09	No LNAPL	11.56	0.00	484.53	
MW-195B-150	4/19/2012	496.09	--	10.86	--	485.23	
MW-195B-150	7/30/2012	496.09	--	9.48	--	486.61	
MW-195B-150	11/1/2012	496.09	--	10.89	--	485.20	
MW-195B-150	1/24/2013	496.12	--	10.86	--	485.26	
MW-195B-150	4/24/2013	496.12	--	11.18	--	484.94	
MW-195B-150	8/1/2013	496.12	--	9.41	--	486.71	
MW-195B-150	10/1/2013	496.12	--	11.00	--	485.12	
MW-195B-150	3/18/2014	496.12	--	11.53	--	484.59	
MW-195B-150	6/11/2014	496.11	--	11.11	--	485.00	
MW-195B-150	9/9/2014	496.11	--	9.96	--	486.15	
MW-195B-150	11/20/2014	496.11	No LNAPL	10.63	0.00	485.48	
MW-195B-150	3/19/2015	496.11	--	11.16	--	484.95	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-195B-150	6/11/2015	496.11	No LNAPL	10.76	0.00	485.35	
MW-195B-150	8/12/2015	496.17	--	9.60	--	486.57	
MW-195B-150	11/19/2015	496.17	--	10.75	--	485.42	
MW-195B-150	3/22/2016	496.17	No LNAPL	11.58	0.00	484.59	
MW-195B-150	9/13/2016	496.14	--	9.99	--	486.15	
MW-195B-150	3/14/2017	496.14	--	10.89	--	485.25	
MW-196-15	2/7/2012	497.20	No LNAPL	11.36	0.00	485.84	
MW-196-15	4/10/2012	497.20	No LNAPL	11.22	0.00	485.98	
MW-196-15	7/17/2012	497.20	No LNAPL	9.49	0.00	487.71	
MW-196-15	8/21/2012	497.20	No LNAPL	9.98	0.00	487.22	
MW-196-15	9/18/2012	497.20	No LNAPL	10.74	0.00	486.46	
MW-196-15	10/16/2012	497.20	No LNAPL	10.77	0.00	486.43	
MW-196-15	11/29/2012	497.37	No LNAPL	10.33	0.00	487.04	
MW-196-15	12/27/2012	497.37	No LNAPL	10.84	0.00	486.53	
MW-196-15	1/24/2013	497.37	No LNAPL	10.85	0.00	486.52	
MW-196-15	2/26/2013	497.37	No LNAPL	11.06	0.00	486.31	
MW-196-15	4/24/2013	497.37	No LNAPL	11.21	0.00	486.16	
MW-196-15	10/29/2013	497.37	No LNAPL	11.53	0.00	485.84	
MW-196-15	10/15/2015	497.09	No LNAPL	10.18	0.00	486.91	
MW-196-15	8/9/2016	497.29	--	8.13	--	489.16	
MW-197A-65	7/30/2012	495.15	No LNAPL	9.28	0.00	485.87	
MW-197A-65	11/1/2012	495.15	No LNAPL	10.67	0.00	484.48	
MW-197A-65	1/24/2013	495.17	--	10.57	--	484.60	
MW-197A-65	4/24/2013	495.17	No LNAPL	10.87	0.00	484.30	
MW-197A-65	7/23/2013	495.27	--	9.49	--	485.78	
MW-197A-65	8/1/2013	495.27	--	9.36	--	485.91	
MW-197A-65	8/21/2013	495.27	No LNAPL	9.35	0.00	485.92	
MW-197A-65	9/30/2013	495.27	No LNAPL	10.62	0.00	484.65	
MW-197A-65	1/9/2014	495.28	No LNAPL	10.87	0.00	484.41	
MW-197A-65	2/5/2014	495.30	No LNAPL	11.01	0.00	484.29	
MW-197A-65	3/18/2014	495.28	No LNAPL	11.25	0.00	484.03	
MW-197A-65	3/24/2014	495.28	No LNAPL	11.28	0.00	484.00	
MW-197A-65	4/18/2014	495.31	No LNAPL	11.09	0.00	484.22	
MW-197A-65	5/15/2014	495.31	--	10.67	--	484.64	
MW-197A-65	6/11/2014	495.30	No LNAPL	10.83	0.00	484.47	
MW-197A-65	6/19/2014	495.30	No LNAPL	10.49	0.00	484.81	
MW-197A-65	7/15/2014	495.32	No LNAPL	8.68	0.00	486.64	
MW-197A-65	8/26/2014	495.32	No LNAPL	9.30	0.00	486.02	
MW-197A-65	9/9/2014	495.32	No LNAPL	9.57	0.00	485.75	
MW-197A-65	9/24/2014	495.29	No LNAPL	9.91	0.00	485.38	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-197A-65	10/21/2014	495.29	No LNAPL	10.83	0.00	484.46	
MW-197A-65	11/19/2014	495.27	No LNAPL	10.43	0.00	484.84	
MW-197A-65	12/16/2014	495.29	No LNAPL	10.62	0.00	484.67	
MW-197A-65	12/29/2014	495.29	No LNAPL	10.74	0.00	484.55	
MW-197A-65	1/21/2015	495.31	No LNAPL	10.81	0.00	484.50	
MW-197A-65	2/25/2015	495.33	No LNAPL	10.95	0.00	484.38	
MW-197A-65	3/18/2015	495.30	--	10.98	--	484.32	
MW-197A-65	3/26/2015	495.30	No LNAPL	10.91	0.00	484.39	
MW-197A-65	4/16/2015	495.33	--	10.76	--	484.57	
MW-197A-65	5/21/2015	495.32	No LNAPL	10.51	0.00	484.81	
MW-197A-65	6/10/2015	495.34	No LNAPL	10.54	0.00	484.80	
MW-197A-65	8/12/2015	495.33	--	9.48	--	485.85	
MW-197A-65	8/19/2015	495.33	No LNAPL	9.76	0.00	485.60	
MW-197A-65	10/6/2015	495.32	No LNAPL	10.07	0.00	485.26	
MW-197A-65	11/19/2015	495.32	--	10.61	--	484.71	
MW-197A-65	1/19/2016	495.32	--	11.11	--	484.17	
MW-197A-65	3/22/2016	495.32	No LNAPL	11.38	0.00	483.94	
MW-197A-65	5/26/2016	495.34	No LNAPL	10.75	0.00	484.61	
MW-197A-65	8/18/2016	495.31	--	9.09	--	486.22	
MW-197A-65	9/9/2016	495.33	No LNAPL	9.64	0.00	485.73	
MW-197A-65	9/12/2016	495.33	--	9.67	--	485.66	
MW-197A-65	11/15/2016	495.31	No LNAPL	10.25	0.00	485.16	
MW-197A-65	2/8/2017	495.37	No LNAPL	10.74	0.00	484.70	
MW-197A-65	3/14/2017	495.37	--	10.81	--	484.56	
MW-197A-65	6/13/2017	495.43	No LNAPL	10.12	0.00	485.36	
MW-197B-150	7/23/2013	495.30	--	9.41	--	485.89	
MW-197B-150	8/1/2013	495.30	--	9.29	--	486.01	
MW-197B-150	8/21/2013	495.30	No LNAPL	9.30	0.00	486.00	
MW-197B-150	1/9/2014	495.30	No LNAPL	10.81	0.00	484.49	
MW-197B-150	2/5/2014	495.32	No LNAPL	10.95	0.00	484.37	
MW-197B-150	3/24/2014	495.30	No LNAPL	11.23	0.00	484.07	
MW-197B-150	4/18/2014	495.33	No LNAPL	11.05	0.00	484.28	
MW-197B-150	5/15/2014	495.32	--	10.53	--	484.79	
MW-197B-150	6/19/2014	495.32	No LNAPL	10.42	0.00	484.90	
MW-197B-150	7/15/2014	495.33	No LNAPL	8.62	0.00	486.71	
MW-197B-150	8/26/2014	495.33	No LNAPL	9.24	0.00	486.09	
MW-197B-150	9/24/2014	495.30	No LNAPL	9.86	0.00	485.44	
MW-197B-150	10/21/2014	495.30	No LNAPL	10.76	0.00	484.54	
MW-197B-150	11/19/2014	495.28	No LNAPL	10.38	0.00	484.90	
MW-197B-150	12/16/2014	495.30	No LNAPL	10.56	0.00	484.74	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-197B-150	12/29/2014	495.30	No LNAPL	10.67	0.00	484.63	
MW-197B-150	1/21/2015	495.30	No LNAPL	10.72	0.00	484.58	
MW-197B-150	2/25/2015	495.29	No LNAPL	10.84	0.00	484.45	
MW-197B-150	3/18/2015	495.26	No LNAPL	10.87	0.00	484.39	
MW-197B-150	3/26/2015	495.26	No LNAPL	10.79	0.00	484.47	
MW-197B-150	4/16/2015	495.29	--	10.66	--	484.63	
MW-197B-150	5/21/2015	495.30	No LNAPL	10.41	0.00	484.89	
MW-197B-150	6/10/2015	495.32	No LNAPL	10.43	0.00	484.89	
MW-197B-150	8/19/2015	495.31	No LNAPL	9.65	0.00	485.69	
MW-197B-150	10/6/2015	495.30	No LNAPL	9.98	0.00	485.33	
MW-197B-150	1/19/2016	495.30	--	11.01	--	484.25	
MW-197B-150	5/26/2016	495.32	No LNAPL	10.65	0.00	484.69	
MW-197B-150	9/9/2016	495.31	No LNAPL	9.53	0.00	485.82	
MW-197B-150	11/15/2016	495.28	No LNAPL	10.15	0.00	485.23	
MW-197B-150	2/8/2017	495.29	No LNAPL	10.60	0.00	484.76	
MW-197B-150	6/13/2017	495.31	No LNAPL	9.91	0.00	485.45	
MW-198-150	2/18/2012	493.31	No LNAPL	8.31	0.00	485.00	
MW-198-150	4/19/2012	493.31	No LNAPL	7.60	0.00	485.71	
MW-198-150	7/30/2012	493.31	No LNAPL	6.16	0.00	487.15	
MW-198-150	11/1/2012	493.31	No LNAPL	7.65	0.00	485.66	
MW-198-150	1/24/2013	493.32	--	7.61	--	485.71	
MW-198-150	4/24/2013	493.32	No LNAPL	Frozen	0.00	—	Frozen at 7.65 ft BTOC
MW-198-150	8/1/2013	493.32	No LNAPL	6.11	0.00	487.21	
MW-198-150	10/1/2013	493.32	No LNAPL	7.75	0.00	485.57	
MW-198-150	3/18/2014	493.32	No LNAPL	8.31	0.00	485.01	
MW-198-150	6/11/2014	493.32	No LNAPL	7.70	0.00	485.62	
MW-198-150	9/9/2014	493.32	No LNAPL	6.64	0.00	486.68	
MW-198-150	11/20/2014	493.32	No LNAPL	7.38	0.00	485.94	
MW-198-150	3/18/2015	493.32	--	7.90	--	485.42	
MW-198-150	6/10/2015	493.32	No LNAPL	Frozen	0.00	—	Depth to ice is 7.57 feet
MW-198-150	8/12/2015	493.32	--	6.25	--	487.07	
MW-198-150	11/20/2015	493.32	--	7.41	--	485.91	
MW-198-150	3/22/2016	493.32	No LNAPL	8.34	0.00	484.98	
MW-198-150	9/12/2016	493.33	--	6.56	--	486.77	
MW-198-150	3/15/2017	493.33	--	7.59	--	485.74	
MW-198-150	9/21/2017	493.16	--	7.36	--	485.80	
MW-199-150	2/15/2012	495.89	No LNAPL	12.03	0.00	483.86	
MW-199-150	4/19/2012	495.89	--	11.36	--	484.53	
MW-199-150	7/30/2012	495.89	No LNAPL	10.07	0.00	485.82	
MW-199-150	11/1/2012	495.89	--	11.41	--	484.48	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-199-150	1/24/2013	495.90	--	11.37	--	484.53	
MW-199-150	4/24/2013	495.90	--	11.62	--	484.28	
MW-199-150	7/23/2013	495.92	--	10.16	--	485.76	
MW-199-150	8/1/2013	495.92	--	10.05	--	485.87	
MW-199-150	8/21/2013	495.92	No LNAPL	10.05	0.00	485.87	
MW-199-150	10/1/2013	495.90	--	11.45	--	484.45	
MW-199-150	1/9/2014	495.93	--	11.62	--	484.31	
MW-199-150	2/5/2014	495.91	--	11.72	--	484.19	
MW-199-150	3/18/2014	495.94	--	12.03	--	483.91	
MW-199-150	3/24/2014	495.94	--	12.05	--	483.89	
MW-199-150	4/18/2014	495.95	--	11.80	--	484.15	
MW-199-150	5/15/2014	495.91	--	11.39	--	484.52	
MW-199-150	6/11/2014	495.95	--	11.59	--	484.36	
MW-199-150	6/19/2014	495.95	--	11.23	--	484.72	
MW-199-150	7/15/2014	495.91	--	9.41	--	486.50	
MW-199-150	8/26/2014	495.92	--	10.10	--	485.82	
MW-199-150	9/9/2014	495.92	--	10.42	--	485.50	
MW-199-150	9/24/2014	495.90	--	10.73	--	485.17	
MW-199-150	10/21/2014	495.90	--	11.65	--	484.25	
MW-199-150	11/19/2014	495.90	--	11.23	--	484.67	
MW-199-150	12/16/2014	495.93	--	11.43	--	484.50	
MW-199-150	1/21/2015	495.91	--	11.62	--	484.29	
MW-199-150	2/25/2015	495.92	--	11.69	--	484.23	
MW-199-150	3/18/2015	495.93	--	11.75	--	484.18	
MW-199-150	3/26/2015	495.93	--	11.67	--	484.26	
MW-199-150	4/16/2015	495.92	--	11.51	--	484.41	
MW-199-150	5/21/2015	495.92	--	11.23	--	484.69	
MW-199-150	6/10/2015	495.90	--	11.29	--	484.61	
MW-199-150	8/12/2015	495.90	--	10.23	--	485.67	
MW-199-150	8/19/2015	495.90	--	10.48	--	485.42	
MW-199-150	10/6/2015	495.90	--	10.84	--	485.06	
MW-199-150	11/19/2015	495.90	--	11.31	--	484.59	
MW-199-150	1/19/2016	495.91	--	11.87	--	484.04	
MW-199-150	3/22/2016	495.91	No LNAPL	12.12	0.00	483.79	
MW-199-150	5/26/2016	495.90	--	11.46	--	484.44	
MW-199-150	8/9/2016	495.91	--	9.36	--	486.55	
MW-199-150	9/9/2016	495.90	--	10.38	--	485.52	
MW-199-150	9/13/2016	495.90	--	10.52	--	485.38	
MW-199-150	11/15/2016	495.91	--	10.96	--	484.95	
MW-199-150	2/8/2017	495.91	--	11.40	--	484.51	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-199-150	3/14/2017	495.91	--	11.48	--	484.43	
MW-199-150	6/13/2017	495.89	--	10.70	--	485.19	
MW-300-150	2/16/2012	495.98	No LNAPL	11.02	0.00	484.96	
MW-300-150	4/19/2012	495.98	No LNAPL	10.34	0.00	485.64	
MW-300-150	7/30/2012	495.98	No LNAPL	9.00	0.00	486.98	
MW-300-150	11/1/2012	495.98	No LNAPL	10.45	0.00	485.53	
MW-300-150	1/24/2013	496.00	--	10.34	--	485.66	
MW-300-150	4/24/2013	496.00	No LNAPL	10.58	0.00	485.42	
MW-300-150	8/1/2013	496.00	No LNAPL	9.98	0.00	486.02	
MW-300-150	10/1/2013	496.00	No LNAPL	10.36	0.00	485.64	
MW-300-150	3/18/2014	496.00	No LNAPL	10.98	0.00	485.02	
MW-300-150	6/11/2014	496.04	No LNAPL	10.55	0.00	485.49	
MW-300-150	9/9/2014	496.04	No LNAPL	9.21	0.00	486.83	
MW-300-150	11/20/2014	496.04	No LNAPL	10.04	0.00	486.00	
MW-300-150	3/19/2015	496.04	--	10.53	--	485.51	
MW-300-150	6/11/2015	496.04	No LNAPL	10.12	0.00	485.92	
MW-300-150	8/12/2015	496.03	--	8.98	--	487.05	
MW-300-150	11/19/2015	496.03	--	10.15	--	485.88	
MW-300-150	3/22/2016	496.03	No LNAPL	11.00	0.00	485.03	
MW-300-150	9/12/2016	496.02	--	9.19	--	486.83	
MW-300-150	3/14/2017	496.02	--	10.21	--	485.81	
MW-300-150	9/21/2017	496.03	--	10.15	--	485.88	
MW-301-CMT-10	2/15/2012	—	--	9.57	--	—	
MW-301-CMT-10	4/20/2012	—	--	Frozen	--	—	Frozen at 9.50 ft BTOC
MW-301-CMT-10	7/31/2012	—	--	7.61	--	—	
MW-301-CMT-10	11/1/2012	—	--	8.99	--	—	
MW-301-CMT-10	1/24/2013	—	--	8.98	--	—	
MW-301-CMT-10	4/24/2013	—	--	Frozen	--	—	Frozen at 9.15 ft BTOC
MW-301-CMT-10	8/1/2013	—	--	7.64	--	—	
MW-301-CMT-10	10/1/2013	493.00	--	9.10	--	483.90	
MW-301-CMT-10	1/9/2014	493.15	--	6.34	--	486.81	
MW-301-CMT-10	2/5/2014	493.14	--	9.48	--	483.66	
MW-301-CMT-10	3/18/2014	493.18	--	9.80	--	483.38	
MW-301-CMT-10	3/24/2014	493.18	--	9.87	--	483.31	
MW-301-CMT-10	4/18/2014	493.13	--	9.54	--	483.59	
MW-301-CMT-10	5/15/2014	493.15	--	9.28	--	483.87	
MW-301-CMT-10	6/11/2014	493.16	--	9.48	--	483.68	
MW-301-CMT-10	6/19/2014	493.16	--	6.11	--	487.05	
MW-301-CMT-10	7/15/2014	493.13	--	7.22	--	485.91	
MW-301-CMT-10	9/9/2014	493.13	--	8.29	--	484.84	

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North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-301-CMT-10	11/20/2014	493.13	--	9.22	--	483.91	
MW-301-CMT-10	3/19/2015	493.13	--	9.89	--	483.24	
MW-301-CMT-10	6/10/2015	493.13	--	9.38	--	483.75	
MW-301-CMT-10	8/12/2015	493.27	--	8.28	--	484.99	
MW-301-CMT-10	11/19/2015	493.27	--	9.49	--	483.78	
MW-301-CMT-10	3/22/2016	493.27	--	10.43	--	482.84	
MW-301-CMT-10	7/15/2016	492.79	--	7.37	--	485.42	
MW-301-CMT-10	9/13/2016	492.79	--	8.00	--	484.79	
MW-301-CMT-10	3/15/2017	492.79	--	9.30	--	483.49	
MW-301-CMT-20	2/15/2012	—	--	9.57	--	—	
MW-301-CMT-20	4/20/2012	—	--	Frozen	--	—	Frozen at 9.49 ft BTOC
MW-301-CMT-20	7/31/2012	—	--	7.60	--	—	
MW-301-CMT-20	11/1/2012	—	--	8.98	--	—	
MW-301-CMT-20	1/24/2013	—	--	8.97	--	—	
MW-301-CMT-20	4/24/2013	—	--	Frozen	--	—	Frozen at 9.17 ft BTOC
MW-301-CMT-20	8/1/2013	—	--	7.62	--	—	
MW-301-CMT-20	10/1/2013	—	--	9.11	--	—	
MW-301-CMT-20	3/18/2014	—	--	9.79	--	—	
MW-301-CMT-20	6/11/2014	493.15	--	9.47	--	483.68	
MW-301-CMT-20	9/9/2014	493.15	--	8.27	--	484.88	
MW-301-CMT-20	11/20/2014	493.15	--	9.13	--	484.02	
MW-301-CMT-20	3/19/2015	493.15	--	9.88	--	483.27	
MW-301-CMT-20	6/10/2015	493.15	--	9.39	--	483.76	
MW-301-CMT-20	8/12/2015	493.27	--	8.29	--	484.98	
MW-301-CMT-20	11/19/2015	493.27	--	9.46	--	483.81	
MW-301-CMT-20	7/15/2016	492.79	--	7.35	--	485.44	
MW-301-CMT-20	7/26/2017	492.79	--	7.55	--	485.24	
MW-301-CMT-20	10/16/2017	492.79	--	8.82	--	483.97	
MW-301-CMT-30	2/15/2012	—	--	9.58	--	—	
MW-301-CMT-30	4/20/2012	—	--	Frozen	--	—	Frozen at 9.38 ft BTOC
MW-301-CMT-30	7/31/2012	—	--	7.61	--	—	
MW-301-CMT-30	11/1/2012	—	--	8.98	--	—	
MW-301-CMT-30	1/24/2013	—	--	8.97	--	—	
MW-301-CMT-30	4/24/2013	—	--	Frozen	--	—	Frozen at 9.15 ft BTOC
MW-301-CMT-30	8/1/2013	—	--	7.63	--	—	
MW-301-CMT-30	10/1/2013	—	--	9.12	--	—	
MW-301-CMT-30	3/18/2014	—	--	9.81	--	—	
MW-301-CMT-30	6/11/2014	493.15	--	9.50	--	483.65	
MW-301-CMT-30	9/9/2014	493.15	--	8.28	--	484.87	
MW-301-CMT-30	11/20/2014	493.15	--	9.13	--	484.02	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-301-CMT-30	3/19/2015	493.15	--	9.89	--	483.26	
MW-301-CMT-30	6/10/2015	493.15	--	9.38	--	483.77	
MW-301-CMT-30	8/12/2015	493.27	--	8.30	--	484.97	
MW-301-CMT-30	11/19/2015	493.27	--	9.47	--	483.80	
MW-301-CMT-30	7/15/2016	492.79	--	7.38	--	485.41	
MW-301-CMT-40	2/15/2012	—	--	9.59	--	—	
MW-301-CMT-40	4/20/2012	—	--	Frozen	--	—	Frozen at 8.70 ft BTOC
MW-301-CMT-40	7/31/2012	—	--	7.66	--	—	
MW-301-CMT-40	11/1/2012	—	--	8.99	--	—	
MW-301-CMT-40	1/24/2013	—	--	8.98	--	—	
MW-301-CMT-40	4/24/2013	—	--	Frozen	--	—	Frozen at 9.16 ft BTOC
MW-301-CMT-40	8/1/2013	—	--	7.64	--	—	
MW-301-CMT-40	10/1/2013	—	--	9.12	--	—	
MW-301-CMT-40	3/18/2014	—	--	9.81	--	—	
MW-301-CMT-40	6/11/2014	493.15	--	9.50	--	483.65	
MW-301-CMT-40	9/9/2014	493.15	--	8.29	--	484.86	
MW-301-CMT-40	11/20/2014	493.15	--	9.12	--	484.03	
MW-301-CMT-40	3/19/2015	493.15	--	9.90	--	483.25	
MW-301-CMT-40	6/10/2015	493.15	--	9.38	--	483.77	
MW-301-CMT-40	8/12/2015	493.27	--	8.29	--	484.98	
MW-301-CMT-40	11/19/2015	493.27	--	9.49	--	483.78	
MW-301-CMT-40	7/15/2016	492.79	--	7.39	--	485.40	
MW-301-CMT-50	2/15/2012	—	--	9.70	--	—	
MW-301-CMT-50	4/20/2012	—	--	Frozen	--	—	Frozen at 9.36 ft BTOC
MW-301-CMT-50	7/31/2012	—	--	7.62	--	—	
MW-301-CMT-50	11/1/2012	—	--	9.10	--	—	
MW-301-CMT-50	1/24/2013	—	--	8.98	--	—	
MW-301-CMT-50	4/24/2013	—	--	Frozen	--	—	Frozen at 9.16 ft BTOC
MW-301-CMT-50	8/1/2013	—	--	7.66	--	—	
MW-301-CMT-50	10/1/2013	—	--	9.13	--	—	
MW-301-CMT-50	3/18/2014	—	--	9.81	--	—	
MW-301-CMT-50	6/11/2014	493.15	--	9.48	--	483.67	
MW-301-CMT-50	9/9/2014	493.15	--	8.27	--	484.88	
MW-301-CMT-50	11/20/2014	493.15	No LNAPL	9.20	0.00	483.95	
MW-301-CMT-50	3/19/2015	493.15	--	9.90	--	483.25	
MW-301-CMT-50	6/10/2015	493.15	--	9.39	--	483.76	
MW-301-CMT-50	8/12/2015	493.27	--	8.31	--	484.96	
MW-301-CMT-50	11/19/2015	493.27	--	9.47	--	483.80	
MW-301-CMT-50	7/15/2016	492.79	--	7.38	--	485.41	
MW-301-60	2/15/2012	492.76	--	9.52	--	483.24	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-301-60	4/20/2012	492.76	--	8.78	--	483.98	
MW-301-60	7/31/2012	492.76	--	7.59	--	485.17	
MW-301-60	11/1/2012	492.76	--	8.94	--	483.82	
MW-301-60	1/24/2013	492.85	--	8.72	--	484.13	
MW-301-60	4/24/2013	492.85	--	Frozen	--	—	Frozen at 9.24 ft BTOC
MW-301-60	8/1/2013	492.85	--	7.25	--	485.60	
MW-301-60	10/1/2013	492.61	No LNAPL	8.75	0.00	483.86	
MW-301-60	3/18/2014	492.65	--	9.32	--	483.33	
MW-301-60	4/25/2014	492.60	--	8.38	--	484.22	
MW-301-60	5/20/2014	492.66	--	8.84	--	483.82	
MW-301-60	6/4/2014	492.65	--	9.02	--	483.63	
MW-301-60	6/11/2014	492.65	--	8.98	--	483.67	
MW-301-60	9/9/2014	492.65	--	7.85	--	484.80	
MW-301-60	11/20/2014	492.65	No LNAPL	8.69	0.00	483.96	
MW-301-60	3/19/2015	492.54	--	9.22	--	483.32	
MW-301-60	6/10/2015	492.86	--	8.74	--	484.12	
MW-301-60	8/12/2015	492.86	--	7.65	--	485.21	Datalogger was found displaced on arrival- reset to proper position
MW-301-60	11/19/2015	492.86	--	8.84	--	484.02	
MW-301-60	3/22/2016	492.75	No LNAPL	9.58	0.00	483.17	
MW-301-60	7/21/2016	492.75	--	6.68	--	486.07	
MW-301-60	9/13/2016	492.75	--	8.11	--	484.64	
MW-301-60	3/15/2017	492.75	--	9.08	--	483.67	
MW-301-60	7/14/2017	492.75	--	7.56	--	485.19	
MW-301-60	9/21/2017	492.87	--	8.99	--	483.88	
MW-301-60	10/16/2017	492.87	--	8.91	--	483.96	
MW-301-70	2/15/2012	—	--	9.09	--	—	
MW-301-70	4/20/2012	—	--	8.37	--	—	
MW-301-70	7/31/2012	—	--	7.18	--	—	
MW-301-70	11/1/2012	—	--	8.52	--	—	
MW-301-70	1/24/2013	492.46	--	8.59	--	483.87	
MW-301-70	4/24/2013	492.46	--	9.89	--	482.57	
MW-301-70	8/1/2013	492.46	--	7.26	--	485.20	
MW-301-70	10/1/2013	492.65	No LNAPL	8.78	0.00	483.87	
MW-301-70	1/9/2014	492.73	--	8.92	--	483.81	
MW-301-70	2/5/2014	492.72	--	9.08	--	483.64	
MW-301-70	3/18/2014	492.77	--	9.37	--	483.40	
MW-301-70	3/24/2014	492.77	--	9.40	--	483.37	
MW-301-70	4/18/2014	492.70	--	9.10	--	483.60	
MW-301-70	4/25/2014	492.70	--	8.45	--	484.25	
MW-301-70	5/15/2014	492.73	--	8.81	--	483.92	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-301-70	5/20/2014	492.77	--	8.93	--	483.84	
MW-301-70	6/4/2014	492.76	--	9.10	--	483.66	
MW-301-70	6/11/2014	492.73	--	9.06	--	483.67	
MW-301-70	6/19/2014	492.73	--	8.69	--	484.04	
MW-301-70	7/15/2014	492.74	--	6.85	--	485.89	
MW-301-70	8/26/2014	492.75	--	7.60	--	485.15	
MW-301-70	9/9/2014	492.75	--	7.94	--	484.81	
MW-301-70	9/24/2014	492.75	--	8.22	--	484.53	
MW-301-70	10/21/2014	492.72	--	9.14	--	483.58	
MW-301-70	11/19/2014	492.66	--	8.69	--	483.97	
MW-301-70	11/20/2014	492.66	No LNAPL	8.68	0.00	483.98	
MW-301-70	12/16/2014	492.62	--	8.91	--	483.71	
MW-301-70	1/21/2015	492.63	--	9.15	--	483.48	
MW-301-70	2/25/2015	492.64	--	9.22	--	483.42	
MW-301-70	3/18/2015	492.85	--	9.28	--	483.57	
MW-301-70	3/19/2015	492.85	--	9.26	--	483.59	
MW-301-70	3/26/2015	492.85	--	9.20	--	483.65	
MW-301-70	4/16/2015	492.85	--	9.06	--	483.79	
MW-301-70	5/21/2015	492.85	--	8.76	--	484.09	
MW-301-70	6/10/2015	492.51	--	8.35	--	484.16	
MW-301-70	6/10/2015	492.51	--	8.39	--	484.12	
MW-301-70	8/12/2015	492.51	--	7.27	--	485.24	Datalogger was found displaced on arrival - reset to proper position
MW-301-70	8/19/2015	492.51	--	7.55	--	484.96	
MW-301-70	10/6/2015	492.52	--	8.01	--	484.51	
MW-301-70	11/19/2015	492.50	--	8.45	--	484.05	
MW-301-70	1/19/2016	492.51	--	8.95	--	483.56	
MW-301-70	3/22/2016	492.41	No LNAPL	9.25	0.00	483.16	
MW-301-70	5/26/2016	492.51	--	8.57	--	483.94	
MW-301-70	7/21/2016	492.47	--	6.33	--	486.14	
MW-301-70	9/9/2016	492.51	--	7.62	--	484.89	
MW-301-70	9/13/2016	492.51	--	7.74	--	484.77	
MW-301-70	11/15/2016	492.47	--	8.18	--	484.29	
MW-301-70	2/8/2017	492.49	--	8.69	--	483.80	
MW-301-70	3/15/2017	492.49	--	8.79	--	483.70	
MW-301-70	6/13/2017	492.61	--	8.00	--	484.61	
MW-302-CMT-10	2/15/2012	—	--	11.05	--	—	
MW-302-CMT-10	4/20/2012	—	--	10.27	--	—	
MW-302-CMT-10	7/31/2012	—	--	9.13	--	—	
MW-302-CMT-10	11/1/2012	—	--	10.50	--	—	
MW-302-CMT-10	1/24/2013	—	--	10.36	--	—	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-302-CMT-10	4/24/2013	—	--	10.71	--	—	
MW-302-CMT-10	8/1/2013	—	--	9.02	--	—	
MW-302-CMT-10	10/1/2013	—	--	10.42	--	—	
MW-302-CMT-10	3/18/2014	—	--	10.97	--	—	
MW-302-CMT-10	6/11/2014	494.27	--	10.60	--	483.67	
MW-302-CMT-10	9/9/2014	494.27	--	9.42	--	484.85	
MW-302-CMT-10	11/20/2014	494.27	--	10.21	--	484.06	
MW-302-CMT-10	3/19/2015	494.27	--	10.78	--	483.49	
MW-302-CMT-10	6/10/2015	494.27	--	10.29	--	483.98	
MW-302-CMT-10	8/12/2015	494.24	--	9.24	--	485.00	
MW-302-CMT-10	11/19/2015	494.24	--	10.39	--	483.85	
MW-302-CMT-10	7/14/2016	494.16	--	8.95	--	485.21	
MW-302-CMT-10	9/13/2016	494.16	--	9.60	--	484.56	
MW-302-CMT-10	3/15/2017	494.16	--	10.60	--	483.56	
MW-302-CMT-20	2/15/2012	—	--	11.05	--	—	
MW-302-CMT-20	4/20/2012	—	--	10.25	--	—	
MW-302-CMT-20	7/31/2012	—	--	9.12	--	—	
MW-302-CMT-20	11/1/2012	—	--	10.47	--	—	
MW-302-CMT-20	1/24/2013	—	--	10.35	--	—	
MW-302-CMT-20	4/24/2013	—	--	10.70	--	—	
MW-302-CMT-20	8/1/2013	—	--	9.03	--	—	
MW-302-CMT-20	10/1/2013	—	--	10.41	--	—	
MW-302-CMT-20	3/18/2014	—	--	10.96	--	—	
MW-302-CMT-20	6/11/2014	494.27	--	10.59	--	483.68	
MW-302-CMT-20	9/9/2014	494.27	--	9.43	--	484.84	
MW-302-CMT-20	11/20/2014	494.27	--	10.25	--	484.02	
MW-302-CMT-20	3/19/2015	494.27	--	10.77	--	483.50	
MW-302-CMT-20	6/10/2015	494.27	--	10.29	--	483.98	
MW-302-CMT-20	8/12/2015	494.24	--	9.24	--	485.00	
MW-302-CMT-20	11/19/2015	494.24	--	10.39	--	483.85	
MW-302-CMT-20	7/14/2016	494.16	--	8.95	--	485.21	
MW-302-CMT-20	10/19/2016	494.16	--	10.49	--	483.67	
MW-302-CMT-20	7/31/2017	494.16	--	9.27	--	484.89	
MW-302-CMT-20	10/17/2017	494.16	--	10.37	--	483.79	
MW-302-CMT-30	2/15/2012	—	--	11.10	--	—	
MW-302-CMT-30	4/20/2012	—	--	10.25	--	—	
MW-302-CMT-30	7/31/2012	—	--	9.12	--	—	
MW-302-CMT-30	11/1/2012	—	--	10.48	--	—	
MW-302-CMT-30	1/24/2013	—	--	10.35	--	—	
MW-302-CMT-30	4/24/2013	—	--	10.70	--	—	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-302-CMT-30	8/1/2013	—	--	9.02	--	—	
MW-302-CMT-30	10/1/2013	—	--	10.41	--	—	
MW-302-CMT-30	3/18/2014	—	--	10.96	--	—	
MW-302-CMT-30	6/11/2014	494.27	--	10.60	--	483.67	
MW-302-CMT-30	9/9/2014	494.27	--	9.43	--	484.84	
MW-302-CMT-30	11/20/2014	494.27	--	10.21	--	484.06	
MW-302-CMT-30	3/19/2015	494.27	--	10.77	--	483.50	
MW-302-CMT-30	6/10/2015	494.27	--	10.29	--	483.98	
MW-302-CMT-30	8/12/2015	494.24	--	9.24	--	485.00	
MW-302-CMT-30	11/19/2015	494.24	--	10.38	--	483.86	
MW-302-CMT-30	7/14/2016	494.16	--	8.94	--	485.22	
MW-302-CMT-40	2/15/2012	—	--	11.13	--	—	
MW-302-CMT-40	4/20/2012	—	--	10.26	--	—	
MW-302-CMT-40	7/31/2012	—	--	9.10	--	—	
MW-302-CMT-40	11/1/2012	—	--	10.47	--	—	
MW-302-CMT-40	1/24/2013	—	--	10.37	--	—	
MW-302-CMT-40	4/24/2013	—	--	10.69	--	—	
MW-302-CMT-40	8/1/2013	—	--	9.06	--	—	
MW-302-CMT-40	10/1/2013	—	--	10.40	--	—	
MW-302-CMT-40	3/18/2014	—	--	10.96	--	—	
MW-302-CMT-40	6/11/2014	494.27	--	10.60	--	483.67	
MW-302-CMT-40	9/9/2014	494.27	--	9.42	--	484.85	
MW-302-CMT-40	11/20/2014	494.27	--	10.21	--	484.06	
MW-302-CMT-40	3/19/2015	494.27	--	10.77	--	483.50	
MW-302-CMT-40	6/10/2015	494.27	--	10.28	--	483.99	
MW-302-CMT-40	8/12/2015	494.24	--	9.23	--	485.01	
MW-302-CMT-40	11/19/2015	494.24	--	10.36	--	483.88	
MW-302-CMT-40	7/14/2016	494.16	--	8.94	--	485.22	
MW-302-CMT-50	2/15/2012	—	--	11.15	--	—	
MW-302-CMT-50	4/20/2012	—	--	10.27	--	—	
MW-302-CMT-50	7/31/2012	—	--	9.13	--	—	
MW-302-CMT-50	11/1/2012	—	--	10.48	--	—	
MW-302-CMT-50	1/24/2013	—	--	10.36	--	—	
MW-302-CMT-50	4/24/2013	—	--	10.70	--	—	
MW-302-CMT-50	8/1/2013	—	--	9.05	--	—	
MW-302-CMT-50	10/1/2013	—	--	10.40	--	—	
MW-302-CMT-50	3/18/2014	—	--	10.97	--	—	
MW-302-CMT-50	6/11/2014	494.27	--	10.61	--	483.66	
MW-302-CMT-50	9/9/2014	494.27	--	9.43	--	484.84	
MW-302-CMT-50	11/20/2014	494.27	--	10.23	--	484.04	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-302-CMT-50	3/19/2015	494.27	--	10.77	--	483.50	
MW-302-CMT-50	6/10/2015	494.27	--	10.29	--	483.98	
MW-302-CMT-50	8/12/2015	494.24	--	9.25	--	484.99	
MW-302-CMT-50	11/19/2015	494.24	--	10.39	--	483.85	
MW-302-CMT-50	3/22/2016	494.24	--	11.12	--	483.12	
MW-302-CMT-50	7/14/2016	494.16	--	8.96	--	485.20	
MW-302-CMT-50	9/13/2016	494.16	--	9.61	--	484.55	
MW-302-CMT-50	3/15/2017	494.16	--	10.60	--	483.56	
MW-302-CMT-50	7/31/2017	494.16	--	9.41	--	484.75	
MW-302-CMT-50	9/21/2017	494.16	--	10.41	--	483.75	
MW-302-CMT-50	10/17/2017	494.16	--	10.38	--	483.78	
MW-302-70	2/15/2012	493.25	--	9.96	--	483.29	
MW-302-70	4/20/2012	493.25	--	9.24	--	484.01	
MW-302-70	7/31/2012	493.25	--	8.32	--	484.93	
MW-302-70	11/1/2012	493.25	--	9.41	--	483.84	
MW-302-70	1/24/2013	493.29	--	9.26	--	484.03	
MW-302-70	4/24/2013	493.29	--	9.51	--	483.78	
MW-302-70	8/1/2013	493.29	--	8.03	--	485.26	
MW-302-70	10/1/2013	493.29	No LNAPL	9.43	0.00	483.86	
MW-302-70	3/18/2014	493.29	--	9.92	--	483.37	
MW-302-70	6/11/2014	493.16	--	9.58	--	483.58	
MW-302-70	9/9/2014	493.16	--	8.43	--	484.73	
MW-302-70	11/20/2014	493.16	No LNAPL	9.23	0.00	483.93	
MW-302-70	3/19/2015	493.16	--	9.72	--	483.44	
MW-302-70	6/10/2015	493.16	--	9.30	--	483.86	
MW-302-70	8/12/2015	493.27	--	8.24	--	485.03	
MW-302-70	11/19/2015	493.27	--	9.39	--	483.88	
MW-302-70	7/14/2016	493.25	--	8.11	--	485.14	
MW-302-80	2/15/2012	493.46	--	10.19	--	483.27	
MW-302-80	4/20/2012	493.46	--	9.45	--	484.01	
MW-302-80	7/31/2012	493.46	--	8.10	--	485.36	
MW-302-80	11/1/2012	493.46	--	9.67	--	483.79	
MW-302-80	1/24/2013	493.49	--	9.51	--	483.98	
MW-302-80	4/24/2013	493.49	--	9.73	--	483.76	
MW-302-80	8/1/2013	493.49	--	8.23	--	485.26	
MW-302-80	10/1/2013	493.49	No LNAPL	9.66	0.00	483.83	
MW-302-80	3/18/2014	493.49	--	10.19	--	483.30	
MW-302-80	6/11/2014	493.38	--	9.81	--	483.57	
MW-302-80	9/9/2014	493.38	--	8.69	--	484.69	
MW-302-80	11/20/2014	493.38	No LNAPL	9.45	0.00	483.93	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-302-80	3/19/2015	493.38	--	9.94	--	483.44	
MW-302-80	6/10/2015	493.38	--	9.52	--	483.86	
MW-302-80	8/12/2015	493.48	--	8.48	--	485.00	
MW-302-80	11/19/2015	493.48	--	9.61	--	483.87	
MW-302-80	7/14/2016	493.46	--	8.29	--	485.17	
MW-302-80	9/13/2016	493.46	--	8.83	--	484.63	
MW-302-80	3/15/2017	493.46	--	9.78	--	483.68	
MW-302-80	8/1/2017	493.46	--	8.46	--	485.00	
MW-302-80	9/21/2017	493.67	--	9.68	--	483.99	
MW-302-80	10/16/2017	493.67	--	9.64	--	484.03	
MW-302-95	7/31/2012	492.93	--	7.84	--	485.09	
MW-302-95	11/1/2012	492.93	--	9.12	--	483.81	
MW-302-95	1/24/2013	493.00	--	8.96	--	484.04	
MW-302-95	4/24/2013	493.00	--	9.23	--	483.77	
MW-302-95	8/1/2013	493.00	--	5.75	--	487.25	
MW-302-95	10/1/2013	493.00	No LNAPL	9.15	0.00	483.85	
MW-302-95	3/18/2014	493.00	--	9.93	--	483.07	
MW-302-95	6/11/2014	492.85	--	9.30	--	483.55	
MW-302-95	9/9/2014	492.85	--	8.15	--	484.70	
MW-302-95	11/20/2014	492.85	No LNAPL	8.95	0.00	483.90	
MW-302-95	3/19/2015	492.85	--	9.42	--	483.43	
MW-302-95	6/10/2015	492.85	--	9.00	--	483.85	
MW-302-95	8/12/2015	492.95	--	7.95	--	485.00	
MW-302-95	11/19/2015	492.95	--	9.08	--	483.87	
MW-302-95	7/14/2016	492.93	--	7.79	--	485.14	
MW-302-110	2/15/2012	493.60	--	10.37	--	483.23	
MW-302-110	4/20/2012	493.60	--	9.64	--	483.96	
MW-302-110	7/31/2012	493.60	--	8.49	--	485.11	
MW-302-110	11/1/2012	493.60	--	9.83	--	483.77	
MW-302-110	1/24/2013	493.65	--	9.68	--	483.97	
MW-302-110	4/24/2013	493.65	--	9.93	--	483.72	
MW-302-110	8/1/2013	493.65	--	8.41	--	485.24	
MW-302-110	10/1/2013	493.65	No LNAPL	9.83	0.00	483.82	
MW-302-110	3/18/2014	493.65	--	10.38	--	483.27	
MW-302-110	6/11/2014	493.58	--	10.00	--	483.58	
MW-302-110	9/9/2014	493.58	--	8.85	--	484.73	
MW-302-110	11/20/2014	493.58	No LNAPL	9.61	0.00	483.97	
MW-302-110	3/19/2015	493.58	--	10.13	--	483.45	
MW-302-110	6/10/2015	493.58	--	9.70	--	483.88	
MW-302-110	8/12/2015	493.66	--	8.65	--	485.01	

Appendix A-1
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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-302-110	11/19/2015	493.66	--	9.78	--	483.88	
MW-302-110	7/14/2016	493.65	--	8.47	--	485.18	
MW-302-110	9/13/2016	493.65	--	9.01	--	484.64	
MW-302-110	3/15/2017	493.65	--	9.98	--	483.67	
MW-303-CMT-9	2/15/2012	—	--	12.62	--	—	
MW-303-CMT-9	4/20/2012	—	--	11.73	--	—	
MW-303-CMT-9	7/31/2012	—	--	10.69	--	—	
MW-303-CMT-9	11/1/2012	—	--	12.02	--	—	
MW-303-CMT-9	1/24/2013	—	--	12.00	--	—	
MW-303-CMT-9	4/24/2013	—	--	12.27	--	—	
MW-303-CMT-9	8/1/2013	—	--	10.87	--	—	
MW-303-CMT-9	10/1/2013	—	--	11.85	--	—	
MW-303-CMT-9	3/18/2014	—	--	12.63	--	—	
MW-303-CMT-9	6/11/2014	495.91	--	12.70	--	483.21	
MW-303-CMT-9	9/9/2014	495.91	--	10.84	--	485.07	
MW-303-CMT-9	11/20/2014	495.91	--	11.76	--	484.15	
MW-303-CMT-9	3/19/2015	495.91	--	12.46	--	483.45	
MW-303-CMT-9	6/10/2015	495.91	--	11.75	--	484.16	
MW-303-CMT-9	8/12/2015	495.73	--	10.74	--	484.99	
MW-303-CMT-9	11/19/2015	495.73	--	11.87	--	483.86	
MW-303-CMT-9	7/14/2016	495.67	--	10.59	--	485.08	
MW-303-CMT-9	9/13/2016	495.67	--	11.01	--	484.66	
MW-303-CMT-9	3/15/2017	495.67	--	12.28	--	483.39	
MW-303-CMT-19	2/15/2012	—	--	12.64	--	—	
MW-303-CMT-19	4/20/2012	—	--	11.74	--	—	
MW-303-CMT-19	7/31/2012	—	--	10.70	--	—	
MW-303-CMT-19	11/1/2012	—	--	12.02	--	—	
MW-303-CMT-19	1/24/2013	—	--	11.59	--	—	
MW-303-CMT-19	4/24/2013	—	--	12.25	--	—	
MW-303-CMT-19	8/1/2013	—	--	10.89	--	—	
MW-303-CMT-19	10/1/2013	—	--	11.86	--	—	
MW-303-CMT-19	3/18/2014	—	--	12.61	--	—	
MW-303-CMT-19	6/11/2014	495.91	--	11.96	--	483.95	
MW-303-CMT-19	9/9/2014	495.91	--	10.85	--	485.06	
MW-303-CMT-19	11/20/2014	495.91	--	11.78	--	484.13	
MW-303-CMT-19	3/19/2015	495.91	--	12.46	--	483.45	
MW-303-CMT-19	6/10/2015	495.91	--	11.76	--	484.15	
MW-303-CMT-19	8/12/2015	495.73	--	10.74	--	484.99	
MW-303-CMT-19	11/19/2015	495.73	--	11.87	--	483.86	
MW-303-CMT-19	7/14/2016	495.67	--	10.59	--	485.08	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-303-CMT-19	7/28/2017	495.67	--	10.75	--	484.92	
MW-303-CMT-19	10/17/2017	495.67	--	11.87	--	483.80	
MW-303-CMT-29	2/15/2012	—	--	12.65	--	—	
MW-303-CMT-29	4/20/2012	—	--	11.75	--	—	
MW-303-CMT-29	7/31/2012	—	--	10.70	--	—	
MW-303-CMT-29	11/1/2012	—	--	12.02	--	—	
MW-303-CMT-29	1/24/2013	—	--	11.59	--	—	
MW-303-CMT-29	4/24/2013	—	--	12.25	--	—	
MW-303-CMT-29	8/1/2013	—	--	10.86	--	—	
MW-303-CMT-29	10/1/2013	—	--	11.86	--	—	
MW-303-CMT-29	3/18/2014	—	--	12.62	--	—	
MW-303-CMT-29	6/11/2014	495.91	--	12.06	--	483.85	
MW-303-CMT-29	9/9/2014	495.91	--	10.86	--	485.05	
MW-303-CMT-29	11/20/2014	495.91	--	11.77	--	484.14	
MW-303-CMT-29	3/19/2015	495.91	--	12.46	--	483.45	
MW-303-CMT-29	6/10/2015	495.91	--	11.77	--	484.14	
MW-303-CMT-29	8/12/2015	495.73	--	10.74	--	484.99	
MW-303-CMT-29	11/19/2015	495.73	--	11.86	--	483.87	
MW-303-CMT-29	7/14/2016	495.67	--	10.61	--	485.06	
MW-303-CMT-39	2/15/2012	—	--	12.64	--	—	
MW-303-CMT-39	4/20/2012	—	--	11.71	--	—	
MW-303-CMT-39	7/31/2012	—	--	10.70	--	—	
MW-303-CMT-39	11/1/2012	—	--	12.02	--	—	
MW-303-CMT-39	1/24/2013	—	--	12.01	--	—	
MW-303-CMT-39	4/24/2013	—	--	12.25	--	—	
MW-303-CMT-39	8/1/2013	—	--	10.86	--	—	
MW-303-CMT-39	10/1/2013	—	--	11.86	--	—	
MW-303-CMT-39	3/18/2014	—	--	12.61	--	—	
MW-303-CMT-39	6/11/2014	495.91	--	12.06	--	483.85	
MW-303-CMT-39	9/9/2014	495.91	--	10.87	--	485.04	
MW-303-CMT-39	11/20/2014	495.91	--	11.78	--	484.13	
MW-303-CMT-39	3/19/2015	495.91	--	12.46	--	483.45	
MW-303-CMT-39	6/10/2015	495.91	--	11.75	--	484.16	
MW-303-CMT-39	8/12/2015	495.73	--	10.75	--	484.98	
MW-303-CMT-39	11/19/2015	495.73	--	11.86	--	483.87	
MW-303-CMT-39	7/14/2016	495.67	--	10.59	--	485.08	
MW-303-CMT-39	7/28/2017	495.67	--	10.75	--	484.92	
MW-303-CMT-39	10/17/2017	495.67	--	11.88	--	483.79	
MW-303-CMT-49	2/15/2012	—	--	12.64	--	—	
MW-303-CMT-49	4/20/2012	—	--	11.73	--	—	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-303-CMT-49	7/31/2012	—	--	10.70	--	—	
MW-303-CMT-49	11/1/2012	—	--	12.02	--	—	
MW-303-CMT-49	1/24/2013	—	--	11.59	--	—	
MW-303-CMT-49	4/24/2013	—	--	12.26	--	—	
MW-303-CMT-49	8/1/2013	—	--	10.86	--	—	
MW-303-CMT-49	10/1/2013	—	--	11.86	--	—	
MW-303-CMT-49	3/18/2014	—	--	12.61	--	—	
MW-303-CMT-49	6/11/2014	495.91	--	12.08	--	483.83	
MW-303-CMT-49	9/9/2014	495.91	--	10.86	--	485.05	
MW-303-CMT-49	11/20/2014	495.91	--	11.77	--	484.14	
MW-303-CMT-49	3/19/2015	495.91	--	12.47	--	483.44	
MW-303-CMT-49	6/10/2015	495.91	--	11.75	--	484.16	
MW-303-CMT-49	8/12/2015	495.73	--	10.75	--	484.98	
MW-303-CMT-49	11/19/2015	495.73	--	11.84	--	483.89	
MW-303-CMT-49	7/14/2016	495.67	--	10.61	--	485.06	
MW-303-CMT-59	2/15/2012	—	--	12.65	--	—	
MW-303-CMT-59	4/20/2012	—	--	11.75	--	—	
MW-303-CMT-59	7/31/2012	—	--	10.70	--	—	
MW-303-CMT-59	11/1/2012	—	--	12.02	--	—	
MW-303-CMT-59	1/24/2013	—	--	12.00	--	—	
MW-303-CMT-59	4/24/2013	—	--	12.26	--	—	
MW-303-CMT-59	8/1/2013	—	--	10.88	--	—	
MW-303-CMT-59	10/1/2013	—	--	11.88	--	—	
MW-303-CMT-59	3/18/2014	—	--	12.61	--	—	
MW-303-CMT-59	6/11/2014	495.91	--	12.05	--	483.86	
MW-303-CMT-59	9/9/2014	495.91	--	10.87	--	485.04	
MW-303-CMT-59	11/20/2014	495.91	--	11.78	--	484.13	
MW-303-CMT-59	3/19/2015	495.91	--	12.46	--	483.45	
MW-303-CMT-59	6/10/2015	495.91	--	11.77	--	484.14	
MW-303-CMT-59	8/12/2015	495.73	--	10.76	--	484.97	
MW-303-CMT-59	11/19/2015	495.73	--	11.86	--	483.87	
MW-303-CMT-59	3/22/2016	495.73	--	12.76	--	482.97	
MW-303-CMT-59	7/14/2016	495.67	--	10.61	--	485.06	
MW-303-CMT-59	9/13/2016	495.67	--	11.05	--	484.62	
MW-303-CMT-59	3/15/2017	495.67	--	12.29	--	483.38	
MW-303-CMT-59	7/28/2017	495.67	--	10.76	--	484.91	
MW-303-CMT-59	9/21/2017	495.70	--	11.93	--	483.77	
MW-303-CMT-59	10/17/2017	495.70	--	11.89	--	483.81	
MW-303-70	2/15/2012	495.03	--	11.75	--	483.28	
MW-303-70	4/20/2012	495.03	--	11.02	--	484.01	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-303-70	7/31/2012	495.03	--	9.90	--	485.13	
MW-303-70	11/1/2012	495.03	--	11.26	--	483.77	
MW-303-70	1/24/2013	495.06	--	11.14	--	483.92	
MW-303-70	4/24/2013	495.06	--	11.39	--	483.67	
MW-303-70	8/1/2013	495.06	--	9.89	--	485.17	
MW-303-70	10/1/2013	495.06	No LNAPL	11.25	0.00	483.81	
MW-303-70	3/18/2014	491.74	--	8.49	--	483.25	
MW-303-70	6/11/2014	491.74	--	8.14	--	483.60	
MW-303-70	9/9/2014	491.74	--	6.93	--	484.81	
MW-303-70	11/20/2014	491.74	No LNAPL	7.73	0.00	484.01	
MW-303-70	3/19/2015	491.74	--	8.31	--	483.43	
MW-303-70	6/10/2015	491.74	--	7.85	--	483.89	
MW-303-70	8/12/2015	491.82	--	6.84	--	484.98	Casing needs to be cut
MW-303-70	11/19/2015	491.82	--	7.95	--	483.87	
MW-303-70	7/18/2016	491.93	--	6.48	--	485.45	
MW-303-80	2/15/2012	—	--	11.79	--	—	
MW-303-80	4/20/2012	—	--	11.07	--	—	
MW-303-80	7/31/2012	—	--	9.95	--	—	
MW-303-80	11/1/2012	—	--	11.27	--	—	
MW-303-80	1/24/2013	495.12	--	11.17	--	483.95	
MW-303-80	4/24/2013	495.12	--	11.41	--	483.71	
MW-303-80	8/1/2013	495.12	--	9.96	--	485.16	
MW-303-80	10/1/2013	495.12	No LNAPL	11.30	0.00	483.82	
MW-303-80	3/18/2014	491.77	--	8.49	--	483.28	
MW-303-80	6/11/2014	491.77	--	8.15	--	483.62	
MW-303-80	9/9/2014	491.77	--	6.97	--	484.80	
MW-303-80	11/20/2014	491.77	No LNAPL	7.81	0.00	483.96	
MW-303-80	3/19/2015	491.77	--	8.31	--	483.46	
MW-303-80	6/10/2015	491.77	--	7.85	--	483.92	
MW-303-80	8/12/2015	491.83	--	6.83	--	485.00	
MW-303-80	11/19/2015	491.83	--	7.94	--	483.89	
MW-303-80	3/22/2016	491.83	No LNAPL	8.69	0.00	483.14	
MW-303-80	7/18/2016	491.83	--	6.39	--	485.44	
MW-303-80	9/13/2016	491.83	--	7.14	--	484.69	
MW-303-80	3/15/2017	491.83	--	8.19	--	483.64	
MW-303-80	8/1/2017	491.83	--	6.87	--	484.96	
MW-303-80	9/21/2017	491.62	--	7.80	--	483.82	
MW-303-80	10/16/2017	491.62	--	7.72	--	483.90	
MW-303-95	4/20/2012	—	--	11.02	--	—	
MW-303-95	7/31/2012	495.11	--	9.91	--	485.20	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-303-95	11/1/2012	495.11	--	12.24	--	482.87	
MW-303-95	1/24/2013	495.12	--	11.15	--	483.97	
MW-303-95	4/24/2013	495.12	--	11.38	--	483.74	
MW-303-95	8/1/2013	495.12	--	9.87	--	485.25	
MW-303-95	10/1/2013	495.12	No LNAPL	11.25	0.00	483.87	
MW-303-95	3/18/2014	495.12	--	11.84	--	483.28	
MW-303-95	6/11/2014	495.08	--	11.44	--	483.64	
MW-303-95	9/9/2014	495.08	--	10.25	--	484.83	
MW-303-95	11/20/2014	495.08	No LNAPL	11.05	0.00	484.03	
MW-303-95	3/19/2015	495.08	--	11.59	--	483.49	
MW-303-95	6/10/2015	495.08	--	11.13	--	483.95	
MW-303-95	8/12/2015	495.15	--	10.10	--	485.05	
MW-303-95	11/19/2015	495.15	--	11.20	--	483.95	
MW-303-95	7/18/2016	495.14	--	9.65	--	485.49	
MW-303-130	2/15/2012	495.12	--	11.80	--	483.32	
MW-303-130	4/20/2012	495.12	--	11.07	--	484.05	
MW-303-130	7/31/2012	495.12	--	9.95	--	485.17	
MW-303-130	11/1/2012	495.12	--	11.24	--	483.88	
MW-303-130	1/24/2013	495.15	--	11.13	--	484.02	
MW-303-130	4/24/2013	495.15	--	11.38	--	483.77	
MW-303-130	8/1/2013	495.15	--	9.89	--	485.26	
MW-303-130	10/1/2013	495.15	No LNAPL	11.25	0.00	483.90	
MW-303-130	3/18/2014	495.15	--	11.79	--	483.36	
MW-303-130	6/11/2014	495.08	--	11.43	--	483.65	
MW-303-130	9/9/2014	495.08	--	10.13	--	484.95	
MW-303-130	11/20/2014	495.08	No LNAPL	10.99	0.00	484.09	
MW-303-130	3/19/2015	495.08	--	11.56	--	483.52	
MW-303-130	6/10/2015	495.08	--	11.13	--	483.95	
MW-303-130	8/12/2015	495.13	--	10.08	--	485.05	
MW-303-130	11/19/2015	495.13	--	11.17	--	483.96	
MW-303-130	3/22/2016	495.13	No LNAPL	11.91	0.00	483.22	
MW-303-130	7/18/2016	495.12	--	9.64	--	485.48	
MW-303-130	9/13/2016	495.12	--	10.40	--	484.72	
MW-303-130	3/15/2017	495.12	--	11.37	--	483.75	
MW-304-CMT-10	2/17/2012	—	--	Frozen	--	—	Frozen at 2.45 ft BTOC
MW-304-CMT-10	4/20/2012	—	--	Frozen	--	—	Frozen at 5.04 ft BTOC
MW-304-CMT-10	7/31/2012	—	--	12.53	--	—	
MW-304-CMT-10	11/1/2012	—	--	-	--	—	
MW-304-CMT-10	1/24/2013	—	--	Frozen	--	—	Frozen at 2.60 ft BTOC
MW-304-CMT-10	4/24/2013	—	--	Frozen	--	—	Frozen at 3.54 ft BTOC

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-304-CMT-10	8/1/2013	—	--	12.40	--	—	
MW-304-CMT-10	10/1/2013	—	--	Dry	--	—	Well channel was dry
MW-304-CMT-10	3/18/2014	—	--	Dry	--	—	Well channel was dry
MW-304-CMT-10	6/11/2014	497.59	--	Dry	--	—	Well channel was dry, measured to 13.32 feet
MW-304-CMT-10	9/9/2014	497.59	--	12.61	--	484.98	
MW-304-CMT-10	11/20/2014	497.59	--	Dry	--	—	Well was dry
MW-304-CMT-10	3/19/2015	497.59	--	Dry	--	—	Depth to ice/bottom = 13.42 feet
MW-304-CMT-10	6/10/2015	497.59	--	Dry	--	—	BOW measured to be 13.40 feet
MW-304-CMT-10	8/12/2015	497.56	--	12.52	--	485.04	
MW-304-CMT-10	11/19/2015	497.56	--	Dry	--	—	Depth to bottom = 13.08 feet
MW-304-CMT-10	3/22/2016	497.56	--	Dry	--	—	Well is dry; bottom at 13.42 feet
MW-304-CMT-10	7/21/2016	497.56	--	11.77	--	485.79	
MW-304-CMT-10	9/13/2016	497.56	--	12.79	--	484.77	
MW-304-CMT-10	3/14/2017	497.56	--	Dry	--	—	Well was dry. Depth to bottom not recorded
MW-304-15	4/20/2012	—	--	13.02	--	—	
MW-304-15	7/31/2012	496.95	--	11.81	--	485.14	
MW-304-15	11/1/2012	496.95	--	13.16	--	483.79	
MW-304-15	1/24/2013	496.97	--	13.00	--	483.97	
MW-304-15	3/20/2013	497.00	--	Frozen	--	—	Frozen/obstructed; a depth to ice was not recorded
MW-304-15	4/19/2013	496.98	--	Frozen	--	—	Frozen/obstructed at 2.69 feet below measuring point
MW-304-15	4/24/2013	496.98	--	Frozen	--	—	Frozen at 3.47 ft BTOC
MW-304-15	5/21/2013	496.99	--	Frozen	--	—	Frozen at 5.83 feet below measuring point
MW-304-15	6/19/2013	496.98	--	12.17	--	484.81	
MW-304-15	7/25/2013	496.96	--	11.93	--	485.03	
MW-304-15	8/1/2013	496.96	--	11.82	--	485.14	
MW-304-15	8/20/2013	496.97	--	11.88	--	485.09	
MW-304-15	10/1/2013	496.97	No LNAPL	13.07	0.00	483.90	
MW-304-15	1/9/2014	496.98	--	13.30	--	483.68	
MW-304-15	1/30/2014	496.99	--	13.33	--	483.66	
MW-304-15	2/5/2014	496.99	--	13.39	--	483.60	
MW-304-15	2/24/2014	496.99	--	13.58	--	483.41	
MW-304-15	3/14/2014	497.01	--	13.64	--	483.37	
MW-304-15	3/18/2014	497.01	--	13.63	--	483.38	
MW-304-15	3/24/2014	497.01	--	13.87	--	483.14	
MW-304-15	4/18/2014	497.00	--	13.45	--	483.55	
MW-304-15	4/25/2014	497.00	--	12.74	--	484.26	
MW-304-15	5/15/2014	497.00	--	13.05	--	483.95	
MW-304-15	5/20/2014	496.99	--	13.13	--	483.86	
MW-304-15	6/10/2014	497.00	--	13.25	--	483.75	
MW-304-15	6/11/2014	497.00	--	13.27	--	483.73	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-304-15	6/19/2014	496.99	--	12.96	--	484.03	
MW-304-15	7/15/2014	496.99	--	11.15	--	485.84	
MW-304-15	8/26/2014	496.99	--	11.83	--	485.16	
MW-304-15	8/28/2014	496.99	--	11.85	--	485.14	
MW-304-15	9/9/2014	496.99	--	12.05	--	484.94	
MW-304-15	9/24/2014	496.99	--	12.39	--	484.60	
MW-304-15	9/26/2014	496.99	--	12.42	--	484.57	
MW-304-15	10/21/2014	496.99	--	13.27	--	483.72	
MW-304-15	10/27/2014	496.99	No LNAPL	13.45	0.00	483.54	
MW-304-15	11/19/2014	496.99	--	12.94	--	484.05	
MW-304-15	11/20/2014	496.99	No LNAPL	12.91	0.00	484.08	
MW-304-15	12/16/2014	497.02	No LNAPL	13.15	0.00	483.87	
MW-304-15	12/29/2014	497.02	No LNAPL	13.27	0.00	483.75	
MW-304-15	1/21/2015	497.03	--	13.35	--	483.68	
MW-304-15	2/2/2015	497.03	No LNAPL	13.44	0.00	483.59	
MW-304-15	2/17/2015	497.02	No LNAPL	13.45	0.00	483.57	
MW-304-15	2/25/2015	497.02	--	13.42	--	483.60	
MW-304-15	3/18/2015	497.03	--	13.47	--	483.56	
MW-304-15	3/19/2015	497.03	--	13.45	--	483.58	
MW-304-15	3/26/2015	497.03	--	13.39	--	483.64	
MW-304-15	4/14/2015	497.04	--	13.26	--	483.78	
MW-304-15	4/16/2015	497.04	--	13.24	--	483.80	
MW-304-15	5/18/2015	497.04	--	12.96	--	484.08	
MW-304-15	5/21/2015	497.04	--	12.97	--	484.07	
MW-304-15	6/10/2015	497.03	--	13.00	--	484.03	
MW-304-15	7/22/2015	496.89	--	11.95	--	484.94	
MW-304-15	8/12/2015	496.88	--	11.84	--	485.04	
MW-304-15	8/19/2015	496.88	--	12.10	--	484.78	
MW-304-15	9/30/2015	496.90	--	12.54	--	484.36	
MW-304-15	10/6/2015	496.89	--	12.35	--	484.54	
MW-304-15	10/22/2015	496.89	No LNAPL	13.01	0.00	483.88	
MW-304-15	11/19/2015	496.89	--	12.95	--	483.94	
MW-304-15	11/25/2015	496.89	No LNAPL	12.77	0.00	484.15	
MW-304-15	12/11/2015	496.89	--	12.96	--	483.93	
MW-304-15	1/19/2016	496.90	--	13.44	--	483.46	
MW-304-15	1/26/2016	496.91	--	13.50	--	483.41	
MW-304-15	5/26/2016	496.91	--	13.07	--	483.84	
MW-304-15	7/22/2016	496.92	--	10.84	--	486.08	
MW-304-15	9/9/2016	496.92	--	12.01	--	484.91	
MW-304-15	10/14/2016	496.92	--	13.01	--	483.91	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-304-15	11/15/2016	496.92	--	12.66	--	484.26	
MW-304-15	2/8/2017	496.95	--	13.07	--	483.88	
MW-304-15	2/15/2017	496.95	--	13.12	--	483.83	
MW-304-15	6/13/2017	496.97	--	12.42	--	484.55	
MW-304-CMT-20	2/17/2012	—	--	14.33	--	—	
MW-304-CMT-20	4/20/2012	—	--	14.08	--	—	
MW-304-CMT-20	7/31/2012	—	--	12.54	--	—	
MW-304-CMT-20	11/1/2012	—	--	13.86	--	—	
MW-304-CMT-20	1/24/2013	—	--	13.65	--	—	
MW-304-CMT-20	4/24/2013	—	--	13.86	--	—	
MW-304-CMT-20	8/1/2013	—	--	12.41	--	—	
MW-304-CMT-20	10/1/2013	—	--	13.67	--	—	
MW-304-CMT-20	3/18/2014	—	--	14.27	--	—	
MW-304-CMT-20	6/11/2014	497.59	--	13.85	--	483.74	
MW-304-CMT-20	9/9/2014	497.59	--	12.61	--	484.98	
MW-304-CMT-20	11/20/2014	497.59	--	13.48	--	484.11	
MW-304-CMT-20	3/19/2015	497.59	--	14.01	--	483.58	
MW-304-CMT-20	6/10/2015	497.59	--	13.54	--	484.05	
MW-304-CMT-20	8/12/2015	497.56	--	12.52	--	485.04	
MW-304-CMT-20	11/19/2015	497.56	--	13.60	--	483.96	
MW-304-CMT-20	7/21/2016	497.56	--	11.70	--	485.86	
MW-304-CMT-20	10/19/2016	497.56	--	13.82	--	483.74	
MW-304-CMT-20	7/28/2017	497.56	--	12.56	--	485.00	
MW-304-CMT-20	10/17/2017	497.56	--	13.62	--	483.94	
MW-304-CMT-30	2/17/2012	—	--	Frozen	--	—	Frozen at 3.26 ft BTOC
MW-304-CMT-30	4/20/2012	—	--	13.89	--	—	
MW-304-CMT-30	7/31/2012	—	--	12.51	--	—	
MW-304-CMT-30	11/1/2012	—	--	13.85	--	—	
MW-304-CMT-30	1/24/2013	—	--	13.65	--	—	
MW-304-CMT-30	4/24/2013	—	--	13.86	--	—	
MW-304-CMT-30	8/1/2013	—	--	12.41	--	—	
MW-304-CMT-30	10/1/2013	—	--	13.67	--	—	
MW-304-CMT-30	3/18/2014	—	--	14.27	--	—	
MW-304-CMT-30	6/11/2014	497.59	--	13.86	--	483.73	
MW-304-CMT-30	9/9/2014	497.59	--	12.63	--	484.96	
MW-304-CMT-30	11/20/2014	497.59	--	13.49	--	484.10	
MW-304-CMT-30	3/19/2015	497.59	--	14.01	--	483.58	
MW-304-CMT-30	6/10/2015	497.59	--	13.55	--	484.04	
MW-304-CMT-30	8/12/2015	497.56	--	12.53	--	485.03	
MW-304-CMT-30	11/19/2015	497.56	--	13.60	--	483.96	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-304-CMT-30	7/21/2016	497.56	--	11.71	--	485.85	
MW-304-CMT-40	2/17/2012	—	--	Frozen	--	—	Frozen at 2.44 ft BTOC
MW-304-CMT-40	4/20/2012	—	--	13.79	--	—	
MW-304-CMT-40	7/31/2012	—	--	12.52	--	—	
MW-304-CMT-40	11/1/2012	—	--	13.86	--	—	
MW-304-CMT-40	1/24/2013	—	--	13.65	--	—	
MW-304-CMT-40	4/24/2013	—	--	13.86	--	—	
MW-304-CMT-40	8/1/2013	—	--	12.43	--	—	
MW-304-CMT-40	10/1/2013	—	--	13.67	--	—	
MW-304-CMT-40	3/18/2014	—	--	14.27	--	—	
MW-304-CMT-40	6/11/2014	497.59	--	13.86	--	483.73	
MW-304-CMT-40	9/9/2014	497.59	--	12.63	--	484.96	
MW-304-CMT-40	11/20/2014	497.59	--	13.48	--	484.11	
MW-304-CMT-40	3/19/2015	497.59	--	14.02	--	483.57	
MW-304-CMT-40	6/10/2015	497.59	--	13.55	--	484.04	
MW-304-CMT-40	8/12/2015	497.56	--	12.52	--	485.04	
MW-304-CMT-40	11/19/2015	497.56	--	13.61	--	483.95	
MW-304-CMT-40	7/21/2016	497.56	--	11.72	--	485.84	
MW-304-CMT-40	7/28/2017	497.56	--	12.61	--	484.95	
MW-304-CMT-40	10/17/2017	497.56	--	13.65	--	483.91	
MW-304-CMT-50	2/17/2012	—	--	Frozen	--	—	Frozen at 2.62 ft BTOC
MW-304-CMT-50	4/20/2012	—	--	13.71	--	—	
MW-304-CMT-50	7/31/2012	—	--	12.52	--	—	
MW-304-CMT-50	11/1/2012	—	--	13.85	--	—	
MW-304-CMT-50	1/24/2013	—	--	13.66	--	—	
MW-304-CMT-50	4/24/2013	—	--	13.86	--	—	
MW-304-CMT-50	8/1/2013	—	--	12.39	--	—	
MW-304-CMT-50	10/1/2013	—	--	13.66	--	—	
MW-304-CMT-50	3/18/2014	—	--	14.25	--	—	
MW-304-CMT-50	6/11/2014	497.59	--	13.86	--	483.73	
MW-304-CMT-50	9/9/2014	497.59	--	12.61	--	484.98	
MW-304-CMT-50	11/20/2014	497.59	--	13.50	--	484.09	
MW-304-CMT-50	3/19/2015	497.59	--	14.00	--	483.59	
MW-304-CMT-50	6/10/2015	497.59	--	13.55	--	484.04	
MW-304-CMT-50	8/12/2015	497.56	--	12.53	--	485.03	
MW-304-CMT-50	11/19/2015	497.56	--	13.60	--	483.96	
MW-304-CMT-50	7/21/2016	497.56	--	11.69	--	485.87	
MW-304-CMT-60	2/17/2012	—	--	Frozen	--	—	Frozen at 3.32 ft BTOC
MW-304-CMT-60	4/20/2012	—	--	13.67	--	—	
MW-304-CMT-60	7/31/2012	—	--	12.51	--	—	

Appendix A-1
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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-304-CMT-60	11/1/2012	—	--	13.85	--	—	
MW-304-CMT-60	1/24/2013	—	--	13.66	--	—	
MW-304-CMT-60	4/24/2013	—	--	13.86	--	—	
MW-304-CMT-60	8/1/2013	—	--	12.37	--	—	
MW-304-CMT-60	10/1/2013	—	--	13.66	--	—	
MW-304-CMT-60	3/18/2014	—	--	14.26	--	—	
MW-304-CMT-60	6/11/2014	497.59	--	13.85	--	483.74	
MW-304-CMT-60	9/9/2014	497.59	--	12.62	--	484.97	
MW-304-CMT-60	11/20/2014	497.59	--	13.46	--	484.13	
MW-304-CMT-60	3/19/2015	497.59	--	14.00	--	483.59	
MW-304-CMT-60	6/10/2015	497.59	--	13.54	--	484.05	
MW-304-CMT-60	8/12/2015	497.56	--	12.53	--	485.03	
MW-304-CMT-60	11/19/2015	497.56	--	13.59	--	483.97	
MW-304-CMT-60	3/22/2016	497.56	--	14.31	--	483.25	
MW-304-CMT-60	7/21/2016	497.56	--	11.67	--	485.89	
MW-304-CMT-60	9/13/2016	497.56	--	12.79	--	484.77	
MW-304-CMT-60	3/14/2017	497.56	--	13.80	--	483.76	
MW-304-CMT-60	7/28/2017	497.56	--	12.32	--	485.24	
MW-304-CMT-60	10/17/2017	497.56	--	13.68	--	483.88	
MW-304-70	2/16/2012	496.94	--	13.63	--	483.31	
MW-304-70	4/20/2012	496.94	--	12.99	--	483.95	
MW-304-70	7/31/2012	496.94	--	11.83	--	485.11	
MW-304-70	11/1/2012	496.94	--	13.12	--	483.82	
MW-304-70	1/24/2013	496.99	--	12.97	--	484.02	
MW-304-70	4/24/2013	496.99	--	13.21	--	483.78	
MW-304-70	8/1/2013	496.99	--	11.79	--	485.20	
MW-304-70	10/1/2013	496.99	No LNAPL	13.05	0.00	483.94	
MW-304-70	3/18/2014	496.99	--	13.63	--	483.36	
MW-304-70	6/11/2014	496.96	--	13.24	--	483.72	
MW-304-70	9/9/2014	496.96	--	12.04	--	484.92	
MW-304-70	11/20/2014	496.96	No LNAPL	12.88	0.00	484.08	
MW-304-70	3/19/2015	496.96	--	13.39	--	483.57	
MW-304-70	6/10/2015	496.96	--	12.95	--	484.01	
MW-304-70	8/12/2015	496.98	--	11.93	--	485.05	
MW-304-70	11/19/2015	496.98	--	13.02	--	483.96	
MW-304-70	7/27/2016	496.99	--	11.03	--	485.96	
MW-304-80	2/16/2012	496.69	--	13.39	--	483.30	
MW-304-80	4/20/2012	496.69	--	12.71	--	483.98	
MW-304-80	7/31/2012	496.69	--	11.56	--	485.13	
MW-304-80	11/1/2012	496.69	--	12.90	--	483.79	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-304-80	1/24/2013	496.75	--	12.73	--	484.02	
MW-304-80	4/19/2013	496.73	--	13.04	--	483.69	
MW-304-80	4/24/2013	496.73	--	12.94	--	483.79	
MW-304-80	5/21/2013	496.72	--	12.73	--	483.99	
MW-304-80	6/19/2013	496.72	--	11.87	--	484.85	
MW-304-80	7/25/2013	496.71	--	11.66	--	485.05	
MW-304-80	8/1/2013	496.71	--	11.73	--	484.98	
MW-304-80	8/20/2013	496.72	--	11.59	--	485.13	
MW-304-80	10/1/2013	496.72	No LNAPL	12.82	0.00	483.90	
MW-304-80	1/30/2014	496.73	--	13.02	--	483.71	
MW-304-80	2/24/2014	496.71	--	13.30	--	483.41	
MW-304-80	3/14/2014	496.74	--	13.36	--	483.38	
MW-304-80	3/18/2014	496.74	--	13.36	--	483.38	
MW-304-80	4/25/2014	496.73	--	12.43	--	484.30	
MW-304-80	5/20/2014	496.73	--	12.84	--	483.89	
MW-304-80	6/10/2014	496.73	--	12.96	--	483.77	
MW-304-80	6/11/2014	496.73	--	12.98	--	483.75	
MW-304-80	7/15/2014	496.73	--	10.88	--	485.85	
MW-304-80	8/28/2014	496.73	--	11.55	--	485.18	
MW-304-80	9/9/2014	496.73	--	11.80	--	484.93	
MW-304-80	9/26/2014	496.74	--	12.15	--	484.59	
MW-304-80	10/27/2014	496.73	No LNAPL	13.16	0.00	483.57	
MW-304-80	11/20/2014	496.74	No LNAPL	12.61	0.00	484.13	
MW-304-80	12/16/2014	496.74	No LNAPL	12.84	0.00	483.90	
MW-304-80	2/2/2015	496.75	No LNAPL	13.14	0.00	483.61	
MW-304-80	2/17/2015	496.75	No LNAPL	13.14	0.00	483.61	
MW-304-80	3/19/2015	496.75	--	13.14	--	483.61	
MW-304-80	4/14/2015	496.76	--	12.93	--	483.83	
MW-304-80	5/18/2015	496.76	--	12.63	--	484.13	
MW-304-80	6/10/2015	496.74	--	12.69	--	484.05	
MW-304-80	7/22/2015	496.75	--	11.79	--	484.96	
MW-304-80	8/12/2015	496.75	--	11.69	--	485.06	
MW-304-80	9/30/2015	496.76	--	12.39	--	484.37	
MW-304-80	10/22/2015	496.75	No LNAPL	12.84	0.00	483.91	
MW-304-80	11/19/2015	496.76	--	12.80	--	483.96	
MW-304-80	11/25/2015	496.76	No LNAPL	12.61	0.00	484.18	
MW-304-80	12/11/2015	496.73	--	12.80	--	483.93	
MW-304-80	1/26/2016	496.74	--	13.30	--	483.44	
MW-304-80	3/22/2016	496.74	No LNAPL	13.49	0.00	483.25	
MW-304-80	7/22/2016	496.74	--	10.85	--	485.89	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-304-80	9/13/2016	496.74	--	11.95	--	484.79	
MW-304-80	3/14/2017	496.74	--	12.90	--	483.84	
MW-304-80	7/25/2017	496.74	--	11.61	--	485.13	
MW-304-80	10/16/2017	496.74	--	12.75	--	483.99	
MW-304-96	4/20/2012	—	--	12.91	--	—	
MW-304-96	7/31/2012	—	--	11.76	--	—	
MW-304-96	11/1/2012	—	--	13.80	--	—	
MW-304-96	1/24/2013	496.95	--	12.99	--	483.96	
MW-304-96	4/24/2013	496.95	--	13.16	--	483.79	
MW-304-96	8/1/2013	496.95	--	11.52	--	485.43	
MW-304-96	10/1/2013	496.95	No LNAPL	13.01	0.00	483.94	
MW-304-96	3/18/2014	496.95	--	13.58	--	483.37	
MW-304-96	6/11/2014	496.92	--	13.19	--	483.73	
MW-304-96	9/9/2014	496.92	--	12.00	--	484.92	
MW-304-96	11/20/2014	496.92	No LNAPL	12.83	0.00	484.09	
MW-304-96	3/19/2015	496.92	--	13.35	--	483.57	
MW-304-96	6/10/2015	496.92	--	12.90	--	484.02	
MW-304-96	8/12/2015	496.93	--	11.88	--	485.05	
MW-304-96	11/19/2015	496.93	--	12.94	--	483.99	
MW-304-96	7/27/2016	496.95	--	10.96	--	485.99	
MW-304-125	2/16/2012	497.09	--	13.76	--	483.33	
MW-304-125	4/20/2012	497.09	--	13.08	--	484.01	
MW-304-125	7/31/2012	497.09	--	12.15	--	484.94	
MW-304-125	11/1/2012	497.09	--	13.48	--	483.61	
MW-304-125	1/24/2013	497.32	--	13.27	--	484.05	
MW-304-125	3/20/2013	497.33	--	13.52	--	483.81	
MW-304-125	4/19/2013	497.31	--	13.60	--	483.71	
MW-304-125	4/24/2013	497.31	--	13.51	--	483.80	
MW-304-125	5/21/2013	497.31	--	13.31	--	484.00	
MW-304-125	6/19/2013	497.31	--	12.44	--	484.87	
MW-304-125	7/25/2013	497.30	--	12.24	--	485.06	
MW-304-125	8/1/2013	497.30	--	12.12	--	485.18	
MW-304-125	8/20/2013	497.30	--	12.16	--	485.14	
MW-304-125	10/1/2013	497.31	No LNAPL	13.39	0.00	483.92	
MW-304-125	1/30/2014	497.30	--	13.58	--	483.72	
MW-304-125	2/24/2014	497.29	--	13.85	--	483.44	
MW-304-125	3/14/2014	497.31	--	13.91	--	483.40	
MW-304-125	3/18/2014	497.31	--	13.94	--	483.37	
MW-304-125	4/25/2014	497.32	--	13.02	--	484.30	
MW-304-125	5/20/2014	497.31	--	13.42	--	483.89	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-304-125	6/10/2014	497.32	--	13.53	--	483.79	
MW-304-125	6/11/2014	497.32	--	13.54	--	483.78	
MW-304-125	7/15/2014	497.31	--	11.46	--	485.85	
MW-304-125	8/28/2014	497.31	--	12.14	--	485.17	
MW-304-125	9/9/2014	497.31	--	12.37	--	484.94	
MW-304-125	9/26/2014	497.32	--	12.71	--	484.61	
MW-304-125	10/27/2014	497.32	No LNAPL	13.75	0.00	483.57	
MW-304-125	11/20/2014	497.29	No LNAPL	13.17	0.00	484.12	
MW-304-125	12/16/2014	497.30	No LNAPL	13.40	0.00	483.90	
MW-304-125	2/2/2015	497.31	No LNAPL	13.68	0.00	483.63	
MW-304-125	2/17/2015	497.30	No LNAPL	13.68	0.00	483.62	
MW-304-125	3/19/2015	497.30	--	13.68	--	483.62	
MW-304-125	4/14/2015	497.32	--	13.49	--	483.83	
MW-304-125	5/18/2015	497.32	--	13.19	--	484.13	
MW-304-125	6/10/2015	497.30	--	13.23	--	484.07	
MW-304-125	7/22/2015	497.31	--	12.34	--	484.97	
MW-304-125	8/12/2015	497.30	--	12.25	--	485.05	
MW-304-125	9/30/2015	497.32	--	12.94	--	484.38	
MW-304-125	10/22/2015	497.31	No LNAPL	13.38	0.00	483.93	
MW-304-125	11/19/2015	497.31	--	13.31	--	484.00	
MW-304-125	11/25/2015	497.31	No LNAPL	13.15	0.00	484.19	
MW-304-125	12/11/2015	497.29	--	13.35	--	483.94	
MW-304-125	1/26/2016	497.30	--	13.87	--	483.43	
MW-304-125	3/22/2016	497.30	No LNAPL	14.05	0.00	483.25	
MW-304-125	7/22/2016	497.29	--	11.20	--	486.09	
MW-304-125	9/13/2016	497.29	--	12.51	--	484.78	
MW-304-125	3/14/2017	497.34	--	13.47	--	483.87	
MW-304-150	2/16/2012	497.00	--	13.65	--	483.35	
MW-304-150	4/20/2012	497.00	--	12.96	--	484.04	
MW-304-150	7/31/2012	497.18	--	12.01	--	485.17	
MW-304-150	11/1/2012	497.18	--	13.35	--	483.83	
MW-304-150	1/24/2013	497.21	--	12.96	--	484.25	
MW-304-150	3/20/2013	497.21	--	13.42	--	483.79	
MW-304-150	4/19/2013	497.18	--	13.47	--	483.71	
MW-304-150	4/24/2013	497.18	--	13.39	--	483.79	
MW-304-150	5/21/2013	497.20	--	13.19	--	484.01	
MW-304-150	6/19/2013	497.18	--	12.31	--	484.87	
MW-304-150	7/25/2013	497.16	--	12.10	--	485.06	
MW-304-150	8/1/2013	497.17	--	12.01	--	485.16	
MW-304-150	8/20/2013	497.16	--	12.03	--	485.13	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-304-150	10/1/2013	497.16	No LNAPL	13.24	0.00	483.92	
MW-304-150	1/9/2014	497.18	--	13.45	--	483.73	
MW-304-150	1/30/2014	497.20	--	13.46	--	483.74	
MW-304-150	2/5/2014	497.20	--	13.57	--	483.63	
MW-304-150	2/24/2014	497.18	--	13.76	--	483.42	
MW-304-150	3/14/2014	497.20	--	13.81	--	483.39	
MW-304-150	3/18/2014	497.20	--	13.81	--	483.39	
MW-304-150	3/24/2014	497.20	--	13.87	--	483.33	
MW-304-150	4/18/2014	497.21	--	13.62	--	483.59	
MW-304-150	4/25/2014	497.21	--	12.92	--	484.29	
MW-304-150	5/15/2014	497.22	--	13.22	--	484.00	
MW-304-150	5/20/2014	497.21	--	13.31	--	483.90	
MW-304-150	6/10/2014	497.19	--	13.42	--	483.77	
MW-304-150	6/11/2014	497.19	--	13.42	--	483.77	
MW-304-150	6/19/2014	497.19	--	13.09	--	484.10	
MW-304-150	7/15/2014	497.18	--	11.34	--	485.84	
MW-304-150	7/15/2014	497.18	--	11.31	--	485.87	
MW-304-150	8/26/2014	497.18	--	11.97	--	485.21	
MW-304-150	8/28/2014	497.18	--	12.00	--	485.18	
MW-304-150	9/9/2014	497.18	--	12.20	--	484.98	
MW-304-150	9/24/2014	497.18	--	12.56	--	484.62	
MW-304-150	9/26/2014	497.18	--	12.57	--	484.61	
MW-304-150	10/21/2014	497.18	--	13.43	--	483.75	
MW-304-150	10/27/2014	497.18	No LNAPL	13.60	0.00	483.58	
MW-304-150	11/19/2014	497.18	--	13.07	--	484.11	
MW-304-150	11/20/2014	497.18	No LNAPL	13.06	0.00	484.12	
MW-304-150	12/16/2014	497.19	No LNAPL	13.27	0.00	483.92	
MW-304-150	12/29/2014	497.19	No LNAPL	13.38	0.00	483.81	
MW-304-150	1/21/2015	497.20	--	13.45	--	483.75	
MW-304-150	2/2/2015	497.20	No LNAPL	13.58	0.00	483.62	
MW-304-150	2/17/2015	497.20	No LNAPL	13.58	0.00	483.62	
MW-304-150	2/25/2015	497.20	--	13.53	--	483.67	
MW-304-150	3/18/2015	497.21	--	13.60	--	483.61	
MW-304-150	3/19/2015	497.21	--	13.58	--	483.63	
MW-304-150	3/26/2015	497.21	--	13.52	--	483.69	
MW-304-150	4/14/2015	497.23	--	13.39	--	483.84	
MW-304-150	4/16/2015	497.23	--	13.38	--	483.85	
MW-304-150	5/18/2015	497.21	--	13.10	--	484.11	
MW-304-150	5/21/2015	497.21	--	13.10	--	484.11	
MW-304-150	6/10/2015	497.20	--	13.13	--	484.07	

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Historical Groundwater Elevation and LNAPL Thickness Data

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-304-150	7/22/2015	497.20	--	12.21	--	484.99	
MW-304-150	8/12/2015	497.18	--	12.11	--	485.07	
MW-304-150	8/19/2015	497.18	--	12.37	--	484.81	
MW-304-150	9/30/2015	497.20	--	12.84	--	484.36	
MW-304-150	10/6/2015	497.19	--	12.65	--	484.54	
MW-304-150	10/22/2015	497.20	No LNAPL	13.27	0.00	483.93	
MW-304-150	11/19/2015	497.20	--	13.18	--	484.02	
MW-304-150	11/25/2015	497.20	No LNAPL	13.02	0.00	484.21	
MW-304-150	12/11/2015	497.18	--	13.24	--	483.94	
MW-304-150	1/19/2016	497.19	--	13.69	--	483.50	
MW-304-150	1/26/2016	497.19	--	13.74	--	483.45	
MW-304-150	5/26/2016	497.19	--	13.31	--	483.88	
MW-304-150	7/27/2016	497.02	--	11.03	--	485.99	
MW-304-150	9/9/2016	497.03	--	12.09	--	484.94	
MW-304-150	11/15/2016	497.02	--	12.73	--	484.29	
MW-304-150	2/8/2017	497.05	--	13.14	--	483.91	
MW-304-150	2/15/2017	497.05	--	13.16	--	483.89	
MW-304-150	6/13/2017	497.04	--	12.44	--	484.60	
MW-305-CMT-8	2/17/2012	—	--	Frozen	--	—	Frozen at 2.24 ft BTOC
MW-305-CMT-8	4/19/2012	—	--	Frozen	--	—	Frozen at 5.04 ft BTOC
MW-305-CMT-8	7/31/2012	—	--	Frozen	--	—	Frozen at 11.08 ft BTOC
MW-305-CMT-8	11/1/2012	—	--	Dry	--	—	
MW-305-CMT-8	1/24/2013	—	--	Frozen	--	—	Frozen at 2.40 ft BTOC
MW-305-CMT-8	4/24/2013	—	--	Frozen	--	—	Frozen at 3.48 ft BTOC
MW-305-CMT-8	8/1/2013	—	--	Dry	--	—	Well channel was dry
MW-305-CMT-8	10/1/2013	—	--	Dry	--	—	Well channel was dry
MW-305-CMT-8	3/18/2014	—	--	Dry	--	—	Well channel was dry
MW-305-CMT-8	6/11/2014	496.44	--	Dry	--	—	Well channel was dry, measured to 11.04 feet
MW-305-CMT-8	9/9/2014	496.44	--	Dry	--	—	Well channel was dry; total well depth measured 11.17 feet
MW-305-CMT-8	11/20/2014	496.44	--	Dry	--	—	Well was dry
MW-305-CMT-8	3/19/2015	496.44	--	Dry	--	—	Depth to ice/bottom = 11.23 feet
MW-305-CMT-8	6/10/2015	496.44	--	Dry	--	—	BOW measured to be 11.17 feet
MW-305-CMT-8	8/12/2015	496.44	--	Dry	--	—	Depth to bottom = 11.16 feet
MW-305-CMT-8	11/19/2015	496.44	—	—	—	—	Depth to bottom = 10.87 feet
MW-305-CMT-8	8/19/2016	496.34	--	Dry	--	—	Well was dry
MW-305-CMT-8	10/18/2016	496.34	--	Dry	--	—	Well was dry
MW-305-CMT-18	2/17/2012	—	--	Frozen	--	—	Frozen at 3.33 ft BTOC
MW-305-CMT-18	4/19/2012	—	--	12.54	--	—	
MW-305-CMT-18	7/31/2012	—	--	11.36	--	—	
MW-305-CMT-18	11/1/2012	—	--	12.66	--	—	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-305-CMT-18	1/24/2013	—	--	12.48	--	—	
MW-305-CMT-18	4/24/2013	—	--	12.75	--	—	
MW-305-CMT-18	8/1/2013	—	--	11.25	--	—	
MW-305-CMT-18	10/1/2013	—	--	12.47	--	—	
MW-305-CMT-18	3/18/2014	—	--	13.13	--	—	
MW-305-CMT-18	6/11/2014	496.44	--	12.65	--	483.79	
MW-305-CMT-18	9/9/2014	496.44	--	11.42	--	485.02	
MW-305-CMT-18	11/20/2014	496.44	--	12.30	--	484.14	
MW-305-CMT-18	3/19/2015	496.44	--	12.89	--	483.55	
MW-305-CMT-18	6/10/2015	496.44	--	12.38	--	484.06	
MW-305-CMT-18	8/12/2015	496.44	--	11.38	--	485.06	
MW-305-CMT-18	11/19/2015	496.44	--	12.46	--	483.98	
MW-305-CMT-18	7/22/2016	496.34	--	10.38	--	485.96	
MW-305-CMT-18	9/13/2016	496.34	--	11.64	--	484.70	
MW-305-CMT-18	3/14/2017	496.34	--	12.80	--	483.54	
MW-305-CMT-28	2/17/2012	—	--	Frozen	--	—	Frozen at 3.38 ft BTOC
MW-305-CMT-28	4/19/2012	—	--	12.53	--	—	
MW-305-CMT-28	7/31/2012	—	--	11.35	--	—	
MW-305-CMT-28	11/1/2012	—	--	12.66	--	—	
MW-305-CMT-28	1/24/2013	—	--	12.49	--	—	
MW-305-CMT-28	4/24/2013	—	--	12.75	--	—	
MW-305-CMT-28	8/1/2013	—	--	11.25	--	—	
MW-305-CMT-28	10/1/2013	—	--	12.48	--	—	
MW-305-CMT-28	3/18/2014	—	--	13.14	--	—	
MW-305-CMT-28	6/11/2014	496.44	--	12.68	--	483.76	
MW-305-CMT-28	9/9/2014	496.44	--	11.42	--	485.02	
MW-305-CMT-28	11/20/2014	496.44	--	12.32	--	484.12	
MW-305-CMT-28	3/19/2015	496.44	--	12.88	--	483.56	
MW-305-CMT-28	6/10/2015	496.44	--	12.38	--	484.06	
MW-305-CMT-28	8/12/2015	496.44	--	11.39	--	485.05	
MW-305-CMT-28	11/19/2015	496.44	--	12.46	--	483.98	
MW-305-CMT-28	7/22/2016	496.34	--	10.35	--	485.99	
MW-305-CMT-28	7/27/2017	496.34	--	11.36	--	484.98	
MW-305-CMT-28	10/17/2017	496.34	--	12.40	--	483.94	
MW-305-CMT-38	2/17/2012	—	--	13.13	--	—	
MW-305-CMT-38	4/19/2012	—	--	12.50	--	—	
MW-305-CMT-38	7/31/2012	—	--	11.34	--	—	
MW-305-CMT-38	11/1/2012	—	--	12.64	--	—	
MW-305-CMT-38	1/24/2013	—	--	12.47	--	—	
MW-305-CMT-38	4/24/2013	—	--	12.72	--	—	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-305-CMT-38	8/1/2013	—	--	11.23	--	—	
MW-305-CMT-38	10/1/2013	—	--	12.45	--	—	
MW-305-CMT-38	3/18/2014	—	--	13.11	--	—	
MW-305-CMT-38	6/11/2014	496.44	--	12.68	--	483.76	
MW-305-CMT-38	9/9/2014	496.44	--	11.40	--	485.04	
MW-305-CMT-38	11/20/2014	496.44	--	12.31	--	484.13	
MW-305-CMT-38	3/19/2015	496.44	--	12.87	--	483.57	
MW-305-CMT-38	6/10/2015	496.44	--	12.38	--	484.06	
MW-305-CMT-38	8/12/2015	496.44	--	11.37	--	485.07	
MW-305-CMT-38	11/19/2015	496.44	--	12.47	--	483.97	
MW-305-CMT-38	7/27/2016	496.34	--	10.48	--	485.86	
MW-305-CMT-48	2/17/2012	—	--	13.14	--	—	
MW-305-CMT-48	4/19/2012	—	--	12.52	--	—	
MW-305-CMT-48	7/31/2012	—	--	11.37	--	—	
MW-305-CMT-48	11/1/2012	—	--	12.66	--	—	
MW-305-CMT-48	1/24/2013	—	--	12.47	--	—	
MW-305-CMT-48	4/24/2013	—	--	Frozen	--	—	Frozen at 3.76 ft BTOC
MW-305-CMT-48	8/1/2013	—	--	11.26	--	—	
MW-305-CMT-48	10/1/2013	—	--	12.47	--	—	
MW-305-CMT-48	3/18/2014	—	--	13.13	--	—	
MW-305-CMT-48	6/11/2014	496.44	--	12.73	--	483.71	
MW-305-CMT-48	9/9/2014	496.44	--	11.42	--	485.02	
MW-305-CMT-48	11/20/2014	496.44	--	12.33	--	484.11	
MW-305-CMT-48	3/19/2015	496.44	--	12.88	--	483.56	
MW-305-CMT-48	6/10/2015	496.44	--	12.39	--	484.05	
MW-305-CMT-48	8/12/2015	496.44	--	11.41	--	485.03	
MW-305-CMT-48	11/19/2015	496.44	--	12.44	--	484.00	
MW-305-CMT-48	7/27/2016	496.34	--	10.58	--	485.76	
MW-305-CMT-48	7/27/2017	496.34	--	11.41	--	484.93	
MW-305-CMT-48	10/17/2017	496.34	--	12.40	--	483.94	
MW-305-CMT-58	2/17/2012	—	--	13.16	--	—	
MW-305-CMT-58	4/19/2012	—	--	12.53	--	—	
MW-305-CMT-58	7/31/2012	—	--	11.39	--	—	
MW-305-CMT-58	11/1/2012	—	--	12.68	--	—	
MW-305-CMT-58	1/24/2013	—	--	12.48	--	—	
MW-305-CMT-58	4/24/2013	—	--	12.76	--	—	
MW-305-CMT-58	8/1/2013	—	--	11.30	--	—	
MW-305-CMT-58	10/1/2013	—	--	12.47	--	—	
MW-305-CMT-58	3/18/2014	—	--	13.17	--	—	
MW-305-CMT-58	6/11/2014	496.44	--	12.68	--	483.76	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-305-CMT-58	9/9/2014	496.44	--	11.43	--	485.01	
MW-305-CMT-58	11/20/2014	496.44	--	12.35	--	484.09	
MW-305-CMT-58	3/19/2015	496.44	--	12.89	--	483.55	
MW-305-CMT-58	6/10/2015	496.44	--	12.38	--	484.06	
MW-305-CMT-58	8/12/2015	496.44	--	11.39	--	485.05	
MW-305-CMT-58	11/19/2015	496.44	--	12.46	--	483.98	
MW-305-CMT-58	7/27/2016	496.34	--	10.53	--	485.81	
MW-305-CMT-58	9/13/2016	496.34	--	11.65	--	484.69	
MW-305-CMT-58	3/14/2017	496.34	--	12.70	--	483.64	
MW-305-70	2/16/2012	495.58	--	12.41	--	483.17	
MW-305-70	4/19/2012	495.58	--	11.80	--	483.78	
MW-305-70	7/31/2012	495.58	--	10.68	--	484.90	
MW-305-70	11/1/2012	495.58	--	11.93	--	483.65	
MW-305-70	1/24/2013	495.67	--	11.83	--	483.84	
MW-305-70	4/24/2013	495.67	--	12.11	--	483.56	
MW-305-70	8/1/2013	495.67	--	10.73	--	484.94	
MW-305-70	10/1/2013	495.67	No LNAPL	11.93	0.00	483.74	
MW-305-70	3/18/2014	495.67	--	12.50	--	483.17	
MW-305-70	6/11/2014	495.76	--	12.12	--	483.64	
MW-305-70	9/9/2014	495.76	--	11.89	--	483.87	
MW-305-70	11/20/2014	495.76	No LNAPL	11.78	0.00	483.98	
MW-305-70	3/19/2015	495.76	--	12.28	--	483.48	
MW-305-70	6/10/2015	495.76	--	11.87	--	483.89	
MW-305-70	8/12/2015	495.79	--	10.89	--	484.90	
MW-305-70	11/19/2015	495.79	--	11.95	--	483.84	
MW-305-70	7/27/2016	495.79	--	9.98	--	485.81	
MW-305-80	2/16/2012	495.35	--	12.15	--	483.20	
MW-305-80	4/19/2012	495.35	--	11.50	--	483.85	
MW-305-80	7/31/2012	495.35	--	10.37	--	484.98	
MW-305-80	11/1/2012	495.35	--	11.66	--	483.69	
MW-305-80	1/24/2013	495.38	--	10.47	--	484.91	The DTW measurement was recorded as 10.47 ft BTOC on the field form
MW-305-80	4/24/2013	495.38	--	11.72	--	483.66	
MW-305-80	8/1/2013	495.38	--	10.35	--	485.03	
MW-305-80	10/1/2013	495.38	No LNAPL	11.86	0.00	483.52	
MW-305-80	3/18/2014	495.38	--	12.14	--	483.24	
MW-305-80	6/11/2014	495.37	--	11.72	--	483.65	
MW-305-80	9/9/2014	495.37	--	10.48	--	484.89	
MW-305-80	11/20/2014	495.37	No LNAPL	11.38	0.00	483.99	
MW-305-80	3/19/2015	495.37	--	11.85	--	483.52	
MW-305-80	6/10/2015	495.37	--	11.45	--	483.92	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-305-80	8/12/2015	495.37	--	10.47	--	484.90	
MW-305-80	11/19/2015	495.37	--	11.59	--	483.78	
MW-305-80	7/27/2016	495.37	--	9.59	--	485.78	
MW-305-80	9/13/2016	495.37	--	10.70	--	484.67	
MW-305-80	3/14/2017	495.37	--	11.70	--	483.67	
MW-305-100	2/16/2012	—	--	12.45	--	—	
MW-305-100	4/19/2012	—	--	11.81	--	—	
MW-305-100	7/31/2012	—	--	10.56	--	—	
MW-305-100	11/1/2012	—	--	11.94	--	—	
MW-305-100	1/24/2013	495.71	--	11.78	--	483.93	
MW-305-100	4/24/2013	495.71	--	12.05	--	483.66	
MW-305-100	8/1/2013	495.71	--	10.62	--	485.09	
MW-305-100	10/1/2013	495.71	No LNAPL	11.85	0.00	483.86	
MW-305-100	3/18/2014	495.71	--	12.40	--	483.31	
MW-305-100	6/11/2014	495.73	--	12.03	--	483.70	
MW-305-100	9/9/2014	495.73	--	10.82	--	484.91	
MW-305-100	11/20/2014	495.73	No LNAPL	11.69	0.00	484.04	
MW-305-100	3/19/2015	495.73	--	12.19	--	483.54	
MW-305-100	6/10/2015	495.73	--	11.75	--	483.98	
MW-305-100	8/12/2015	495.72	--	10.76	--	484.96	
MW-305-100	11/19/2015	495.72	--	11.82	--	483.90	
MW-305-100	7/27/2016	495.72	--	9.89	--	485.83	
MW-305-100	9/13/2016	495.72	--	11.00	--	484.72	
MW-305-100	3/14/2017	495.72	--	12.04	--	483.68	
MW-306-CMT-10	2/17/2012	—	--	Frozen	--	—	Frozen at 2.54 ft BTOC
MW-306-CMT-10	4/19/2012	—	--	Frozen	--	—	Frozen at 5.09 ft BTOC
MW-306-CMT-10	7/31/2012	—	--	12.10	--	—	
MW-306-CMT-10	11/1/2012	—	--	13.35	--	—	
MW-306-CMT-10	1/24/2013	—	--	13.14	--	—	
MW-306-CMT-10	4/24/2013	—	--	13.31	--	—	
MW-306-CMT-10	8/1/2013	—	--	11.97	--	—	
MW-306-CMT-10	10/1/2013	—	--	13.09	--	—	
MW-306-CMT-10	3/18/2014	—	--	Dry	--	—	Well channel was dry
MW-306-CMT-10	6/11/2014	496.89	--	13.31	--	483.58	
MW-306-CMT-10	9/9/2014	496.89	--	12.01	--	484.88	
MW-306-CMT-10	11/20/2014	496.89	--	12.98	--	483.91	
MW-306-CMT-10	12/16/2014	496.89	--	13.15	--	483.74	
MW-306-CMT-10	3/19/2015	496.89	--	Dry	--	—	Depth to ice/bottom = 13.65 feet
MW-306-CMT-10	6/10/2015	496.89	--	13.00	--	483.89	
MW-306-CMT-10	8/12/2015	496.84	--	12.05	--	484.79	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-306-CMT-10	11/19/2015	496.84	--	13.07	--	483.77	
MW-306-CMT-10	7/22/2016	496.87	--	11.15	--	485.72	
MW-306-CMT-10	9/13/2016	496.87	--	12.24	--	484.63	
MW-306-CMT-10	3/14/2017	496.87	--	13.35	--	483.52	
MW-306-15	4/19/2012	—	--	12.98	--	—	
MW-306-15	7/31/2012	496.74	--	11.86	--	484.88	
MW-306-15	11/1/2012	496.74	--	13.14	--	483.60	
MW-306-15	1/24/2013	496.78	--	12.95	--	483.83	
MW-306-15	3/20/2013	496.79	--	13.17	--	483.62	
MW-306-15	4/19/2013	496.77	--	13.24	--	483.53	
MW-306-15	4/24/2013	496.77	--	13.17	--	483.60	
MW-306-15	5/21/2013	496.77	--	12.93	--	483.84	
MW-306-15	6/19/2013	496.76	--	12.13	--	484.63	
MW-306-15	7/25/2013	496.74	--	11.94	--	484.80	
MW-306-15	8/1/2013	496.75	--	11.86	--	484.89	
MW-306-15	8/20/2013	496.76	--	11.90	--	484.86	
MW-306-15	10/1/2013	496.76	No LNAPL	12.97	0.00	483.79	
MW-306-15	1/30/2014	496.78	--	13.24	--	483.54	
MW-306-15	2/5/2014	496.78	--	13.34	--	483.44	
MW-306-15	2/24/2014	496.78	--	13.52	--	483.26	
MW-306-15	3/14/2014	496.77	--	13.58	--	483.19	
MW-306-15	3/18/2014	496.77	--	13.62	--	483.15	
MW-306-15	3/24/2014	496.77	--	13.66	--	483.11	
MW-306-15	4/18/2014	496.77	--	12.74	--	484.03	
MW-306-15	4/25/2014	496.77	--	12.71	--	484.06	
MW-306-15	5/15/2014	496.77	--	12.96	--	483.81	
MW-306-15	5/20/2014	496.77	--	13.03	--	483.74	
MW-306-15	6/10/2014	496.77	--	13.16	--	483.61	
MW-306-15	6/11/2014	496.77	--	13.18	--	483.59	
MW-306-15	6/19/2014	496.77	--	12.89	--	483.88	
MW-306-15	7/15/2014	496.76	No LNAPL	11.14	0.00	485.62	
MW-306-15	8/26/2014	496.77	--	11.74	--	485.03	
MW-306-15	8/28/2014	496.77	--	11.75	--	485.02	
MW-306-15	9/9/2014	496.77	--	11.88	--	484.89	
MW-306-15	9/24/2014	496.77	--	12.28	--	484.49	
MW-306-15	9/26/2014	496.77	--	12.31	--	484.46	
MW-306-15	10/21/2014	496.76	--	13.14	--	483.62	
MW-306-15	10/27/2014	496.77	No LNAPL	13.31	0.00	483.46	
MW-306-15	11/19/2014	496.76	--	12.86	--	483.90	
MW-306-15	11/20/2014	496.76	No LNAPL	12.85	0.00	483.91	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-306-15	12/16/2014	496.77	No LNAPL	13.07	0.00	483.70	
MW-306-15	12/29/2014	496.77	No LNAPL	13.16	0.00	483.61	
MW-306-15	1/21/2015	496.79	--	13.24	--	483.55	
MW-306-15	2/2/2015	496.77	No LNAPL	13.33	0.00	483.44	
MW-306-15	2/17/2015	496.77	No LNAPL	13.34	0.00	483.43	
MW-306-15	2/25/2015	496.79	--	13.28	--	483.51	
MW-306-15	3/18/2015	496.77	--	13.35	--	483.42	
MW-306-15	3/19/2015	496.77	--	13.32	--	483.45	
MW-306-15	3/26/2015	496.77	--	13.27	--	483.50	
MW-306-15	4/14/2015	496.78	--	13.14	--	483.64	
MW-306-15	4/16/2015	496.78	--	13.11	--	483.67	
MW-306-15	5/18/2015	496.79	--	12.86	--	483.93	
MW-306-15	5/21/2015	496.79	--	12.84	--	483.95	
MW-306-15	6/4/2015	496.77	--	12.67	--	484.10	
MW-306-15	6/10/2015	496.77	--	12.90	--	483.87	
MW-306-15	7/22/2015	496.79	--	12.07	--	484.72	
MW-306-15	8/12/2015	496.78	--	11.95	--	484.83	
MW-306-15	8/19/2015	496.78	--	12.18	--	484.60	
MW-306-15	9/30/2015	496.80	--	12.53	--	484.27	
MW-306-15	10/6/2015	496.78	--	12.34	--	484.44	
MW-306-15	10/22/2015	496.79	No LNAPL	12.99	0.00	483.80	
MW-306-15	11/19/2015	496.79	--	13.00	--	483.79	
MW-306-15	11/25/2015	496.79	No LNAPL	12.85	0.00	483.97	Datalogger downloaded
MW-306-15	12/11/2015	496.79	--	12.99	--	483.80	
MW-306-15	1/19/2016	496.79	--	13.46	--	483.33	
MW-306-15	1/26/2016	496.80	--	13.50	--	483.30	
MW-306-15	5/26/2016	496.80	--	13.10	--	483.70	
MW-306-15	7/20/2016	496.79	--	11.38	--	485.41	
MW-306-15	9/9/2016	496.81	--	12.03	--	484.78	
MW-306-15	11/15/2016	496.79	--	12.73	--	484.06	
MW-306-15	2/8/2017	496.82	--	13.10	--	483.72	
MW-306-15	2/15/2017	496.82	--	13.14	--	483.68	
MW-306-15	6/13/2017	496.57	--	12.20	--	484.37	
MW-306-CMT-20	2/17/2012	—	--	13.75	--	—	
MW-306-CMT-20	4/19/2012	—	--	13.18	--	—	
MW-306-CMT-20	7/31/2012	—	--	12.08	--	—	
MW-306-CMT-20	11/1/2012	—	--	13.35	--	—	
MW-306-CMT-20	1/24/2013	—	--	13.13	--	—	
MW-306-CMT-20	4/24/2013	—	--	13.31	--	—	
MW-306-CMT-20	8/1/2013	—	--	11.97	--	—	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-306-CMT-20	10/1/2013	—	--	13.09	--	—	
MW-306-CMT-20	3/18/2014	—	--	13.72	--	—	
MW-306-CMT-20	6/11/2014	496.89	--	13.31	--	483.58	
MW-306-CMT-20	9/9/2014	496.89	--	12.03	--	484.86	
MW-306-CMT-20	11/20/2014	496.89	--	12.98	--	483.91	
MW-306-CMT-20	12/16/2014	496.89	--	13.14	--	483.75	
MW-306-CMT-20	3/19/2015	496.89	--	13.48	--	483.41	
MW-306-CMT-20	6/10/2015	496.89	--	13.01	--	483.88	
MW-306-CMT-20	8/12/2015	496.84	--	12.06	--	484.78	
MW-306-CMT-20	11/19/2015	496.84	--	13.08	--	483.76	
MW-306-CMT-20	7/22/2016	496.87	--	11.13	--	485.74	
MW-306-CMT-30	2/17/2012	—	--	13.76	--	—	
MW-306-CMT-30	4/19/2012	—	--	13.18	--	—	
MW-306-CMT-30	7/31/2012	—	--	12.08	--	—	
MW-306-CMT-30	11/1/2012	—	--	13.35	--	—	
MW-306-CMT-30	1/24/2013	—	--	13.12	--	—	
MW-306-CMT-30	4/24/2013	—	--	13.31	--	—	
MW-306-CMT-30	8/1/2013	—	--	11.95	--	—	
MW-306-CMT-30	10/1/2013	—	--	13.09	--	—	
MW-306-CMT-30	3/18/2014	—	--	13.72	--	—	
MW-306-CMT-30	6/11/2014	496.89	--	13.30	--	483.59	
MW-306-CMT-30	9/9/2014	496.89	--	12.02	--	484.87	
MW-306-CMT-30	11/20/2014	496.89	--	12.97	--	483.92	
MW-306-CMT-30	12/16/2014	496.89	--	13.17	--	483.72	
MW-306-CMT-30	3/19/2015	496.89	--	13.48	--	483.41	
MW-306-CMT-30	6/10/2015	496.89	--	13.03	--	483.86	
MW-306-CMT-30	8/12/2015	496.84	--	12.08	--	484.76	
MW-306-CMT-30	11/19/2015	496.84	--	13.08	--	483.76	
MW-306-CMT-30	7/22/2016	496.87	--	11.13	--	485.74	
MW-306-CMT-40	2/17/2012	—	--	Frozen	--	—	Frozen at 3.26 ft BTOC
MW-306-CMT-40	4/19/2012	—	--	13.19	--	—	
MW-306-CMT-40	7/31/2012	—	--	12.10	--	—	
MW-306-CMT-40	11/1/2012	—	--	13.35	--	—	
MW-306-CMT-40	1/24/2013	—	--	13.13	--	—	
MW-306-CMT-40	4/24/2013	—	--	13.31	--	—	
MW-306-CMT-40	8/1/2013	—	--	12.00	--	—	
MW-306-CMT-40	10/1/2013	—	--	13.11	--	—	
MW-306-CMT-40	3/18/2014	—	--	13.72	--	—	
MW-306-CMT-40	6/11/2014	496.89	--	13.32	--	483.57	
MW-306-CMT-40	9/9/2014	496.89	--	12.05	--	484.84	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-306-CMT-40	11/20/2014	496.89	--	12.99	--	483.90	
MW-306-CMT-40	12/16/2014	496.89	--	13.17	--	483.72	
MW-306-CMT-40	3/19/2015	496.89	--	13.49	--	483.40	
MW-306-CMT-40	6/10/2015	496.89	--	13.04	--	483.85	
MW-306-CMT-40	8/12/2015	496.84	--	12.08	--	484.76	
MW-306-CMT-40	11/19/2015	496.84	--	13.10	--	483.74	
MW-306-CMT-40	7/22/2016	496.87	--	11.17	--	485.70	
MW-306-CMT-50	2/17/2012	—	--	Frozen	--	—	Frozen at 3.35 ft BTOC
MW-306-CMT-50	4/19/2012	—	--	Frozen	--	—	Frozen at 5.29 ft BTOC
MW-306-CMT-50	7/31/2012	—	--	12.10	--	—	
MW-306-CMT-50	11/1/2012	—	--	13.35	--	—	
MW-306-CMT-50	1/24/2013	—	--	13.13	--	—	
MW-306-CMT-50	4/24/2013	—	--	13.31	--	—	
MW-306-CMT-50	8/1/2013	—	--	12.00	--	—	
MW-306-CMT-50	10/1/2013	—	--	13.11	--	—	
MW-306-CMT-50	3/18/2014	—	--	13.72	--	—	
MW-306-CMT-50	6/11/2014	496.89	--	13.32	--	483.57	
MW-306-CMT-50	9/9/2014	496.89	--	12.05	--	484.84	
MW-306-CMT-50	11/20/2014	496.89	--	12.99	--	483.90	
MW-306-CMT-50	12/16/2014	496.89	--	13.18	--	483.71	
MW-306-CMT-50	3/19/2015	496.89	--	13.48	--	483.41	
MW-306-CMT-50	6/10/2015	496.89	--	13.06	--	483.83	
MW-306-CMT-50	8/12/2015	496.84	--	12.09	--	484.75	
MW-306-CMT-50	11/19/2015	496.84	--	13.09	--	483.75	
MW-306-CMT-50	7/22/2016	496.87	--	11.17	--	485.70	
MW-306-CMT-60	2/17/2012	—	--	Frozen	--	—	Frozen at 3.33 ft BTOC
MW-306-CMT-60	4/19/2012	—	--	Frozen	--	—	Frozen at 5.15 ft BTOC
MW-306-CMT-60	7/31/2012	—	--	12.10	--	—	
MW-306-CMT-60	11/1/2012	—	--	13.35	--	—	
MW-306-CMT-60	1/24/2013	—	--	13.14	--	—	
MW-306-CMT-60	4/24/2013	—	--	13.32	--	—	
MW-306-CMT-60	8/1/2013	—	--	12.01	--	—	
MW-306-CMT-60	10/1/2013	—	--	13.11	--	—	
MW-306-CMT-60	3/18/2014	—	--	13.72	--	—	
MW-306-CMT-60	6/11/2014	496.89	--	13.33	--	483.56	
MW-306-CMT-60	9/9/2014	496.89	--	12.05	--	484.84	
MW-306-CMT-60	11/20/2014	496.89	--	13.00	--	483.89	
MW-306-CMT-60	12/16/2014	496.89	--	13.19	--	483.70	
MW-306-CMT-60	3/19/2015	496.89	--	13.49	--	483.40	
MW-306-CMT-60	6/10/2015	496.89	--	13.06	--	483.83	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-306-CMT-60	8/12/2015	496.84	--	12.08	--	484.76	
MW-306-CMT-60	11/19/2015	496.84	--	13.07	--	483.77	
MW-306-CMT-60	3/22/2016	496.84	--	13.84	--	483.00	
MW-306-CMT-60	7/22/2016	496.87	--	11.17	--	485.70	
MW-306-CMT-60	9/13/2016	496.87	--	12.29	--	484.58	
MW-306-CMT-60	3/14/2017	496.87	--	13.30	--	483.57	
MW-306-70	2/16/2012	496.68	--	13.57	--	483.11	
MW-306-70	4/19/2012	496.68	--	12.96	--	483.72	
MW-306-70	7/31/2012	496.68	--	11.86	--	484.82	
MW-306-70	11/1/2012	496.68	--	13.10	--	483.58	
MW-306-70	1/24/2013	496.70	--	-	--	---	The depth to water measurement was not recorded on the field form.
MW-306-70	4/24/2013	496.70	--	13.15	--	483.55	
MW-306-70	8/1/2013	496.70	--	11.80	--	484.90	
MW-306-70	10/1/2013	496.70	No LNAPL	12.96	0.00	483.74	
MW-306-70	3/18/2014	496.70	--	13.55	--	483.15	
MW-306-70	6/11/2014	496.70	--	13.15	--	483.55	
MW-306-70	9/9/2014	496.70	--	11.97	--	484.73	
MW-306-70	11/20/2014	496.68	No LNAPL	12.82	0.00	483.86	
MW-306-70	12/16/2014	496.69	No LNAPL	13.04	0.00	483.65	
MW-306-70	2/2/2015	496.69	No LNAPL	13.30	0.00	483.39	
MW-306-70	2/17/2015	496.69	No LNAPL	13.31	0.00	483.38	
MW-306-70	3/19/2015	496.69	--	13.30	--	483.39	
MW-306-70	4/14/2015	496.71	--	13.12	--	483.59	
MW-306-70	5/18/2015	496.72	--	12.82	--	483.90	
MW-306-70	6/4/2015	496.69	--	12.64	--	484.05	
MW-306-70	6/10/2015	496.69	--	12.85	--	483.84	
MW-306-70	7/22/2015	496.70	--	12.05	--	484.65	
MW-306-70	8/12/2015	496.69	--	11.93	--	484.76	
MW-306-70	9/30/2015	496.71	--	12.52	--	484.19	
MW-306-70	10/22/2015	496.70	No LNAPL	12.97	0.00	483.73	
MW-306-70	11/19/2015	496.70	--	12.96	--	483.74	
MW-306-70	11/25/2015	496.70	No LNAPL	12.81	0.00	483.92	
MW-306-70	12/11/2015	496.70	--	12.96	--	483.74	
MW-306-70	1/26/2016	496.70	--	13.46	--	483.24	
MW-306-70	7/26/2016	496.70	--	11.06	--	485.64	
MW-306-80	2/16/2012	496.50	--	13.38	--	483.12	
MW-306-80	4/19/2012	496.50	--	12.77	--	483.73	
MW-306-80	7/31/2012	496.50	--	11.65	--	484.85	
MW-306-80	11/1/2012	496.50	--	12.92	--	483.58	
MW-306-80	1/24/2013	496.52	--	12.75	--	483.77	

Appendix A-1
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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-306-80	4/19/2013	496.53	--	13.04	--	483.49	
MW-306-80	4/24/2013	496.53	--	13.04	--	483.49	
MW-306-80	5/21/2013	496.52	--	12.73	--	483.79	
MW-306-80	6/19/2013	496.51	--	11.94	--	484.57	
MW-306-80	7/25/2013	496.50	--	11.75	--	484.75	
MW-306-80	8/1/2013	496.50	--	11.66	--	484.84	
MW-306-80	8/20/2013	496.52	--	11.70	--	484.82	
MW-306-80	10/1/2013	496.52	No LNAPL	12.80	0.00	483.72	
MW-306-80	1/30/2014	496.51	--	13.07	--	483.44	
MW-306-80	2/24/2014	496.53	--	13.32	--	483.21	
MW-306-80	3/14/2014	496.51	--	13.39	--	483.12	
MW-306-80	3/18/2014	496.51	--	13.38	--	483.13	
MW-306-80	4/25/2014	496.51	--	12.51	--	484.00	
MW-306-80	5/20/2014	496.52	--	12.83	--	483.69	
MW-306-80	6/10/2014	496.52	--	12.96	--	483.56	
MW-306-80	6/11/2014	496.52	--	12.98	--	483.54	
MW-306-80	7/15/2014	496.51	--	10.96	--	485.55	
MW-306-80	8/28/2014	496.52	--	11.57	--	484.95	
MW-306-80	9/9/2014	496.52	--	11.80	--	484.72	
MW-306-80	9/26/2014	496.52	--	12.13	--	484.39	
MW-306-80	10/27/2014	496.52	No LNAPL	13.12	0.00	483.40	
MW-306-80	11/20/2014	496.51	No LNAPL	12.65	0.00	483.86	
MW-306-80	12/16/2014	496.51	No LNAPL	12.85	0.00	483.66	
MW-306-80	2/2/2015	496.52	No LNAPL	13.12	0.00	483.40	
MW-306-80	2/17/2015	496.52	No LNAPL	13.09	0.00	483.43	
MW-306-80	3/19/2015	496.51	--	13.11	--	483.40	
MW-306-80	4/14/2015	496.52	--	12.92	--	483.60	
MW-306-80	5/18/2015	496.53	--	12.65	--	483.88	
MW-306-80	6/4/2015	496.52	--	12.48	--	484.04	
MW-306-80	6/10/2015	496.52	--	12.69	--	483.83	
MW-306-80	7/22/2015	496.53	--	11.87	--	484.66	
MW-306-80	8/12/2015	496.52	--	11.75	--	484.77	
MW-306-80	9/30/2015	496.53	--	12.35	--	484.18	
MW-306-80	10/22/2015	496.52	No LNAPL	12.79	0.00	483.73	
MW-306-80	11/19/2015	496.53	--	12.79	--	483.74	
MW-306-80	11/25/2015	496.53	No LNAPL	12.63	0.00	483.93	
MW-306-80	12/11/2015	496.53	--	12.79	--	483.74	
MW-306-80	1/26/2016	496.53	--	13.28	--	483.25	
MW-306-80	3/22/2016	496.52	No LNAPL	13.47	0.00	483.05	
MW-306-80	7/26/2016	496.52	--	10.87	--	485.65	

Appendix A-1
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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-306-80	9/13/2016	496.52	--	11.95	--	484.57	
MW-306-80	3/14/2017	496.52	--	12.93	--	483.59	
MW-306-80	9/21/2017	496.54	--	12.82	--	483.72	
MW-306-100	2/16/2012	—	--	12.41	--	—	
MW-306-100	4/19/2012	—	--	11.80	--	—	
MW-306-100	7/31/2012	—	--	10.71	--	—	
MW-306-100	11/1/2012	—	--	11.98	--	—	
MW-306-100	1/24/2013	495.55	--	11.79	--	483.76	
MW-306-100	4/24/2013	495.55	--	12.01	--	483.54	
MW-306-100	8/1/2013	495.55	--	10.68	--	484.87	
MW-306-100	10/1/2013	495.55	No LNAPL	11.81	0.00	483.74	
MW-306-100	3/18/2014	495.55	--	12.40	--	483.15	
MW-306-100	6/11/2014	495.55	--	12.00	--	483.55	
MW-306-100	9/9/2014	495.55	--	10.78	--	484.77	
MW-306-100	11/20/2014	495.53	No LNAPL	11.68	0.00	483.85	
MW-306-100	12/16/2014	495.54	No LNAPL	11.89	0.00	483.65	
MW-306-100	3/19/2015	495.54	--	12.15	--	483.39	
MW-306-100	6/10/2015	495.54	--	11.73	--	483.81	
MW-306-100	8/12/2015	495.55	--	10.79	--	484.76	
MW-306-100	11/19/2015	495.55	--	11.83	--	483.72	
MW-306-100	7/26/2016	495.53	--	9.90	--	485.63	
MW-306-150	2/16/2012	496.00	--	12.93	--	483.07	
MW-306-150	4/19/2012	496.00	--	12.32	--	483.68	
MW-306-150	7/31/2012	496.00	--	11.18	--	484.82	
MW-306-150	11/1/2012	496.00	--	12.45	--	483.55	
MW-306-150	1/24/2013	495.98	--	12.26	--	483.72	
MW-306-150	3/20/2013	496.05	--	12.51	--	483.54	
MW-306-150	4/19/2013	496.03	--	12.58	--	483.45	
MW-306-150	4/24/2013	496.03	--	12.50	--	483.53	
MW-306-150	5/21/2013	496.01	--	12.26	--	483.75	
MW-306-150	6/19/2013	495.99	--	11.44	--	484.55	
MW-306-150	7/25/2013	495.98	--	11.26	--	484.72	
MW-306-150	8/1/2013	495.98	--	11.17	--	484.81	
MW-306-150	8/20/2013	496.00	--	11.20	--	484.80	
MW-306-150	10/1/2013	496.00	No LNAPL	12.29	0.00	483.71	
MW-306-150	1/30/2014	496.02	--	12.54	--	483.48	
MW-306-150	2/5/2014	496.02	--	12.65	--	483.37	
MW-306-150	2/24/2014	496.00	--	12.83	--	483.17	
MW-306-150	3/14/2014	496.00	--	12.88	--	483.12	
MW-306-150	3/18/2014	496.00	--	12.92	--	483.08	

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Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-306-150	3/24/2014	496.00	--	12.92	--	483.08	
MW-306-150	4/18/2014	496.01	--	13.43	--	482.58	
MW-306-150	4/25/2014	496.01	--	12.02	--	483.99	
MW-306-150	5/15/2014	496.00	--	12.27	--	483.73	
MW-306-150	5/20/2014	496.00	--	12.34	--	483.66	
MW-306-150	6/10/2014	496.00	--	12.47	--	483.53	
MW-306-150	6/11/2014	496.00	--	12.48	--	483.52	
MW-306-150	6/19/2014	496.00	--	12.17	--	483.83	
MW-306-150	7/15/2014	496.00	No LNAPL	10.48	0.00	485.52	
MW-306-150	8/26/2014	496.00	--	11.06	--	484.94	
MW-306-150	8/28/2014	496.00	--	11.07	--	484.93	
MW-306-150	9/9/2014	496.00	--	11.26	--	484.74	
MW-306-150	9/24/2014	496.00	--	11.60	--	484.40	
MW-306-150	9/26/2014	496.00	--	11.64	--	484.36	
MW-306-150	10/21/2014	495.99	--	12.44	--	483.55	
MW-306-150	10/27/2014	496.00	No LNAPL	12.61	0.00	483.39	
MW-306-150	11/19/2014	495.99	--	12.18	--	483.81	
MW-306-150	11/20/2014	495.99	No LNAPL	12.14	0.00	483.85	
MW-306-150	12/16/2014	496.01	No LNAPL	12.36	0.00	483.65	
MW-306-150	12/29/2014	496.01	No LNAPL	12.45	0.00	483.56	
MW-306-150	1/21/2015	496.01	--	12.54	--	483.47	
MW-306-150	2/2/2015	496.01	No LNAPL	12.62	0.00	483.39	
MW-306-150	2/17/2015	496.01	No LNAPL	12.64	0.00	483.37	
MW-306-150	2/25/2015	496.02	--	12.60	--	483.42	
MW-306-150	3/18/2015	496.01	--	12.65	--	483.36	
MW-306-150	3/19/2015	496.01	--	12.63	--	483.38	
MW-306-150	3/26/2015	496.01	--	12.59	--	483.42	
MW-306-150	4/14/2015	496.03	--	12.47	--	483.56	
MW-306-150	4/16/2015	496.03	--	12.45	--	483.58	
MW-306-150	5/18/2015	496.02	--	12.15	--	483.87	
MW-306-150	5/21/2015	496.02	--	12.16	--	483.86	
MW-306-150	6/4/2015	496.00	--	11.98	--	484.02	
MW-306-150	6/10/2015	496.00	--	12.20	--	483.80	
MW-306-150	7/22/2015	496.02	--	11.38	--	484.64	
MW-306-150	8/12/2015	496.00	--	11.27	--	484.73	
MW-306-150	8/19/2015	496.00	--	11.48	--	484.52	
MW-306-150	9/30/2015	496.01	--	11.87	--	484.14	
MW-306-150	10/6/2015	496.00	--	11.68	--	484.32	
MW-306-150	10/22/2015	496.01	No LNAPL	12.29	0.00	483.72	
MW-306-150	11/19/2015	496.01	--	12.29	--	483.72	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-306-150	11/25/2015	496.01	No LNAPL	12.14	0.00	483.90	
MW-306-150	12/11/2015	496.01	--	12.29	--	483.72	
MW-306-150	1/19/2016	496.01	--	12.76	--	483.25	
MW-306-150	1/26/2016	496.02	--	12.79	--	483.23	
MW-306-150	3/22/2016	496.02	No LNAPL	12.99	0.00	483.03	
MW-306-150	5/26/2016	496.01	--	12.34	--	483.67	
MW-306-150	7/26/2016	496.00	--	10.37	--	485.63	
MW-306-150	9/9/2016	496.02	--	11.35	--	484.67	
MW-306-150	9/13/2016	496.02	--	11.46	--	484.56	
MW-306-150	11/15/2016	496.00	--	12.03	--	483.97	
MW-306-150	2/8/2017	496.03	--	12.41	--	483.62	
MW-306-150	3/14/2017	496.03	--	12.47	--	483.56	
MW-306-150	6/13/2017	496.02	--	11.71	--	484.31	
MW-307-150	2/16/2012	495.48	No LNAPL	Frozen	0.00	—	Frozen at 11.34 ft BTOC
MW-307-150	4/19/2012	495.48	No LNAPL	Frozen	0.00	—	Frozen at 11.34 ft BTOC
MW-307-150	7/30/2012	495.48	No LNAPL	9.48	0.00	486.00	
MW-307-150	11/1/2012	495.48	No LNAPL	10.85	0.00	484.63	
MW-307-150	1/24/2013	495.49	--	10.68	--	484.81	
MW-307-150	4/24/2013	495.49	No LNAPL	10.72	0.00	484.77	
MW-307-150	7/23/2013	495.47	--	9.55	--	485.92	
MW-307-150	8/1/2013	495.47	--	9.57	--	485.90	
MW-307-150	8/21/2013	495.47	No LNAPL	9.44	0.00	486.03	
MW-307-150	9/30/2013	495.48	No LNAPL	10.68	0.00	484.80	
MW-307-150	1/9/2014	495.48	No LNAPL	10.94	0.00	484.54	
MW-307-150	2/5/2014	495.48	No LNAPL	11.56	0.00	483.92	
MW-307-150	3/18/2014	495.47	No LNAPL	11.32	0.00	484.15	
MW-307-150	3/24/2014	495.47	No LNAPL	11.35	0.00	484.12	
MW-307-150	4/18/2014	495.48	No LNAPL	11.16	0.00	484.32	
MW-307-150	5/15/2014	495.49	--	10.67	--	484.82	
MW-307-150	6/11/2014	495.49	No LNAPL	10.90	0.00	484.59	
MW-307-150	6/19/2014	495.49	No LNAPL	10.55	0.00	484.94	
MW-307-150	7/15/2014	495.50	No LNAPL	8.75	0.00	486.75	
MW-307-150	8/26/2014	495.49	No LNAPL	9.34	0.00	486.15	
MW-307-150	9/9/2014	495.49	No LNAPL	9.60	0.00	485.89	
MW-307-150	9/24/2014	495.48	No LNAPL	9.96	0.00	485.52	
MW-307-150	10/21/2014	495.49	No LNAPL	10.86	0.00	484.63	
MW-307-150	11/19/2014	495.47	No LNAPL	10.50	0.00	484.97	
MW-307-150	12/16/2014	495.48	No LNAPL	10.67	0.00	484.81	
MW-307-150	12/29/2014	495.48	No LNAPL	10.78	0.00	484.70	
MW-307-150	1/21/2015	495.46	No LNAPL	10.83	0.00	484.63	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-307-150	2/25/2015	495.48	No LNAPL	10.94	0.00	484.54	
MW-307-150	3/18/2015	495.47	No LNAPL	Frozen	0.00	—	
MW-307-150	3/18/2015	495.47	No LNAPL	Frozen	0.00	—	Depth to ice = 10.85 feet
MW-307-150	3/26/2015	495.47	No LNAPL	Frozen	0.00	—	
MW-307-150	4/16/2015	495.48	--	Frozen	--	—	
MW-307-150	5/21/2015	495.49	No LNAPL	Frozen	0.00	—	Ice at 10.67 feet
MW-307-150	6/10/2015	495.49	No LNAPL	10.56	0.00	484.93	
MW-307-150	8/12/2015	495.50	--	9.51	--	485.99	
MW-307-150	8/19/2015	495.50	No LNAPL	9.78	0.00	485.75	
MW-307-150	10/6/2015	495.48	No LNAPL	10.07	0.00	485.42	
MW-307-150	11/19/2015	495.48	--	10.65	--	484.83	
MW-307-150	1/19/2016	495.46	--	11.11	--	484.31	
MW-307-150	3/22/2016	495.46	No LNAPL	11.38	0.00	484.08	
MW-307-150	5/26/2016	495.48	No LNAPL	10.76	0.00	484.74	
MW-307-150	9/9/2016	495.49	--	9.63	--	485.86	
MW-307-150	9/12/2016	495.49	--	9.66	--	485.83	
MW-307-150	11/15/2016	495.47	No LNAPL	10.26	0.00	485.31	
MW-307-150	2/8/2017	495.44	No LNAPL	10.67	0.00	484.84	
MW-307-150	3/14/2017	495.44	--	10.71	--	484.73	
MW-307-150	6/13/2017	495.46	No LNAPL	10.03	0.00	485.48	
MW-309-15	7/31/2012	495.10	--	9.56	--	485.54	
MW-309-15	11/1/2012	495.10	--	10.91	--	484.19	
MW-309-15	1/24/2013	495.08	--	10.83	--	484.25	
MW-309-15	4/24/2013	495.22	--	11.12	--	484.10	
MW-309-15	7/23/2013	494.92	--	9.35	--	485.57	
MW-309-15	8/1/2013	494.92	--	9.27	--	485.65	
MW-309-15	8/21/2013	494.92	No LNAPL	9.23	0.00	485.69	
MW-309-15	10/1/2013	494.90	--	10.63	--	484.27	
MW-309-15	1/9/2014	494.95	--	10.87	--	484.08	
MW-309-15	2/5/2014	495.00	--	11.03	--	483.97	
MW-309-15	3/18/2014	495.04	--	11.30	--	483.74	
MW-309-15	3/24/2014	495.04	--	11.28	--	483.76	
MW-309-15	4/18/2014	495.05	--	11.08	--	483.97	
MW-309-15	4/25/2014	495.05	--	10.28	--	484.77	
MW-309-15	5/15/2014	495.04	--	10.73	--	484.31	
MW-309-15	5/20/2014	495.04	--	10.83	--	484.21	
MW-309-15	6/4/2014	495.04	--	10.95	--	484.09	
MW-309-15	6/11/2014	495.04	--	10.84	--	484.20	
MW-309-15	6/19/2014	495.04	--	10.53	--	484.51	
MW-309-15	7/15/2014	495.05	--	9.12	--	485.93	

Appendix A-1
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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-309-15	8/26/2014	495.05	--	9.79	--	485.26	
MW-309-15	9/9/2014	495.05	--	10.09	--	484.96	
MW-309-15	9/24/2014	495.05	--	10.40	--	484.65	
MW-309-15	10/21/2014	495.04	--	11.30	--	483.74	
MW-309-15	11/19/2014	495.04	No LNAPL	10.91	0.00	484.13	
MW-309-15	12/16/2014	495.05	--	11.14	--	483.91	
MW-309-15	1/21/2015	495.06	--	11.33	--	483.73	
MW-309-15	2/25/2015	495.07	--	11.39	--	483.68	
MW-309-15	3/18/2015	495.06	--	11.47	--	483.59	
MW-309-15	3/26/2015	495.06	--	11.38	--	483.68	
MW-309-15	4/16/2015	495.06	--	11.22	--	483.84	
MW-309-15	5/21/2015	495.05	--	10.96	--	484.09	
MW-309-15	6/10/2015	495.04	--	10.97	--	484.07	
MW-309-15	8/12/2015	495.05	--	9.92	--	485.13	
MW-309-15	8/19/2015	495.05	--	10.15	--	484.90	
MW-309-15	10/6/2015	494.77	--	10.20	--	484.57	Casing was cut down 0.28 feet on 10-1-15
MW-309-15	11/20/2015	494.77	--	10.80	--	483.97	
MW-309-15	1/19/2016	494.76	--	11.29	--	483.47	
MW-309-15	3/22/2016	494.76	No LNAPL	11.53	0.00	483.23	
MW-309-15	5/26/2016	494.77	--	10.87	--	483.90	
MW-309-15	7/19/2016	494.77	--	9.92	--	484.85	
MW-309-15	9/9/2016	494.77	--	9.45	--	485.32	
MW-309-15	9/13/2016	494.77	--	9.58	--	485.19	
MW-309-15	10/14/2016	494.77	--	10.53	--	484.24	
MW-309-15	11/15/2016	494.77	--	10.04	--	484.73	
MW-309-15	2/8/2017	494.78	--	10.47	--	484.31	
MW-309-15	3/14/2017	494.78	--	10.57	--	484.21	
MW-309-15	6/13/2017	494.77	--	9.74	--	485.03	
MW-309-15	8/8/2017	494.77	--	8.99	--	485.78	
MW-309-15	9/21/2017	494.77	--	10.37	--	484.40	
MW-309-66	7/31/2012	—	--	9.38	--	—	
MW-309-66	11/1/2012	—	--	10.75	--	—	
MW-309-66	1/24/2013	495.05	--	10.71	--	484.34	
MW-309-66	4/24/2013	495.19	--	11.01	--	484.18	
MW-309-66	7/23/2013	495.17	--	9.53	--	485.64	
MW-309-66	8/1/2013	495.17	--	9.44	--	485.73	
MW-309-66	8/21/2013	495.17	No LNAPL	9.42	0.00	485.75	
MW-309-66	10/1/2013	495.15	--	10.85	--	484.30	
MW-309-66	1/9/2014	495.15	--	11.00	--	484.15	
MW-309-66	2/5/2014	495.17	--	11.14	--	484.03	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-309-66	3/18/2014	495.20	--	11.42	--	483.78	
MW-309-66	3/24/2014	495.20	--	11.43	--	483.77	
MW-309-66	4/18/2014	495.21	--	11.20	--	484.01	
MW-309-66	4/25/2014	495.21	--	10.46	--	484.75	
MW-309-66	5/15/2014	495.20	--	10.83	--	484.37	
MW-309-66	5/20/2014	495.20	--	10.93	--	484.27	
MW-309-66	6/4/2014	495.19	--	11.08	--	484.11	
MW-309-66	6/11/2014	495.19	--	11.00	--	484.19	
MW-309-66	6/19/2014	495.19	--	10.67	--	484.52	
MW-309-66	7/15/2014	495.19	--	8.94	--	486.25	
MW-309-66	8/26/2014	495.20	--	9.64	--	485.56	
MW-309-66	9/9/2014	495.20	--	9.95	--	485.25	
MW-309-66	9/24/2014	495.19	--	10.27	--	484.92	
MW-309-66	10/21/2014	495.19	--	11.18	--	484.01	
MW-309-66	11/19/2014	495.18	No LNAPL	10.75	0.00	484.43	
MW-309-66	12/16/2014	495.21	--	10.98	--	484.23	
MW-309-66	1/21/2015	495.20	--	11.15	--	484.05	
MW-309-66	2/25/2015	495.21	--	11.21	--	484.00	
MW-309-66	3/18/2015	495.20	--	11.28	--	483.92	
MW-309-66	3/26/2015	495.20	--	11.18	--	484.02	
MW-309-66	4/16/2015	495.21	--	11.05	--	484.16	
MW-309-66	5/21/2015	495.21	--	10.78	--	484.43	
MW-309-66	6/10/2015	495.19	--	10.81	--	484.38	
MW-309-66	8/12/2015	495.07	--	9.65	--	485.42	
MW-309-66	8/19/2015	495.07	--	9.85	--	485.22	
MW-309-66	10/6/2015	495.05	--	10.22	--	484.83	
MW-309-66	11/20/2015	495.05	--	10.73	--	484.32	
MW-309-66	1/19/2016	495.05	--	11.25	--	483.80	
MW-309-66	3/22/2016	495.06	No LNAPL	11.49	0.00	483.57	
MW-309-66	5/26/2016	495.06	--	10.81	--	484.25	
MW-309-66	7/19/2016	495.06	--	8.91	--	486.15	
MW-309-66	9/9/2016	495.06	--	9.71	--	485.35	
MW-309-66	9/13/2016	495.06	--	9.85	--	485.21	
MW-309-66	11/15/2016	495.06	--	10.29	--	484.77	
MW-309-66	2/8/2017	495.06	--	10.71	--	484.35	
MW-309-66	3/14/2017	495.06	--	10.80	--	484.26	
MW-309-66	6/13/2017	495.06	--	10.03	--	485.03	
MW-310-15	7/31/2012	494.32	--	8.60	--	485.72	
MW-310-15	11/1/2012	494.32	--	10.19	--	484.13	
MW-310-15	1/24/2013	494.32	--	9.75	--	484.57	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-310-15	4/24/2013	494.59	--	10.44	--	484.15	
MW-310-15	8/1/2013	494.26	--	8.47	--	485.79	
MW-310-15	10/1/2013	494.26	--	9.92	--	484.34	
MW-310-15	1/9/2014	494.36	--	10.13	--	484.23	
MW-310-15	2/5/2014	494.39	--	10.23	--	484.16	
MW-310-15	3/18/2014	494.48	--	10.66	--	483.82	
MW-310-15	3/24/2014	494.48	--	10.66	--	483.82	
MW-310-15	4/18/2014	494.51	--	10.31	--	484.20	
MW-310-15	4/25/2014	494.51	--	9.86	--	484.65	
MW-310-15	5/15/2014	494.48	--	10.12	--	484.36	
MW-310-15	5/20/2014	494.47	--	10.25	--	484.22	
MW-310-15	6/4/2014	494.45	--	10.42	--	484.03	
MW-310-15	6/11/2014	494.04	--	10.39	--	483.65	
MW-310-15	6/19/2014	494.04	--	10.12	--	483.92	
MW-310-15	7/15/2014	494.05	--	7.61	--	486.44	
MW-310-15	8/26/2014	494.04	--	8.38	--	485.66	
MW-310-15	9/9/2014	494.04	--	8.70	--	485.34	
MW-310-15	9/24/2014	494.03	--	8.98	--	485.05	
MW-310-15	10/21/2014	494.03	--	9.92	--	484.11	
MW-310-15	11/19/2014	494.11	No LNAPL	9.50	0.00	484.61	
MW-310-15	12/16/2014	494.15	--	9.78	--	484.37	
MW-310-15	1/21/2015	494.23	--	10.03	--	484.20	
MW-310-15	2/25/2015	494.31	--	10.14	--	484.17	
MW-310-15	3/18/2015	494.33	--	10.25	--	484.08	
MW-310-15	3/26/2015	494.33	--	10.15	--	484.18	
MW-310-15	4/16/2015	494.33	--	10.02	--	484.31	
MW-310-15	5/21/2015	494.31	--	9.75	--	484.56	
MW-310-15	6/10/2015	494.30	--	9.75	--	484.55	
MW-310-15	8/12/2015	493.88	--	8.30	--	485.58	
MW-310-15	8/19/2015	493.88	--	8.54	--	485.34	
MW-310-15	10/6/2015	493.87	--	9.05	--	484.82	
MW-310-15	11/19/2015	493.93	--	9.53	--	484.40	
MW-310-15	1/19/2016	494.04	--	10.14	--	483.90	
MW-310-15	2/3/2016	494.04	--	10.25	--	483.79	MW-310-15 DTW tracking for R-well specific capacity estimates
MW-310-15	2/8/2016	494.04	--	10.30	--	483.74	MW-310-15 DTW tracking for R-well specific capacity estimates
MW-310-15	2/12/2016	494.04	No LNAPL	10.33	0.00	483.71	MW-310-15 DTW tracking for R-well specific capacity estimates
MW-310-15	2/23/2016	494.04	--	10.34	--	483.70	MW-310-15 DTW tracking for R-well specific capacity estimates
MW-310-15	2/26/2016	494.04	No LNAPL	10.38	0.00	483.66	MW-310-15 DTW tracking for R-well specific capacity estimates
MW-310-15	3/4/2016	494.04	No LNAPL	10.34	0.00	483.70	MW-310-15 DTW tracking for R-well specific capacity estimates
MW-310-15	3/18/2016	494.04	--	10.43	--	483.61	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-310-15	3/22/2016	494.04	No LNAPL	10.48	0.00	483.56	
MW-310-15	3/23/2016	494.04	--	10.48	--	483.56	
MW-310-15	5/26/2016	494.14	--	9.85	--	484.29	
MW-310-15	7/2/2016	494.14	No LNAPL	8.97	0.00	485.17	
MW-310-15	7/4/2016	494.14	No LNAPL	8.74	0.00	485.40	
MW-310-15	7/8/2016	494.14	No LNAPL	8.45	0.00	485.69	
MW-310-15	7/12/2016	494.14	No LNAPL	8.40	0.00	485.74	
MW-310-15	7/16/2016	494.14	No LNAPL	8.32	0.00	485.82	
MW-310-15	7/19/2016	494.14	No LNAPL	8.46	0.00	485.68	
MW-310-15	7/20/2016	494.20	--	7.86	--	486.34	
MW-310-15	7/23/2016	494.14	No LNAPL	7.50	0.00	486.64	
MW-310-15	7/26/2016	494.14	No LNAPL	7.50	0.00	486.64	
MW-310-15	7/30/2016	494.14	No LNAPL	7.58	0.00	486.56	
MW-310-15	8/1/2016	494.14	No LNAPL	7.45	0.00	486.69	
MW-310-15	8/6/2016	494.14	No LNAPL	7.65	0.00	486.49	
MW-310-15	8/9/2016	494.14	No LNAPL	7.80	0.00	486.34	
MW-310-15	8/13/2016	494.14	No LNAPL	7.92	0.00	486.22	
MW-310-15	8/16/2016	494.14	No LNAPL	—	0.00	—	DTW recorded at 6.1 feet. Suspected to be erroneous based on recent measurements, and was not entered in database.
MW-310-15	8/20/2016	494.14	No LNAPL	8.30	0.00	485.84	
MW-310-15	8/23/2016	494.14	No LNAPL	8.40	0.00	485.74	
MW-310-15	8/27/2016	494.14	No LNAPL	8.48	0.00	485.66	
MW-310-15	8/30/2016	494.14	No LNAPL	8.49	0.00	485.65	
MW-310-15	9/3/2016	494.14	No LNAPL	8.75	0.00	485.39	
MW-310-15	9/6/2016	494.14	No LNAPL	8.83	0.00	485.31	
MW-310-15	9/9/2016	494.14	--	8.90	--	485.24	
MW-310-15	9/10/2016	494.14	No LNAPL	9.00	0.00	485.14	
MW-310-15	9/13/2016	494.14	No LNAPL	9.46	0.00	484.68	
MW-310-15	9/13/2016	494.14	--	9.06	--	485.08	
MW-310-15	9/17/2016	494.14	No LNAPL	9.10	0.00	485.04	
MW-310-15	9/20/2016	494.14	No LNAPL	9.21	0.00	484.93	
MW-310-15	9/24/2016	494.14	No LNAPL	9.35	0.00	484.79	
MW-310-15	9/27/2016	494.14	No LNAPL	9.50	0.00	484.64	
MW-310-15	9/30/2016	494.14	No LNAPL	9.61	0.00	484.53	
MW-310-15	10/4/2016	494.14	No LNAPL	9.72	0.00	484.42	
MW-310-15	10/8/2016	494.14	No LNAPL	9.86	0.00	484.28	
MW-310-15	10/11/2016	494.14	No LNAPL	9.98	0.00	484.16	
MW-310-15	10/15/2016	494.14	No LNAPL	10.46	0.00	483.68	
MW-310-15	10/18/2016	494.14	No LNAPL	10.16	0.00	483.98	
MW-310-15	10/25/2016	494.14	No LNAPL	10.37	0.00	483.77	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-310-15	10/28/2016	494.14	No LNAPL	10.28	0.00	483.86	
MW-310-15	11/1/2016	494.20	No LNAPL	9.75	0.00	484.45	
MW-310-15	11/5/2016	494.20	No LNAPL	9.35	0.00	484.85	
MW-310-15	11/8/2016	494.20	No LNAPL	9.75	0.00	484.45	
MW-310-15	11/12/2016	494.20	No LNAPL	9.90	0.00	484.30	
MW-310-15	11/15/2016	494.20	No LNAPL	9.50	0.00	484.70	
MW-310-15	11/15/2016	494.20	--	9.49	--	484.71	
MW-310-15	11/19/2016	494.20	No LNAPL	9.51	0.00	484.69	
MW-310-15	11/22/2016	494.20	No LNAPL	9.61	0.00	484.59	
MW-310-15	11/26/2016	494.20	No LNAPL	9.74	0.00	484.46	
MW-310-15	11/29/2016	494.20	No LNAPL	9.80	0.00	484.40	
MW-310-15	12/3/2016	494.20	No LNAPL	9.91	0.00	484.29	
MW-310-15	12/6/2016	494.20	No LNAPL	9.91	0.00	484.29	
MW-310-15	12/10/2016	494.20	No LNAPL	9.89	0.00	484.31	
MW-310-15	12/13/2016	494.20	No LNAPL	9.89	0.00	484.31	
MW-310-15	12/17/2016	494.20	No LNAPL	9.90	0.00	484.30	
MW-310-15	12/20/2016	494.20	No LNAPL	9.92	0.00	484.28	
MW-310-15	12/24/2016	494.20	No LNAPL	9.91	0.00	484.29	
MW-310-15	12/27/2016	494.20	No LNAPL	9.80	0.00	484.40	
MW-310-15	12/31/2016	494.20	No LNAPL	9.96	0.00	484.24	
MW-310-15	1/7/2017	494.20	No LNAPL	9.98	0.00	484.22	
MW-310-15	1/10/2017	494.20	No LNAPL	10.01	0.00	484.19	
MW-310-15	1/15/2017	494.20	No LNAPL	10.01	0.00	484.19	
MW-310-15	1/17/2017	494.20	No LNAPL	10.00	0.00	484.20	
MW-310-15	1/21/2017	494.20	No LNAPL	10.46	0.00	483.74	
MW-310-15	1/24/2017	494.20	No LNAPL	10.09	0.00	484.11	
MW-310-15	1/28/2017	494.38	No LNAPL	10.10	0.00	484.28	
MW-310-15	1/31/2017	494.38	No LNAPL	10.15	0.00	484.23	
MW-310-15	2/4/2017	494.38	No LNAPL	10.15	0.00	484.23	
MW-310-15	2/7/2017	494.38	No LNAPL	10.15	0.00	484.23	
MW-310-15	2/8/2017	494.38	--	10.11	--	484.27	
MW-310-15	2/11/2017	494.38	No LNAPL	10.15	0.00	484.23	
MW-310-15	2/14/2017	494.38	No LNAPL	10.17	0.00	484.21	
MW-310-15	2/18/2017	494.38	No LNAPL	10.20	0.00	484.18	
MW-310-15	2/21/2017	494.38	No LNAPL	10.25	0.00	484.13	
MW-310-15	2/25/2017	494.38	No LNAPL	10.25	0.00	484.13	
MW-310-15	2/28/2017	494.38	No LNAPL	10.21	0.00	484.17	
MW-310-15	3/4/2017	494.38	No LNAPL	10.27	0.00	484.11	
MW-310-15	3/7/2017	494.38	No LNAPL	10.28	0.00	484.10	
MW-310-15	3/11/2017	494.38	No LNAPL	10.28	0.00	484.10	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-310-15	3/14/2017	494.38	--	10.28	--	484.10	
MW-310-15	3/14/2017	494.38	No LNAPL	10.31	0.00	484.07	
MW-310-15	3/18/2017	494.38	No LNAPL	10.31	0.00	484.07	
MW-310-15	3/21/2017	494.38	No LNAPL	10.36	0.00	484.02	
MW-310-15	3/24/2017	494.38	No LNAPL	10.37	0.00	484.01	
MW-310-15	3/28/2017	494.38	No LNAPL	10.38	0.00	484.00	
MW-310-15	4/1/2017	494.38	No LNAPL	10.42	0.00	483.96	
MW-310-15	4/4/2017	494.38	No LNAPL	10.35	0.00	484.03	
MW-310-15	4/8/2017	494.38	No LNAPL	10.35	0.00	484.03	
MW-310-15	4/11/2017	494.38	No LNAPL	10.30	0.00	484.08	
MW-310-15	4/15/2017	494.38	No LNAPL	10.18	0.00	484.20	
MW-310-15	4/18/2017	494.38	No LNAPL	10.12	0.00	484.26	
MW-310-15	4/22/2017	494.38	No LNAPL	10.18	0.00	484.20	
MW-310-15	4/25/2017	494.38	No LNAPL	10.04	0.00	484.34	
MW-310-15	4/29/2017	494.38	No LNAPL	9.80	0.00	484.58	
MW-310-15	5/2/2017	494.38	No LNAPL	9.57	0.00	484.81	
MW-310-15	5/6/2017	494.38	No LNAPL	9.83	0.00	484.55	
MW-310-15	5/9/2017	494.38	No LNAPL	9.70	0.00	484.68	
MW-310-15	5/13/2017	494.45	No LNAPL	9.87	0.00	484.58	
MW-310-15	5/16/2017	494.45	No LNAPL	9.78	0.00	484.67	
MW-310-15	5/20/2017	494.18	No LNAPL	9.75	0.00	484.43	
MW-310-15	5/23/2017	494.45	No LNAPL	9.88	0.00	484.57	
MW-310-15	5/27/2017	494.18	No LNAPL	9.76	0.00	484.42	
MW-310-15	5/30/2017	494.16	No LNAPL	9.89	0.00	484.27	
MW-310-15	6/3/2017	494.16	No LNAPL	10.06	0.00	484.10	
MW-310-15	6/6/2017	494.16	No LNAPL	10.10	0.00	484.06	
MW-310-15	6/10/2017	494.16	No LNAPL	10.08	0.00	484.08	
MW-310-15	6/13/2017	494.16	--	9.47	--	484.69	
MW-310-15	6/13/2017	494.16	No LNAPL	9.52	0.00	484.64	
MW-310-15	6/16/2017	494.16	No LNAPL	9.18	0.00	484.98	
MW-310-15	6/20/2017	494.16	No LNAPL	9.33	0.00	484.83	
MW-310-15	6/24/2017	494.16	No LNAPL	9.42	0.00	484.74	
MW-310-15	6/27/2017	494.16	No LNAPL	9.33	0.00	484.83	
MW-310-15	7/1/2017	494.16	No LNAPL	9.27	0.00	484.89	
MW-310-15	7/4/2017	494.16	No LNAPL	9.15	0.00	485.01	
MW-310-15	7/8/2017	494.16	No LNAPL	8.90	0.00	485.26	
MW-310-15	7/10/2017	494.16	--	8.72	--	485.44	
MW-310-15	9/21/2017	494.16	--	9.95	--	484.21	
MW-310-65	7/31/2012	494.47	--	8.64	--	485.83	
MW-310-65	11/1/2012	494.47	--	10.08	--	484.39	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-310-65	1/24/2013	494.48	--	10.09	--	484.39	
MW-310-65	4/24/2013	494.48	--	10.58	--	483.90	
MW-310-65	10/1/2013	494.38	--	10.02	--	484.36	
MW-310-65	3/18/2014	494.54	--	10.67	--	483.87	
MW-310-65	4/25/2014	494.59	--	9.80	--	484.79	
MW-310-65	5/20/2014	494.57	--	10.24	--	484.33	
MW-310-65	6/4/2014	494.57	--	10.41	--	484.16	
MW-310-65	6/11/2014	494.55	--	10.34	--	484.21	
MW-310-65	9/9/2014	494.12	--	8.78	--	485.34	
MW-310-65	11/20/2014	494.12	No LNAPL	9.47	0.00	484.65	
MW-310-65	3/18/2015	493.77	--	10.30	--	483.47	
MW-310-65	6/10/2015	494.37	--	9.82	--	484.55	
MW-310-65	8/12/2015	494.07	--	8.43	--	485.64	
MW-310-65	11/19/2015	494.09	--	9.58	--	484.51	
MW-310-65	3/22/2016	494.34	No LNAPL	10.59	0.00	483.75	
MW-310-65	7/20/2016	494.00	--	7.90	--	486.10	
MW-310-65	9/13/2016	494.00	--	9.11	--	484.89	
MW-310-65	3/14/2017	494.00	--	9.99	--	484.01	
MW-310-110	7/31/2012	494.27	--	8.43	--	485.84	
MW-310-110	11/1/2012	494.27	--	9.79	--	484.48	
MW-310-110	1/24/2013	494.26	--	9.79	--	484.47	
MW-310-110	4/24/2013	494.40	--	10.93	--	483.47	
MW-310-110	8/1/2013	494.28	--	8.36	--	485.92	
MW-310-110	10/1/2013	494.13	--	9.75	--	484.38	
MW-310-110	1/9/2014	494.15	--	9.88	--	484.27	
MW-310-110	2/5/2014	494.16	--	10.00	--	484.16	
MW-310-110	3/18/2014	494.18	--	10.30	--	483.88	
MW-310-110	3/24/2014	494.18	--	10.29	--	483.89	
MW-310-110	4/18/2014	494.18	--	10.05	--	484.13	
MW-310-110	4/25/2014	494.18	--	9.35	--	484.83	
MW-310-110	5/15/2014	494.15	--	9.70	--	484.45	
MW-310-110	5/20/2014	494.16	--	9.79	--	484.37	
MW-310-110	6/4/2014	494.16	--	9.98	--	484.18	
MW-310-110	6/11/2014	494.15	--	9.89	--	484.26	
MW-310-110	6/19/2014	494.15	--	9.49	--	484.66	
MW-310-110	7/15/2014	494.15	--	7.67	--	486.48	
MW-310-110	8/26/2014	494.15	--	8.42	--	485.73	
MW-310-110	9/9/2014	494.15	--	8.80	--	485.35	
MW-310-110	9/24/2014	494.14	--	9.07	--	485.07	
MW-310-110	10/21/2014	494.14	--	9.99	--	484.15	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-310-110	11/19/2014	494.16	No LNAPL	9.52	0.00	484.64	
MW-310-110	12/16/2014	494.16	--	9.75	--	484.41	
MW-310-110	1/21/2015	494.22	--	9.98	--	484.24	
MW-310-110	2/25/2015	494.32	--	10.13	--	484.19	
MW-310-110	3/18/2015	494.32	--	10.22	--	484.10	
MW-310-110	3/26/2015	494.32	--	10.12	--	484.20	
MW-310-110	4/16/2015	494.32	--	9.97	--	484.35	
MW-310-110	5/21/2015	494.30	--	9.72	--	484.58	
MW-310-110	6/10/2015	494.27	--	9.72	--	484.55	
MW-310-110	8/12/2015	494.28	--	8.84	--	485.44	
MW-310-110	8/19/2015	494.28	--	8.88	--	485.40	
MW-310-110	10/6/2015	493.98	--	9.03	--	484.95	Casing was cut down 0.33 feet on 10-1-15
MW-310-110	11/19/2015	493.97	--	9.43	--	484.54	
MW-310-110	1/19/2016	494.00	--	10.04	--	483.96	
MW-310-110	3/22/2016	494.22	No LNAPL	10.45	0.00	483.77	
MW-310-110	5/26/2016	494.17	--	9.77	--	484.40	
MW-310-110	8/10/2016	494.17	--	7.64	--	486.53	
MW-310-110	9/9/2016	494.17	--	8.78	--	485.39	
MW-310-110	9/13/2016	494.17	--	8.96	--	485.21	
MW-310-110	11/15/2016	494.17	--	9.31	--	484.86	
MW-310-110	2/8/2017	494.27	--	9.84	--	484.43	
MW-310-110	3/14/2017	494.27	--	9.97	--	484.30	
MW-310-110	6/13/2017	494.32	--	9.21	--	485.11	
MW-310-110	9/21/2017	493.83	--	9.45	--	484.38	
MW-321-15	11/1/2012	495.62	--	10.05	--	485.57	
MW-321-15	1/24/2013	495.59	--	10.51	--	485.08	
MW-321-15	4/24/2013	495.59	--	10.87	--	484.72	
MW-321-15	8/1/2013	495.59	--	9.18	--	486.41	
MW-321-15	10/1/2013	495.59	--	10.68	--	484.91	
MW-321-15	3/18/2014	495.59	--	11.34	--	484.25	
MW-321-15	6/11/2014	495.86	--	10.89	--	484.97	
MW-321-15	9/9/2014	495.86	--	9.70	--	486.16	
MW-321-15	11/20/2014	495.86	No LNAPL	10.43	0.00	485.43	
MW-321-15	3/19/2015	495.86	--	11.10	--	484.76	
MW-321-15	6/12/2015	495.86	--	10.64	--	485.22	
MW-321-15	8/12/2015	495.75	--	9.25	--	486.50	
MW-321-15	11/19/2015	495.75	--	10.42	--	485.33	
MW-321-15	3/22/2016	495.75	No LNAPL	11.35	0.00	484.40	
MW-321-15	8/11/2016	495.87	--	8.56	--	487.31	
MW-321-15	9/13/2016	495.87	--	9.68	--	486.19	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-321-15	3/14/2017	495.87	--	10.78	--	485.09	
MW-321-15	8/8/2017	495.87	--	9.25	--	486.62	
MW-321-15	9/21/2017	495.54	--	10.29	--	485.25	
MW-321-15	11/15/2017	495.54	--	10.45	--	485.09	
MW-321-65	11/1/2012	495.28	--	10.23	--	485.05	
MW-321-65	1/24/2013	495.26	--	10.26	--	485.00	
MW-321-65	4/24/2013	495.26	--	10.60	--	484.66	
MW-321-65	8/1/2013	495.26	--	8.92	--	486.34	
MW-321-65	10/1/2013	495.26	--	10.40	--	484.86	
MW-321-65	3/18/2014	495.26	--	11.07	--	484.19	
MW-321-65	6/11/2014	495.54	--	10.64	--	484.90	
MW-321-65	9/9/2014	495.54	--	9.45	--	486.09	
MW-321-65	11/20/2014	495.54	No LNAPL	10.19	0.00	485.35	
MW-321-65	3/19/2015	495.54	--	10.88	--	484.66	
MW-321-65	6/12/2015	495.54	--	10.50	--	485.04	
MW-321-65	8/12/2015	495.55	--	9.15	--	486.40	
MW-321-65	11/19/2015	495.55	--	10.29	--	485.26	
MW-321-65	8/11/2016	495.67	--	8.43	--	487.24	
MW-330-20	3/18/2014	500.03	--	15.63	--	484.40	
MW-330-20	6/11/2014	500.03	--	15.21	--	484.82	
MW-330-20	9/9/2014	500.03	--	14.05	--	485.98	
MW-330-20	11/20/2014	500.03	No LNAPL	14.75	0.00	485.28	
MW-330-20	3/19/2015	500.03	--	15.28	--	484.75	
MW-330-20	6/11/2015	500.03	--	14.86	--	485.17	
MW-330-20	8/12/2015	500.06	--	13.95	--	486.11	
MW-330-20	11/19/2015	500.06	--	14.85	--	485.21	
MW-330-20	3/22/2016	500.06	No LNAPL	15.69	0.00	484.37	
MW-330-20	7/20/2016	500.08	--	12.93	--	487.15	
MW-330-20	9/13/2016	500.08	--	14.10	--	485.98	
MW-330-20	10/18/2016	500.08	--	15.21	--	484.87	
MW-330-20	3/14/2017	500.08	--	15.03	--	485.05	
MW-330-20	7/10/2017	500.08	--	13.70	--	486.38	
MW-330-65	7/30/2012	499.82	--	13.37	--	486.45	
MW-330-65	11/1/2012	499.82	No LNAPL	14.79	0.00	485.03	
MW-330-65	1/24/2013	499.83	--	14.75	--	485.08	
MW-330-65	4/24/2013	499.83	--	15.10	--	484.73	
MW-330-65	8/1/2013	499.83	--	12.65	--	487.18	
MW-330-65	10/1/2013	499.83	--	14.90	--	484.93	
MW-330-65	3/18/2014	499.83	--	15.43	--	484.40	
MW-330-65	6/11/2014	499.83	--	15.02	--	484.81	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-330-65	9/9/2014	499.83	--	13.88	--	485.95	
MW-330-65	11/20/2014	499.83	No LNAPL	14.56	0.00	485.27	
MW-330-65	3/19/2015	499.83	--	15.09	--	484.74	
MW-330-65	6/11/2015	499.83	--	14.67	--	485.16	
MW-330-65	8/12/2015	499.85	--	13.50	--	486.35	
MW-330-65	11/19/2015	499.85	--	14.86	--	484.99	
MW-330-65	3/22/2016	499.85	No LNAPL	15.51	0.00	484.34	
MW-330-65	7/20/2016	499.87	--	12.52	--	487.35	
MW-330-65	9/13/2016	499.87	--	13.92	--	485.95	
MW-330-65	3/14/2017	499.87	--	14.84	--	485.03	
MW-334-15	9/19/2012	490.82	11.39	12.79	1.40	479.15	Erroneous data for this measurement was reported in 2012 Q3 due to surveying error
MW-334-15	10/15/2012	490.82	11.33	12.74	1.41	479.21	
MW-334-15	10/17/2012	490.82	11.43	12.84	1.41	479.11	Initial levels of first October 2012 baildown test
MW-334-15	10/19/2012	490.82	11.49	12.91	1.42	479.05	Initial levels of second October 2012 baildown test
MW-334-15	11/29/2012	495.87	11.01	12.08	1.07	484.65	
MW-334-15	12/27/2012	495.87	11.32	12.61	1.29	484.29	
MW-334-15	2/26/2013	495.87	11.40	12.84	1.44	484.18	
MW-334-15	3/29/2013	495.82	11.52	12.99	1.47	484.01	R-35R, R-39, and R-40 were offline on this date
MW-334-15	4/24/2013	495.82	11.48	13.04	1.56	484.03	
MW-334-15	5/20/2013	495.93	11.42	13.08	1.66	484.18	
MW-334-15	6/24/2013	495.92	10.83	11.13	0.30	485.03	
MW-334-15	7/23/2013	495.89	10.55	11.41	0.86	485.17	
MW-334-15	8/1/2013	495.89	10.49	11.52	1.03	485.19	
MW-334-15	8/21/2013	495.89	10.41	11.45	1.04	485.27	
MW-334-15	9/30/2013	495.89	11.48	13.07	1.59	484.09	
MW-334-15	10/22/2013	495.90	12.08	13.76	1.68	483.48	
MW-334-15	11/26/2013	496.91	12.11	13.36	1.25	484.55	
MW-334-15	12/18/2013	496.94	12.44	13.74	1.30	484.24	
MW-334-15	1/9/2014	496.96	12.74	14.14	1.40	483.94	
MW-334-15	2/5/2014	496.98	12.96	14.37	1.41	483.74	
MW-334-15	2/25/2014	496.98	13.12	14.56	1.44	483.57	
MW-334-15	3/18/2014	496.97	13.12	14.62	1.50	483.55	
MW-334-15	3/24/2014	496.97	13.20	14.64	1.44	483.48	
MW-334-15	4/18/2014	496.98	13.05	14.46	1.41	483.65	
MW-334-15	5/15/2014	496.98	12.81	12.90	0.09	484.15	Skimmer pump removed to take measurement.
MW-334-15	5/16/2014	496.98	12.85	12.94	0.09	484.11	
MW-334-15	6/11/2014	496.95	12.95	12.96	0.01	484.00	Product skimmer-pump present
MW-334-15	6/19/2014	496.95	12.54	12.57	0.03	484.40	Skimmer pump removed to take measurement.
MW-334-15	7/15/2014	496.95	10.80	10.81	0.01	486.15	

**Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-334-15	8/26/2014	496.96	11.51	11.72	0.21	485.41	Product skimmer-pump present
MW-334-15	9/9/2014	496.96	11.73	11.97	0.24	485.18	Product skimmer-pump present
MW-334-15	9/24/2014	496.95	12.02	12.20	0.18	484.89	
MW-334-15	10/21/2014	496.94	12.84	13.50	0.66	483.97	
MW-334-15	11/19/2014	496.96	12.48	12.92	0.44	484.39	
MW-334-15	12/16/2014	496.98	12.64	13.49	0.85	484.17	
MW-334-15	12/29/2014	496.98	12.77	13.70	0.93	484.02	
MW-334-15	1/21/2015	497.01	12.88	13.80	0.92	483.95	
MW-334-15	2/25/2015	497.01	13.16	13.86	0.70	483.71	
MW-334-15	3/10/2015	497.00	12.97	13.87	0.90	483.85	
MW-334-15	3/18/2015	497.00	13.04	14.00	0.96	483.77	
MW-334-15	3/26/2015	497.00	12.97	14.02	1.05	483.82	
MW-334-15	4/16/2015	497.02	12.86	13.86	1.00	483.96	
MW-334-15	5/21/2015	497.02	12.64	13.21	0.57	484.27	Skimmer pump present; removed for measurement, and reinstalled after
MW-334-15	6/10/2015	497.03	12.66	13.28	0.62	484.25	Skimmer pump present; removed for measurement, and reinstalled after
MW-334-15	7/22/2015	497.03	11.76	11.92	0.16	485.26	
MW-334-15	8/12/2015	497.02	11.62	11.85	0.23	485.39	
MW-334-15	8/19/2015	497.02	11.90	12.27	0.37	485.12	
MW-334-15	9/30/2015	497.02	12.36	12.74	0.38	484.62	
MW-334-15	10/6/2015	497.02	12.19	12.54	0.35	484.80	
MW-334-15	10/15/2015	497.02	12.59	12.86	0.27	484.42	Skimmer pump present
MW-334-15	11/19/2015	497.02	12.50	13.35	0.85	484.35	
MW-334-15	11/25/2015	497.02	12.51	12.85	0.34	484.47	
MW-334-15	12/16/2015	497.02	12.82	13.31	0.49	484.10	
MW-334-15	1/19/2016	497.01	13.20	13.72	0.52	483.71	
MW-334-15	1/19/2016	497.01	13.20	13.72	0.52	483.71	
MW-334-15	2/25/2016	497.01	11.32	11.83	0.51	485.59	
MW-334-15	3/4/2016	497.01	13.25	13.82	0.57	483.70	
MW-334-15	3/22/2016	497.01	13.46	13.52	0.06	483.54	
MW-334-15	3/25/2016	497.01	13.36	13.96	0.60	483.53	Initial fluid levels and product recovered by SWI during baildown testing
MW-334-15	4/14/2016	497.01	12.62	13.16	0.54	484.28	R-45 and R-40 both not pumping
MW-334-15	5/20/2016	497.03	12.95	13.55	0.60	483.96	
MW-334-15	5/26/2016	497.03	12.78	13.32	0.54	484.16	
MW-334-15	6/14/2016	497.03	12.53	12.54	0.01	484.50	
MW-334-15	7/2/2016	497.03	No LNAPL	12.07	0.00	484.96	
MW-334-15	7/4/2016	497.03	No LNAPL	11.85	0.00	485.18	
MW-334-15	7/8/2016	497.03	No LNAPL	11.59	0.00	485.44	
MW-334-15	7/12/2016	497.03	No LNAPL	11.50	0.00	485.53	
MW-334-15	7/26/2016	497.03	10.40	10.85	0.45	486.54	
MW-334-15	8/18/2016	497.03	11.24	11.53	0.29	485.73	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-334-15	8/18/2016	497.00	11.26	11.56	0.30	485.68	
MW-334-15	9/9/2016	497.01	11.73	11.91	0.18	485.29	Skimmer pump removed prior to measurement
MW-334-15	9/9/2016	497.01	11.73	11.91	0.18	485.29	
MW-334-15	9/12/2016	497.01	11.83	12.05	0.22	485.14	
MW-334-15	10/13/2016	497.01	12.79	12.82	0.03	484.21	
MW-334-15	10/25/2016	497.00	13.14	13.19	0.05	483.85	
MW-334-15	11/15/2016	497.00	Sheen	12.41	Sheen	484.63	
MW-334-15	11/15/2016	497.00	Sheen	12.41	Sheen	484.63	
MW-334-15	12/9/2016	497.00	12.65	12.66	0.01	484.35	
MW-334-15	1/24/2017	496.95	Sheen	12.76	Sheen	484.19	
MW-334-15	2/8/2017	496.95	Sheen	12.81	Sheen	484.21	
MW-334-15	2/8/2017	496.95	Sheen	12.81	Sheen	484.21	
MW-334-15	2/15/2017	496.95	Sheen	12.84	Sheen	484.14	
MW-334-15	3/1/2017	496.95	12.94	12.99	0.05	484.00	
MW-334-15	3/14/2017	496.95	12.84	13.10	0.26	484.06	
MW-334-15	4/18/2017	496.95	12.55	13.43	0.88	484.22	
MW-334-15	4/22/2017	496.95	12.57	13.40	0.83	484.21	
MW-334-15	4/29/2017	496.95	No LNAPL	12.30	0.00	484.65	
MW-334-15	5/6/2017	496.95	12.45	12.46	0.01	484.50	
MW-334-15	5/13/2017	496.95	13.38	13.43	0.05	483.56	
MW-334-15	5/20/2017	496.95	No LNAPL	12.30	0.00	484.65	
MW-334-15	5/25/2017	496.95	Sheen	12.50	Sheen	484.45	Skimmer pump removed for measurement and replaced
MW-334-15	5/27/2017	496.95	12.54	12.56	0.02	484.41	
MW-334-15	6/6/2017	497.01	12.79	13.23	0.44	484.13	
MW-334-15	6/13/2017	497.01	12.19	12.20	0.01	484.88	
MW-334-15	7/1/2017	497.01	12.12	12.13	0.01	484.89	
MW-334-15	7/25/2017	497.01	Sheen	11.21	Sheen	485.80	
MW-334-15	7/27/2017	497.01	No LNAPL	11.22	0.00	485.79	
MW-334-15	8/28/2017	497.01	11.71	11.85	0.14	485.27	
MW-334-15	8/31/2017	497.01	11.77	11.89	0.12	485.12	
MW-334-15	9/20/2017	497.01	12.40	12.51	0.11	484.50	
MW-334-15	9/21/2017	497.01	12.41	12.51	0.10	484.58	
MW-334-15	9/21/2017	497.01	12.41	12.51	0.10	484.58	
MW-334-15	10/25/2017	497.01	Sheen	13.11	Sheen	483.90	
MW-334-15	11/1/2017	497.01	12.85	13.28	0.43	484.07	
MW-334-65	11/1/2012	490.76	No LNAPL	11.46	0.00	479.30	
MW-334-65	1/24/2013	495.82	--	11.30	--	484.52	
MW-334-65	4/24/2013	495.76	No LNAPL	11.55	0.00	484.21	
MW-334-65	7/23/2013	495.81	--	10.18	--	485.63	
MW-334-65	8/1/2013	495.81	No LNAPL	10.09	0.00	485.72	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-334-65	8/21/2013	495.81	No LNAPL	10.06	0.00	485.75	
MW-334-65	9/30/2013	495.81	No LNAPL	11.33	0.00	484.48	
MW-334-65	1/9/2014	495.83	No LNAPL	11.56	0.00	484.27	
MW-334-65	2/5/2014	495.85	No LNAPL	11.71	0.00	484.14	
MW-334-65	3/18/2014	495.84	No LNAPL	11.97	0.00	483.87	
MW-334-65	3/24/2014	495.84	No LNAPL	11.99	0.00	483.85	
MW-334-65	4/18/2014	495.85	No LNAPL	11.81	0.00	484.04	
MW-334-65	5/15/2014	495.85	--	11.35	--	484.50	
MW-334-65	6/11/2014	495.82	No LNAPL	11.50	0.00	484.32	
MW-334-65	6/19/2014	495.82	No LNAPL	11.16	0.00	484.66	
MW-334-65	7/15/2014	495.83	No LNAPL	9.39	0.00	486.44	
MW-334-65	8/26/2014	495.83	No LNAPL	10.02	0.00	485.81	
MW-334-65	9/9/2014	495.83	No LNAPL	10.28	0.00	485.55	
MW-334-65	9/24/2014	495.81	No LNAPL	10.62	0.00	485.19	
MW-334-65	10/21/2014	495.81	No LNAPL	11.53	0.00	484.28	
MW-334-65	11/19/2014	495.83	No LNAPL	11.15	0.00	484.68	
MW-334-65	12/16/2014	495.83	No LNAPL	11.34	0.00	484.49	
MW-334-65	12/29/2014	495.83	No LNAPL	11.47	0.00	484.36	
MW-334-65	1/21/2015	495.84	No LNAPL	11.53	0.00	484.31	
MW-334-65	2/25/2015	495.85	No LNAPL	11.66	0.00	484.19	
MW-334-65	3/18/2015	495.84	--	11.69	--	484.15	
MW-334-65	3/26/2015	495.84	No LNAPL	11.60	0.00	484.24	
MW-334-65	4/16/2015	495.84	--	11.48	--	484.36	
MW-334-65	5/21/2015	495.85	No LNAPL	11.23	0.00	484.62	
MW-334-65	6/10/2015	495.85	No LNAPL	11.24	0.00	484.61	
MW-334-65	8/12/2015	495.85	--	10.26	--	485.59	
MW-334-65	8/19/2015	495.85	No LNAPL	10.45	0.00	485.43	
MW-334-65	10/6/2015	495.84	No LNAPL	10.75	0.00	485.10	
MW-334-65	11/19/2015	495.84	--	11.30	--	484.54	
MW-334-65	1/19/2016	495.84	--	11.79	--	484.01	
MW-334-65	5/26/2016	495.86	No LNAPL	11.43	0.00	484.45	
MW-334-65	8/12/2016	495.85	--	10.52	--	485.33	
MW-334-65	9/9/2016	495.85	No LNAPL	10.32	0.00	485.57	
MW-334-65	10/20/2016	495.85	--	11.55	--	484.30	
MW-334-65	11/15/2016	495.85	No LNAPL	10.97	0.00	484.98	
MW-334-65	2/8/2017	495.82	No LNAPL	11.37	0.00	484.52	
MW-334-65	6/13/2017	495.86	No LNAPL	10.72	0.00	485.19	
MW-334-65	8/3/2017	495.86	--	10.03	--	485.83	
MW-334-65	10/19/2017	495.86	--	11.36	--	484.50	
MW-334-85	3/18/2014	496.12	No LNAPL	12.20	0.00	483.92	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-334-85	5/15/2014	496.13	--	11.59	--	484.54	
MW-334-85	6/11/2014	496.12	No LNAPL	11.77	0.00	484.35	
MW-334-85	6/19/2014	496.12	No LNAPL	11.43	0.00	484.69	
MW-334-85	7/15/2014	496.14	No LNAPL	9.65	0.00	486.49	
MW-334-85	8/26/2014	496.13	No LNAPL	10.29	0.00	485.84	
MW-334-85	9/9/2014	496.13	No LNAPL	10.55	0.00	485.58	
MW-334-85	9/24/2014	496.12	No LNAPL	10.88	0.00	485.24	
MW-334-85	10/21/2014	496.12	No LNAPL	11.80	0.00	484.32	
MW-334-85	11/19/2014	496.14	No LNAPL	11.42	0.00	484.72	
MW-334-85	12/16/2014	496.12	No LNAPL	11.59	0.00	484.53	
MW-334-85	12/29/2014	496.12	No LNAPL	11.70	0.00	484.42	
MW-334-85	1/21/2015	496.12	No LNAPL	11.77	0.00	484.35	
MW-334-85	2/25/2015	496.11	No LNAPL	11.88	0.00	484.23	
MW-334-85	3/18/2015	496.11	--	11.92	--	484.19	
MW-334-85	3/26/2015	496.11	No LNAPL	11.84	0.00	484.27	
MW-334-85	4/16/2015	496.11	--	11.70	--	484.41	
MW-334-85	5/21/2015	496.14	No LNAPL	11.46	0.00	484.68	
MW-334-85	6/10/2015	496.15	No LNAPL	11.49	0.00	484.66	
MW-334-85	8/12/2015	496.14	--	10.44	--	485.70	
MW-334-85	8/19/2015	496.14	No LNAPL	10.70	0.00	485.47	
MW-334-85	10/6/2015	496.14	No LNAPL	11.02	0.00	485.13	
MW-334-85	11/19/2015	496.14	--	11.56	--	484.58	
MW-334-85	1/19/2016	496.11	--	12.05	--	484.02	
MW-334-85	3/22/2016	496.11	No LNAPL	12.29	0.00	483.82	
MW-334-85	5/26/2016	496.15	No LNAPL	11.69	0.00	484.48	
MW-334-85	8/12/2016	496.13	--	10.76	--	485.37	
MW-334-85	9/9/2016	496.14	No LNAPL	10.58	0.00	485.60	
MW-334-85	9/12/2016	496.14	--	10.63	--	485.51	
MW-334-85	11/15/2016	496.13	No LNAPL	11.20	0.00	485.03	
MW-334-85	2/8/2017	496.10	No LNAPL	11.63	0.00	484.54	
MW-334-85	3/14/2017	496.10	--	11.66	--	484.44	
MW-334-85	6/13/2017	496.15	No LNAPL	10.97	0.00	485.23	
MW-336-15	4/14/2014	492.90	7.45	Frozen	0.32	—	Frozen at 7.77 feet below measuring point
MW-336-15	6/11/2014	492.90	7.13	7.36	0.23	485.72	
MW-336-15	10/30/2014	492.90	7.47	7.58	0.11	485.41	
MW-336-15	3/10/2015	492.90	Sheen	Frozen	Sheen	—	Depth to ice = 6.87 feet
MW-336-15	10/15/2015	492.92	6.75	6.80	0.05	486.20	
MW-336-15	3/4/2016	492.92	Sheen	Frozen	Sheen	—	Ice at 7.45 feet
MW-336-15	8/17/2016	492.91	Sheen	5.11	Sheen	487.80	
MW-336-15	10/13/2016	492.91	6.81	6.82	0.01	486.10	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-336-15	10/26/2016	492.91	7.18	7.24	0.06	485.72	
MW-336-15	3/2/2017	492.91	No LNAPL	Frozen	0.00	—	Ice at 6.60 feet BTOC
MW-336-20	3/18/2014	493.32	No LNAPL	Frozen	0.00	—	Frozen at 7.93 feet below measuring point
MW-336-20	6/12/2014	493.32	--	7.84	--	485.48	
MW-336-20	9/9/2014	493.32	No LNAPL	6.31	0.00	487.01	
MW-336-20	11/20/2014	493.32	No LNAPL	7.11	0.00	486.21	
MW-336-20	3/19/2015	493.32	--	Frozen	--	—	Depth to ice = 7.36 feet
MW-336-20	6/11/2015	493.32	No LNAPL	7.42	0.00	485.90	
MW-336-20	8/12/2015	493.34	--	6.02	--	487.32	
MW-336-20	11/20/2015	493.34	--	7.21	--	486.13	
MW-336-20	3/22/2016	493.34	No LNAPL	Frozen	0.00	—	Ice at 7.77 feet
MW-336-20	8/15/2016	493.33	--	5.45	--	487.88	
MW-336-20	9/12/2016	493.33	--	6.24	--	487.09	
MW-336-20	10/21/2016	493.33	--	7.53	--	485.80	
MW-336-20	3/14/2017	493.33	—	—	—	—	Well was inaccessible due to demolition debris. Well was Frozen on 2-23-17
MW-336-20	8/15/2017	493.33	--	5.74	--	487.59	
MW-336-20	9/21/2017	493.33	--	7.23	--	486.10	
MW-336-20	11/15/2017	493.33	--	7.48	--	485.85	
MW-336-35	8/15/2016	493.27	--	5.41	--	487.86	
MW-336-35	10/21/2016	493.27	--	7.48	--	485.79	
MW-336-55	3/18/2014	493.29	No LNAPL	Frozen	0.00	—	Frozen at 7.70 feet below measuring point
MW-336-55	6/11/2014	493.29	No LNAPL	Frozen	0.00	—	Water measured at 7.46 feet, Frozen at 8.43 feet below the measuring point
MW-336-55	9/9/2014	493.29	No LNAPL	6.26	0.00	487.03	
MW-336-55	11/20/2014	493.29	No LNAPL	7.05	0.00	486.24	
MW-336-55	3/19/2015	493.29	--	Frozen	--	—	Depth to ice = 7.31 feet
MW-336-55	6/11/2015	493.29	No LNAPL	7.43	0.00	485.86	
MW-336-55	8/12/2015	493.31	--	5.95	--	487.36	
MW-336-55	11/20/2015	493.31	--	7.14	--	486.17	
MW-336-55	3/22/2016	493.31	No LNAPL	Frozen	0.00	—	Ice at 6.82 feet
MW-336-55	8/15/2016	493.31	--	5.37	--	487.94	
MW-336-55	9/12/2016	493.31	--	6.23	--	487.08	
MW-336-55	3/14/2017	493.31	—	—	—	—	Well was inaccessible due to demolition debris. Well was Frozen on 2-23-17
MW-337-20	8/17/2016	493.02	--	5.23	--	487.79	
MW-337-20	10/21/2016	493.02	--	7.22	--	485.80	
MW-344-15	8/1/2013	493.52	No LNAPL	8.43	0.00	485.09	
MW-344-15	8/21/2013	493.52	No LNAPL	8.24	0.00	485.28	
MW-344-15	1/9/2014	493.51	--	9.86	--	483.65	
MW-344-15	2/5/2014	493.51	--	10.08	--	483.43	
MW-344-15	3/24/2014	493.53	--	9.97	--	483.56	
MW-344-15	4/18/2014	493.52	--	10.15	--	483.37	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-344-15	5/15/2014	493.52	--	9.64	--	483.88	
MW-344-15	6/19/2014	493.54	--	9.10	--	484.44	
MW-344-15	7/15/2014	493.50	--	7.72	--	485.78	
MW-344-15	8/26/2014	493.54	--	8.36	--	485.18	
MW-344-15	9/24/2014	493.50	--	8.99	--	484.51	
MW-344-15	10/21/2014	493.51	--	9.92	--	483.59	
MW-344-15	11/19/2014	493.51	--	9.51	--	484.00	
MW-344-15	12/16/2014	493.52	--	9.70	--	483.82	
MW-344-15	1/21/2015	493.51	--	9.95	--	483.56	
MW-344-15	2/25/2015	493.53	--	10.18	--	483.35	
MW-344-15	3/18/2015	493.54	--	10.10	--	483.44	
MW-344-15	3/26/2015	493.54	--	10.08	--	483.46	
MW-344-15	4/16/2015	493.57	--	9.84	--	483.73	
MW-344-15	5/21/2015	493.57	--	9.52	--	484.05	
MW-344-15	6/10/2015	493.54	--	9.56	--	483.98	
MW-344-15	8/19/2015	493.56	--	8.73	--	484.83	
MW-344-15	10/6/2015	493.55	--	9.10	--	484.45	
MW-344-15	1/19/2016	493.54	--	10.15	--	483.39	
MW-344-15	5/26/2016	493.57	--	9.75	--	483.82	
MW-344-15	8/11/2016	493.54	--	7.68	--	485.86	
MW-344-15	9/9/2016	493.56	--	8.47	--	485.09	
MW-344-15	10/19/2016	493.54	--	9.73	--	483.81	
MW-344-15	11/15/2016	493.54	--	9.07	--	484.47	
MW-344-15	2/8/2017	493.54	--	9.48	--	484.06	
MW-344-15	6/13/2017	493.55	--	8.78	--	484.77	
MW-344-15	7/24/2017	493.55	--	7.76	--	485.79	
MW-344-15	8/29/2017	493.55	--	8.33	--	485.22	
MW-344-15	9/19/2017	493.55	--	9.04	--	484.51	
MW-344-15	10/24/2017	493.55	--	9.41	--	484.14	
MW-344-55	2/5/2014	493.94	--	9.89	--	484.05	
MW-344-55	3/24/2014	493.96	--	10.13	--	483.83	
MW-344-55	4/18/2014	493.96	--	9.94	--	484.02	
MW-344-55	5/15/2014	493.94	--	9.52	--	484.42	
MW-344-55	6/19/2014	493.96	--	9.31	--	484.65	
MW-344-55	7/15/2014	493.92	--	7.58	--	486.34	
MW-344-55	8/26/2014	493.95	--	8.28	--	485.67	
MW-344-55	9/24/2014	493.92	--	8.89	--	485.03	
MW-344-55	10/21/2014	493.92	--	9.82	--	484.10	
MW-344-55	11/19/2014	493.92	--	9.40	--	484.52	
MW-344-55	12/16/2014	493.94	--	9.60	--	484.34	

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Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-344-55	1/21/2015	493.93	--	9.80	--	484.13	
MW-344-55	2/25/2015	493.93	--	9.86	--	484.07	
MW-344-55	3/18/2015	493.94	--	9.93	--	484.01	
MW-344-55	3/26/2015	493.94	--	9.84	--	484.10	
MW-344-55	4/16/2015	493.96	--	9.69	--	484.27	
MW-344-55	5/21/2015	493.96	--	9.41	--	484.55	
MW-344-55	6/10/2015	493.92	--	9.46	--	484.46	
MW-344-55	8/19/2015	493.95	--	8.64	--	485.31	
MW-344-55	10/6/2015	493.94	--	9.02	--	484.92	
MW-344-55	1/19/2016	493.93	--	10.03	--	483.90	
MW-344-55	5/26/2016	493.94	--	9.63	--	484.31	
MW-344-55	8/11/2016	493.93	--	7.60	--	486.33	
MW-344-55	9/9/2016	493.95	--	8.52	--	485.43	
MW-344-55	10/19/2016	493.93	--	9.76	--	484.17	
MW-344-55	11/15/2016	493.93	--	9.13	--	484.80	
MW-344-55	2/8/2017	493.92	--	9.53	--	484.39	
MW-344-55	6/13/2017	493.93	--	8.85	--	485.08	
MW-344-75	2/5/2014	493.35	--	9.28	--	484.07	
MW-344-75	3/24/2014	493.38	--	9.58	--	483.80	
MW-344-75	4/18/2014	493.36	--	9.34	--	484.02	
MW-344-75	5/15/2014	493.37	--	8.94	--	484.43	
MW-344-75	6/19/2014	493.38	--	8.75	--	484.63	
MW-344-75	7/15/2014	493.35	--	6.97	--	486.38	
MW-344-75	8/26/2014	493.37	--	7.67	--	485.70	
MW-344-75	9/24/2014	493.35	--	8.30	--	485.05	
MW-344-75	10/21/2014	493.35	--	9.22	--	484.13	
MW-344-75	11/19/2014	493.35	--	8.79	--	484.56	
MW-344-75	12/16/2014	493.35	--	8.98	--	484.37	
MW-344-75	1/21/2015	493.35	--	9.16	--	484.19	
MW-344-75	2/25/2015	493.36	--	9.25	--	484.11	
MW-344-75	3/18/2015	493.35	--	9.32	--	484.03	
MW-344-75	3/26/2015	493.35	--	9.22	--	484.13	
MW-344-75	4/16/2015	493.39	--	9.07	--	484.32	
MW-344-75	5/21/2015	493.38	--	8.82	--	484.56	
MW-344-75	6/10/2015	493.36	--	8.86	--	484.50	
MW-344-75	8/19/2015	493.38	--	8.03	--	485.35	
MW-344-75	10/6/2015	493.35	--	8.42	--	484.93	
MW-344-75	1/19/2016	493.35	--	9.43	--	483.92	
MW-344-75	5/26/2016	493.36	--	9.03	--	484.33	
MW-344-75	8/11/2016	493.36	--	7.01	--	486.35	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-344-75	9/9/2016	493.37	--	7.95	--	485.42	
MW-344-75	11/15/2016	493.36	--	8.52	--	484.84	
MW-344-75	2/8/2017	493.35	--	8.93	--	484.42	
MW-344-75	6/13/2017	493.36	--	8.27	--	485.09	
MW-345-15	8/1/2013	495.49	No LNAPL	10.56	0.00	484.93	
MW-345-15	8/21/2013	495.49	No LNAPL	10.44	0.00	485.05	
MW-345-15	1/9/2014	495.51	--	11.48	--	484.03	
MW-345-15	2/5/2014	495.51	--	11.92	--	483.59	
MW-345-15	3/24/2014	495.51	--	12.16	--	483.35	
MW-345-15	4/18/2014	495.52	--	Frozen	--	—	Frozen at 11.50 feet below measuring point
MW-345-15	5/15/2014	495.51	--	Frozen	--	—	Frozen at 11.52 feet below measuring point
MW-345-15	6/19/2014	495.52	--	Frozen	--	—	
MW-345-15	7/15/2014	495.50	No LNAPL	9.77	0.00	485.73	
MW-345-15	8/26/2014	495.51	--	10.42	--	485.09	
MW-345-15	9/24/2014	495.51	--	10.95	--	484.56	
MW-345-15	10/21/2014	495.51	--	11.83	--	483.68	
MW-345-15	11/19/2014	495.54	--	11.47	--	484.07	
MW-345-15	12/16/2014	495.55	--	11.67	--	483.88	
MW-345-15	1/21/2015	495.54	--	11.79	--	483.75	
MW-345-15	2/25/2015	495.54	--	11.86	--	483.68	
MW-345-15	3/18/2015	495.55	--	Frozen	--	—	
MW-345-15	3/26/2015	495.55	--	11.83	--	483.72	
MW-345-15	4/16/2015	495.55	--	11.66	--	483.89	
MW-345-15	5/21/2015	495.54	--	11.80	--	483.74	
MW-345-15	6/10/2015	495.54	--	11.86	--	483.68	
MW-345-15	8/19/2015	495.54	--	10.95	--	484.59	
MW-345-15	10/6/2015	495.54	--	11.23	--	484.31	
MW-345-15	1/19/2016	495.54	--	12.17	--	483.37	
MW-345-15	5/26/2016	495.54	--	11.75	--	483.79	
MW-345-15	7/22/2016	495.54	--	9.45	--	486.09	
MW-345-15	9/9/2016	495.53	--	10.58	--	484.95	
MW-345-15	10/19/2016	495.54	--	11.84	--	483.70	
MW-345-15	11/15/2016	495.54	--	11.15	--	484.39	
MW-345-15	2/8/2017	495.54	--	11.61	--	483.93	
MW-345-15	2/15/2017	495.54	--	11.62	--	483.92	
MW-345-15	6/13/2017	495.54	--	10.97	--	484.57	
MW-345-15	7/24/2017	495.54	--	9.84	--	485.70	
MW-345-15	7/28/2017	495.54	No LNAPL	9.90	0.00	485.64	
MW-345-15	8/29/2017	495.54	--	10.43	--	485.11	
MW-345-15	9/20/2017	495.54	--	11.07	--	484.47	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-345-15	10/24/2017	495.55	--	11.40	--	484.15	
MW-345-15	11/1/2017	495.55	No LNAPL	11.62	0.00	483.93	
MW-345-55	2/5/2014	496.03	--	11.99	--	484.04	
MW-345-55	3/24/2014	496.01	--	Frozen	--	—	Frozen at 12.19 feet below measuring point
MW-345-55	4/18/2014	496.02	--	Frozen	--	—	Frozen at 12.18 feet below measuring point
MW-345-55	5/15/2014	496.02	--	Frozen	--	—	Frozen at 12.16 feet below measuring point
MW-345-55	6/19/2014	496.04	--	Frozen	--	—	
MW-345-55	7/15/2014	496.02	No LNAPL	9.76	0.00	486.26	
MW-345-55	8/26/2014	496.01	--	10.41	--	485.60	
MW-345-55	9/24/2014	496.01	--	11.01	--	485.00	
MW-345-55	10/21/2014	496.01	--	11.94	--	484.07	
MW-345-55	11/19/2014	496.02	--	11.54	--	484.48	
MW-345-55	12/16/2014	496.05	--	11.76	--	484.29	
MW-345-55	1/21/2015	496.03	--	11.91	--	484.12	
MW-345-55	2/25/2015	496.03	--	11.98	--	484.05	
MW-345-55	3/18/2015	496.03	--	Frozen	--	—	
MW-345-55	3/26/2015	496.03	--	Frozen	--	—	
MW-345-55	4/16/2015	496.03	--	Frozen	--	—	
MW-345-55	5/21/2015	496.03	--	Frozen	--	—	Depth to ice = 11.88 feet
MW-345-55	6/10/2015	496.01	--	Frozen	--	—	
MW-345-55	8/19/2015	496.02	--	10.76	--	485.26	
MW-345-55	10/6/2015	496.01	--	11.12	--	484.89	
MW-345-55	1/19/2016	496.02	--	12.16	--	483.86	
MW-345-55	5/26/2016	496.01	--	Frozen	--	—	Ice at 11.80 feet
MW-345-55	7/22/2016	496.01	--	9.40	--	486.61	
MW-345-55	9/9/2016	495.99	--	10.65	--	485.34	
MW-345-55	10/19/2016	496.01	--	11.87	--	484.14	
MW-345-55	11/15/2016	496.01	--	11.18	--	484.83	
MW-345-55	2/8/2017	496.01	--	11.67	--	484.34	
MW-345-55	6/13/2017	495.99	--	Frozen	--	—	Depth to ice = 10.67 feet
MW-345-55	7/14/2017	495.99	--	10.18	--	485.81	
MW-345-55	10/20/2017	495.99	--	11.67	--	484.32	
MW-345-75	2/5/2014	495.65	--	11.58	--	484.07	
MW-345-75	3/24/2014	495.66	--	Frozen	--	—	Frozen at 11.05 feet below measuring point
MW-345-75	4/18/2014	495.67	--	Frozen	--	—	Frozen at 11.78 feet below measuring point
MW-345-75	5/15/2014	495.63	--	Frozen	--	—	Frozen at 11.79 feet below measuring point
MW-345-75	6/19/2014	495.65	--	Frozen	--	—	
MW-345-75	7/15/2014	495.63	No LNAPL	9.28	0.00	486.35	
MW-345-75	8/26/2014	495.62	--	9.93	--	485.69	
MW-345-75	9/24/2014	495.62	--	10.56	--	485.06	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-345-75	10/21/2014	495.61	--	11.46	--	484.15	
MW-345-75	11/19/2014	495.64	--	11.08	--	484.56	
MW-345-75	12/16/2014	495.66	--	11.30	--	484.36	
MW-345-75	1/21/2015	495.65	--	11.47	--	484.18	
MW-345-75	2/25/2015	495.64	--	Frozen	--	—	
MW-345-75	3/18/2015	495.65	--	Frozen	--	—	
MW-345-75	3/26/2015	495.65	--	Frozen	--	—	
MW-345-75	4/16/2015	495.65	--	Frozen	--	—	
MW-345-75	5/21/2015	495.62	--	Frozen	--	—	Depth to ice = 11.56 feet
MW-345-75	6/10/2015	495.61	--	Frozen	--	—	
MW-345-75	8/19/2015	495.62	--	10.31	--	485.31	
MW-345-75	10/6/2015	495.62	--	10.67	--	484.95	
MW-345-75	1/19/2016	495.64	--	11.70	--	483.94	
MW-345-75	5/26/2016	495.61	--	Frozen	--	—	Ice at 11.31 feet
MW-345-75	7/22/2016	495.64	--	8.95	--	486.69	
MW-345-75	9/9/2016	495.61	--	10.20	--	485.41	
MW-345-75	10/19/2016	495.64	--	11.40	--	484.24	
MW-345-75	11/15/2016	495.64	--	10.73	--	484.91	
MW-345-75	2/8/2017	495.64	--	11.24	--	484.40	
MW-345-75	6/13/2017	495.61	--	Frozen	--	—	Depth to ice = 11.22 feet
MW-348-15	10/29/2014	493.74	8.65	8.97	0.32	485.03	
MW-348-15	3/10/2015	493.74	8.33	8.41	0.08	485.39	
MW-348-15	10/15/2015	493.80	Sheen	8.04	Sheen	485.80	
MW-348-15	3/4/2016	493.80	8.81	8.82	0.01	485.04	
MW-348-15	8/17/2016	493.85	Sheen	6.48	Sheen	487.37	
MW-348-15	10/13/2016	493.85	No LNAPL	8.16	0.00	485.69	
MW-348-15	3/1/2017	493.85	No LNAPL	8.25	0.00	485.60	
MW-348-65	8/11/2016	493.91	--	6.14	--	487.77	
MW-348-65	11/16/2016	493.91	--	7.65	--	486.26	
MW-351-15	1/15/2014	493.42	--	9.50	--	483.92	
MW-351-15	2/5/2014	493.41	--	9.54	--	483.87	
MW-351-15	3/4/2014	493.38	--	9.77	--	483.61	
MW-351-15	3/24/2014	493.36	--	9.83	--	483.53	
MW-351-15	4/18/2014	493.36	--	9.59	--	483.77	
MW-351-15	4/25/2014	493.36	--	8.88	--	484.48	
MW-351-15	5/15/2014	493.40	--	9.23	--	484.17	
MW-351-15	5/20/2014	493.40	--	9.33	--	484.07	
MW-351-15	6/4/2014	493.41	--	9.50	--	483.91	
MW-351-15	6/19/2014	493.45	--	9.12	--	484.33	
MW-351-15	7/8/2014	493.49	--	6.94	--	486.55	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-351-15	7/15/2014	493.48	No LNAPL	7.36	0.00	486.12	
MW-351-15	8/26/2014	493.46	--	8.06	--	485.40	
MW-351-15	9/24/2014	493.46	--	8.69	--	484.77	
MW-351-15	10/21/2014	493.45	--	9.60	--	483.85	
MW-351-15	11/19/2014	493.45	--	9.19	--	484.26	
MW-351-15	12/16/2014	493.43	No LNAPL	9.41	0.00	484.02	
MW-351-15	1/21/2015	493.45	--	9.58	--	483.87	
MW-351-15	2/17/2015	493.45	No LNAPL	9.69	0.00	483.76	
MW-351-15	2/25/2015	493.48	--	9.63	--	483.85	
MW-351-15	3/18/2015	493.45	--	9.71	--	483.74	
MW-351-15	3/26/2015	493.45	--	9.61	--	483.84	
MW-351-15	4/16/2015	493.43	--	9.48	--	483.95	
MW-351-15	5/21/2015	493.45	--	9.19	--	484.26	
MW-351-15	6/10/2015	493.46	--	9.24	--	484.22	
MW-351-15	7/22/2015	493.47	--	8.23	--	485.24	
MW-351-15	8/19/2015	493.44	--	8.43	--	485.01	
MW-351-15	9/30/2015	493.46	--	8.96	--	484.50	
MW-351-15	10/6/2015	493.43	--	8.79	--	484.64	
MW-351-15	10/22/2015	493.45	No LNAPL	9.42	0.00	484.03	
MW-351-15	11/25/2015	493.46	--	9.07	--	484.40	DTW was measured during Datalogger download
MW-351-15	12/11/2015	493.46	--	9.31	--	484.15	
MW-351-15	1/19/2016	493.42	--	9.80	--	483.62	
MW-351-15	1/26/2016	493.47	--	9.85	--	483.62	
MW-351-15	5/26/2016	493.46	--	9.41	--	484.05	
MW-351-15	7/19/2016	493.46	--	7.48	--	485.98	
MW-351-15	9/9/2016	493.46	--	8.31	--	485.15	
MW-351-15	10/19/2016	493.46	--	10.52	--	482.94	
MW-351-15	11/15/2016	493.46	--	8.88	--	484.58	
MW-351-15	2/8/2017	493.48	--	9.31	--	484.17	
MW-351-15	6/13/2017	493.48	--	8.64	--	484.84	
MW-351-15	8/1/2017	493.48	--	8.06	--	485.42	
MW-351-55	1/15/2014	493.55	--	9.57	--	483.98	
MW-351-55	2/5/2014	493.54	--	9.62	--	483.92	
MW-351-55	3/4/2014	493.52	--	9.85	--	483.67	
MW-351-55	3/24/2014	493.51	--	9.92	--	483.59	
MW-351-55	4/18/2014	493.51	--	9.68	--	483.83	
MW-351-55	4/25/2014	493.51	--	8.87	--	484.64	
MW-351-55	5/15/2014	493.54	--	9.33	--	484.21	
MW-351-55	5/20/2014	493.56	--	9.43	--	484.13	
MW-351-55	6/4/2014	493.56	--	9.60	--	483.96	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-351-55	6/19/2014	493.62	--	9.19	--	484.43	
MW-351-55	7/8/2014	493.65	--	7.01	--	486.64	
MW-351-55	7/15/2014	493.63	--	7.45	--	486.18	
MW-351-55	8/26/2014	493.59	--	8.13	--	485.46	
MW-351-55	9/24/2014	493.61	--	8.74	--	484.87	
MW-351-55	10/21/2014	493.61	--	9.66	--	483.95	
MW-351-55	11/19/2014	493.61	--	9.24	--	484.37	
MW-351-55	12/16/2014	493.59	No LNAPL	9.44	0.00	484.15	
MW-351-55	1/21/2015	493.61	No LNAPL	9.63	0.00	483.98	
MW-351-55	2/17/2015	493.61	No LNAPL	9.74	0.00	483.87	
MW-351-55	2/25/2015	493.63	--	9.68	--	483.95	
MW-351-55	3/18/2015	493.63	--	9.76	--	483.87	
MW-351-55	3/26/2015	493.63	--	9.67	--	483.96	
MW-351-55	4/16/2015	493.57	--	9.51	--	484.06	
MW-351-55	5/21/2015	493.60	--	9.24	--	484.36	
MW-351-55	6/10/2015	493.60	--	9.28	--	484.32	
MW-351-55	7/22/2015	493.60	--	8.26	--	485.34	
MW-351-55	8/19/2015	493.58	--	8.46	--	485.12	
MW-351-55	9/30/2015	493.59	--	9.03	--	484.56	
MW-351-55	10/6/2015	493.55	--	8.86	--	484.69	
MW-351-55	10/22/2015	493.59	No LNAPL	9.47	0.00	484.12	
MW-351-55	11/25/2015	493.59	--	9.10	--	484.50	DTW was measured during Datalogger download
MW-351-55	12/11/2015	493.60	--	9.36	--	484.24	
MW-351-55	1/19/2016	493.56	--	9.85	--	483.71	
MW-351-55	1/26/2016	493.61	--	9.90	--	483.71	
MW-351-55	5/26/2016	493.61	--	9.46	--	484.15	
MW-351-55	7/19/2016	493.61	--	7.53	--	486.08	
MW-351-55	9/9/2016	493.62	--	8.39	--	485.23	
MW-351-55	10/19/2016	493.61	--	9.61	--	484.00	
MW-351-55	11/15/2016	493.61	--	8.96	--	484.65	
MW-351-55	2/8/2017	493.62	--	9.38	--	484.24	
MW-351-55	6/13/2017	493.61	--	8.71	--	484.90	
MW-351-75	1/15/2014	493.44	--	9.46	--	483.98	
MW-351-75	2/5/2014	493.42	--	9.51	--	483.91	
MW-351-75	3/24/2014	493.38	--	9.80	--	483.58	
MW-351-75	4/18/2014	493.37	--	9.55	--	483.82	
MW-351-75	4/25/2014	493.37	--	8.85	--	484.52	
MW-351-75	5/15/2014	493.41	--	9.20	--	484.21	
MW-351-75	5/20/2014	493.42	--	9.31	--	484.11	
MW-351-75	6/4/2014	493.43	--	9.47	--	483.96	

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Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-351-75	6/19/2014	493.47	--	9.07	--	484.40	
MW-351-75	7/8/2014	493.51	--	6.87	--	486.64	
MW-351-75	7/15/2014	493.49	--	7.28	--	486.21	
MW-351-75	8/26/2014	493.46	--	7.99	--	485.47	
MW-351-75	9/24/2014	493.48	--	8.61	--	484.87	
MW-351-75	10/21/2014	493.47	--	9.53	--	483.94	
MW-351-75	11/19/2014	493.48	No LNAPL	9.09	0.00	484.39	
MW-351-75	12/16/2014	493.46	No LNAPL	9.28	0.00	484.18	
MW-351-75	1/21/2015	493.47	No LNAPL	9.46	0.00	484.01	
MW-351-75	2/17/2015	493.49	No LNAPL	9.61	0.00	483.88	
MW-351-75	2/25/2015	493.48	--	9.53	--	483.95	
MW-351-75	3/18/2015	493.48	--	9.61	--	483.87	
MW-351-75	3/26/2015	493.48	--	9.51	--	483.97	
MW-351-75	4/16/2015	493.44	--	9.38	--	484.06	
MW-351-75	5/21/2015	493.47	--	9.10	--	484.37	
MW-351-75	6/10/2015	493.48	--	9.15	--	484.33	
MW-351-75	7/22/2015	493.48	--	8.12	--	485.36	
MW-351-75	8/19/2015	493.45	--	8.33	--	485.12	
MW-351-75	9/30/2015	493.46	--	8.91	--	484.55	
MW-351-75	10/6/2015	493.44	--	8.74	--	484.70	
MW-351-75	10/22/2015	493.46	No LNAPL	9.36	0.00	484.10	
MW-351-75	11/25/2015	493.47	--	8.97	--	484.51	DTW was measured during Datalogger download
MW-351-75	12/11/2015	493.49	--	9.25	--	484.24	
MW-351-75	1/19/2016	493.43	--	9.71	--	483.72	
MW-351-75	1/26/2016	493.49	--	9.77	--	483.72	
MW-351-75	5/26/2016	493.48	--	9.32	--	484.16	
MW-351-75	7/19/2016	493.48	--	7.38	--	486.10	
MW-351-75	9/9/2016	493.49	--	8.28	--	485.21	
MW-351-75	10/19/2016	493.48	--	10.50	--	482.98	
MW-351-75	11/15/2016	493.48	--	8.85	--	484.63	
MW-351-75	2/8/2017	493.50	--	9.27	--	484.23	
MW-351-75	6/13/2017	493.48	--	8.58	--	484.90	
MW-351-150	1/15/2014	493.74	--	10.09	--	483.65	
MW-351-150	2/5/2014	493.73	--	10.09	--	483.64	
MW-351-150	3/4/2014	493.70	--	10.11	--	483.59	
MW-351-150	3/24/2014	493.69	--	10.15	--	483.54	
MW-351-150	4/18/2014	493.67	--	9.95	--	483.72	
MW-351-150	4/25/2014	493.67	--	9.19	--	484.48	
MW-351-150	5/15/2014	493.71	--	9.51	--	484.20	
MW-351-150	5/20/2014	493.73	--	9.61	--	484.12	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-351-150	6/4/2014	493.73	--	9.77	--	483.96	
MW-351-150	6/19/2014	493.76	--	9.35	--	484.41	
MW-351-150	7/8/2014	493.82	--	7.18	--	486.64	
MW-351-150	7/15/2014	493.81	--	7.79	--	486.02	
MW-351-150	8/26/2014	493.77	--	8.28	--	485.49	
MW-351-150	9/24/2014	493.77	--	8.91	--	484.86	
MW-351-150	10/21/2014	493.79	--	9.82	--	483.97	
MW-351-150	11/19/2014	493.79	--	9.38	--	484.41	
MW-351-150	12/16/2014	493.76	No LNAPL	9.60	0.00	484.16	
MW-351-150	1/21/2015	493.77	No LNAPL	9.74	0.00	484.03	
MW-351-150	2/17/2015	493.77	No LNAPL	9.88	0.00	483.89	
MW-351-150	2/25/2015	493.76	--	9.81	--	483.95	
MW-351-150	3/18/2015	493.77	--	9.89	--	483.88	
MW-351-150	3/26/2015	493.77	--	9.79	--	483.98	
MW-351-150	4/16/2015	493.74	--	9.65	--	484.09	
MW-351-150	5/21/2015	493.78	--	9.37	--	484.41	
MW-351-150	6/10/2015	493.79	--	9.44	--	484.35	
MW-351-150	7/22/2015	493.79	--	8.42	--	485.37	
MW-351-150	8/19/2015	493.75	--	8.62	--	485.13	
MW-351-150	9/30/2015	493.77	--	9.19	--	484.58	
MW-351-150	10/6/2015	493.75	--	9.03	--	484.72	
MW-351-150	10/22/2015	493.78	No LNAPL	9.64	0.00	484.14	
MW-351-150	11/25/2015	493.78	--	9.26	--	484.53	DTW was measured during Datalogger download
MW-351-150	12/11/2015	493.78	--	9.52	--	484.26	
MW-351-150	1/19/2016	493.73	--	10.01	--	483.72	
MW-351-150	1/26/2016	493.79	--	10.05	--	483.74	
MW-351-150	5/26/2016	493.79	--	9.61	--	484.18	
MW-351-150	7/19/2016	493.78	--	7.72	--	486.06	
MW-351-150	9/9/2016	493.80	--	8.59	--	485.21	
MW-351-150	11/15/2016	493.78	--	9.16	--	484.62	
MW-351-150	2/8/2017	493.79	--	9.56	--	484.23	
MW-351-150	6/13/2017	493.79	--	8.87	--	484.92	
MW-354-15	10/29/2014	496.33	11.48	11.91	0.43	484.76	
MW-354-15	3/10/2015	496.33	11.18	11.39	0.21	485.11	
MW-354-15	5/18/2015	496.33	10.77	11.28	0.51	485.46	
MW-354-15	8/12/2015	496.35	9.79	9.80	0.01	486.60	
MW-354-15	10/15/2015	496.35	10.85	11.05	0.20	485.46	
MW-354-15	3/4/2016	496.35	11.57	11.87	0.30	484.77	
MW-354-15	8/17/2016	496.35	9.29	9.59	0.30	487.00	
MW-354-15	10/13/2016	496.35	10.93	11.30	0.37	485.35	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-354-15	3/1/2017	496.35	11.03	11.04	0.01	485.32	
MW-354-35	8/10/2016	496.85	--	9.46	--	487.39	
MW-354-35	7/12/2017	496.85	--	10.23	--	486.62	
MW-354-65	8/10/2016	497.71	--	10.28	--	487.43	
MW-355-15	11/20/2014	497.61	No LNAPL	12.17	0.00	485.44	
MW-355-15	3/19/2015	497.61	--	12.75	--	484.86	
MW-355-15	6/11/2015	497.61	--	12.31	--	485.30	
MW-355-15	8/12/2015	497.65	--	11.15	--	486.50	
MW-355-15	11/19/2015	497.65	--	12.31	--	485.34	
MW-355-15	7/20/2016	497.67	--	10.35	--	487.32	
MW-355-15	9/13/2016	497.67	--	11.55	--	486.12	
MW-355-15	10/18/2016	497.67	--	12.67	--	485.00	
MW-355-15	3/14/2017	497.67	--	12.54	--	485.13	
MW-355-55	11/20/2014	497.46	No LNAPL	12.04	0.00	485.42	
MW-355-55	3/19/2015	497.46	--	12.59	--	484.87	
MW-355-55	6/11/2015	497.46	--	12.18	--	485.28	
MW-355-55	8/12/2015	497.48	--	10.98	--	486.50	
MW-355-55	11/19/2015	497.48	--	12.18	--	485.30	
MW-355-55	3/22/2016	497.48	No LNAPL	13.02	0.00	484.46	
MW-355-55	7/20/2016	497.50	--	10.21	--	487.29	
MW-355-55	9/13/2016	497.50	--	11.44	--	486.06	
MW-355-55	3/14/2017	497.50	--	12.35	--	485.15	
MW-358-15	3/18/2014	495.53	--	12.50	--	483.03	
MW-358-15	6/11/2014	495.53	--	12.09	--	483.44	
MW-358-15	9/9/2014	495.53	--	10.99	--	484.54	
MW-358-15	11/20/2014	495.59	No LNAPL	11.79	0.00	483.80	
MW-358-15	11/25/2014	495.59	No LNAPL	11.95	0.00	483.64	
MW-358-15	12/17/2014	495.58	No LNAPL	12.04	0.00	483.54	
MW-358-15	2/2/2015	495.59	No LNAPL	12.35	0.00	483.24	
MW-358-15	2/16/2015	495.65	No LNAPL	12.36	0.00	483.29	
MW-358-15	3/19/2015	495.63	--	12.36	--	483.27	
MW-358-15	4/14/2015	495.66	--	12.17	--	483.49	
MW-358-15	5/18/2015	495.62	--	11.84	--	483.78	
MW-358-15	6/4/2015	495.63	--	11.65	--	483.98	
MW-358-15	6/10/2015	495.63	--	11.89	--	483.74	
MW-358-15	7/22/2015	495.65	--	10.94	--	484.71	
MW-358-15	8/12/2015	495.60	--	10.84	--	484.76	
MW-358-15	9/30/2015	495.28	--	11.26	--	484.02	
MW-358-15	10/22/2015	495.26	No LNAPL	11.73	0.00	483.53	
MW-358-15	11/19/2015	495.26	--	11.62	--	483.64	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-358-15	11/25/2015	495.26	No LNAPL	11.43	0.00	483.86	
MW-358-15	12/11/2015	495.30	--	11.65	--	483.65	
MW-358-15	1/26/2016	495.34	--	12.20	--	483.14	
MW-358-15	7/18/2016	495.34	--	10.05	--	485.29	
MW-358-15	8/1/2017	495.34	--	10.65	--	484.69	
MW-358-20	3/18/2014	495.65	--	12.60	--	483.05	
MW-358-20	6/11/2014	495.65	--	12.20	--	483.45	
MW-358-20	9/9/2014	495.65	--	11.12	--	484.53	
MW-358-20	11/20/2014	495.71	No LNAPL	11.91	0.00	483.80	
MW-358-20	11/25/2014	495.71	No LNAPL	12.06	0.00	483.65	
MW-358-20	12/17/2014	495.70	No LNAPL	12.15	0.00	483.55	
MW-358-20	2/2/2015	495.69	No LNAPL	12.47	0.00	483.22	
MW-358-20	2/16/2015	495.76	No LNAPL	12.47	0.00	483.29	
MW-358-20	3/19/2015	495.74	--	12.46	--	483.28	
MW-358-20	4/14/2015	495.76	--	12.29	--	483.47	
MW-358-20	5/18/2015	495.74	--	11.96	--	483.78	
MW-358-20	6/4/2015	495.75	--	11.77	--	483.98	
MW-358-20	6/10/2015	495.75	--	12.01	--	483.74	
MW-358-20	7/22/2015	495.77	--	11.06	--	484.71	
MW-358-20	8/12/2015	495.72	--	10.97	--	484.75	
MW-358-20	9/30/2015	495.42	--	11.42	--	484.00	
MW-358-20	10/22/2015	495.39	No LNAPL	11.87	0.00	483.52	
MW-358-20	11/19/2015	495.39	--	11.75	--	483.64	
MW-358-20	11/25/2015	495.39	No LNAPL	11.57	0.00	483.85	Datalogger downloaded
MW-358-20	12/11/2015	495.43	--	11.80	--	483.63	
MW-358-20	1/26/2016	495.47	--	12.32	--	483.15	
MW-358-20	3/22/2016	495.47	No LNAPL	12.53	0.00	482.94	
MW-358-20	7/18/2016	495.47	--	10.20	--	485.27	
MW-358-20	9/13/2016	495.47	--	11.07	--	484.40	
MW-358-20	3/15/2017	495.57	--	12.11	--	483.46	
MW-358-20	8/8/2017	495.57	--	10.69	--	484.88	
MW-358-20	9/21/2017	495.58	--	12.02	--	483.56	
MW-358-40	3/18/2014	495.40	--	12.31	--	483.09	
MW-358-40	6/11/2014	495.40	--	11.95	--	483.45	
MW-358-40	9/9/2014	495.40	--	10.85	--	484.55	
MW-358-40	11/20/2014	495.44	No LNAPL	11.63	0.00	483.81	
MW-358-40	11/25/2014	495.44	No LNAPL	11.80	0.00	483.64	
MW-358-40	12/17/2014	495.42	No LNAPL	11.88	0.00	483.54	
MW-358-40	2/2/2015	495.42	No LNAPL	12.19	0.00	483.23	
MW-358-40	2/16/2015	495.47	No LNAPL	12.20	0.00	483.27	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-358-40	3/19/2015	495.46	--	12.19	--	483.27	
MW-358-40	4/14/2015	495.48	--	12.01	--	483.47	
MW-358-40	5/18/2015	495.47	--	11.69	--	483.78	
MW-358-40	6/4/2015	495.47	--	11.49	--	483.98	
MW-358-40	6/10/2015	495.47	--	11.75	--	483.72	
MW-358-40	7/22/2015	495.49	--	10.80	--	484.69	
MW-358-40	8/12/2015	495.44	--	10.69	--	484.75	
MW-358-40	9/30/2015	495.46	--	11.48	--	483.98	
MW-358-40	10/22/2015	495.46	No LNAPL	11.95	0.00	483.51	
MW-358-40	11/19/2015	495.46	--	11.82	--	483.64	
MW-358-40	11/25/2015	495.46	No LNAPL	11.63	0.00	483.86	
MW-358-40	12/11/2015	495.49	--	11.88	--	483.61	
MW-358-40	1/26/2016	495.53	--	12.41	--	483.12	
MW-358-40	3/22/2016	495.56	No LNAPL	12.61	0.00	482.95	
MW-358-40	7/18/2016	495.56	--	10.27	--	485.29	
MW-358-40	9/13/2016	495.56	--	11.15	--	484.41	
MW-358-40	3/15/2017	495.56	--	12.19	--	483.37	
MW-358-40	7/11/2017	495.56	--	10.80	--	484.76	
MW-358-40	9/21/2017	495.25	--	11.71	--	483.54	
MW-358-60	3/18/2014	495.46	--	12.44	--	483.02	
MW-358-60	6/11/2014	495.46	--	12.05	--	483.41	
MW-358-60	9/9/2014	495.46	--	10.97	--	484.49	
MW-358-60	11/20/2014	495.55	No LNAPL	11.75	0.00	483.80	
MW-358-60	11/25/2014	495.55	No LNAPL	11.90	0.00	483.65	
MW-358-60	12/17/2014	495.53	No LNAPL	11.99	0.00	483.54	
MW-358-60	2/2/2015	495.54	No LNAPL	12.32	0.00	483.22	
MW-358-60	2/16/2015	495.59	No LNAPL	12.32	0.00	483.27	
MW-358-60	3/19/2015	495.59	--	12.31	--	483.28	
MW-358-60	4/14/2015	495.60	--	12.13	--	483.47	
MW-358-60	5/18/2015	495.57	--	11.80	--	483.77	
MW-358-60	6/4/2015	495.36	--	11.39	--	483.97	
MW-358-60	6/10/2015	495.36	--	11.64	--	483.72	
MW-358-60	7/22/2015	495.38	--	10.69	--	484.69	
MW-358-60	8/12/2015	495.33	--	10.59	--	484.74	
MW-358-60	9/30/2015	495.36	--	11.38	--	483.98	
MW-358-60	10/22/2015	495.35	No LNAPL	11.84	0.00	483.51	
MW-358-60	11/19/2015	495.35	--	11.71	--	483.64	
MW-358-60	11/25/2015	495.35	No LNAPL	11.53	0.00	483.85	
MW-358-60	12/11/2015	495.38	--	11.77	--	483.61	
MW-358-60	1/26/2016	495.43	--	12.30	--	483.13	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-358-60	3/22/2016	495.43	No LNAPL	12.50	0.00	482.93	
MW-358-60	7/19/2016	495.43	--	9.98	--	485.45	
MW-358-60	9/13/2016	495.43	--	11.03	--	484.40	
MW-358-60	3/15/2017	495.43	--	12.08	--	483.35	
MW-358-60	7/11/2017	495.43	--	10.76	--	484.67	
MW-358-60	9/21/2017	495.52	--	12.00	--	483.52	
MW-358-150	3/18/2014	495.43	--	12.39	--	483.04	
MW-358-150	6/11/2014	495.43	--	11.92	--	483.51	
MW-358-150	9/9/2014	495.43	--	10.83	--	484.60	
MW-358-150	11/20/2014	495.45	No LNAPL	11.59	0.00	483.86	
MW-358-150	11/25/2014	495.45	No LNAPL	11.74	0.00	483.71	
MW-358-150	12/17/2014	495.42	No LNAPL	11.83	0.00	483.59	
MW-358-150	2/2/2015	495.44	No LNAPL	12.15	0.00	483.29	
MW-358-150	2/16/2015	495.50	No LNAPL	12.15	0.00	483.35	
MW-358-150	3/19/2015	495.50	--	12.16	--	483.34	
MW-358-150	4/14/2015	495.50	--	11.96	--	483.54	
MW-358-150	5/18/2015	495.42	--	11.59	--	483.83	
MW-358-150	6/4/2015	495.43	--	11.40	--	484.03	
MW-358-150	6/10/2015	495.43	--	11.65	--	483.78	
MW-358-150	7/22/2015	495.45	--	10.68	--	484.77	
MW-358-150	8/12/2015	495.40	--	10.59	--	484.81	
MW-358-150	9/30/2015	495.43	--	11.41	--	484.02	
MW-358-150	10/22/2015	495.44	No LNAPL	11.85	0.00	483.59	
MW-358-150	11/19/2015	495.43	--	11.72	--	483.71	
MW-358-150	11/25/2015	495.43	No LNAPL	11.50	0.00	483.96	
MW-358-150	12/11/2015	495.45	--	11.76	--	483.69	
MW-358-150	1/26/2016	495.49	--	12.29	--	483.20	
MW-358-150	3/22/2016	495.49	No LNAPL	12.51	0.00	482.98	
MW-358-150	7/19/2016	495.49	--	9.95	--	485.54	
MW-358-150	9/13/2016	495.49	--	10.98	--	484.51	
MW-358-150	3/15/2017	495.49	--	11.97	--	483.52	
MW-359-15	3/18/2014	495.05	--	11.99	--	483.06	
MW-359-15	6/11/2014	495.05	--	11.60	--	483.45	
MW-359-15	9/9/2014	495.05	--	10.48	--	484.57	
MW-359-15	11/20/2014	495.07	No LNAPL	11.20	0.00	483.87	
MW-359-15	11/25/2014	495.07	No LNAPL	11.47	0.00	483.60	
MW-359-15	12/17/2014	495.05	No LNAPL	11.56	0.00	483.49	
MW-359-15	2/2/2015	495.05	No LNAPL	11.85	0.00	483.20	
MW-359-15	2/16/2015	495.11	No LNAPL	11.86	0.00	483.25	
MW-359-15	3/19/2015	495.11	--	11.85	--	483.26	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-359-15	4/14/2015	495.11	--	11.65	--	483.46	
MW-359-15	5/18/2015	495.07	--	11.33	--	483.74	
MW-359-15	6/4/2015	495.10	--	11.15	--	483.95	
MW-359-15	6/10/2015	495.10	--	11.39	--	483.71	
MW-359-15	7/22/2015	495.11	--	10.50	--	484.61	
MW-359-15	8/12/2015	495.08	--	10.39	--	484.69	
MW-359-15	9/30/2015	495.11	--	11.08	--	484.03	
MW-359-15	10/22/2015	495.11	No LNAPL	11.55	0.00	483.56	
MW-359-15	11/19/2015	495.09	--	11.53	--	483.56	
MW-359-15	11/25/2015	495.09	No LNAPL	11.31	0.00	483.81	
MW-359-15	12/11/2015	495.11	--	11.52	--	483.59	
MW-359-15	1/26/2016	495.13	--	12.02	--	483.11	
MW-359-15	3/22/2016	495.13	No LNAPL	12.23	0.00	482.90	
MW-359-15	7/14/2016	495.13	--	10.29	--	484.84	
MW-359-15	9/13/2016	495.13	--	10.73	--	484.40	
MW-359-15	10/19/2016	495.13	--	11.77	--	483.36	
MW-359-15	3/15/2017	495.13	--	11.78	--	483.35	
MW-359-15	8/8/2017	495.13	--	10.39	--	484.74	
MW-359-15	9/21/2017	495.20	--	11.66	--	483.54	
MW-359-35	3/18/2014	494.97	--	11.94	--	483.03	
MW-359-35	6/11/2014	494.97	--	11.54	--	483.43	
MW-359-35	9/9/2014	494.97	--	10.42	--	484.55	
MW-359-35	11/20/2014	495.01	No LNAPL	11.26	0.00	483.75	
MW-359-35	11/25/2014	495.01	No LNAPL	11.41	0.00	483.60	
MW-359-35	12/17/2014	495.02	No LNAPL	11.51	0.00	483.51	
MW-359-35	2/2/2015	495.01	No LNAPL	11.81	0.00	483.20	
MW-359-35	2/16/2015	495.07	No LNAPL	11.81	0.00	483.26	
MW-359-35	3/19/2015	495.08	--	11.80	--	483.28	
MW-359-35	4/14/2015	495.08	--	11.61	--	483.47	
MW-359-35	5/18/2015	495.05	--	11.31	--	483.74	
MW-359-35	6/4/2015	495.08	--	11.11	--	483.97	
MW-359-35	6/10/2015	495.08	--	11.36	--	483.72	
MW-359-35	7/22/2015	495.09	--	10.47	--	484.62	
MW-359-35	8/12/2015	495.06	--	10.35	--	484.71	
MW-359-35	9/30/2015	495.08	--	11.07	--	484.01	
MW-359-35	10/22/2015	495.08	No LNAPL	11.53	0.00	483.55	
MW-359-35	11/19/2015	495.07	--	11.45	--	483.62	
MW-359-35	11/25/2015	495.07	No LNAPL	11.27	0.00	483.83	
MW-359-35	12/11/2015	495.10	--	11.50	--	483.60	
MW-359-35	1/26/2016	495.14	--	12.06	--	483.08	

Appendix A-1
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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-359-35	7/14/2016	494.94	--	10.27	--	484.67	
MW-359-35	8/8/2017	495.01	--	10.19	--	484.82	
MW-359-60	3/18/2014	494.92	--	11.87	--	483.05	
MW-359-60	6/11/2014	494.92	--	11.49	--	483.43	
MW-359-60	9/9/2014	494.92	--	10.36	--	484.56	
MW-359-60	11/20/2014	494.96	No LNAPL	11.20	0.00	483.76	
MW-359-60	11/25/2014	494.96	No LNAPL	11.32	0.00	483.64	
MW-359-60	12/17/2014	494.95	No LNAPL	11.40	0.00	483.55	
MW-359-60	2/2/2015	494.94	No LNAPL	11.70	0.00	483.24	
MW-359-60	2/16/2015	495.00	No LNAPL	11.70	0.00	483.30	
MW-359-60	3/19/2015	495.00	--	11.69	--	483.31	
MW-359-60	4/14/2015	495.00	--	11.51	--	483.49	
MW-359-60	5/18/2015	494.97	--	11.19	--	483.78	
MW-359-60	6/4/2015	495.00	--	11.02	--	483.98	
MW-359-60	6/10/2015	495.00	--	11.26	--	483.74	
MW-359-60	7/22/2015	495.00	--	10.34	--	484.66	
MW-359-60	8/12/2015	494.98	--	10.25	--	484.73	
MW-359-60	9/30/2015	495.00	--	10.96	--	484.04	
MW-359-60	10/22/2015	495.00	No LNAPL	11.43	0.00	483.57	
MW-359-60	11/19/2015	494.98	--	11.32	--	483.66	
MW-359-60	11/25/2015	494.98	No LNAPL	11.13	0.00	483.88	
MW-359-60	12/11/2015	494.99	--	11.37	--	483.62	
MW-359-60	1/26/2016	495.01	--	11.88	--	483.13	
MW-359-60	3/22/2016	495.01	No LNAPL	12.07	0.00	482.94	
MW-359-60	7/14/2016	495.01	--	10.14	--	484.87	
MW-359-60	9/13/2016	495.01	--	10.59	--	484.42	
MW-359-60	3/15/2017	495.01	--	11.60	--	483.41	
MW-359-60	7/11/2017	495.01	--	10.32	--	484.69	
MW-359-60	9/21/2017	495.06	--	11.49	--	483.57	
MW-359-80	3/18/2014	495.13	--	12.13	--	483.00	
MW-359-80	6/11/2014	495.13	--	11.73	--	483.40	
MW-359-80	9/9/2014	495.13	--	10.59	--	484.54	
MW-359-80	11/20/2014	495.15	No LNAPL	11.44	0.00	483.71	
MW-359-80	11/25/2014	495.15	No LNAPL	11.57	0.00	483.58	
MW-359-80	12/17/2014	495.15	No LNAPL	11.67	0.00	483.48	
MW-359-80	2/2/2015	495.14	No LNAPL	11.96	0.00	483.18	
MW-359-80	2/16/2015	495.20	No LNAPL	11.97	0.00	483.23	
MW-359-80	3/19/2015	495.21	--	11.96	--	483.25	
MW-359-80	4/14/2015	495.21	--	11.77	--	483.44	
MW-359-80	5/18/2015	495.16	--	11.46	--	483.70	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-359-80	6/4/2015	495.19	--	11.27	--	483.92	
MW-359-80	6/10/2015	495.19	--	11.51	--	483.68	
MW-359-80	7/22/2015	495.20	--	10.60	--	484.60	
MW-359-80	8/12/2015	495.17	--	10.50	--	484.67	
MW-359-80	9/30/2015	495.19	--	11.22	--	483.97	
MW-359-80	10/22/2015	495.19	No LNAPL	11.67	0.00	483.52	
MW-359-80	11/19/2015	495.18	--	11.58	--	483.60	
MW-359-80	11/25/2015	495.18	No LNAPL	11.40	0.00	483.81	Datalogger downloaded
MW-359-80	12/11/2015	495.20	--	11.63	--	483.57	
MW-359-80	1/26/2016	495.23	--	12.14	--	483.09	
MW-359-80	3/22/2016	495.23	No LNAPL	12.35	0.00	482.88	
MW-359-80	7/14/2016	495.02	--	10.39	--	484.63	
MW-359-80	9/13/2016	495.23	--	10.86	--	484.37	
MW-359-80	3/15/2017	495.08	--	11.66	--	483.42	
MW-359-80	7/11/2017	495.08	--	10.38	--	484.70	
MW-359-80	9/21/2017	495.06	--	11.55	--	483.51	
MW-359-150	3/18/2014	494.77	--	11.76	--	483.01	
MW-359-150	6/11/2014	494.77	--	11.34	--	483.43	
MW-359-150	9/9/2014	494.77	--	10.22	--	484.55	
MW-359-150	11/20/2014	494.77	No LNAPL	11.02	0.00	483.75	
MW-359-150	11/25/2014	494.77	No LNAPL	11.15	0.00	483.62	
MW-359-150	12/17/2014	494.76	No LNAPL	11.23	0.00	483.53	
MW-359-150	2/2/2015	494.75	No LNAPL	11.52	0.00	483.23	
MW-359-150	2/16/2015	494.81	No LNAPL	11.53	0.00	483.28	
MW-359-150	3/19/2015	494.82	--	11.54	--	483.28	
MW-359-150	4/14/2015	494.81	--	11.34	--	483.47	
MW-359-150	5/18/2015	494.77	--	11.02	--	483.75	
MW-359-150	6/4/2015	494.80	--	10.84	--	483.96	
MW-359-150	6/10/2015	494.80	--	11.09	--	483.71	
MW-359-150	7/22/2015	494.80	--	10.18	--	484.62	
MW-359-150	8/12/2015	494.79	--	10.07	--	484.72	
MW-359-150	9/30/2015	494.80	--	10.79	--	484.01	
MW-359-150	10/22/2015	494.81	No LNAPL	11.25	0.00	483.56	
MW-359-150	11/19/2015	494.79	--	11.14	--	483.65	
MW-359-150	11/25/2015	494.79	No LNAPL	10.95	0.00	483.87	
MW-359-150	12/11/2015	494.79	--	11.19	--	483.60	
MW-359-150	1/26/2016	494.81	--	11.69	--	483.12	
MW-359-150	7/14/2016	494.83	--	9.92	--	484.91	
MW-360-15	3/18/2014	495.12	--	12.22	--	482.90	
MW-360-15	6/11/2014	495.12	--	11.83	--	483.29	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-360-15	9/9/2014	495.12	--	10.68	--	484.44	
MW-360-15	11/21/2014	495.11	No LNAPL	11.50	0.00	483.61	
MW-360-15	11/25/2014	495.11	No LNAPL	11.67	0.00	483.44	
MW-360-15	12/17/2014	495.11	No LNAPL	11.74	0.00	483.37	
MW-360-15	2/2/2015	495.13	No LNAPL	12.06	0.00	483.07	
MW-360-15	2/16/2015	495.20	No LNAPL	12.08	0.00	483.12	
MW-360-15	3/19/2015	495.22	--	12.09	--	483.13	
MW-360-15	4/14/2015	495.22	--	11.91	--	483.31	
MW-360-15	5/18/2015	495.21	--	11.60	--	483.61	
MW-360-15	6/4/2015	494.89	--	11.08	--	483.81	
MW-360-15	6/10/2015	494.89	--	11.30	--	483.59	
MW-360-15	7/22/2015	494.87	--	10.44	--	484.43	
MW-360-15	8/12/2015	494.87	--	10.32	--	484.55	
MW-360-15	9/30/2015	494.87	--	10.97	--	483.90	
MW-360-15	10/22/2015	494.89	No LNAPL	11.46	0.00	483.43	
MW-360-15	11/19/2015	494.87	--	11.39	--	483.48	
MW-360-15	11/25/2015	494.87	No LNAPL	11.25	0.00	483.65	
MW-360-15	12/11/2015	494.89	--	11.43	--	483.46	
MW-360-15	1/26/2016	494.92	--	11.96	--	482.96	
MW-360-15	3/22/2016	494.92	No LNAPL	12.20	0.00	482.72	
MW-360-15	7/14/2016	494.98	--	10.31	--	484.67	
MW-360-15	9/13/2016	494.98	--	10.72	--	484.26	
MW-360-15	3/15/2017	494.98	--	11.83	--	483.15	
MW-360-15	7/11/2017	495.13	--	10.52	--	484.61	
MW-360-15	9/21/2017	495.02	--	11.55	--	483.47	
MW-360-35	3/18/2014	495.23	--	12.43	--	482.80	
MW-360-35	6/11/2014	495.23	--	12.04	--	483.19	
MW-360-35	9/9/2014	495.23	--	10.64	--	484.59	
MW-360-35	11/21/2014	495.06	No LNAPL	11.49	0.00	483.57	
MW-360-35	11/25/2014	495.06	No LNAPL	11.63	0.00	483.43	
MW-360-35	12/17/2014	495.07	No LNAPL	11.70	0.00	483.37	
MW-360-35	2/2/2015	495.09	No LNAPL	12.02	0.00	483.07	
MW-360-35	2/16/2015	495.16	No LNAPL	12.05	0.00	483.11	
MW-360-35	3/19/2015	495.19	--	12.06	--	483.13	
MW-360-35	4/14/2015	495.19	--	11.88	--	483.31	
MW-360-35	5/18/2015	495.17	--	11.57	--	483.60	
MW-360-35	6/4/2015	495.20	--	11.42	--	483.78	
MW-360-35	6/10/2015	495.20	--	11.64	--	483.56	
MW-360-35	7/22/2015	495.20	--	10.75	--	484.45	
MW-360-35	8/12/2015	495.19	--	10.66	--	484.53	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-360-35	9/30/2015	495.19	--	11.32	--	483.87	
MW-360-35	10/22/2015	495.20	No LNAPL	11.78	0.00	483.42	
MW-360-35	11/19/2015	495.19	--	11.71	--	483.48	
MW-360-35	11/25/2015	495.19	No LNAPL	11.55	0.00	483.67	
MW-360-35	12/11/2015	495.20	--	11.76	--	483.44	
MW-360-35	1/26/2016	495.25	--	12.29	--	482.96	
MW-360-35	7/14/2016	495.25	--	10.63	--	484.62	
MW-360-35	7/11/2017	495.25	--	10.50	--	484.75	
MW-360-50	3/18/2014	494.59	--	11.81	--	482.78	
MW-360-50	6/11/2014	494.59	--	11.43	--	483.16	
MW-360-50	9/9/2014	494.59	--	10.29	--	484.30	
MW-360-50	11/20/2014	494.71	No LNAPL	11.20	0.00	483.51	
MW-360-50	11/25/2014	494.71	No LNAPL	11.28	0.00	483.43	
MW-360-50	12/17/2014	494.72	No LNAPL	11.35	0.00	483.37	
MW-360-50	2/2/2015	494.74	No LNAPL	11.67	0.00	483.07	
MW-360-50	2/16/2015	494.81	No LNAPL	11.69	0.00	483.12	
MW-360-50	3/19/2015	494.83	--	11.71	--	483.12	
MW-360-50	4/14/2015	494.83	--	11.52	--	483.31	
MW-360-50	6/4/2015	494.84	--	11.05	--	483.79	
MW-360-50	6/10/2015	494.84	--	11.29	--	483.55	
MW-360-50	7/22/2015	494.84	--	10.41	--	484.43	
MW-360-50	8/12/2015	494.84	--	10.30	--	484.54	
MW-360-50	9/30/2015	494.84	--	10.97	--	483.87	
MW-360-50	10/22/2015	494.85	No LNAPL	11.43	0.00	483.42	
MW-360-50	11/19/2015	494.83	--	11.36	--	483.47	
MW-360-50	11/25/2015	494.83	No LNAPL	11.19	0.00	483.67	
MW-360-50	12/11/2015	494.84	--	11.39	--	483.45	
MW-360-50	1/26/2016	494.89	--	11.92	--	482.97	
MW-360-50	3/22/2016	494.89	No LNAPL	12.15	0.00	482.74	
MW-360-50	7/14/2016	494.89	--	10.27	--	484.62	
MW-360-50	9/13/2016	494.89	--	10.70	--	484.19	
MW-360-50	3/15/2017	494.89	--	11.80	--	483.09	
MW-360-50	7/11/2017	494.89	--	10.53	--	484.36	
MW-360-50	9/21/2017	494.94	--	11.54	--	483.40	
MW-360-80	3/18/2014	494.75	--	11.85	--	482.90	
MW-360-80	6/11/2014	494.75	--	11.44	--	483.31	
MW-360-80	9/9/2014	494.75	--	10.29	--	484.46	
MW-360-80	11/20/2014	494.72	No LNAPL	11.15	0.00	483.57	
MW-360-80	11/25/2014	494.72	No LNAPL	11.26	0.00	483.46	
MW-360-80	12/17/2014	494.73	No LNAPL	11.33	0.00	483.40	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-360-80	2/2/2015	494.72	No LNAPL	11.63	0.00	483.09	
MW-360-80	2/16/2015	494.80	No LNAPL	11.65	0.00	483.15	
MW-360-80	3/19/2015	494.80	--	11.66	--	483.14	
MW-360-80	4/14/2015	494.78	--	11.47	--	483.31	
MW-360-80	5/18/2015	494.75	--	11.13	--	483.62	
MW-360-80	6/10/2015	494.77	--	11.19	--	483.58	
MW-360-80	7/22/2015	494.76	--	10.31	--	484.45	
MW-360-80	8/12/2015	494.76	--	10.20	--	484.56	
MW-360-80	9/30/2015	494.76	--	10.88	--	483.88	
MW-360-80	10/22/2015	494.77	No LNAPL	11.33	0.00	483.44	
MW-360-80	11/19/2015	494.76	--	11.26	--	483.50	
MW-360-80	11/25/2015	494.76	No LNAPL	11.10	0.00	483.69	
MW-360-80	12/11/2015	494.77	--	11.31	--	483.46	
MW-360-80	1/26/2016	494.81	--	11.82	--	482.99	
MW-360-80	3/22/2016	494.81	No LNAPL	12.06	0.00	482.75	
MW-360-80	7/14/2016	494.81	--	10.01	--	484.80	
MW-360-80	9/13/2016	494.81	--	10.53	--	484.28	
MW-360-80	3/15/2017	494.81	--	11.62	--	483.19	
MW-360-80	7/11/2017	494.81	--	10.36	--	484.45	
MW-360-80	9/21/2017	494.53	--	11.12	--	483.41	
MW-360-150	3/18/2014	494.58	--	11.75	--	482.83	
MW-360-150	6/11/2014	494.58	--	11.30	--	483.28	
MW-360-150	9/9/2014	494.58	--	10.16	--	484.42	
MW-360-150	11/21/2014	494.61	No LNAPL	11.02	0.00	483.59	
MW-360-150	11/25/2014	494.61	No LNAPL	11.12	0.00	483.49	
MW-360-150	12/17/2014	494.62	No LNAPL	11.21	0.00	483.41	
MW-360-150	2/2/2015	494.62	No LNAPL	11.50	0.00	483.12	
MW-360-150	2/16/2015	494.71	No LNAPL	11.53	0.00	483.18	
MW-360-150	3/19/2015	494.71	--	11.54	--	483.17	
MW-360-150	4/14/2015	494.68	--	11.34	--	483.34	
MW-360-150	5/18/2015	494.65	--	10.99	--	483.66	
MW-360-150	6/4/2015	494.65	--	10.83	--	483.82	
MW-360-150	6/10/2015	494.65	--	11.06	--	483.59	
MW-360-150	7/22/2015	494.65	--	10.18	--	484.47	
MW-360-150	8/12/2015	494.65	--	10.06	--	484.59	
MW-360-150	9/30/2015	494.65	--	10.76	--	483.89	
MW-360-150	10/22/2015	494.66	No LNAPL	11.19	0.00	483.47	
MW-360-150	11/19/2015	494.64	--	11.12	--	483.52	
MW-360-150	11/25/2015	494.64	No LNAPL	10.94	0.00	483.73	
MW-360-150	12/11/2015	494.65	--	11.17	--	483.48	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-360-150	1/26/2016	494.68	--	11.69	--	482.99	
MW-360-150	3/22/2016	494.68	No LNAPL	11.90	0.00	482.78	
MW-360-150	7/14/2016	494.68	--	9.93	--	484.75	
MW-360-150	9/13/2016	494.68	--	10.38	--	484.30	
MW-360-150	3/15/2017	494.68	--	11.38	--	483.30	
MW-360-150	9/21/2017	494.66	--	11.23	--	483.43	
MW-361-15	3/18/2014	496.93	No LNAPL	11.39	0.00	485.54	
MW-361-15	6/11/2014	496.93	No LNAPL	10.91	0.00	486.02	
MW-361-15	9/9/2014	496.93	No LNAPL	9.59	0.00	487.34	
MW-361-15	11/20/2014	496.93	No LNAPL	10.38	0.00	486.55	
MW-361-15	3/18/2015	496.93	--	Frozen	--	---	Depth to ice = 10.85 feet
MW-361-15	6/10/2015	496.93	No LNAPL	10.40	0.00	486.53	
MW-361-15	8/12/2015	496.95	--	9.25	--	487.70	
MW-361-15	11/20/2015	496.95	--	10.46	--	486.49	
MW-361-15	3/22/2016	496.95	No LNAPL	Frozen	0.00	---	Ice at 11.24 feet
MW-361-15	8/15/2016	496.95	--	8.70	--	488.25	
MW-361-15	9/13/2016	496.95	--	9.49	--	487.46	
MW-361-15	10/21/2016	496.95	--	10.77	--	486.18	
MW-361-15	3/15/2017	496.95	--	Frozen	--	---	Depth to ice = 10.52 feet
MW-362-15	3/19/2014	495.49	--	12.31	--	483.18	
MW-362-15	6/11/2014	495.49	--	11.92	--	483.57	
MW-362-15	9/9/2014	495.49	--	10.54	--	484.95	
MW-362-15	11/20/2014	495.11	No LNAPL	11.32	0.00	483.79	
MW-362-15	11/25/2014	495.11	No LNAPL	11.47	0.00	483.64	
MW-362-15	12/17/2014	495.09	No LNAPL	11.55	0.00	483.54	
MW-362-15	2/2/2015	495.06	No LNAPL	11.89	0.00	483.17	
MW-362-15	2/17/2015	495.08	No LNAPL	11.91	0.00	483.17	
MW-362-15	3/19/2015	495.30	--	11.89	--	483.41	
MW-362-15	4/14/2015	495.29	--	11.69	--	483.60	
MW-362-15	5/18/2015	495.38	--	11.37	--	484.01	
MW-362-15	6/4/2015	495.37	--	11.18	--	484.19	
MW-362-15	7/22/2015	495.39	--	10.42	--	484.97	
MW-362-15	8/12/2015	495.38	--	10.33	--	485.05	
MW-362-15	9/30/2015	495.40	--	11.16	--	484.24	
MW-362-15	10/22/2015	495.38	No LNAPL	11.64	0.00	483.74	
MW-362-15	11/20/2015	495.37	--	11.48	--	483.89	
MW-362-15	11/25/2015	495.37	No LNAPL	11.29	0.00	484.11	
MW-362-15	12/11/2015	495.37	--	11.55	--	483.82	
MW-362-15	1/26/2016	495.33	--	12.10	--	483.23	
MW-362-15	3/22/2016	495.33	No LNAPL	12.30	0.00	483.03	

Appendix A-1
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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-362-15	7/18/2016	495.33	--	9.85	--	485.48	
MW-362-15	9/13/2016	495.33	--	10.82	--	484.51	
MW-362-15	3/15/2017	495.33	--	11.88	--	483.45	
MW-362-15	8/8/2017	495.33	--	10.38	--	484.95	
MW-362-15	9/21/2017	495.24	--	11.51	--	483.73	
MW-362-25	3/19/2014	495.59	--	12.39	--	483.20	
MW-362-25	6/11/2014	495.59	--	11.99	--	483.60	
MW-362-25	9/9/2014	495.59	--	10.89	--	484.70	
MW-362-25	11/20/2014	495.48	No LNAPL	11.65	0.00	483.83	
MW-362-25	11/25/2014	495.48	No LNAPL	11.82	0.00	483.66	
MW-362-25	12/17/2014	495.46	No LNAPL	11.90	0.00	483.56	
MW-362-25	2/2/2015	495.43	--	12.24	--	483.19	
MW-362-25	2/17/2015	495.45	No LNAPL	12.24	0.00	483.21	
MW-362-25	3/19/2015	495.67	--	12.23	--	483.44	
MW-362-25	4/14/2015	495.66	--	12.04	--	483.62	
MW-362-25	5/18/2015	495.74	--	11.70	--	484.04	
MW-362-25	6/4/2015	495.73	--	11.50	--	484.23	
MW-362-25	6/10/2015	495.73	--	11.76	--	483.97	
MW-362-25	7/22/2015	495.75	--	10.76	--	484.99	
MW-362-25	8/12/2015	495.75	--	10.66	--	485.09	
MW-362-25	9/30/2015	495.76	--	11.52	--	484.24	
MW-362-25	10/22/2015	495.74	No LNAPL	11.98	0.00	483.76	
MW-362-25	11/20/2015	495.74	--	11.83	--	483.91	
MW-362-25	11/25/2015	495.74	No LNAPL	11.63	0.00	484.14	
MW-362-25	12/11/2015	495.73	--	11.90	--	483.83	
MW-362-25	1/26/2016	495.68	--	12.42	--	483.26	
MW-362-25	7/18/2016	495.68	--	10.18	--	485.50	
MW-362-25	8/9/2017	495.68	--	10.69	--	484.99	
MW-362-35	3/19/2014	495.31	--	12.07	--	483.24	
MW-362-35	6/11/2014	495.31	--	11.70	--	483.61	
MW-362-35	9/9/2014	495.31	--	10.60	--	484.71	
MW-362-35	11/20/2014	495.18	No LNAPL	11.32	0.00	483.86	
MW-362-35	11/25/2014	495.18	No LNAPL	11.49	0.00	483.69	
MW-362-35	12/17/2014	495.14	No LNAPL	11.58	0.00	483.56	
MW-362-35	2/2/2015	495.07	No LNAPL	11.87	0.00	483.20	
MW-362-35	3/19/2015	495.31	--	11.86	--	483.45	
MW-362-35	4/14/2015	495.30	--	11.68	--	483.62	
MW-362-35	5/18/2015	495.40	--	11.36	--	484.04	
MW-362-35	6/4/2015	495.39	--	11.15	--	484.24	
MW-362-35	6/10/2015	495.39	--	11.42	--	483.97	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-362-35	7/22/2015	495.42	--	10.40	--	485.02	
MW-362-35	8/12/2015	495.40	--	10.31	--	485.09	
MW-362-35	9/30/2015	495.42	--	11.19	--	484.23	
MW-362-35	10/22/2015	495.40	No LNAPL	11.63	0.00	483.77	
MW-362-35	11/20/2015	495.39	--	11.46	--	483.93	
MW-362-35	11/25/2015	495.39	No LNAPL	11.27	0.00	484.15	
MW-362-35	12/11/2015	495.38	--	11.53	--	483.85	
MW-362-35	1/26/2016	495.29	--	12.04	--	483.25	
MW-362-35	7/18/2016	495.29	--	9.78	--	485.51	
MW-362-50	3/19/2014	495.10	--	11.85	--	483.25	
MW-362-50	6/11/2014	495.10	--	11.49	--	483.61	
MW-362-50	9/9/2014	495.10	--	10.41	--	484.69	
MW-362-50	11/20/2014	494.96	No LNAPL	11.17	0.00	483.79	
MW-362-50	11/25/2014	494.96	No LNAPL	11.31	0.00	483.65	
MW-362-50	12/17/2014	494.92	No LNAPL	11.39	0.00	483.53	
MW-362-50	2/2/2015	494.85	No LNAPL	11.68	0.00	483.17	
MW-362-50	2/17/2015	494.88	No LNAPL	11.69	0.00	483.19	
MW-362-50	4/14/2015	495.09	--	11.48	--	483.61	
MW-362-50	5/18/2015	495.17	--	11.16	--	484.01	
MW-362-50	6/4/2015	495.17	--	10.97	--	484.20	
MW-362-50	6/10/2015	495.17	--	11.21	--	483.96	
MW-362-50	7/22/2015	495.19	--	10.21	--	484.98	
MW-362-50	8/12/2015	495.18	--	10.11	--	485.07	
MW-362-50	9/30/2015	495.20	--	10.97	--	484.23	
MW-362-50	10/22/2015	495.18	No LNAPL	11.44	0.00	483.74	
MW-362-50	11/20/2015	495.17	--	11.47	--	483.70	
MW-362-50	11/25/2015	495.17	No LNAPL	11.07	0.00	484.13	
MW-362-50	12/11/2015	495.16	--	11.35	--	483.81	
MW-362-50	1/26/2016	495.08	--	11.85	--	483.23	
MW-362-50	3/22/2016	495.08	No LNAPL	12.04	0.00	483.04	
MW-362-50	7/18/2016	495.08	--	9.59	--	485.49	
MW-362-50	9/13/2016	495.08	--	10.56	--	484.52	
MW-362-50	3/15/2017	495.08	--	11.53	--	483.55	
MW-362-50	7/12/2017	495.08	--	10.14	--	484.94	
MW-362-50	9/21/2017	495.16	--	11.40	--	483.76	
MW-362-80	3/19/2014	495.28	--	12.08	--	483.20	
MW-362-80	6/11/2014	495.28	--	11.71	--	483.57	
MW-362-80	9/9/2014	495.28	--	10.64	--	484.64	
MW-362-80	11/20/2014	495.15	No LNAPL	11.43	0.00	483.72	
MW-362-80	11/25/2014	495.15	No LNAPL	11.52	0.00	483.63	

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Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-362-80	12/17/2014	495.13	No LNAPL	11.62	0.00	483.51	
MW-362-80	2/2/2015	495.10	No LNAPL	11.94	0.00	483.16	
MW-362-80	2/17/2015	495.13	No LNAPL	11.96	0.00	483.17	
MW-362-80	3/19/2015	495.33	--	11.93	--	483.40	
MW-362-80	4/14/2015	495.30	--	11.74	--	483.56	
MW-362-80	5/18/2015	495.38	--	11.40	--	483.98	
MW-362-80	6/4/2015	495.38	--	11.21	--	484.17	
MW-362-80	6/10/2015	495.38	--	11.46	--	483.92	
MW-362-80	7/22/2015	495.39	--	10.44	--	484.95	
MW-362-80	8/12/2015	495.39	--	10.36	--	485.03	
MW-362-80	9/30/2015	495.16	--	10.98	--	484.18	
MW-362-80	10/22/2015	495.14	No LNAPL	11.44	0.00	483.70	
MW-362-80	11/20/2015	495.13	--	11.29	--	483.84	
MW-362-80	11/25/2015	495.13	No LNAPL	11.06	0.00	484.10	
MW-362-80	12/11/2015	495.12	--	11.34	--	483.78	
MW-362-80	1/26/2016	495.09	--	11.87	--	483.22	
MW-362-80	3/22/2016	495.09	No LNAPL	12.08	0.00	483.01	
MW-362-80	7/19/2016	495.09	--	9.49	--	485.60	
MW-362-80	9/13/2016	495.09	--	10.60	--	484.49	
MW-362-80	3/15/2017	495.09	--	11.59	--	483.50	
MW-362-150	3/19/2014	495.39	--	12.27	--	483.12	
MW-362-150	6/11/2014	495.39	--	11.82	--	483.57	
MW-362-150	9/9/2014	495.39	--	10.75	--	484.64	
MW-362-150	11/20/2014	495.22	No LNAPL	11.49	0.00	483.73	
MW-362-150	11/25/2014	495.22	No LNAPL	11.63	0.00	483.59	
MW-362-150	12/17/2014	495.21	No LNAPL	11.73	0.00	483.48	
MW-362-150	2/2/2015	495.18	No LNAPL	12.06	0.00	483.12	
MW-362-150	2/17/2015	495.22	No LNAPL	12.08	0.00	483.14	
MW-362-150	3/19/2015	495.44	--	12.08	--	483.36	
MW-362-150	4/14/2015	495.40	--	11.86	--	483.54	
MW-362-150	5/18/2015	495.44	--	11.48	--	483.96	
MW-362-150	6/4/2015	495.43	--	11.30	--	484.13	
MW-362-150	6/10/2015	495.43	--	11.56	--	483.87	
MW-362-150	7/22/2015	495.44	--	10.55	--	484.89	
MW-362-150	8/12/2015	495.44	--	10.47	--	484.97	
MW-362-150	9/30/2015	495.45	--	11.33	--	484.12	
MW-362-150	10/22/2015	495.43	No LNAPL	11.79	0.00	483.64	
MW-362-150	11/20/2015	495.43	--	11.59	--	483.84	
MW-362-150	11/25/2015	495.43	No LNAPL	11.37	0.00	484.09	
MW-362-150	12/11/2015	495.41	--	11.66	--	483.75	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-362-150	1/26/2016	495.37	--	12.20	--	483.17	
MW-362-150	3/22/2016	495.37	No LNAPL	12.41	0.00	482.96	
MW-362-150	7/19/2016	495.37	--	9.82	--	485.55	
MW-362-150	9/13/2016	495.37	--	10.90	--	484.47	
MW-362-150	3/15/2017	495.37	--	11.92	--	483.45	
MW-362-150	9/21/2017	495.43	--	11.77	--	483.66	
MW-363-15	3/19/2014	495.30	--	12.80	--	482.50	
MW-363-15	6/11/2014	495.30	--	12.34	--	482.96	
MW-363-15	9/9/2014	495.30	--	11.08	--	484.22	
MW-363-15	11/20/2014	495.30	No LNAPL	12.09	0.00	483.21	
MW-363-15	3/18/2015	495.30	--	12.58	--	482.72	
MW-363-15	6/11/2015	495.30	--	12.20	--	483.10	
MW-363-15	8/12/2015	494.70	--	10.59	--	484.11	
MW-363-15	11/19/2015	494.70	--	11.57	--	483.13	
MW-363-15	3/22/2016	494.70	--	12.26	--	482.44	
MW-363-15	7/25/2016	494.73	--	9.76	--	484.97	
MW-363-15	9/13/2016	494.73	--	10.82	--	483.91	
MW-363-15	3/14/2017	494.73	--	11.88	--	482.85	
MW-364-15	3/19/2014	494.66	--	12.19	--	482.47	
MW-364-15	6/11/2014	494.66	--	11.77	--	482.89	
MW-364-15	9/9/2014	494.66	--	10.65	--	484.01	
MW-364-15	11/20/2014	494.66	No LNAPL	11.55	0.00	483.11	
MW-364-15	3/18/2015	494.66	--	12.10	--	482.56	
MW-364-15	6/11/2015	494.93	--	11.70	--	483.23	
MW-364-15	8/12/2015	493.94	--	9.63	--	484.31	Slight oxidation noted on probe
MW-364-15	11/19/2015	493.94	--	10.68	--	483.26	
MW-364-15	3/22/2016	493.94	--	11.38	--	482.56	
MW-364-15	7/25/2016	493.91	--	8.70	--	485.21	
MW-364-15	9/13/2016	493.91	--	10.00	--	483.91	
MW-364-15	3/14/2017	493.91	--	11.07	--	482.84	
MW-364-15	8/8/2017	493.91	--	9.82	--	484.09	
MW-364-15	9/21/2017	494.16	--	11.00	--	483.16	
MW-364-30	3/19/2014	495.22	--	12.76	--	482.46	
MW-364-30	6/11/2014	495.22	--	12.32	--	482.90	
MW-364-30	9/9/2014	495.22	--	11.18	--	484.04	
MW-364-30	11/20/2014	495.22	No LNAPL	12.11	0.00	483.11	
MW-364-30	3/18/2015	495.22	--	12.83	--	482.39	
MW-364-30	6/11/2015	495.22	--	12.27	--	482.95	
MW-364-30	8/12/2015	494.26	--	9.97	--	484.29	
MW-364-30	11/19/2015	494.26	--	10.97	--	483.29	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-364-30	7/25/2016	494.36	--	9.06	--	485.30	
MW-364-30	8/8/2017	494.36	--	10.18	--	484.18	
MW-364-65	3/19/2014	494.45	--	11.97	--	482.48	
MW-364-65	6/11/2014	494.45	--	11.52	--	482.93	
MW-364-65	9/9/2014	494.45	--	9.77	--	484.68	
MW-364-65	11/20/2014	494.04	No LNAPL	10.65	0.00	483.39	
MW-364-65	3/18/2015	494.04	--	11.13	--	482.91	
MW-364-65	6/11/2015	494.04	--	10.74	--	483.30	
MW-364-65	8/12/2015	494.07	--	9.75	--	484.32	
MW-364-65	11/19/2015	494.07	--	10.82	--	483.25	
MW-364-65	3/22/2016	494.07	--	11.41	--	482.66	
MW-364-65	7/25/2016	494.06	--	8.77	--	485.29	
MW-364-65	9/13/2016	494.06	--	10.03	--	484.03	
MW-364-65	3/14/2017	494.06	--	10.95	--	483.11	
MW-364-65	7/12/2017	494.06	--	9.52	--	484.54	
MW-364-65	9/21/2017	494.07	--	10.89	--	483.18	
MW-364-90	3/19/2014	494.66	--	12.18	--	482.48	
MW-364-90	6/11/2014	494.66	--	11.74	--	482.92	
MW-364-90	9/9/2014	494.66	--	10.30	--	484.36	
MW-364-90	11/20/2014	494.58	No LNAPL	11.21	0.00	483.37	
MW-364-90	3/18/2015	494.58	--	11.74	--	482.84	
MW-364-90	6/11/2015	494.58	--	11.35	--	483.23	
MW-364-90	8/12/2015	494.66	--	10.35	--	484.31	Casing may need to be cut
MW-364-90	11/19/2015	494.66	--	10.48	--	484.18	
MW-364-90	3/22/2016	494.66	--	12.06	--	482.60	
MW-364-90	7/25/2016	494.71	--	9.42	--	485.29	
MW-364-90	9/13/2016	494.71	--	10.68	--	484.03	
MW-364-90	3/14/2017	494.71	--	11.72	--	482.99	
MW-364-90	7/12/2017	494.71	--	10.53	--	484.18	
MW-364-90	9/21/2017	494.25	--	11.07	--	483.18	
MW-364-150	3/19/2014	494.40	--	11.92	--	482.48	
MW-364-150	6/11/2014	494.40	--	11.50	--	482.90	
MW-364-150	9/9/2014	494.40	--	10.08	--	484.32	
MW-364-150	11/20/2014	494.32	No LNAPL	10.96	0.00	483.36	
MW-364-150	6/11/2015	494.32	--	11.04	--	483.28	
MW-364-150	8/12/2015	494.36	--	10.05	--	484.31	
MW-364-150	11/19/2015	494.36	--	11.09	--	483.27	
MW-364-150	3/22/2016	494.36	--	11.69	--	482.67	
MW-364-150	7/25/2016	494.35	--	9.08	--	485.27	
MW-364-150	9/13/2016	494.35	--	10.34	--	484.01	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-364-150	3/14/2017	494.35	--	11.24	--	483.11	
MW-365-15	3/18/2014	493.96	No LNAPL	8.66	0.00	485.30	
MW-365-15	6/11/2014	493.96	No LNAPL	8.19	0.00	485.77	
MW-365-15	9/9/2014	493.96	No LNAPL	6.96	0.00	487.00	
MW-365-15	11/20/2014	493.96	No LNAPL	7.68	0.00	486.28	
MW-365-15	3/18/2015	493.96	--	8.24	--	485.72	
MW-365-15	6/10/2015	493.96	No LNAPL	7.75	0.00	486.21	
MW-365-15	8/12/2015	494.08	--	6.56	--	487.52	
MW-365-15	11/20/2015	494.08	--	7.79	--	486.29	
MW-365-15	3/22/2016	494.08	No LNAPL	8.75	0.00	485.33	
MW-365-15	8/17/2016	494.11	--	6.12	--	487.99	
MW-365-15	9/13/2016	494.11	--	6.96	--	487.15	
MW-365-15	3/15/2017	494.11	--	8.01	--	486.10	
MW-366-15	9/29/2014	493.62	7.09	7.30	0.21	486.49	
MW-366-15	10/16/2014	493.62	7.66	7.90	0.24	485.91	
MW-366-15	3/10/2015	493.62	Sheen	Frozen	Sheen	—	Depth to ice = 7.68 feet
MW-366-15	5/18/2015	493.62	No LNAPL	Frozen	0.00	—	Well was frozen with water on top of ice; depth to ice = 7.64 feet
MW-366-15	8/12/2015	493.68	Sheen	6.19	Sheen	487.53	
MW-366-15	10/15/2015	493.68	7.46	7.51	0.05	486.25	
MW-366-15	3/4/2016	493.68	8.10	8.62	0.52	485.53	
MW-366-15	3/24/2016	493.68	8.20	8.65	0.45	485.39	Baildown testing not conducted- insufficient LNAPL thickness
MW-366-15	3/25/2016	493.68	8.15	8.65	0.50	485.43	Initial fluid levels and product recovered by SWI during baildown testing
MW-366-15	6/14/2016	493.68	Sheen	7.16	Sheen	486.52	
MW-366-15	8/17/2016	493.55	Sheen	5.64	Sheen	487.91	
MW-366-15	8/18/2016	493.68	Sheen	5.66	Sheen	488.02	
MW-366-15	10/13/2016	493.55	7.40	7.41	0.01	486.15	
MW-366-15	3/2/2017	493.55	7.39	7.43	0.04	486.15	
MW-366-15	6/6/2017	493.55	7.48	7.68	0.20	486.03	
MW-366-15	9/21/2017	493.59	7.36	7.60	0.24	486.18	
MW-367-15	3/18/2014	497.37	No LNAPL	12.08	0.00	485.29	
MW-367-15	6/11/2014	497.37	No LNAPL	11.61	0.00	485.76	
MW-367-15	9/9/2014	497.37	No LNAPL	10.33	0.00	487.04	
MW-367-15	11/20/2014	497.37	No LNAPL	11.10	0.00	486.27	
MW-367-15	3/18/2015	497.37	--	11.71	--	485.66	
MW-367-15	6/10/2015	497.37	No LNAPL	11.25	0.00	486.12	
MW-367-15	8/12/2015	497.16	--	9.96	--	487.20	
MW-367-15	11/19/2015	497.16	--	10.82	--	486.34	
MW-367-15	8/15/2016	497.20	--	9.09	--	488.11	
MW-368-15	8/15/2016	496.81	--	8.65	--	488.16	
MW-369-16	6/19/2014	498.54	--	13.84	--	484.70	

Appendix A-1
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-369-16	7/15/2014	498.55	--	11.98	--	486.57	
MW-369-16	8/26/2014	498.55	--	12.71	--	485.84	
MW-369-16	9/24/2014	498.54	--	13.31	--	485.23	
MW-369-16	10/21/2014	498.54	--	14.28	--	484.26	
MW-369-16	11/19/2014	498.53	--	13.79	--	484.74	
MW-369-16	12/16/2014	498.56	--	14.05	--	484.51	
MW-369-16	1/21/2015	498.57	--	14.25	--	484.32	
MW-369-16	2/25/2015	498.57	--	14.11	--	484.46	
MW-369-16	3/18/2015	498.58	--	14.36	--	484.22	
MW-369-16	3/26/2015	498.58	--	14.27	--	484.31	
MW-369-16	4/16/2015	498.57	--	14.12	--	484.45	
MW-369-16	5/21/2015	498.58	--	13.86	--	484.72	
MW-369-16	6/10/2015	498.58	--	13.88	--	484.70	
MW-369-16	8/19/2015	498.58	--	13.05	--	485.53	
MW-369-16	10/6/2015	498.57	--	13.51	--	485.06	
MW-369-16	1/19/2016	498.58	--	14.52	--	484.06	
MW-369-16	5/26/2016	498.64	--	14.13	--	484.51	
MW-369-16	7/20/2016	498.16	--	11.65	--	486.51	
MW-369-16	9/9/2016	498.17	--	12.61	--	485.56	
MW-369-16	10/20/2016	498.16	--	13.89	--	484.27	
MW-369-16	11/15/2016	498.16	--	13.15	--	485.01	
MW-369-16	2/8/2017	498.17	--	13.58	--	484.59	
MW-369-16	6/13/2017	498.19	--	12.98	--	485.21	
MW-369-16	8/9/2017	498.19	--	12.19	--	486.00	
MW-369-16	8/16/2017	498.19	--	12.05	--	486.14	
MW-369-16	11/15/2017	498.19	--	13.86	--	484.33	
MW-369-55	6/19/2014	498.37	--	13.67	--	484.70	
MW-369-55	7/15/2014	498.38	--	11.82	--	486.56	
MW-369-55	8/26/2014	498.38	--	12.56	--	485.82	
MW-369-55	9/24/2014	498.36	--	13.18	--	485.18	
MW-369-55	10/21/2014	498.36	--	14.14	--	484.22	
MW-369-55	11/19/2014	498.36	--	13.66	--	484.70	
MW-369-55	12/16/2014	498.36	--	13.89	--	484.47	
MW-369-55	1/21/2015	498.37	--	14.08	--	484.29	
MW-369-55	2/25/2015	498.36	--	14.30	--	484.06	
MW-369-55	3/18/2015	498.38	--	14.19	--	484.19	
MW-369-55	3/26/2015	498.38	--	14.11	--	484.27	
MW-369-55	4/16/2015	498.37	--	13.96	--	484.41	
MW-369-55	5/21/2015	498.36	--	13.67	--	484.69	
MW-369-55	6/10/2015	498.36	--	13.71	--	484.65	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-369-55	8/19/2015	498.36	--	12.88	--	485.48	
MW-369-55	10/6/2015	498.36	--	13.33	--	485.03	
MW-369-55	1/19/2016	498.34	--	14.32	--	484.02	
MW-369-55	5/26/2016	498.37	--	13.90	--	484.47	
MW-369-55	7/20/2016	498.36	--	11.89	--	486.47	
MW-369-55	9/9/2016	498.38	--	12.85	--	485.53	
MW-369-55	10/20/2016	498.36	--	14.13	--	484.23	
MW-369-55	11/15/2016	498.36	--	13.39	--	484.97	
MW-369-55	2/8/2017	498.37	--	13.84	--	484.53	
MW-369-55	6/13/2017	498.37	--	13.16	--	485.21	
MW-369-75	6/19/2014	498.74	--	14.04	--	484.70	
MW-369-75	7/15/2014	498.76	--	12.19	--	486.57	
MW-369-75	8/26/2014	498.75	--	12.94	--	485.81	
MW-369-75	9/24/2014	498.74	--	13.58	--	485.16	
MW-369-75	10/21/2014	498.74	--	14.51	--	484.23	
MW-369-75	11/19/2014	498.75	--	14.04	--	484.71	
MW-369-75	12/16/2014	498.75	--	14.27	--	484.48	
MW-369-75	1/21/2015	498.75	--	14.45	--	484.30	
MW-369-75	2/25/2015	498.74	--	14.49	--	484.25	
MW-369-75	3/18/2015	498.76	--	14.58	--	484.18	
MW-369-75	3/26/2015	498.76	--	14.47	--	484.29	
MW-369-75	4/16/2015	498.75	--	14.33	--	484.42	
MW-369-75	5/21/2015	498.73	--	14.04	--	484.69	
MW-369-75	6/10/2015	498.73	--	14.08	--	484.65	
MW-369-75	8/19/2015	498.73	--	13.15	--	485.58	
MW-369-75	10/6/2015	498.73	--	13.71	--	485.02	
MW-369-75	1/19/2016	498.72	--	14.69	--	484.03	
MW-369-75	5/26/2016	498.74	--	14.27	--	484.47	
MW-369-75	7/20/2016	498.74	--	12.24	--	486.50	
MW-369-75	9/9/2016	498.75	--	13.22	--	485.53	
MW-369-75	10/20/2016	498.74	--	14.49	--	484.25	
MW-369-75	11/15/2016	498.74	--	13.77	--	484.97	
MW-369-75	2/8/2017	498.75	--	14.21	--	484.54	
MW-369-75	6/13/2017	498.75	--	13.52	--	485.23	
MW-370-15	2/5/2014	495.21	--	11.37	--	483.84	
MW-370-15	3/24/2014	495.22	--	11.46	--	483.76	
MW-370-15	4/18/2014	495.21	--	11.23	--	483.98	
MW-370-15	5/15/2014	495.22	--	10.87	--	484.35	
MW-370-15	6/19/2014	495.21	--	10.74	--	484.47	
MW-370-15	7/15/2014	495.22	--	9.15	--	486.07	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-370-15	8/26/2014	495.22	--	9.88	--	485.34	
MW-370-15	9/24/2014	495.22	--	10.50	--	484.72	
MW-370-15	10/21/2014	495.22	--	11.42	--	483.80	
MW-370-15	11/19/2014	495.22	--	10.99	--	484.23	
MW-370-15	12/16/2014	495.26	--	11.25	--	484.01	
MW-370-15	1/21/2015	495.32	--	11.49	--	483.83	
MW-370-15	2/25/2015	495.33	--	11.54	--	483.79	
MW-370-15	3/18/2015	495.32	--	11.62	--	483.70	
MW-370-15	3/26/2015	495.32	--	11.53	--	483.79	
MW-370-15	4/16/2015	495.33	--	11.39	--	483.94	
MW-370-15	5/21/2015	495.35	--	11.10	--	484.25	
MW-370-15	6/10/2015	495.31	--	11.13	--	484.18	
MW-370-15	8/19/2015	494.82	--	9.83	--	484.99	
MW-370-15	10/6/2015	494.83	--	10.22	--	484.61	
MW-370-15	1/19/2016	494.83	--	11.26	--	483.57	
MW-370-15	5/26/2016	494.85	--	10.85	--	484.00	
MW-370-15	7/19/2016	494.87	--	8.90	--	485.97	
MW-370-15	9/9/2016	494.86	--	9.57	--	485.29	
MW-370-15	10/18/2016	494.87	--	10.78	--	484.09	
MW-370-15	11/15/2016	494.87	--	10.14	--	484.73	
MW-370-15	2/8/2017	494.99	--	10.69	--	484.30	
MW-370-15	6/13/2017	495.00	--	10.05	--	484.95	
MW-370-55	2/5/2014	495.25	--	11.19	--	484.06	
MW-370-55	3/24/2014	495.26	--	11.48	--	483.78	
MW-370-55	4/18/2014	495.26	--	11.25	--	484.01	
MW-370-55	5/15/2014	495.26	--	10.91	--	484.35	
MW-370-55	6/19/2014	495.24	--	10.74	--	484.50	
MW-370-55	7/15/2014	495.25	--	9.05	--	486.20	
MW-370-55	8/26/2014	495.25	--	9.75	--	485.50	
MW-370-55	9/24/2014	495.25	--	10.38	--	484.87	
MW-370-55	10/21/2014	495.25	--	11.24	--	484.01	
MW-370-55	11/19/2014	495.25	--	10.86	--	484.39	
MW-370-55	12/16/2014	495.30	--	11.13	--	484.17	
MW-370-55	1/21/2015	495.37	--	11.39	--	483.98	
MW-370-55	2/25/2015	495.38	--	11.44	--	483.94	
MW-370-55	3/18/2015	495.38	--	11.51	--	483.87	
MW-370-55	3/26/2015	495.38	--	11.42	--	483.96	
MW-370-55	4/16/2015	495.39	--	11.29	--	484.10	
MW-370-55	5/21/2015	495.40	--	11.01	--	484.39	
MW-370-55	6/10/2015	495.36	--	11.04	--	484.32	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-370-55	8/19/2015	494.87	--	9.72	--	485.15	
MW-370-55	10/6/2015	494.87	--	10.10	--	484.77	
MW-370-55	1/19/2016	494.86	--	11.14	--	483.72	
MW-370-55	5/26/2016	494.88	--	10.72	--	484.16	
MW-370-55	7/19/2016	494.90	--	8.76	--	486.14	
MW-370-55	9/9/2016	494.89	--	9.58	--	485.31	
MW-370-55	10/18/2016	494.90	--	10.77	--	484.13	
MW-370-55	11/15/2016	494.90	--	10.16	--	484.74	
MW-370-55	2/8/2017	495.03	--	10.71	--	484.32	
MW-370-55	6/13/2017	495.03	--	10.06	--	484.97	
MW-370-75	2/5/2014	494.96	--	10.90	--	484.06	
MW-370-75	3/24/2014	494.97	--	11.20	--	483.77	
MW-370-75	4/18/2014	494.96	--	10.98	--	483.98	
MW-370-75	5/15/2014	494.96	--	10.60	--	484.36	
MW-370-75	6/19/2014	494.94	--	10.45	--	484.49	
MW-370-75	7/15/2014	494.95	--	8.65	--	486.30	
MW-370-75	8/26/2014	494.96	--	9.38	--	485.58	
MW-370-75	9/24/2014	494.95	--	10.00	--	484.95	
MW-370-75	10/21/2014	494.95	--	10.93	--	484.02	
MW-370-75	11/19/2014	494.96	--	10.50	--	484.46	
MW-370-75	12/16/2014	494.99	--	10.73	--	484.26	
MW-370-75	1/21/2015	494.99	--	10.91	--	484.08	
MW-370-75	2/25/2015	494.99	--	10.97	--	484.02	
MW-370-75	3/18/2015	494.98	--	11.03	--	483.95	
MW-370-75	3/26/2015	494.98	--	10.95	--	484.03	
MW-370-75	4/16/2015	494.99	--	10.81	--	484.18	
MW-370-75	5/21/2015	494.99	--	10.52	--	484.47	
MW-370-75	6/10/2015	494.95	--	10.55	--	484.40	
MW-370-75	8/19/2015	494.46	--	9.23	--	485.23	
MW-370-75	10/6/2015	494.47	--	9.65	--	484.82	
MW-370-75	1/19/2016	494.45	--	10.65	--	483.80	
MW-370-75	5/26/2016	494.47	--	10.23	--	484.24	
MW-370-75	7/19/2016	494.48	--	8.28	--	486.20	
MW-370-75	9/9/2016	494.48	--	9.17	--	485.31	
MW-370-75	11/15/2016	494.48	--	9.73	--	484.75	
MW-370-75	2/8/2017	494.63	--	10.31	--	484.32	
MW-370-75	6/13/2017	494.62	--	9.64	--	484.98	
MW-371-15	6/19/2014	495.16	--	10.83	--	484.33	
MW-371-15	7/15/2014	495.16	--	9.03	--	486.13	
MW-371-15	8/26/2014	495.16	--	9.75	--	485.41	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-371-15	9/24/2014	495.14	--	10.34	--	484.80	
MW-371-15	10/21/2014	495.15	--	11.25	--	483.90	
MW-371-15	11/19/2014	495.16	--	10.88	--	484.28	
MW-371-15	12/16/2014	495.16	--	11.07	--	484.09	
MW-371-15	1/21/2015	495.17	--	11.21	--	483.96	
MW-371-15	2/25/2015	495.20	--	11.31	--	483.89	
MW-371-15	3/18/2015	495.16	--	11.39	--	483.77	
MW-371-15	3/26/2015	495.16	--	11.30	--	483.86	
MW-371-15	4/16/2015	495.17	--	11.15	--	484.02	
MW-371-15	5/21/2015	495.18	--	10.87	--	484.31	
MW-371-15	6/10/2015	495.20	--	10.93	--	484.27	
MW-371-15	8/19/2015	495.18	--	10.13	--	485.05	
MW-371-15	10/6/2015	495.17	--	10.46	--	484.71	
MW-371-15	1/19/2016	495.17	--	11.53	--	483.64	
MW-371-15	5/26/2016	496.07	--	11.99	--	484.08	
MW-371-15	7/15/2016	496.11	--	10.59	--	485.52	
MW-371-15	9/9/2016	496.07	--	10.90	--	485.17	
MW-371-15	10/19/2016	496.11	--	12.12	--	483.99	
MW-371-15	11/15/2016	496.11	--	11.55	--	484.56	
MW-371-15	2/8/2017	496.14	--	11.99	--	484.15	
MW-371-15	6/13/2017	496.19	--	11.31	--	484.88	
MW-371-15	7/11/2017	496.19	--	10.72	--	485.47	
MW-371-55	6/19/2014	495.54	--	11.16	--	484.38	
MW-371-55	7/15/2014	495.55	--	9.39	--	486.16	
MW-371-55	8/26/2014	495.55	--	10.11	--	485.44	
MW-371-55	9/24/2014	495.53	--	10.71	--	484.82	
MW-371-55	10/21/2014	495.53	--	11.60	--	483.93	
MW-371-55	11/19/2014	495.54	--	11.12	--	484.42	
MW-371-55	12/16/2014	495.53	--	11.42	--	484.11	
MW-371-55	1/21/2015	495.54	--	11.60	--	483.94	
MW-371-55	2/25/2015	495.55	--	11.66	--	483.89	
MW-371-55	3/18/2015	495.53	--	11.72	--	483.81	
MW-371-55	3/26/2015	495.53	--	11.64	--	483.89	
MW-371-55	4/16/2015	495.52	--	11.49	--	484.03	
MW-371-55	5/21/2015	495.54	--	11.21	--	484.33	
MW-371-55	6/10/2015	495.55	--	11.27	--	484.28	
MW-371-55	8/19/2015	495.53	--	10.47	--	485.06	
MW-371-55	10/6/2015	495.51	--	10.80	--	484.71	
MW-371-55	1/19/2016	495.48	--	11.84	--	483.64	
MW-371-55	5/26/2016	495.53	--	11.44	--	484.09	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-371-55	7/15/2016	495.54	--	10.03	--	485.51	
MW-371-55	9/9/2016	495.54	--	10.36	--	485.18	
MW-371-55	10/19/2016	495.54	--	11.57	--	483.97	
MW-371-55	11/15/2016	495.54	--	10.96	--	484.58	
MW-371-55	2/8/2017	495.58	--	11.40	--	484.18	
MW-371-55	6/13/2017	495.58	--	10.69	--	484.89	
MW-371-75	6/19/2014	495.92	--	11.54	--	484.38	
MW-371-75	7/15/2014	495.92	--	9.78	--	486.14	
MW-371-75	8/26/2014	495.92	--	10.46	--	485.46	
MW-371-75	9/24/2014	495.90	--	11.07	--	484.83	
MW-371-75	10/21/2014	495.90	--	11.97	--	483.93	
MW-371-75	11/19/2014	495.91	--	11.58	--	484.33	
MW-371-75	12/16/2014	495.90	--	11.79	--	484.11	
MW-371-75	1/21/2015	495.91	--	11.96	--	483.95	
MW-371-75	2/25/2015	495.95	--	12.03	--	483.92	
MW-371-75	3/18/2015	495.92	--	12.10	--	483.82	
MW-371-75	3/26/2015	495.92	--	12.03	--	483.89	
MW-371-75	4/16/2015	495.92	--	11.87	--	484.05	
MW-371-75	5/21/2015	495.90	--	11.58	--	484.32	
MW-371-75	6/10/2015	495.92	--	11.64	--	484.28	
MW-371-75	8/19/2015	495.89	--	10.82	--	485.07	
MW-371-75	10/6/2015	495.88	--	11.17	--	484.71	
MW-371-75	1/19/2016	495.86	--	12.20	--	483.66	
MW-371-75	5/26/2016	495.91	--	11.80	--	484.11	
MW-371-75	7/15/2016	495.91	--	10.35	--	485.56	
MW-371-75	9/9/2016	495.91	--	10.74	--	485.17	
MW-371-75	10/19/2016	495.91	--	11.94	--	483.97	
MW-371-75	11/15/2016	495.91	--	11.34	--	484.57	
MW-371-75	2/8/2017	495.95	--	11.77	--	484.18	
MW-371-75	6/13/2017	495.94	--	11.04	--	484.90	
MW-371-125	6/19/2014	495.47	--	11.09	--	484.38	
MW-371-125	7/15/2014	495.47	--	9.29	--	486.18	
MW-371-125	8/26/2014	495.47	--	10.00	--	485.47	
MW-371-125	9/24/2014	495.43	--	10.60	--	484.83	
MW-371-125	10/21/2014	495.46	--	11.50	--	483.96	
MW-371-125	11/19/2014	495.48	--	11.21	--	484.27	
MW-371-125	12/16/2014	495.48	--	11.33	--	484.15	
MW-371-125	1/21/2015	495.50	--	11.53	--	483.97	
MW-371-125	2/25/2015	495.52	--	11.61	--	483.91	
MW-371-125	3/18/2015	495.51	--	11.67	--	483.84	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
MW-371-125	3/26/2015	495.51	--	11.59	--	483.92	
MW-371-125	4/16/2015	495.52	--	11.44	--	484.08	
MW-371-125	5/21/2015	495.51	--	11.16	--	484.35	
MW-371-125	6/10/2015	495.51	--	11.21	--	484.30	
MW-371-125	8/19/2015	495.48	--	10.40	--	485.08	
MW-371-125	10/6/2015	495.47	--	10.75	--	484.72	
MW-371-125	1/19/2016	495.45	--	11.78	--	483.67	
MW-371-125	5/26/2016	495.95	--	11.83	--	484.12	
MW-371-125	7/15/2016	495.97	--	10.42	--	485.55	
MW-371-125	9/9/2016	495.96	--	10.79	--	485.17	
MW-371-125	11/15/2016	495.97	--	11.40	--	484.57	
MW-371-125	2/8/2017	496.03	--	11.85	--	484.18	
MW-371-125	6/13/2017	496.00	--	11.10	--	484.90	
MW-372-15	3/22/2016	500.29	No LNAPL	15.94	0.00	484.35	
MW-372-15	7/27/2016	500.37	--	12.87	--	487.50	
MW-372-15	9/13/2016	500.37	--	14.33	--	486.04	
MW-372-15	10/18/2016	500.37	--	15.46	--	484.91	
MW-372-15	3/14/2017	500.37	--	15.35	--	485.02	
MW-372-15	7/10/2017	500.37	--	13.95	--	486.42	
MW-373-15	3/22/2016	500.61	No LNAPL	16.02	0.00	484.59	
MW-373-15	7/27/2016	500.70	--	12.87	--	487.83	
MW-373-15	9/13/2016	500.70	--	14.37	--	486.33	
MW-373-15	10/18/2016	500.70	--	15.52	--	485.18	
MW-373-15	3/14/2017	500.70	--	15.35	--	485.35	
North Gravel Pit	2/16/2012	492.81	--	9.00	--	483.81	
North Gravel Pit	3/20/2012	492.81	--	9.01	--	483.80	
North Gravel Pit	4/18/2012	492.81	--	8.45	--	484.36	
North Gravel Pit	7/31/2012	492.81	--	7.12	--	485.69	
North Gravel Pit	11/2/2012	492.81	--	8.58	--	484.23	
North Gravel Pit	1/24/2013	492.81	--	8.29	--	484.52	
North Gravel Pit	4/24/2013	492.81	--	8.65	--	484.16	
North Gravel Pit	8/1/2013	492.81	--	7.02	--	485.79	
North Gravel Pit	10/1/2013	492.81	--	8.51	--	484.30	
North Gravel Pit	1/9/2014	492.78	--	8.57	--	484.21	
North Gravel Pit	2/5/2014	492.76	--	8.66	--	484.10	
North Gravel Pit	3/18/2014	492.78	--	9.04	--	483.74	
North Gravel Pit	3/24/2014	492.78	--	9.03	--	483.75	
North Gravel Pit	4/18/2014	492.78	--	8.53	--	484.25	
North Gravel Pit	4/25/2014	492.78	--	8.20	--	484.58	
North Gravel Pit	5/15/2014	492.78	--	8.46	--	484.32	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
North Gravel Pit	5/20/2014	492.78	--	8.60	--	484.18	
North Gravel Pit	6/4/2014	492.78	--	8.80	--	483.98	
North Gravel Pit	6/11/2014	492.78	--	8.74	--	484.04	
North Gravel Pit	6/19/2014	492.78	--	8.47	--	484.31	
North Gravel Pit	7/15/2014	492.78	--	6.38	--	486.40	
North Gravel Pit	8/26/2014	492.78	--	7.14	--	485.64	
North Gravel Pit	9/9/2014	492.78	--	7.47	--	485.31	
North Gravel Pit	9/24/2014	492.78	--	7.76	--	485.02	
North Gravel Pit	10/21/2014	492.78	--	8.68	--	484.10	
North Gravel Pit	11/19/2014	492.78	No LNAPL	8.18	0.00	484.60	
North Gravel Pit	11/20/2014	492.78	No LNAPL	8.18	0.00	484.60	
North Gravel Pit	12/16/2014	492.78	--	8.43	--	484.35	
North Gravel Pit	12/29/2014	492.78	No LNAPL	8.57	0.00	484.21	
North Gravel Pit	1/21/2015	492.78	--	8.61	--	484.17	
North Gravel Pit	2/25/2015	492.78	--	8.66	--	484.12	
North Gravel Pit	3/18/2015	492.78	--	8.74	--	484.04	
North Gravel Pit	3/18/2015	492.78	--	8.73	--	484.05	
North Gravel Pit	3/26/2015	492.78	--	8.65	--	484.13	
North Gravel Pit	4/16/2015	492.78	--	8.52	--	484.26	
North Gravel Pit	5/21/2015	492.78	--	8.27	--	484.51	
North Gravel Pit	6/10/2015	492.78	--	8.23	--	484.55	
North Gravel Pit	8/13/2015	492.78	--	7.18	--	485.60	
North Gravel Pit	8/19/2015	492.78	--	7.47	--	485.31	
North Gravel Pit	10/6/2015	492.78	--	8.03	--	484.75	
North Gravel Pit	11/19/2015	492.78	--	8.48	--	484.30	
North Gravel Pit	1/19/2016	492.78	--	8.90	--	483.88	
North Gravel Pit	3/22/2016	492.78	No LNAPL	9.15	0.00	483.63	
North Gravel Pit	5/26/2016	492.78	--	8.55	--	484.23	
North Gravel Pit	9/9/2016	492.78	--	7.61	--	485.17	
North Gravel Pit	9/13/2016	492.78	--	7.76	--	485.02	
North Gravel Pit	11/15/2016	492.78	--	8.15	--	484.63	
North Gravel Pit	2/8/2017	492.78	--	8.59	--	484.19	
North Gravel Pit	2/15/2017	492.78	--	8.63	--	484.15	
North Gravel Pit	3/14/2017	492.78	--	8.78	--	484.00	DTW field measurement incorrectly recorded as 9.78 ft, confirmed with datalogger measurement.
North Gravel Pit	6/13/2017	492.78	--	8.20	--	484.58	
North Gravel Pit	9/21/2017	492.78	--	8.64	--	484.14	
O-1	5/6/2011	497.19	No LNAPL	Frozen	0.00	—	Frozen at 10.91 ft BTOC
O-1	5/16/2011	497.19	No LNAPL	Frozen	0.00	—	Frozen at 10.90 ft BTOC
O-1	5/24/2011	497.19	Sheen	10.00	Sheen	487.19	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-1	6/21/2011	497.19	No LNAPL	10.82	0.00	486.37	
O-1	7/15/2011	497.19	No LNAPL	10.08	0.00	487.11	
O-1	8/23/2011	497.19	No LNAPL	10.41	0.00	486.78	
O-1	9/22/2011	497.19	No LNAPL	11.59	0.00	485.60	
O-1	10/21/2011	497.19	No LNAPL	12.37	0.00	484.82	
O-1	12/2/2011	497.15	No LNAPL	12.05	0.00	485.10	
O-1	1/11/2012	497.15	No LNAPL	12.17	0.00	484.98	
O-1	2/7/2012	497.15	No LNAPL	Frozen	0.00	—	Frozen at 12.26 ft BTOC
O-1	2/16/2012	497.15	No LNAPL	Frozen	0.00	—	Frozen at 12.24 ft BTOC
O-1	3/13/2012	497.15	No LNAPL	Frozen	0.00	—	Frozen at 12.22 ft BTOC
O-1	4/10/2012	497.15	No LNAPL	Frozen	0.00	—	Frozen at 12.23 ft BTOC
O-1	4/19/2012	497.15	No LNAPL	Frozen	0.00	—	Frozen at 12.24 ft BTOC
O-1	5/9/2012	497.15	No LNAPL	8.45	0.00	488.70	Water at 8.45 feet, ice/bottom at 11.24 feet
O-1	6/12/2012	497.15	No LNAPL	9.89	0.00	487.26	
O-1	7/18/2012	497.15	No LNAPL	10.51	0.00	486.64	
O-1	7/30/2012	497.15	No LNAPL	10.11	0.00	487.04	
O-1	8/21/2012	497.15	No LNAPL	10.91	0.00	486.24	
O-1	9/18/2012	497.15	No LNAPL	11.62	0.00	485.53	
O-1	10/16/2012	497.15	No LNAPL	11.65	0.00	485.50	
O-1	11/1/2012	497.15	No LNAPL	11.62	0.00	485.53	
O-1	11/29/2012	497.14	No LNAPL	11.18	0.00	485.96	
O-1	12/27/2012	497.14	No LNAPL	11.50	0.00	485.64	
O-1	1/24/2013	497.14	No LNAPL	11.48	0.00	485.66	
O-1	2/26/2013	497.14	No LNAPL	Frozen	0.00	—	Frozen at 11.53 ft BTOC
O-1	3/28/2013	497.14	No LNAPL	Frozen	0.00	—	Frozen at 11.53 ft BTOC. R-35R, R-39, and R-40 were offline on this date
O-1	4/24/2013	497.14	No LNAPL	Frozen	0.00	—	Frozen at 11.53 ft BTOC
O-1	5/29/2013	497.14	No LNAPL	9.64	0.00	487.50	
O-1	6/25/2013	497.14	No LNAPL	10.46	0.00	486.68	
O-1	8/2/2013	497.14	No LNAPL	10.07	0.00	487.07	
O-1	10/1/2013	497.14	No LNAPL	11.54	0.00	485.60	
O-1	10/29/2013	497.14	No LNAPL	12.30	0.00	484.84	
O-1	11/19/2013	497.14	No LNAPL	11.80	0.00	485.34	
O-1	12/20/2013	497.14	No LNAPL	11.50	0.00	485.64	
O-1	10/15/2015	497.18	No LNAPL	11.28	0.00	485.90	
O-1	8/11/2016	497.18	--	9.35	--	487.83	
O-1	7/12/2017	497.18	--	10.08	--	487.10	
O-2	3/18/2011	496.84	12.30	12.85	0.55	484.44	
O-2	5/4/2011	496.84	11.52	11.95	0.43	485.24	
O-2	5/13/2011	496.84	12.31	12.82	0.51	484.43	
O-2	5/16/2011	496.84	12.46	12.92	0.46	484.29	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-2	5/24/2011	496.84	12.10	12.59	0.49	484.65	
O-2	6/21/2011	496.84	12.52	13.04	0.52	484.22	
O-2	7/15/2011	496.84	11.83	12.17	0.34	484.95	
O-2	8/23/2011	496.84	Sheen	11.43	Sheen	485.41	
O-2	9/22/2011	496.84	Sheen	12.51	Sheen	484.33	
O-2	10/21/2011	496.84	14.25	14.87	0.62	482.47	
O-2	12/7/2011	497.57	13.52	13.83	0.31	483.99	
O-2	2/17/2012	497.57	13.05	13.32	0.27	484.47	
O-2	3/14/2012	497.57	13.06	13.41	0.35	484.44	
O-2	4/12/2012	497.57	12.94	13.26	0.32	484.57	
O-2	4/19/2012	497.57	12.36	12.78	0.42	485.13	
O-2	5/7/2012	497.57	12.66	13.09	0.43	484.83	
O-2	6/13/2012	497.57	11.77	12.17	0.40	485.72	
O-2	7/17/2012	497.57	11.41	11.99	0.58	486.05	
O-2	7/30/2012	497.57	11.14	11.43	0.29	486.38	
O-2	8/21/2012	497.57	11.83	12.48	0.65	485.62	
O-2	9/18/2012	497.57	12.53	12.87	0.34	484.98	
O-2	10/15/2012	497.57	12.44	12.86	0.42	485.05	
O-2	11/1/2012	497.57	12.52	12.81	0.29	485.00	
O-2	11/29/2012	497.54	12.04	12.51	0.47	485.41	
O-2	12/28/2012	497.54	12.43	12.83	0.40	485.03	
O-2	1/24/2013	497.54	12.39	12.78	0.39	485.08	
O-2	2/26/2013	497.54	12.53	12.93	0.40	484.93	
O-2	3/29/2013	497.54	12.71	13.03	0.32	484.77	R-35R, R-39, and R-40 were offline on this date
O-2	4/24/2013	497.54	12.66	12.95	0.29	484.83	
O-2	5/21/2013	496.89	12.68	13.01	0.33	484.15	
O-2	6/24/2013	496.89	11.82	12.22	0.40	484.99	
O-2	7/23/2013	496.90	11.56	11.60	0.04	485.33	
O-2	8/1/2013	496.90	11.53	11.66	0.13	485.35	
O-2	8/21/2013	496.90	11.47	11.57	0.10	485.41	
O-2	9/24/2013	496.89	12.40	12.78	0.38	484.42	
O-2	9/30/2013	496.89	12.65	12.93	0.28	484.19	
O-2	10/22/2013	496.88	13.27	13.60	0.33	483.55	
O-2	11/26/2013	496.88	12.29	12.75	0.46	484.50	
O-2	12/18/2013	496.91	12.68	13.27	0.59	484.12	
O-2	1/9/2014	496.92	12.90	13.33	0.43	483.94	
O-2	2/5/2014	496.95	13.06	13.49	0.43	483.81	
O-2	3/18/2014	496.96	—	—	—	—	Well was inaccessible due to soil vapor extraction work
O-2	3/24/2014	496.96	13.33	13.75	0.42	483.55	
O-2	4/18/2014	496.96	13.25	13.62	0.37	483.64	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-2	5/15/2014	496.97	12.77	13.25	0.48	484.11	
O-2	6/11/2014	496.96	12.85	13.25	0.40	484.03	
O-2	6/19/2014	496.96	12.47	12.93	0.46	484.40	
O-2	7/15/2014	496.95	Sheen	10.87	Sheen	486.08	
O-2	8/26/2014	496.95	11.49	11.50	0.01	485.46	
O-2	9/9/2014	496.95	11.71	12.01	0.30	485.18	
O-2	9/24/2014	496.96	12.03	12.45	0.42	484.85	
O-2	10/16/2014	496.94	12.83	13.05	0.22	484.07	
O-2	10/21/2014	496.94	12.97	13.20	0.23	483.93	
O-2	11/19/2014	496.96	12.58	12.80	0.22	484.34	
O-2	12/16/2014	497.02	12.83	13.03	0.20	484.15	
O-2	12/29/2014	497.02	12.95	13.19	0.24	484.02	
O-2	1/21/2015	497.02	12.99	13.19	0.20	483.99	
O-2	2/25/2015	497.02	13.08	13.30	0.22	483.90	
O-2	3/10/2015	497.04	12.97	13.18	0.21	484.03	
O-2	3/18/2015	497.04	13.07	13.33	0.26	483.92	
O-2	3/26/2015	497.04	13.03	13.25	0.22	483.97	
O-2	4/16/2015	497.02	12.88	13.09	0.21	484.10	
O-2	5/21/2015	497.02	12.67	12.86	0.19	484.31	
O-2	6/10/2015	497.04	12.72	12.92	0.20	484.28	
O-2	8/12/2015	497.03	11.66	11.75	0.09	485.39	
O-2	8/19/2015	497.03	11.89	12.31	0.42	485.13	
O-2	10/6/2015	497.03	12.24	12.45	0.21	484.79	
O-2	10/15/2015	497.03	12.64	12.89	0.25	484.38	
O-2	11/19/2015	497.03	12.75	12.97	0.22	484.24	
O-2	1/19/2016	497.05	13.30	13.58	0.28	483.70	
O-2	3/4/2016	497.05	13.40	13.69	0.29	483.65	
O-2	5/26/2016	497.08	12.89	13.20	0.31	484.15	
O-2	8/17/2016	497.10	Sheen	11.29	Sheen	485.81	
O-2	9/9/2016	497.08	11.71	12.30	0.59	485.31	
O-2	10/13/2016	497.08	12.78	13.08	0.30	484.24	
O-2	10/15/2016	497.08	12.90	13.07	0.17	484.15	
O-2	10/22/2016	497.08	13.09	13.21	0.12	483.97	
O-2	10/25/2016	497.10	13.19	13.32	0.13	483.89	
O-2	10/28/2016	497.08	13.04	13.12	0.08	484.02	
O-2	11/5/2016	497.10	12.30	12.35	0.05	484.79	
O-2	11/15/2016	497.10	12.43	12.55	0.12	484.69	
O-2	2/8/2017	497.15	12.90	13.07	0.17	484.29	
O-2	2/15/2017	497.15	12.94	13.10	0.16	484.21	
O-2	3/1/2017	497.15	12.95	13.12	0.17	484.17	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-2	6/6/2017	497.15	12.95	13.21	0.26	484.15	
O-2	6/13/2017	497.15	12.28	12.30	0.02	484.93	
O-2	7/24/2017	497.15	Sheen	11.49	Sheen	485.66	
O-2	7/27/2017	497.15	No LNAPL	11.46	0.00	485.69	
O-2	8/29/2017	497.15	11.95	11.96	0.01	485.19	
O-2	9/20/2017	497.15	12.66	12.68	0.02	484.47	
O-2	10/25/2017	497.15	Sheen	13.17	Sheen	483.98	
O-2	11/1/2017	497.15	13.15	13.31	0.16	483.97	
O-3	3/18/2011	497.67	No LNAPL	13.28	0.00	484.39	
O-3	5/4/2011	497.67	No LNAPL	12.50	0.00	485.17	
O-3	5/16/2011	497.67	No LNAPL	13.39	0.00	484.28	
O-3	5/24/2011	497.67	No LNAPL	13.01	0.00	484.66	
O-3	6/21/2011	497.67	No LNAPL	13.74	0.00	483.93	
O-3	7/15/2011	497.67	No LNAPL	12.07	0.00	485.60	
O-3	8/23/2011	497.67	No LNAPL	12.40	0.00	485.27	
O-3	9/22/2011	497.67	No LNAPL	13.40	0.00	484.27	
O-3	10/21/2011	497.67	No LNAPL	14.09	0.00	483.58	
O-3	12/7/2011	497.74	No LNAPL	13.74	0.00	484.00	
O-3	1/10/2012	497.74	No LNAPL	14.01	0.00	483.73	
O-3	2/6/2012	497.74	No LNAPL	14.10	0.00	483.64	
O-3	2/16/2012	497.74	No LNAPL	14.03	0.00	483.71	
O-3	3/13/2012	497.74	No LNAPL	14.03	0.00	483.71	
O-3	4/10/2012	497.74	No LNAPL	13.93	0.00	483.81	
O-3	4/19/2012	497.74	No LNAPL	13.43	0.00	484.31	
O-3	5/8/2012	497.74	No LNAPL	13.65	0.00	484.09	
O-3	6/13/2012	497.74	No LNAPL	12.72	0.00	485.02	
O-3	7/17/2012	497.74	No LNAPL	12.45	0.00	485.29	
O-3	7/30/2012	497.74	No LNAPL	12.16	0.00	485.58	
O-3	8/21/2012	497.74	No LNAPL	12.87	0.00	484.87	
O-3	9/18/2012	497.74	No LNAPL	13.49	0.00	484.25	
O-3	10/16/2012	497.74	No LNAPL	13.50	0.00	484.24	
O-3	11/1/2012	497.74	No LNAPL	13.58	0.00	484.16	
O-3	11/29/2012	497.76	No LNAPL	13.08	0.00	484.68	
O-3	12/27/2012	497.76	No LNAPL	13.42	0.00	484.34	
O-3	1/23/2013	497.76	No LNAPL	13.38	0.00	484.38	
O-3	2/26/2013	497.76	No LNAPL	13.53	0.00	484.23	
O-3	3/29/2013	497.76	No LNAPL	13.68	0.00	484.08	R-35R, R-39, and R-40 were offline on this date
O-3	4/24/2013	497.76	No LNAPL	13.65	0.00	484.11	
O-3	5/20/2013	497.83	No LNAPL	13.31	0.00	484.52	
O-3	6/25/2013	497.83	No LNAPL	12.47	0.00	485.36	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-3	7/23/2013	497.83	--	12.16	--	485.67	
O-3	8/1/2013	497.83	--	12.15	--	485.68	
O-3	8/21/2013	497.83	No LNAPL	12.14	0.00	485.69	
O-3	9/30/2013	497.83	No LNAPL	13.29	0.00	484.54	
O-3	10/22/2013	497.82	No LNAPL	13.94	0.00	483.88	
O-3	11/26/2013	497.82	No LNAPL	13.27	0.00	484.55	
O-3	12/18/2013	497.84	No LNAPL	13.35	0.00	484.49	
O-3	1/9/2014	497.85	No LNAPL	13.63	0.00	484.22	
O-3	2/5/2014	497.86	No LNAPL	13.78	0.00	484.08	
O-3	3/18/2014	497.88	No LNAPL	14.01	0.00	483.87	
O-3	3/24/2014	497.88	No LNAPL	14.05	0.00	483.83	
O-3	4/18/2014	497.89	No LNAPL	13.86	0.00	484.03	
O-3	5/15/2014	497.89	--	13.44	--	484.45	
O-3	6/11/2014	497.87	No LNAPL	13.59	0.00	484.28	
O-3	6/19/2014	497.87	No LNAPL	13.26	0.00	484.61	
O-3	7/15/2014	497.89	No LNAPL	11.46	0.00	486.43	
O-3	8/26/2014	497.89	No LNAPL	12.09	0.00	485.80	
O-3	9/9/2014	497.89	No LNAPL	12.30	0.00	485.59	
O-3	9/24/2014	497.87	No LNAPL	12.66	0.00	485.21	
O-3	10/21/2014	497.87	No LNAPL	13.56	0.00	484.31	
O-3	11/19/2014	497.88	No LNAPL	13.25	0.00	484.63	
O-3	12/16/2014	497.92	No LNAPL	13.45	0.00	484.47	
O-3	12/29/2014	497.92	No LNAPL	13.58	0.00	484.34	
O-3	1/21/2015	497.94	No LNAPL	13.65	0.00	484.29	
O-3	2/25/2015	497.95	No LNAPL	13.78	0.00	484.17	
O-3	3/10/2015	497.96	No LNAPL	13.70	0.00	484.26	
O-3	3/18/2015	497.96	--	13.80	--	484.16	
O-3	3/26/2015	497.96	No LNAPL	13.72	0.00	484.24	
O-3	4/16/2015	497.96	--	13.57	--	484.39	
O-3	5/21/2015	497.96	No LNAPL	13.33	0.00	484.63	
O-3	6/10/2015	497.95	No LNAPL	13.36	0.00	484.59	
O-3	8/12/2015	497.95	No LNAPL	12.35	0.00	485.64	
O-3	8/19/2015	497.95	No LNAPL	12.59	0.00	485.39	
O-3	10/6/2015	497.96	No LNAPL	12.85	0.00	485.12	
O-3	10/15/2015	497.96	No LNAPL	13.26	0.00	484.70	
O-3	11/19/2015	497.96	--	13.44	--	484.52	
O-3	1/19/2016	497.97	--	13.94	--	483.99	
O-3	3/4/2016	497.97	No LNAPL	14.11	0.00	483.86	
O-3	5/26/2016	498.01	No LNAPL	13.61	0.00	484.42	
O-3	6/14/2016	498.01	No LNAPL	13.27	0.00	484.74	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-3	8/15/2016	498.00	--	11.83	--	486.17	
O-3	8/18/2016	498.01	No LNAPL	12.00	0.00	486.01	
O-3	9/9/2016	498.00	No LNAPL	12.47	0.00	485.57	
O-3	10/13/2016	498.00	No LNAPL	13.49	0.00	484.51	
O-3	11/15/2016	498.00	No LNAPL	13.15	0.00	484.95	
O-3	2/8/2017	498.07	No LNAPL	13.64	0.00	484.50	
O-3	3/1/2017	498.07	No LNAPL	13.70	0.00	484.37	
O-3	6/6/2017	498.07	No LNAPL	13.65	0.00	484.42	
O-3	6/13/2017	498.07	No LNAPL	12.94	0.00	485.18	
O-3	8/2/2017	498.07	--	12.32	--	485.75	
O-4	3/18/2011	496.48	No LNAPL	12.12	0.00	484.36	
O-4	5/6/2011	496.48	No LNAPL	11.46	0.00	485.02	
O-4	5/16/2011	496.48	No LNAPL	12.23	0.00	484.25	
O-4	5/24/2011	496.48	No LNAPL	11.93	0.00	484.55	
O-4	6/21/2011	496.48	No LNAPL	11.55	0.00	484.93	
O-4	7/14/2011	496.48	No LNAPL	10.77	0.00	485.71	
O-4	8/23/2011	496.48	No LNAPL	11.15	0.00	485.33	
O-4	9/22/2011	496.48	No LNAPL	10.15	0.00	486.33	
O-4	10/21/2011	496.48	No LNAPL	12.95	0.00	483.53	
O-4	12/2/2011	496.47	No LNAPL	12.63	0.00	483.84	
O-4	1/10/2012	496.47	No LNAPL	12.79	0.00	483.68	
O-4	2/6/2012	496.47	No LNAPL	12.88	0.00	483.59	
O-4	2/15/2012	496.47	No LNAPL	12.81	0.00	483.66	
O-4	3/13/2012	496.47	No LNAPL	12.79	0.00	483.68	
O-4	4/10/2012	496.47	No LNAPL	12.70	0.00	483.77	
O-4	4/19/2012	496.47	--	12.15	--	484.32	
O-4	5/8/2012	496.47	No LNAPL	12.50	0.00	483.97	
O-4	6/12/2012	496.47	No LNAPL	11.61	0.00	484.86	
O-4	7/17/2012	496.47	No LNAPL	11.20	0.00	485.27	
O-4	7/30/2012	496.47	No LNAPL	10.88	0.00	485.59	
O-4	8/21/2012	496.47	No LNAPL	11.63	0.00	484.84	
O-4	9/18/2012	496.47	No LNAPL	12.30	0.00	484.17	
O-4	10/16/2012	496.47	No LNAPL	12.30	0.00	484.17	
O-4	11/1/2012	496.47	No LNAPL	12.26	0.00	484.21	
O-4	11/29/2012	496.50	No LNAPL	11.83	0.00	484.67	
O-4	12/27/2012	496.50	No LNAPL	12.18	0.00	484.32	
O-4	1/23/2013	496.50	No LNAPL	12.16	0.00	484.34	
O-4	2/26/2013	496.50	No LNAPL	12.31	0.00	484.19	
O-4	3/28/2013	496.50	No LNAPL	12.46	0.00	484.04	R-35R, R-39, and R-40 were offline on this date
O-4	4/24/2013	496.50	No LNAPL	12.43	0.00	484.07	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-4	5/21/2013	496.54	No LNAPL	12.28	0.00	484.26	
O-4	6/25/2013	496.55	No LNAPL	11.38	0.00	485.17	
O-4	7/23/2013	496.54	--	11.10	--	485.44	
O-4	8/1/2013	496.54	--	11.03	--	485.51	
O-4	8/21/2013	496.54	No LNAPL	11.01	0.00	485.53	
O-4	10/1/2013	496.53	--	12.34	--	484.19	
O-4	10/29/2013	496.53	No LNAPL	13.05	0.00	483.48	
O-4	11/26/2013	496.53	No LNAPL	12.08	0.00	484.45	
O-4	12/18/2013	496.53	No LNAPL	12.26	0.00	484.27	
O-4	1/9/2014	496.54	--	12.52	--	484.02	
O-4	2/5/2014	496.54	--	12.64	--	483.90	
O-4	3/18/2014	496.55	--	12.88	--	483.67	
O-4	3/24/2014	496.55	--	12.91	--	483.64	
O-4	4/18/2014	496.57	--	12.74	--	483.83	
O-4	5/15/2014	496.56	--	12.33	--	484.23	
O-4	6/11/2014	496.57	--	12.47	--	484.10	
O-4	6/19/2014	496.57	--	12.16	--	484.41	
O-4	7/15/2014	496.54	No LNAPL	10.41	0.00	486.13	
O-4	8/26/2014	496.55	--	11.08	--	485.47	
O-4	9/9/2014	496.55	--	11.33	--	485.22	
O-4	9/24/2014	496.55	--	11.65	--	484.90	
O-4	10/21/2014	496.55	--	12.53	--	484.02	
O-4	11/19/2014	496.55	No LNAPL	12.17	0.00	484.38	
O-4	12/16/2014	496.54	--	12.39	--	484.15	
O-4	1/21/2015	496.54	--	12.55	--	483.99	
O-4	2/25/2015	496.55	--	12.62	--	483.93	
O-4	3/10/2015	496.57	No LNAPL	12.57	0.00	484.00	
O-4	3/18/2015	496.57	--	12.67	--	483.90	
O-4	3/26/2015	496.57	--	12.61	--	483.96	
O-4	4/16/2015	496.57	--	12.44	--	484.13	
O-4	5/18/2015	496.57	No LNAPL	12.19	0.00	484.38	
O-4	5/21/2015	496.57	--	12.18	--	484.39	
O-4	6/10/2015	496.55	--	12.25	--	484.30	
O-4	8/12/2015	496.56	No LNAPL	11.21	0.00	485.39	
O-4	8/19/2015	496.56	--	11.43	--	485.13	
O-4	10/6/2015	496.55	--	11.77	--	484.78	
O-4	10/15/2015	496.55	No LNAPL	12.23	0.00	484.32	
O-4	11/19/2015	496.55	--	12.31	--	484.24	
O-4	1/19/2016	496.55	--	12.83	--	483.72	
O-4	3/4/2016	496.55	No LNAPL	12.94	0.00	483.61	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-4	5/26/2016	496.56	--	12.42	--	484.14	
O-4	6/14/2016	496.56	No LNAPL	12.08	0.00	484.48	
O-4	8/4/2016	496.55	--	10.19	--	486.36	
O-4	8/18/2016	496.56	No LNAPL	10.83	0.00	485.73	
O-4	9/9/2016	496.55	--	11.38	--	485.17	
O-4	10/13/2016	496.55	No LNAPL	12.36	0.00	484.19	
O-4	10/14/2016	496.55	--	12.35	--	484.20	
O-4	11/15/2016	496.55	--	11.90	--	484.65	
O-4	2/8/2017	496.56	--	12.36	--	484.20	
O-4	2/15/2017	496.56	--	12.37	--	484.19	
O-4	3/1/2017	496.56	No LNAPL	12.45	0.00	484.11	
O-4	6/6/2017	496.57	No LNAPL	12.47	0.00	484.10	
O-4	6/13/2017	496.57	--	11.70	--	484.87	
O-4	7/14/2017	496.57	--	10.88	--	485.69	
O-4	11/1/2017	496.58	No LNAPL	12.74	0.00	483.84	
O-5	10/21/2011	—	No LNAPL	12.41	0.00	—	New well
O-5	12/2/2011	496.05	No LNAPL	12.11	0.00	483.94	
O-5	2/6/2012	496.05	No LNAPL	12.42	0.00	483.63	
O-5	2/15/2012	496.05	No LNAPL	12.34	0.00	483.71	
O-5	3/13/2012	496.05	No LNAPL	12.33	0.00	483.72	
O-5	4/10/2012	496.05	No LNAPL	12.25	0.00	483.80	
O-5	4/19/2012	496.05	--	11.69	--	484.36	
O-5	5/8/2012	496.05	No LNAPL	12.04	0.00	484.01	
O-5	6/12/2012	496.05	No LNAPL	11.14	0.00	484.91	
O-5	7/17/2012	496.05	No LNAPL	10.72	0.00	485.33	
O-5	7/30/2012	496.05	No LNAPL	10.40	0.00	485.65	
O-5	8/21/2012	496.05	No LNAPL	11.17	0.00	484.88	
O-5	9/18/2012	496.05	No LNAPL	11.84	0.00	484.21	
O-5	10/16/2012	496.05	No LNAPL	11.84	0.00	484.21	
O-5	11/1/2012	496.05	No LNAPL	11.85	0.00	484.20	
O-5	11/29/2012	496.11	No LNAPL	11.36	0.00	484.75	
O-5	12/27/2012	496.11	No LNAPL	11.74	0.00	484.37	
O-5	1/23/2013	496.11	No LNAPL	11.72	0.00	484.39	
O-5	2/26/2013	496.11	No LNAPL	11.88	0.00	484.23	
O-5	3/28/2013	496.11	No LNAPL	12.03	0.00	484.08	R-35R, R-39, and R-40 were offline on this date
O-5	4/24/2013	496.11	No LNAPL	12.00	0.00	484.11	
O-5	5/21/2013	496.21	No LNAPL	11.84	0.00	484.37	
O-5	6/25/2013	496.21	No LNAPL	10.93	0.00	485.28	
O-5	7/23/2013	496.21	--	10.64	--	485.57	
O-5	7/25/2013	496.21	--	10.68	--	485.53	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-5	8/1/2013	496.21	--	10.57	--	485.64	
O-5	8/21/2013	496.21	No LNAPL	10.53	0.00	485.68	
O-5	10/1/2013	496.19	--	11.87	--	484.32	
O-5	10/22/2013	496.20	No LNAPL	12.42	0.00	483.78	
O-5	11/26/2013	496.20	No LNAPL	11.60	0.00	484.60	
O-5	12/18/2013	496.22	No LNAPL	11.79	0.00	484.43	
O-5	1/9/2014	496.23	--	12.68	--	483.55	
O-5	2/5/2014	496.22	--	12.23	--	483.99	
O-5	3/18/2014	496.25	--	12.44	--	483.81	
O-5	3/24/2014	496.25	--	12.47	--	483.78	
O-5	4/18/2014	496.27	--	12.35	--	483.92	
O-5	5/15/2014	496.25	--	11.91	--	484.34	
O-5	6/11/2014	496.01	--	12.04	--	483.97	
O-5	6/19/2014	496.01	--	11.70	--	484.31	
O-5	7/15/2014	495.98	--	9.70	--	486.28	
O-5	8/26/2014	496.00	--	10.39	--	485.61	
O-5	9/9/2014	496.00	--	10.66	--	485.34	
O-5	9/24/2014	495.98	--	10.96	--	485.02	
O-5	10/21/2014	495.98	--	11.90	--	484.08	
O-5	11/19/2014	495.98	No LNAPL	11.51	0.00	484.47	
O-5	12/16/2014	496.04	--	11.74	--	484.30	
O-5	1/21/2015	496.06	--	11.96	--	484.10	
O-5	2/25/2015	496.07	--	12.04	--	484.03	
O-5	3/10/2015	496.08	No LNAPL	11.98	0.00	484.10	
O-5	3/18/2015	496.08	--	12.09	--	483.99	
O-5	3/26/2015	496.08	--	12.02	--	484.06	
O-5	4/16/2015	496.09	--	11.84	--	484.25	
O-5	5/21/2015	496.09	--	11.60	--	484.49	
O-5	6/10/2015	496.07	--	11.67	--	484.40	
O-5	8/12/2015	496.08	--	10.55	--	485.53	
O-5	8/19/2015	496.08	--	10.83	--	485.25	
O-5	10/6/2015	496.07	--	11.20	--	484.87	
O-5	10/15/2015	496.07	No LNAPL	11.64	0.00	484.43	
O-5	11/19/2015	496.07	--	11.71	--	484.36	
O-5	1/19/2016	496.10	--	12.25	--	483.85	
O-5	3/4/2016	496.10	No LNAPL	12.42	0.00	483.68	
O-5	5/26/2016	496.13	--	11.89	--	484.24	
O-5	8/4/2016	495.69	--	9.18	--	486.51	
O-5	9/9/2016	495.66	--	10.29	--	485.37	
O-5	10/13/2016	495.66	No LNAPL	11.35	0.00	484.31	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-5	10/14/2016	495.69	--	11.35	--	484.34	
O-5	11/15/2016	495.69	--	10.90	--	484.79	
O-5	2/8/2017	495.75	--	11.37	--	484.38	
O-5	2/15/2017	495.75	--	11.40	--	484.35	
O-5	3/1/2017	495.75	No LNAPL	11.50	0.00	484.25	
O-5	6/13/2017	495.76	--	10.73	--	485.03	
O-5	11/3/2017	495.77	No LNAPL	11.81	0.00	483.96	
O-5-65	7/25/2013	495.67	--	10.01	--	485.66	
O-5-65	8/1/2013	495.67	--	9.88	--	485.79	
O-5-65	8/21/2013	495.67	No LNAPL	9.85	0.00	485.82	
O-5-65	1/9/2014	495.69	--	11.89	--	483.80	
O-5-65	2/5/2014	495.67	--	11.56	--	484.11	
O-5-65	3/24/2014	495.71	--	11.82	--	483.89	
O-5-65	4/18/2014	495.70	--	11.65	--	484.05	
O-5-65	5/15/2014	495.68	--	11.21	--	484.47	
O-5-65	6/19/2014	495.67	--	11.02	--	484.65	
O-5-65	7/15/2014	495.66	--	9.22	--	486.44	
O-5-65	8/26/2014	495.68	--	9.93	--	485.75	
O-5-65	9/24/2014	495.65	--	10.54	--	485.11	
O-5-65	10/21/2014	495.65	--	11.46	--	484.19	
O-5-65	11/19/2014	495.65	--	11.03	--	484.62	
O-5-65	12/16/2014	495.68	--	11.25	--	484.43	
O-5-65	1/21/2015	495.69	--	11.45	--	484.24	
O-5-65	2/25/2015	495.69	--	11.53	--	484.16	
O-5-65	3/18/2015	495.70	--	11.59	--	484.11	
O-5-65	3/26/2015	495.70	--	11.50	--	484.20	
O-5-65	4/16/2015	495.70	--	11.35	--	484.35	
O-5-65	5/21/2015	495.68	--	11.06	--	484.62	
O-5-65	6/10/2015	495.65	--	11.10	--	484.55	
O-5-65	8/19/2015	495.66	--	10.28	--	485.38	
O-5-65	10/6/2015	495.65	--	10.65	--	485.00	
O-5-65	1/19/2016	495.66	--	11.68	--	483.98	
O-5-65	5/26/2016	495.67	--	11.24	--	484.43	
O-5-65	8/4/2016	495.67	--	9.03	--	486.64	
O-5-65	9/9/2016	495.67	--	10.18	--	485.49	
O-5-65	10/18/2016	495.67	--	11.39	--	484.28	
O-5-65	11/15/2016	495.67	--	10.76	--	484.91	
O-5-65	2/8/2017	495.68	--	11.20	--	484.48	
O-5-65	6/13/2017	495.66	--	10.50	--	485.16	
O-6	10/21/2011	—	No LNAPL	10.64	0.00	—	New well

Appendix A-1
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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-6	12/2/2011	494.52	No LNAPL	10.34	0.00	484.18	
O-6	2/6/2012	494.52	No LNAPL	10.73	0.00	483.79	
O-6	2/15/2012	494.52	No LNAPL	10.68	0.00	483.84	
O-6	3/13/2012	494.52	No LNAPL	10.70	0.00	483.82	
O-6	4/10/2012	494.52	No LNAPL	10.61	0.00	483.91	
O-6	4/19/2012	494.52	--	10.05	--	484.47	
O-6	5/8/2012	494.52	No LNAPL	10.42	0.00	484.10	
O-6	6/12/2012	494.52	No LNAPL	9.49	0.00	485.03	
O-6	7/17/2012	494.52	No LNAPL	9.07	0.00	485.45	
O-6	7/30/2012	494.52	No LNAPL	8.74	0.00	485.78	
O-6	8/21/2012	494.52	No LNAPL	9.50	0.00	485.02	
O-6	9/18/2012	494.52	No LNAPL	10.20	0.00	484.32	
O-6	10/16/2012	494.52	No LNAPL	10.20	0.00	484.32	
O-6	11/1/2012	494.52	No LNAPL	10.17	0.00	484.35	
O-6	11/29/2012	494.73	No LNAPL	9.79	0.00	484.94	
O-6	12/27/2012	494.73	No LNAPL	10.25	0.00	484.48	
O-6	1/23/2013	494.73	No LNAPL	10.28	0.00	484.45	
O-6	2/26/2013	494.73	No LNAPL	10.44	0.00	484.29	
O-6	3/28/2013	494.73	No LNAPL	10.61	0.00	484.12	R-35R, R-39, and R-40 were offline on this date
O-6	4/24/2013	494.73	No LNAPL	10.59	0.00	484.14	
O-6	5/29/2013	495.04	No LNAPL	9.49	0.00	485.55	
O-6	6/25/2013	495.04	No LNAPL	9.42	0.00	485.62	
O-6	7/23/2013	495.05	--	9.12	--	485.93	
O-6	8/1/2013	495.05	--	9.02	--	486.03	
O-6	8/21/2013	495.05	No LNAPL	8.99	0.00	486.06	
O-6	10/1/2013	495.02	--	10.42	--	484.60	
O-6	10/22/2013	495.03	No LNAPL	10.95	0.00	484.08	
O-6	11/26/2013	495.03	No LNAPL	10.22	0.00	484.81	
O-6	12/18/2013	495.06	No LNAPL	10.31	0.00	484.75	
O-6	1/9/2014	495.06	--	10.42	--	484.64	
O-6	2/5/2014	495.14	--	10.81	--	484.33	
O-6	3/18/2014	495.24	--	11.15	--	484.09	
O-6	3/24/2014	495.24	--	11.18	--	484.06	
O-6	4/18/2014	495.24	--	10.99	--	484.25	
O-6	5/15/2014	495.25	--	10.59	--	484.66	
O-6	6/11/2014	495.20	--	10.74	--	484.46	
O-6	6/20/2014	495.20	--	10.01	--	485.19	
O-6	7/15/2014	495.18	--	8.54	--	486.64	
O-6	8/26/2014	495.20	--	9.26	--	485.94	
O-6	9/9/2014	495.20	--	9.57	--	485.63	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-6	9/24/2014	495.19	--	9.87	--	485.32	
O-6	10/21/2014	494.80	--	10.43	--	484.37	
O-6	11/19/2014	494.81	No LNAPL	10.00	0.00	484.81	
O-6	12/16/2014	494.84	--	10.24	--	484.60	
O-6	1/21/2015	494.96	--	10.53	--	484.43	
O-6	2/25/2015	495.07	--	10.72	--	484.35	
O-6	3/10/2015	495.10	No LNAPL	10.68	0.00	484.42	
O-6	3/18/2015	495.10	--	10.80	--	484.30	
O-6	3/26/2015	495.10	--	10.74	--	484.36	
O-6	4/16/2015	495.14	--	10.57	--	484.57	
O-6	5/21/2015	495.14	--	10.29	--	484.85	
O-6	6/10/2015	495.12	--	10.34	--	484.78	
O-6	8/12/2015	495.13	--	9.25	--	485.88	
O-6	8/19/2015	495.13	--	9.52	--	485.61	
O-6	10/6/2015	495.14	--	9.91	--	485.23	
O-6	10/15/2015	495.14	No LNAPL	10.37	0.00	484.77	
O-6	11/19/2015	495.14	--	10.43	--	484.71	
O-6	1/19/2016	495.12	--	10.96	--	484.16	
O-6	5/26/2016	495.22	--	10.62	--	484.60	
O-6	8/8/2016	494.74	--	8.07	--	486.67	
O-6	9/9/2016	494.75	--	9.02	--	485.73	
O-6	10/18/2016	494.74	--	10.24	--	484.50	
O-6	11/15/2016	494.74	--	9.60	--	485.14	
O-6	2/8/2017	494.97	--	10.30	--	484.67	
O-6	2/15/2017	494.97	--	10.33	--	484.64	
O-6	6/13/2017	495.04	--	9.68	--	485.36	
O-7	10/21/2011	—	11.67	12.14	0.47	—	
O-7	12/7/2011	495.95	11.18	12.14	0.96	484.57	
O-7	2/17/2012	495.95	11.37	12.91	1.54	484.25	
O-7	3/15/2012	495.95	11.39	12.97	1.58	484.23	
O-7	4/12/2012	495.95	11.30	12.64	1.34	484.37	
O-7	5/7/2012	495.95	11.22	11.69	0.47	484.63	
O-7	5/15/2012	495.95	11.47	11.96	0.49	484.38	Initial levels of May 2012 baildown test
O-7	6/12/2012	495.95	Sheen	10.53	Sheen	485.42	
O-7	7/17/2012	495.95	Sheen	10.10	Sheen	485.85	
O-7	8/21/2012	495.95	Sheen	10.54	Sheen	485.41	
O-7	9/18/2012	495.95	11.16	11.20	0.04	484.78	
O-7	10/15/2012	495.95	11.13	11.14	0.01	484.82	
O-7	11/29/2012	496.01	Sheen	10.85	Sheen	485.16	
O-7	12/28/2012	496.01	11.19	11.20	0.01	484.82	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-7	2/26/2013	496.01	11.27	11.28	0.01	484.74	
O-7	3/28/2013	496.01	11.36	11.38	0.02	484.65	R-35R, R-39, and R-40 were offline on this date
O-7	4/24/2013	496.01	11.37	11.38	0.01	484.64	
O-7	5/31/2013	496.01	Sheen	10.15	Sheen	485.86	
O-7	6/24/2013	496.01	No LNAPL	10.21	0.00	485.80	
O-7	7/23/2013	496.01	No LNAPL	10.02	0.00	485.99	
O-7	8/21/2013	496.01	No LNAPL	9.94	0.00	486.07	
O-7	9/24/2013	496.01	Sheen	10.81	Sheen	485.20	
O-7	10/29/2013	496.01	11.87	11.90	0.03	484.13	
O-7	11/19/2013	496.01	11.22	11.69	0.47	484.69	
O-7	12/20/2013	496.01	11.19	11.21	0.02	484.82	
O-7	1/14/2014	496.01	No LNAPL	11.47	0.00	484.54	
O-7	2/25/2014	496.01	11.81	11.87	0.06	484.19	
O-7	3/24/2014	496.01	11.89	11.93	0.04	484.11	
O-7	4/14/2014	496.21	11.89	11.98	0.09	484.30	
O-7	5/16/2014	496.21	Sheen	11.23	Sheen	484.98	
O-7	6/20/2014	496.21	Sheen	10.81	Sheen	485.40	
O-7	7/19/2014	496.21	No LNAPL	9.59	0.00	486.62	
O-7	8/28/2014	496.21	No LNAPL	9.85	0.00	486.36	
O-7	9/29/2014	496.21	Sheen	10.66	Sheen	485.55	
O-7	10/16/2014	496.21	Sheen	11.21	Sheen	485.00	
O-7	3/10/2015	496.21	Sheen	11.47	Sheen	484.74	
O-7	10/15/2015	496.33	No LNAPL	11.07	0.00	485.30	
O-7	6/14/2016	496.33	Sheen	11.08	Sheen	485.25	
O-7	8/18/2016	496.33	No LNAPL	9.76	0.00	486.57	
O-7	11/1/2017	496.48	11.86	11.88	0.02	484.62	
O-8	10/21/2011	—	No LNAPL	11.96	0.00	—	New well
O-8	12/2/2011	496.71	No LNAPL	11.67	0.00	485.04	
O-8	2/7/2012	496.71	No LNAPL	11.88	0.00	484.83	
O-8	2/16/2012	496.71	No LNAPL	11.82	0.00	484.89	
O-8	3/13/2012	496.71	No LNAPL	11.79	0.00	484.92	
O-8	4/10/2012	496.71	No LNAPL	11.38	0.00	485.33	
O-8	4/19/2012	496.71	No LNAPL	11.10	0.00	485.61	
O-8	5/9/2012	496.71	No LNAPL	11.48	0.00	485.23	
O-8	6/12/2012	496.71	No LNAPL	10.53	0.00	486.18	
O-8	7/18/2012	496.71	No LNAPL	10.16	0.00	486.55	
O-8	7/30/2012	496.71	No LNAPL	9.77	0.00	486.94	
O-8	8/21/2012	496.71	No LNAPL	10.56	0.00	486.15	
O-8	9/18/2012	496.71	No LNAPL	11.24	0.00	485.47	
O-8	10/16/2012	496.71	No LNAPL	11.26	0.00	485.45	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-8	11/1/2012	496.71	No LNAPL	11.26	0.00	485.45	
O-8	11/29/2012	496.72	No LNAPL	10.77	0.00	485.95	
O-8	12/27/2012	496.72	No LNAPL	11.14	0.00	485.58	
O-8	1/24/2013	496.72	No LNAPL	11.11	0.00	485.61	
O-8	2/26/2013	496.72	No LNAPL	11.25	0.00	485.47	
O-8	3/28/2013	496.72	No LNAPL	11.41	0.00	485.31	R-35R, R-39, and R-40 were offline on this date
O-8	4/24/2013	496.72	No LNAPL	11.38	0.00	485.34	
O-8	5/29/2013	496.72	No LNAPL	10.27	0.00	486.45	
O-8	6/25/2013	496.72	No LNAPL	10.14	0.00	486.58	
O-8	8/2/2013	496.72	No LNAPL	9.74	0.00	486.98	
O-8	10/1/2013	496.72	No LNAPL	11.14	0.00	485.58	
O-8	10/29/2013	496.72	No LNAPL	11.91	0.00	484.81	
O-8	11/19/2013	496.72	No LNAPL	11.26	0.00	485.46	
O-8	12/20/2013	496.72	No LNAPL	11.12	0.00	485.60	
O-8	3/18/2014	496.72	No LNAPL	11.77	0.00	484.95	
O-8	6/11/2014	496.76	No LNAPL	11.33	0.00	485.43	
O-8	9/9/2014	496.76	No LNAPL	10.00	0.00	486.76	
O-8	11/20/2014	496.76	No LNAPL	10.84	0.00	485.92	
O-8	3/19/2015	496.76	--	11.32	--	485.44	
O-8	6/11/2015	496.76	No LNAPL	10.91	0.00	485.85	
O-8	8/12/2015	496.76	--	9.75	--	487.01	
O-8	10/15/2015	496.76	No LNAPL	10.87	0.00	485.89	
O-8	11/19/2015	496.76	--	10.98	--	485.78	
O-8	10/13/2016	496.76	No LNAPL	10.99	0.00	485.77	
O-8	3/1/2017	496.76	No LNAPL	11.03	0.00	485.73	
O-9	10/21/2011	—	12.10	13.44	1.34	—	
O-9	12/7/2011	496.89	—	—	—	—	Unable to open
O-9	2/17/2012	496.89	11.90	13.91	2.01	484.63	
O-9	3/15/2012	496.89	11.91	14.05	2.14	484.60	
O-9	4/12/2012	496.89	11.57	13.68	2.11	484.94	
O-9	5/7/2012	496.89	11.66	13.01	1.35	484.99	
O-9	5/15/2012	496.89	11.85	13.42	1.57	484.76	Initial levels of first May 2012 baildown test
O-9	5/16/2012	496.89	12.02	12.81	0.79	484.73	Initial levels of second May 2012 baildown test
O-9	6/12/2012	496.89	Sheen	11.06	Sheen	485.83	
O-9	7/17/2012	496.89	Sheen	10.63	Sheen	486.26	
O-9	8/21/2012	496.89	Sheen	11.08	Sheen	485.81	
O-9	9/18/2012	496.89	11.71	11.85	0.14	485.15	
O-9	10/15/2012	496.89	11.69	11.78	0.09	485.18	
O-9	11/29/2012	496.95	Sheen	11.37	Sheen	485.58	
O-9	12/28/2012	496.95	11.74	11.76	0.02	485.21	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-9	2/26/2013	496.95	11.85	11.87	0.02	485.10	
O-9	3/28/2013	496.95	11.91	12.25	0.34	484.98	R-35R, R-39, and R-40 were offline on this date
O-9	4/24/2013	496.95	11.85	12.46	0.61	484.99	
O-9	5/31/2013	496.95	No LNAPL	10.68	0.00	486.27	
O-9	6/24/2013	496.95	No LNAPL	10.76	0.00	486.19	
O-9	7/23/2013	496.95	No LNAPL	10.52	0.00	486.43	
O-9	8/21/2013	496.95	Sheen	10.44	Sheen	486.51	
O-9	9/25/2013	496.95	11.40	11.42	0.02	485.55	
O-9	10/29/2013	496.95	12.31	13.19	0.88	484.48	
O-9	11/19/2013	496.95	11.69	12.70	1.01	485.08	
O-9	12/20/2013	496.95	11.69	12.12	0.43	485.18	
O-9	1/14/2014	496.95	11.92	12.71	0.79	484.89	
O-9	2/25/2014	496.95	12.20	13.33	1.13	484.55	
O-9	3/24/2014	496.95	12.34	13.11	0.77	484.47	
O-9	4/14/2014	497.16	12.27	13.53	1.26	484.66	
O-9	5/16/2014	497.16	11.70	12.20	0.50	485.37	
O-9	6/20/2014	497.16	11.35	11.36	0.01	485.81	
O-9	7/19/2014	497.16	Sheen	10.15	Sheen	487.01	
O-9	8/28/2014	497.16	10.41	10.47	0.06	486.74	
O-9	9/29/2014	497.16	11.22	11.36	0.14	485.91	
O-9	10/16/2014	497.16	11.78	11.94	0.16	485.35	
O-9	3/10/2015	497.16	11.97	12.27	0.30	485.14	
O-9	5/18/2015	497.16	11.66	11.75	0.09	485.48	
O-9	8/12/2015	497.28	Sheen	10.64	Sheen	486.68	
O-9	10/15/2015	497.28	11.67	11.68	0.01	485.65	
O-9	3/4/2016	497.28	12.47	12.87	0.40	484.79	
O-9	10/13/2016	497.36	11.87	11.88	0.01	485.49	
O-9	3/1/2017	497.36	12.06	12.08	0.02	485.30	
O-10	10/21/2011	—	11.56	11.94	0.38	—	
O-10	12/7/2011	496.21	11.05	12.02	0.97	484.99	
O-10	2/17/2012	496.21	11.39	12.70	1.31	484.59	
O-10	3/15/2012	496.21	11.42	12.83	1.41	484.54	
O-10	4/12/2012	496.21	11.26	12.87	1.61	484.66	
O-10	5/7/2012	496.21	11.04	12.64	1.60	484.88	
O-10	5/11/2012	496.21	11.20	12.61	1.41	484.76	Initial levels of first May 2012 baildown test
O-10	5/14/2012	496.21	11.32	12.62	1.30	484.66	Initial levels of second May 2012 baildown test
O-10	6/12/2012	496.21	10.03	12.33	2.30	485.77	
O-10	7/18/2012	496.21	9.88	10.88	1.00	486.15	
O-10	8/21/2012	496.21	10.39	10.69	0.30	485.77	
O-10	9/18/2012	496.21	11.00	11.73	0.73	485.08	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-10	10/15/2012	496.21	10.97	11.68	0.71	485.11	
O-10	10/22/2012	496.21	11.15	12.40	1.25	484.84	Initial levels of first October 2012 baildown test
O-10	10/24/2012	496.21	11.33	12.26	0.93	484.71	Initial levels of second October 2012 baildown test
O-10	11/29/2012	496.36	10.62	11.51	0.89	485.58	
O-10	12/28/2012	496.36	11.04	12.00	0.96	485.15	
O-10	2/26/2013	496.36	11.09	12.48	1.39	485.02	
O-10	3/28/2013	496.36	11.20	12.74	1.54	484.88	R-35R, R-39, and R-40 were offline on this date
O-10	4/24/2013	496.36	11.20	12.71	1.51	484.89	
O-10	5/31/2013	496.36	10.03	10.91	0.88	486.17	
O-10	6/24/2013	496.36	10.18	10.76	0.58	486.08	
O-10	7/23/2013	496.36	10.03	10.04	0.01	486.33	
O-10	8/21/2013	496.36	Sheen	9.87	Sheen	486.49	
O-10	9/25/2013	496.36	10.94	11.03	0.09	485.40	
O-10	10/29/2013	496.36	12.00	12.04	0.04	484.35	
O-10	11/19/2013	496.36	Sheen	11.36	Sheen	485.00	
O-10	12/20/2013	496.36	11.24	11.34	0.10	485.10	
O-10	1/14/2014	496.36	11.55	11.68	0.13	484.79	
O-10	2/24/2014	496.36	11.92	12.07	0.15	484.41	
O-10	3/24/2014	496.36	12.03	12.16	0.13	484.31	
O-10	4/14/2014	496.78	11.93	12.92	0.99	484.67	
O-10	5/16/2014	496.78	11.37	11.57	0.20	485.37	
O-10	6/20/2014	496.78	10.77	11.47	0.70	485.88	
O-10	7/19/2014	496.78	9.27	10.12	0.85	487.36	
O-10	8/28/2014	496.78	9.85	10.80	0.95	486.76	
O-10	9/29/2014	496.78	10.78	11.10	0.32	485.94	
O-10	10/16/2014	496.61	11.40	11.48	0.08	485.20	
O-10	3/10/2015	496.61	11.55	11.58	0.03	485.05	
O-10	5/18/2015	496.61	11.18	11.31	0.13	485.41	
O-10	8/12/2015	496.75	10.07	10.16	0.09	486.70	
O-10	10/15/2015	496.75	11.08	11.48	0.40	485.64	
O-10	3/4/2016	496.75	11.67	12.64	0.97	484.96	
O-10	6/14/2016	496.75	10.89	11.23	0.34	485.80	
O-10	7/2/2016	496.75	10.44	10.70	0.26	486.26	
O-10	7/9/2016	496.75	9.92	10.13	0.21	486.79	
O-10	8/18/2016	496.75	9.52	10.06	0.54	487.13	
O-10	9/10/2016	496.70	10.10	10.71	0.61	486.49	
O-10	9/17/2016	496.70	10.25	10.55	0.30	486.40	
O-10	9/24/2016	496.70	10.50	10.65	0.15	486.17	
O-10	9/30/2016	496.70	10.80	10.83	0.03	485.89	
O-10	10/8/2016	496.70	11.00	11.02	0.02	485.70	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-10	10/13/2016	496.70	11.20	11.23	0.03	485.49	
O-10	10/15/2016	496.70	11.34	11.37	0.03	485.35	
O-10	10/22/2016	496.70	11.51	11.55	0.04	485.18	
O-10	10/28/2016	496.70	No LNAPL	11.45	0.00	485.25	
O-10	11/5/2016	496.70	No LNAPL	10.65	0.00	486.05	
O-10	3/1/2017	496.70	11.48	11.51	0.03	485.21	
O-10	6/6/2017	496.70	11.40	11.44	0.04	485.29	
O-11	10/21/2011	—	14.25	14.87	0.62	—	
O-11	12/7/2011	497.86	13.89	14.71	0.82	483.83	
O-11	2/17/2012	497.86	14.18	14.43	0.25	483.64	
O-11	3/14/2012	497.86	14.24	14.25	0.01	483.62	
O-11	4/12/2012	497.86	14.11	14.12	0.01	483.75	
O-11	5/7/2012	497.86	13.68	14.81	1.13	483.99	
O-11	5/11/2012	497.86	11.82	12.29	0.47	485.96	Initial levels of first May 2012 baildown test
O-11	5/31/2012	497.86	13.30	13.93	0.63	484.45	Initial levels of second May 2012 baildown test
O-11	6/13/2012	497.86	Sheen	12.97	Sheen	484.89	
O-11	7/17/2012	497.86	12.65	12.66	0.01	485.21	
O-11	8/21/2012	497.86	13.07	13.10	0.03	484.78	
O-11	9/18/2012	497.86	13.67	14.01	0.34	484.13	
O-11	10/15/2012	497.86	13.52	14.45	0.93	484.18	
O-11	10/23/2012	497.86	13.82	14.81	0.99	483.87	Initial levels of October 2012 baildown test
O-11	11/29/2012	497.87	13.18	13.62	0.44	484.62	
O-11	12/28/2012	497.87	13.45	14.34	0.89	484.27	
O-11	2/26/2013	497.87	13.54	14.41	0.87	484.18	
O-11	3/29/2013	497.87	13.71	14.48	0.77	484.03	R-35R, R-39, and R-40 were offline on this date
O-11	4/24/2013	497.87	13.63	14.56	0.93	484.08	
O-11	5/21/2013	497.89	13.45	14.59	1.14	484.25	
O-11	6/24/2013	497.89	12.77	12.82	0.05	485.11	
O-11	7/23/2013	497.90	No LNAPL	12.52	0.00	485.38	
O-11	8/1/2013	497.90	12.45	12.46	0.01	485.45	
O-11	8/21/2013	497.90	Sheen	12.41	Sheen	485.49	
O-11	9/24/2013	497.90	13.33	13.71	0.38	484.51	
O-11	10/22/2013	497.88	14.10	15.08	0.98	483.61	
O-11	11/26/2013	497.88	13.36	14.04	0.68	484.40	
O-11	12/18/2013	497.89	13.51	14.36	0.85	484.24	
O-11	1/9/2014	497.89	13.77	14.45	0.68	484.00	
O-11	2/5/2014	497.90	13.92	14.55	0.63	483.87	
O-11	3/24/2014	497.89	14.27	14.33	0.06	483.61	
O-11	4/18/2014	497.90	14.11	14.19	0.08	483.78	
O-11	5/15/2014	497.90	13.55	14.32	0.77	484.22	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-11	6/19/2014	497.90	13.42	13.84	0.42	484.41	
O-11	7/15/2014	497.89	Sheen	11.73	Sheen	486.16	
O-11	8/26/2014	497.88	12.40	12.41	0.01	485.48	
O-11	9/24/2014	497.90	13.00	13.02	0.02	484.90	
O-11	10/16/2014	497.87	13.74	13.86	0.12	484.11	
O-11	10/21/2014	497.87	13.89	14.02	0.13	483.96	
O-11	11/19/2014	497.88	13.49	13.66	0.17	484.36	
O-11	12/16/2014	497.89	13.64	14.22	0.58	484.15	
O-11	12/29/2014	497.89	13.74	14.40	0.66	484.04	
O-11	1/21/2015	497.88	13.77	14.51	0.74	483.98	
O-11	2/25/2015	497.88	13.95	14.19	0.24	483.89	
O-11	3/10/2015	497.89	13.79	14.30	0.51	484.01	
O-11	3/18/2015	497.89	13.96	14.14	0.18	483.90	
O-11	3/26/2015	497.89	13.87	14.29	0.42	483.95	
O-11	4/16/2015	497.88	13.72	14.28	0.56	484.06	
O-11	5/21/2015	497.90	13.52	13.73	0.21	484.34	
O-11	6/10/2015	497.92	13.58	13.68	0.10	484.32	
O-11	8/12/2015	497.92	No LNAPL	12.54	0.00	485.42	
O-11	8/19/2015	497.92	12.82	12.83	0.01	485.17	
O-11	10/6/2015	497.90	Sheen	13.14	Sheen	484.80	
O-11	10/15/2015	497.90	13.55	13.56	0.01	484.39	
O-11	1/19/2016	497.89	14.09	14.59	0.50	483.72	
O-11	3/4/2016	497.89	14.23	14.41	0.18	483.68	
O-11	3/24/2016	497.89	14.34	14.55	0.21	483.51	Baildown testing not conducted- insufficient LNAPL thickness
O-11	3/25/2016	497.89	14.31	14.53	0.22	483.54	Baildown testing not conducted- insufficient LNAPL thickness
O-11	3/31/2016	497.89	14.19	14.33	0.14	483.68	Baildown testing not conducted- insufficient LNAPL thickness
O-11	5/26/2016	497.91	13.68	14.14	0.46	484.17	
O-11	6/14/2016	497.91	13.39	13.45	0.06	484.51	
O-11	8/18/2016	497.91	Sheen	12.16	Sheen	485.75	
O-11	9/9/2016	497.91	Sheen	12.66	Sheen	485.30	
O-11	10/13/2016	497.91	Sheen	13.68	Sheen	484.23	
O-11	11/15/2016	497.92	13.30	13.31	0.01	484.66	
O-11	2/8/2017	497.91	13.72	13.75	0.03	484.25	
O-11	2/15/2017	497.91	13.75	13.77	0.02	484.19	
O-11	3/1/2017	497.91	13.76	13.79	0.03	484.14	
O-11	6/6/2017	497.92	13.76	13.81	0.05	484.15	
O-11	6/13/2017	497.92	No LNAPL	13.05	0.00	484.93	
O-11	8/2/2017	497.92	Sheen	12.39	Sheen	485.53	
O-11	10/18/2017	497.92	Sheen	13.60	Sheen	484.32	
O-11	11/1/2017	497.92	14.05	14.16	0.11	483.85	

Appendix A-1
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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-12	10/21/2011	—	No LNAPL	12.59	0.00	—	New well
O-12	12/2/2011	496.12	No LNAPL	12.34	0.00	483.78	
O-12	1/10/2012	496.12	No LNAPL	12.45	0.00	483.67	
O-12	2/6/2012	496.12	No LNAPL	12.57	0.00	483.55	
O-12	2/16/2012	496.12	No LNAPL	12.49	0.00	483.63	
O-12	3/13/2012	496.12	No LNAPL	12.48	0.00	483.64	
O-12	4/10/2012	496.12	No LNAPL	12.40	0.00	483.72	
O-12	4/19/2012	496.12	No LNAPL	11.85	0.00	484.27	
O-12	5/8/2012	496.12	No LNAPL	12.17	0.00	483.95	
O-12	6/13/2012	496.12	No LNAPL	11.24	0.00	484.88	
O-12	7/17/2012	496.12	No LNAPL	10.92	0.00	485.20	
O-12	7/30/2012	496.12	No LNAPL	10.63	0.00	485.49	
O-12	8/21/2012	496.12	No LNAPL	11.35	0.00	484.77	
O-12	9/18/2012	496.12	No LNAPL	12.01	0.00	484.11	
O-12	10/16/2012	496.12	No LNAPL	11.99	0.00	484.13	
O-12	11/1/2012	496.12	No LNAPL	12.01	0.00	484.11	
O-12	11/29/2012	496.17	No LNAPL	11.55	0.00	484.62	
O-12	12/28/2012	496.17	No LNAPL	11.91	0.00	484.26	
O-12	1/23/2013	496.17	No LNAPL	11.86	0.00	484.31	
O-12	2/26/2013	496.17	No LNAPL	12.03	0.00	484.14	
O-12	3/29/2013	496.26	No LNAPL	12.21	0.00	484.05	R-35R, R-39, and R-40 were offline on this date
O-12	4/24/2013	496.26	No LNAPL	12.16	0.00	484.10	
O-12	5/20/2013	496.28	No LNAPL	11.94	0.00	484.34	
O-12	6/25/2013	496.28	No LNAPL	11.13	0.00	485.15	
O-12	7/23/2013	496.29	--	10.88	--	485.41	
O-12	7/25/2013	496.29	--	10.92	--	485.37	
O-12	8/1/2013	496.29	--	10.79	--	485.50	
O-12	8/21/2013	496.29	No LNAPL	10.77	0.00	485.52	
O-12	9/30/2013	496.28	No LNAPL	12.00	0.00	484.28	
O-12	10/22/2013	496.27	No LNAPL	12.61	0.00	483.66	
O-12	11/26/2013	496.27	No LNAPL	11.88	0.00	484.39	
O-12	12/18/2013	496.32	No LNAPL	12.06	0.00	484.26	
O-12	1/9/2014	496.32	No LNAPL	12.29	0.00	484.03	
O-12	2/5/2014	496.33	No LNAPL	12.42	0.00	483.91	
O-12	3/18/2014	496.37	No LNAPL	12.70	0.00	483.67	
O-12	3/24/2014	496.37	No LNAPL	12.73	0.00	483.64	
O-12	4/18/2014	496.37	No LNAPL	12.55	0.00	483.82	
O-12	5/15/2014	496.39	--	12.08	--	484.31	
O-12	6/11/2014	496.38	No LNAPL	12.27	0.00	484.11	
O-12	6/19/2014	496.38	No LNAPL	11.88	0.00	484.50	

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Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-12	7/15/2014	496.37	No LNAPL	10.16	0.00	486.21	
O-12	8/26/2014	496.37	No LNAPL	10.81	0.00	485.56	
O-12	9/9/2014	496.37	No LNAPL	11.06	0.00	485.31	
O-12	9/24/2014	496.37	No LNAPL	11.40	0.00	484.97	
O-12	10/21/2014	496.37	No LNAPL	12.32	0.00	484.05	
O-12	11/19/2014	496.40	No LNAPL	12.02	0.00	484.38	
O-12	12/16/2014	496.42	No LNAPL	12.19	0.00	484.23	
O-12	12/29/2014	496.42	No LNAPL	12.31	0.00	484.11	
O-12	1/21/2015	496.43	No LNAPL	12.36	0.00	484.07	
O-12	2/25/2015	496.47	No LNAPL	12.50	0.00	483.97	
O-12	3/10/2015	496.48	No LNAPL	12.42	0.00	484.06	
O-12	3/18/2015	496.48	--	12.54	--	483.94	
O-12	3/26/2015	496.48	No LNAPL	12.46	0.00	484.02	
O-12	4/16/2015	496.47	--	12.31	--	484.16	
O-12	5/18/2015	496.48	No LNAPL	12.05	0.00	484.43	
O-12	5/21/2015	496.48	No LNAPL	12.07	0.00	484.41	
O-12	6/10/2015	496.51	No LNAPL	12.11	0.00	484.40	
O-12	8/12/2015	496.48	No LNAPL	11.09	0.00	485.43	
O-12	8/19/2015	496.48	No LNAPL	11.33	0.00	485.18	
O-12	10/6/2015	496.21	No LNAPL	11.36	0.00	484.86	Casing was cut down 0.28 feet on 10-1-15
O-12	10/15/2015	496.21	No LNAPL	11.78	0.00	484.43	
O-12	11/19/2015	496.19	--	11.90	--	484.29	
O-12	1/19/2016	496.24	--	12.44	--	483.76	
O-12	3/4/2016	496.24	No LNAPL	12.60	0.00	483.64	
O-12	5/26/2016	496.28	No LNAPL	12.11	0.00	484.19	
O-12	6/14/2016	496.28	No LNAPL	11.75	0.00	484.53	
O-12	8/10/2016	496.33	--	10.05	--	486.28	
O-12	8/18/2016	496.28	No LNAPL	10.52	0.00	485.76	
O-12	9/9/2016	496.28	No LNAPL	11.00	0.00	485.32	
O-12	10/13/2016	496.28	No LNAPL	12.02	0.00	484.26	
O-12	10/21/2016	496.33	--	12.24	--	484.09	
O-12	11/15/2016	496.33	No LNAPL	11.69	0.00	484.74	
O-12	2/8/2017	496.35	No LNAPL	12.15	0.00	484.27	
O-12	2/15/2017	496.35	No LNAPL	12.16	0.00	484.24	
O-12	3/1/2017	496.35	No LNAPL	12.20	0.00	484.15	
O-12	6/6/2017	496.39	No LNAPL	12.21	0.00	484.18	
O-12	6/13/2017	496.39	No LNAPL	11.48	0.00	484.96	
O-12	8/2/2017	496.39	--	10.84	--	485.55	
O-12	10/19/2017	496.39	--	12.60	--	483.79	
O-12	11/1/2017	496.39	No LNAPL	12.56	0.00	483.83	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-12-65	7/25/2013	495.78	--	10.34	--	485.44	
O-12-65	8/1/2013	495.78	--	10.22	--	485.56	
O-12-65	8/21/2013	495.78	No LNAPL	10.20	0.00	485.58	
O-12-65	1/9/2014	495.79	No LNAPL	11.68	0.00	484.11	
O-12-65	2/5/2014	495.80	No LNAPL	11.83	0.00	483.97	
O-12-65	3/24/2014	495.84	No LNAPL	12.12	0.00	483.72	
O-12-65	4/18/2014	495.83	No LNAPL	11.93	0.00	483.90	
O-12-65	5/15/2014	495.84	--	11.48	--	484.36	
O-12-65	6/19/2014	495.82	No LNAPL	11.30	0.00	484.52	
O-12-65	7/15/2014	495.82	No LNAPL	9.54	0.00	486.28	
O-12-65	8/26/2014	495.81	No LNAPL	10.19	0.00	485.62	
O-12-65	9/24/2014	495.82	No LNAPL	10.78	0.00	485.04	
O-12-65	10/21/2014	495.80	No LNAPL	11.68	0.00	484.12	
O-12-65	11/19/2014	495.81	No LNAPL	11.33	0.00	484.48	
O-12-65	12/16/2014	495.83	No LNAPL	11.51	0.00	484.32	
O-12-65	12/29/2014	495.83	No LNAPL	11.63	0.00	484.20	
O-12-65	1/21/2015	495.84	No LNAPL	11.70	0.00	484.14	
O-12-65	2/25/2015	495.87	No LNAPL	11.82	0.00	484.05	
O-12-65	3/18/2015	495.89	No LNAPL	11.88	0.00	484.01	
O-12-65	3/26/2015	495.89	No LNAPL	11.81	0.00	484.08	
O-12-65	4/16/2015	495.88	--	11.66	--	484.22	
O-12-65	5/21/2015	495.89	No LNAPL	11.40	0.00	484.49	
O-12-65	6/10/2015	495.88	No LNAPL	11.45	0.00	484.43	
O-12-65	8/19/2015	495.88	No LNAPL	10.66	0.00	485.25	
O-12-65	10/6/2015	495.89	No LNAPL	10.97	0.00	484.93	
O-12-65	1/19/2016	495.88	--	12.00	--	483.84	
O-12-65	5/26/2016	495.89	No LNAPL	11.64	0.00	484.27	
O-12-65	8/9/2016	495.90	--	9.59	--	486.31	
O-12-65	9/9/2016	495.89	No LNAPL	10.56	0.00	485.37	
O-12-65	11/15/2016	495.90	No LNAPL	11.18	0.00	484.82	
O-12-65	2/8/2017	495.92	No LNAPL	11.82	0.00	484.17	
O-12-65	2/15/2017	495.92	No LNAPL	11.66	0.00	484.31	
O-12-65	6/13/2017	495.95	No LNAPL	10.97	0.00	485.03	
O-13	10/21/2011	—	11.57	11.91	0.34	—	
O-13	12/2/2011	495.35	11.30	12.70	1.40	483.81	
O-13	2/17/2012	495.35	11.14	12.91	1.77	483.91	
O-13	3/14/2012	495.35	11.56	12.44	0.88	483.64	
O-13	4/12/2012	495.35	11.38	12.38	1.00	483.80	
O-13	5/7/2012	495.35	11.20	11.77	0.57	484.05	
O-13	5/11/2012	495.35	11.36	11.78	0.42	483.92	Initial levels of May 2012 baildown test

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-13	6/13/2012	495.35	10.43	10.53	0.10	484.90	
O-13	7/17/2012	495.35	9.97	10.72	0.75	485.25	
O-13	8/21/2012	495.35	10.42	11.12	0.70	484.81	
O-13	9/18/2012	495.35	Sheen	11.07	Sheen	484.28	
O-13	10/15/2012	495.35	11.06	11.45	0.39	484.22	
O-13	10/23/2012	495.35	11.35	11.89	0.54	483.91	Initial levels of first October 2012 baildown test
O-13	10/29/2012	495.35	11.52	12.21	0.69	483.71	Initial levels of second October 2012 baildown test
O-13	11/29/2012	495.37	10.70	10.90	0.20	484.64	
O-13	12/28/2012	495.37	11.03	11.19	0.16	484.31	
O-13	2/26/2013	495.37	11.12	11.22	0.10	484.23	
O-13	3/29/2013	495.37	11.25	11.47	0.22	484.08	R-35R, R-39, and R-40 were offline on this date
O-13	4/24/2013	495.37	11.20	11.40	0.20	484.14	
O-13	5/21/2013	495.37	11.03	11.10	0.07	484.33	
O-13	6/24/2013	495.37	10.17	10.21	0.04	485.19	
O-13	7/23/2013	495.38	Sheen	9.95	Sheen	485.43	
O-13	8/1/2013	495.38	Sheen	9.89	Sheen	485.49	
O-13	8/21/2013	495.38	Sheen	9.84	Sheen	485.54	
O-13	9/24/2013	495.38	10.73	11.11	0.38	484.59	
O-13	10/22/2013	495.37	11.54	12.35	0.81	483.69	
O-13	11/26/2013	495.37	10.92	11.10	0.18	484.42	
O-13	12/18/2013	495.39	11.03	11.35	0.32	484.31	
O-13	1/9/2014	495.39	11.25	11.66	0.41	484.07	
O-13	2/5/2014	495.38	11.36	11.97	0.61	483.92	
O-13	3/24/2014	495.38	11.62	12.24	0.62	483.65	
O-13	4/18/2014	495.38	11.46	11.90	0.44	483.85	
O-13	5/15/2014	495.39	11.04	11.26	0.22	484.31	
O-13	5/29/2014	495.39	11.35	11.63	0.28	483.99	
O-13	6/19/2014	495.38	10.89	11.05	0.16	484.46	
O-13	7/15/2014	495.38	9.09	9.33	0.24	486.25	
O-13	8/26/2014	495.38	9.70	10.19	0.49	485.60	
O-13	9/24/2014	495.38	10.28	10.86	0.58	485.00	
O-13	10/16/2014	495.37	11.07	11.47	0.40	484.23	
O-13	10/21/2014	495.37	11.23	11.64	0.41	484.07	
O-13	11/19/2014	495.38	10.91	11.03	0.12	484.45	
O-13	12/16/2014	495.38	11.12	11.31	0.19	484.23	
O-13	12/29/2014	495.38	11.22	11.43	0.21	484.12	
O-13	1/21/2015	495.38	11.25	11.51	0.26	484.09	
O-13	2/25/2015	495.37	11.35	11.62	0.27	483.97	
O-13	3/10/2015	495.38	11.25	11.49	0.24	484.09	
O-13	3/18/2015	495.38	11.36	11.65	0.29	483.97	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-13	3/26/2015	495.38	11.31	11.56	0.25	484.03	
O-13	4/16/2015	495.37	11.18	11.41	0.23	484.15	
O-13	5/18/2015	495.39	10.92	11.06	0.14	484.45	
O-13	5/21/2015	495.39	10.95	11.05	0.10	484.42	
O-13	6/10/2015	495.39	10.99	11.10	0.11	484.38	
O-13	8/12/2015	495.39	9.91	10.07	0.16	485.49	
O-13	8/19/2015	495.39	10.16	10.50	0.34	485.24	
O-13	10/6/2015	495.39	10.47	10.68	0.21	484.92	
O-13	10/15/2015	495.39	10.86	11.21	0.35	484.51	
O-13	1/19/2016	495.40	11.50	12.10	0.60	483.80	
O-13	3/4/2016	495.40	11.57	12.22	0.65	483.77	
O-13	3/24/2016	495.40	11.67	12.33	0.66	483.62	Initial fluid levels and product recovered by SWI during baildown testing
O-13	5/26/2016	495.40	11.15	11.31	0.16	484.24	
O-13	6/14/2016	495.40	No LNAPL	10.83	0.00	484.57	
O-13	8/18/2016	495.40	9.51	9.88	0.37	485.83	
O-13	9/9/2016	495.40	9.99	10.43	0.44	485.39	
O-13	10/13/2016	495.40	11.04	11.30	0.26	484.32	
O-13	11/15/2016	495.41	10.72	10.76	0.04	484.72	
O-13	2/8/2017	495.40	11.12	11.22	0.10	484.33	
O-13	2/15/2017	495.40	11.15	11.25	0.10	484.26	
O-13	3/1/2017	495.40	11.17	11.27	0.10	484.21	
O-13	6/6/2017	495.41	11.16	11.17	0.01	484.25	
O-13	6/13/2017	495.41	Sheen	10.48	Sheen	484.99	
O-13	8/2/2017	495.41	9.83	9.98	0.15	485.43	
O-13	10/18/2017	495.41	Sheen	11.22	Sheen	484.19	
O-14	10/21/2011	—	No LNAPL	9.85	0.00	—	New well
O-14	12/7/2011	494.89	—	—	—	—	Access unavailable per NPT operator
O-14	2/7/2012	494.89	No LNAPL	9.76	0.00	485.13	
O-14	2/17/2012	494.89	Sheen	9.71	Sheen	485.18	
O-14	3/13/2012	494.89	No LNAPL	Frozen	0.00	—	Frozen at 9.68 ft BTOC
O-14	4/10/2012	494.89	No LNAPL	Frozen	0.00	—	Frozen at 9.69 ft BTOC
O-14	4/19/2012	494.89	No LNAPL	Frozen	0.00	—	Frozen at 9.68 ft BTOC
O-14	5/9/2012	494.89	No LNAPL	Frozen	0.00	—	Frozen at 9.67 ft BTOC
O-14	6/13/2012	494.89	No LNAPL	8.45	0.00	486.44	
O-14	7/18/2012	494.89	No LNAPL	8.06	0.00	486.83	
O-14	7/30/2012	494.89	No LNAPL	7.71	0.00	487.18	
O-14	8/21/2012	494.89	No LNAPL	8.46	0.00	486.43	
O-14	9/18/2012	494.89	No LNAPL	9.13	0.00	485.76	
O-14	10/16/2012	494.89	No LNAPL	9.16	0.00	485.73	
O-14	11/1/2012	494.89	No LNAPL	9.21	0.00	485.68	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-14	11/29/2012	494.90	No LNAPL	8.70	0.00	486.20	
O-14	12/27/2012	494.90	No LNAPL	9.06	0.00	485.84	
O-14	1/24/2013	494.90	No LNAPL	9.03	0.00	485.87	
O-14	2/26/2013	494.90	No LNAPL	Frozen	0.00	—	Frozen at 9.09 ft BTOC
O-14	3/28/2013	494.90	No LNAPL	Frozen	0.00	—	Frozen at 9.09 ft BTOC. R-35R, R-39, and R-40 were offline on this date
O-14	4/24/2013	494.90	No LNAPL	Frozen	0.00	—	Frozen at 9.05 ft BTOC
O-14	5/30/2013	494.90	No LNAPL	Frozen	0.00	—	Frozen at 9.05 ft BTOC
O-14	6/25/2013	494.90	No LNAPL	8.06	0.00	486.84	
O-14	8/2/2013	494.90	No LNAPL	7.68	0.00	487.22	
O-14	10/1/2013	494.90	No LNAPL	9.04	0.00	485.86	
O-14	10/29/2013	494.90	No LNAPL	9.81	0.00	485.09	
O-14	11/25/2013	494.90	No LNAPL	9.01	0.00	485.89	
O-14	12/20/2013	494.90	No LNAPL	9.04	0.00	485.86	
O-14	3/18/2014	494.90	No LNAPL	9.71	0.00	485.19	
O-14	6/11/2014	494.93	No LNAPL	Frozen	0.00	—	Frozen at 8.93 feet below the measuring point
O-14	9/9/2014	494.93	No LNAPL	7.88	0.00	487.05	
O-14	11/20/2014	494.93	No LNAPL	8.74	0.00	486.19	
O-14	3/18/2015	494.93	--	9.22	--	485.71	
O-14	6/11/2015	494.93	No LNAPL	8.80	0.00	486.13	
O-14	8/12/2015	494.94	--	7.70	--	487.24	
O-14	10/15/2015	494.94	No LNAPL	8.76	0.00	486.18	
O-14	11/19/2015	494.94	--	8.88	--	486.06	
O-14	3/22/2016	494.94	No LNAPL	Frozen	0.00	—	Ice at 9.64 feet
O-14	8/17/2016	494.93	--	7.18	--	487.75	
O-14	9/12/2016	494.93	--	7.85	--	487.08	
O-14	3/14/2017	494.93	—	—	—	—	Unable to locate well. Well was frozen on 2-23-17.
O-15	10/21/2011	—	No LNAPL	13.18	0.00	—	New well
O-15	12/2/2011	498.62	No LNAPL	13.88	0.00	484.74	
O-15	2/7/2012	498.62	No LNAPL	13.13	0.00	485.49	
O-15	2/16/2012	498.62	No LNAPL	13.08	0.00	485.54	
O-15	3/13/2012	498.62	No LNAPL	13.07	0.00	485.55	
O-15	4/10/2012	498.62	No LNAPL	12.95	0.00	485.67	
O-15	4/19/2012	498.62	No LNAPL	12.40	0.00	486.22	
O-15	5/9/2012	498.62	No LNAPL	12.78	0.00	485.84	
O-15	6/12/2012	498.62	No LNAPL	11.85	0.00	486.77	
O-15	7/17/2012	498.62	No LNAPL	11.31	0.00	487.31	
O-15	7/30/2012	498.62	No LNAPL	11.00	0.00	487.62	
O-15	8/21/2012	498.62	No LNAPL	11.78	0.00	486.84	
O-15	9/18/2012	498.62	No LNAPL	12.50	0.00	486.12	
O-15	10/16/2012	498.62	No LNAPL	12.52	0.00	486.10	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-15	11/1/2012	498.62	No LNAPL	12.54	0.00	486.08	
O-15	11/29/2012	498.70	No LNAPL	12.09	0.00	486.61	
O-15	12/27/2012	498.70	No LNAPL	12.50	0.00	486.20	
O-15	1/24/2013	498.70	No LNAPL	12.51	0.00	486.19	
O-15	2/26/2013	498.70	No LNAPL	12.64	0.00	486.06	
O-15	3/28/2013	498.70	No LNAPL	12.81	0.00	485.89	R-35R, R-39, and R-40 were offline on this date
O-15	4/24/2013	498.70	No LNAPL	12.75	0.00	485.95	
O-15	5/29/2013	498.70	No LNAPL	11.69	0.00	487.01	
O-15	6/25/2013	498.70	No LNAPL	11.47	0.00	487.23	
O-15	8/2/2013	498.70	No LNAPL	11.05	0.00	487.65	
O-15	10/1/2013	498.70	No LNAPL	12.50	0.00	486.20	
O-15	10/29/2013	498.70	No LNAPL	13.30	0.00	485.40	
O-15	11/19/2013	498.70	No LNAPL	12.62	0.00	486.08	
O-15	12/20/2013	498.70	No LNAPL	12.52	0.00	486.18	
O-15	3/18/2014	498.70	No LNAPL	13.26	0.00	485.44	
O-15	6/11/2014	498.87	No LNAPL	12.76	0.00	486.11	
O-15	9/9/2014	498.87	No LNAPL	11.08	0.00	487.79	
O-15	11/20/2014	498.52	No LNAPL	11.93	0.00	486.59	
O-15	3/18/2015	498.52	--	12.50	--	486.02	
O-15	6/10/2015	498.52	No LNAPL	12.01	0.00	486.51	
O-15	8/12/2015	498.62	--	10.95	--	487.67	
O-15	10/15/2015	498.62	No LNAPL	12.07	0.00	486.55	
O-15	11/19/2015	498.62	--	12.13	--	486.49	
O-15	8/10/2017	498.62	--	10.96	--	487.66	
O-15	8/16/2017	498.62	--	10.77	--	487.85	
O-15	11/16/2017	498.62	--	12.11	--	486.51	
O-16	10/21/2011	—	No LNAPL	8.28	0.00	—	New well
O-16	12/7/2011	493.05	—	—	—	—	Access unavailable per NPT operator
O-16	3/13/2012	493.05	No LNAPL	8.10	0.00	484.95	
O-16	4/10/2012	493.05	No LNAPL	7.95	0.00	485.10	
O-16	5/9/2012	493.05	No LNAPL	7.84	0.00	485.21	
O-16	6/12/2012	493.05	No LNAPL	6.82	0.00	486.23	
O-16	7/17/2012	493.05	No LNAPL	6.34	0.00	486.71	
O-16	8/21/2012	493.05	No LNAPL	6.77	0.00	486.28	
O-16	9/18/2012	493.05	No LNAPL	7.54	0.00	485.51	
O-16	10/16/2012	493.05	No LNAPL	7.55	0.00	485.50	
O-16	11/29/2012	493.09	No LNAPL	7.06	0.00	486.03	
O-16	12/27/2012	493.09	No LNAPL	7.46	0.00	485.63	
O-16	1/23/2013	493.09	No LNAPL	7.40	0.00	485.69	
O-16	2/26/2013	493.09	No LNAPL	7.61	0.00	485.48	

**Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-16	3/28/2013	493.09	No LNAPL	Frozen	0.00	—	Frozen at 7.61 ft BTOC. R-35R, R-39, and R-40 were offline on this date
O-16	4/24/2013	493.09	No LNAPL	Frozen	0.00	—	Frozen at 7.55 ft BTOC
O-16	5/31/2013	493.09	No LNAPL	Frozen	0.00	—	*This measurement is probably to water on top of ice based on April and June 2013 measurements.
O-16	6/25/2013	493.09	No LNAPL	Frozen	0.00	—	*Frozen at 7.57 ft BTOC below the measuring point
O-16	10/29/2013	493.09	No LNAPL	8.28	0.00	484.81	
O-16	11/19/2013	493.09	No LNAPL	7.49	0.00	485.60	
O-16	12/20/2013	493.09	No LNAPL	7.46	0.00	485.63	
O-16	10/15/2015	493.23	No LNAPL	7.38	0.00	485.85	
O-16	8/16/2016	493.24	--	5.68	--	487.56	
O-16	10/13/2016	493.24	No LNAPL	7.50	0.00	485.74	
O-16	3/2/2017	493.24	No LNAPL	7.50	0.00	485.74	
O-17	10/21/2011	—	No LNAPL	9.05	0.00	—	New well
O-17	12/2/2011	493.23	No LNAPL	8.74	0.00	484.49	
O-17	1/11/2012	493.23	No LNAPL	8.93	0.00	484.30	
O-17	2/7/2012	493.23	No LNAPL	9.01	0.00	484.22	
O-17	2/16/2012	493.23	No LNAPL	8.93	0.00	484.30	
O-17	3/13/2012	493.23	No LNAPL	8.93	0.00	484.30	
O-17	4/10/2012	493.23	No LNAPL	8.81	0.00	484.42	
O-17	4/19/2012	493.23	No LNAPL	8.25	0.00	484.98	
O-17	5/9/2012	493.23	No LNAPL	8.65	0.00	484.58	
O-17	6/12/2012	493.23	No LNAPL	7.68	0.00	485.55	
O-17	7/17/2012	493.23	No LNAPL	7.26	0.00	485.97	
O-17	7/30/2012	493.23	No LNAPL	6.91	0.00	486.32	
O-17	8/21/2012	493.23	No LNAPL	6.70	0.00	486.53	
O-17	9/19/2012	493.23	No LNAPL	8.41	0.00	484.82	
O-17	10/16/2012	493.23	No LNAPL	8.41	0.00	484.82	
O-17	11/1/2012	493.23	No LNAPL	8.38	0.00	484.85	
O-17	11/29/2012	493.26	No LNAPL	7.95	0.00	485.31	
O-17	12/27/2012	493.26	No LNAPL	8.34	0.00	484.92	
O-17	1/23/2013	493.26	No LNAPL	8.31	0.00	484.95	
O-17	2/26/2013	493.26	No LNAPL	6.48	0.00	486.78	
O-17	3/28/2013	493.26	No LNAPL	8.63	0.00	484.63	R-35R, R-39, and R-40 were offline on this date
O-17	4/24/2013	493.26	No LNAPL	8.91	0.00	484.35	
O-17	5/31/2013	493.26	No LNAPL	7.26	0.00	486.00	
O-17	6/25/2013	493.26	No LNAPL	7.39	0.00	485.87	
O-17	8/2/2013	493.26	No LNAPL	6.96	0.00	486.30	
O-17	10/1/2013	493.26	No LNAPL	8.42	0.00	484.84	
O-17	10/29/2013	493.26	No LNAPL	9.17	0.00	484.09	
O-17	11/26/2013	493.26	No LNAPL	8.24	0.00	485.02	

**Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-17	12/20/2013	493.26	—	—	—	—	Well was buried under snow berm, and was inaccessible.
O-17	3/18/2014	493.26	No LNAPL	9.05	0.00	484.21	
O-17	5/14/2014	493.40	--	Frozen	--	—	Frozen at 3.88 feet below measuring point
O-17	6/11/2014	493.18	No LNAPL	8.61	0.00	484.57	
O-17	6/19/2014	493.18	--	7.97	--	485.21	
O-17	7/15/2014	493.16	No LNAPL	6.14	0.00	487.02	
O-17	8/26/2014	493.18	--	6.83	--	486.35	
O-17	9/9/2014	493.18	No LNAPL	7.15	0.00	486.03	
O-17	9/24/2014	493.18	--	7.46	--	485.72	
O-17	10/21/2014	493.18	--	8.41	--	484.77	
O-17	11/19/2014	493.20	No LNAPL	7.99	0.00	485.21	
O-17	12/16/2014	493.26	No LNAPL	8.20	0.00	485.06	
O-17	12/29/2014	493.26	No LNAPL	8.33	0.00	484.93	
O-17	1/21/2015	493.29	No LNAPL	8.40	0.00	484.89	
O-17	2/25/2015	493.26	No LNAPL	8.51	0.00	484.75	
O-17	3/18/2015	493.26	--	8.54	--	484.72	
O-17	3/26/2015	493.26	No LNAPL	8.46	0.00	484.80	
O-17	4/16/2015	493.27	--	8.32	--	484.95	
O-17	5/21/2015	493.27	No LNAPL	8.06	0.00	485.21	
O-17	6/10/2015	493.27	No LNAPL	8.09	0.00	485.18	
O-17	8/12/2015	493.27	--	6.96	--	486.31	
O-17	8/19/2015	493.27	No LNAPL	7.28	0.00	486.02	
O-17	10/6/2015	493.26	No LNAPL	7.66	0.00	485.61	
O-17	10/15/2015	493.26	No LNAPL	8.10	0.00	485.16	
O-17	11/20/2015	493.26	--	8.14	--	485.12	
O-17	1/19/2016	493.36	--	8.77	--	484.55	
O-17	5/26/2016	493.35	No LNAPL	8.38	0.00	484.99	
O-17	8/17/2016	493.40	--	6.64	--	486.76	
O-17	9/9/2016	493.35	No LNAPL	7.28	0.00	486.11	
O-17	10/13/2016	493.35	No LNAPL	8.33	0.00	485.02	
O-17	11/15/2016	493.40	No LNAPL	7.90	0.00	485.60	
O-17	2/8/2017	493.44	No LNAPL	8.40	0.00	485.11	
O-17	2/15/2017	493.44	--	8.36	--	485.08	
O-17	3/2/2017	493.44	No LNAPL	8.46	0.00	484.98	
O-17	6/13/2017	493.39	No LNAPL	7.66	0.00	485.78	
O-18	10/21/2011	—	No LNAPL	8.26	0.00	—	New well
O-18	12/2/2011	492.66	No LNAPL	7.99	0.00	484.67	
O-18	1/11/2012	492.66	No LNAPL	8.17	0.00	484.49	
O-18	2/7/2012	492.66	No LNAPL	8.24	0.00	484.42	
O-18	2/16/2012	492.66	No LNAPL	8.15	0.00	484.51	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-18	3/13/2012	492.66	No LNAPL	8.15	0.00	484.51	
O-18	4/10/2012	492.66	No LNAPL	8.04	0.00	484.62	
O-18	4/19/2012	492.66	No LNAPL	7.48	0.00	485.18	
O-18	5/9/2012	492.66	No LNAPL	7.89	0.00	484.77	
O-18	6/12/2012	492.66	No LNAPL	7.87	0.00	484.79	
O-18	7/17/2012	492.66	No LNAPL	6.45	0.00	486.21	
O-18	7/30/2012	492.66	No LNAPL	5.08	0.00	487.58	
O-18	8/21/2012	492.66	No LNAPL	6.89	0.00	485.77	
O-18	9/19/2012	492.66	No LNAPL	7.62	0.00	485.04	
O-18	10/24/2012	492.66	No LNAPL	8.01	0.00	484.65	
O-18	11/1/2012	492.66	No LNAPL	7.59	0.00	485.07	
O-18	11/29/2012	492.70	No LNAPL	7.21	0.00	485.49	
O-18	12/27/2012	492.70	No LNAPL	7.59	0.00	485.11	
O-18	1/23/2013	492.70	No LNAPL	7.54	0.00	485.16	
O-18	2/26/2013	492.70	No LNAPL	7.70	0.00	485.00	
O-18	3/28/2013	492.70	No LNAPL	7.87	0.00	484.83	R-35R, R-39, and R-40 were offline on this date
O-18	4/24/2013	492.70	No LNAPL	7.83	0.00	484.87	
O-18	5/31/2013	492.70	No LNAPL	6.47	0.00	486.23	
O-18	6/25/2013	492.70	No LNAPL	6.56	0.00	486.14	
O-18	8/2/2013	492.70	No LNAPL	6.13	0.00	486.57	
O-18	10/1/2013	492.70	No LNAPL	7.64	0.00	485.06	
O-18	10/29/2013	492.70	No LNAPL	8.39	0.00	484.31	
O-18	11/19/2013	492.70	No LNAPL	7.65	0.00	485.05	
O-18	12/20/2013	492.70	No LNAPL	7.63	0.00	485.07	
O-18	3/18/2014	492.70	No LNAPL	8.30	0.00	484.40	
O-18	5/15/2014	492.86	--	7.68	--	485.18	
O-18	6/11/2014	492.59	No LNAPL	7.88	0.00	484.71	
O-18	6/19/2014	492.59	--	7.18	--	485.41	
O-18	7/15/2014	492.58	No LNAPL	5.32	0.00	487.26	
O-18	8/26/2014	492.59	--	6.03	--	486.56	
O-18	9/9/2014	492.59	No LNAPL	6.36	0.00	486.23	
O-18	9/24/2014	492.59	--	6.68	--	485.91	
O-18	10/21/2014	492.58	--	7.63	--	484.95	
O-18	11/19/2014	492.63	No LNAPL	7.22	0.00	485.41	
O-18	12/16/2014	492.68	No LNAPL	7.43	0.00	485.25	
O-18	12/29/2014	492.68	No LNAPL	7.56	0.00	485.12	
O-18	1/21/2015	492.71	No LNAPL	7.62	0.00	485.09	
O-18	2/25/2015	492.70	No LNAPL	7.73	0.00	484.97	
O-18	3/18/2015	492.70	--	7.79	--	484.91	
O-18	3/26/2015	492.70	No LNAPL	7.70	0.00	485.00	

Appendix A-1
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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-18	4/16/2015	492.70	--	7.51	--	485.19	
O-18	5/21/2015	492.69	No LNAPL	7.28	0.00	485.41	
O-18	6/10/2015	492.69	No LNAPL	7.30	0.00	485.39	
O-18	8/12/2015	492.69	--	6.21	--	486.48	
O-18	8/19/2015	492.69	No LNAPL	6.47	0.00	486.25	
O-18	10/6/2015	492.69	No LNAPL	6.90	0.00	485.80	
O-18	10/15/2015	492.69	No LNAPL	7.35	0.00	485.34	
O-18	11/20/2015	492.69	--	7.36	--	485.33	
O-18	1/19/2016	492.75	--	7.98	--	484.73	
O-18	5/26/2016	492.75	No LNAPL	7.57	0.00	485.20	
O-18	8/17/2016	492.79	--	5.77	--	487.02	
O-18	9/9/2016	492.75	No LNAPL	6.46	0.00	486.33	
O-18	10/13/2016	492.75	No LNAPL	7.55	0.00	485.20	
O-18	11/15/2016	492.79	No LNAPL	7.07	0.00	485.82	
O-18	2/8/2017	492.88	No LNAPL	7.62	0.00	485.33	
O-18	2/15/2017	492.88	--	7.61	--	485.27	
O-18	3/2/2017	492.88	No LNAPL	7.68	0.00	485.20	
O-19	10/21/2011	—	12.15	14.28	2.13	—	
O-19	12/7/2011	496.44	11.85	13.41	1.56	484.29	
O-19	2/16/2012	496.44	12.08	14.03	1.95	483.99	
O-19	3/15/2012	496.44	12.09	14.15	2.06	483.96	
O-19	4/12/2012	496.44	11.96	13.91	1.95	484.11	
O-19	5/7/2012	496.44	11.79	13.40	1.61	484.34	
O-19	5/14/2012	496.44	12.01	13.50	1.49	484.15	Initial levels of May 2012 baildown test
O-19	6/12/2012	496.44	11.24	11.26	0.02	485.20	
O-19	7/18/2012	496.44	10.82	11.11	0.29	485.56	
O-19	8/21/2012	496.44	11.21	11.56	0.35	485.16	
O-19	9/19/2012	496.44	11.83	12.37	0.54	484.51	
O-19	10/15/2012	496.44	11.80	12.36	0.56	484.53	
O-19	10/22/2012	496.44	12.07	12.64	0.57	484.26	Initial levels of first October 2012 baildown test
O-19	10/24/2012	496.44	12.18	12.65	0.47	484.17	Initial levels of second October 2012 baildown test
O-19	11/29/2012	496.48	11.44	11.65	0.21	485.00	
O-19	12/28/2012	496.48	11.80	11.97	0.17	484.65	
O-19	2/26/2013	496.48	11.87	12.24	0.37	484.54	
O-19	3/28/2013	496.48	11.92	12.41	0.49	484.47	R-35R, R-39, and R-40 were offline on this date
O-19	4/24/2013	496.48	11.79	13.01	1.22	484.46	
O-19	5/21/2013	496.51	11.71	12.28	0.57	484.69	
O-19	6/24/2013	496.51	Sheen	10.91	Sheen	485.60	
O-19	7/23/2013	496.49	Sheen	10.66	Sheen	485.83	
O-19	8/1/2013	496.49	Sheen	10.55	Sheen	485.94	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-19	8/21/2013	496.49	No LNAPL	10.52	0.00	485.97	
O-19	9/30/2013	496.50	11.80	11.88	0.08	484.68	
O-19	10/22/2013	496.50	12.19	13.50	1.31	484.06	
O-19	11/26/2013	496.50	11.65	11.73	0.08	484.83	
O-19	12/18/2013	496.51	11.75	12.11	0.36	484.69	
O-19	1/9/2014	496.52	11.97	12.58	0.61	484.43	
O-19	2/5/2014	496.53	12.07	12.95	0.88	484.29	
O-19	3/24/2014	496.51	12.28	13.43	1.15	484.01	
O-19	4/18/2014	496.52	12.07	13.44	1.37	484.19	
O-19	5/15/2014	496.53	11.80	12.10	0.30	484.67	
O-19	5/16/2014	496.53	11.82	12.15	0.33	484.65	
O-19	6/19/2014	496.52	11.70	11.71	0.01	484.82	
O-19	7/15/2014	496.54	No LNAPL	9.88	0.00	486.66	
O-19	8/26/2014	496.54	Sheen	10.53	Sheen	486.01	
O-19	9/24/2014	496.53	No LNAPL	11.15	0.00	485.38	
O-19	10/21/2014	496.52	12.06	12.07	0.01	484.46	
O-19	11/19/2014	496.54	11.65	11.73	0.08	484.87	
O-19	12/16/2014	496.57	11.88	11.95	0.07	484.68	
O-19	12/29/2014	496.57	11.97	12.18	0.21	484.56	
O-19	1/21/2015	496.55	12.02	12.32	0.30	484.47	
O-19	2/25/2015	496.55	12.08	12.61	0.53	484.37	
O-19	3/10/2015	496.50	12.02	12.27	0.25	484.43	
O-19	3/18/2015	496.50	12.10	12.51	0.41	484.32	
O-19	3/26/2015	496.50	12.05	12.44	0.39	484.38	
O-19	4/16/2015	496.52	11.93	12.27	0.34	484.53	
O-19	5/21/2015	496.55	11.72	11.74	0.02	484.83	
O-19	6/10/2015	496.57	Sheen	11.76	Sheen	484.81	
O-19	8/12/2015	496.56	No LNAPL	10.68	0.00	485.92	
O-19	8/19/2015	496.56	Sheen	10.95	Sheen	485.64	
O-19	10/6/2015	496.56	No LNAPL	11.32	0.00	485.28	
O-19	10/15/2015	496.56	Sheen	11.74	Sheen	484.86	
O-19	1/19/2016	496.58	12.33	12.65	0.32	484.19	
O-19	3/4/2016	496.58	12.25	13.60	1.35	484.12	
O-19	5/26/2016	496.59	11.93	12.17	0.24	484.63	
O-19	6/14/2016	496.59	No LNAPL	11.61	0.00	484.98	
O-19	8/18/2016	496.59	Sheen	10.01	Sheen	486.58	
O-19	8/18/2016	496.58	Sheen	10.34	Sheen	486.24	
O-19	9/9/2016	496.60	Sheen	10.84	Sheen	485.80	
O-19	10/13/2016	496.60	11.87	11.88	0.01	484.73	
O-19	10/25/2016	496.58	12.25	12.26	0.01	484.33	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-19	11/15/2016	496.58	Sheen	11.48	Sheen	485.20	
O-19	2/8/2017	496.60	Sheen	11.92	Sheen	484.75	
O-19	2/15/2017	496.60	Sheen	11.95	Sheen	484.70	
O-19	3/1/2017	496.60	Sheen	11.98	Sheen	484.62	
O-19	6/6/2017	496.63	No LNAPL	12.00	0.00	484.63	
O-19	6/13/2017	496.63	No LNAPL	11.26	0.00	485.42	
O-19	7/13/2017	496.63	No LNAPL	10.55	0.00	486.08	
O-19	10/18/2017	496.63	Sheen	11.83	Sheen	484.80	
O-19-55	1/9/2014	496.56	No LNAPL	12.07	0.00	484.49	
O-19-55	2/5/2014	496.57	No LNAPL	12.21	0.00	484.36	
O-19-55	3/24/2014	496.56	No LNAPL	12.47	0.00	484.09	
O-19-55	4/18/2014	496.56	No LNAPL	12.29	0.00	484.27	
O-19-55	5/15/2014	496.58	--	11.83	--	484.75	
O-19-55	6/19/2014	496.57	No LNAPL	11.68	0.00	484.89	
O-19-55	7/15/2014	496.59	No LNAPL	9.86	0.00	486.73	
O-19-55	8/26/2014	496.59	No LNAPL	10.52	0.00	486.07	
O-19-55	9/24/2014	496.58	No LNAPL	11.13	0.00	485.45	
O-19-55	10/21/2014	496.57	No LNAPL	12.05	0.00	484.52	
O-19-55	11/19/2014	496.56	No LNAPL	11.65	0.00	484.91	
O-19-55	12/16/2014	496.58	No LNAPL	11.83	0.00	484.75	
O-19-55	12/29/2014	496.58	No LNAPL	11.95	0.00	484.63	
O-19-55	1/21/2015	496.57	No LNAPL	12.00	0.00	484.57	
O-19-55	2/25/2015	496.56	No LNAPL	12.11	0.00	484.45	
O-19-55	3/18/2015	496.52	No LNAPL	12.14	0.00	484.38	
O-19-55	3/26/2015	496.52	No LNAPL	12.06	0.00	484.46	
O-19-55	4/16/2015	496.54	--	11.92	--	484.62	
O-19-55	5/21/2015	496.56	No LNAPL	11.67	0.00	484.89	
O-19-55	6/10/2015	496.59	No LNAPL	11.71	0.00	484.88	
O-19-55	8/19/2015	496.58	No LNAPL	10.91	0.00	485.70	
O-19-55	10/6/2015	496.58	No LNAPL	11.26	0.00	485.33	
O-19-55	1/19/2016	496.57	--	12.29	--	484.24	
O-19-55	5/26/2016	496.58	No LNAPL	11.91	0.00	484.69	
O-19-55	8/15/2016	496.56	--	10.10	--	486.46	
O-19-55	9/9/2016	496.60	No LNAPL	10.80	0.00	485.84	
O-19-55	10/20/2016	496.56	--	12.04	--	484.52	
O-19-55	11/15/2016	496.56	No LNAPL	11.41	0.00	485.25	
O-19-55	2/8/2017	496.57	No LNAPL	11.84	0.00	484.80	
O-19-55	6/13/2017	496.60	No LNAPL	11.18	0.00	485.47	
O-19-90	1/9/2014	496.38	No LNAPL	11.90	0.00	484.48	
O-19-90	2/5/2014	496.39	No LNAPL	12.03	0.00	484.36	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-19-90	3/24/2014	496.38	No LNAPL	12.29	0.00	484.09	
O-19-90	4/18/2014	496.38	No LNAPL	12.11	0.00	484.27	
O-19-90	5/15/2014	496.40	--	11.65	--	484.75	
O-19-90	6/19/2014	496.40	No LNAPL	11.51	0.00	484.89	
O-19-90	7/15/2014	496.41	No LNAPL	9.69	0.00	486.72	
O-19-90	8/26/2014	496.41	No LNAPL	10.35	0.00	486.06	
O-19-90	9/24/2014	496.40	No LNAPL	10.96	0.00	485.44	
O-19-90	10/21/2014	496.39	No LNAPL	11.88	0.00	484.51	
O-19-90	11/19/2014	496.38	No LNAPL	11.47	0.00	484.91	
O-19-90	12/16/2014	496.40	No LNAPL	11.65	0.00	484.75	
O-19-90	12/29/2014	496.40	No LNAPL	11.77	0.00	484.63	
O-19-90	1/21/2015	496.38	No LNAPL	11.82	0.00	484.56	
O-19-90	2/25/2015	496.38	No LNAPL	11.93	0.00	484.45	
O-19-90	3/18/2015	496.34	No LNAPL	11.97	0.00	484.37	
O-19-90	3/26/2015	496.34	No LNAPL	11.88	0.00	484.46	
O-19-90	4/16/2015	496.36	--	11.74	--	484.62	
O-19-90	5/21/2015	496.38	No LNAPL	11.50	0.00	484.88	
O-19-90	6/10/2015	496.40	No LNAPL	11.53	0.00	484.87	
O-19-90	8/19/2015	496.40	No LNAPL	10.73	0.00	485.70	
O-19-90	10/6/2015	496.39	No LNAPL	11.08	0.00	485.32	
O-19-90	1/19/2016	496.39	--	12.11	--	484.24	
O-19-90	5/26/2016	496.19	No LNAPL	11.52	0.00	484.69	
O-19-90	8/15/2016	496.17	--	9.72	--	486.45	
O-19-90	9/9/2016	496.20	No LNAPL	10.40	0.00	485.84	
O-19-90	11/15/2016	496.17	No LNAPL	11.00	0.00	485.27	
O-19-90	2/8/2017	496.16	No LNAPL	11.44	0.00	484.79	
O-19-90	6/13/2017	496.19	No LNAPL	10.77	0.00	485.47	
O-19-90	8/3/2017	496.19	--	10.10	--	486.09	
O-19-90	10/19/2017	496.19	--	11.46	--	484.73	
O-20	10/21/2011	—	No LNAPL	12.49	0.00	—	New well
O-20	12/2/2011	497.42	No LNAPL	12.16	0.00	485.26	
O-20	1/11/2012	497.42	No LNAPL	12.32	0.00	485.10	
O-20	2/7/2012	497.42	No LNAPL	12.38	0.00	485.04	
O-20	3/13/2012	497.42	No LNAPL	12.30	0.00	485.12	
O-20	4/10/2012	497.42	No LNAPL	12.17	0.00	485.25	
O-20	5/9/2012	497.42	No LNAPL	12.00	0.00	485.42	
O-20	6/12/2012	497.42	No LNAPL	11.01	0.00	486.41	
O-20	7/18/2012	497.42	No LNAPL	10.64	0.00	486.78	
O-20	8/21/2012	497.42	No LNAPL	11.04	0.00	486.38	
O-20	9/18/2012	497.42	No LNAPL	11.75	0.00	485.67	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-20	10/16/2012	497.42	No LNAPL	11.77	0.00	485.65	
O-20	11/29/2012	497.41	No LNAPL	11.28	0.00	486.13	
O-20	12/27/2012	497.41	No LNAPL	11.65	0.00	485.76	
O-20	1/24/2013	497.41	No LNAPL	11.61	0.00	485.80	
O-20	2/26/2013	497.41	No LNAPL	11.76	0.00	485.65	
O-20	3/28/2013	497.41	No LNAPL	11.95	0.00	485.46	R-35R, R-39, and R-40 were offline on this date
O-20	4/24/2013	497.41	No LNAPL	11.84	0.00	485.57	
O-20	5/29/2013	497.41	No LNAPL	10.79	0.00	486.62	
O-20	6/25/2013	497.41	No LNAPL	10.64	0.00	486.77	
O-20	10/29/2013	497.41	No LNAPL	12.44	0.00	484.97	
O-20	11/19/2013	497.41	No LNAPL	11.76	0.00	485.65	
O-20	12/20/2013	497.41	No LNAPL	11.63	0.00	485.78	
O-20	10/15/2015	497.45	No LNAPL	11.40	0.00	486.05	
O-20	8/11/2016	497.43	--	9.45	--	487.98	
O-20	10/13/2016	497.43	No LNAPL	11.50	0.00	485.93	
O-20	3/1/2017	497.43	No LNAPL	Frozen	0.00	—	Ice at 11.59 feet BTOC
O-21	10/21/2011	—	No LNAPL	8.00	0.00	—	New well
O-21	12/7/2011	493.12	—	—	—	—	Access unavailable per NPT operator
O-21	2/8/2012	493.12	No LNAPL	9.83	0.00	483.29	
O-21	2/17/2012	493.12	7.81	7.90	0.09	485.30	
O-21	3/13/2012	493.12	7.84	7.85	0.01	485.28	
O-21	4/10/2012	493.12	Sheen	7.68	Sheen	485.44	
O-21	5/14/2012	493.12	Sheen	7.75	Sheen	485.37	
O-21	6/13/2012	493.12	Sheen	6.43	Sheen	486.69	
O-21	7/18/2012	493.12	No LNAPL	6.55	0.00	486.57	
O-21	8/21/2012	493.12	6.51	6.55	0.04	486.60	
O-21	9/18/2012	493.12	7.26	7.31	0.05	485.85	
O-21	10/16/2012	493.12	7.28	7.33	0.05	485.83	
O-21	11/29/2012	493.12	6.80	6.81	0.01	486.32	
O-21	12/28/2012	493.12	7.14	7.16	0.02	485.98	
O-21	1/24/2013	493.12	No LNAPL	Frozen	0.00	—	Frozen at 7.16 ft BTOC
O-21	2/26/2013	493.12	No LNAPL	Frozen	0.00	—	Frozen at 7.14 ft BTOC
O-21	3/28/2013	493.12	No LNAPL	Frozen	0.00	—	Frozen at 7.12 ft BTOC. R-35R, R-39, and R-40 were offline on this date
O-21	4/24/2013	493.12	Sheen	7.26	Sheen	485.86	
O-21	5/30/2013	493.12	No LNAPL	6.16	0.00	486.96	
O-21	6/24/2013	493.12	6.10	6.11	0.01	487.02	
O-21	7/23/2013	493.12	Sheen	5.80	Sheen	487.32	
O-21	8/21/2013	493.12	No LNAPL	5.66	0.00	487.46	
O-21	9/24/2013	493.12	6.79	6.91	0.12	486.31	
O-21	10/29/2013	493.12	7.90	8.18	0.28	485.18	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-21	11/19/2013	493.12	7.20	7.25	0.05	485.91	
O-21	12/20/2013	493.12	Sheen	7.11	Sheen	486.01	
O-21	1/14/2014	493.12	7.42	7.45	0.03	485.70	
O-21	2/25/2014	493.12	7.75	7.83	0.08	485.36	
O-21	3/18/2014	493.12	7.73	8.04	0.31	485.35	
O-21	4/14/2014	493.14	7.82	8.21	0.39	485.26	
O-21	5/29/2014	493.14	7.41	7.77	0.36	485.68	
O-21	6/19/2014	493.14	—	—	—	—	Well is submerged
O-21	8/28/2014	493.14	5.65	6.03	0.38	487.44	
O-21	9/29/2014	493.14	6.51	7.03	0.52	486.56	
O-21	10/16/2014	493.14	7.11	7.50	0.39	485.97	
O-21	3/10/2015	493.14	6.97	8.25	1.28	485.99	
O-21	5/18/2015	493.14	6.83	6.87	0.04	486.30	
O-21	8/12/2015	493.16	5.71	5.72	0.01	487.49	
O-21	10/15/2015	493.16	6.87	7.17	0.30	486.29	
O-21	3/4/2016	493.16	7.55	8.21	0.66	485.57	
O-21	6/14/2016	493.16	6.65	6.67	0.02	486.51	
O-21	8/18/2016	493.16	No LNAPL	5.28	0.00	487.88	
O-21	10/13/2016	493.13	6.95	7.13	0.18	486.15	
O-21	3/1/2017	493.13	6.81	Frozen	0.86	—	Ice at 7.67 feet BTOC
O-21	3/11/2017	493.13	6.80	7.70	0.90	486.20	
O-21	3/18/2017	493.13	6.95	Frozen	0.08	—	Depth to ice = 7.03 feet
O-21	3/24/2017	493.13	6.95	Frozen	0.13	—	Depth to ice = 7.08 feet
O-21	4/1/2017	493.13	6.90	7.05	0.15	486.21	
O-21	4/8/2017	493.13	No LNAPL	4.95	0.00	488.18	
O-21	4/15/2017	493.13	No LNAPL	4.45	0.00	488.68	
O-21	6/6/2017	493.13	Sheen	Frozen	Sheen	—	DTW = 6.90 feet BTOC. Ice at 7.07 feet BTOC
O-22	12/2/2011	496.73	No LNAPL	12.29	0.00	484.44	New well
O-22	2/7/2012	496.73	No LNAPL	12.52	0.00	484.21	
O-22	2/16/2012	496.73	No LNAPL	12.45	0.00	484.28	
O-22	3/13/2012	496.73	No LNAPL	12.43	0.00	484.30	
O-22	4/10/2012	496.73	No LNAPL	12.34	0.00	484.39	
O-22	4/19/2012	496.73	No LNAPL	11.81	0.00	484.92	
O-22	5/9/2012	496.73	No LNAPL	12.12	0.00	484.61	
O-22	6/12/2012	496.73	No LNAPL	11.25	0.00	485.48	
O-22	7/17/2012	496.73	No LNAPL	10.82	0.00	485.91	
O-22	7/30/2012	496.73	No LNAPL	10.57	0.00	486.16	
O-22	8/21/2012	496.73	No LNAPL	11.25	0.00	485.48	
O-22	9/18/2012	496.73	No LNAPL	11.87	0.00	484.86	
O-22	10/16/2012	496.73	No LNAPL	11.89	0.00	484.84	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-22	11/1/2012	496.73	No LNAPL	11.98	0.00	484.75	
O-22	11/29/2012	496.76	No LNAPL	11.45	0.00	485.31	
O-22	12/27/2012	496.76	No LNAPL	11.79	0.00	484.97	
O-22	1/23/2013	496.76	No LNAPL	11.79	0.00	484.97	
O-22	2/26/2013	496.76	No LNAPL	11.72	0.00	485.04	
O-22	3/28/2013	496.76	No LNAPL	12.04	0.00	484.72	R-35R, R-39, and R-40 were offline on this date
O-22	4/24/2013	496.76	No LNAPL	12.05	0.00	484.71	
O-22	5/29/2013	496.76	—	—	—	—	Depth to water measurement was not recorded
O-22	6/25/2013	496.76	No LNAPL	10.88	0.00	485.88	
O-22	8/2/2013	496.76	No LNAPL	10.55	0.00	486.21	
O-22	10/1/2013	496.76	No LNAPL	11.77	0.00	484.99	
O-22	10/29/2013	496.76	No LNAPL	12.53	0.00	484.23	
O-22	11/19/2013	496.76	No LNAPL	11.98	0.00	484.78	
O-22	12/20/2013	496.76	No LNAPL	11.82	0.00	484.94	
O-22	3/18/2014	496.76	No LNAPL	12.45	0.00	484.31	
O-22	6/11/2014	496.82	No LNAPL	11.98	0.00	484.84	
O-22	9/9/2014	496.82	No LNAPL	10.63	0.00	486.19	
O-22	11/20/2014	496.82	No LNAPL	11.56	0.00	485.26	
O-22	3/18/2015	496.82	--	12.07	--	484.75	
O-22	6/11/2015	496.82	No LNAPL	11.65	0.00	485.17	
O-22	8/12/2015	496.86	--	10.64	--	486.22	
O-22	10/15/2015	496.86	No LNAPL	11.52	0.00	485.34	
O-22	11/19/2015	496.86	--	11.71	--	485.15	
O-23	1/10/2012	495.83	No LNAPL	11.82	0.00	484.01	
O-23	2/6/2012	495.83	No LNAPL	11.89	0.00	483.94	
O-23	2/15/2012	495.83	No LNAPL	11.82	0.00	484.01	
O-23	3/13/2012	495.83	No LNAPL	11.79	0.00	484.04	
O-23	4/10/2012	495.83	No LNAPL	11.71	0.00	484.12	
O-23	4/19/2012	495.83	--	11.21	--	484.62	
O-23	5/8/2012	495.83	No LNAPL	11.45	0.00	484.38	
O-23	6/12/2012	495.83	No LNAPL	10.66	0.00	485.17	
O-23	7/17/2012	495.83	No LNAPL	10.25	0.00	485.58	
O-23	7/30/2012	495.83	No LNAPL	10.01	0.00	485.82	
O-23	8/21/2012	495.83	No LNAPL	10.67	0.00	485.16	
O-23	9/18/2012	495.83	No LNAPL	11.28	0.00	484.55	
O-23	10/16/2012	495.83	No LNAPL	11.28	0.00	484.55	
O-23	11/1/2012	495.83	No LNAPL	11.34	0.00	484.49	
O-23	11/29/2012	495.83	No LNAPL	10.89	0.00	484.94	
O-23	12/27/2012	495.83	No LNAPL	11.21	0.00	484.62	
O-23	1/23/2013	495.83	No LNAPL	11.15	0.00	484.68	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-23	2/26/2013	495.83	No LNAPL	11.27	0.00	484.56	
O-23	3/28/2013	495.83	No LNAPL	11.40	0.00	484.43	R-35R, R-39, and R-40 were offline on this date
O-23	4/24/2013	495.83	No LNAPL	11.40	0.00	484.43	
O-23	5/29/2013	495.83	No LNAPL	10.46	0.00	485.37	
O-23	6/25/2013	495.83	No LNAPL	10.27	0.00	485.56	
O-23	8/2/2013	495.83	No LNAPL	9.97	0.00	485.86	
O-23	10/1/2013	495.83	--	11.13	--	484.70	
O-23	10/29/2013	495.83	No LNAPL	11.89	0.00	483.94	
O-23	11/19/2013	495.83	No LNAPL	11.35	0.00	484.48	
O-23	12/20/2013	495.83	No LNAPL	11.20	0.00	484.63	
O-23	3/18/2014	495.83	--	11.81	--	484.02	
O-23	6/11/2014	495.83	--	11.35	--	484.48	
O-23	9/9/2014	495.83	--	10.00	--	485.83	
O-23	11/20/2014	495.83	No LNAPL	10.95	0.00	484.88	
O-23	3/18/2015	495.83	--	11.45	--	484.38	
O-23	6/11/2015	495.83	--	11.04	--	484.79	
O-23	8/12/2015	495.85	--	10.25	--	485.64	
O-23	10/15/2015	495.85	No LNAPL	10.91	0.00	484.94	
O-23	11/19/2015	495.85	--	11.14	--	484.71	
O-23	10/13/2016	495.86	No LNAPL	11.08	0.00	484.78	
O-23	3/1/2017	495.86	No LNAPL	11.24	0.00	484.62	
O-24	12/2/2011	496.86	No LNAPL	13.05	0.00	483.81	New well
O-24	1/10/2012	496.86	No LNAPL	13.17	0.00	483.69	
O-24	2/6/2012	496.86	No LNAPL	13.27	0.00	483.59	
O-24	2/16/2012	496.86	No LNAPL	13.18	0.00	483.68	
O-24	3/13/2012	496.86	No LNAPL	13.17	0.00	483.69	
O-24	4/10/2012	496.86	No LNAPL	13.10	0.00	483.76	
O-24	4/19/2012	496.86	No LNAPL	12.55	0.00	484.31	
O-24	5/8/2012	496.86	No LNAPL	12.84	0.00	484.02	
O-24	6/13/2012	496.86	No LNAPL	11.91	0.00	484.95	
O-24	7/17/2012	496.86	No LNAPL	11.61	0.00	485.25	
O-24	7/30/2012	496.86	No LNAPL	11.33	0.00	485.53	
O-24	8/21/2012	496.86	No LNAPL	12.04	0.00	484.82	
O-24	9/18/2012	496.86	No LNAPL	12.66	0.00	484.20	
O-24	10/16/2012	496.86	No LNAPL	12.66	0.00	484.20	
O-24	11/1/2012	496.86	No LNAPL	12.70	0.00	484.16	
O-24	11/29/2012	496.87	No LNAPL	12.23	0.00	484.64	
O-24	12/27/2012	496.87	No LNAPL	12.54	0.00	484.33	
O-24	1/23/2013	496.87	No LNAPL	12.51	0.00	484.36	
O-24	2/26/2013	496.87	No LNAPL	12.67	0.00	484.20	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-24	3/29/2013	496.87	No LNAPL	12.83	0.00	484.04	R-35R, R-39, and R-40 were offline on this date
O-24	4/24/2013	496.87	No LNAPL	12.81	0.00	484.06	
O-24	5/29/2013	496.87	No LNAPL	11.76	0.00	485.11	
O-24	6/25/2013	496.87	No LNAPL	11.67	0.00	485.20	
O-24	7/23/2013	496.87	--	11.44	--	485.43	
O-24	8/2/2013	496.87	No LNAPL	11.32	0.00	485.55	
O-24	8/21/2013	496.87	No LNAPL	11.31	0.00	485.56	
O-24	9/30/2013	496.89	No LNAPL	12.53	0.00	484.36	
O-24	10/22/2013	496.89	No LNAPL	13.14	0.00	483.75	
O-24	11/26/2013	496.89	No LNAPL	12.49	0.00	484.40	
O-24	12/18/2013	496.92	No LNAPL	12.56	0.00	484.36	
O-24	1/9/2014	496.93	No LNAPL	12.84	0.00	484.09	
O-24	2/5/2014	496.93	No LNAPL	12.97	0.00	483.96	
O-24	3/18/2014	496.95	No LNAPL	13.21	0.00	483.74	
O-24	3/24/2014	496.95	No LNAPL	13.24	0.00	483.71	
O-24	4/18/2014	496.96	No LNAPL	13.05	0.00	483.91	
O-24	5/15/2014	496.95	--	12.57	--	484.38	
O-24	6/11/2014	496.92	No LNAPL	12.75	0.00	484.17	
O-24	6/19/2014	496.92	No LNAPL	12.43	0.00	484.49	
O-24	7/15/2014	496.93	No LNAPL	10.67	0.00	486.26	
O-24	8/26/2014	496.94	No LNAPL	11.30	0.00	485.64	
O-24	9/9/2014	496.94	No LNAPL	11.52	0.00	485.42	
O-24	9/24/2014	496.92	No LNAPL	11.87	0.00	485.05	
O-24	10/21/2014	496.93	No LNAPL	12.77	0.00	484.16	
O-24	11/19/2014	496.96	No LNAPL	12.48	0.00	484.48	
O-24	12/16/2014	496.97	No LNAPL	12.66	0.00	484.31	
O-24	12/29/2014	496.97	No LNAPL	12.77	0.00	484.20	
O-24	1/21/2015	496.99	No LNAPL	12.83	0.00	484.16	
O-24	2/25/2015	497.00	No LNAPL	12.96	0.00	484.04	
O-24	3/10/2015	497.01	No LNAPL	12.88	0.00	484.13	
O-24	3/18/2015	497.01	--	12.98	--	484.03	
O-24	3/26/2015	497.01	No LNAPL	12.91	0.00	484.10	
O-24	4/16/2015	497.01	--	12.76	--	484.25	
O-24	5/21/2015	497.00	No LNAPL	12.51	0.00	484.49	
O-24	6/10/2015	496.98	No LNAPL	12.52	0.00	484.46	
O-24	8/12/2015	496.98	No LNAPL	11.52	0.00	485.50	
O-24	8/19/2015	496.98	No LNAPL	11.76	0.00	485.25	
O-24	10/6/2015	496.98	No LNAPL	12.02	0.00	484.97	
O-24	10/15/2015	496.98	No LNAPL	12.44	0.00	484.54	
O-24	11/19/2015	496.98	--	12.60	--	484.38	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-24	1/19/2016	497.02	--	13.12	--	483.86	
O-24	3/4/2016	497.02	No LNAPL	13.29	0.00	483.73	
O-24	5/26/2016	497.03	No LNAPL	12.78	0.00	484.27	
O-24	6/14/2016	497.03	No LNAPL	12.42	0.00	484.61	
O-24	8/15/2016	497.07	--	11.01	--	486.06	
O-24	8/18/2016	497.03	No LNAPL	11.19	0.00	485.84	
O-24	9/9/2016	497.03	No LNAPL	11.67	0.00	485.40	
O-24	10/13/2016	497.03	No LNAPL	12.67	0.00	484.36	
O-24	10/21/2016	497.07	--	12.90	--	484.17	
O-24	11/15/2016	497.07	No LNAPL	12.37	0.00	484.80	
O-24	2/8/2017	497.11	No LNAPL	12.81	0.00	484.37	
O-24	3/1/2017	497.11	No LNAPL	12.87	0.00	484.24	
O-24	6/6/2017	497.09	No LNAPL	12.81	0.00	484.28	
O-24	6/13/2017	497.09	No LNAPL	12.14	0.00	485.00	
O-24	7/10/2017	497.09	--	11.63	--	485.46	
O-24	11/1/2017	497.09	No LNAPL	13.15	0.00	483.94	
O-24-65	1/9/2014	497.03	No LNAPL	12.91	0.00	484.12	
O-24-65	2/5/2014	497.03	No LNAPL	13.05	0.00	483.98	
O-24-65	3/24/2014	497.06	No LNAPL	13.32	0.00	483.74	
O-24-65	4/18/2014	497.07	No LNAPL	13.13	0.00	483.94	
O-24-65	5/15/2014	497.07	--	12.67	--	484.40	
O-24-65	6/19/2014	497.04	No LNAPL	12.52	0.00	484.52	
O-24-65	7/15/2014	497.05	No LNAPL	10.77	0.00	486.28	
O-24-65	8/26/2014	497.04	No LNAPL	11.39	0.00	485.65	
O-24-65	9/24/2014	497.04	No LNAPL	11.97	0.00	485.07	
O-24-65	10/21/2014	497.04	No LNAPL	12.87	0.00	484.17	
O-24-65	11/19/2014	497.07	No LNAPL	12.55	0.00	484.52	
O-24-65	12/16/2014	497.09	No LNAPL	12.75	0.00	484.34	
O-24-65	12/29/2014	497.09	No LNAPL	12.85	0.00	484.24	
O-24-65	1/21/2015	497.11	No LNAPL	12.93	0.00	484.18	
O-24-65	2/25/2015	497.13	No LNAPL	13.06	0.00	484.07	
O-24-65	3/18/2015	497.13	No LNAPL	13.08	0.00	484.05	
O-24-65	3/26/2015	497.13	No LNAPL	13.01	0.00	484.12	
O-24-65	4/16/2015	497.14	--	12.87	--	484.27	
O-24-65	5/21/2015	497.13	No LNAPL	12.62	0.00	484.51	
O-24-65	6/10/2015	497.12	No LNAPL	12.65	0.00	484.47	
O-24-65	8/19/2015	497.11	No LNAPL	11.88	0.00	485.26	
O-24-65	10/6/2015	497.12	No LNAPL	12.15	0.00	484.98	
O-24-65	1/19/2016	497.15	--	13.23	--	483.88	
O-24-65	5/26/2016	497.18	No LNAPL	12.90	0.00	484.30	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-24-65	8/15/2016	497.19	--	11.16	--	486.03	
O-24-65	9/9/2016	497.18	No LNAPL	11.80	0.00	485.42	
O-24-65	11/15/2016	497.19	No LNAPL	12.46	0.00	484.83	
O-24-65	2/8/2017	497.24	No LNAPL	12.91	0.00	484.40	
O-24-65	6/13/2017	497.25	No LNAPL	12.27	0.00	485.03	
O-25	12/2/2011	497.74	No LNAPL	14.03	0.00	483.71	New well
O-25	1/10/2012	497.74	No LNAPL	14.13	0.00	483.61	
O-25	2/6/2012	497.74	No LNAPL	14.23	0.00	483.51	
O-25	3/13/2012	497.74	No LNAPL	14.13	0.00	483.61	
O-25	4/10/2012	497.74	No LNAPL	14.05	0.00	483.69	
O-25	5/8/2012	497.74	No LNAPL	13.81	0.00	483.93	
O-25	6/13/2012	497.74	No LNAPL	13.92	0.00	483.82	
O-25	7/17/2012	497.74	No LNAPL	12.57	0.00	485.17	
O-25	8/21/2012	497.74	No LNAPL	13.00	0.00	484.74	
O-25	9/18/2012	497.74	No LNAPL	13.62	0.00	484.12	
O-25	10/16/2012	497.74	No LNAPL	13.62	0.00	484.12	
O-25	11/29/2012	497.75	No LNAPL	13.15	0.00	484.60	
O-25	12/27/2012	497.75	No LNAPL	13.51	0.00	484.24	
O-25	1/23/2013	497.75	No LNAPL	13.47	0.00	484.28	
O-25	2/26/2013	497.75	No LNAPL	13.63	0.00	484.12	
O-25	3/29/2013	497.75	No LNAPL	13.79	0.00	483.96	R-35R, R-39, and R-40 were offline on this date
O-25	4/24/2013	497.75	No LNAPL	13.74	0.00	484.01	
O-25	5/29/2013	497.75	No LNAPL	12.78	0.00	484.97	
O-25	6/25/2013	497.75	No LNAPL	12.64	0.00	485.11	
O-25	10/29/2013	497.75	No LNAPL	14.26	0.00	483.49	
O-25	11/19/2013	497.75	No LNAPL	13.69	0.00	484.06	
O-25	12/20/2013	497.75	No LNAPL	13.69	0.00	484.06	
O-25	3/10/2015	497.79	No LNAPL	13.81	0.00	483.98	
O-25	5/18/2015	497.79	No LNAPL	13.41	0.00	484.38	
O-25	8/12/2015	497.79	No LNAPL	12.45	0.00	485.38	
O-25	10/15/2015	497.79	No LNAPL	13.38	0.00	484.41	
O-25	3/4/2016	497.79	No LNAPL	14.19	0.00	483.60	
O-25	6/14/2016	497.79	No LNAPL	13.32	0.00	484.47	
O-25	8/18/2016	497.81	No LNAPL	12.08	0.00	485.73	
O-25	10/13/2016	497.81	No LNAPL	13.58	0.00	484.23	
O-25	3/1/2017	497.81	No LNAPL	13.74	0.00	484.07	
O-25	6/6/2017	497.81	No LNAPL	13.68	0.00	484.13	
O-25	11/1/2017	497.85	No LNAPL	14.62	0.00	483.23	
O-26	12/2/2011	496.79	No LNAPL	13.10	0.00	483.69	New well
O-26	1/10/2012	496.79	No LNAPL	13.21	0.00	483.58	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-26	2/6/2012	496.79	No LNAPL	13.31	0.00	483.48	
O-26	2/16/2012	496.79	No LNAPL	13.22	0.00	483.57	
O-26	3/13/2012	496.79	No LNAPL	13.21	0.00	483.58	
O-26	4/10/2012	496.79	No LNAPL	13.16	0.00	483.63	
O-26	4/19/2012	496.79	No LNAPL	12.61	0.00	484.18	
O-26	5/8/2012	496.79	No LNAPL	12.93	0.00	483.86	
O-26	6/13/2012	496.79	No LNAPL	11.99	0.00	484.80	
O-26	7/17/2012	496.79	No LNAPL	11.66	0.00	485.13	
O-26	7/30/2012	496.79	No LNAPL	11.37	0.00	485.42	
O-26	8/21/2012	496.79	No LNAPL	12.08	0.00	484.71	
O-26	9/18/2012	496.79	No LNAPL	12.72	0.00	484.07	
O-26	10/16/2012	496.79	No LNAPL	12.73	0.00	484.06	
O-26	11/1/2012	496.79	No LNAPL	12.75	0.00	484.04	
O-26	11/29/2012	496.82	No LNAPL	12.27	0.00	484.55	
O-26	12/27/2012	496.82	No LNAPL	12.62	0.00	484.20	
O-26	1/23/2013	496.82	No LNAPL	12.58	0.00	484.24	
O-26	2/26/2013	496.82	No LNAPL	12.74	0.00	484.08	
O-26	3/29/2013	496.82	No LNAPL	12.92	0.00	483.90	R-35R, R-39, and R-40 were offline on this date
O-26	4/24/2013	496.82	No LNAPL	12.89	0.00	483.93	
O-26	5/29/2013	496.82	No LNAPL	11.87	0.00	484.95	
O-26	6/25/2013	496.82	No LNAPL	11.78	0.00	485.04	
O-26	8/2/2013	496.82	No LNAPL	11.40	0.00	485.42	
O-26	10/1/2013	496.82	No LNAPL	12.70	0.00	484.12	
O-26	10/29/2013	496.82	No LNAPL	13.41	0.00	483.41	
O-26	11/19/2013	496.82	No LNAPL	12.78	0.00	484.04	
O-26	12/20/2013	496.82	No LNAPL	12.71	0.00	484.11	
O-26	3/18/2014	496.82	No LNAPL	13.31	0.00	483.51	
O-26	6/11/2014	496.41	No LNAPL	12.88	0.00	483.53	
O-26	9/9/2014	496.41	No LNAPL	11.69	0.00	484.72	
O-26	11/20/2014	496.41	No LNAPL	12.57	0.00	483.84	
O-26	3/10/2015	496.41	No LNAPL	13.00	0.00	483.41	
O-26	3/19/2015	496.41	--	13.09	--	483.32	
O-26	5/18/2015	496.41	No LNAPL	12.60	0.00	483.81	
O-26	6/10/2015	496.41	No LNAPL	12.64	0.00	483.77	
O-26	8/12/2015	496.41	No LNAPL	11.63	0.00	484.82	
O-26	10/15/2015	496.41	No LNAPL	12.59	0.00	483.82	
O-26	11/19/2015	496.41	--	12.72	--	483.69	
O-26	3/4/2016	496.41	No LNAPL	13.39	0.00	483.02	
O-26	6/14/2016	496.41	No LNAPL	12.49	0.00	483.92	
O-26	8/10/2016	496.94	--	10.78	--	486.16	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-26	8/18/2016	496.94	No LNAPL	11.27	0.00	485.67	
O-26	10/13/2016	496.94	No LNAPL	12.78	0.00	484.16	
O-26	10/21/2016	496.94	--	12.99	--	483.95	
O-26	3/1/2017	496.94	No LNAPL	12.94	0.00	484.00	
O-26	6/6/2017	496.94	No LNAPL	12.89	0.00	484.05	
O-26	7/10/2017	496.97	--	11.66	--	485.31	
O-26	11/1/2017	496.98	No LNAPL	13.22	0.00	483.76	
O-26-65	8/10/2016	496.61	--	10.47	--	486.14	
O-26-65	7/10/2017	496.60	--	11.31	--	485.29	
O-27	12/2/2011	496.84	No LNAPL	13.04	0.00	483.80	New well
O-27	1/10/2012	496.84	No LNAPL	13.20	0.00	483.64	
O-27	2/6/2012	496.84	No LNAPL	13.29	0.00	483.55	
O-27	2/15/2012	496.84	No LNAPL	13.22	0.00	483.62	
O-27	3/13/2012	496.84	No LNAPL	13.20	0.00	483.64	
O-27	4/19/2012	496.84	12.51	12.82	0.31	484.28	
O-27	5/8/2012	496.84	12.75	13.77	1.02	483.92	
O-27	6/12/2012	496.84	12.03	12.10	0.07	484.80	
O-27	7/17/2012	496.84	11.55	11.94	0.39	485.22	
O-27	7/30/2012	496.84	11.26	11.37	0.11	485.56	
O-27	8/21/2012	496.84	12.00	12.28	0.28	484.79	
O-27	9/18/2012	496.84	12.59	13.30	0.71	484.13	
O-27	10/15/2012	496.84	12.50	13.41	0.91	484.19	
O-27	10/17/2012	496.84	12.57	13.56	0.99	484.10	Initial levels of first October 2012 baildown test
O-27	10/29/2012	496.84	13.06	13.74	0.68	483.66	Initial levels of second October 2012 baildown test
O-27	11/1/2012	496.84	12.68	12.70	0.02	484.16	
O-27	11/29/2012	496.86	12.19	12.42	0.23	484.63	
O-27	12/28/2012	496.86	12.52	12.97	0.45	484.26	
O-27	1/24/2013	496.86	12.50	12.88	0.38	484.30	
O-27	2/26/2013	496.86	12.62	13.16	0.54	484.15	
O-27	3/28/2013	496.86	12.76	13.25	0.49	484.02	R-35R, R-39, and R-40 were offline on this date
O-27	4/24/2013	496.86	12.80	12.91	0.11	484.04	
O-27	5/29/2013	496.86	11.82	11.83	0.01	485.04	
O-27	6/24/2013	496.86	12.74	12.80	0.06	484.11	
O-27	7/23/2013	496.86	11.46	11.49	0.03	485.39	
O-27	8/2/2013	496.86	11.34	11.35	0.01	485.52	
O-27	8/21/2013	496.86	11.35	11.36	0.01	485.51	
O-27	9/24/2013	496.86	12.37	12.41	0.04	484.48	
O-27	10/1/2013	496.86	12.67	12.72	0.05	484.18	
O-27	10/29/2013	496.86	13.37	13.48	0.11	483.47	
O-27	11/19/2013	496.86	Sheen	12.73	Sheen	484.13	

**Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-27	12/20/2013	496.86	12.65	12.66	0.01	484.21	
O-27	1/15/2014	496.86	No LNAPL	12.96	0.00	483.90	
O-27	2/25/2014	496.86	Sheen	13.23	Sheen	483.63	
O-27	3/18/2014	496.86	Sheen	13.26	Sheen	483.60	
O-27	4/14/2014	496.93	13.28	13.29	0.01	483.65	
O-27	5/16/2014	496.93	Sheen	12.72	Sheen	484.21	
O-27	6/11/2014	496.93	Sheen	12.86	Sheen	484.07	
O-27	7/15/2014	496.93	No LNAPL	10.75	0.00	486.18	
O-27	8/28/2014	496.93	11.42	11.43	0.01	485.51	
O-27	9/9/2014	496.93	11.69	11.70	0.01	485.24	
O-27	10/16/2014	496.93	Sheen	12.77	Sheen	484.16	
O-27	11/20/2014	496.93	No LNAPL	12.46	0.00	484.47	
O-27	3/10/2015	496.93	12.95	12.97	0.02	483.98	
O-27	3/18/2015	496.93	13.02	13.14	0.12	483.89	
O-27	6/10/2015	496.93	12.62	12.66	0.04	484.30	
O-27	8/12/2015	496.88	Sheen	11.56	Sheen	485.36	
O-27	10/15/2015	496.88	12.58	12.59	0.01	484.34	
O-27	11/19/2015	496.88	12.66	12.75	0.09	484.20	
O-27	3/4/2016	496.88	13.19	13.84	0.65	483.63	
O-27	3/24/2016	496.88	13.37	13.69	0.32	483.46	Baildown testing not conducted- insufficient LNAPL thickness
O-27	3/25/2016	496.88	13.35	13.65	0.30	483.48	Baildown testing not conducted- insufficient LNAPL thickness
O-27	3/31/2016	496.88	13.21	13.45	0.24	483.63	Baildown testing not conducted- insufficient LNAPL thickness
O-27	6/14/2016	496.88	Sheen	12.43	Sheen	484.45	
O-27	8/17/2016	496.94	Sheen	11.41	Sheen	485.53	
O-27	8/18/2016	496.94	No LNAPL	11.19	0.00	485.75	
O-27	10/13/2016	496.94	12.72	12.73	0.01	484.22	
O-27	10/25/2016	496.94	13.03	13.30	0.27	483.86	
O-27	3/1/2017	496.94	12.73	13.31	0.58	484.11	
O-27	3/10/2017	496.94	12.77	13.41	0.64	484.06	Initial fluid levels prior to Q1 2017 transmissivity testing
O-27	3/11/2017	496.94	12.80	13.02	0.22	484.10	
O-27	3/18/2017	496.94	12.82	13.15	0.33	484.06	
O-27	3/24/2017	496.94	12.92	13.28	0.36	483.96	
O-27	4/1/2017	496.94	12.85	13.33	0.48	484.01	
O-27	4/8/2017	496.94	12.85	13.01	0.16	484.06	
O-27	4/15/2017	496.94	12.65	12.78	0.13	484.27	
O-27	6/6/2017	496.94	12.80	13.04	0.24	484.10	
O-27	7/13/2017	496.94	No LNAPL	11.37	0.00	485.57	
O-27	10/18/2017	496.97	Sheen	12.86	Sheen	484.11	
O-27	11/1/2017	496.97	12.91	13.99	1.08	483.88	
O-27-65	7/28/2016	497.44	--	11.11	--	486.33	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-27-65	10/18/2016	497.44	--	13.34	--	484.10	
O-27-65	7/10/2017	497.44	--	12.00	--	485.44	
O-27-150	7/28/2016	497.62	--	11.32	--	486.30	
O-28	12/2/2011	494.62	No LNAPL	9.37	0.00	485.25	New well
O-28	1/11/2012	494.62	No LNAPL	9.55	0.00	485.07	
O-28	2/8/2012	494.62	No LNAPL	9.59	0.00	485.03	
O-28	2/16/2012	494.62	No LNAPL	9.54	0.00	485.08	
O-28	3/13/2012	494.62	No LNAPL	9.54	0.00	485.08	
O-28	4/10/2012	494.62	No LNAPL	9.39	0.00	485.23	
O-28	4/19/2012	494.62	No LNAPL	8.93	0.00	485.69	
O-28	5/9/2012	494.62	No LNAPL	Frozen	0.00	—	Frozen at 9.22 ft BTOC
O-28	6/12/2012	494.62	No LNAPL	8.15	0.00	486.47	
O-28	7/17/2012	494.62	No LNAPL	7.71	0.00	486.91	
O-28	7/30/2012	494.62	No LNAPL	7.31	0.00	487.31	
O-28	8/21/2012	494.62	No LNAPL	8.15	0.00	486.47	
O-28	9/19/2012	494.62	No LNAPL	9.02	0.00	485.60	
O-28	10/16/2012	494.62	No LNAPL	9.00	0.00	485.62	
O-28	11/1/2012	494.62	No LNAPL	8.88	0.00	485.74	
O-28	11/29/2012	494.65	No LNAPL	8.45	0.00	486.20	
O-28	12/27/2012	494.65	No LNAPL	8.86	0.00	485.79	
O-28	1/23/2013	494.65	No LNAPL	8.81	0.00	485.84	
O-28	2/26/2013	494.65	No LNAPL	8.99	0.00	485.66	
O-28	3/28/2013	494.65	No LNAPL	9.17	0.00	485.48	R-35R, R-39, and R-40 were offline on this date
O-28	4/24/2013	494.65	No LNAPL	9.14	0.00	485.51	
O-28	5/29/2013	494.65	No LNAPL	7.91	0.00	486.74	
O-28	6/25/2013	494.65	No LNAPL	7.78	0.00	486.87	
O-28	8/2/2013	494.65	No LNAPL	7.23	0.00	487.42	
O-28	10/1/2013	494.65	--	8.91	--	485.74	
O-28	10/29/2013	494.65	No LNAPL	9.70	0.00	484.95	
O-28	11/19/2013	494.65	No LNAPL	8.85	0.00	485.80	
O-28	12/20/2013	494.65	No LNAPL	8.84	0.00	485.81	
O-28	3/18/2014	494.65	--	9.54	--	485.11	
O-28	6/11/2014	494.76	--	9.08	--	485.68	
O-28	9/9/2014	494.76	--	7.88	--	486.88	
O-28	11/20/2014	494.76	No LNAPL	8.60	0.00	486.16	
O-28	3/19/2015	494.76	--	9.13	--	485.63	
O-28	6/11/2015	494.76	--	8.68	--	486.08	
O-28	8/12/2015	494.82	--	7.45	--	487.37	
O-28	10/15/2015	494.82	No LNAPL	8.80	0.00	486.02	
O-28	11/19/2015	494.82	--	8.69	--	486.13	Added casing cap, no cap upon arrival

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-29	12/2/2011	498.59	No LNAPL	13.93	0.00	484.66	New well
O-29	2/7/2012	498.59	No LNAPL	14.12	0.00	484.47	
O-29	2/16/2012	498.59	No LNAPL	14.04	0.00	484.55	
O-29	3/13/2012	498.59	No LNAPL	14.05	0.00	484.54	
O-29	4/10/2012	498.59	No LNAPL	13.96	0.00	484.63	
O-29	4/19/2012	498.59	No LNAPL	13.43	0.00	485.16	
O-29	5/9/2012	498.59	No LNAPL	13.73	0.00	484.86	
O-29	6/12/2012	498.59	No LNAPL	12.90	0.00	485.69	
O-29	7/17/2012	498.59	No LNAPL	12.42	0.00	486.17	
O-29	7/30/2012	498.59	No LNAPL	12.14	0.00	486.45	
O-29	8/21/2012	498.59	No LNAPL	12.86	0.00	485.73	
O-29	9/18/2012	498.59	No LNAPL	13.50	0.00	485.09	
O-29	10/16/2012	498.59	No LNAPL	13.51	0.00	485.08	
O-29	11/1/2012	498.59	No LNAPL	13.60	0.00	484.99	
O-29	11/29/2012	498.61	No LNAPL	13.10	0.00	485.51	
O-29	12/27/2012	498.61	No LNAPL	13.42	0.00	485.19	
O-29	1/23/2013	498.61	No LNAPL	13.39	0.00	485.22	
O-29	2/26/2013	498.61	No LNAPL	13.53	0.00	485.08	
O-29	3/28/2013	498.61	No LNAPL	13.66	0.00	484.95	R-35R, R-39, and R-40 were offline on this date
O-29	4/24/2013	498.61	No LNAPL	13.64	0.00	484.97	
O-29	5/29/2013	498.61	No LNAPL	12.66	0.00	485.95	
O-29	6/25/2013	498.61	No LNAPL	12.46	0.00	486.15	
O-29	8/2/2013	498.61	No LNAPL	12.11	0.00	486.50	
O-29	10/1/2013	498.61	No LNAPL	13.38	0.00	485.23	
O-29	10/29/2013	498.61	No LNAPL	14.15	0.00	484.46	
O-29	11/19/2013	498.61	No LNAPL	13.58	0.00	485.03	
O-29	12/20/2013	498.61	No LNAPL	13.41	0.00	485.20	
O-29	10/15/2015	498.68	No LNAPL	13.12	0.00	485.56	
O-29	10/13/2016	498.65	No LNAPL	13.26	0.00	485.39	
O-29	3/1/2017	498.65	No LNAPL	13.38	0.00	485.27	
O-30	2/26/2013	497.97	No LNAPL	12.54	0.00	485.43	
O-30	3/28/2013	497.97	No LNAPL	Frozen	0.00	—	Frozen at 12.65 ft BTOC. R-35R, R-39, and R-40 were offline on this date
O-30	4/24/2013	497.97	No LNAPL	12.03	0.00	485.94	
O-30	6/25/2013	497.97	No LNAPL	11.46	0.00	486.51	
O-30	8/2/2013	497.97	No LNAPL	11.12	0.00	486.85	
O-30	10/1/2013	497.97	No LNAPL	12.40	0.00	485.57	
O-30	10/29/2013	497.97	No LNAPL	13.26	0.00	484.71	
O-30	3/18/2014	497.97	No LNAPL	13.07	0.00	484.90	
O-30	6/11/2014	498.01	No LNAPL	12.61	0.00	485.40	
O-30	9/9/2014	498.01	No LNAPL	11.25	0.00	486.76	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-30	11/20/2014	498.01	No LNAPL	12.14	0.00	485.87	
O-30	3/18/2015	498.01	--	12.63	--	485.38	
O-30	6/11/2015	498.01	No LNAPL	12.21	0.00	485.80	
O-30	8/12/2015	498.02	--	11.18	--	486.84	
O-30	10/15/2015	498.02	No LNAPL	12.11	0.00	485.91	
O-30	11/19/2015	498.02	--	12.28	--	485.74	
O-30	10/13/2016	498.01	No LNAPL	12.22	0.00	485.79	
O-30	3/1/2017	498.01	No LNAPL	12.33	0.00	485.68	
O-31	9/24/2013	—	11.38	12.12	0.74	—	
O-31	10/29/2013	496.11	12.43	13.11	0.68	483.54	
O-31	11/25/2013	496.11	11.46	12.99	1.53	484.34	
O-31	12/20/2013	496.13	11.63	12.87	1.24	484.25	
O-31	1/15/2014	496.13	11.93	13.06	1.13	483.97	
O-31	2/5/2014	496.13	11.98	13.14	1.16	483.92	
O-31	3/24/2014	496.13	12.27	13.29	1.02	483.66	
O-31	4/14/2014	496.13	12.25	13.39	1.14	483.65	
O-31	5/29/2014	496.13	11.91	13.10	1.19	483.98	
O-31	6/20/2014	496.13	Sheen	11.05	Sheen	485.08	
O-31	7/30/2014	496.13	10.11	11.19	1.08	485.80	
O-31	8/28/2014	496.13	10.28	11.57	1.29	485.59	
O-31	9/24/2014	496.13	11.02	11.47	0.45	485.02	
O-31	10/16/2014	496.13	11.79	12.15	0.36	484.27	
O-31	3/10/2015	496.13	11.84	12.81	0.97	484.10	
O-31	5/18/2015	496.13	11.54	12.24	0.70	484.45	
O-31	8/12/2015	496.14	10.62	10.90	0.28	485.50	
O-31	10/15/2015	496.14	11.56	11.99	0.43	484.53	
O-31	3/4/2016	496.14	12.27	13.04	0.77	483.77	
O-31	3/24/2016	496.14	12.35	13.14	0.79	483.63	Initial fluid levels and product recovered by SWI during baildown testing
O-31	6/14/2016	496.14	11.41	12.25	0.84	484.56	
O-31	7/2/2016	496.14	11.05	11.33	0.28	485.03	
O-31	7/8/2016	496.14	No LNAPL	10.61	0.00	485.53	
O-31	7/16/2016	496.14	No LNAPL	10.48	0.00	485.66	
O-31	7/23/2016	496.14	No LNAPL	9.60	0.00	486.54	
O-31	7/30/2016	496.14	No LNAPL	9.80	0.00	486.34	
O-31	8/6/2016	496.14	No LNAPL	9.84	0.00	486.30	
O-31	8/17/2016	496.14	10.21	10.57	0.36	485.86	
O-31	8/18/2016	496.14	10.22	10.63	0.41	485.84	
O-31	10/13/2016	496.14	11.73	12.11	0.38	484.33	
O-31	3/1/2017	496.14	11.82	12.21	0.39	484.24	
O-31	3/10/2017	496.14	11.86	12.27	0.41	484.20	Baildown testing not conducted-- insufficient LNAPL thickness

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-31	6/6/2017	496.14	11.82	12.21	0.39	484.24	
O-31	7/13/2017	496.14	10.54	10.59	0.05	485.55	
O-31	7/27/2017	496.14	10.48	10.76	0.28	485.60	
O-31	8/28/2017	496.14	10.96	11.36	0.40	485.10	
O-31	9/21/2017	496.15	11.64	12.08	0.44	484.42	
O-31	10/18/2017	496.15	Sheen	12.20	Sheen	483.95	
O-31	11/1/2017	496.15	12.12	12.51	0.39	483.95	
O-32	9/24/2013	—	--	11.85	--	—	
O-32	10/29/2013	496.36	No LNAPL	12.87	0.00	483.49	
O-32	11/19/2013	496.36	No LNAPL	12.19	0.00	484.17	
O-32	12/20/2013	496.36	No LNAPL	12.15	0.00	484.21	
O-32	1/14/2014	496.36	11.76	12.71	0.95	484.41	
O-32	2/5/2014	496.40	No LNAPL	12.49	0.00	483.91	
O-32	3/24/2014	496.41	No LNAPL	12.76	0.00	483.65	
O-32	4/18/2014	496.42	No LNAPL	12.65	0.00	483.77	
O-32	5/15/2014	496.40	--	12.15	--	484.25	
O-32	5/16/2014	496.40	No LNAPL	12.23	0.00	484.17	
O-32	6/19/2014	496.40	No LNAPL	11.92	0.00	484.48	
O-32	6/20/2014	496.40	No LNAPL	11.55	0.00	484.85	
O-32	7/15/2014	496.41	No LNAPL	10.15	0.00	486.26	
O-32	8/26/2014	496.41	No LNAPL	10.84	0.00	485.57	
O-32	9/24/2014	496.40	No LNAPL	11.42	0.00	484.98	
O-32	10/21/2014	496.39	No LNAPL	12.34	0.00	484.05	
O-32	11/19/2014	496.40	No LNAPL	11.97	0.00	484.43	
O-32	12/16/2014	496.42	No LNAPL	12.15	0.00	484.27	
O-32	12/29/2014	496.42	No LNAPL	12.27	0.00	484.15	
O-32	1/21/2015	496.43	No LNAPL	12.32	0.00	484.11	
O-32	2/25/2015	496.43	No LNAPL	12.46	0.00	483.97	
O-32	3/10/2015	496.43	No LNAPL	12.37	0.00	484.06	
O-32	3/18/2015	496.43	No LNAPL	12.47	0.00	483.96	
O-32	3/26/2015	496.43	No LNAPL	12.40	0.00	484.03	
O-32	4/16/2015	496.45	--	12.26	--	484.19	
O-32	5/21/2015	496.46	No LNAPL	12.02	0.00	484.44	
O-32	6/10/2015	496.46	No LNAPL	12.06	0.00	484.40	
O-32	8/19/2015	496.45	No LNAPL	11.27	0.00	485.21	
O-32	10/6/2015	496.44	No LNAPL	11.56	0.00	484.89	
O-32	10/15/2015	496.44	No LNAPL	11.98	0.00	484.46	
O-32	1/19/2016	496.46	--	12.62	--	483.80	
O-32	3/4/2016	496.46	No LNAPL	12.78	0.00	483.68	
O-32	5/26/2016	496.49	No LNAPL	12.28	0.00	484.23	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-32	8/18/2016	496.49	Sheen	10.65	Sheen	485.84	
O-32	9/9/2016	496.48	No LNAPL	11.14	0.00	485.38	
O-32	10/13/2016	496.48	No LNAPL	12.18	0.00	484.30	
O-32	11/15/2016	496.49	No LNAPL	11.81	0.00	484.78	
O-32	2/8/2017	496.50	No LNAPL	12.26	0.00	484.31	
O-32	3/1/2017	496.50	No LNAPL	12.33	0.00	484.17	
O-32	6/13/2017	496.55	No LNAPL	11.56	0.00	485.04	
O-33	9/24/2013	—	11.41	11.48	0.07	—	
O-33	10/29/2013	496.53	12.41	12.75	0.34	484.05	
O-33	11/19/2013	496.53	11.64	12.45	0.81	484.73	
O-33	12/20/2013	496.53	11.56	12.33	0.77	484.82	
O-33	1/14/2014	496.53	10.31	10.66	0.35	486.15	
O-33	2/24/2014	496.53	12.06	13.07	1.01	484.27	
O-33	3/24/2014	496.53	12.30	12.44	0.14	484.20	
O-33	4/14/2014	496.53	12.23	12.80	0.57	484.19	
O-33	5/16/2014	496.53	11.59	12.15	0.56	484.83	
O-33	6/20/2014	496.53	11.13	11.36	0.23	485.35	
O-33	7/19/2014	496.53	9.71	9.86	0.15	486.79	
O-33	8/28/2014	496.53	10.31	10.56	0.25	486.17	
O-33	9/29/2014	496.53	11.12	11.43	0.31	485.35	
O-33	10/16/2014	496.53	11.67	11.97	0.30	484.80	
O-33	3/10/2015	496.53	11.88	12.08	0.20	484.61	
O-33	5/18/2015	496.53	11.43	11.96	0.53	484.99	
O-33	8/12/2015	496.57	10.45	10.61	0.16	486.13	
O-33	10/15/2015	496.57	11.50	11.69	0.19	485.07	
O-33	3/4/2016	496.57	12.01	13.62	1.61	484.29	
O-33	3/24/2016	496.57	12.24	13.23	0.99	484.13	Initial fluid levels and product recovered by SWI during baildown testing
O-33	6/14/2016	496.57	11.43	11.52	0.09	485.12	
O-33	8/16/2016	496.62	10.05	10.15	0.10	486.55	
O-33	8/18/2016	496.57	10.12	10.23	0.11	486.43	
O-33	10/13/2016	496.62	11.70	11.78	0.08	484.90	
O-33	3/1/2017	496.62	11.85	12.20	0.35	484.70	
O-33	6/6/2017	496.62	11.90	12.08	0.18	484.68	
O-34	9/24/2013	—	--	10.87	--	—	
O-34	10/29/2013	496.31	11.31	13.72	2.41	484.52	
O-34	11/19/2013	496.31	10.97	11.42	0.45	485.25	
O-34	12/20/2013	496.31	10.88	11.30	0.42	485.35	
O-34	1/14/2014	496.31	10.91	12.78	1.87	485.03	
O-34	2/25/2014	496.31	11.11	13.71	2.60	484.68	
O-34	3/24/2014	496.31	11.16	13.85	2.69	484.61	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-34	4/14/2014	496.31	11.19	13.90	2.71	484.58	
O-34	5/16/2014	496.31	10.86	11.46	0.60	485.33	
O-34	6/20/2014	496.31	10.39	10.60	0.21	485.88	
O-34	7/19/2014	496.31	Sheen	9.98	Sheen	486.33	
O-34	8/28/2014	496.31	9.60	9.61	0.01	486.71	
O-34	9/29/2014	496.31	10.44	10.47	0.03	485.86	
O-34	10/16/2014	496.31	11.00	11.06	0.06	485.30	
O-34	3/10/2015	496.31	11.04	11.47	0.43	485.18	
O-34	5/18/2015	496.31	10.70	11.04	0.34	485.54	
O-34	8/12/2015	496.33	9.67	9.68	0.01	486.70	
O-34	10/15/2015	496.33	10.80	10.81	0.01	485.57	
O-34	3/4/2016	496.33	11.28	13.38	2.10	484.68	
O-34	6/14/2016	496.33	10.66	10.76	0.10	485.65	
O-34	7/2/2016	496.33	No LNAPL	10.16	0.00	486.17	
O-34	7/9/2016	496.33	No LNAPL	9.67	0.00	486.66	
O-34	8/16/2016	496.43	Sheen	9.28	Sheen	487.15	
O-34	8/18/2016	496.33	Sheen	9.36	Sheen	486.97	
O-34	10/13/2016	496.43	10.99	11.00	0.01	485.44	
O-34	3/2/2017	496.43	11.14	11.15	0.01	485.29	
O-34	6/6/2017	496.43	11.15	11.16	0.01	485.28	
O-34	7/13/2017	496.43	Sheen	9.75	Sheen	486.68	
O-34	9/21/2017	496.52	Sheen	11.03	Sheen	485.49	
O-35	9/24/2013	—	--	11.02	--	—	
O-35	10/29/2013	496.88	12.11	12.12	0.01	484.77	
O-35	11/19/2013	496.88	11.37	11.38	0.01	485.51	
O-35	12/20/2013	496.88	11.29	11.31	0.02	485.59	
O-35	1/14/2014	496.88	11.58	11.68	0.10	485.28	
O-35	2/25/2014	496.88	11.97	12.11	0.14	484.88	
O-35	3/24/2014	496.88	12.05	12.20	0.15	484.80	
O-35	4/14/2014	496.88	12.08	12.34	0.26	484.75	
O-35	5/16/2014	496.88	11.38	11.42	0.04	485.49	
O-35	6/20/2014	496.88	Sheen	10.82	Sheen	486.06	
O-35	7/19/2014	496.88	9.72	9.75	0.03	487.15	
O-35	8/28/2014	496.88	10.00	10.14	0.14	486.85	
O-35	9/29/2014	496.88	10.83	10.97	0.14	486.02	
O-35	10/16/2014	496.88	11.38	11.71	0.33	485.43	
O-35	3/10/2015	496.88	11.61	11.81	0.20	485.23	
O-35	10/15/2015	496.88	11.30	11.38	0.08	485.60	
O-35	3/4/2016	496.88	12.12	12.50	0.38	484.73	
O-35	8/16/2016	497.16	9.70	9.81	0.11	487.44	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-35	10/13/2016	497.16	11.45	11.57	0.12	485.69	
O-35	3/1/2017	497.16	11.48	11.50	0.02	485.68	
O-36	9/24/2013	—	11.27	11.28	0.01	—	
O-36	10/29/2013	496.49	12.32	12.33	0.01	484.17	
O-36	11/19/2013	496.49	11.51	12.54	1.03	484.77	
O-36	12/20/2013	496.49	11.51	11.95	0.44	484.89	
O-36	1/14/2014	496.49	11.77	12.22	0.45	484.63	
O-36	2/25/2014	496.49	12.11	12.55	0.44	484.29	
O-36	3/24/2014	496.49	12.15	12.64	0.49	484.24	
O-36	4/14/2014	496.49	12.10	12.82	0.72	484.25	
O-36	5/16/2014	496.49	11.50	11.85	0.35	484.92	
O-36	6/20/2014	496.49	11.14	11.17	0.03	485.34	
O-36	7/30/2014	496.49	Sheen	9.96	Sheen	486.53	
O-36	8/28/2014	496.49	Sheen	10.25	Sheen	486.24	
O-36	9/29/2014	496.49	Sheen	11.04	Sheen	485.45	
O-36	10/16/2014	496.49	11.58	11.60	0.02	484.91	
O-36	3/10/2015	496.49	Sheen	11.79	Sheen	484.70	
O-36	10/15/2015	496.53	Sheen	11.37	Sheen	485.20	
O-36	3/4/2016	496.53	No LNAPL	12.16	0.00	484.42	
O-36	8/18/2016	496.52	10.00	10.01	0.01	486.52	
O-36	10/13/2016	496.52	Sheen	11.48	Sheen	485.04	
O-36	3/1/2017	496.52	No LNAPL	11.60	0.00	484.92	
O-37	9/24/2013	—	10.92	11.20	0.28	—	
O-37	10/29/2013	496.42	12.00	12.20	0.20	484.38	
O-37	11/19/2013	496.42	11.36	11.64	0.28	485.00	
O-37	12/20/2013	496.42	11.27	11.55	0.28	485.09	
O-37	1/14/2014	496.42	11.57	11.81	0.24	484.80	
O-37	2/25/2014	496.42	11.93	12.15	0.22	484.45	
O-37	3/24/2014	496.42	12.02	12.25	0.23	484.35	
O-37	4/14/2014	496.42	12.04	12.25	0.21	484.34	
O-37	5/16/2014	496.42	11.34	11.58	0.24	485.03	
O-37	6/20/2014	496.42	No LNAPL	10.90	0.00	485.52	
O-37	7/19/2014	496.42	9.68	10.02	0.34	486.67	
O-37	8/28/2014	496.42	9.96	10.25	0.29	486.40	
O-37	9/29/2014	496.42	10.79	11.04	0.25	485.58	
O-37	10/16/2014	496.35	Sheen	11.38	Sheen	484.97	
O-37	3/10/2015	496.35	Sheen	11.62	Sheen	484.73	
O-37	10/15/2015	496.48	Sheen	11.09	Sheen	485.43	
O-37	3/4/2016	496.48	11.95	11.99	0.04	484.57	
O-37	8/18/2016	496.54	9.69	9.93	0.24	486.80	

**Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
O-37	10/13/2016	496.54	11.24	11.37	0.13	485.27	
O-37	10/19/2016	496.54	11.42	11.46	0.04	485.11	0.01 gallons of LNAPL recovered during well redevelopment
O-37	3/1/2017	496.54	11.50	11.51	0.01	485.04	
O-38	9/24/2013	—	10.91	10.93	0.02	—	
O-38	10/29/2013	496.60	11.82	12.77	0.95	484.59	
O-38	11/19/2013	496.60	11.10	12.72	1.62	485.18	
O-38	12/20/2013	496.60	11.14	12.11	0.97	485.27	
O-38	1/14/2014	496.60	11.37	12.62	1.25	484.98	
O-38	2/25/2014	496.60	11.63	13.65	2.02	484.57	
O-38	3/18/2014	496.60	11.76	13.00	1.24	484.59	
O-38	4/14/2014	496.60	11.68	13.56	1.88	484.54	
O-38	5/16/2014	496.60	11.17	11.97	0.80	485.27	
O-38	6/11/2014	496.60	11.24	12.78	1.54	485.05	
O-38	7/19/2014	496.60	9.65	9.79	0.14	486.92	
O-38	8/28/2014	496.60	9.92	10.03	0.11	486.66	
O-38	9/9/2014	496.60	10.18	10.30	0.12	486.40	
O-38	10/16/2014	496.60	11.25	11.64	0.39	485.27	
O-38	11/20/2014	496.60	11.06	11.53	0.47	485.45	
O-38	3/10/2015	496.60	11.46	11.85	0.39	485.06	
O-38	3/19/2015	496.60	11.53	12.26	0.73	484.92	
O-38	5/18/2015	496.60	11.12	11.35	0.23	485.43	
O-38	6/11/2015	496.60	11.15	11.45	0.30	485.39	
O-38	8/12/2015	496.81	Sheen	10.13	Sheen	486.72	
O-38	10/15/2015	496.81	11.16	11.21	0.05	485.68	
O-38	11/19/2015	496.81	11.24	11.83	0.59	485.45	
O-38	3/4/2016	496.81	11.92	12.75	0.83	484.77	
O-38	6/14/2016	496.81	11.12	11.32	0.20	485.65	
O-38	7/2/2016	496.81	No LNAPL	10.70	0.00	486.11	
O-38	7/9/2016	496.81	No LNAPL	10.18	0.00	486.63	
O-38	8/18/2016	496.81	No LNAPL	9.82	0.00	486.99	
O-38	8/18/2016	496.89	Sheen	9.84	Sheen	487.05	
O-38	10/13/2016	496.89	11.37	11.38	0.01	485.52	
O-38	3/1/2017	496.89	Sheen	11.50	Sheen	485.39	
O-38	6/6/2017	496.89	11.53	11.58	0.05	485.35	
PZ-1-15	4/25/2014	498.08	--	13.01	--	485.07	
PZ-1-15	5/20/2014	498.10	--	13.43	--	484.67	
PZ-1-15	6/4/2014	498.12	--	13.63	--	484.49	
PZ-1-20	4/25/2014	500.62	--	15.64	--	484.98	
PZ-1-20	5/20/2014	500.58	--	16.07	--	484.51	
PZ-1-20	6/4/2014	500.65	--	16.25	--	484.40	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
PZ-1-45	4/25/2014	500.39	--	15.41	--	484.98	
PZ-1-45	5/20/2014	500.35	--	15.85	--	484.50	
PZ-1-45	6/4/2014	500.42	--	16.03	--	484.39	
PZ-1-65	4/25/2014	500.41	--	15.40	--	485.01	
PZ-1-65	5/20/2014	500.36	--	15.83	--	484.53	
PZ-1-65	6/4/2014	500.44	--	16.03	--	484.41	
PZ-2-15	4/25/2014	498.20	--	13.10	--	485.10	
PZ-2-15	5/20/2014	498.21	--	11.85	--	486.36	
PZ-2-15	6/4/2014	498.21	--	11.66	--	486.55	
PZ-2-15	11/20/2014	498.19	No LNAPL	11.84	0.00	486.35	
PZ-2-15	3/19/2015	498.19	--	13.48	--	484.71	
PZ-2-15	6/11/2015	498.19	No LNAPL	12.02	0.00	486.17	
PZ-2-15	8/12/2015	498.27	--	10.60	--	487.67	
PZ-2-15	11/19/2015	498.27	--	11.76	--	486.51	
PZ-3-15	4/25/2014	498.20	--	12.95	--	485.25	
PZ-3-15	5/20/2014	498.18	--	12.14	--	486.04	
PZ-3-15	6/4/2014	498.19	--	12.29	--	485.90	
PZ-3-15	11/20/2014	498.15	No LNAPL	11.45	0.00	486.70	
PZ-3-15	3/19/2015	498.15	--	12.77	--	485.38	
PZ-3-15	6/11/2015	498.15	No LNAPL	10.98	0.00	487.17	
PZ-3-15	8/12/2015	498.16	--	9.18	--	488.98	
PZ-3-15	11/19/2015	498.16	--	11.92	--	486.24	
PZ-4-13	4/25/2014	489.73	--	Frozen	--	—	Frozen at 5.37 feet below measuring point
PZ-4-13	5/20/2014	489.70	--	Frozen	--	—	Water at 5.62 feet, frozen at 8.89 feet below measuring point
PZ-4-13	6/4/2014	489.68	--	5.83	--	483.85	
PZ-4-20	4/25/2014	489.65	--	Frozen	--	—	Frozen at 5.67 feet below measuring point
PZ-4-20	5/20/2014	489.63	--	Frozen	--	—	Water at 5.68 feet, frozen at 9.33 feet below measuring point
PZ-4-20	6/4/2014	489.61	--	5.75	--	483.86	
PZ-4-45	4/25/2014	489.75	--	Frozen	--	—	Frozen at 5.73 feet below measuring point
PZ-4-45	5/20/2014	489.72	--	Frozen	--	—	Water at 5.95 feet, frozen at 9.07 feet below measuring point
PZ-4-45	6/4/2014	489.69	--	5.88	--	483.81	
PZ-4-65	4/25/2014	489.60	--	Frozen	--	—	Frozen at 5.32 feet below measuring point
PZ-4-65	5/20/2014	489.57	--	Frozen	--	—	Water at 5.54 feet, frozen at 8.46 feet below measuring point
PZ-4-65	6/4/2014	489.53	--	5.71	--	483.82	
PZ-5-15	4/25/2014	491.91	--	Frozen	--	—	Frozen at 8.34 feet below measuring point
PZ-5-15	5/20/2014	491.87	--	Frozen	--	—	Frozen at 8.30 feet below measuring point
PZ-5-15	6/4/2014	491.87	--	Frozen	--	—	Water at 8.09 feet, frozen at 8.31 feet below measuring point
PZ-5-20	4/25/2014	492.03	--	Frozen	--	—	Frozen at 8.49 feet below measuring point
PZ-5-20	5/20/2014	492.00	--	Frozen	--	—	Frozen at 8.29 feet below measuring point
PZ-5-20	6/4/2014	492.00	--	Frozen	--	—	Frozen at 8.30 feet below measuring point

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
PZ-5-45	4/25/2014	491.78	--	Frozen	--	—	Frozen at 8.10 feet below measuring point
PZ-5-45	5/20/2014	491.75	--	Frozen	--	—	Frozen at 8.07 feet below measuring point
PZ-5-45	6/4/2014	491.74	--	Frozen	--	—	Water at 7.97 feet, frozen at 8.05 feet below measuring point
PZ-5-65	4/25/2014	491.98	--	Frozen	--	—	Frozen at 8.37 feet below measuring point
PZ-5-65	5/20/2014	491.92	--	Frozen	--	—	Frozen at 8.15 feet below measuring point
PZ-5-65	6/4/2014	491.91	--	Frozen	--	—	Frozen at 8.40 feet below measuring point
R-3	9/2/2008	—	No LNAPL	5.91	0.00	—	
R-3	8/17/2009	—	No LNAPL	5.97	0.00	—	
R-3	4/25/2011	493.98	No LNAPL	Frozen	0.00	—	Frozen
R-3	5/24/2011	493.98	No LNAPL	Frozen	0.00	—	Frozen at 7.38 ft BTOC
R-3	7/15/2011	493.98	No LNAPL	5.89	0.00	488.09	
R-3	10/21/2011	493.98	No LNAPL	Dry	0.00	—	Well is dry
R-3	2/17/2012	494.20	No LNAPL	Frozen	0.00	—	Frozen at 7.42 ft BTOC
R-3	4/10/2012	494.20	No LNAPL	Frozen	0.00	—	Frozen at 7.41 ft BTOC
R-3	7/17/2012	494.20	No LNAPL	6.69	0.00	487.51	
R-3	8/21/2012	494.20	No LNAPL	6.42	0.00	487.78	
R-3	9/18/2012	494.20	No LNAPL	6.52	0.00	487.68	
R-3	10/16/2012	494.20	No LNAPL	6.53	0.00	487.67	
R-3	11/29/2012	494.08	No LNAPL	7.41	0.00	486.67	
R-3	12/27/2012	494.08	No LNAPL	7.58	0.00	486.50	
R-3	1/24/2013	494.08	No LNAPL	Frozen	0.00	—	Frozen at 7.52 ft BTOC
R-3	2/26/2013	494.08	No LNAPL	Frozen	0.00	—	Frozen at 7.40 ft BTOC
R-3	5/31/2013	494.08	No LNAPL	6.72	0.00	487.36	
R-3	10/29/2013	494.08	No LNAPL	Dry	0.00	—	Well was dry--bottom at 7.32 feet below measuring point
R-3	10/15/2015	494.03	No LNAPL	5.62	0.00	488.41	
R-4	8/18/2009	494.88	--	7.09	--	487.79	
R-4	4/25/2011	494.88	--	Frozen	--	—	Frozen
R-4	5/24/2011	494.88	--	8.27	--	486.61	
R-4	7/15/2011	494.88	Sheen	7.27	Sheen	487.61	
R-4	10/21/2011	494.88	No LNAPL	Dry	0.00	—	
R-5	8/17/2009	—	7.75	7.92	0.17	—	
R-5	4/26/2011	495.33	Sheen	Frozen	Sheen	—	Frozen at 8.60 ft BTOC
R-5	5/24/2011	495.33	No LNAPL	Frozen	0.00	—	Frozen at 8.70 ft BTOC
R-5	7/15/2011	495.33	7.80	7.85	0.05	487.52	
R-5	10/21/2011	495.33	10.15	10.31	0.16	485.15	
R-5	2/17/2012	495.29	10.26	Frozen	0.09	—	Frozen at 10.35 ft BTOC
R-5	4/12/2012	495.29	10.08	Frozen	0.23	—	Frozen at 10.31 ft BTOC
R-5	7/18/2012	495.29	8.19	8.20	0.01	487.10	
R-5	8/21/2012	495.29	8.85	9.11	0.26	486.39	
R-5	9/18/2012	495.29	9.23	9.54	0.31	486.00	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-5	10/16/2012	495.29	9.47	9.72	0.25	485.77	
R-5	11/29/2012	495.33	8.85	Frozen	0.28	—	
R-5	12/28/2012	495.33	8.96	Frozen	0.02	—	Frozen at 8.98 ft BTOC
R-5	2/26/2013	495.33	Sheen	Frozen	Sheen	—	Frozen at 9.01 ft BTOC
R-5	3/28/2013	495.33	Sheen	Frozen	Sheen	—	Frozen at 8.96 ft BTOC. R-35R, R-39, and R-40 were offline on this date
R-14	8/17/2009	—	8.18	8.19	0.01	—	
R-14	4/29/2011	494.01	8.81	Dry	0.08	—	Dry; bottom of well 8.89 ft BTOC
R-14	5/24/2011	494.01	No LNAPL	Dry	0.00	—	Dry; bottom of well 8.95 ft BTOC
R-14	6/21/2011	494.01	No LNAPL	Dry	0.00	—	Dry
R-14	7/15/2011	494.01	Sheen	8.38	Sheen	485.63	
R-14	8/23/2011	494.01	8.59	8.79	0.20	485.38	
R-14	9/22/2011	494.01	No LNAPL	Dry	0.00	—	Dry
R-14	10/21/2011	494.01	No LNAPL	Dry	0.00	—	Dry
R-14A	9/2/2008	—	8.28	8.37	0.09	—	
R-14A	8/17/2009	—	No LNAPL	8.38	0.00	—	
R-14A	4/29/2011	494.12	No LNAPL	8.97	0.00	485.15	
R-14A	5/24/2011	494.12	9.45	9.68	0.23	484.63	
R-14A	6/21/2011	494.12	9.15	9.26	0.11	484.95	
R-14A	7/15/2011	494.12	No LNAPL	8.45	0.00	485.67	
R-14A	8/23/2011	494.12	8.65	8.89	0.24	485.42	
R-14A	9/22/2011	494.12	9.63	10.59	0.96	484.31	
R-14A	10/21/2011	494.12	10.44	10.94	0.50	483.59	
R-14A	12/2/2011	494.09	11.50	11.98	0.48	482.50	
R-14A	2/17/2012	494.09	10.31	10.70	0.39	483.71	
R-14A	3/14/2012	494.09	10.34	10.78	0.44	483.67	
R-14A	4/12/2012	494.09	10.21	10.54	0.33	483.82	
R-14A	4/19/2012	494.09	9.71	9.78	0.07	484.37	
R-14A	5/7/2012	494.09	9.88	10.72	0.84	484.05	
R-14A	6/13/2012	494.09	9.08	9.31	0.23	484.97	
R-14A	7/17/2012	494.09	8.79	8.87	0.08	485.28	
R-14A	7/30/2012	494.09	11.47	11.48	0.01	482.62	
R-14A	8/21/2012	494.09	9.10	9.82	0.72	484.85	
R-14A	9/18/2012	494.09	9.71	10.72	1.01	484.19	
R-14A	10/15/2012	494.09	9.70	10.51	0.81	484.24	
R-14A	10/23/2012	494.09	10.04	10.82	0.78	483.90	Initial levels of October 2012 baildown test
R-14A	11/1/2012	494.09	9.82	10.10	0.28	484.22	
R-14A	11/29/2012	494.09	9.37	9.63	0.26	484.67	
R-14A	12/28/2012	494.09	9.67	10.25	0.58	484.31	
R-14A	1/24/2013	494.09	9.66	10.00	0.34	484.37	
R-14A	2/26/2013	494.09	9.25	10.42	1.17	484.62	

Appendix A-1
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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-14A	3/29/2013	494.09	9.93	10.48	0.55	484.06	R-35R, R-39, and R-40 were offline on this date
R-14A	4/24/2013	494.09	9.87	10.46	0.59	484.11	
R-14A	5/21/2013	494.11	9.82	10.22	0.40	484.21	
R-14A	6/24/2013	494.12	Sheen	9.03	Sheen	485.09	
R-14A	7/23/2013	494.13	Sheen	8.69	Sheen	485.44	
R-14A	8/1/2013	494.13	Sheen	8.69	Sheen	485.44	
R-14A	8/21/2013	494.13	Sheen	8.64	Sheen	485.49	
R-14A	9/24/2013	494.13	9.62	9.71	0.09	484.49	
R-14A	9/30/2013	494.13	9.87	10.03	0.16	484.23	
R-14A	10/22/2013	494.11	10.44	10.84	0.40	483.59	
R-14A	11/26/2013	494.11	9.62	9.63	0.01	484.49	
R-14A	12/18/2013	494.13	9.76	10.47	0.71	484.24	
R-14A	1/9/2014	494.13	9.99	10.75	0.76	484.00	
R-14A	2/5/2014	494.13	10.15	10.77	0.62	483.86	
R-14A	3/18/2014	494.13	10.40	10.73	0.33	483.67	
R-14A	3/24/2014	494.13	10.47	10.80	0.33	483.60	
R-14A	4/18/2014	494.12	10.36	10.58	0.22	483.72	
R-14A	5/15/2014	494.14	9.85	10.39	0.54	484.19	
R-14A	6/11/2014	494.14	9.98	10.41	0.43	484.08	
R-14A	6/19/2014	494.14	9.68	9.76	0.08	484.44	
R-14A	7/15/2014	494.13	7.93	8.17	0.24	486.15	
R-14A	8/26/2014	494.12	8.63	8.64	0.01	485.49	
R-14A	9/9/2014	494.12	8.90	8.91	0.01	485.22	
R-14A	9/24/2014	494.12	9.23	9.24	0.01	484.89	
R-14A	10/16/2014	494.09	9.98	10.04	0.06	484.10	
R-14A	10/21/2014	494.09	10.13	10.22	0.09	483.94	
R-14A	11/19/2014	494.13	9.75	9.76	0.01	484.38	
R-14A	12/16/2014	494.14	9.93	10.10	0.17	484.18	
R-14A	12/29/2014	494.14	10.03	10.27	0.24	484.06	
R-14A	1/21/2015	494.13	10.07	10.38	0.31	484.00	
R-14A	2/25/2015	494.13	10.13	10.57	0.44	483.92	
R-14A	3/10/2015	494.14	10.03	10.38	0.35	484.04	
R-14A	3/18/2015	494.14	10.12	10.59	0.47	483.93	
R-14A	3/26/2015	494.14	10.09	10.49	0.40	483.97	
R-14A	4/16/2015	494.12	9.94	10.16	0.22	484.14	
R-14A	5/21/2015	494.13	9.78	9.79	0.01	484.35	
R-14A	6/10/2015	494.15	Sheen	9.83	Sheen	484.32	
R-14A	8/12/2015	494.15	No LNAPL	8.76	0.00	485.43	
R-14A	8/19/2015	494.15	Sheen	9.05	Sheen	485.17	
R-14A	10/6/2015	494.14	Sheen	9.37	Sheen	484.81	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-14A	10/15/2015	494.14	9.78	9.80	0.02	484.40	
R-14A	11/19/2015	494.14	9.88	9.99	0.11	484.24	
R-14A	1/19/2016	494.14	10.35	10.75	0.40	483.71	
R-14A	3/4/2016	494.14	10.47	10.64	0.17	483.69	
R-14A	5/26/2016	494.14	9.97	10.07	0.10	484.17	
R-14A	9/9/2016	494.15	8.87	8.88	0.01	485.33	
R-14A	10/13/2016	494.15	9.90	9.91	0.01	484.25	
R-14A	11/15/2016	494.16	No LNAPL	9.51	0.00	484.69	
R-14A	2/8/2017	494.15	Sheen	9.95	Sheen	484.27	
R-14A	2/15/2017	494.15	Sheen	9.95	Sheen	484.23	
R-14A	3/1/2017	494.15	No LNAPL	9.98	0.00	484.17	
R-14A	6/13/2017	494.15	No LNAPL	9.25	0.00	484.96	
R-18	8/17/2009	—	13.21	13.37	0.16	—	
R-18	4/26/2011	499.61	14.06	14.33	0.27	485.49	
R-18	7/15/2011	499.61	13.38	13.51	0.13	486.20	
R-18	10/21/2011	499.61	15.40	16.17	0.77	484.05	
R-18	2/16/2012	499.67	15.18	16.57	1.39	484.20	
R-18	4/12/2012	499.67	15.11	16.31	1.20	484.31	
R-18	5/7/2012	499.67	14.95	15.70	0.75	484.56	
R-18	7/18/2012	499.67	13.85	13.97	0.12	485.79	
R-18	8/21/2012	499.67	Sheen	14.19	Sheen	485.48	
R-18	9/19/2012	499.67	14.84	15.36	0.52	484.72	
R-18	10/15/2012	499.67	14.82	15.19	0.37	484.77	
R-18	11/29/2012	499.76	14.47	14.69	0.22	485.24	
R-18	12/28/2012	499.76	14.79	15.21	0.42	484.88	
R-18	2/26/2013	499.76	14.94	15.23	0.29	484.76	
R-18	3/28/2013	499.76	14.99	15.40	0.41	484.68	R-35R, R-39, and R-40 were offline on this date
R-18	4/24/2013	499.76	15.04	15.44	0.40	484.64	
R-18	7/23/2013	499.82	13.69	13.71	0.02	486.13	
R-18	8/1/2013	499.82	13.59	13.60	0.01	486.23	
R-18	8/21/2013	499.82	Sheen	13.56	Sheen	486.26	
R-18	10/22/2013	499.85	15.40	15.81	0.41	484.36	
R-18	1/9/2014	499.83	15.00	15.58	0.58	484.71	
R-18	2/5/2014	499.86	15.15	15.73	0.58	484.59	
R-18	3/24/2014	499.87	15.47	15.94	0.47	484.30	
R-18	4/18/2014	499.87	15.26	15.78	0.52	484.50	
R-18	5/15/2014	499.87	14.82	15.11	0.29	484.99	
R-18	5/16/2014	499.87	14.82	15.11	0.29	484.99	
R-18	6/19/2014	499.88	14.71	14.88	0.17	485.13	
R-18	6/20/2014	499.88	14.39	14.45	0.06	485.48	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-18	7/15/2014	499.88	Sheen	12.89	Sheen	486.99	
R-18	8/26/2014	499.87	Sheen	13.54	Sheen	486.33	
R-18	9/24/2014	499.88	Sheen	14.18	Sheen	485.70	
R-18	10/16/2014	499.87	14.91	15.06	0.15	484.93	
R-18	10/21/2014	499.87	15.06	15.27	0.21	484.77	
R-18	11/19/2014	499.87	14.68	14.69	0.01	485.19	
R-18	12/16/2014	499.87	14.89	14.95	0.06	484.97	
R-18	12/29/2014	499.87	15.00	15.09	0.09	484.85	
R-18	1/21/2015	499.88	15.05	15.30	0.25	484.78	
R-18	2/25/2015	499.90	15.14	15.53	0.39	484.68	
R-18	3/10/2015	499.90	15.07	15.49	0.42	484.74	
R-18	3/18/2015	499.90	15.15	15.61	0.46	484.65	
R-18	3/26/2015	499.90	15.09	15.58	0.49	484.71	
R-18	4/16/2015	499.93	14.97	15.41	0.44	484.87	
R-18	5/21/2015	499.93	14.74	14.90	0.16	485.16	
R-18	6/10/2015	499.93	14.77	14.94	0.17	485.12	
R-18	8/12/2015	499.93	13.71	13.75	0.04	486.25	
R-18	8/19/2015	499.93	14.01	14.05	0.04	485.98	
R-18	10/6/2015	499.93	14.31	14.51	0.20	485.62	
R-18	10/15/2015	499.93	14.71	14.96	0.25	485.21	
R-18	1/19/2016	499.91	15.37	15.73	0.36	484.46	
R-18	3/4/2016	499.91	15.44	15.95	0.51	484.41	
R-18	3/24/2016	499.91	15.57	16.02	0.45	484.24	Baildown testing not conducted- insufficient LNAPL thickness
R-18	3/25/2016	499.91	15.53	15.99	0.46	484.28	Baildown testing not conducted- insufficient LNAPL thickness
R-18	3/28/2016	499.91	15.50	15.96	0.46	484.31	Baildown testing not conducted- insufficient LNAPL thickness
R-18	3/31/2016	499.91	15.39	15.87	0.48	484.42	Baildown testing not conducted- insufficient LNAPL thickness
R-18	4/6/2016	499.91	15.02	15.52	0.50	484.78	Initial fluid levels and product recovered by SWI during baildown testing
R-18	5/26/2016	499.95	14.97	15.29	0.32	484.93	
R-18	6/14/2016	499.95	14.62	14.71	0.09	485.31	
R-18	8/18/2016	499.95	No LNAPL	13.34	0.00	486.61	
R-18	9/9/2016	499.94	Sheen	13.85	Sheen	486.14	
R-18	10/13/2016	499.94	14.89	14.95	0.06	485.04	
R-18	11/15/2016	499.95	Sheen	14.49	Sheen	485.50	
R-18	2/8/2017	499.96	Sheen	14.95	Sheen	485.08	
R-18	3/1/2017	499.96	14.99	15.04	0.05	484.96	
R-18	6/6/2017	500.00	Sheen	15.04	Sheen	484.96	
R-18	6/13/2017	500.00	14.29	14.30	0.01	485.77	
R-20R	7/15/2011	—	No LNAPL	12.00	0.00	—	
R-20R	10/21/2011	—	14.29	14.30	0.01	—	
R-20R	2/17/2012	498.77	14.13	14.15	0.02	484.64	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-20R	3/15/2012	498.77	14.14	14.41	0.27	484.58	
R-20R	4/12/2012	498.77	14.03	14.04	0.01	484.74	
R-20R	5/14/2012	498.77	13.85	14.73	0.88	484.75	
R-20R	6/12/2012	498.77	12.88	12.96	0.08	485.87	
R-20R	7/18/2012	498.77	12.53	12.61	0.08	486.22	
R-20R	8/21/2012	498.77	12.81	13.43	0.62	485.84	
R-20R	9/18/2012	498.77	13.55	14.01	0.46	485.13	
R-20R	10/15/2012	498.77	13.59	13.66	0.07	485.17	
R-20R	11/29/2012	498.74	13.13	13.23	0.10	485.59	
R-20R	12/28/2012	498.74	13.49	13.60	0.11	485.23	
R-20R	2/26/2013	498.74	13.62	13.68	0.06	485.11	
R-20R	3/28/2013	498.74	13.71	14.01	0.30	484.97	R-35R, R-39, and R-40 were offline on this date
R-20R	4/24/2013	498.74	13.75	13.81	0.06	484.98	
R-20R	5/31/2013	498.74	12.40	12.41	0.01	486.34	
R-20R	6/24/2013	498.74	12.44	12.75	0.31	486.24	
R-20R	7/23/2013	498.74	12.18	12.47	0.29	486.51	
R-20R	8/21/2013	498.74	12.03	12.42	0.39	486.64	
R-20R	9/30/2013	498.74	13.45	13.55	0.10	485.27	
R-20R	10/29/2013	498.74	14.30	14.35	0.05	484.43	
R-20R	11/19/2013	498.74	13.57	13.66	0.09	485.15	
R-20R	12/20/2013	498.74	13.33	14.13	0.80	485.26	
R-20R	1/14/2014	498.74	13.73	13.83	0.10	484.99	
R-20R	2/24/2014	498.74	14.05	14.15	0.10	484.67	
R-20R	3/24/2014	498.74	14.12	14.22	0.10	484.60	
R-20R	4/14/2014	498.79	14.13	14.24	0.11	484.64	
R-20R	5/16/2014	498.79	13.48	13.52	0.04	485.30	
R-20R	6/20/2014	498.79	Sheen	12.99	Sheen	485.80	
R-20R	7/19/2014	498.79	11.87	11.91	0.04	486.91	
R-20R	8/28/2014	498.79	12.07	12.41	0.34	486.66	
R-20R	9/29/2014	498.79	12.94	13.00	0.06	485.84	
R-20R	10/16/2014	498.79	13.49	13.57	0.08	485.28	
R-20R	3/10/2015	498.79	13.46	14.33	0.87	485.17	
R-20R	5/21/2015	498.79	13.25	13.61	0.36	485.47	Skimmer pump present; removed for measurement, and reinstalled after
R-20R	8/12/2015	498.79	12.19	12.21	0.02	486.64	
R-20R	10/15/2015	498.80	13.18	13.82	0.64	485.54	Skimmer pump present
R-20R	3/4/2016	498.80	13.94	14.42	0.48	484.82	
R-20R	3/24/2016	498.80	14.10	14.20	0.10	484.68	Baildown testing not conducted- insufficient LNAPL thickness
R-20R	3/25/2016	498.80	14.07	14.19	0.12	484.71	Baildown testing not conducted- insufficient LNAPL thickness
R-20R	3/28/2016	498.80	14.03	14.19	0.16	484.74	Baildown testing not conducted- insufficient LNAPL thickness
R-20R	3/31/2016	498.80	13.92	14.08	0.16	484.85	Baildown testing not conducted- insufficient LNAPL thickness

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-20R	4/28/2016	498.80	13.90	14.30	0.40	484.82	Baildown testing not conducted- insufficient LNAPL thickness
R-20R	4/29/2016	498.80	13.83	14.31	0.48	484.88	Baildown testing not conducted- insufficient LNAPL thickness
R-20R	5/2/2016	498.80	13.84	14.53	0.69	484.83	Initial fluid levels and product recovered by SWI during baildown testing
R-20R	6/14/2016	498.80	13.10	13.18	0.08	485.68	
R-20R	7/2/2016	498.80	No LNAPL	12.61	0.00	486.19	
R-20R	7/4/2016	498.80	No LNAPL	12.41	0.00	486.39	
R-20R	7/9/2016	498.80	No LNAPL	12.08	0.00	486.72	
R-20R	7/12/2016	498.80	No LNAPL	12.10	0.00	486.70	
R-20R	8/18/2016	498.80	Sheen	11.78	Sheen	487.02	
R-20R	10/13/2016	498.80	13.32	13.65	0.33	485.42	
R-20R	3/1/2017	498.80	13.42	13.52	0.10	485.36	
R-20R	6/6/2017	498.80	13.35	14.10	0.75	485.31	
R-20R	7/8/2017	498.80	12.28	12.30	0.02	486.52	
R-21	1/15/2007	495.09	10.95	10.97	0.02	484.14	
R-21	4/23/2007	495.09	11.20	11.22	0.02	483.89	
R-21	8/17/2009	495.09	10.95	11.24	0.29	484.09	
R-21	4/18/2011	495.06	13.98	15.75	1.77	480.75	
R-21	5/18/2011	495.06	14.23	15.34	1.11	480.63	
R-21	6/21/2011	495.06	12.81	14.29	1.48	481.98	
R-21	7/14/2011	495.06	12.36	13.11	0.75	482.56	
R-21	8/23/2011	495.06	9.46	9.51	0.05	485.59	
R-21	9/22/2011	495.06	11.97	13.65	1.68	482.78	
R-21	10/21/2011	495.06	13.28	15.16	1.88	481.43	
R-21	12/2/2011	495.53	12.44	14.78	2.34	482.66	
R-21	2/17/2012	495.53	12.45	14.00	1.55	482.79	
R-21	3/14/2012	495.53	Sheen	12.84	Sheen	482.69	
R-21	4/12/2012	495.53	12.65	12.66	0.01	482.88	
R-21	4/19/2012	495.53	11.91	12.21	0.30	483.56	
R-21	5/7/2012	495.53	12.18	12.89	0.71	483.22	
R-21	6/12/2012	495.53	11.66	11.67	0.01	483.87	
R-21	7/18/2012	495.53	11.18	11.78	0.60	484.24	
R-21	7/30/2012	495.53	10.73	11.19	0.46	484.72	
R-21	8/21/2012	495.53	11.76	11.83	0.07	483.76	
R-21	9/19/2012	495.53	12.56	12.59	0.03	482.96	
R-21	10/15/2012	495.53	12.43	12.53	0.10	483.08	
R-21	11/1/2012	495.53	12.40	12.47	0.07	483.12	
R-21	11/29/2012	495.52	11.87	11.95	0.08	483.64	
R-21	12/28/2012	495.52	12.15	12.22	0.07	483.36	
R-21	1/24/2013	495.52	12.63	12.89	0.26	482.84	
R-21	2/26/2013	495.52	12.78	12.87	0.09	482.72	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-21	3/29/2013	495.52	12.66	13.35	0.69	482.73	R-35R, R-39, and R-40 were offline on this date
R-21	4/24/2013	495.52	12.94	13.00	0.06	482.57	
R-21	5/20/2013	495.54	12.19	12.53	0.34	483.29	
R-21	6/24/2013	495.53	11.70	12.01	0.31	483.77	
R-21	7/23/2013	495.54	11.25	11.44	0.19	484.26	
R-21	8/1/2013	495.54	11.31	11.51	0.20	484.19	
R-21	8/21/2013	495.54	11.13	11.36	0.23	484.37	
R-21	9/24/2013	495.54	12.20	12.58	0.38	483.27	
R-21	10/1/2013	495.54	12.50	12.62	0.12	483.02	
R-21	10/29/2013	495.54	13.70	13.78	0.08	481.83	
R-21	11/19/2013	495.54	12.60	13.55	0.95	482.77	
R-21	12/20/2013	495.54	12.58	12.65	0.07	482.95	
R-21	1/15/2014	495.54	13.14	13.24	0.10	482.38	
R-21	2/5/2014	495.54	12.97	13.81	0.84	482.42	
R-21	3/18/2014	495.54	12.74	13.07	0.33	482.74	
R-21	4/14/2014	495.52	13.08	15.23	2.15	482.04	
R-21	5/16/2014	495.52	12.87	12.96	0.09	482.63	
R-21	6/11/2014	495.52	12.78	12.88	0.10	482.72	
R-21	7/15/2014	495.52	10.54	10.78	0.24	484.94	
R-21	8/26/2014	495.52	10.99	11.27	0.28	484.48	
R-21	9/9/2014	495.52	11.41	11.81	0.40	484.04	
R-21	9/24/2014	495.52	11.39	11.51	0.12	484.11	
R-21	10/21/2014	495.52	11.82	11.94	0.12	483.68	
R-21	11/19/2014	495.52	11.55	11.68	0.13	483.95	
R-21	12/16/2014	495.52	12.23	12.39	0.16	483.26	
R-21	1/21/2015	495.53	12.79	12.88	0.09	482.72	Flow rate = 47.6 gpm
R-21	2/25/2015	495.53	13.03	13.35	0.32	482.44	Flow rate = 50.1 gpm
R-21	3/10/2015	495.53	12.71	14.31	1.60	482.53	
R-21	3/18/2015	495.53	12.88	13.91	1.03	482.46	
R-21	3/26/2015	495.53	12.90	14.98	2.08	482.25	
R-21	4/16/2015	495.53	12.78	13.54	0.76	482.61	
R-21	5/21/2015	495.53	12.34	12.61	0.27	483.14	
R-21	6/10/2015	495.53	12.49	13.04	0.55	482.94	
R-21	7/22/2015	495.53	11.57	11.64	0.07	483.97	
R-21	8/12/2015	495.53	11.37	11.62	0.25	484.15	
R-21	8/19/2015	495.53	11.77	12.14	0.37	483.76	
R-21	9/30/2015	495.53	12.13	12.57	0.44	483.36	
R-21	10/6/2015	495.53	12.18	12.88	0.70	483.26	
R-21	10/15/2015	495.53	12.60	12.96	0.36	482.90	
R-21	11/19/2015	495.53	12.90	13.70	0.80	482.48	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-21	11/25/2015	495.53	12.56	13.23	0.67	482.88	
R-21	12/16/2015	495.53	13.10	13.31	0.21	482.39	
R-21	1/19/2016	495.53	13.66	13.91	0.25	481.82	
R-21	1/19/2016	495.53	13.66	13.91	0.25	481.82	
R-21	2/25/2016	495.53	13.40	16.37	2.97	481.58	Flow rate not recorded.
R-21	3/4/2016	495.53	13.31	16.66	3.35	481.65	
R-21	4/14/2016	495.53	13.14	13.25	0.11	482.37	
R-21	5/20/2016	495.53	13.40	13.44	0.04	482.12	Automated skimmer pump was active
R-21	5/26/2016	495.53	12.97	14.49	1.52	482.30	
R-21	6/14/2016	495.53	12.70	12.81	0.11	482.81	
R-21	7/2/2016	495.53	12.00	12.84	0.84	483.38	
R-21	7/4/2016	495.53	11.82	12.51	0.69	483.58	
R-21	7/8/2016	495.53	11.61	12.02	0.41	483.84	
R-21	7/12/2016	495.53	11.48	12.17	0.69	483.92	
R-21	7/16/2016	495.53	11.45	11.62	0.17	484.05	
R-21	7/19/2016	495.53	11.10	11.45	0.35	484.37	
R-21	7/23/2016	495.53	10.45	11.62	1.17	484.86	
R-21	7/26/2016	495.53	10.75	11.11	0.36	484.71	
R-21	7/26/2016	495.53	10.75	11.15	0.40	484.71	
R-21	7/30/2016	495.53	10.71	11.25	0.54	484.72	
R-21	8/1/2016	495.53	10.65	10.85	0.20	484.84	
R-21	8/6/2016	495.53	10.94	11.23	0.29	484.54	
R-21	8/9/2016	495.53	10.90	11.31	0.41	484.55	
R-21	8/13/2016	495.53	11.05	11.45	0.40	484.41	
R-21	8/16/2016	495.53	11.30	11.80	0.50	484.14	
R-21	8/18/2016	495.53	11.32	11.93	0.61	484.10	
R-21	8/20/2016	495.53	11.40	12.09	0.69	484.00	
R-21	8/23/2016	495.54	11.63	11.70	0.07	483.90	
R-21	8/27/2016	495.54	11.62	11.79	0.17	483.89	
R-21	8/30/2016	495.54	11.69	11.95	0.26	483.80	
R-21	9/3/2016	495.54	11.36	11.69	0.33	484.12	
R-21	9/6/2016	495.54	11.42	11.73	0.31	484.06	
R-21	9/9/2016	495.54	11.48	11.84	0.36	484.04	
R-21	9/9/2016	495.54	11.48	11.84	0.36	484.04	
R-21	9/10/2016	495.54	11.60	11.95	0.35	483.88	
R-21	9/13/2016	495.54	11.65	12.10	0.45	483.81	Transcription error corrected: DTP/DTW entered vice-versa
R-21	9/17/2016	495.54	11.65	12.20	0.55	483.79	Transcription error corrected: DTP/DTW entered vice-versa
R-21	9/24/2016	495.54	10.28	10.29	0.01	485.26	All recovery wells shutdown for sand filter media changeout
R-21	9/27/2016	495.54	12.10	12.13	0.03	483.43	
R-21	9/30/2016	495.54	12.18	12.27	0.09	483.34	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-21	10/4/2016	495.54	12.32	12.43	0.11	483.20	
R-21	10/8/2016	495.54	12.40	12.60	0.20	483.10	
R-21	10/11/2016	495.54	12.55	12.80	0.25	482.94	
R-21	10/13/2016	495.54	12.58	12.82	0.24	482.92	
R-21	10/15/2016	495.54	12.65	12.92	0.27	482.84	
R-21	10/18/2016	495.54	12.82	13.07	0.25	482.67	
R-21	10/22/2016	495.54	12.95	13.27	0.32	482.53	
R-21	10/25/2016	495.54	13.01	13.32	0.31	482.47	
R-21	10/28/2016	495.54	12.87	13.23	0.36	482.60	
R-21	11/1/2016	495.54	12.25	12.71	0.46	483.21	
R-21	11/5/2016	495.54	12.05	12.16	0.11	483.47	
R-21	11/8/2016	495.54	12.20	12.35	0.15	483.31	
R-21	11/12/2016	495.54	12.20	12.40	0.20	483.30	
R-21	11/15/2016	495.54	12.21	12.42	0.21	483.33	
R-21	11/15/2016	495.54	12.20	12.38	0.18	483.31	
R-21	11/15/2016	495.54	12.21	12.42	0.21	483.33	
R-21	11/19/2016	495.54	12.16	12.41	0.25	483.33	
R-21	11/22/2016	495.54	12.30	12.58	0.28	483.19	
R-21	11/26/2016	495.54	12.35	12.68	0.33	483.13	
R-21	11/29/2016	495.54	12.43	12.80	0.37	483.04	
R-21	12/3/2016	495.54	12.54	12.91	0.37	482.93	
R-21	12/6/2016	495.54	12.55	12.60	0.05	482.98	
R-21	12/9/2016	495.54	12.56	12.62	0.06	482.97	
R-21	12/10/2016	495.54	12.50	12.62	0.12	483.02	
R-21	12/13/2016	495.54	12.50	12.58	0.08	483.03	
R-21	12/17/2016	495.54	12.50	12.60	0.10	483.02	
R-21	12/20/2016	495.54	12.51	12.67	0.16	483.00	
R-21	12/24/2016	495.54	12.52	12.66	0.14	482.99	
R-21	12/27/2016	495.54	12.55	12.73	0.18	482.96	
R-21	12/31/2016	495.54	12.56	12.81	0.25	482.93	
R-21	1/7/2017	495.54	12.50	12.82	0.32	482.98	
R-21	1/10/2017	495.54	12.57	12.96	0.39	482.90	
R-21	1/15/2017	495.54	12.55	13.15	0.60	482.88	
R-21	1/17/2017	495.54	12.60	12.70	0.10	482.92	
R-21	1/21/2017	495.54	12.63	12.85	0.22	482.87	
R-21	1/24/2017	495.54	12.65	12.98	0.33	482.83	
R-21	1/24/2017	495.54	12.60	12.95	0.35	482.88	
R-21	1/28/2017	495.54	12.67	13.08	0.41	482.79	
R-21	1/31/2017	495.54	12.50	13.00	0.50	482.95	
R-21	2/4/2017	495.54	12.65	13.20	0.55	482.79	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-21	2/7/2017	495.54	12.68	12.75	0.07	482.85	
R-21	2/8/2017	495.54	12.68	12.80	0.12	482.91	
R-21	2/8/2017	495.54	12.68	12.80	0.12	482.91	
R-21	2/11/2017	495.54	12.69	12.95	0.26	482.80	
R-21	2/14/2017	495.54	12.68	13.08	0.40	482.79	
R-21	2/18/2017	495.54	12.73	13.23	0.50	482.72	
R-21	2/21/2017	495.54	12.85	13.00	0.15	482.66	
R-21	2/25/2017	495.54	12.80	13.09	0.29	482.69	
R-21	2/28/2017	495.54	12.73	13.31	0.58	482.70	
R-21	3/1/2017	495.54	12.81	12.83	0.02	482.73	
R-21	3/4/2017	495.54	12.88	12.91	0.03	482.65	
R-21	3/7/2017	495.54	12.81	13.05	0.24	482.69	
R-21	3/11/2017	495.54	13.79	14.10	0.31	481.69	
R-21	3/14/2017	495.54	12.72	13.23	0.51	482.73	
R-21	3/18/2017	495.54	12.86	12.88	0.02	482.68	
R-21	3/21/2017	495.54	11.90	12.03	0.13	483.62	
R-21	3/24/2017	495.54	12.90	13.17	0.27	482.59	
R-21	3/28/2017	495.54	12.98	13.37	0.39	482.49	
R-21	4/1/2017	495.54	12.90	13.29	0.39	482.57	
R-21	4/4/2017	495.54	12.86	13.32	0.46	482.60	
R-21	4/8/2017	495.54	12.75	13.41	0.66	482.67	
R-21	4/11/2017	495.54	12.80	12.97	0.17	482.71	
R-21	4/15/2017	495.54	12.55	13.08	0.53	482.89	
R-21	4/18/2017	495.54	12.74	12.88	0.14	482.77	
R-21	4/18/2017	495.54	12.85	12.90	0.05	482.68	
R-21	4/22/2017	495.54	12.70	13.21	0.51	482.75	
R-21	4/25/2017	495.54	12.53	12.72	0.19	482.98	
R-21	4/29/2017	495.54	12.20	12.73	0.53	483.24	
R-21	5/2/2017	495.54	12.05	12.51	0.46	483.41	
R-21	5/6/2017	495.54	12.30	13.12	0.82	483.09	
R-21	5/9/2017	495.54	12.50	12.65	0.15	483.01	
R-21	5/13/2017	495.54	13.33	13.61	0.28	482.16	
R-21	5/16/2017	495.54	12.25	12.60	0.35	483.23	
R-21	5/20/2017	495.54	12.20	13.10	0.90	483.17	
R-21	5/23/2017	495.54	12.46	12.74	0.28	483.03	
R-21	5/25/2017	495.54	12.48	12.87	0.39	482.99	
R-21	5/27/2017	495.54	12.50	13.10	0.60	482.93	
R-21	5/30/2017	495.54	12.75	13.05	0.30	482.73	
R-21	6/3/2017	495.54	12.90	13.50	0.60	482.53	
R-21	6/6/2017	495.54	12.99	13.24	0.25	482.50	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-21	6/6/2017	495.54	13.00	13.22	0.22	482.50	
R-21	6/10/2017	495.54	12.87	13.56	0.69	482.54	
R-21	6/13/2017	495.54	12.08	12.34	0.26	483.47	
R-21	6/13/2017	495.54	12.10	12.45	0.35	483.38	
R-21	6/16/2017	495.54	11.85	13.06	1.21	483.47	
R-21	6/20/2017	495.54	12.22	12.40	0.18	483.29	
R-21	6/24/2017	495.54	12.20	12.65	0.45	483.26	
R-21	6/27/2017	495.54	12.13	12.80	0.67	483.29	
R-21	7/1/2017	495.54	12.20	12.40	0.20	483.30	
R-21	7/4/2017	495.54	12.00	12.55	0.55	483.44	
R-21	7/8/2017	495.54	11.68	12.63	0.95	483.69	
R-21	7/26/2017	495.54	9.62	9.65	0.03	485.89	
R-21	7/27/2017	495.54	9.68	9.70	0.02	485.86	
R-21	8/28/2017	495.54	10.25	10.27	0.02	485.29	
R-21	8/29/2017	495.54	10.19	10.21	0.02	485.33	
R-21	9/19/2017	495.54	10.87	10.92	0.05	484.62	
R-21	9/21/2017	495.55	10.91	10.94	0.03	484.63	
R-21	10/20/2017	495.55	11.05	11.10	0.05	484.50	
R-21	10/26/2017	495.55	11.32	11.39	0.07	484.16	
R-21	11/1/2017	495.55	11.42	11.47	0.05	484.12	
R-22	7/23/2013	495.59	Sheen	10.19	Sheen	485.40	
R-22	8/1/2013	495.59	Sheen	10.12	Sheen	485.47	
R-22	8/21/2013	495.59	Sheen	10.08	Sheen	485.51	
R-22	1/9/2014	495.60	Sheen	11.57	Sheen	484.03	
R-22	2/5/2014	495.60	Sheen	11.68	Sheen	483.92	
R-22	3/24/2014	495.61	11.96	12.07	0.11	483.63	
R-22	4/18/2014	495.58	11.79	12.01	0.22	483.75	
R-22	5/15/2014	495.60	11.37	11.38	0.01	484.23	
R-22	6/19/2014	495.60	11.14	11.15	0.01	484.46	
R-22	7/15/2014	495.62	Sheen	9.42	Sheen	486.20	
R-22	8/26/2014	495.61	Sheen	10.07	Sheen	485.54	
R-22	9/24/2014	495.60	Sheen	10.66	Sheen	484.94	
R-22	10/21/2014	495.62	Sheen	11.57	Sheen	484.05	
R-22	11/19/2014	495.60	No LNAPL	11.17	0.00	484.43	
R-22	12/16/2014	495.61	Sheen	11.39	Sheen	484.22	
R-22	12/29/2014	495.61	Sheen	11.48	Sheen	484.13	
R-22	1/21/2015	495.61	No LNAPL	11.53	0.00	484.08	
R-22	2/25/2015	495.63	No LNAPL	11.67	0.00	483.96	
R-22	3/18/2015	495.57	Sheen	11.65	Sheen	483.92	
R-22	3/26/2015	495.57	Sheen	11.57	Sheen	484.00	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-22	4/16/2015	495.57	Sheen	11.45	Sheen	484.12	
R-22	5/21/2015	495.59	Sheen	11.18	Sheen	484.41	
R-22	6/10/2015	495.60	Sheen	11.22	Sheen	484.38	
R-22	8/19/2015	495.60	Sheen	10.47	Sheen	485.20	
R-22	10/6/2015	495.60	No LNAPL	10.77	0.00	484.84	
R-22	1/19/2016	495.62	No LNAPL	11.87	0.00	483.75	
R-22	5/26/2016	495.60	11.45	11.46	0.01	484.17	
R-22	9/9/2016	495.60	Sheen	10.30	Sheen	485.35	
R-22	10/13/2016	495.60	Sheen	11.36	Sheen	484.24	
R-22	11/15/2016	495.60	No LNAPL	10.97	0.00	484.73	
R-22	2/8/2017	495.58	Sheen	11.39	Sheen	484.26	
R-22	2/15/2017	495.58	Sheen	11.42	Sheen	484.21	
R-22	3/1/2017	495.58	Sheen	11.43	Sheen	484.15	
R-22	6/13/2017	495.60	Sheen	10.68	Sheen	484.97	
R-32	8/17/2009	—	7.66	8.15	0.49	—	
R-32	4/18/2011	494.24	8.89	Frozen	0.31	—	Frozen or bottom of well at 9.20 ft BTOC
R-32	5/24/2011	494.24	8.87	9.04	0.17	485.34	
R-32	7/15/2011	494.24	7.76	7.82	0.06	486.47	
R-32	10/21/2011	494.24	9.64	11.04	1.40	484.34	
R-32	2/16/2012	494.28	9.55	11.23	1.68	484.42	
R-32	3/15/2012	494.28	9.55	11.10	1.55	484.44	
R-32	4/12/2012	494.28	9.45	10.75	1.30	484.59	
R-32	5/14/2012	494.28	9.70	10.46	0.76	484.44	
R-32	6/12/2012	494.28	8.59	8.69	0.10	485.67	
R-32	7/18/2012	494.28	8.18	9.14	0.96	485.92	
R-32	8/21/2012	494.28	8.61	8.65	0.04	485.66	
R-32	9/19/2012	494.28	9.29	9.31	0.02	484.99	
R-32	10/15/2012	494.28	9.24	9.27	0.03	485.03	
R-32	11/29/2012	494.33	8.88	9.13	0.25	485.40	
R-32	12/28/2012	494.33	9.11	9.60	0.49	485.13	
R-32	2/26/2013	494.33	9.26	9.36	0.10	485.05	
R-32	3/28/2013	494.33	9.23	10.12	0.89	484.93	R-35R, R-39, and R-40 were offline on this date
R-32	4/24/2013	494.33	9.24	10.08	0.84	484.93	
R-32	5/31/2013	494.33	8.06	8.08	0.02	486.27	
R-32	6/24/2013	494.33	8.18	8.23	0.05	486.14	
R-32	7/23/2013	494.33	Sheen	7.93	Sheen	486.40	
R-32	8/21/2013	494.33	7.78	7.85	0.07	486.54	
R-32	9/24/2013	494.33	8.84	8.93	0.09	485.47	
R-32	10/29/2013	494.33	9.80	10.52	0.72	484.40	
R-32	11/19/2013	494.33	9.12	10.04	0.92	485.04	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-32	12/20/2013	494.33	9.05	9.69	0.64	485.16	
R-32	10/21/2014	494.31	9.17	9.25	0.08	485.13	
R-32	3/10/2015	494.31	9.26	9.45	0.19	485.01	
R-32	5/18/2015	494.31	8.91	9.05	0.14	485.37	
R-32	8/12/2015	494.30	No LNAPL	10.16	0.00	484.18	
R-32	10/15/2015	494.30	8.91	9.24	0.33	485.37	
R-32	3/4/2016	494.30	9.60	10.28	0.68	484.62	
R-32	6/14/2016	494.30	8.79	8.86	0.07	485.50	
R-32	7/2/2016	494.30	8.30	8.35	0.05	485.99	
R-32	8/18/2016	494.30	7.45	7.54	0.09	486.83	
R-32	10/13/2016	494.30	9.05	9.15	0.10	485.23	
R-32	10/22/2016	494.30	9.35	9.46	0.11	484.93	
R-32	11/12/2016	494.30	8.55	8.70	0.15	485.72	
R-32	3/2/2017	494.30	9.12	9.20	0.08	485.17	
R-32	3/11/2017	494.30	9.10	9.22	0.12	485.18	
R-32	3/18/2017	494.30	9.20	Frozen	0.05	—	Depth to ice = 9.25 feet
R-32	3/24/2017	494.30	9.20	Frozen	0.10	—	Depth to ice = 9.30 feet
R-32	6/6/2017	494.30	9.11	9.33	0.22	485.15	
R-32R	9/24/2013	—	11.11	11.22	0.11	—	
R-32R	10/29/2013	496.55	12.08	12.85	0.77	484.32	
R-32R	11/19/2013	496.55	11.45	11.92	0.47	485.01	
R-32R	12/20/2013	496.55	11.33	11.94	0.61	485.10	
R-32R	1/14/2014	496.55	11.66	11.85	0.19	484.85	
R-32R	2/24/2014	496.55	11.42	11.92	0.50	485.03	
R-32R	3/24/2014	496.55	12.00	12.47	0.47	484.46	
R-32R	4/14/2014	496.56	11.97	12.75	0.78	484.43	
R-32R	5/16/2014	496.56	11.39	11.62	0.23	485.12	
R-32R	6/20/2014	496.56	10.93	10.94	0.01	485.63	
R-32R	7/19/2014	496.56	Sheen	9.46	Sheen	487.10	
R-32R	8/28/2014	496.56	10.08	10.10	0.02	486.48	
R-32R	9/29/2014	496.56	10.80	11.45	0.65	485.63	
R-32R	10/16/2014	496.56	11.46	11.62	0.16	485.07	
R-32R	3/10/2015	496.56	11.50	11.90	0.40	484.98	
R-32R	5/18/2015	496.56	11.14	11.57	0.43	485.33	
R-32R	8/12/2015	496.55	7.84	8.05	0.21	488.71	
R-32R	10/15/2015	496.55	11.20	11.44	0.24	485.34	
R-32R	3/4/2016	496.55	11.90	12.72	0.82	484.54	
R-32R	3/24/2016	496.55	12.00	12.83	0.83	484.38	Initial fluid levels and product recovered by SWI during baildown testing
R-32R	6/14/2016	496.55	No LNAPL	11.10	0.00	485.45	
R-32R	7/2/2016	496.55	No LNAPL	10.62	0.00	485.93	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-32R	7/9/2016	496.55	No LNAPL	10.11	0.00	486.44	
R-32R	8/16/2016	496.59	Sheen	9.70	Sheen	486.89	
R-32R	8/18/2016	496.55	No LNAPL	9.78	0.00	486.77	
R-32R	10/13/2016	496.59	11.28	11.84	0.56	485.20	
R-32R	10/22/2016	496.59	11.60	12.18	0.58	484.87	
R-32R	11/12/2016	496.59	No LNAPL	10.89	0.00	485.70	
R-32R	11/19/2016	496.59	No LNAPL	10.93	0.00	485.66	
R-32R	11/26/2016	496.59	11.13	11.14	0.01	485.46	
R-32R	12/3/2016	496.59	No LNAPL	11.30	0.00	485.29	
R-32R	12/10/2016	496.59	No LNAPL	11.24	0.00	485.35	Transcription error corrected: DTW entered as 31.24 on ops gauging sheet
R-32R	3/2/2017	496.59	11.30	12.35	1.05	485.08	
R-32R	3/11/2017	496.59	11.30	12.50	1.20	485.05	
R-32R	3/18/2017	496.59	11.33	12.59	1.26	485.01	
R-32R	3/24/2017	496.59	11.32	12.73	1.41	484.99	
R-32R	4/1/2017	496.59	11.32	12.90	1.58	484.95	
R-32R	4/8/2017	496.59	11.30	12.70	1.40	485.01	
R-32R	4/15/2017	496.59	11.18	12.11	0.93	485.22	
R-32R	4/22/2017	496.59	11.20	11.95	0.75	485.24	
R-32R	4/29/2017	496.59	10.76	11.27	0.51	485.73	
R-32R	5/6/2017	496.59	10.98	11.35	0.37	485.54	
R-32R	5/13/2017	496.59	10.90	11.28	0.38	485.61	
R-32R	5/20/2017	496.59	10.84	11.15	0.31	485.69	
R-32R	5/27/2017	496.59	11.10	11.45	0.35	485.42	
R-32R	6/6/2017	496.59	11.38	11.94	0.56	485.10	
R-32R	7/1/2017	496.59	10.66	10.70	0.04	485.92	
R-32R	7/8/2017	496.59	No LNAPL	10.33	0.00	486.26	
R-33	9/2/2008	—	8.49	8.60	0.11	—	
R-33	8/17/2009	—	8.43	8.71	0.28	—	
R-33	4/26/2011	495.80	9.37	9.44	0.07	486.42	
R-33	5/24/2011	495.80	No LNAPL	Frozen	0.00	—	Frozen at 9.38 ft BTOC
R-33	7/15/2011	495.80	8.51	8.61	0.10	487.27	
R-33	10/21/2011	495.80	10.91	11.03	0.12	484.87	
R-33	2/17/2012	495.77	10.68	Frozen	0.27	—	Depth to bottom/ice 10.95 feet
R-33	3/15/2012	495.77	10.70	Frozen	0.28	—	Depth to bottom/ice 10.98 feet
R-33	4/12/2012	495.77	10.54	Frozen	0.45	—	Frozen at 10.99 ft BTOC
R-33	5/16/2012	495.77	10.36	10.77	0.41	485.34	
R-33	6/13/2012	495.77	Sheen	9.33	Sheen	486.44	
R-33	7/18/2012	495.77	Sheen	9.07	Sheen	486.70	
R-33	8/21/2012	495.77	9.44	9.47	0.03	486.33	
R-33	9/18/2012	495.77	10.15	10.17	0.02	485.62	

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-33	10/16/2012	495.77	10.23	10.35	0.12	485.52	
R-33	11/29/2012	495.82	9.74	9.85	0.11	486.06	
R-33	12/28/2012	495.82	10.08	Frozen	0.16	—	Frozen at 10.24 ft BTOC
R-33	2/26/2013	495.82	Sheen	Frozen	Sheen	—	Frozen at 10.12 ft BTOC
R-33	3/28/2013	495.82	Sheen	Frozen	Sheen	—	Frozen at 10.12 ft BTOC. R-35R, R-39, and R-40 were offline on this date
R-33	4/24/2013	495.82	No LNAPL	10.12	0.00	485.70	
R-33	5/30/2013	495.82	Sheen	9.02	Sheen	486.80	
R-33	6/24/2013	495.82	9.07	9.08	0.01	486.75	
R-33	7/23/2013	495.82	Sheen	8.71	Sheen	487.11	
R-33	8/21/2013	495.82	8.62	8.63	0.01	487.20	
R-33	9/24/2013	495.82	9.80	9.85	0.05	486.01	
R-33	10/29/2013	495.82	10.87	11.02	0.15	484.93	
R-33	11/19/2013	495.82	10.02	10.27	0.25	485.76	
R-33	12/20/2013	495.82	10.03	10.20	0.17	485.76	
R-33	1/15/2014	495.82	10.37	10.55	0.18	485.42	
R-33	2/25/2014	495.82	10.68	10.92	0.24	485.10	
R-33	3/24/2014	495.82	10.71	10.96	0.25	485.07	
R-33	4/14/2014	495.81	10.76	11.00	0.24	485.01	
R-33	5/29/2014	495.81	10.38	10.54	0.16	485.40	
R-33	6/20/2014	495.81	9.49	9.63	0.14	486.30	
R-33	7/31/2014	495.81	8.52	8.53	0.01	487.29	
R-33	8/28/2014	495.81	8.74	8.75	0.01	487.07	
R-33	9/29/2014	495.81	9.54	9.58	0.04	486.26	
R-33	10/16/2014	495.81	10.10	10.13	0.03	485.71	
R-33	3/10/2015	495.81	10.11	Frozen	0.19	—	Depth to ice = 10.30 feet
R-33	10/15/2015	495.81	9.86	9.91	0.05	485.98	
R-33	3/4/2016	495.81	10.52	10.95	0.43	485.27	
R-33	10/13/2016	495.83	9.96	9.99	0.03	485.87	
R-33	3/2/2017	495.83	9.94	Frozen	0.05	—	Ice at 9.99 feet BTOC
R-34	1/15/2007	496.41	13.30	13.55	0.25	483.06	
R-34	4/23/2007	496.41	13.10	13.53	0.43	483.23	
R-34	8/17/2009	496.41	No LNAPL	8.66	0.00	487.75	
R-34	4/26/2011	495.17	9.40	9.58	0.18	485.74	
R-34	7/15/2011	495.17	Sheen	8.70	Sheen	486.47	
R-34	10/21/2011	495.17	10.63	12.14	1.51	484.26	
R-34	2/16/2012	495.15	10.58	11.55	0.97	484.39	
R-34	4/12/2012	495.15	Sheen	11.21	0.70	484.51	
R-34	7/18/2012	495.15	Sheen	9.14	Sheen	486.01	
R-34	8/21/2012	495.15	Sheen	9.53	Sheen	485.62	
R-34	9/19/2012	495.15	10.22	10.23	0.01	484.93	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-34	10/15/2012	495.15	Sheen	10.21	Sheen	484.94	
R-34	11/29/2012	495.20	9.77	9.78	0.01	485.43	
R-34	12/28/2012	495.20	10.14	10.15	0.01	485.06	
R-34	2/26/2013	495.20	10.23	10.31	0.08	484.96	
R-34	3/28/2013	495.20	10.22	10.81	0.59	484.87	R-35R, R-39, and R-40 were offline on this date
R-34	4/24/2013	495.20	10.27	10.64	0.37	484.86	
R-34	7/23/2013	495.20	Sheen	8.85	Sheen	486.35	
R-34	10/29/2013	495.20	10.80	11.29	0.49	484.31	
R-34	1/15/2014	495.20	10.35	10.74	0.39	484.78	
R-34	2/24/2014	495.20	10.52	11.44	0.92	484.51	
R-34	4/14/2014	495.20	10.67	11.27	0.60	484.42	
R-34	7/19/2014	495.20	8.14	8.15	0.01	487.06	
R-34	10/16/2014	495.20	Sheen	10.15	Sheen	485.05	
R-34	3/10/2015	495.20	10.21	10.48	0.27	484.94	
R-34	5/18/2015	495.20	9.84	10.14	0.30	485.30	
R-34	8/12/2015	495.20	8.83	8.86	0.03	486.40	
R-34	10/15/2015	495.20	9.92	9.93	0.01	485.32	
R-34	3/4/2016	495.20	10.53	11.28	0.75	484.58	
R-34	6/14/2016	495.20	9.66	10.06	0.40	485.47	
R-34	8/18/2016	495.20	No LNAPL	8.42	0.00	486.78	
R-34	10/13/2016	495.18	Sheen	10.02	Sheen	485.16	
R-34	3/2/2017	495.18	Sheen	10.07	Sheen	485.11	
R-34	6/6/2017	495.18	No LNAPL	10.10	0.00	485.08	
R-35R	7/14/2011	—	11.71	12.10	0.39	—	
R-35R	8/23/2011	—	12.45	12.46	0.01	—	
R-35R	9/22/2011	—	13.24	15.31	2.07	—	
R-35R	10/21/2011	—	14.12	17.65	3.53	—	
R-35R	12/7/2011	494.74	—	—	—	—	Unable to measure due to active product recovery
R-35R	2/16/2012	494.74	15.18	15.28	0.10	479.54	
R-35R	3/15/2012	494.74	15.57	16.73	1.16	478.92	
R-35R	4/12/2012	494.74	15.02	19.29	4.27	478.81	
R-35R	4/19/2012	494.74	Sheen	15.15	Sheen	479.59	
R-35R	5/14/2012	494.74	14.37	14.47	0.10	480.35	
R-35R	6/12/2012	494.74	14.52	14.53	0.01	480.22	
R-35R	7/18/2012	494.74	Sheen	14.33	Sheen	480.41	
R-35R	7/30/2012	494.74	No LNAPL	13.01	0.00	481.73	
R-35R	8/21/2012	494.74	Sheen	15.47	Sheen	479.27	
R-35R	9/19/2012	494.74	17.96	18.05	0.09	476.76	
R-35R	10/15/2012	494.74	Sheen	18.72	Sheen	476.02	
R-35R	11/1/2012	494.74	19.19	19.20	0.01	475.55	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-35R	11/29/2012	494.72	Sheen	18.09	Sheen	476.63	
R-35R	12/28/2012	494.72	Sheen	19.29	Sheen	475.43	
R-35R	1/24/2013	494.72	Sheen	19.95	Sheen	474.77	
R-35R	2/26/2013	494.72	Sheen	20.40	Sheen	474.32	
R-35R	3/28/2013	494.72	Sheen	10.15	Sheen	484.57	R-35R, R-39, and R-40 were offline on this date
R-35R	4/24/2013	494.72	No LNAPL	20.66	0.00	474.06	
R-35R	5/21/2013	494.71	No LNAPL	13.12	0.00	481.59	
R-35R	6/24/2013	494.70	No LNAPL	12.40	0.00	482.30	
R-35R	7/23/2013	494.71	No LNAPL	10.64	0.00	484.07	
R-35R	8/1/2013	494.71	No LNAPL	11.80	0.00	482.91	
R-35R	8/21/2013	494.71	No LNAPL	13.14	0.00	481.57	
R-35R	9/24/2013	494.71	No LNAPL	16.82	0.00	477.89	
R-35R	10/1/2013	494.71	No LNAPL	16.65	0.00	478.06	
R-35R	10/29/2013	494.71	No LNAPL	20.71	0.00	474.00	
R-35R	11/19/2013	494.71	No LNAPL	16.05	0.00	478.66	
R-35R	12/20/2013	494.71	No LNAPL	19.67	0.00	475.04	
R-35R	1/14/2014	494.71	No LNAPL	23.98	0.00	470.73	
R-35R	2/24/2014	494.71	No LNAPL	31.76	0.00	462.95	
R-35R	3/18/2014	494.71	No LNAPL	27.20	0.00	467.51	
R-35R	4/14/2014	494.72	No LNAPL	32.03	0.00	462.69	
R-35R	5/16/2014	494.72	Sheen	33.81	Sheen	460.91	
R-35R	6/11/2014	494.72	No LNAPL	29.65	0.00	465.07	
R-35R	7/15/2014	494.72	No LNAPL	20.35	0.00	474.37	
R-35R	8/26/2014	494.72	No LNAPL	21.78	0.00	472.94	
R-35R	9/9/2014	494.72	No LNAPL	23.03	0.00	471.69	
R-35R	9/24/2014	494.72	No LNAPL	18.61	0.00	476.11	
R-35R	10/21/2014	494.72	No LNAPL	31.81	0.00	462.91	
R-35R	11/19/2014	494.72	No LNAPL	31.31	0.00	463.41	
R-35R	12/16/2014	494.72	No LNAPL	37.75	0.00	456.97	
R-35R	1/21/2015	494.24	No LNAPL	33.11	0.00	461.13	Flow rate = 54.5 gpm
R-35R	2/25/2015	494.24	No LNAPL	27.59	0.00	466.65	Flow rate = 47.2 gpm
R-35R	3/10/2015	494.24	No LNAPL	31.78	0.00	462.46	
R-35R	3/18/2015	494.24	--	30.94	--	463.30	
R-35R	3/26/2015	494.24	No LNAPL	31.57	0.00	462.67	
R-35R	4/16/2015	494.24	No LNAPL	31.93	0.00	462.31	
R-35R	5/21/2015	494.24	No LNAPL	28.35	0.00	465.89	
R-35R	6/10/2015	494.24	No LNAPL	35.23	0.00	459.01	
R-35R	7/22/2015	494.29	No LNAPL	28.10	0.00	466.21	
R-35R	8/12/2015	494.29	No LNAPL	25.09	0.00	469.24	
R-35R	8/19/2015	494.29	No LNAPL	28.55	0.00	465.77	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-35R	9/30/2015	494.29	No LNAPL	32.95	0.00	461.38	
R-35R	10/6/2015	494.29	No LNAPL	36.42	0.00	457.88	DTW was initially 36.60 feet at 14:34 and air bubbles were visible in the purgewater during the GW treatment sampling.
R-35R	10/15/2015	494.29	No LNAPL	30.87	0.00	463.46	
R-35R	11/19/2015	494.29	13.51	13.80	0.29	480.72	
R-35R	11/25/2015	494.29	Sheen	13.55	Sheen	480.77	
R-35R	12/16/2015	494.29	No LNAPL	15.20	0.00	479.09	
R-35R	1/19/2016	494.29	Sheen	16.61	Sheen	477.68	
R-35R	1/19/2016	494.29	Sheen	16.61	Sheen	477.68	
R-35R	2/25/2016	494.29	No LNAPL	18.58	0.00	475.71	
R-35R	3/4/2016	494.29	No LNAPL	18.65	0.00	475.64	
R-35R	4/14/2016	494.29	No LNAPL	16.27	0.00	478.02	
R-35R	5/20/2016	494.29	No LNAPL	16.95	0.00	477.34	
R-35R	5/26/2016	494.29	No LNAPL	16.86	0.00	477.45	
R-35R	6/14/2016	494.29	No LNAPL	17.15	0.00	477.14	
R-35R	7/2/2016	494.29	No LNAPL	14.40	0.00	479.89	
R-35R	7/4/2016	494.29	No LNAPL	13.75	0.00	480.54	
R-35R	7/8/2016	494.29	No LNAPL	14.28	0.00	480.01	
R-35R	7/12/2016	494.29	No LNAPL	14.15	0.00	480.14	
R-35R	7/16/2016	494.29	No LNAPL	20.51	0.00	473.78	
R-35R	7/19/2016	494.29	No LNAPL	19.42	0.00	474.87	
R-35R	7/23/2016	494.29	No LNAPL	16.87	0.00	477.42	
R-35R	7/26/2016	494.29	No LNAPL	17.34	0.00	476.95	
R-35R	7/26/2016	494.29	No LNAPL	17.20	0.00	477.09	
R-35R	7/30/2016	494.29	No LNAPL	20.22	0.00	474.07	
R-35R	8/1/2016	494.29	No LNAPL	18.79	0.00	475.50	
R-35R	8/6/2016	494.29	No LNAPL	21.87	0.00	472.42	
R-35R	8/9/2016	494.29	No LNAPL	21.68	0.00	472.61	
R-35R	8/13/2016	494.29	No LNAPL	19.31	0.00	474.98	
R-35R	8/16/2016	494.29	No LNAPL	19.33	0.00	474.96	
R-35R	8/18/2016	494.29	No LNAPL	19.14	0.00	475.15	
R-35R	8/20/2016	494.29	No LNAPL	19.20	0.00	475.09	
R-35R	8/23/2016	494.14	No LNAPL	19.24	0.00	474.90	
R-35R	8/27/2016	494.14	No LNAPL	20.87	0.00	473.27	
R-35R	8/30/2016	494.14	No LNAPL	20.57	0.00	473.57	
R-35R	9/3/2016	494.14	No LNAPL	21.35	0.00	472.79	
R-35R	9/6/2016	494.14	No LNAPL	23.41	0.00	470.73	
R-35R	9/9/2016	494.14	No LNAPL	23.85	0.00	470.33	
R-35R	9/9/2016	494.14	No LNAPL	23.85	0.00	470.33	
R-35R	9/10/2016	494.14	No LNAPL	23.74	0.00	470.40	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-35R	9/13/2016	494.14	No LNAPL	18.60	0.00	475.54	
R-35R	9/17/2016	494.14	No LNAPL	18.60	0.00	475.54	
R-35R	9/24/2016	494.14	No LNAPL	8.63	0.00	485.51	All recovery wells shutdown for sand filter media changeout
R-35R	9/27/2016	494.14	No LNAPL	21.09	0.00	473.05	
R-35R	9/30/2016	494.14	No LNAPL	19.51	0.00	474.63	
R-35R	10/4/2016	494.14	No LNAPL	22.05	0.00	472.09	
R-35R	10/8/2016	494.14	No LNAPL	21.82	0.00	472.32	
R-35R	10/11/2016	494.14	No LNAPL	22.20	0.00	471.94	
R-35R	10/13/2016	494.14	No LNAPL	22.35	0.00	471.79	
R-35R	10/15/2016	494.14	No LNAPL	22.90	0.00	471.24	
R-35R	10/18/2016	494.14	No LNAPL	21.72	0.00	472.42	
R-35R	10/22/2016	494.14	No LNAPL	21.96	0.00	472.18	
R-35R	10/25/2016	494.14	No LNAPL	22.05	0.00	472.09	
R-35R	10/28/2016	494.14	No LNAPL	20.12	0.00	474.02	
R-35R	11/1/2016	494.14	No LNAPL	19.00	0.00	475.14	
R-35R	11/5/2016	494.14	No LNAPL	18.42	0.00	475.72	
R-35R	11/8/2016	494.14	No LNAPL	18.87	0.00	475.27	
R-35R	11/12/2016	494.14	No LNAPL	19.82	0.00	474.32	
R-35R	11/15/2016	494.14	No LNAPL	19.30	0.00	474.94	
R-35R	11/15/2016	494.14	No LNAPL	19.28	0.00	474.86	
R-35R	11/15/2016	494.14	No LNAPL	19.30	0.00	474.94	
R-35R	11/19/2016	494.14	No LNAPL	19.03	0.00	475.11	
R-35R	11/22/2016	494.14	No LNAPL	19.15	0.00	474.99	
R-35R	11/26/2016	494.14	No LNAPL	18.65	0.00	475.49	
R-35R	11/29/2016	494.14	No LNAPL	18.90	0.00	475.24	
R-35R	12/3/2016	494.14	No LNAPL	19.50	0.00	474.64	
R-35R	12/6/2016	494.14	No LNAPL	19.56	0.00	474.58	
R-35R	12/9/2016	494.14	No LNAPL	19.51	0.00	474.63	
R-35R	12/10/2016	494.14	No LNAPL	16.95	0.00	477.19	
R-35R	12/13/2016	494.14	No LNAPL	19.75	0.00	474.39	
R-35R	12/17/2016	494.14	No LNAPL	19.60	0.00	474.54	
R-35R	12/20/2016	494.14	No LNAPL	19.51	0.00	474.63	
R-35R	12/24/2016	494.14	No LNAPL	20.05	0.00	474.09	
R-35R	12/27/2016	494.14	No LNAPL	20.42	0.00	473.72	
R-35R	12/31/2016	494.14	No LNAPL	19.51	0.00	474.63	
R-35R	1/7/2017	494.14	No LNAPL	19.87	0.00	474.27	
R-35R	1/10/2017	494.14	No LNAPL	19.93	0.00	474.21	
R-35R	1/15/2017	494.14	No LNAPL	20.49	0.00	473.65	
R-35R	1/17/2017	494.14	No LNAPL	20.37	0.00	473.77	
R-35R	1/21/2017	494.14	No LNAPL	20.80	0.00	473.34	

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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-35R	1/24/2017	494.14	No LNAPL	20.88	0.00	473.26	
R-35R	1/24/2017	494.14	No LNAPL	21.03	0.00	473.11	
R-35R	1/28/2017	494.14	No LNAPL	21.37	0.00	472.77	
R-35R	1/31/2017	494.14	No LNAPL	21.48	0.00	472.66	
R-35R	2/4/2017	494.14	No LNAPL	21.55	0.00	472.59	
R-35R	2/7/2017	494.14	No LNAPL	21.69	0.00	472.45	
R-35R	2/8/2017	494.14	No LNAPL	21.75	0.00	472.46	
R-35R	2/8/2017	494.14	No LNAPL	21.75	0.00	472.46	
R-35R	2/11/2017	494.14	No LNAPL	21.65	0.00	472.49	
R-35R	2/14/2017	494.14	No LNAPL	21.65	0.00	472.49	
R-35R	2/18/2017	494.14	No LNAPL	21.70	0.00	472.44	
R-35R	2/21/2017	494.14	No LNAPL	21.83	0.00	472.31	
R-35R	2/25/2017	494.14	No LNAPL	24.63	0.00	469.51	
R-35R	2/28/2017	494.14	No LNAPL	22.54	0.00	471.60	
R-35R	3/1/2017	494.14	No LNAPL	22.90	0.00	471.24	
R-35R	3/4/2017	494.14	No LNAPL	22.93	0.00	471.21	
R-35R	3/7/2017	494.14	No LNAPL	22.72	0.00	471.42	
R-35R	3/11/2017	494.14	No LNAPL	24.05	0.00	470.09	
R-35R	3/14/2017	494.14	No LNAPL	23.96	0.00	470.18	
R-35R	3/18/2017	494.14	No LNAPL	23.95	0.00	470.19	
R-35R	3/21/2017	494.14	No LNAPL	24.05	0.00	470.09	
R-35R	3/24/2017	494.14	No LNAPL	23.98	0.00	470.16	
R-35R	3/28/2017	494.14	No LNAPL	23.98	0.00	470.16	
R-35R	4/1/2017	494.14	No LNAPL	25.60	0.00	468.54	
R-35R	4/4/2017	494.14	No LNAPL	24.03	0.00	470.11	
R-35R	4/8/2017	494.14	No LNAPL	23.98	0.00	470.16	
R-35R	4/11/2017	494.14	No LNAPL	24.20	0.00	469.94	
R-35R	4/15/2017	494.14	No LNAPL	23.63	0.00	470.51	
R-35R	4/18/2017	494.14	No LNAPL	23.20	0.00	470.94	
R-35R	4/18/2017	494.14	No LNAPL	23.19	0.00	470.95	
R-35R	4/22/2017	494.14	No LNAPL	23.59	0.00	470.55	
R-35R	4/25/2017	494.14	No LNAPL	22.99	0.00	471.15	
R-35R	4/29/2017	494.14	No LNAPL	22.12	0.00	472.02	
R-35R	5/2/2017	494.14	No LNAPL	21.48	0.00	472.66	
R-35R	5/6/2017	494.14	No LNAPL	22.58	0.00	471.56	
R-35R	5/9/2017	494.14	No LNAPL	22.94	0.00	471.20	
R-35R	5/13/2017	494.14	No LNAPL	22.41	0.00	471.73	
R-35R	5/16/2017	494.14	No LNAPL	22.05	0.00	472.09	
R-35R	5/20/2017	494.14	No LNAPL	22.10	0.00	472.04	
R-35R	5/23/2017	494.14	No LNAPL	22.63	0.00	471.51	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-35R	5/25/2017	494.14	No LNAPL	22.75	0.00	471.39	
R-35R	5/27/2017	494.14	No LNAPL	22.98	0.00	471.16	
R-35R	5/30/2017	494.14	No LNAPL	23.77	0.00	470.37	
R-35R	6/3/2017	494.14	No LNAPL	24.32	0.00	469.82	
R-35R	6/6/2017	494.14	No LNAPL	24.90	0.00	469.24	
R-35R	6/6/2017	494.14	No LNAPL	24.81	0.00	469.33	
R-35R	6/10/2017	494.14	No LNAPL	25.10	0.00	469.04	
R-35R	6/13/2017	494.14	No LNAPL	24.35	0.00	469.84	
R-35R	6/13/2017	494.14	No LNAPL	24.55	0.00	469.59	
R-35R	6/16/2017	494.14	No LNAPL	22.42	0.00	471.72	
R-35R	6/20/2017	494.14	No LNAPL	22.91	0.00	471.23	
R-35R	6/24/2017	494.14	No LNAPL	23.05	0.00	471.09	
R-35R	6/27/2017	494.14	No LNAPL	22.69	0.00	471.45	
R-35R	7/1/2017	494.14	No LNAPL	22.78	0.00	471.36	
R-35R	7/4/2017	494.14	No LNAPL	22.95	0.00	471.19	
R-35R	7/8/2017	494.14	No LNAPL	21.18	0.00	472.96	
R-35R	7/27/2017	494.14	Sheen	8.01	Sheen	486.13	
R-35R	7/28/2017	494.14	No LNAPL	8.05	0.00	486.09	
R-35R	8/30/2017	494.14	Sheen	8.55	Sheen	485.59	
R-35R	9/20/2017	494.14	Sheen	9.24	Sheen	484.90	
R-35R	10/20/2017	494.12	Sheen	9.39	Sheen	484.73	
R-35R	10/25/2017	494.12	Sheen	9.67	Sheen	484.45	
R-35R	11/1/2017	494.12	Sheen	9.76	Sheen	484.36	
R-38	8/18/2009	498.67	No LNAPL	11.71	0.00	486.96	
R-38	4/25/2011	498.67	No LNAPL	Frozen	0.00	—	Frozen
R-38	5/24/2011	498.67	No LNAPL	6.66	0.00	492.01	
R-38	7/15/2011	498.67	No LNAPL	12.20	0.00	486.47	
R-38	10/21/2011	498.67	No LNAPL	11.01	0.00	487.66	
R-38	1/11/2012	498.65	No LNAPL	Frozen	0.00	—	Frozen at 10.18 ft BTOC
R-38	2/7/2012	498.65	No LNAPL	Frozen	0.00	—	Frozen at 10.01 ft BTOC
R-38	4/10/2012	498.65	No LNAPL	Frozen	0.00	—	Frozen at 10.02 ft BTOC
R-38	7/17/2012	498.65	No LNAPL	8.76	0.00	489.89	
R-38	8/21/2012	498.65	No LNAPL	12.03	0.00	486.62	
R-38	9/18/2012	498.65	No LNAPL	11.62	0.00	487.03	
R-38	10/16/2012	498.65	No LNAPL	11.21	0.00	487.44	
R-38	11/29/2012	498.64	No LNAPL	11.21	0.00	487.43	
R-38	12/27/2012	498.64	No LNAPL	Frozen	0.00	—	Frozen at 11.03 ft BTOC
R-38	1/24/2013	498.64	No LNAPL	Frozen	0.00	—	Frozen at 10.77 ft BTOC
R-38	2/26/2013	498.64	No LNAPL	Frozen	0.00	—	Frozen at 10.74 ft BTOC
R-38	4/24/2013	498.64	No LNAPL	Frozen	0.00	—	Frozen at 10.24 ft BTOC

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-39	1/15/2007	495.29	12.95	12.97	0.02	482.34	
R-39	4/23/2007	495.29	12.88	12.89	0.01	482.41	
R-39	8/17/2009	495.29	12.70	12.73	0.03	482.58	
R-39	4/26/2011	495.29	No LNAPL	17.79	0.00	477.50	
R-39	5/18/2011	495.29	Sheen	18.92	Sheen	476.37	
R-39	6/21/2011	495.29	No LNAPL	17.57	0.00	477.72	
R-39	8/23/2011	495.29	14.01	14.02	0.01	481.28	
R-39	9/22/2011	495.29	15.20	15.21	0.01	480.09	
R-39	10/21/2011	495.29	15.86	17.54	1.68	479.04	
R-39	12/7/2011	495.27	16.11	16.91	0.80	478.97	
R-39	2/17/2012	495.27	16.86	17.06	0.20	478.36	
R-39	3/15/2012	495.27	16.85	16.87	0.02	478.42	
R-39	4/12/2012	495.27	15.93	16.68	0.75	479.17	
R-39	4/19/2012	495.27	15.39	15.61	0.22	479.83	
R-39	5/14/2012	495.27	Sheen	13.02	Sheen	482.25	
R-39	6/12/2012	495.27	Sheen	11.86	Sheen	483.41	
R-39	7/18/2012	495.27	15.11	15.12	0.01	480.16	
R-39	7/30/2012	495.27	Sheen	14.33	Sheen	480.94	
R-39	8/21/2012	495.27	Sheen	15.36	Sheen	479.91	
R-39	9/18/2012	495.27	16.58	16.59	0.01	478.69	
R-39	10/15/2012	495.27	17.25	17.26	0.01	478.02	
R-39	11/1/2012	495.27	Sheen	17.39	Sheen	477.88	
R-39	11/29/2012	495.05	Sheen	17.22	Sheen	477.83	
R-39	12/28/2012	495.05	Sheen	17.78	Sheen	477.27	
R-39	1/24/2013	495.05	Sheen	18.52	Sheen	476.53	
R-39	2/26/2013	495.05	Sheen	18.44	Sheen	476.61	
R-39	3/28/2013	495.05	Sheen	10.67	Sheen	484.38	R-35R, R-39, and R-40 were offline on this date
R-39	4/24/2013	495.05	Sheen	19.31	Sheen	475.74	
R-39	5/21/2013	495.04	Sheen	10.93	Sheen	484.11	
R-39	6/24/2013	495.05	Sheen	10.02	Sheen	485.03	
R-39	7/23/2013	495.05	No LNAPL	9.79	0.00	485.26	
R-39	8/1/2013	495.05	No LNAPL	9.70	0.00	485.35	
R-39	8/21/2013	495.05	No LNAPL	9.63	0.00	485.42	
R-39	9/30/2013	495.06	No LNAPL	10.46	0.00	484.60	
R-39	10/22/2013	495.09	No LNAPL	11.36	0.00	483.73	
R-39	11/26/2013	495.09	No LNAPL	10.80	0.00	484.29	
R-39	12/18/2013	495.07	No LNAPL	10.87	0.00	484.20	
R-39	1/9/2014	495.08	No LNAPL	11.10	0.00	483.98	
R-39	2/5/2014	495.08	No LNAPL	11.29	0.00	483.79	
R-39	3/18/2014	495.08	No LNAPL	11.40	0.00	483.68	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-39	3/24/2014	495.08	No LNAPL	11.49	0.00	483.59	
R-39	4/18/2014	495.08	No LNAPL	11.27	0.00	483.81	
R-39	5/15/2014	495.08	--	10.74	--	484.34	
R-39	5/16/2014	495.08	No LNAPL	10.86	0.00	484.22	
R-39	6/11/2014	495.09	No LNAPL	11.00	0.00	484.09	
R-39	6/19/2014	495.09	No LNAPL	10.64	0.00	484.45	
R-39	7/15/2014	495.08	No LNAPL	8.81	0.00	486.27	
R-39	8/26/2014	495.09	No LNAPL	9.54	0.00	485.55	
R-39	9/9/2014	495.09	No LNAPL	9.65	0.00	485.44	
R-39	9/24/2014	495.08	No LNAPL	10.03	0.00	485.05	
R-39	10/21/2014	495.08	No LNAPL	10.98	0.00	484.10	
R-39	11/19/2014	495.06	No LNAPL	10.63	0.00	484.43	
R-39	12/16/2014	495.07	No LNAPL	10.81	0.00	484.26	
R-39	12/29/2014	495.07	No LNAPL	10.88	0.00	484.19	
R-39	1/21/2015	495.07	No LNAPL	10.91	0.00	484.16	
R-39	2/25/2015	495.08	No LNAPL	11.08	0.00	484.00	
R-39	3/10/2015	495.07	No LNAPL	10.97	0.00	484.10	
R-39	3/18/2015	495.07	--	11.03	--	484.04	
R-39	3/26/2015	495.07	No LNAPL	10.98	0.00	484.09	
R-39	4/16/2015	495.07	--	10.80	--	484.27	
R-39	5/21/2015	495.07	No LNAPL	10.67	0.00	484.40	
R-39	6/10/2015	495.07	No LNAPL	10.74	0.00	484.33	
R-39	8/12/2015	495.07	No LNAPL	9.65	0.00	485.46	
R-39	8/19/2015	495.07	No LNAPL	9.96	0.00	485.14	
R-39	10/6/2015	495.07	No LNAPL	10.19	0.00	484.89	
R-39	10/15/2015	495.07	No LNAPL	10.54	0.00	484.53	
R-39	11/19/2015	495.07	No LNAPL	10.85	0.00	484.22	
R-39	1/19/2016	495.07	--	11.27	--	483.76	
R-39	3/4/2016	495.07	No LNAPL	11.49	0.00	483.58	
R-39	5/26/2016	495.08	No LNAPL	10.96	0.00	484.14	
R-39	9/9/2016	495.07	No LNAPL	9.78	0.00	485.33	
R-39	10/13/2016	495.07	No LNAPL	10.81	0.00	484.26	
R-39	11/15/2016	495.06	No LNAPL	10.47	0.00	484.69	
R-39	2/8/2017	495.05	No LNAPL	10.85	0.00	484.27	
R-39	3/2/2017	495.05	No LNAPL	10.87	0.00	484.18	
R-39	6/13/2017	495.05	No LNAPL	10.23	0.00	484.87	
R-39	7/26/2017	495.05	Sheen	9.18	Sheen	485.87	
R-39	8/31/2017	495.05	Sheen	9.88	Sheen	485.17	
R-39	9/19/2017	495.05	Sheen	10.36	Sheen	484.69	
R-39	10/19/2017	495.05	Sheen	10.49	Sheen	484.56	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-40	1/15/2007	494.56	12.95	12.97	0.02	481.61	
R-40	4/23/2007	494.56	12.88	12.89	0.01	481.68	
R-40	8/17/2009	494.56	--	18.27	--	476.29	
R-40	4/26/2011	494.55	14.29	14.65	0.36	480.20	
R-40	5/18/2011	494.55	18.02	18.30	0.28	476.48	
R-40	6/21/2011	494.55	14.11	Frozen	0.14	—	Frozen at 14.25 ft BTOC
R-40	8/23/2011	494.55	18.94	18.97	0.03	475.60	
R-40	9/22/2011	494.55	16.36	17.01	0.65	478.07	
R-40	10/21/2011	494.55	15.05	20.05	5.00	478.61	
R-40	12/7/2011	494.53	16.51	16.53	0.02	478.02	
R-40	2/16/2012	494.53	17.62	17.69	0.07	476.90	
R-40	3/15/2012	494.53	18.41	18.46	0.05	476.11	
R-40	4/12/2012	494.53	18.48	18.51	0.03	476.04	
R-40	4/19/2012	494.53	17.69	17.80	0.11	476.82	
R-40	5/14/2012	494.53	Sheen	17.42	Sheen	477.11	
R-40	6/12/2012	494.53	17.00	17.04	0.04	477.52	
R-40	7/18/2012	494.53	18.52	18.63	0.11	475.99	
R-40	7/30/2012	494.53	17.39	17.42	0.03	477.13	
R-40	8/21/2012	494.53	19.00	19.15	0.15	475.50	
R-40	9/19/2012	494.53	16.24	16.73	0.49	478.20	
R-40	10/15/2012	494.53	18.19	18.49	0.30	476.29	
R-40	11/1/2012	494.53	18.18	18.28	0.10	476.33	
R-40	11/29/2012	494.46	18.73	19.43	0.70	475.61	
R-40	12/28/2012	494.46	19.20	19.31	0.11	475.24	
R-40	1/24/2013	494.46	21.02	21.25	0.23	473.40	
R-40	2/26/2013	494.46	20.44	20.76	0.32	473.96	
R-40	3/28/2013	494.46	10.12	10.13	0.01	484.34	R-35R, R-39, and R-40 were offline on this date
R-40	4/24/2013	494.46	18.02	18.12	0.10	476.42	
R-40	5/21/2013	494.46	10.19	10.20	0.01	484.27	
R-40	6/24/2013	494.46	Sheen	9.62	Sheen	484.84	
R-40	7/23/2013	494.46	Sheen	9.05	Sheen	485.41	
R-40	8/1/2013	494.46	No LNAPL	9.00	0.00	485.46	
R-40	8/21/2013	494.46	Sheen	8.94	Sheen	485.52	
R-40	9/30/2013	494.47	10.16	10.17	0.01	484.31	
R-40	10/22/2013	494.48	10.78	10.84	0.06	483.69	
R-40	11/26/2013	494.48	Sheen	9.84	Sheen	484.64	
R-40	12/18/2013	494.48	10.09	10.10	0.01	484.39	
R-40	1/9/2014	494.48	10.37	10.38	0.01	484.11	
R-40	2/5/2014	494.49	10.54	10.55	0.01	483.95	
R-40	3/18/2014	494.46	10.74	10.75	0.01	483.72	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-40	3/24/2014	494.46	10.79	10.82	0.03	483.66	
R-40	4/18/2014	494.47	10.58	10.59	0.01	483.89	
R-40	5/15/2014	494.48	10.14	10.15	0.01	484.34	
R-40	5/16/2014	494.48	Sheen	10.20	Sheen	484.28	
R-40	6/11/2014	494.48	Sheen	10.34	Sheen	484.14	
R-40	6/19/2014	494.48	Sheen	9.92	Sheen	484.56	
R-40	7/15/2014	494.50	8.13	8.32	0.19	486.34	
R-40	8/26/2014	494.49	8.80	9.12	0.32	485.63	
R-40	9/9/2014	494.49	9.03	9.42	0.39	485.39	
R-40	9/24/2014	494.48	9.31	9.75	0.44	485.09	
R-40	10/21/2014	494.48	10.22	10.74	0.52	484.17	
R-40	11/19/2014	494.50	9.90	10.04	0.14	484.58	
R-40	12/16/2014	494.47	10.10	10.25	0.15	484.34	
R-40	12/29/2014	494.47	12.26	12.38	0.12	482.19	
R-40	1/21/2015	494.46	20.91	21.06	0.15	473.52	Flow rate = 45.0 gpm
R-40	2/25/2015	494.47	15.53	16.33	0.80	478.80	Flow rate = ~30 gpm
R-40	3/10/2015	494.42	16.01	17.20	1.19	478.20	
R-40	3/18/2015	494.42	15.54	16.52	0.98	478.71	
R-40	3/26/2015	494.42	15.48	17.31	1.83	478.61	
R-40	4/16/2015	494.42	19.72	20.10	0.38	474.63	
R-40	5/21/2015	494.42	14.01	14.44	0.43	480.33	
R-40	6/10/2015	494.42	14.70	15.29	0.59	479.61	
R-40	7/22/2015	494.42	11.61	11.62	0.01	482.83	
R-40	8/12/2015	495.49	11.10	11.16	0.06	484.42	
R-40	8/19/2015	495.49	11.59	11.64	0.05	483.96	
R-40	9/30/2015	494.48	11.65	11.70	0.05	482.86	
R-40	10/6/2015	494.48	11.46	11.47	0.01	483.06	The flow rate gauge (needle-style) was not working. The flow rate of 10 gpm was recorded on the 10-5-15 Night AM log entry in the well house.
R-40	10/15/2015	494.48	10.92	10.94	0.02	483.60	
R-40	11/19/2015	494.48	12.01	12.04	0.03	482.46	
R-40	11/25/2015	494.48	11.85	11.89	0.04	482.65	
R-40	12/16/2015	494.48	12.21	12.32	0.11	482.25	
R-40	1/19/2016	494.48	12.58	12.60	0.02	481.90	
R-40	1/19/2016	494.48	12.58	12.60	0.02	481.90	
R-40	2/25/2016	494.48	13.82	13.96	0.14	480.64	
R-40	3/4/2016	494.48	Sheen	11.69	Sheen	482.84	
R-40	4/14/2016	494.48	Sheen	10.16	Sheen	484.32	Pump was off
R-40	5/20/2016	494.48	14.34	14.65	0.31	480.08	
R-40	5/26/2016	494.48	14.16	14.50	0.34	480.28	
R-40	6/14/2016	494.48	14.02	14.45	0.43	480.38	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-40	7/2/2016	494.48	13.85	14.25	0.40	480.56	
R-40	7/4/2016	494.48	13.69	14.12	0.43	480.71	DTP recorded as 14.12 on fieldsheet. Corrected based on recorded product thickness and recent Water level trend.
R-40	7/8/2016	494.48	12.80	12.98	0.18	481.65	
R-40	7/12/2016	494.48	12.76	13.00	0.24	481.68	
R-40	7/16/2016	494.48	12.90	13.13	0.23	481.54	
R-40	7/19/2016	494.48	12.50	12.60	0.10	481.96	
R-40	7/23/2016	494.48	12.03	12.25	0.22	482.41	
R-40	7/26/2016	494.48	12.17	12.48	0.31	482.25	
R-40	7/26/2016	494.48	12.17	12.47	0.30	482.26	
R-40	7/30/2016	494.48	12.32	12.71	0.39	482.09	
R-40	8/1/2016	494.48	12.05	12.36	0.31	482.37	
R-40	8/6/2016	494.48	11.43	11.73	0.30	483.00	
R-40	8/9/2016	494.48	12.10	12.41	0.31	482.32	
R-40	8/13/2016	494.48	12.15	12.45	0.30	482.28	
R-40	8/16/2016	494.48	12.55	13.00	0.45	481.85	Transcription error corrected: DTP/DTW entered vice-versa
R-40	8/18/2016	494.48	12.61	13.11	0.50	481.78	
R-40	8/20/2016	494.48	12.70	13.27	0.57	481.68	
R-40	8/23/2016	494.48	12.83	12.93	0.10	481.63	
R-40	8/27/2016	494.48	12.85	12.95	0.10	481.61	
R-40	8/30/2016	494.48	12.92	13.08	0.16	481.53	
R-40	9/3/2016	494.48	13.23	13.51	0.28	481.20	
R-40	9/6/2016	494.48	13.20	13.46	0.26	481.23	
R-40	9/9/2016	494.48	13.26	13.58	0.32	481.21	
R-40	9/9/2016	494.48	13.26	13.58	0.32	481.21	
R-40	9/10/2016	494.48	13.30	13.61	0.31	481.12	
R-40	9/13/2016	494.48	13.30	13.65	0.35	481.12	Transcription error corrected: DTP/DTW entered vice-versa
R-40	9/17/2016	494.48	13.40	13.80	0.40	481.01	
R-40	9/24/2016	494.48	9.21	9.23	0.02	485.27	All recovery wells shutdown for sand filter media changeout
R-40	9/27/2016	494.48	13.92	14.29	0.37	480.49	
R-40	9/30/2016	494.48	13.37	13.66	0.29	481.06	
R-40	10/4/2016	494.48	14.00	14.36	0.36	480.42	
R-40	10/8/2016	494.48	13.95	14.40	0.45	480.45	
R-40	10/11/2016	494.48	14.15	14.25	0.10	480.31	
R-40	10/13/2016	494.48	14.18	14.25	0.07	480.29	
R-40	10/15/2016	494.48	14.25	14.40	0.15	480.20	
R-40	10/18/2016	494.48	14.46	14.55	0.09	480.00	
R-40	10/22/2016	494.48	14.60	14.72	0.12	479.86	
R-40	10/25/2016	494.48	14.79	14.92	0.13	479.67	
R-40	10/28/2016	494.48	14.68	14.79	0.11	479.78	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-40	11/1/2016	494.48	14.06	14.15	0.09	480.40	
R-40	11/5/2016	494.48	13.82	13.94	0.12	480.64	
R-40	11/8/2016	494.48	—	—	—	—	Well pump was broken. DTW/DTP not recorded on fieldsheet
R-40	11/12/2016	494.48	13.90	14.05	0.15	480.55	
R-40	11/15/2016	494.48	13.89	14.00	0.11	480.57	
R-40	11/15/2016	494.48	13.92	14.02	0.10	480.58	
R-40	11/15/2016	494.48	13.92	14.02	0.10	480.58	
R-40	11/19/2016	494.48	13.83	13.95	0.12	480.63	
R-40	11/22/2016	494.48	14.01	14.15	0.14	480.45	
R-40	11/26/2016	494.48	14.01	14.16	0.15	480.44	
R-40	11/29/2016	494.48	14.10	14.27	0.17	480.35	
R-40	12/3/2016	494.48	14.26	14.45	0.19	480.19	
R-40	12/6/2016	494.48	14.30	14.36	0.06	480.17	
R-40	12/9/2016	494.48	14.70	14.88	0.18	479.75	
R-40	12/10/2016	494.48	14.40	14.57	0.17	480.05	
R-40	12/13/2016	494.48	14.22	14.35	0.13	480.24	
R-40	12/17/2016	494.48	14.25	14.45	0.20	480.19	
R-40	12/20/2016	494.48	14.20	14.33	0.13	480.26	
R-40	12/24/2016	494.48	14.25	14.44	0.19	480.20	
R-40	12/27/2016	494.48	14.25	14.55	0.30	480.18	
R-40	12/31/2016	494.48	14.24	14.40	0.16	480.21	
R-40	1/7/2017	494.48	14.45	14.72	0.27	479.98	
R-40	1/10/2017	494.48	14.87	15.20	0.33	479.55	
R-40	1/15/2017	494.48	14.93	15.37	0.44	479.47	
R-40	1/17/2017	494.48	14.82	15.40	0.58	479.56	
R-40	1/21/2017	494.48	14.90	14.98	0.08	479.57	
R-40	1/24/2017	494.48	15.79	15.91	0.12	478.67	
R-40	1/24/2017	494.48	14.90	15.04	0.14	479.56	
R-40	1/28/2017	494.48	15.07	15.22	0.15	479.38	
R-40	1/31/2017	494.48	15.04	15.15	0.11	479.42	
R-40	2/4/2017	494.48	15.20	15.35	0.15	479.25	
R-40	2/7/2017	494.48	15.07	15.14	0.07	479.40	
R-40	2/8/2017	494.48	15.11	15.26	0.15	479.41	
R-40	2/8/2017	494.48	15.11	15.26	0.15	479.41	
R-40	2/11/2017	494.48	15.17	15.30	0.13	479.29	
R-40	2/14/2017	494.48	15.15	15.31	0.16	479.30	
R-40	2/18/2017	494.48	15.48	15.65	0.17	478.97	
R-40	2/21/2017	494.48	15.55	15.75	0.20	478.89	
R-40	2/25/2017	494.48	15.55	15.79	0.24	478.89	
R-40	2/28/2017	494.48	15.54	15.81	0.27	478.89	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-40	3/1/2017	494.48	15.51	15.65	0.14	478.95	
R-40	3/4/2017	494.48	15.60	15.86	0.26	478.83	
R-40	3/7/2017	494.48	15.02	15.35	0.33	479.40	
R-40	3/11/2017	494.48	15.20	15.43	0.23	479.24	
R-40	3/14/2017	494.48	15.08	15.41	0.33	479.34	
R-40	3/18/2017	494.48	15.13	15.48	0.35	479.29	
R-40	3/21/2017	494.48	15.10	15.46	0.36	479.32	
R-40	3/24/2017	494.48	15.16	15.61	0.45	479.24	
R-40	3/28/2017	494.48	15.15	15.60	0.45	479.25	
R-40	4/1/2017	494.48	15.32	15.67	0.01	479.10	
R-40	4/4/2017	494.48	15.42	15.84	0.42	478.99	
R-40	4/8/2017	494.48	15.28	15.73	0.45	479.12	
R-40	4/11/2017	494.48	15.25	15.31	0.06	479.22	
R-40	4/15/2017	494.48	15.08	15.64	0.56	479.30	
R-40	4/18/2017	494.48	15.16	15.25	0.09	479.30	
R-40	4/18/2017	494.48	15.15	15.21	0.06	479.32	
R-40	4/22/2017	494.48	15.21	15.36	0.15	479.24	
R-40	4/25/2017	494.48	15.01	15.17	0.16	479.44	
R-40	4/29/2017	494.48	14.80	15.02	0.22	479.64	
R-40	5/2/2017	494.48	14.63	14.88	0.25	479.81	
R-40	5/6/2017	494.48	14.74	15.06	0.32	479.68	
R-40	5/9/2017	494.48	15.03	15.41	0.38	479.38	
R-40	5/13/2017	494.48	14.80	15.21	0.41	479.61	
R-40	5/16/2017	494.48	14.50	15.10	0.60	479.87	
R-40	5/20/2017	494.48	14.70	14.78	0.08	479.77	
R-40	5/23/2017	494.48	14.88	14.97	0.09	479.58	
R-40	5/25/2017	494.48	14.91	15.01	0.10	479.55	
R-40	5/27/2017	494.48	15.00	15.10	0.10	479.46	
R-40	5/30/2017	494.48	15.11	15.28	0.17	479.34	
R-40	6/3/2017	494.48	15.10	15.30	0.20	479.34	
R-40	6/6/2017	494.48	15.16	15.37	0.21	479.28	
R-40	6/6/2017	494.48	15.12	15.35	0.23	479.32	
R-40	6/10/2017	494.48	14.80	15.04	0.24	479.64	
R-40	6/13/2017	494.48	14.15	14.35	0.20	480.35	
R-40	6/13/2017	494.48	14.15	14.35	0.20	480.29	
R-40	6/16/2017	494.48	14.10	14.37	0.27	480.33	
R-40	6/20/2017	494.48	14.07	14.38	0.31	480.35	
R-40	6/24/2017	494.48	14.08	14.20	0.12	480.38	
R-40	6/27/2017	494.48	14.09	14.16	0.07	480.38	
R-40	7/1/2017	494.48	14.10	14.25	0.15	480.35	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-40	7/4/2017	494.48	13.97	14.10	0.13	480.49	
R-40	7/8/2017	494.48	13.76	13.92	0.16	480.69	
R-40	7/27/2017	494.48	No LNAPL	8.65	0.00	485.83	
R-40	8/15/2017	494.48	8.55	8.56	0.01	485.93	
R-40	8/28/2017	494.48	No LNAPL	9.15	0.00	485.33	
R-40	9/21/2017	494.47	Sheen	9.83	Sheen	484.64	
R-40	10/20/2017	494.47	Sheen	10.10	Sheen	484.37	
R-40	11/1/2017	494.47	Sheen	10.35	Sheen	484.12	
R-42	2/6/2012	493.30	No LNAPL	11.26	0.00	482.04	
R-42	2/15/2012	493.30	No LNAPL	11.11	0.00	482.19	
R-42	3/13/2012	493.30	No LNAPL	11.21	0.00	482.09	
R-42	4/10/2012	493.30	No LNAPL	11.10	0.00	482.20	
R-42	4/19/2012	493.30	--	10.51	--	482.79	
R-42	5/8/2012	493.30	No LNAPL	10.87	0.00	482.43	
R-42	6/12/2012	493.30	No LNAPL	9.98	0.00	483.32	
R-42	7/17/2012	493.30	No LNAPL	9.65	0.00	483.65	
R-42	7/30/2012	493.30	No LNAPL	9.16	0.00	484.14	
R-42	8/21/2012	493.30	No LNAPL	10.03	0.00	483.27	
R-42	9/18/2012	493.30	No LNAPL	10.86	0.00	482.44	
R-42	10/16/2012	493.30	No LNAPL	10.87	0.00	482.43	
R-42	11/1/2012	493.30	No LNAPL	10.81	0.00	482.49	
R-42	11/29/2012	493.31	No LNAPL	10.44	0.00	482.87	
R-42	12/27/2012	493.31	No LNAPL	10.81	0.00	482.50	
R-42	1/23/2013	493.31	No LNAPL	10.87	0.00	482.44	
R-42	2/26/2013	493.31	No LNAPL	10.86	0.00	482.45	
R-42	3/28/2013	493.31	No LNAPL	11.16	0.00	482.15	R-35R, R-39, and R-40 were offline on this date
R-42	4/24/2013	493.31	No LNAPL	11.15	0.00	482.16	
R-42	5/21/2013	493.29	No LNAPL	10.38	0.00	482.91	
R-42	6/25/2013	493.29	No LNAPL	9.58	0.00	483.71	
R-42	8/1/2013	493.29	No LNAPL	9.17	0.00	484.12	
R-42	10/1/2013	493.29	--	10.27	--	483.02	
R-42	10/29/2013	493.29	No LNAPL	11.20	0.00	482.09	
R-42	11/19/2013	493.29	No LNAPL	10.36	0.00	482.93	
R-42	12/18/2013	493.29	No LNAPL	10.71	0.00	482.58	
R-42	3/18/2014	493.29	--	10.21	--	483.08	
R-42	6/11/2014	493.28	--	9.05	--	484.23	
R-42	8/26/2014	493.28	--	8.94	--	484.34	
R-42	9/9/2014	493.28	--	9.42	--	483.86	
R-42	9/24/2014	493.28	No LNAPL	9.59	0.00	483.69	
R-42	10/21/2014	493.28	No LNAPL	10.50	0.00	482.78	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-42	11/19/2014	493.28	No LNAPL	10.11	0.00	483.17	
R-42	11/20/2014	493.28	No LNAPL	10.06	0.00	483.22	
R-42	12/16/2014	493.28	No LNAPL	10.27	0.00	483.01	
R-42	1/21/2015	493.26	No LNAPL	10.60	0.00	482.66	Flow rate not recorded
R-42	2/25/2015	493.26	No LNAPL	11.05	0.00	482.21	Flow rate = 120.1 gpm
R-42	3/10/2015	493.26	No LNAPL	10.63	0.00	482.63	Flow rate = 99.7 gpm
R-42	3/18/2015	493.26	--	10.76	--	482.50	
R-42	3/26/2015	493.26	No LNAPL	10.86	0.00	482.40	
R-42	4/16/2015	493.26	No LNAPL	10.58	0.00	482.68	Flow rate = 100.1 gpm
R-42	5/21/2015	493.26	No LNAPL	10.05	0.00	483.21	Flow rate = 85.0 gpm
R-42	6/10/2015	493.26	No LNAPL	10.12	0.00	483.14	Flow rate = 85.1 gpm
R-42	7/22/2015	493.28	No LNAPL	9.20	0.00	484.10	
R-42	8/12/2015	493.28	No LNAPL	9.05	0.00	484.27	
R-42	8/19/2015	493.28	No LNAPL	9.32	0.00	483.99	
R-42	9/30/2015	493.28	No LNAPL	9.90	0.00	483.42	
R-42	10/6/2015	493.28	No LNAPL	9.67	0.00	483.62	
R-42	10/15/2015	493.28	No LNAPL	10.12	0.00	483.16	
R-42	11/19/2015	493.28	--	10.22	--	483.06	
R-42	11/25/2015	493.28	No LNAPL	9.95	0.00	483.36	
R-42	12/16/2015	493.28	No LNAPL	10.35	0.00	482.93	
R-42	1/19/2016	493.28	No LNAPL	10.75	0.00	482.53	
R-42	1/19/2016	493.28	No LNAPL	10.75	0.00	482.53	
R-42	2/25/2016	493.28	No LNAPL	10.90	0.00	482.38	
R-42	3/4/2016	493.28	No LNAPL	10.86	0.00	482.42	
R-42	4/14/2016	493.28	No LNAPL	10.35	0.00	482.93	
R-42	5/20/2016	493.28	No LNAPL	10.52	0.00	482.76	
R-42	5/26/2016	493.28	No LNAPL	10.36	0.00	482.94	
R-42	6/14/2016	493.28	No LNAPL	9.98	0.00	483.30	
R-42	7/2/2016	493.28	No LNAPL	9.47	0.00	483.81	
R-42	7/4/2016	493.28	No LNAPL	9.23	0.00	484.05	
R-42	7/8/2016	493.28	No LNAPL	8.99	0.00	484.29	
R-42	7/12/2016	493.28	No LNAPL	8.95	0.00	484.33	
R-42	7/16/2016	493.28	No LNAPL	8.86	0.00	484.42	
R-42	7/19/2016	493.28	No LNAPL	8.50	0.00	484.78	
R-42	7/23/2016	493.28	No LNAPL	8.00	0.00	485.28	
R-42	7/26/2016	493.28	No LNAPL	8.10	0.00	485.18	
R-42	7/26/2016	493.28	No LNAPL	8.09	0.00	485.19	
R-42	7/30/2016	493.28	No LNAPL	8.15	0.00	485.13	
R-42	8/1/2016	493.28	No LNAPL	7.99	0.00	485.29	
R-42	8/6/2016	493.28	No LNAPL	8.25	0.00	485.03	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-42	8/9/2016	493.28	No LNAPL	8.33	0.00	484.95	
R-42	8/13/2016	493.28	No LNAPL	8.47	0.00	484.81	
R-42	8/16/2016	493.28	No LNAPL	8.71	0.00	484.57	
R-42	8/18/2016	493.28	No LNAPL	8.79	0.00	484.49	
R-42	8/20/2016	493.28	No LNAPL	8.90	0.00	484.38	
R-42	8/23/2016	493.28	No LNAPL	8.97	0.00	484.31	
R-42	8/27/2016	493.28	No LNAPL	8.98	0.00	484.30	
R-42	8/30/2016	493.28	No LNAPL	9.01	0.00	484.27	
R-42	9/3/2016	493.28	No LNAPL	8.65	0.00	484.63	
R-42	9/6/2016	493.28	No LNAPL	8.70	0.00	484.58	
R-42	9/9/2016	493.28	No LNAPL	8.84	0.00	484.48	
R-42	9/9/2016	493.28	No LNAPL	8.84	0.00	484.48	
R-42	9/10/2016	493.28	No LNAPL	8.89	0.00	484.39	
R-42	9/13/2016	493.28	No LNAPL	8.92	0.00	484.36	
R-42	9/17/2016	493.28	No LNAPL	8.98	0.00	484.30	
R-42	9/24/2016	493.28	No LNAPL	8.11	0.00	485.17	All recovery wells shutdown for sand filter media changeout
R-42	9/27/2016	493.28	No LNAPL	9.36	0.00	483.92	
R-42	9/30/2016	493.28	--	9.42	--	483.86	
R-42	10/4/2016	493.28	No LNAPL	9.60	0.00	483.68	
R-42	10/8/2016	493.28	No LNAPL	9.70	0.00	483.58	
R-42	10/11/2016	493.28	No LNAPL	9.83	0.00	483.45	
R-42	10/13/2016	493.28	No LNAPL	9.89	0.00	483.39	
R-42	10/15/2016	493.28	No LNAPL	9.94	0.00	483.34	
R-42	10/18/2016	493.28	No LNAPL	10.02	0.00	483.26	
R-42	10/22/2016	493.28	No LNAPL	10.13	0.00	483.15	
R-42	10/25/2016	493.28	No LNAPL	10.19	0.00	483.09	
R-42	10/28/2016	493.28	No LNAPL	10.01	0.00	483.27	
R-42	11/1/2016	493.28	No LNAPL	9.48	0.00	483.80	
R-42	11/5/2016	493.28	No LNAPL	9.20	0.00	484.08	
R-42	11/8/2016	493.28	No LNAPL	9.35	0.00	483.93	
R-42	11/12/2016	493.28	No LNAPL	9.35	0.00	483.93	
R-42	11/15/2016	493.28	No LNAPL	9.44	0.00	483.94	
R-42	11/15/2016	493.28	No LNAPL	9.36	0.00	483.92	
R-42	11/15/2016	493.28	No LNAPL	9.44	0.00	483.94	
R-42	11/19/2016	493.28	No LNAPL	9.35	0.00	483.93	
R-42	11/22/2016	493.28	No LNAPL	9.43	0.00	483.85	
R-42	11/26/2016	493.28	No LNAPL	9.54	0.00	483.74	
R-42	11/29/2016	493.28	No LNAPL	9.60	0.00	483.68	
R-42	12/3/2016	493.28	No LNAPL	9.71	0.00	483.57	
R-42	12/6/2016	493.28	No LNAPL	9.67	0.00	483.61	

**Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-42	12/9/2016	493.28	No LNAPL	9.65	0.00	483.63	
R-42	12/10/2016	493.28	No LNAPL	9.65	0.00	483.63	Transcription error corrected: DTW entered as 17.65 on ops gauging sheet
R-42	12/13/2016	493.28	No LNAPL	9.66	0.00	483.62	
R-42	12/17/2016	493.28	No LNAPL	9.65	0.00	483.63	
R-42	12/20/2016	493.28	No LNAPL	9.59	0.00	483.69	
R-42	12/24/2016	493.28	No LNAPL	9.64	0.00	483.64	
R-42	12/27/2016	493.28	No LNAPL	9.69	0.00	483.59	
R-42	12/31/2016	493.28	No LNAPL	9.72	0.00	483.56	
R-42	1/7/2017	493.28	No LNAPL	9.67	0.00	483.61	
R-42	1/10/2017	493.28	No LNAPL	9.74	0.00	483.54	
R-42	1/15/2017	493.28	No LNAPL	9.75	0.00	483.53	
R-42	1/17/2017	493.28	No LNAPL	9.70	0.00	483.58	
R-42	1/21/2017	493.28	No LNAPL	9.75	0.00	483.53	
R-42	1/24/2017	493.28	No LNAPL	9.77	0.00	483.51	
R-42	1/24/2017	493.28	No LNAPL	9.77	0.00	483.51	
R-42	1/28/2017	493.28	No LNAPL	9.78	0.00	483.50	
R-42	1/31/2017	493.28	No LNAPL	9.80	0.00	483.48	
R-42	2/4/2017	493.28	No LNAPL	9.82	0.00	483.46	
R-42	2/7/2017	493.28	No LNAPL	9.80	0.00	483.48	
R-42	2/8/2017	493.28	No LNAPL	9.85	0.00	483.50	
R-42	2/8/2017	493.28	No LNAPL	9.85	0.00	483.50	
R-42	2/11/2017	493.28	No LNAPL	9.80	0.00	483.48	
R-42	2/14/2017	493.28	No LNAPL	9.80	0.00	483.48	
R-42	2/18/2017	493.28	No LNAPL	9.88	0.00	483.40	
R-42	2/21/2017	493.28	No LNAPL	9.89	0.00	483.39	
R-42	2/25/2017	493.28	No LNAPL	9.89	0.00	483.39	
R-42	2/28/2017	493.28	No LNAPL	9.85	0.00	483.43	
R-42	3/1/2017	493.28	No LNAPL	9.90	0.00	483.38	
R-42	3/4/2017	493.28	No LNAPL	9.92	0.00	483.36	
R-42	3/7/2017	493.28	No LNAPL	9.91	0.00	483.37	
R-42	3/11/2017	493.28	No LNAPL	9.93	0.00	483.35	
R-42	3/14/2017	493.28	No LNAPL	9.91	0.00	483.37	
R-42	3/18/2017	493.28	No LNAPL	9.92	0.00	483.36	
R-42	3/21/2017	493.28	No LNAPL	9.98	0.00	483.30	
R-42	3/24/2017	493.28	No LNAPL	9.98	0.00	483.30	
R-42	3/28/2017	493.28	No LNAPL	9.97	0.00	483.31	
R-42	4/1/2017	493.28	No LNAPL	9.97	0.00	483.31	
R-42	4/4/2017	493.28	No LNAPL	9.92	0.00	483.36	
R-42	4/8/2017	493.28	No LNAPL	9.92	0.00	483.36	
R-42	4/11/2017	493.28	No LNAPL	9.88	0.00	483.40	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-42	4/15/2017	493.28	No LNAPL	9.77	0.00	483.51	
R-42	4/18/2017	493.28	No LNAPL	9.76	0.00	483.52	
R-42	4/18/2017	493.28	No LNAPL	9.72	0.00	483.56	
R-42	4/22/2017	493.28	No LNAPL	9.76	0.00	483.52	
R-42	4/25/2017	493.28	No LNAPL	9.61	0.00	483.67	
R-42	4/29/2017	493.28	No LNAPL	9.84	0.00	483.44	
R-42	5/2/2017	493.28	No LNAPL	9.91	0.00	483.37	
R-42	5/6/2017	493.28	No LNAPL	9.54	0.00	483.74	
R-42	5/9/2017	493.28	No LNAPL	9.60	0.00	483.68	
R-42	5/13/2017	493.28	No LNAPL	9.48	0.00	483.80	
R-42	5/16/2017	493.28	No LNAPL	9.40	0.00	483.88	
R-42	5/20/2017	493.28	No LNAPL	9.43	0.00	483.85	
R-42	5/23/2017	493.28	No LNAPL	9.60	0.00	483.68	
R-42	5/25/2017	493.28	No LNAPL	9.64	0.00	483.64	
R-42	5/27/2017	493.28	No LNAPL	9.72	0.00	483.56	
R-42	5/30/2017	493.28	No LNAPL	9.86	0.00	483.42	
R-42	6/3/2017	493.28	No LNAPL	9.98	0.00	483.30	
R-42	6/6/2017	493.28	No LNAPL	10.04	0.00	483.24	
R-42	6/6/2017	493.28	No LNAPL	10.00	0.00	483.28	
R-42	6/10/2017	493.28	No LNAPL	9.99	0.00	483.29	
R-42	6/13/2017	493.28	No LNAPL	9.27	0.00	484.06	
R-42	6/13/2017	493.28	No LNAPL	9.25	0.00	484.03	
R-42	6/16/2017	493.28	No LNAPL	9.11	0.00	484.17	
R-42	6/20/2017	493.28	No LNAPL	9.44	0.00	483.84	
R-42	6/24/2017	493.28	No LNAPL	9.36	0.00	483.92	
R-42	6/27/2017	493.28	No LNAPL	9.29	0.00	483.99	
R-42	7/1/2017	493.28	No LNAPL	9.30	0.00	483.98	
R-42	7/4/2017	493.28	No LNAPL	9.12	0.00	484.16	
R-42	7/8/2017	493.28	No LNAPL	8.89	0.00	484.39	
R-43	7/23/2013	495.45	No LNAPL	23.33	0.00	472.12	
R-43	8/1/2013	495.45	No LNAPL	25.86	0.00	469.59	
R-43	8/21/2013	495.45	No LNAPL	23.56	0.00	471.89	
R-43	9/24/2013	495.45	No LNAPL	25.42	0.00	470.03	
R-43	10/29/2013	495.45	No LNAPL	22.73	0.00	472.72	
R-43	11/19/2013	495.45	No LNAPL	19.52	0.00	475.93	
R-43	12/18/2013	495.45	No LNAPL	20.22	0.00	475.23	
R-43	8/26/2014	495.44	--	23.82	--	471.62	
R-43	9/24/2014	495.44	No LNAPL	25.49	0.00	469.95	
R-43	10/21/2014	495.44	No LNAPL	34.04	0.00	461.40	
R-43	11/19/2014	495.44	No LNAPL	34.10	0.00	461.34	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-43	12/16/2014	495.44	No LNAPL	34.11	0.00	461.33	
R-43	1/21/2015	495.43	No LNAPL	32.70	0.00	462.73	
R-43	2/25/2015	495.43	No LNAPL	29.13	0.00	466.30	Flow rate = 42.2 gpm
R-43	3/10/2015	495.43	No LNAPL	29.06	0.00	466.37	Flow rate = 39.8 gpm
R-43	3/18/2015	495.43	No LNAPL	27.11	0.00	468.32	
R-43	3/26/2015	495.43	No LNAPL	28.61	0.00	466.82	
R-43	4/16/2015	495.43	No LNAPL	26.65	0.00	468.78	Flow rate = 31.8 gpm
R-43	5/21/2015	495.43	No LNAPL	23.96	0.00	471.47	Flow rate = 65.1 gpm
R-43	6/10/2015	495.43	No LNAPL	25.71	0.00	469.72	Flow rate = 70.3 gpm
R-43	7/22/2015	495.45	No LNAPL	23.53	0.00	471.94	
R-43	8/12/2015	495.45	No LNAPL	21.97	0.00	473.52	
R-43	8/19/2015	495.45	No LNAPL	23.93	0.00	471.55	
R-43	9/30/2015	495.45	No LNAPL	24.97	0.00	470.48	
R-43	10/6/2015	495.45	No LNAPL	26.83	0.00	468.63	
R-43	10/15/2015	495.45	No LNAPL	26.27	0.00	469.18	
R-43	11/25/2015	495.45	No LNAPL	25.34	0.00	470.14	
R-43	12/16/2015	495.45	No LNAPL	26.85	0.00	468.60	
R-43	1/19/2016	495.45	No LNAPL	28.48	0.00	466.97	
R-43	1/19/2016	495.45	No LNAPL	28.48	0.00	466.97	
R-43	2/25/2016	495.45	No LNAPL	28.23	0.00	467.22	
R-43	3/4/2016	495.45	No LNAPL	29.44	0.00	466.01	
R-43	4/14/2016	495.45	No LNAPL	27.89	0.00	467.56	
R-43	5/20/2016	495.45	No LNAPL	28.78	0.00	466.67	
R-43	5/26/2016	495.45	No LNAPL	28.92	0.00	466.55	
R-43	6/14/2016	495.45	No LNAPL	29.00	0.00	466.45	
R-43	7/2/2016	495.45	No LNAPL	28.88	0.00	466.57	
R-43	7/4/2016	495.45	No LNAPL	28.43	0.00	467.02	
R-43	7/8/2016	495.45	No LNAPL	26.14	0.00	469.31	
R-43	7/12/2016	495.45	No LNAPL	27.23	0.00	468.22	
R-43	7/16/2016	495.45	No LNAPL	26.62	0.00	468.83	
R-43	7/19/2016	495.45	No LNAPL	26.53	0.00	468.92	
R-43	7/23/2016	495.45	No LNAPL	25.83	0.00	469.62	
R-43	7/26/2016	495.45	No LNAPL	24.52	0.00	470.93	
R-43	7/26/2016	495.45	No LNAPL	24.52	0.00	470.93	
R-43	7/30/2016	495.45	No LNAPL	25.12	0.00	470.33	
R-43	8/1/2016	495.45	No LNAPL	25.38	0.00	470.07	
R-43	8/6/2016	495.45	No LNAPL	24.23	0.00	471.22	
R-43	8/9/2016	495.45	No LNAPL	—	0.00	—	Well rehab in progress. DTP/DTW not recorded
R-43	8/14/2016	495.45	No LNAPL	22.55	0.00	472.90	
R-43	8/16/2016	495.45	No LNAPL	23.62	0.00	471.83	

**Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-43	8/18/2016	495.45	No LNAPL	23.88	0.00	471.57	
R-43	8/20/2016	495.45	No LNAPL	24.12	0.00	471.33	
R-43	8/23/2016	495.45	No LNAPL	24.41	0.00	471.04	
R-43	8/27/2016	495.44	No LNAPL	24.22	0.00	471.22	
R-43	8/30/2016	495.44	No LNAPL	24.53	0.00	470.91	
R-43	9/3/2016	495.44	No LNAPL	24.78	0.00	470.66	
R-43	9/6/2016	495.44	No LNAPL	24.60	0.00	470.84	
R-43	9/9/2016	495.44	No LNAPL	24.78	0.00	470.70	
R-43	9/9/2016	495.44	No LNAPL	24.78	0.00	470.70	
R-43	9/10/2016	495.44	No LNAPL	24.93	0.00	470.51	
R-43	9/13/2016	495.44	No LNAPL	24.99	0.00	470.45	
R-43	9/17/2016	495.44	No LNAPL	24.78	0.00	470.66	
R-43	9/24/2016	495.44	No LNAPL	10.35	0.00	485.09	All recovery wells shutdown for sand filter media changeout
R-43	9/27/2016	495.44	No LNAPL	25.64	0.00	469.80	
R-43	9/30/2016	495.44	No LNAPL	26.06	0.00	469.38	
R-43	10/4/2016	495.44	No LNAPL	26.60	0.00	468.84	
R-43	10/8/2016	495.44	No LNAPL	26.73	0.00	468.71	
R-43	10/11/2016	495.44	No LNAPL	27.30	0.00	468.14	
R-43	10/13/2016	495.44	No LNAPL	27.33	0.00	468.11	
R-43	10/15/2016	495.44	No LNAPL	27.32	0.00	468.12	
R-43	10/18/2016	495.44	No LNAPL	27.44	0.00	468.00	
R-43	10/22/2016	495.44	No LNAPL	29.09	0.00	466.35	
R-43	10/25/2016	495.44	No LNAPL	28.70	0.00	466.74	
R-43	10/28/2016	495.44	No LNAPL	28.64	0.00	466.80	
R-43	11/1/2016	495.44	No LNAPL	27.95	0.00	467.49	
R-43	11/5/2016	495.44	No LNAPL	27.26	0.00	468.18	
R-43	11/8/2016	495.44	No LNAPL	27.60	0.00	467.84	
R-43	11/12/2016	495.44	No LNAPL	26.68	0.00	468.76	
R-43	11/15/2016	495.44	No LNAPL	26.68	0.00	468.86	
R-43	11/15/2016	495.44	No LNAPL	26.68	0.00	468.86	
R-43	11/15/2016	495.44	No LNAPL	26.64	0.00	468.80	
R-43	11/19/2016	495.44	No LNAPL	26.65	0.00	468.79	
R-43	11/22/2016	495.44	No LNAPL	26.88	0.00	468.56	
R-43	11/26/2016	495.44	No LNAPL	27.32	0.00	468.12	
R-43	11/29/2016	495.44	No LNAPL	27.71	0.00	467.73	
R-43	12/3/2016	495.44	No LNAPL	27.85	0.00	467.59	
R-43	12/6/2016	495.44	No LNAPL	27.46	0.00	467.98	
R-43	12/9/2016	495.44	No LNAPL	27.62	0.00	467.82	
R-43	12/10/2016	495.44	No LNAPL	27.30	0.00	468.14	
R-43	12/13/2016	495.44	No LNAPL	27.34	0.00	468.10	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-43	12/17/2016	495.44	No LNAPL	27.70	0.00	467.74	
R-43	12/20/2016	495.44	No LNAPL	27.78	0.00	467.66	
R-43	12/24/2016	495.44	No LNAPL	28.09	0.00	467.35	
R-43	12/27/2016	495.44	No LNAPL	28.30	0.00	467.14	
R-43	12/31/2016	495.44	No LNAPL	28.15	0.00	467.29	
R-43	1/7/2017	495.44	No LNAPL	27.85	0.00	467.59	
R-43	1/10/2017	495.44	No LNAPL	27.87	0.00	467.57	
R-43	1/15/2017	495.44	No LNAPL	28.01	0.00	467.43	
R-43	1/17/2017	495.44	No LNAPL	28.27	0.00	467.17	
R-43	1/21/2017	495.44	No LNAPL	28.38	0.00	467.06	
R-43	1/24/2017	495.44	No LNAPL	28.97	0.00	466.47	
R-43	1/24/2017	495.44	No LNAPL	29.28	0.00	466.16	
R-43	1/28/2017	495.44	No LNAPL	29.85	0.00	465.59	
R-43	1/31/2017	495.44	No LNAPL	30.10	0.00	465.34	
R-43	2/4/2017	495.44	No LNAPL	29.72	0.00	465.72	
R-43	2/7/2017	495.44	No LNAPL	29.47	0.00	465.97	
R-43	2/8/2017	495.44	No LNAPL	29.75	0.00	465.76	
R-43	2/8/2017	495.44	No LNAPL	29.75	0.00	465.76	
R-43	2/11/2017	495.44	No LNAPL	29.42	0.00	466.02	
R-43	2/14/2017	495.44	No LNAPL	29.35	0.00	466.09	
R-43	2/18/2017	495.44	No LNAPL	29.09	0.00	466.35	
R-43	2/21/2017	495.44	No LNAPL	29.02	0.00	466.42	
R-43	2/25/2017	495.44	No LNAPL	29.02	0.00	466.42	
R-43	2/28/2017	495.44	No LNAPL	28.95	0.00	466.49	
R-43	3/1/2017	495.44	No LNAPL	28.97	0.00	466.47	
R-43	3/4/2017	495.44	No LNAPL	29.01	0.00	466.43	
R-43	3/7/2017	495.44	No LNAPL	28.74	0.00	466.70	
R-43	3/11/2017	495.44	No LNAPL	28.72	0.00	466.72	
R-43	3/14/2017	495.44	No LNAPL	28.70	0.00	466.74	
R-43	3/18/2017	495.44	No LNAPL	28.73	0.00	466.71	
R-43	3/21/2017	495.44	No LNAPL	28.75	0.00	466.69	
R-43	3/28/2017	495.44	No LNAPL	28.71	0.00	466.73	
R-43	4/1/2017	495.44	No LNAPL	29.31	0.00	466.13	
R-43	4/4/2017	495.44	No LNAPL	29.35	0.00	466.09	
R-43	4/8/2017	495.44	No LNAPL	29.40	0.00	466.04	
R-43	4/11/2017	495.44	No LNAPL	29.82	0.00	465.62	
R-43	4/15/2017	495.44	No LNAPL	29.60	0.00	465.84	
R-43	4/18/2017	495.44	No LNAPL	29.10	0.00	466.34	
R-43	4/18/2017	495.44	No LNAPL	29.12	0.00	466.32	
R-43	4/22/2017	495.44	No LNAPL	29.23	0.00	466.21	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-43	4/25/2017	495.44	No LNAPL	28.99	0.00	466.45	
R-43	4/29/2017	495.44	No LNAPL	28.60	0.00	466.84	
R-43	5/2/2017	495.44	No LNAPL	28.35	0.00	467.09	
R-43	5/6/2017	495.44	No LNAPL	28.63	0.00	466.81	
R-43	5/9/2017	495.44	No LNAPL	29.26	0.00	466.18	
R-43	5/13/2017	495.44	No LNAPL	28.87	0.00	466.57	
R-43	5/16/2017	495.44	No LNAPL	28.78	0.00	466.66	
R-43	5/20/2017	495.44	No LNAPL	28.83	0.00	466.61	
R-43	5/23/2017	495.44	No LNAPL	28.89	0.00	466.55	
R-43	5/25/2017	495.44	No LNAPL	28.91	0.00	466.53	Heavy biofoul/oxidation observed on probe
R-43	5/27/2017	495.44	No LNAPL	29.00	0.00	466.44	
R-43	5/30/2017	495.44	No LNAPL	29.10	0.00	466.34	
R-43	6/3/2017	495.44	No LNAPL	29.20	0.00	466.24	
R-43	6/6/2017	495.44	No LNAPL	29.12	0.00	466.32	
R-43	6/6/2017	495.44	No LNAPL	29.13	0.00	466.31	
R-43	6/10/2017	495.44	No LNAPL	29.37	0.00	466.07	
R-43	6/13/2017	495.44	No LNAPL	28.70	0.00	466.79	
R-43	6/13/2017	495.44	No LNAPL	28.73	0.00	466.71	
R-43	6/16/2017	495.44	No LNAPL	28.53	0.00	466.91	
R-43	6/20/2017	495.44	No LNAPL	28.65	0.00	466.79	
R-43	6/24/2017	495.44	No LNAPL	29.02	0.00	466.42	
R-43	6/27/2017	495.44	No LNAPL	28.81	0.00	466.63	
R-43	7/1/2017	495.44	No LNAPL	28.67	0.00	466.77	
R-43	7/4/2017	495.44	No LNAPL	28.41	0.00	467.03	
R-43	7/8/2017	495.44	No LNAPL	23.91	0.00	471.53	
R-44	7/23/2013	496.25	15.14	15.34	0.20	481.07	
R-44	8/1/2013	496.25	16.69	16.84	0.15	479.53	
R-44	8/21/2013	496.25	16.14	16.30	0.16	480.08	
R-44	9/30/2013	496.25	16.12	16.26	0.14	480.10	
R-44	10/29/2013	496.25	18.41	18.46	0.05	477.83	
R-44	11/25/2013	496.25	Sheen	11.76	Sheen	484.49	
R-44	12/20/2013	496.25	No LNAPL	19.10	0.00	477.15	
R-44	1/15/2014	496.25	No LNAPL	17.72	0.00	478.53	
R-44	2/25/2014	496.25	Sheen	16.73	Sheen	479.52	
R-44	3/24/2014	496.25	Sheen	18.45	Sheen	477.80	
R-44	4/14/2014	496.24	Sheen	19.62	Sheen	476.62	
R-44	5/29/2014	496.24	No LNAPL	24.65	0.00	471.59	
R-44	6/20/2014	496.24	No LNAPL	17.74	0.00	478.50	
R-44	7/15/2014	496.24	17.26	17.40	0.14	478.95	
R-44	8/28/2014	496.24	18.83	18.90	0.07	477.40	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-44	9/24/2014	496.24	Sheen	22.72	Sheen	473.52	
R-44	10/21/2014	496.24	Sheen	29.33	Sheen	466.91	
R-44	11/19/2014	496.24	No LNAPL	33.41	0.00	462.83	
R-44	12/16/2014	496.24	No LNAPL	34.02	0.00	462.22	
R-44	1/21/2015	496.25	No LNAPL	33.31	0.00	462.94	Flow rate = 61.9 gpm
R-44	2/25/2015	496.25	No LNAPL	33.66	0.00	462.59	Flow rate = 51.6 gpm
R-44	3/10/2015	496.25	No LNAPL	32.97	0.00	463.28	
R-44	3/18/2015	496.25	No LNAPL	32.89	0.00	463.36	
R-44	3/26/2015	496.25	No LNAPL	34.56	0.00	461.69	
R-44	4/16/2015	496.25	No LNAPL	17.63	0.00	478.62	
R-44	5/21/2015	496.25	No LNAPL	18.23	0.00	478.02	
R-44	6/10/2015	496.25	No LNAPL	19.78	0.00	476.47	
R-44	7/22/2015	496.25	19.29	19.30	0.01	476.98	
R-44	8/12/2015	496.22	19.03	19.07	0.04	477.22	
R-44	8/19/2015	496.22	Sheen	19.69	Sheen	476.60	
R-44	9/30/2015	496.22	No LNAPL	18.67	0.00	477.59	
R-44	10/6/2015	496.22	20.23	20.25	0.02	476.04	Brown, product-saturated precipitate (sludge) affected how the interface probe registered product
R-44	10/15/2015	496.22	Sheen	20.34	Sheen	475.92	
R-44	11/25/2015	496.22	20.96	21.19	0.23	475.24	
R-44	12/16/2015	496.22	Sheen	21.86	Sheen	474.36	
R-44	1/19/2016	496.22	No LNAPL	23.40	0.00	472.82	
R-44	1/19/2016	496.22	No LNAPL	23.40	0.00	472.82	
R-44	2/25/2016	496.22	Sheen	24.93	Sheen	471.29	
R-44	3/4/2016	496.22	Sheen	25.58	Sheen	470.69	
R-44	4/14/2016	496.22	No LNAPL	26.64	0.00	469.58	
R-44	5/20/2016	496.22	Sheen	26.81	Sheen	469.41	
R-44	5/26/2016	496.22	Sheen	26.89	Sheen	469.35	
R-44	6/14/2016	496.22	No LNAPL	27.01	0.00	469.21	
R-44	7/2/2016	496.22	No LNAPL	26.91	0.00	469.31	
R-44	7/4/2016	496.22	No LNAPL	26.66	0.00	469.56	
R-44	7/8/2016	496.22	No LNAPL	27.24	0.00	468.98	
R-44	7/12/2016	496.22	No LNAPL	26.20	0.00	470.02	
R-44	7/16/2016	496.22	No LNAPL	26.22	0.00	470.00	
R-44	7/19/2016	496.22	No LNAPL	25.32	0.00	470.90	
R-44	7/23/2016	496.22	No LNAPL	21.10	0.00	475.12	
R-44	7/26/2016	496.22	No LNAPL	21.60	0.00	474.62	
R-44	7/26/2016	496.22	No LNAPL	21.50	0.00	474.72	
R-44	7/30/2016	496.22	No LNAPL	21.96	0.00	474.26	
R-44	8/1/2016	496.22	No LNAPL	—	0.00	—	Well rehab in progress. DTP/DTW not recorded

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-44	8/6/2016	496.21	No LNAPL	—	0.00	—	Well rehab in progress. DTP/DTW not recorded
R-44	8/9/2016	496.21	No LNAPL	18.10	0.00	478.11	
R-44	8/13/2016	496.21	No LNAPL	18.20	0.00	478.01	
R-44	8/16/2016	496.21	19.55	19.60	0.05	476.65	
R-44	8/18/2016	496.21	18.70	18.79	0.09	477.49	
R-44	8/20/2016	496.21	18.81	19.02	0.21	477.36	
R-44	8/23/2016	496.21	18.98	19.27	0.29	477.17	
R-44	8/27/2016	496.21	18.74	18.92	0.18	477.43	
R-44	8/30/2016	496.21	19.00	19.31	0.31	477.15	
R-44	9/3/2016	496.21	19.20	19.54	0.34	476.94	
R-44	9/6/2016	496.21	No LNAPL	19.25	0.00	476.96	
R-44	9/9/2016	496.21	19.35	19.39	0.04	476.89	
R-44	9/9/2016	496.21	19.35	19.39	0.04	476.89	
R-44	9/10/2016	496.21	19.50	19.60	0.10	476.69	
R-44	9/13/2016	496.21	No LNAPL	18.90	0.00	477.31	
R-44	9/17/2016	496.21	19.45	19.67	0.22	476.72	
R-44	9/24/2016	496.21	11.06	11.15	0.09	485.13	All recovery wells shutdown for sand filter media changeout
R-44	9/27/2016	496.21	19.70	20.01	0.31	476.45	
R-44	9/30/2016	496.21	19.66	19.98	0.32	476.49	
R-44	10/4/2016	496.21	20.22	20.30	0.08	475.97	
R-44	10/8/2016	496.21	20.50	20.55	0.05	475.70	
R-44	10/11/2016	496.21	No LNAPL	27.87	0.00	468.34	
R-44	10/14/2016	496.21	Sheen	20.95	Sheen	475.26	
R-44	10/15/2016	496.21	No LNAPL	20.50	0.00	475.71	
R-44	10/18/2016	496.21	20.65	20.66	0.01	475.56	
R-44	10/22/2016	496.21	21.07	21.10	0.03	475.13	
R-44	10/25/2016	496.21	21.04	21.05	0.01	475.17	
R-44	10/28/2016	496.21	No LNAPL	21.78	0.00	474.43	
R-44	11/1/2016	496.77	No LNAPL	21.12	0.00	475.65	
R-44	11/5/2016	496.77	No LNAPL	21.11	0.00	475.66	
R-44	11/8/2016	496.77	No LNAPL	21.40	0.00	475.37	
R-44	11/12/2016	496.77	No LNAPL	20.28	0.00	476.49	
R-44	11/15/2016	496.77	Sheen	20.97	Sheen	475.90	
R-44	11/15/2016	496.77	No LNAPL	20.30	0.00	476.47	
R-44	11/15/2016	496.77	Sheen	20.97	Sheen	475.90	
R-44	11/19/2016	496.77	No LNAPL	21.70	0.00	475.07	
R-44	11/22/2016	496.77	No LNAPL	20.75	0.00	476.02	
R-44	11/26/2016	496.77	20.80	20.82	0.02	475.97	
R-44	11/29/2016	496.77	No LNAPL	21.00	0.00	475.77	
R-44	12/3/2016	496.77	No LNAPL	20.95	0.00	475.82	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-44	12/6/2016	496.77	No LNAPL	20.87	0.00	475.90	
R-44	12/9/2016	496.77	21.49	21.50	0.01	475.28	
R-44	12/10/2016	496.77	No LNAPL	20.40	0.00	476.37	
R-44	12/13/2016	496.77	No LNAPL	20.70	0.00	476.07	
R-44	12/17/2016	496.77	No LNAPL	21.03	0.00	475.74	
R-44	12/20/2016	496.77	21.08	21.10	0.02	475.69	
R-44	12/24/2016	496.77	21.05	21.07	0.02	475.72	
R-44	12/27/2016	496.77	No LNAPL	21.08	0.00	475.69	
R-44	12/31/2016	496.77	No LNAPL	21.28	0.00	475.49	
R-44	1/7/2017	496.77	No LNAPL	21.43	0.00	475.34	
R-44	1/10/2017	496.77	21.58	21.59	0.01	475.19	
R-44	1/15/2017	496.77	No LNAPL	21.70	0.00	475.07	
R-44	1/17/2017	496.77	21.69	21.71	0.02	475.08	
R-44	1/21/2017	496.77	No LNAPL	21.85	0.00	474.92	
R-44	1/24/2017	496.20	No LNAPL	21.80	0.00	474.40	
R-44	1/24/2017	496.20	No LNAPL	21.60	0.00	474.60	
R-44	1/28/2017	496.20	No LNAPL	21.91	0.00	474.29	
R-44	1/31/2017	496.20	No LNAPL	21.92	0.00	474.28	
R-44	2/4/2017	496.20	No LNAPL	21.97	0.00	474.23	
R-44	2/7/2017	496.20	No LNAPL	22.00	0.00	474.20	
R-44	2/8/2017	496.20	Sheen	22.13	Sheen	474.14	
R-44	2/8/2017	496.20	Sheen	22.13	Sheen	474.14	
R-44	2/11/2017	496.20	No LNAPL	22.20	0.00	474.00	
R-44	2/14/2017	496.20	No LNAPL	22.31	0.00	473.89	
R-44	2/15/2017	496.20	Sheen	22.36	Sheen	473.87	
R-44	2/18/2017	496.20	No LNAPL	22.05	0.00	474.15	
R-44	2/21/2017	496.20	No LNAPL	22.30	0.00	473.90	
R-44	2/25/2017	496.20	No LNAPL	22.42	0.00	473.78	
R-44	2/28/2017	496.20	No LNAPL	22.47	0.00	473.73	
R-44	3/1/2017	496.20	Sheen	22.55	Sheen	473.65	
R-44	3/4/2017	496.20	No LNAPL	22.65	0.00	473.55	
R-44	3/7/2017	496.20	No LNAPL	22.79	0.00	473.41	
R-44	3/11/2017	496.20	No LNAPL	22.90	0.00	473.30	
R-44	3/14/2017	496.20	No LNAPL	22.98	0.00	473.22	
R-44	3/18/2017	496.20	No LNAPL	23.08	0.00	473.12	
R-44	3/21/2017	496.20	No LNAPL	23.21	0.00	472.99	
R-44	3/28/2017	496.20	No LNAPL	23.45	0.00	472.75	
R-44	4/1/2017	496.20	No LNAPL	23.50	0.00	472.70	
R-44	4/4/2017	496.20	No LNAPL	23.37	0.00	472.83	
R-44	4/8/2017	496.20	No LNAPL	23.47	0.00	472.73	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-44	4/11/2017	496.20	No LNAPL	23.61	0.00	472.59	
R-44	4/15/2017	496.20	No LNAPL	23.48	0.00	472.72	
R-44	4/18/2017	496.20	No LNAPL	23.44	0.00	472.76	Flow rate not recorded. Scaly sheen observed.
R-44	4/18/2017	496.20	No LNAPL	23.40	0.00	472.80	
R-44	4/22/2017	496.20	No LNAPL	23.66	0.00	472.54	
R-44	4/25/2017	496.20	No LNAPL	23.60	0.00	472.60	
R-44	4/29/2017	496.20	No LNAPL	23.64	0.00	472.56	
R-44	5/2/2017	496.20	No LNAPL	23.57	0.00	472.63	
R-44	5/6/2017	496.20	No LNAPL	23.98	0.00	472.22	
R-44	5/9/2017	496.20	No LNAPL	24.26	0.00	471.94	
R-44	5/13/2017	496.20	No LNAPL	24.28	0.00	471.92	
R-44	5/16/2017	496.20	No LNAPL	24.51	0.00	471.69	
R-44	5/20/2017	496.20	No LNAPL	24.70	0.00	471.50	
R-44	5/23/2017	496.20	No LNAPL	24.98	0.00	471.22	
R-44	5/25/2017	496.20	Sheen	25.09	Sheen	471.11	Heavy biofoul/oxidation observed on probe
R-44	5/27/2017	496.20	No LNAPL	25.25	0.00	470.95	
R-44	5/30/2017	496.20	No LNAPL	25.50	0.00	470.70	
R-44	6/3/2017	496.20	No LNAPL	25.82	0.00	470.38	
R-44	6/6/2017	496.20	No LNAPL	25.95	0.00	470.25	
R-44	6/6/2017	496.20	No LNAPL	26.00	0.00	470.20	
R-44	6/10/2017	496.20	No LNAPL	25.99	0.00	470.21	
R-44	6/13/2017	496.20	No LNAPL	25.68	0.00	470.57	
R-44	6/13/2017	496.20	No LNAPL	25.70	0.00	470.50	
R-44	6/16/2017	496.20	No LNAPL	25.66	0.00	470.54	
R-44	6/20/2017	496.20	No LNAPL	25.93	0.00	470.27	
R-44	6/24/2017	496.20	No LNAPL	26.30	0.00	469.90	
R-44	6/27/2017	496.20	No LNAPL	26.35	0.00	469.85	
R-44	7/1/2017	496.20	No LNAPL	26.51	0.00	469.69	
R-44	7/4/2017	496.20	No LNAPL	26.50	0.00	469.70	
R-44	7/8/2017	496.20	No LNAPL	26.42	0.00	469.78	
R-45	7/23/2013	495.97	No LNAPL	22.55	0.00	473.42	
R-45	8/1/2013	495.97	No LNAPL	25.11	0.00	470.86	
R-45	8/21/2013	495.97	No LNAPL	24.13	0.00	471.84	
R-45	9/24/2013	495.97	No LNAPL	23.21	0.00	472.76	
R-45	10/29/2013	495.97	22.94	23.36	0.42	472.95	
R-45	11/19/2013	495.97	20.89	20.90	0.01	475.08	
R-45	12/20/2013	495.97	No LNAPL	18.35	0.00	477.62	
R-45	1/15/2014	495.97	No LNAPL	23.66	0.00	472.31	
R-45	2/25/2014	495.97	Sheen	27.06	Sheen	468.91	
R-45	3/24/2014	495.97	Sheen	29.13	Sheen	466.84	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-45	4/14/2014	495.99	No LNAPL	32.03	0.00	463.96	
R-45	5/16/2014	495.99	No LNAPL	31.31	0.00	464.68	
R-45	6/20/2014	495.99	No LNAPL	24.72	0.00	471.27	
R-45	7/15/2014	495.99	No LNAPL	24.90	0.00	471.09	
R-45	8/26/2014	495.99	No LNAPL	29.87	0.00	466.12	
R-45	9/24/2014	495.99	No LNAPL	23.94	0.00	472.05	
R-45	10/21/2014	495.99	No LNAPL	27.91	0.00	468.08	
R-45	11/19/2014	495.99	No LNAPL	28.74	0.00	467.25	
R-45	12/16/2014	495.99	No LNAPL	29.43	0.00	466.56	
R-45	1/21/2015	495.96	No LNAPL	24.10	0.00	471.86	Flow rate = 16.3 gpm
R-45	2/25/2015	496.80	No LNAPL	31.37	0.00	465.43	Flow rate = 50.5 gpm
R-45	3/10/2015	496.80	No LNAPL	26.45	0.00	470.35	
R-45	3/18/2015	496.80	No LNAPL	25.79	0.00	471.01	
R-45	3/26/2015	496.80	No LNAPL	27.21	0.00	469.59	
R-45	4/16/2015	496.80	No LNAPL	28.04	0.00	468.76	
R-45	5/21/2015	496.80	No LNAPL	31.24	0.00	465.56	
R-45	6/10/2015	496.80	No LNAPL	29.49	0.00	467.31	
R-45	7/22/2015	496.75	No LNAPL	27.23	0.00	469.54	
R-45	8/12/2015	496.75	No LNAPL	27.34	0.00	469.45	
R-45	8/19/2015	496.75	No LNAPL	29.46	0.00	467.32	
R-45	9/30/2015	496.75	No LNAPL	25.25	0.00	471.50	
R-45	10/6/2015	496.75	No LNAPL	27.74	0.00	469.02	
R-45	10/15/2015	496.75	No LNAPL	27.86	0.00	468.93	
R-45	11/25/2015	496.75	No LNAPL	27.65	0.00	469.13	
R-45	12/16/2015	496.75	No LNAPL	28.48	0.00	468.27	
R-45	1/19/2016	495.82	No LNAPL	29.65	0.00	466.17	
R-45	1/19/2016	495.82	No LNAPL	29.65	0.00	466.17	
R-45	2/25/2016	495.82	No LNAPL	28.12	0.00	467.70	
R-45	3/4/2016	495.82	No LNAPL	28.30	0.00	467.52	
R-45	4/14/2016	495.82	No LNAPL	11.46	0.00	484.36	Pump was off
R-45	5/20/2016	495.78	No LNAPL	27.55	0.00	468.23	
R-45	5/26/2016	495.78	No LNAPL	26.95	0.00	468.85	
R-45	6/14/2016	495.78	No LNAPL	26.15	0.00	469.63	
R-45	7/2/2016	495.78	No LNAPL	25.03	0.00	470.75	
R-45	7/4/2016	495.78	No LNAPL	24.73	0.00	471.05	
R-45	7/8/2016	495.78	No LNAPL	25.51	0.00	470.27	
R-45	7/12/2016	495.78	No LNAPL	25.41	0.00	470.37	
R-45	7/16/2016	495.78	No LNAPL	24.25	0.00	471.53	
R-45	7/19/2016	495.78	No LNAPL	—	0.00	—	Well rehab in progress. DTP/DTW not recorded
R-45	7/23/2016	495.78	No LNAPL	—	0.00	—	Well rehab in progress. DTP/DTW not recorded

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-45	7/26/2016	495.78	Sheen	8.93	Sheen	486.85	
R-45	7/26/2016	495.78	No LNAPL	—	0.00	—	Well rehab in progress. DTP/DTW not recorded
R-45	7/30/2016	495.78	No LNAPL	19.67	0.00	476.11	
R-45	8/1/2016	495.78	No LNAPL	20.52	0.00	475.26	
R-45	8/6/2016	495.78	No LNAPL	20.35	0.00	475.43	
R-45	8/9/2016	495.78	No LNAPL	21.20	0.00	474.58	
R-45	8/13/2016	495.78	No LNAPL	20.80	0.00	474.98	
R-45	8/16/2016	495.78	No LNAPL	21.11	0.00	474.67	
R-45	8/18/2016	495.78	No LNAPL	21.27	0.00	474.51	
R-45	8/20/2016	495.78	No LNAPL	21.37	0.00	474.41	
R-45	8/23/2016	495.78	No LNAPL	21.92	0.00	473.86	
R-45	8/27/2016	495.78	No LNAPL	21.39	0.00	474.39	
R-45	8/30/2016	495.78	No LNAPL	22.03	0.00	473.75	
R-45	9/3/2016	495.78	No LNAPL	22.46	0.00	473.32	
R-45	9/6/2016	495.78	No LNAPL	22.47	0.00	473.31	
R-45	9/9/2016	495.78	No LNAPL	22.73	0.00	473.09	
R-45	9/9/2016	495.78	No LNAPL	22.73	0.00	473.09	
R-45	9/10/2016	495.78	No LNAPL	23.13	0.00	472.65	
R-45	9/13/2016	495.78	No LNAPL	23.10	0.00	472.68	
R-45	9/17/2016	495.78	No LNAPL	22.55	0.00	473.23	
R-45	9/24/2016	495.78	No LNAPL	10.20	0.00	485.58	All recovery wells shutdown for sand filter media changeout
R-45	9/27/2016	495.78	No LNAPL	24.03	0.00	471.75	
R-45	9/30/2016	495.78	No LNAPL	23.25	0.00	472.53	
R-45	10/4/2016	495.78	No LNAPL	23.67	0.00	472.11	
R-45	10/8/2016	495.78	No LNAPL	23.84	0.00	471.94	
R-45	10/11/2016	495.78	No LNAPL	25.15	0.00	470.63	
R-45	10/13/2016	495.78	No LNAPL	25.18	0.00	470.60	
R-45	10/15/2016	495.78	No LNAPL	24.33	0.00	471.45	
R-45	10/18/2016	495.78	No LNAPL	25.02	0.00	470.76	
R-45	10/22/2016	495.78	No LNAPL	25.22	0.00	470.56	
R-45	10/25/2016	495.78	No LNAPL	25.05	0.00	470.73	
R-45	10/28/2016	495.78	No LNAPL	25.20	0.00	470.58	
R-45	11/1/2016	495.78	No LNAPL	24.26	0.00	471.52	
R-45	11/5/2016	495.78	No LNAPL	23.96	0.00	471.82	
R-45	11/8/2016	495.78	No LNAPL	24.32	0.00	471.46	
R-45	11/12/2016	495.78	No LNAPL	22.39	0.00	473.39	
R-45	11/15/2016	495.78	No LNAPL	23.67	0.00	472.21	
R-45	11/15/2016	495.78	No LNAPL	23.67	0.00	472.21	
R-45	11/15/2016	495.78	No LNAPL	22.48	0.00	473.30	
R-45	11/19/2016	495.78	No LNAPL	23.68	0.00	472.10	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-45	11/22/2016	495.78	No LNAPL	23.05	0.00	472.73	
R-45	11/26/2016	495.78	No LNAPL	24.69	0.00	471.09	
R-45	11/29/2016	495.78	No LNAPL	25.28	0.00	470.50	
R-45	12/3/2016	495.78	No LNAPL	25.31	0.00	470.47	
R-45	12/6/2016	495.78	No LNAPL	24.51	0.00	471.27	
R-45	12/9/2016	495.78	No LNAPL	24.23	0.00	471.55	
R-45	12/10/2016	495.78	No LNAPL	23.05	0.00	472.73	
R-45	12/13/2016	495.78	No LNAPL	23.04	0.00	472.74	
R-45	12/17/2016	495.78	No LNAPL	25.03	0.00	470.75	
R-45	12/20/2016	495.78	No LNAPL	26.14	0.00	469.64	
R-45	12/24/2016	495.78	No LNAPL	26.36	0.00	469.42	
R-45	12/27/2016	495.78	No LNAPL	26.15	0.00	469.63	
R-45	12/31/2016	495.78	No LNAPL	25.60	0.00	470.18	
R-45	1/7/2017	495.78	No LNAPL	25.12	0.00	470.66	
R-45	1/10/2017	495.78	No LNAPL	25.33	0.00	470.45	
R-45	1/15/2017	495.78	No LNAPL	26.87	0.00	468.91	
R-45	1/17/2017	495.78	No LNAPL	27.27	0.00	468.51	
R-45	1/21/2017	495.78	No LNAPL	27.23	0.00	468.55	
R-45	1/24/2017	495.78	No LNAPL	27.46	0.00	468.32	
R-45	1/24/2017	495.78	No LNAPL	26.58	0.00	469.20	
R-45	1/28/2017	495.78	No LNAPL	26.71	0.00	469.07	
R-45	1/31/2017	495.78	No LNAPL	26.60	0.00	469.18	
R-45	2/4/2017	495.78	No LNAPL	26.75	0.00	469.03	
R-45	2/7/2017	495.78	No LNAPL	26.68	0.00	469.10	
R-45	2/8/2017	495.78	No LNAPL	26.76	0.00	469.09	
R-45	2/8/2017	495.78	No LNAPL	26.76	0.00	469.09	
R-45	2/11/2017	495.78	No LNAPL	27.96	0.00	467.82	
R-45	2/14/2017	495.78	No LNAPL	28.00	0.00	467.78	
R-45	2/18/2017	495.78	No LNAPL	27.24	0.00	468.54	
R-45	2/21/2017	495.78	No LNAPL	27.43	0.00	468.35	
R-45	2/25/2017	495.78	No LNAPL	27.65	0.00	468.13	
R-45	2/28/2017	495.78	No LNAPL	27.71	0.00	468.07	
R-45	3/1/2017	495.78	No LNAPL	27.74	0.00	468.04	
R-45	3/4/2017	495.78	No LNAPL	27.86	0.00	467.92	
R-45	3/7/2017	495.78	No LNAPL	27.90	0.00	467.88	
R-45	3/11/2017	495.78	No LNAPL	27.52	0.00	468.26	
R-45	3/14/2017	495.78	No LNAPL	27.73	0.00	468.05	
R-45	3/18/2017	495.78	No LNAPL	27.43	0.00	468.35	
R-45	3/21/2017	495.78	No LNAPL	27.60	0.00	468.18	
R-45	3/24/2017	495.78	No LNAPL	29.27	0.00	466.51	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-45	3/28/2017	495.78	No LNAPL	29.99	0.00	465.79	
R-45	4/1/2017	495.78	No LNAPL	26.82	0.00	468.96	
R-45	4/4/2017	495.78	No LNAPL	26.95	0.00	468.83	
R-45	4/8/2017	495.78	No LNAPL	26.13	0.00	469.65	
R-45	4/11/2017	495.78	No LNAPL	27.33	0.00	468.45	
R-45	4/15/2017	495.78	No LNAPL	27.18	0.00	468.60	
R-45	4/18/2017	495.78	Sheen	27.97	Sheen	467.81	
R-45	4/18/2017	495.78	No LNAPL	26.82	0.00	468.96	
R-45	4/22/2017	495.78	No LNAPL	22.00	0.00	473.78	
R-45	4/25/2017	495.78	No LNAPL	22.88	0.00	472.90	
R-45	4/29/2017	495.78	No LNAPL	23.47	0.00	472.31	
R-45	5/2/2017	495.78	No LNAPL	23.39	0.00	472.39	
R-45	5/6/2017	495.78	No LNAPL	24.10	0.00	471.68	
R-45	5/9/2017	495.78	No LNAPL	20.77	0.00	475.01	
R-45	5/13/2017	495.78	No LNAPL	22.27	0.00	473.51	
R-45	5/16/2017	495.78	No LNAPL	22.20	0.00	473.58	
R-45	5/20/2017	495.78	No LNAPL	22.32	0.00	473.46	
R-45	5/23/2017	495.78	No LNAPL	22.99	0.00	472.79	
R-45	5/25/2017	495.78	No LNAPL	23.10	0.00	472.68	
R-45	5/27/2017	495.78	No LNAPL	23.28	0.00	472.50	
R-45	5/30/2017	495.78	No LNAPL	23.38	0.00	472.40	
R-45	6/3/2017	495.78	No LNAPL	24.65	0.00	471.13	
R-45	6/6/2017	495.78	No LNAPL	24.97	0.00	470.81	
R-45	6/6/2017	495.78	No LNAPL	24.91	0.00	470.87	Transcription error corrected: pumping rate was recorded as 43 gpm
R-45	6/10/2017	495.78	No LNAPL	24.72	0.00	471.06	
R-45	6/13/2017	495.78	No LNAPL	24.70	0.00	471.13	
R-45	6/13/2017	495.78	No LNAPL	24.68	0.00	471.10	
R-45	6/16/2017	495.78	No LNAPL	24.57	0.00	471.21	
R-45	6/20/2017	495.78	No LNAPL	24.80	0.00	470.98	
R-45	6/24/2017	495.78	No LNAPL	21.65	0.00	474.13	
R-45	6/27/2017	495.78	No LNAPL	22.03	0.00	473.75	
R-45	7/1/2017	495.78	No LNAPL	22.02	0.00	473.76	
R-45	7/4/2017	495.78	No LNAPL	21.80	0.00	473.98	
R-45	7/8/2017	495.78	No LNAPL	21.01	0.00	474.77	
R-46	7/23/2013	496.10	No LNAPL	24.11	0.00	471.99	
R-46	8/1/2013	496.10	No LNAPL	23.63	0.00	472.47	
R-46	8/21/2013	496.10	No LNAPL	22.47	0.00	473.63	
R-46	9/25/2013	496.10	No LNAPL	22.12	0.00	473.98	
R-46	10/29/2013	496.10	No LNAPL	26.96	0.00	469.14	
R-46	11/19/2013	496.10	No LNAPL	23.63	0.00	472.47	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-46	12/20/2013	496.10	No LNAPL	26.51	0.00	469.59	
R-46	7/15/2014	496.12	No LNAPL	22.72	0.00	473.40	
R-46	9/24/2014	496.12	No LNAPL	21.59	0.00	474.53	
R-46	10/21/2014	496.12	No LNAPL	25.90	0.00	470.22	
R-46	11/19/2014	496.12	No LNAPL	26.48	0.00	469.64	
R-46	12/16/2014	496.12	No LNAPL	25.86	0.00	470.26	
R-46	1/21/2015	496.08	No LNAPL	23.14	0.00	472.94	Flow rate = 22.0 gpm
R-46	2/25/2015	496.08	No LNAPL	28.32	0.00	467.76	Flow rate = 28.7 gpm
R-46	3/10/2015	496.08	No LNAPL	25.99	0.00	470.09	Flow rate = 25.5 gpm
R-46	3/18/2015	496.08	No LNAPL	23.10	0.00	472.98	
R-46	3/26/2015	496.08	No LNAPL	25.06	0.00	471.02	
R-46	4/16/2015	496.08	No LNAPL	23.06	0.00	473.02	Flow rate = 20.1 gpm
R-46	5/21/2015	496.08	No LNAPL	22.37	0.00	473.71	Flow rate = 31.7 gpm
R-46	6/10/2015	496.08	No LNAPL	24.20	0.00	471.88	Flow rate = 35.2 gpm
R-46	7/22/2015	496.08	No LNAPL	22.69	0.00	473.41	
R-46	8/12/2015	496.08	No LNAPL	20.47	0.00	475.65	
R-46	8/19/2015	496.08	No LNAPL	23.44	0.00	472.67	
R-46	9/30/2015	496.08	No LNAPL	23.21	0.00	472.87	
R-46	10/6/2015	496.08	No LNAPL	22.00	0.00	474.09	
R-46	10/15/2015	496.08	No LNAPL	20.31	0.00	475.81	
R-46	11/25/2015	496.08	No LNAPL	22.18	0.00	473.93	
R-46	12/16/2015	496.08	No LNAPL	24.65	0.00	471.43	
R-46	1/19/2016	496.08	No LNAPL	23.43	0.00	472.65	
R-46	1/19/2016	496.08	No LNAPL	23.34	0.00	472.74	
R-46	2/25/2016	496.08	No LNAPL	25.72	0.00	470.36	
R-46	3/4/2016	496.08	No LNAPL	26.35	0.00	469.73	
R-46	4/14/2016	496.08	No LNAPL	29.02	0.00	467.06	
R-46	5/20/2016	496.08	No LNAPL	23.20	0.00	472.88	
R-46	5/26/2016	496.08	No LNAPL	24.65	0.00	471.45	
R-46	6/14/2016	496.08	No LNAPL	23.68	0.00	472.40	
R-46	7/2/2016	496.08	No LNAPL	23.00	0.00	473.08	
R-46	7/4/2016	496.08	No LNAPL	23.97	0.00	472.11	
R-46	7/8/2016	496.08	No LNAPL	22.46	0.00	473.62	
R-46	7/12/2016	496.08	No LNAPL	21.45	0.00	474.63	
R-46	7/16/2016	496.08	No LNAPL	22.77	0.00	473.31	
R-46	7/19/2016	496.08	No LNAPL	21.98	0.00	474.10	
R-46	7/23/2016	496.08	No LNAPL	21.30	0.00	474.78	
R-46	7/26/2016	496.08	No LNAPL	—	0.00	—	Well rehab in progress. DTP/DTW not recorded
R-46	7/26/2016	496.08	No LNAPL	9.37	0.00	486.71	
R-46	7/30/2016	496.08	No LNAPL	—	0.00	—	Well rehab in progress. DTP/DTW not recorded

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-46	8/1/2016	496.08	No LNAPL	20.63	0.00	475.45	
R-46	8/6/2016	496.08	No LNAPL	20.74	0.00	475.34	
R-46	8/9/2016	496.08	No LNAPL	21.41	0.00	474.67	
R-46	8/13/2016	496.08	No LNAPL	20.57	0.00	475.51	
R-46	8/16/2016	496.08	No LNAPL	21.15	0.00	474.93	
R-46	8/18/2016	496.08	No LNAPL	20.74	0.00	475.34	
R-46	8/20/2016	496.08	No LNAPL	20.18	0.00	475.90	
R-46	8/23/2016	496.08	No LNAPL	21.97	0.00	474.11	
R-46	8/27/2016	496.05	No LNAPL	21.60	0.00	474.45	
R-46	8/30/2016	496.05	No LNAPL	21.64	0.00	474.41	
R-46	9/3/2016	496.05	No LNAPL	22.20	0.00	473.85	
R-46	9/6/2016	496.05	No LNAPL	22.20	0.00	473.85	
R-46	9/9/2016	496.05	No LNAPL	21.96	0.00	474.13	
R-46	9/9/2016	496.05	No LNAPL	21.96	0.00	474.13	
R-46	9/10/2016	496.05	No LNAPL	22.10	0.00	473.95	
R-46	9/13/2016	496.05	No LNAPL	22.03	0.00	474.02	
R-46	9/17/2016	496.05	No LNAPL	21.86	0.00	474.19	
R-46	9/24/2016	496.05	No LNAPL	10.73	0.00	485.32	All recovery wells shutdown for sand filter media changeout
R-46	9/27/2016	496.05	No LNAPL	22.76	0.00	473.29	
R-46	9/30/2016	496.05	No LNAPL	22.67	0.00	473.38	
R-46	10/4/2016	496.05	No LNAPL	22.85	0.00	473.20	
R-46	10/8/2016	496.05	No LNAPL	23.16	0.00	472.89	
R-46	10/11/2016	496.05	No LNAPL	23.72	0.00	472.33	
R-46	10/13/2016	496.05	No LNAPL	23.05	0.00	473.00	
R-46	10/15/2016	496.05	No LNAPL	22.53	0.00	473.52	
R-46	10/18/2016	496.05	No LNAPL	23.55	0.00	472.50	
R-46	10/22/2016	496.05	No LNAPL	22.98	0.00	473.07	
R-46	10/25/2016	496.05	No LNAPL	23.56	0.00	472.49	
R-46	10/28/2016	496.05	No LNAPL	24.78	0.00	471.27	
R-46	11/1/2016	496.05	No LNAPL	24.11	0.00	471.94	
R-46	11/5/2016	496.05	No LNAPL	23.04	0.00	473.01	
R-46	11/8/2016	496.05	No LNAPL	22.82	0.00	473.23	
R-46	11/12/2016	496.05	No LNAPL	22.71	0.00	473.34	
R-46	11/15/2016	496.05	No LNAPL	23.80	0.00	472.25	
R-46	11/15/2016	496.05	No LNAPL	23.83	0.00	472.32	
R-46	11/15/2016	496.05	No LNAPL	23.83	0.00	472.32	
R-46	11/19/2016	496.05	No LNAPL	23.14	0.00	472.91	
R-46	11/22/2016	496.05	No LNAPL	23.78	0.00	472.27	
R-46	11/26/2016	496.05	No LNAPL	23.95	0.00	472.10	
R-46	11/29/2016	496.05	No LNAPL	24.24	0.00	471.81	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-46	12/3/2016	496.05	No LNAPL	23.97	0.00	472.08	
R-46	12/6/2016	496.05	No LNAPL	23.58	0.00	472.47	
R-46	12/9/2016	496.05	No LNAPL	24.05	0.00	472.00	
R-46	12/10/2016	496.05	No LNAPL	22.69	0.00	473.36	
R-46	12/13/2016	496.05	No LNAPL	24.08	0.00	471.97	
R-46	12/17/2016	496.05	No LNAPL	23.90	0.00	472.15	
R-46	12/20/2016	496.05	No LNAPL	24.28	0.00	471.77	
R-46	12/24/2016	496.05	No LNAPL	24.10	0.00	471.95	
R-46	12/27/2016	496.05	No LNAPL	23.96	0.00	472.09	
R-46	12/31/2016	496.05	No LNAPL	24.49	0.00	471.56	
R-46	1/7/2017	496.05	No LNAPL	22.65	0.00	473.40	
R-46	1/10/2017	496.05	No LNAPL	22.94	0.00	473.11	
R-46	1/15/2017	496.05	No LNAPL	24.38	0.00	471.67	
R-46	1/17/2017	496.05	No LNAPL	24.87	0.00	471.18	
R-46	1/21/2017	496.05	No LNAPL	23.74	0.00	472.31	
R-46	1/24/2017	496.05	No LNAPL	24.62	0.00	471.43	
R-46	1/24/2017	496.05	No LNAPL	24.73	0.00	471.32	
R-46	1/28/2017	496.05	No LNAPL	25.82	0.00	470.23	
R-46	1/31/2017	496.05	No LNAPL	26.35	0.00	469.70	
R-46	2/4/2017	496.05	No LNAPL	24.32	0.00	471.73	
R-46	2/7/2017	496.05	No LNAPL	24.68	0.00	471.37	
R-46	2/8/2017	496.05	No LNAPL	24.64	0.00	471.48	
R-46	2/8/2017	496.05	No LNAPL	24.64	0.00	471.48	
R-46	2/11/2017	496.05	No LNAPL	24.27	0.00	471.78	
R-46	2/14/2017	496.05	No LNAPL	24.45	0.00	471.60	
R-46	2/18/2017	496.05	No LNAPL	25.50	0.00	470.55	
R-46	2/21/2017	496.05	No LNAPL	25.28	0.00	470.77	
R-46	2/25/2017	496.05	No LNAPL	25.62	0.00	470.43	
R-46	2/28/2017	496.05	No LNAPL	25.17	0.00	470.88	
R-46	3/2/2017	496.05	No LNAPL	23.01	0.00	473.04	
R-46	3/4/2017	496.05	No LNAPL	24.50	0.00	471.55	
R-46	3/7/2017	496.05	No LNAPL	25.51	0.00	470.54	
R-46	3/11/2017	496.05	No LNAPL	25.42	0.00	470.63	
R-46	3/14/2017	496.05	No LNAPL	25.18	0.00	470.87	
R-46	3/18/2017	496.05	No LNAPL	24.88	0.00	471.17	
R-46	3/21/2017	496.05	No LNAPL	24.67	0.00	471.38	
R-46	3/24/2017	496.05	No LNAPL	25.04	0.00	471.01	
R-46	3/28/2017	496.05	No LNAPL	25.59	0.00	470.46	
R-46	4/1/2017	496.05	No LNAPL	25.72	0.00	470.33	
R-46	4/4/2017	496.05	No LNAPL	25.02	0.00	471.03	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-46	4/8/2017	496.05	No LNAPL	24.58	0.00	471.47	
R-46	4/11/2017	496.05	No LNAPL	24.07	0.00	471.98	
R-46	4/15/2017	496.05	No LNAPL	24.53	0.00	471.52	
R-46	4/18/2017	496.05	No LNAPL	24.98	0.00	471.07	
R-46	4/18/2017	496.05	No LNAPL	24.12	0.00	471.93	
R-46	4/22/2017	496.05	No LNAPL	25.05	0.00	471.00	
R-46	4/25/2017	496.05	No LNAPL	23.56	0.00	472.49	
R-46	4/29/2017	496.05	No LNAPL	23.15	0.00	472.90	
R-46	5/2/2017	496.05	No LNAPL	22.72	0.00	473.33	
R-46	5/6/2017	496.05	No LNAPL	24.68	0.00	471.37	Flow rate incorrectly recorded at 60.9 gpm on fieldsheet. Flow rate of approximately 30 gpm verified on Pi system.
R-46	5/9/2017	496.05	No LNAPL	22.50	0.00	473.55	
R-46	5/13/2017	496.05	No LNAPL	23.27	0.00	472.78	
R-46	5/16/2017	496.05	No LNAPL	22.33	0.00	473.72	
R-46	5/20/2017	496.05	No LNAPL	22.15	0.00	473.90	
R-46	5/23/2017	496.05	No LNAPL	24.96	0.00	471.09	
R-46	5/25/2017	496.05	No LNAPL	25.04	0.00	471.01	Light biofoul/oxidation observed on probe
R-46	5/27/2017	496.05	No LNAPL	24.95	0.00	471.10	
R-46	5/30/2017	496.05	No LNAPL	25.25	0.00	470.80	
R-46	6/3/2017	496.05	No LNAPL	25.58	0.00	470.47	
R-46	6/6/2017	496.05	No LNAPL	25.11	0.00	470.94	
R-46	6/6/2017	496.05	No LNAPL	25.08	0.00	470.97	
R-46	6/10/2017	496.05	No LNAPL	26.56	0.00	469.49	
R-46	6/13/2017	496.05	No LNAPL	25.41	0.00	470.69	
R-46	6/13/2017	496.05	No LNAPL	25.65	0.00	470.40	
R-46	6/16/2017	496.05	No LNAPL	24.87	0.00	471.18	
R-46	6/20/2017	496.05	No LNAPL	26.58	0.00	469.47	
R-46	6/24/2017	496.05	No LNAPL	23.10	0.00	472.95	
R-46	6/27/2017	496.05	No LNAPL	23.19	0.00	472.86	
R-46	7/1/2017	496.05	No LNAPL	23.05	0.00	473.00	
R-46	7/4/2017	496.05	No LNAPL	23.05	0.00	473.00	
R-46	7/8/2017	496.05	No LNAPL	23.79	0.00	472.26	
R-47	8/26/2014	494.82	--	24.50	--	470.32	
R-47	9/24/2014	494.82	No LNAPL	25.77	0.00	469.05	
R-47	10/21/2014	494.82	No LNAPL	26.91	0.00	467.91	
R-47	11/19/2014	494.82	No LNAPL	25.90	0.00	468.92	
R-47	12/16/2014	494.82	No LNAPL	25.75	0.00	469.07	
R-47	1/21/2015	494.81	No LNAPL	26.15	0.00	468.66	
R-47	2/25/2015	494.81	No LNAPL	-	0.00	—	DTW recorded at ~25.4. Field sheet notes, "heavy organic interference ~4.5' of probe tape" causing imprecision in measurement.

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-47	3/18/2015	494.81	No LNAPL	26.60	0.00	468.21	
R-47	3/26/2015	494.81	No LNAPL	27.54	0.00	467.27	
R-47	4/16/2015	494.81	No LNAPL	23.89	0.00	470.92	
R-47	8/19/2015	494.81	No LNAPL	30.76	0.00	464.08	
R-47	10/6/2015	494.81	--	29.26	--	465.56	
R-47	1/19/2016	494.81	No LNAPL	26.77	0.00	468.04	
R-47	5/26/2016	494.81	No LNAPL	23.77	0.00	471.06	
R-47	7/2/2016	494.81	No LNAPL	31.72	0.00	463.09	
R-47	7/4/2016	494.81	No LNAPL	31.65	0.00	463.16	
R-47	7/8/2016	494.81	No LNAPL	31.78	0.00	463.03	
R-47	7/12/2016	494.81	No LNAPL	32.10	0.00	462.71	
R-47	7/16/2016	494.81	No LNAPL	32.49	0.00	462.32	
R-47	7/19/2016	494.81	No LNAPL	32.21	0.00	462.60	
R-47	7/23/2016	494.81	No LNAPL	32.00	0.00	462.81	
R-47	7/26/2016	494.81	No LNAPL	32.49	0.00	462.32	
R-47	7/30/2016	494.81	No LNAPL	33.11	0.00	461.70	
R-47	8/1/2016	494.81	No LNAPL	33.15	0.00	461.66	
R-47	8/6/2016	494.81	No LNAPL	34.04	0.00	460.77	
R-47	8/9/2016	494.81	No LNAPL	34.64	0.00	460.17	
R-47	8/13/2016	494.81	No LNAPL	35.48	0.00	459.33	
R-47	8/16/2016	494.81	No LNAPL	36.30	0.00	458.51	
R-47	8/20/2016	494.81	No LNAPL	32.60	0.00	462.21	
R-47	8/23/2016	494.81	No LNAPL	33.45	0.00	461.36	
R-47	8/27/2016	494.81	No LNAPL	33.08	0.00	461.73	
R-47	8/30/2016	494.81	No LNAPL	33.85	0.00	460.96	
R-47	9/9/2016	494.81	No LNAPL	9.55	0.00	485.30	
R-47	11/15/2016	494.81	No LNAPL	10.15	0.00	484.76	
R-47	2/8/2017	494.81	No LNAPL	10.55	0.00	484.33	
R-47	6/13/2017	494.81	No LNAPL	9.87	0.00	484.99	
R-48	9/24/2014	494.42	No LNAPL	16.91	0.00	477.51	
R-48	10/21/2014	494.42	No LNAPL	17.90	0.00	476.52	
R-48	11/19/2014	494.42	No LNAPL	17.40	0.00	477.02	
R-48	12/16/2014	494.42	No LNAPL	17.49	0.00	476.93	
R-48	1/21/2015	494.42	No LNAPL	17.80	0.00	476.62	
R-48	2/25/2015	494.42	No LNAPL	18.08	0.00	476.34	
R-48	3/18/2015	494.42	No LNAPL	18.13	0.00	476.29	
R-48	3/26/2015	494.42	No LNAPL	17.99	0.00	476.43	
R-48	4/16/2015	494.42	No LNAPL	17.93	0.00	476.49	
R-48	8/19/2015	494.42	No LNAPL	20.71	0.00	473.74	
R-48	10/6/2015	494.42	--	20.65	--	473.78	

Appendix A-1
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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
R-48	1/19/2016	494.42	No LNAPL	26.92	0.00	467.50	
R-48	5/26/2016	494.42	No LNAPL	27.85	0.00	466.59	
R-48	7/2/2016	494.42	No LNAPL	26.14	0.00	468.28	
R-48	7/4/2016	494.42	No LNAPL	25.85	0.00	468.57	
R-48	7/8/2016	494.42	No LNAPL	25.60	0.00	468.82	
R-48	7/12/2016	494.42	No LNAPL	25.50	0.00	468.92	
R-48	7/16/2016	494.42	No LNAPL	25.40	0.00	469.02	
R-48	7/19/2016	494.42	No LNAPL	24.98	0.00	469.44	
R-48	7/23/2016	494.42	No LNAPL	24.36	0.00	470.06	
R-48	7/26/2016	494.42	No LNAPL	24.49	0.00	469.93	
R-48	7/30/2016	494.42	No LNAPL	24.50	0.00	469.92	
R-48	8/1/2016	494.42	No LNAPL	24.21	0.00	470.21	
R-48	8/6/2016	494.42	No LNAPL	24.49	0.00	469.93	
R-48	8/9/2016	494.42	No LNAPL	24.55	0.00	469.87	
R-48	8/13/2016	494.42	No LNAPL	24.62	0.00	469.80	
R-48	8/16/2016	494.42	No LNAPL	24.74	0.00	469.68	
R-48	8/20/2016	494.42	No LNAPL	22.85	0.00	471.57	
R-48	8/23/2016	494.42	No LNAPL	22.93	0.00	471.49	
R-48	8/27/2016	494.42	No LNAPL	22.97	0.00	471.45	
R-48	8/30/2016	494.42	No LNAPL	22.99	0.00	471.43	
R-48	9/9/2016	494.42	No LNAPL	9.19	0.00	485.27	
R-48	11/15/2016	494.42	No LNAPL	9.78	0.00	484.74	
R-48	2/8/2017	494.42	No LNAPL	10.20	0.00	484.29	
R-48	6/13/2017	494.42	No LNAPL	9.52	0.00	484.95	
S-9	4/18/2006	—	--	11.04	--	—	
S-9	7/19/2006	—	--	9.46	--	—	
S-9	10/19/2006	—	--	11.09	--	—	
S-9	1/16/2007	—	No LNAPL	11.01	0.00	—	
S-9	4/23/2007	—	No LNAPL	10.95	0.00	—	
S-9	7/17/2007	—	No LNAPL	9.77	0.00	—	
S-9	10/17/2007	—	No LNAPL	11.05	0.00	—	
S-9	1/4/2008	—	No LNAPL	10.43	0.00	—	
S-9	4/1/2008	—	No LNAPL	11.05	0.00	—	
S-9	7/2/2008	—	No LNAPL	9.87	0.00	—	
S-9	10/1/2008	—	No LNAPL	10.43	0.00	—	
S-9	4/10/2009	—	No LNAPL	10.63	0.00	—	
S-9	7/8/2009	—	No LNAPL	9.87	0.00	—	
S-9	10/5/2009	—	No LNAPL	10.93	0.00	—	
S-9	1/22/2010	—	No LNAPL	11.07	0.00	—	
S-9	4/7/2010	—	No LNAPL	10.98	0.00	—	

Appendix A-1
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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-9	10/13/2010	—	No LNAPL	11.22	0.00	—	
S-9	3/18/2011	—	No LNAPL	10.97	0.00	—	
S-9	4/25/2011	—	No LNAPL	10.48	0.00	—	
S-9	5/6/2011	—	No LNAPL	10.33	0.00	—	
S-9	5/16/2011	—	No LNAPL	11.08	0.00	—	
S-9	7/15/2011	—	No LNAPL	9.76	0.00	—	
S-9	10/21/2011	—	No LNAPL	11.73	0.00	—	
S-9	1/10/2012	495.11	No LNAPL	11.60	0.00	483.51	
S-9	2/6/2012	495.11	No LNAPL	11.66	0.00	483.45	
S-9	3/13/2012	495.11	No LNAPL	11.57	0.00	483.54	
S-9	4/10/2012	495.11	No LNAPL	11.51	0.00	483.60	
S-9	5/8/2012	495.11	No LNAPL	11.29	0.00	483.82	
S-9	6/13/2012	495.11	No LNAPL	10.38	0.00	484.73	
S-9	7/17/2012	495.11	No LNAPL	10.06	0.00	485.05	
S-9	8/21/2012	495.11	No LNAPL	10.47	0.00	484.64	
S-9	9/18/2012	495.11	No LNAPL	11.09	0.00	484.02	
S-9	10/16/2012	495.11	No LNAPL	11.10	0.00	484.01	
S-9	11/29/2012	495.12	No LNAPL	10.65	0.00	484.47	
S-9	12/27/2012	495.12	No LNAPL	10.98	0.00	484.14	
S-9	1/23/2013	495.12	No LNAPL	10.90	0.00	484.22	
S-9	2/26/2013	495.12	No LNAPL	11.06	0.00	484.06	
S-9	3/29/2013	495.12	No LNAPL	11.22	0.00	483.90	R-35R, R-39, and R-40 were offline on this date
S-9	4/24/2013	495.12	No LNAPL	11.18	0.00	483.94	
S-9	5/21/2013	495.12	No LNAPL	10.18	0.00	484.94	
S-9	6/25/2013	495.12	No LNAPL	10.10	0.00	485.02	
S-9	10/29/2013	495.12	No LNAPL	11.73	0.00	483.39	
S-9	11/19/2013	495.12	No LNAPL	11.23	0.00	483.89	
S-9	12/20/2013	495.12	No LNAPL	11.02	0.00	484.10	
S-9	3/10/2015	495.14	No LNAPL	11.23	0.00	483.91	
S-9	10/15/2015	495.15	No LNAPL	10.86	0.00	484.29	
S-9	8/10/2016	495.16	--	9.09	--	486.07	
S-9	8/2/2017	495.16	--	9.81	--	485.35	
S-21	4/19/2006	—	13.22	13.74	0.52	—	
S-21	10/19/2006	—	13.31	13.82	0.51	—	
S-21	1/15/2007	—	13.20	13.65	0.45	—	
S-21	7/18/2007	—	11.78	12.32	0.54	—	
S-21	10/18/2007	—	13.65	13.89	0.24	—	
S-21	4/1/2008	—	13.35	13.78	0.43	—	
S-21	7/2/2008	—	12.51	12.53	0.02	—	
S-21	10/1/2008	—	13.02	13.19	0.17	—	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-21	4/8/2009	—	13.24	13.74	0.50	—	
S-21	7/7/2009	—	12.38	12.62	0.24	—	
S-21	8/20/2009	—	12.29	12.54	0.25	—	
S-21	10/5/2009	—	--	13.57	--	—	
S-21	1/22/2010	—	13.65	14.00	0.35	—	
S-21	4/7/2010	—	13.58	13.99	0.41	—	
S-21	7/22/2010	—	12.25	12.55	0.30	—	
S-21	10/13/2010	—	13.85	14.10	0.25	—	
S-21	3/17/2011	—	13.61	14.00	0.39	—	
S-21	4/6/2011	—	13.59	14.00	0.41	—	
S-21	5/5/2011	—	12.87	13.13	0.26	—	
S-21	5/17/2011	—	13.90	14.10	0.20	—	
S-21	5/18/2011	—	13.80	14.12	0.32	—	
S-21	6/21/2011	—	13.14	13.42	0.28	—	
S-21	7/15/2011	—	No LNAPL	12.71	0.00	—	
S-21	8/23/2011	—	12.62	13.26	0.64	—	
S-21	9/22/2011	—	13.81	14.05	0.24	—	
S-21	10/21/2011	—	12.90	14.37	1.47	—	
S-21	12/7/2011	497.16	--	13.58	--	483.58	
S-21	2/16/2012	497.16	12.77	14.28	1.51	484.07	
S-21	3/15/2012	497.16	12.76	14.39	1.63	484.05	
S-21	4/12/2012	497.16	12.69	13.96	1.27	484.20	
S-21	5/7/2012	497.16	12.58	13.15	0.57	484.46	
S-21	6/12/2012	497.16	11.83	11.86	0.03	485.32	
S-21	7/18/2012	497.16	11.36	11.99	0.63	485.67	
S-21	8/21/2012	497.16	11.71	12.47	0.76	485.29	
S-21	9/19/2012	497.16	12.46	12.81	0.35	484.63	
S-21	10/15/2012	497.16	12.43	12.69	0.26	484.67	
S-21	11/29/2012	497.19	12.02	12.34	0.32	485.10	
S-21	12/28/2012	497.19	12.37	12.59	0.22	484.77	
S-21	2/26/2013	497.19	12.46	12.79	0.33	484.66	
S-21	3/28/2013	497.19	12.50	12.83	0.33	484.62	R-35R, R-39, and R-40 were offline on this date
S-21	4/24/2013	497.19	12.55	12.88	0.33	484.57	
S-21	5/31/2013	497.19	Sheen	11.30	Sheen	485.89	
S-21	6/24/2013	497.19	11.43	11.59	0.16	485.73	
S-21	7/23/2013	497.19	11.20	11.21	0.01	485.99	
S-21	8/21/2013	497.19	11.06	11.11	0.05	486.12	
S-21	9/25/2013	497.19	12.04	12.48	0.44	485.06	
S-21	10/29/2013	497.19	12.91	14.20	1.29	484.01	
S-21	11/19/2013	497.19	12.47	12.70	0.23	484.67	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-21	12/20/2013	497.19	12.34	12.62	0.28	484.79	
S-21	1/14/2014	497.19	12.61	12.95	0.34	484.51	
S-21	2/25/2014	497.19	12.83	13.44	0.61	484.23	
S-21	3/24/2014	497.19	12.87	13.73	0.86	484.14	
S-21	4/14/2014	497.19	12.87	13.81	0.94	484.12	
S-21	5/16/2014	497.19	12.36	12.56	0.20	484.79	
S-21	6/20/2014	497.19	Sheen	11.90	Sheen	485.29	
S-21	7/19/2014	497.19	Sheen	10.43	Sheen	486.76	
S-21	8/28/2014	497.19	11.02	11.13	0.11	486.15	
S-21	9/29/2014	497.19	11.77	12.22	0.45	485.32	
S-21	10/16/2014	497.19	12.38	12.53	0.15	484.78	
S-21	3/10/2015	497.19	12.53	12.65	0.12	484.63	
S-21	5/18/2015	497.19	12.18	12.21	0.03	485.00	
S-21	8/12/2015	497.19	Sheen	11.13	Sheen	486.10	
S-21	10/15/2015	497.19	12.11	12.46	0.35	485.05	
S-21	3/4/2016	497.19	12.83	13.41	0.58	484.29	
S-21	6/14/2016	497.19	No LNAPL	12.06	0.00	485.13	
S-21	8/18/2016	497.19	Sheen	10.74	Sheen	486.45	
S-21	8/18/2016	497.25	Sheen	10.76	Sheen	486.49	
S-21	10/13/2016	497.25	12.26	12.50	0.24	484.94	
S-21	3/1/2017	497.25	12.35	12.51	0.16	484.87	
S-21	6/6/2017	497.25	12.42	12.52	0.10	484.81	
S-22	4/21/2006	—	12.61	13.74	1.13	—	
S-22	7/19/2006	—	No LNAPL	11.25	0.00	—	
S-22	10/19/2006	—	12.63	14.46	1.83	—	
S-22	1/16/2007	—	12.65	13.91	1.26	—	
S-22	4/23/2007	—	12.59	13.72	1.13	—	
S-22	7/18/2007	—	No LNAPL	11.38	0.00	—	
S-22	10/17/2007	—	12.95	14.75	1.80	—	
S-22	1/4/2008	—	12.38	13.49	1.11	—	
S-22	4/1/2008	—	12.88	14.08	1.20	—	
S-22	7/2/2008	—	12.08	12.19	0.11	—	
S-22	10/1/2008	—	12.57	12.84	0.27	—	
S-22	4/10/2009	—	12.68	13.76	1.08	—	
S-22	7/8/2009	—	11.92	12.28	0.36	—	
S-22	8/20/2009	—	11.84	12.04	0.20	—	
S-22	10/5/2009	—	12.76	12.77	0.01	—	
S-22	1/22/2010	—	12.97	14.55	1.58	—	
S-22	4/7/2010	—	13.01	14.11	1.10	—	
S-22	7/21/2010	—	11.86	11.91	0.05	—	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-22	10/13/2010	—	13.15	15.05	1.90	—	
S-22	3/18/2011	—	13.08	14.18	1.10	—	
S-22	4/26/2011	—	12.65	12.97	0.32	—	
S-22	5/5/2011	—	12.47	12.58	0.11	—	
S-22	5/17/2011	—	13.16	14.57	1.41	—	
S-22	5/18/2011	—	13.17	14.59	1.42	—	
S-22	6/21/2011	—	12.63	13.22	0.59	—	
S-22	7/15/2011	—	No LNAPL	11.97	0.00	—	
S-22	8/23/2011	—	12.20	12.70	0.50	—	
S-22	9/22/2011	—	13.04	14.96	1.92	—	
S-22	10/21/2011	—	11.94	13.88	1.94	—	
S-22	12/7/2011	496.70	--	-	--	—	Unable to open
S-22	2/17/2012	496.70	11.86	13.44	1.58	484.56	
S-22	3/15/2012	496.70	11.88	13.55	1.67	484.52	
S-22	4/12/2012	496.70	11.78	13.19	1.41	484.67	
S-22	5/7/2012	496.70	11.57	12.78	1.21	484.91	
S-22	5/11/2012	496.70	11.82	12.29	0.47	484.80	Initial levels of first May 2012 baildown test
S-22	6/12/2012	496.70	10.88	11.03	0.15	485.79	
S-22	7/18/2012	496.70	10.54	10.56	0.02	486.16	
S-22	8/21/2012	496.70	10.72	11.93	1.21	485.76	
S-22	9/18/2012	496.70	11.27	13.25	1.98	485.08	
S-22	10/15/2012	496.70	11.26	13.07	1.81	485.12	
S-22	10/26/2012	496.70	11.81	13.30	1.49	484.62	Initial levels of October 2012 baildown test
S-22	11/29/2012	496.70	11.08	11.63	0.55	485.52	
S-22	12/28/2012	496.70	11.33	12.41	1.08	485.18	
S-22	2/26/2013	496.70	11.45	12.39	0.94	485.08	
S-22	3/28/2013	496.70	11.60	12.46	0.86	484.95	R-35R, R-39, and R-40 were offline on this date
S-22	4/24/2013	496.70	11.55	12.61	1.06	484.96	
S-22	5/31/2013	496.70	Sheen	10.43	Sheen	486.27	
S-22	6/24/2013	496.70	Sheen	10.53	Sheen	486.17	
S-22	7/23/2013	496.70	No LNAPL	10.28	0.00	486.42	
S-22	8/21/2013	496.70	Sheen	10.14	Sheen	486.56	
S-22	9/30/2013	496.70	11.18	12.79	1.61	485.23	
S-22	10/29/2013	496.70	11.95	13.73	1.78	484.43	
S-22	11/19/2013	496.70	11.42	12.53	1.11	485.08	
S-22	12/20/2013	496.70	11.31	12.37	1.06	485.20	
S-22	1/14/2014	496.70	11.51	13.00	1.49	484.92	
S-22	2/24/2014	496.70	11.82	13.29	1.47	484.62	
S-22	3/24/2014	496.70	11.92	13.28	1.36	484.54	
S-22	4/14/2014	496.77	11.87	13.63	1.76	484.58	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-22	5/16/2014	496.77	11.34	12.23	0.89	485.27	
S-22	6/20/2014	496.77	10.97	11.13	0.16	485.77	
S-22	7/19/2014	496.77	9.51	9.53	0.02	487.26	
S-22	8/28/2014	496.77	10.12	10.13	0.01	486.65	
S-22	9/29/2014	496.77	10.79	11.81	1.02	485.80	
S-22	10/16/2014	496.77	11.27	12.62	1.35	485.26	
S-22	3/10/2015	496.77	11.58	11.99	0.41	485.12	
S-22	5/18/2015	496.77	11.26	11.42	0.16	485.48	
S-22	8/12/2015	496.78	Sheen	10.23	Sheen	486.59	
S-22	10/15/2015	496.78	11.10	12.27	1.17	485.51	
S-22	3/4/2016	496.78	11.87	13.02	1.15	484.75	
S-22	6/14/2016	496.78	11.14	11.27	0.13	485.62	
S-22	7/2/2016	496.78	No LNAPL	10.67	0.00	486.11	
S-22	7/9/2016	496.78	No LNAPL	10.14	0.00	486.64	
S-22	8/18/2016	496.78	9.83	9.85	0.02	486.95	
S-22	10/13/2016	496.85	11.14	11.35	0.21	485.67	
S-22	3/1/2017	496.85	11.33	12.09	0.76	485.38	
S-22	3/11/2017	496.85	11.40	12.30	0.90	485.29	
S-22	3/18/2017	496.85	11.33	12.20	0.87	485.36	
S-22	3/24/2017	496.85	11.40	12.26	0.86	485.30	
S-22	4/1/2017	496.85	11.35	12.30	0.95	485.33	
S-22	4/8/2017	496.85	11.42	12.05	0.63	485.32	
S-22	4/15/2017	496.85	11.21	11.62	0.41	485.57	
S-22	4/22/2017	496.85	11.26	11.70	0.44	485.51	
S-22	4/29/2017	496.85	--	10.88	--	485.97	
S-22	5/6/2017	496.85	No LNAPL	Frozen	0.00	—	Ice or obstruction at 12.28 feet
S-22	5/13/2017	496.85	10.95	10.97	0.02	485.90	
S-22	5/20/2017	496.85	No LNAPL	10.92	0.00	485.93	
S-22	5/27/2017	496.85	11.15	11.20	0.05	485.69	
S-22	6/6/2017	496.85	11.37	12.11	0.74	485.35	
S-22	7/1/2017	496.85	No LNAPL	10.71	0.00	486.14	
S-22	7/8/2017	496.85	No LNAPL	10.35	0.00	486.50	
S-32	7/19/2006	—	--	9.31	--	—	
S-32	10/19/2006	—	--	10.74	--	—	
S-32	1/15/2007	—	No LNAPL	10.59	0.00	—	
S-32	4/23/2007	—	No LNAPL	6.64	0.00	—	
S-32	7/18/2007	—	No LNAPL	9.42	0.00	—	
S-32	10/17/2007	—	No LNAPL	11.10	0.00	—	
S-32	1/4/2008	—	No LNAPL	10.44	0.00	—	
S-32	4/1/2008	—	No LNAPL	7.16	0.00	—	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-32	7/2/2008	—	No LNAPL	9.92	0.00	—	
S-32	10/1/2008	—	No LNAPL	10.43	0.00	—	
S-32	4/10/2009	—	No LNAPL	Frozen	0.00	—	Frozen
S-32	7/8/2009	—	No LNAPL	9.90	0.00	—	
S-32	8/20/2009	—	No LNAPL	9.75	0.00	—	
S-32	10/5/2009	—	No LNAPL	10.98	0.00	—	
S-32	1/22/2010	—	No LNAPL	10.97	0.00	—	
S-32	4/7/2010	—	No LNAPL	7.77	0.00	—	
S-32	7/22/2010	—	No LNAPL	9.73	0.00	—	
S-32	10/13/2010	—	No LNAPL	11.17	0.00	—	
S-32	4/26/2011	—	No LNAPL	7.77	0.00	—	
S-32	5/5/2011	—	No LNAPL	10.20	0.00	—	
S-32	5/17/2011	—	No LNAPL	11.21	0.00	—	
S-32	5/18/2011	—	No LNAPL	11.24	0.00	—	
S-32	6/21/2011	—	No LNAPL	10.55	0.00	—	
S-32	7/15/2011	—	No LNAPL	9.89	0.00	—	
S-32	8/23/2011	—	No LNAPL	10.17	0.00	—	
S-32	9/22/2011	—	No LNAPL	11.19	0.00	—	
S-32	10/21/2011	—	Sheen	11.90	Sheen	—	
S-32	2/17/2012	495.69	Sheen	11.78	Sheen	483.91	
S-32	3/15/2012	495.69	Sheen	11.79	Sheen	483.90	
S-32	4/12/2012	495.69	No LNAPL	Frozen	0.00	—	Frozen at 11.82 ft BTOC
S-32	4/19/2012	495.69	No LNAPL	10.94	0.00	484.75	
S-32	5/14/2012	495.69	Sheen	11.55	Sheen	484.14	
S-32	6/12/2012	495.69	Sheen	10.56	Sheen	485.13	
S-32	7/18/2012	495.69	No LNAPL	10.31	0.00	485.38	
S-32	7/30/2012	495.69	No LNAPL	9.90	0.00	485.79	
S-32	8/21/2012	495.69	No LNAPL	10.60	0.00	485.09	
S-32	9/18/2012	495.69	No LNAPL	11.22	0.00	484.47	
S-32	10/15/2012	495.69	No LNAPL	11.32	0.00	484.37	
S-32	11/1/2012	495.69	No LNAPL	11.44	0.00	484.25	
S-32	11/29/2012	495.82	No LNAPL	10.97	0.00	484.85	
S-32	12/28/2012	495.82	No LNAPL	11.26	0.00	484.56	
S-32	1/24/2013	495.82	No LNAPL	11.21	0.00	484.61	
S-32	2/26/2013	495.82	No LNAPL	11.34	0.00	484.48	
S-32	3/28/2013	495.82	No LNAPL	Frozen	0.00	—	Frozen at 11.36 ft BTOC. R-35R, R-39, and R-40 were offline on this date
S-32	4/24/2013	495.82	No LNAPL	Frozen	0.00	—	Frozen at 11.35 ft BTOC
S-32	5/23/2013	495.82	No LNAPL	11.19	0.00	484.63	
S-32	6/24/2013	495.82	No LNAPL	10.31	0.00	485.51	
S-32	7/23/2013	495.81	No LNAPL	10.07	0.00	485.74	

Appendix A-1
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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-32	8/1/2013	495.81	--	11.91	--	483.90	
S-32	8/21/2013	495.81	No LNAPL	9.95	0.00	485.86	
S-32	9/30/2013	495.81	No LNAPL	11.10	0.00	484.71	
S-32	10/22/2013	495.84	No LNAPL	11.75	0.00	484.09	
S-32	11/26/2013	495.84	No LNAPL	11.11	0.00	484.73	
S-32	12/18/2013	495.81	No LNAPL	11.11	0.00	484.70	
S-32	1/9/2014	495.80	No LNAPL	11.42	0.00	484.38	
S-32	2/5/2014	495.82	No LNAPL	11.08	0.00	484.74	
S-32	3/18/2014	495.81	No LNAPL	11.79	0.00	484.02	
S-32	3/24/2014	495.81	No LNAPL	11.83	0.00	483.98	
S-32	4/14/2014	495.82	No LNAPL	11.81	0.00	484.01	
S-32	4/18/2014	495.82	No LNAPL	7.29	0.00	488.53	Surface water infiltration was possibly affecting the water table elevation at S-32 on this date.
S-32	5/15/2014	495.82	--	11.17	--	484.65	
S-32	5/16/2014	495.82	No LNAPL	11.30	0.00	484.52	
S-32	6/11/2014	495.83	No LNAPL	11.38	0.00	484.45	
S-32	6/19/2014	495.83	No LNAPL	11.04	0.00	484.79	
S-32	7/15/2014	495.83	No LNAPL	9.21	0.00	486.62	
S-32	8/26/2014	495.82	No LNAPL	9.84	0.00	485.98	
S-32	9/9/2014	495.82	No LNAPL	10.04	0.00	485.78	
S-32	9/24/2014	495.82	No LNAPL	10.41	0.00	485.41	
S-32	10/21/2014	495.84	No LNAPL	11.32	0.00	484.52	
S-32	11/19/2014	495.80	No LNAPL	10.98	0.00	484.82	
S-32	12/16/2014	495.81	No LNAPL	11.15	0.00	484.66	
S-32	12/29/2014	495.81	No LNAPL	11.27	0.00	484.54	
S-32	1/21/2015	495.79	No LNAPL	11.31	0.00	484.48	
S-32	2/25/2015	495.81	No LNAPL	11.43	0.00	484.38	
S-32	3/10/2015	495.80	No LNAPL	11.36	0.00	484.44	
S-32	3/18/2015	495.80	No LNAPL	11.46	0.00	484.34	
S-32	3/26/2015	495.80	No LNAPL	11.39	0.00	484.41	
S-32	4/16/2015	495.81	--	9.59	--	486.22	Surface water infiltration was possibly affecting the water table elevation at S-32 on this date.
S-32	5/21/2015	495.82	No LNAPL	11.00	0.00	484.82	
S-32	6/10/2015	495.81	No LNAPL	11.05	0.00	484.76	
S-32	8/12/2015	495.83	--	9.97	--	485.86	
S-32	8/19/2015	495.83	No LNAPL	10.26	0.00	485.60	
S-32	10/6/2015	495.81	No LNAPL	10.52	0.00	485.30	
S-32	10/15/2015	495.81	No LNAPL	10.94	0.00	484.87	
S-32	11/19/2015	495.81	--	11.13	--	484.68	
S-32	1/19/2016	495.79	--	11.55	--	484.20	

Appendix A-1
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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-32	3/4/2016	495.79	No LNAPL	11.77	0.00	484.02	
S-32	5/26/2016	495.81	No LNAPL	11.27	0.00	484.56	
S-32	9/9/2016	495.82	No LNAPL	10.09	0.00	485.77	
S-32	10/13/2016	495.82	No LNAPL	11.13	0.00	484.69	
S-32	11/15/2016	495.80	No LNAPL	10.78	0.00	485.12	
S-32	2/8/2017	495.77	No LNAPL	11.16	0.00	484.68	
S-32	3/1/2017	495.77	No LNAPL	11.12	0.00	484.65	
S-32	6/13/2017	495.79	No LNAPL	10.54	0.00	485.30	
S-39	4/21/2006	—	--	10.78	--	—	
S-39	7/19/2006	—	--	9.30	--	—	
S-39	10/19/2006	—	12.69	13.21	0.52	—	
S-39	1/15/2007	—	12.62	13.23	0.61	—	
S-39	4/23/2007	—	No LNAPL	10.82	0.00	—	
S-39	7/18/2007	—	No LNAPL	9.64	0.00	—	
S-39	10/17/2007	—	No LNAPL	11.38	0.00	—	
S-39	1/4/2008	—	No LNAPL	10.66	0.00	—	
S-39	7/2/2008	—	11.16	11.98	0.82	—	
S-39	10/1/2008	—	12.36	12.78	0.42	—	
S-39	4/10/2009	—	No LNAPL	Frozen	0.00	—	Frozen
S-39	7/8/2009	—	11.78	12.66	0.88	—	
S-39	8/20/2009	—	11.68	12.86	1.18	—	
S-39	10/5/2009	—	No LNAPL	11.37	0.00	—	
S-39	1/22/2010	—	No LNAPL	11.57	0.00	—	
S-39	4/7/2010	—	12.85	13.70	0.85	—	
S-39	7/21/2010	—	11.72	12.67	0.95	—	
S-39	10/13/2010	—	12.54	13.80	1.26	—	
S-39	3/18/2011	—	12.85	13.33	0.48	—	
S-39	4/5/2011	—	12.84	13.58	0.74	—	
S-39	5/10/2011	—	12.77	13.34	0.57	—	
S-39	5/13/2011	—	12.88	13.57	0.69	—	
S-39	5/18/2011	—	12.94	14.19	1.25	—	
S-39	6/21/2011	—	12.31	13.08	0.77	—	
S-39	10/21/2011	—	12.90	12.91	0.01	—	
S-39	12/7/2011	497.11	14.71	15.06	0.35	482.33	
S-39	2/16/2012	497.11	14.89	15.26	0.37	482.15	
S-39	3/15/2012	497.11	14.93	15.29	0.36	482.11	
S-39	4/12/2012	497.11	13.70	13.87	0.17	483.38	
S-39	4/19/2012	497.11	14.34	14.41	0.07	482.76	
S-39	5/14/2012	497.11	14.61	14.80	0.19	482.46	
S-39	6/12/2012	497.11	13.75	14.02	0.27	483.31	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-39	7/18/2012	497.11	13.63	13.80	0.17	483.45	
S-39	7/30/2012	497.11	13.19	13.58	0.39	483.85	
S-39	8/21/2012	497.11	13.82	14.18	0.36	483.22	
S-39	9/19/2012	497.11	13.98	14.50	0.52	483.03	
S-39	10/15/2012	497.11	10.98	11.61	0.63	486.01	
S-39	10/26/2012	497.11	11.38	12.02	0.64	485.61	Initial levels of October 2012 baildown test
S-39	11/1/2012	497.11	11.10	11.18	0.08	485.99	
S-39	11/29/2012	494.07	10.76	10.80	0.04	483.30	
S-39	12/28/2012	494.07	11.00	11.13	0.13	483.05	
S-39	1/24/2013	494.07	11.02	11.24	0.22	483.01	
S-39	2/26/2013	494.07	11.09	11.14	0.05	482.97	
S-39	3/28/2013	494.07	9.76	9.81	0.05	484.30	R-35R, R-39, and R-40 were offline on this date
S-39	4/24/2013	494.07	10.97	11.07	0.10	483.08	
S-39	5/31/2013	494.07	8.52	8.53	0.01	485.55	
S-39	6/24/2013	494.07	8.94	9.54	0.60	485.02	
S-39	7/23/2013	494.07	8.62	9.47	0.85	485.29	
S-39	8/2/2013	494.07	8.51	9.46	0.95	485.38	
S-39	8/21/2013	494.07	8.58	8.95	0.37	485.42	
S-39	9/24/2013	494.07	9.27	11.03	1.76	484.47	
S-39	10/1/2013	494.07	9.57	11.43	1.86	484.15	
S-39	10/29/2013	494.07	10.48	11.24	0.76	483.45	
S-39	11/19/2013	494.07	9.96	10.01	0.05	484.10	
S-39	12/20/2013	494.07	9.81	9.93	0.12	484.24	
S-39	1/14/2014	494.07	10.10	10.46	0.36	483.90	
S-39	2/25/2014	494.07	10.35	11.03	0.68	483.59	
S-39	3/18/2014	494.07	10.48	10.50	0.02	483.59	
S-39	4/14/2014	494.13	10.48	10.87	0.39	483.58	
S-39	5/16/2014	494.13	9.89	10.13	0.24	484.19	
S-39	6/11/2014	494.13	9.97	10.60	0.63	484.04	
S-39	7/19/2014	494.13	7.59	9.24	1.65	486.23	
S-39	8/28/2014	494.13	8.42	9.43	1.01	485.52	
S-39	9/9/2014	494.13	8.61	9.91	1.30	485.28	
S-39	10/16/2014	494.13	9.75	10.19	0.44	484.30	
S-39	11/20/2014	494.13	9.57	9.96	0.39	484.49	
S-39	12/29/2014	494.13	10.36	10.90	0.54	483.67	
S-39	1/21/2015	494.19	11.26	11.93	0.67	482.80	
S-39	2/25/2015	494.19	11.15	11.16	0.01	483.04	
S-39	3/10/2015	494.15	11.09	11.25	0.16	483.03	
S-39	3/18/2015	494.15	11.09	11.26	0.17	483.03	
S-39	3/26/2015	494.15	11.03	11.25	0.22	483.08	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-39	4/16/2015	494.16	11.18	11.47	0.29	482.93	
S-39	5/18/2015	494.19	10.80	10.88	0.08	483.37	
S-39	5/21/2015	494.19	10.58	10.59	0.01	483.61	
S-39	6/10/2015	493.98	10.44	10.52	0.08	483.52	
S-39	8/12/2015	493.98	8.97	9.09	0.12	485.03	
S-39	8/19/2015	494.31	9.29	9.43	0.14	485.06	
S-39	10/6/2015	493.97	9.41	10.04	0.63	484.48	
S-39	10/15/2015	493.97	9.57	10.33	0.76	484.30	
S-39	11/19/2015	493.97	9.90	10.16	0.26	484.02	
S-39	1/19/2016	494.00	10.58	10.72	0.14	483.39	
S-39	3/4/2016	494.00	10.30	10.32	0.02	483.75	
S-39	5/26/2016	494.00	10.50	10.53	0.03	483.51	
S-39	6/14/2016	494.00	10.16	10.29	0.13	483.82	
S-39	8/18/2016	494.00	8.70	10.00	1.30	485.06	
S-39	8/18/2016	494.02	8.73	10.05	1.32	485.04	
S-39	9/9/2016	494.03	9.17	10.48	1.31	484.66	
S-39	9/10/2016	494.03	9.23	10.54	1.31	484.55	
S-39	9/17/2016	494.03	9.70	10.50	0.80	484.18	
S-39	9/24/2016	494.03	8.66	9.13	0.47	485.28	
S-39	9/30/2016	494.03	9.91	9.96	0.05	484.11	
S-39	10/8/2016	494.03	10.20	10.23	0.03	483.82	
S-39	10/13/2016	494.03	10.32	10.46	0.14	483.68	
S-39	10/15/2016	494.03	10.70	10.85	0.15	483.30	
S-39	10/22/2016	494.03	10.60	10.80	0.20	483.39	
S-39	10/26/2016	494.02	10.70	10.98	0.28	483.27	
S-39	10/28/2016	494.03	10.58	10.68	0.10	483.43	
S-39	11/5/2016	494.02	9.90	10.10	0.20	484.08	
S-39	11/15/2016	494.02	10.04	10.19	0.15	483.99	
S-39	2/8/2017	494.03	10.40	11.13	0.73	483.56	
S-39	3/1/2017	494.03	10.45	11.28	0.83	483.42	
S-39	3/11/2017	494.03	10.50	11.20	0.70	483.40	
S-39	3/18/2017	494.03	10.55	10.68	0.13	483.46	
S-39	3/24/2017	494.03	10.61	10.82	0.21	483.38	
S-39	4/1/2017	494.03	10.57	10.75	0.18	483.43	
S-39	4/8/2017	494.03	10.50	10.80	0.30	483.47	
S-39	4/15/2017	494.03	10.33	10.34	0.01	483.70	
S-39	6/6/2017	494.08	10.42	10.81	0.39	483.59	
S-39	6/13/2017	494.08	9.75	10.14	0.39	484.32	
S-41R	8/16/2016	496.83	--	9.23	--	487.60	
S-43	4/21/2006	—	--	11.88	--	—	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-43	7/19/2006	—	--	10.42	--	—	
S-43	10/19/2006	—	--	12.01	--	—	
S-43	1/16/2007	—	No LNAPL	12.01	0.00	—	
S-43	4/23/2007	—	No LNAPL	11.97	0.00	—	
S-43	7/18/2007	—	No LNAPL	10.68	0.00	—	
S-43	10/17/2007	—	No LNAPL	12.45	0.00	—	
S-43	1/4/2008	—	No LNAPL	11.86	0.00	—	
S-43	4/1/2008	—	No LNAPL	12.42	0.00	—	
S-43	7/2/2008	—	No LNAPL	11.37	0.00	—	
S-43	10/1/2008	—	No LNAPL	11.97	0.00	—	
S-43	4/10/2009	—	No LNAPL	15.44	0.00	—	
S-43	7/8/2009	—	No LNAPL	11.38	0.00	—	
S-43	8/20/2009	—	No LNAPL	11.28	0.00	—	
S-43	10/5/2009	—	12.60	12.61	0.01	—	
S-43	1/22/2010	—	No LNAPL	12.78	0.00	—	
S-43	4/7/2010	—	No LNAPL	12.68	0.00	—	
S-43	7/21/2010	—	No LNAPL	11.45	0.00	—	
S-43	10/13/2010	—	No LNAPL	12.75	0.00	—	
S-43	3/18/2011	—	No LNAPL	12.60	0.00	—	
S-43	4/26/2011	—	No LNAPL	12.50	0.00	—	
S-43	5/5/2011	—	No LNAPL	11.81	0.00	—	
S-43	5/17/2011	—	No LNAPL	12.84	0.00	—	
S-43	5/18/2011	—	No LNAPL	12.88	0.00	—	
S-43	6/21/2011	—	No LNAPL	12.26	0.00	—	
S-43	7/15/2011	—	No LNAPL	11.55	0.00	—	
S-43	8/23/2011	—	No LNAPL	11.88	0.00	—	
S-43	9/22/2011	—	No LNAPL	12.89	0.00	—	
S-43	10/21/2011	—	Sheen	12.29	Sheen	—	
S-43	12/7/2011	496.13	No LNAPL	11.43	0.00	484.70	
S-43	2/16/2012	496.13	Sheen	12.22	Sheen	483.91	
S-43	3/15/2012	496.13	Sheen	12.25	Sheen	483.88	
S-43	4/12/2012	496.13	Sheen	12.11	Sheen	484.02	
S-43	4/19/2012	496.13	Sheen	11.60	Sheen	484.53	
S-43	5/7/2012	496.13	Sheen	11.91	Sheen	484.22	
S-43	6/12/2012	496.13	Sheen	11.05	Sheen	485.08	
S-43	7/18/2012	496.13	No LNAPL	10.72	0.00	485.41	
S-43	7/30/2012	496.13	No LNAPL	10.34	0.00	485.79	
S-43	8/21/2012	496.13	Sheen	11.06	Sheen	485.07	
S-43	9/19/2012	496.13	No LNAPL	11.69	0.00	484.44	
S-43	10/15/2012	496.13	Sheen	11.64	Sheen	484.49	

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-43	11/1/2012	496.13	Sheen	11.70	Sheen	484.43	
S-43	11/29/2012	496.21	No LNAPL	11.29	0.00	484.92	
S-43	12/28/2012	496.21	Sheen	11.62	Sheen	484.59	
S-43	1/24/2013	496.21	Sheen	11.60	Sheen	484.61	
S-43	2/26/2013	496.21	Sheen	11.72	Sheen	484.49	
S-43	3/29/2013	496.20	Sheen	11.88	Sheen	484.32	R-35R, R-39, and R-40 were offline on this date
S-43	4/24/2013	496.20	11.83	11.84	0.01	484.37	
S-43	5/20/2013	496.27	Sheen	11.51	Sheen	484.76	
S-43	6/24/2013	496.28	No LNAPL	10.69	0.00	485.59	
S-43	7/23/2013	496.28	Sheen	10.46	Sheen	485.82	
S-43	8/1/2013	496.28	No LNAPL	10.35	0.00	485.93	
S-43	8/21/2013	496.28	Sheen	10.34	Sheen	485.94	
S-43	9/30/2013	496.29	Sheen	11.57	Sheen	484.72	
S-43	10/22/2013	496.31	Sheen	12.17	Sheen	484.14	
S-43	11/19/2013	496.31	Sheen	11.69	Sheen	484.62	
S-43	12/18/2013	496.28	Sheen	11.57	Sheen	484.71	
S-43	1/9/2014	496.28	Sheen	11.79	Sheen	484.49	
S-43	2/5/2014	496.30	No LNAPL	11.93	0.00	484.37	
S-43	3/14/2014	496.32	Sheen	12.18	Sheen	484.14	
S-43	3/18/2014	496.32	No LNAPL	12.20	0.00	484.12	
S-43	3/24/2014	496.32	Sheen	12.23	Sheen	484.09	
S-43	4/14/2014	496.33	Sheen	12.01	Sheen	484.32	
S-43	4/18/2014	496.33	Sheen	12.01	Sheen	484.32	
S-43	5/15/2014	496.33	Sheen	11.57	Sheen	484.76	
S-43	5/16/2014	496.33	Sheen	11.60	Sheen	484.73	
S-43	6/11/2014	496.34	No LNAPL	11.77	0.00	484.57	
S-43	6/19/2014	496.34	Sheen	11.41	Sheen	484.93	
S-43	7/15/2014	496.34	No LNAPL	9.60	0.00	486.74	
S-43	7/15/2014	496.34	No LNAPL	9.59	0.00	486.75	
S-43	8/26/2014	496.33	No LNAPL	10.24	0.00	486.09	
S-43	9/9/2014	496.33	Sheen	10.49	Sheen	485.84	
S-43	9/24/2014	496.34	No LNAPL	10.84	0.00	485.50	
S-43	10/21/2014	496.33	No LNAPL	11.76	0.00	484.57	
S-43	11/19/2014	496.34	No LNAPL	11.38	0.00	484.96	
S-43	12/16/2014	496.36	No LNAPL	11.58	0.00	484.78	
S-43	12/29/2014	496.36	Sheen	11.71	Sheen	484.65	
S-43	1/21/2015	496.38	No LNAPL	11.79	0.00	484.59	
S-43	2/25/2015	496.41	Sheen	11.92	Sheen	484.49	
S-43	3/10/2015	496.42	Sheen	11.85	Sheen	484.57	
S-43	3/18/2015	496.42	Sheen	11.96	Sheen	484.46	

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Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-43	3/26/2015	496.42	Sheen	11.88	Sheen	484.54	
S-43	4/16/2015	496.43	Sheen	11.79	Sheen	484.64	
S-43	5/21/2015	496.44	No LNAPL	11.50	0.00	484.94	
S-43	6/10/2015	496.44	No LNAPL	11.53	0.00	484.91	
S-43	8/12/2015	496.44	Sheen	10.49	Sheen	485.99	
S-43	8/19/2015	496.44	No LNAPL	10.73	0.00	485.74	
S-43	10/6/2015	496.45	Sheen	11.04	Sheen	485.42	
S-43	10/15/2015	496.45	Sheen	11.46	Sheen	484.99	
S-43	11/19/2015	496.45	No LNAPL	11.69	0.00	484.76	
S-43	1/19/2016	496.43	No LNAPL	12.18	0.00	484.25	
S-43	5/26/2016	496.50	Sheen	11.87	Sheen	484.65	
S-43	8/18/2016	496.22	Sheen	9.87	Sheen	486.35	
S-43	9/9/2016	496.20	No LNAPL	10.35	0.00	485.90	
S-43	10/25/2016	496.22	Sheen	11.75	Sheen	484.47	
S-43	11/15/2016	496.22	No LNAPL	11.05	0.00	485.27	
S-43	2/8/2017	496.27	No LNAPL	11.54	0.00	484.80	
S-43	3/2/2017	496.27	No LNAPL	11.54	0.00	484.73	
S-43	6/13/2017	496.33	No LNAPL	10.92	0.00	485.46	
S-44	4/21/2006	—	10.05	10.95	0.90	—	
S-44	7/19/2006	—	--	8.79	--	—	
S-44	10/19/2006	—	10.05	11.37	1.32	—	
S-44	1/15/2007	—	10.19	10.91	0.72	—	
S-44	4/23/2007	—	10.20	10.76	0.56	—	
S-44	7/18/2007	—	No LNAPL	9.05	0.00	—	
S-44	10/17/2007	—	10.78	11.21	0.43	—	
S-44	1/4/2008	—	10.15	10.48	0.33	—	
S-44	4/1/2008	—	10.58	11.61	1.03	—	
S-44	7/2/2008	—	No LNAPL	9.76	0.00	—	
S-44	10/1/2008	—	10.34	10.45	0.11	—	
S-44	4/10/2009	—	10.68	10.85	0.17	—	
S-44	7/8/2009	—	No LNAPL	9.87	0.00	—	
S-44	8/20/2009	—	No LNAPL	9.76	0.00	—	
S-44	10/5/2009	—	No LNAPL	11.04	0.00	—	
S-44	1/22/2010	—	10.87	12.18	1.31	—	
S-44	4/7/2010	—	10.82	11.88	1.06	—	
S-44	7/21/2010	—	No LNAPL	9.84	0.00	—	
S-44	10/13/2010	—	10.80	12.50	1.70	—	
S-44	3/18/2011	—	10.78	11.98	1.20	—	
S-44	4/6/2011	—	10.83	11.84	1.01	—	
S-44	5/5/2011	—	No LNAPL	10.30	0.00	—	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-44	5/17/2011	—	No LNAPL	11.24	0.00	—	
S-44	5/18/2011	—	Sheen	11.28	Sheen	—	
S-44	6/21/2011	—	10.59	10.83	0.24	—	
S-44	7/15/2011	—	No LNAPL	9.92	0.00	—	
S-44	8/23/2011	—	10.24	10.54	0.30	—	
S-44	9/22/2011	—	10.93	12.71	1.78	—	
S-44	10/21/2011	—	11.59	13.65	2.06	—	
S-44	12/7/2011	495.69	11.35	12.70	1.35	484.04	
S-44	2/16/2012	495.69	11.53	13.35	1.82	483.76	
S-44	3/15/2012	495.69	11.58	13.38	1.80	483.71	
S-44	4/12/2012	495.69	11.49	13.00	1.51	483.86	
S-44	4/19/2012	495.69	11.19	11.56	0.37	484.42	
S-44	5/14/2012	495.69	11.65	11.93	0.28	483.98	
S-44	6/12/2012	495.69	Sheen	10.05	Sheen	485.64	
S-44	7/18/2012	495.69	Sheen	9.74	Sheen	485.95	
S-44	7/30/2012	495.69	Sheen	9.36	Sheen	486.33	
S-44	8/21/2012	495.69	Sheen	10.11	Sheen	485.58	
S-44	9/19/2012	495.69	Sheen	10.76	Sheen	484.93	
S-44	10/15/2012	495.69	10.66	10.79	0.13	485.00	
S-44	11/1/2012	495.69	10.60	11.35	0.75	484.92	
S-44	11/29/2012	495.02	10.25	10.61	0.36	484.69	
S-44	12/28/2012	495.02	10.45	11.27	0.82	484.39	
S-44	1/24/2013	495.02	10.37	10.39	0.02	484.65	
S-44	2/26/2013	495.02	10.46	11.59	1.13	484.31	
S-44	3/28/2013	495.02	10.38	11.34	0.96	484.43	R-35R, R-39, and R-40 were offline on this date
S-44	4/24/2013	495.02	10.51	11.82	1.31	484.22	
S-44	5/21/2013	495.02	10.38	10.88	0.50	484.53	
S-44	6/24/2013	495.05	Sheen	9.63	Sheen	485.42	
S-44	7/23/2013	495.04	Sheen	9.40	Sheen	485.64	
S-44	8/1/2013	495.04	No LNAPL	9.31	0.00	485.73	
S-44	8/21/2013	495.04	Sheen	9.30	Sheen	485.74	
S-44	9/30/2013	495.03	10.48	10.52	0.04	484.54	
S-44	10/22/2013	495.04	10.83	12.14	1.31	483.92	
S-44	11/26/2013	495.04	10.27	10.41	0.14	484.74	
S-44	12/18/2013	495.05	10.48	10.65	0.17	484.53	
S-44	1/9/2014	495.04	10.63	11.10	0.47	484.31	
S-44	2/5/2014	495.05	10.70	11.62	0.92	484.15	
S-44	3/18/2014	495.02	11.16	11.22	0.06	483.85	
S-44	3/24/2014	495.02	11.07	11.39	0.32	483.88	
S-44	4/14/2014	495.04	10.69	11.74	1.05	484.12	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-44	4/18/2014	495.04	10.69	11.74	1.05	484.12	
S-44	5/15/2014	495.05	10.43	10.63	0.20	484.58	
S-44	5/16/2014	495.05	10.46	10.69	0.23	484.54	
S-44	6/11/2014	495.05	10.53	11.27	0.74	484.36	
S-44	6/19/2014	495.05	10.21	10.75	0.54	484.72	
S-44	7/15/2014	495.07	Sheen	8.52	Sheen	486.55	
S-44	8/26/2014	495.06	Sheen	9.17	Sheen	485.89	
S-44	9/9/2014	495.06	Sheen	9.42	Sheen	485.64	
S-44	9/24/2014	495.04	Sheen	9.75	Sheen	485.29	
S-44	10/21/2014	495.04	Sheen	10.68	Sheen	484.36	
S-44	11/19/2014	495.06	10.24	10.45	0.21	484.77	
S-44	12/16/2014	495.03	10.38	10.92	0.54	484.53	
S-44	12/29/2014	495.03	10.45	11.16	0.71	484.42	
S-44	1/21/2015	495.03	10.50	11.43	0.93	484.32	
S-44	2/25/2015	495.03	10.68	11.18	0.50	484.24	
S-44	3/10/2015	494.99	10.66	10.91	0.25	484.27	
S-44	3/18/2015	494.99	10.77	10.85	0.08	484.20	
S-44	3/26/2015	494.99	10.67	11.01	0.34	484.24	
S-44	4/16/2015	495.03	10.54	10.94	0.40	484.40	
S-44	5/21/2015	495.03	10.35	10.37	0.02	484.68	
S-44	6/10/2015	495.06	10.37	10.47	0.10	484.67	
S-44	8/12/2015	495.05	Sheen	9.31	Sheen	485.78	
S-44	8/19/2015	495.05	Sheen	9.61	Sheen	485.51	
S-44	10/6/2015	495.03	Sheen	9.90	Sheen	485.17	
S-44	10/15/2015	495.03	Sheen	10.29	Sheen	484.78	
S-44	11/19/2015	495.03	10.32	11.03	0.71	484.55	
S-44	1/19/2016	495.03	10.66	12.12	1.46	484.05	
S-44	3/4/2016	495.03	10.88	11.73	0.85	484.01	
S-44	5/26/2016	495.05	10.49	10.91	0.42	484.49	
S-44	6/14/2016	495.05	No LNAPL	10.24	0.00	484.81	
S-44	8/18/2016	495.05	No LNAPL	8.94	0.00	486.11	
S-44	8/18/2016	495.02	Sheen	8.96	Sheen	486.06	
S-44	9/9/2016	495.05	Sheen	9.43	Sheen	485.67	
S-44	10/13/2016	495.05	Sheen	10.46	Sheen	484.59	
S-44	11/15/2016	495.02	Sheen	10.09	Sheen	484.97	
S-44	2/8/2017	495.00	10.46	10.62	0.16	484.57	
S-44	2/15/2017	495.00	10.47	10.67	0.20	484.52	
S-44	3/1/2017	495.00	10.49	10.73	0.24	484.46	
S-44	6/6/2017	495.05	10.52	10.65	0.13	484.50	
S-44	6/13/2017	495.05	Sheen	9.86	Sheen	485.25	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-50	4/21/2006	—	11.39	—	—	—	Only depth to LNAPL was recorded
S-50	7/19/2006	—	No LNAPL	10.07	0.00	—	
S-50	10/19/2006	—	11.52	12.81	1.29	—	
S-50	1/15/2007	—	11.46	12.34	0.88	—	
S-50	7/17/2007	—	--	10.15	--	—	
S-50	10/17/2007	—	11.69	13.58	1.89	—	
S-50	1/4/2008	—	11.19	11.76	0.57	—	
S-50	4/1/2008	—	11.45	13.31	1.86	—	
S-50	7/2/2008	—	No LNAPL	10.79	0.00	—	
S-50	9/2/2008	—	10.52	10.60	0.08	—	
S-50	10/1/2008	—	11.39	11.52	0.13	—	
S-50	4/8/2009	—	11.46	12.64	1.18	—	
S-50	7/7/2009	—	10.67	10.98	0.31	—	
S-50	8/21/2009	—	10.62	10.83	0.21	—	
S-50	10/5/2009	—	11.69	12.86	1.17	—	
S-50	1/22/2010	—	11.75	11.76	0.01	—	
S-50	4/7/2010	—	11.59	13.48	1.89	—	
S-50	7/21/2010	—	10.55	10.56	0.01	—	
S-50	10/13/2010	—	11.80	14.00	2.20	—	
S-50	3/18/2011	—	11.67	13.36	1.69	—	
S-50	4/18/2011	—	11.62	12.91	1.29	—	
S-50	5/4/2011	—	No LNAPL	11.04	0.00	—	
S-50	5/17/2011	—	11.82	13.48	1.66	—	
S-50	5/24/2011	—	11.42	13.30	1.88	—	
S-50	6/21/2011	—	11.31	11.87	0.56	—	
S-50	7/14/2011	—	No LNAPL	10.60	0.00	—	
S-50	8/23/2011	—	Sheen	10.95	Sheen	—	
S-50	9/22/2011	—	11.87	13.50	1.63	—	
S-50	10/21/2011	—	12.42	14.75	2.33	—	
S-50	12/2/2011	496.67	12.30	13.74	1.44	484.14	
S-50	2/17/2012	496.67	11.67	13.44	1.77	484.72	
S-50	3/15/2012	496.67	12.36	14.42	2.06	483.98	
S-50	4/12/2012	496.67	12.27	13.98	1.71	484.13	
S-50	4/19/2012	496.67	11.96	12.11	0.15	484.69	
S-50	5/7/2012	496.67	12.12	13.30	1.18	484.36	
S-50	6/12/2012	496.67	Sheen	11.46	Sheen	485.21	
S-50	7/18/2012	496.67	11.09	11.11	0.02	485.58	
S-50	7/30/2012	496.67	Sheen	10.70	Sheen	485.97	
S-50	8/21/2012	496.67	11.46	11.56	0.10	485.19	
S-50	9/19/2012	496.67	11.94	13.36	1.42	484.51	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-50	10/15/2012	496.67	11.87	13.36	1.49	484.56	
S-50	10/19/2012	496.67	11.98	13.70	1.72	484.42	Initial levels of first October 2012 baildown test
S-50	10/22/2012	496.67	12.11	13.84	1.73	484.29	Initial levels of second October 2012 baildown test
S-50	11/1/2012	496.67	12.04	12.75	0.71	484.52	
S-50	11/29/2012	496.68	11.66	11.79	0.13	485.00	
S-50	12/28/2012	496.68	11.89	12.67	0.78	484.67	
S-50	1/24/2013	496.68	11.90	12.43	0.53	484.70	
S-50	2/26/2013	496.68	12.04	12.89	0.85	484.51	
S-50	3/28/2013	496.68	12.07	13.98	1.91	484.31	R-35R, R-39, and R-40 were offline on this date
S-50	4/24/2013	496.68	12.11	13.61	1.50	484.33	
S-50	5/21/2013	496.70	11.99	12.02	0.03	484.71	
S-50	6/24/2013	496.69	11.08	11.11	0.03	485.61	
S-50	7/23/2013	496.70	Sheen	10.77	Sheen	485.93	
S-50	8/1/2013	496.70	Sheen	10.73	Sheen	485.97	
S-50	8/21/2013	496.70	Sheen	10.70	Sheen	486.00	
S-50	9/30/2013	496.70	12.00	12.17	0.17	484.67	
S-50	10/22/2013	496.71	12.50	13.89	1.39	483.99	
S-50	11/26/2013	496.71	11.90	11.91	0.01	484.81	
S-50	12/18/2013	496.69	11.94	12.68	0.74	484.63	
S-50	1/9/2014	496.69	12.09	13.13	1.04	484.44	
S-50	2/5/2014	496.66	12.38	13.30	0.92	484.13	
S-50	3/18/2014	496.68	12.42	13.68	1.26	484.06	
S-50	3/24/2014	496.68	12.41	13.93	1.52	484.03	
S-50	4/14/2014	497.00	12.27	13.61	1.34	484.52	
S-50	4/18/2014	497.00	12.27	13.61	1.34	484.52	
S-50	5/15/2014	496.71	12.01	12.17	0.16	484.67	Skimmer pump removed to take measurement
S-50	5/16/2014	496.71	12.05	12.20	0.15	484.64	
S-50	6/11/2014	496.70	12.27	12.30	0.03	484.43	Product skimmer-pump present
S-50	6/19/2014	496.70	11.86	11.99	0.13	484.82	No skimmer pump present
S-50	7/15/2014	496.70	10.05	10.06	0.01	486.65	
S-50	8/26/2014	496.72	10.72	10.73	0.01	486.00	
S-50	9/9/2014	496.72	11.02	11.03	0.01	485.70	
S-50	9/24/2014	496.70	11.34	11.36	0.02	485.36	
S-50	10/21/2014	496.70	12.24	12.25	0.01	484.46	
S-50	11/19/2014	496.69	11.82	11.83	0.01	484.87	
S-50	12/16/2014	496.71	12.03	12.18	0.15	484.66	
S-50	12/29/2014	496.71	12.11	12.49	0.38	484.54	
S-50	1/21/2015	496.69	12.14	12.74	0.60	484.46	
S-50	2/25/2015	496.70	12.14	13.25	1.11	484.38	
S-50	3/10/2015	496.64	12.15	12.54	0.39	484.43	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-50	3/18/2015	496.64	12.26	12.63	0.37	484.32	
S-50	3/26/2015	496.64	12.15	12.96	0.81	484.36	
S-50	4/16/2015	496.65	12.09	12.42	0.33	484.51	
S-50	5/21/2015	496.69	11.87	11.89	0.02	484.82	
S-50	6/10/2015	496.72	11.91	11.97	0.06	484.80	
S-50	8/12/2015	496.70	Sheen	10.82	Sheen	485.92	
S-50	8/19/2015	496.70	11.11	11.12	0.01	485.66	
S-50	10/6/2015	496.70	11.48	11.49	0.01	485.26	
S-50	10/15/2015	496.70	11.90	11.91	0.01	484.84	
S-50	11/19/2015	496.70	11.96	12.21	0.25	484.70	
S-50	1/19/2016	496.71	12.27	13.80	1.53	484.20	
S-50	3/4/2016	496.71	12.37	13.85	1.48	484.16	
S-50	5/26/2016	496.70	12.07	12.22	0.15	484.63	
S-50	6/14/2016	496.70	No LNAPL	11.72	0.00	484.98	
S-50	8/18/2016	496.70	Sheen	10.43	Sheen	486.27	
S-50	8/18/2016	496.68	10.46	10.47	0.01	486.22	
S-50	9/9/2016	496.71	Sheen	10.95	Sheen	485.81	
S-50	10/13/2016	496.71	12.00	12.01	0.01	484.71	
S-50	11/15/2016	496.68	No LNAPL	11.57	0.00	485.15	
S-50	2/8/2017	496.67	11.98	12.05	0.07	484.75	
S-50	2/15/2017	496.67	12.00	12.11	0.11	484.68	
S-50	3/1/2017	496.67	12.02	12.18	0.16	484.62	
S-50	6/6/2017	496.71	12.06	12.17	0.11	484.63	
S-50	6/13/2017	496.71	11.33	11.42	0.09	485.43	
S-51	4/21/2006	—	10.77	10.85	0.08	—	
S-51	7/19/2006	—	--	9.38	--	—	
S-51	10/19/2006	—	10.81	11.80	0.99	—	
S-51	1/16/2007	—	10.76	11.30	0.54	—	
S-51	7/18/2007	—	9.37	9.44	0.07	—	
S-51	10/17/2007	—	11.04	12.59	1.55	—	
S-51	1/4/2008	—	10.47	11.11	0.64	—	
S-51	4/1/2008	—	10.88	12.07	1.19	—	
S-51	7/2/2008	—	No LNAPL	10.04	0.00	—	
S-51	10/1/2008	—	10.54	11.02	0.48	—	
S-51	4/10/2009	—	No LNAPL	16.75	0.00	—	
S-51	7/8/2009	—	9.96	10.00	0.04	—	
S-51	8/21/2009	—	9.91	10.28	0.37	—	
S-51	10/5/2009	—	10.88	12.47	1.59	—	
S-51	1/22/2010	—	11.07	12.40	1.33	—	
S-51	4/7/2010	—	10.91	12.29	1.38	—	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-51	7/21/2010	—	9.85	9.86	0.01	—	
S-51	10/13/2010	—	11.16	12.71	1.55	—	
S-51	3/17/2011	—	11.02	12.53	1.51	—	
S-51	4/5/2011	—	10.98	11.99	1.01	—	
S-51	5/4/2011	—	10.42	10.44	0.02	—	
S-51	5/17/2011	—	11.09	12.92	1.83	—	
S-51	5/18/2011	—	11.11	12.98	1.87	—	
S-51	6/21/2011	—	10.64	11.03	0.39	—	
S-51	7/14/2011	—	Sheen	9.93	Sheen	—	
S-51	8/23/2011	—	10.23	10.27	0.04	—	
S-51	9/22/2011	—	11.12	12.70	1.58	—	
S-51	10/21/2011	—	11.75	13.91	2.16	—	
S-51	12/7/2011	495.90	11.85	13.48	1.63	483.76	
S-51	2/17/2012	495.90	12.35	14.29	1.94	483.21	
S-51	3/15/2012	495.90	11.67	13.67	2.00	483.88	
S-51	4/12/2012	495.90	11.57	13.37	1.80	484.02	
S-51	5/7/2012	495.90	11.39	12.86	1.47	484.25	
S-51	6/12/2012	495.90	Sheen	10.78	Sheen	485.12	
S-51	7/18/2012	495.90	Sheen	10.42	Sheen	485.48	
S-51	8/21/2012	495.90	10.76	11.00	0.24	485.10	
S-51	9/19/2012	495.90	11.36	12.14	0.78	484.40	
S-51	10/15/2012	495.90	11.27	12.25	0.98	484.46	
S-51	10/18/2012	495.90	11.33	12.60	1.27	484.35	Initial levels of first October 2012 baildown test
S-51	10/19/2012	495.90	11.35	12.64	1.29	484.32	Initial levels of second October 2012 baildown test
S-51	11/29/2012	495.90	10.95	11.12	0.17	484.92	
S-51	12/28/2012	495.90	11.28	11.68	0.40	484.55	
S-51	2/26/2013	495.90	11.32	12.03	0.71	484.46	
S-51	3/28/2013	495.90	11.29	12.84	1.55	484.34	R-35R, R-39, and R-40 were offline on this date
S-51	4/24/2013	495.90	11.29	12.89	1.60	484.33	
S-51	5/21/2013	495.93	11.23	11.90	0.67	484.58	
S-51	6/24/2013	495.92	10.41	10.53	0.12	485.49	
S-51	7/23/2013	495.92	10.14	10.28	0.14	485.76	
S-51	8/1/2013	495.92	10.17	10.18	0.01	485.75	
S-51	8/21/2013	495.92	10.03	10.05	0.02	485.89	
S-51	9/30/2013	495.92	11.19	12.17	0.98	484.56	
S-51	10/22/2013	495.92	11.63	13.56	1.93	483.95	
S-51	11/26/2013	495.92	11.12	11.26	0.14	484.78	
S-51	12/18/2013	495.92	11.21	11.76	0.55	484.61	
S-51	1/9/2014	495.92	11.35	12.68	1.33	484.34	
S-51	2/5/2014	495.92	11.46	12.97	1.51	484.20	

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-51	3/18/2014	495.91	11.68	13.30	1.62	483.95	
S-51	3/24/2014	495.91	11.71	13.38	1.67	483.91	
S-51	4/14/2014	495.92	11.58	13.50	1.92	484.00	
S-51	4/18/2014	495.92	11.58	13.50	1.92	484.00	
S-51	5/15/2014	495.93	11.27	11.81	0.54	484.57	
S-51	5/16/2014	495.93	11.29	11.90	0.61	484.53	
S-51	6/19/2014	495.93	11.18	11.28	0.10	484.73	
S-51	6/20/2014	495.93	Sheen	10.81	Sheen	485.12	
S-51	7/15/2014	495.94	Sheen	9.40	Sheen	486.54	
S-51	8/26/2014	495.95	10.05	10.07	0.02	485.90	
S-51	9/24/2014	495.93	10.69	10.71	0.02	485.24	
S-51	10/21/2014	495.93	11.55	11.70	0.15	484.35	
S-51	11/19/2014	495.92	11.15	11.23	0.08	484.76	
S-51	12/16/2014	495.95	11.32	11.76	0.44	484.55	
S-51	12/29/2014	495.95	11.41	12.13	0.72	484.41	
S-51	1/21/2015	495.93	11.42	12.34	0.92	484.35	
S-51	2/25/2015	495.94	11.51	12.61	1.10	484.24	
S-51	3/10/2015	495.88	11.43	12.26	0.83	484.30	
S-51	3/18/2015	495.88	11.46	11.69	0.23	484.38	
S-51	3/26/2015	495.88	11.45	12.58	1.13	484.23	
S-51	4/16/2015	495.90	11.40	12.05	0.65	484.39	
S-51	5/21/2015	495.92	11.22	11.26	0.04	484.69	
S-51	6/10/2015	495.95	11.25	11.31	0.06	484.69	
S-51	8/12/2015	495.93	Sheen	10.18	Sheen	485.79	
S-51	8/19/2015	495.93	Sheen	10.47	Sheen	485.53	
S-51	10/6/2015	495.93	10.81	10.87	0.06	485.15	
S-51	10/15/2015	495.93	11.22	11.35	0.13	484.73	
S-51	1/19/2016	495.94	11.61	13.16	1.55	484.06	
S-51	3/4/2016	495.94	11.73	13.18	1.45	484.01	
S-51	5/26/2016	495.94	11.40	11.69	0.29	484.51	
S-51	6/14/2016	495.94	No LNAPL	11.07	0.00	484.87	
S-51	7/2/2016	495.94	No LNAPL	10.59	0.00	485.35	
S-51	7/8/2016	495.94	No LNAPL	10.06	0.00	485.88	
S-51	8/18/2016	495.94	9.80	9.81	0.01	486.14	
S-51	8/18/2016	495.92	9.82	9.83	0.01	486.10	
S-51	9/9/2016	495.95	10.30	10.31	0.01	485.70	
S-51	10/13/2016	495.95	11.35	11.41	0.06	484.59	
S-51	10/26/2016	495.92	11.73	11.78	0.05	484.18	
S-51	11/15/2016	495.92	No LNAPL	10.93	0.00	485.03	
S-51	2/8/2017	495.92	11.36	11.37	0.01	484.63	

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Flint Hills Resources Alaska, LLC
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Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation# (feet MSL)	Notes
S-51	2/15/2017	495.92	11.38	11.39	0.01	484.57	
S-51	3/1/2017	495.92	11.39	11.48	0.09	484.51	
S-51	6/6/2017	495.95	11.41	11.56	0.15	484.51	
S-51	6/13/2017	495.95	Sheen	10.69	Sheen	485.32	
S-51	7/13/2017	495.95	9.95	9.96	0.01	485.99	
S-51	10/18/2017	495.95	Sheen	11.28	Sheen	484.67	
S-54	10/19/2006	497.53	--	13.55	--	483.98	
S-54	4/1/2008	497.53	--	13.79	--	483.74	
S-54	9/2/2008	497.53	--	12.70	--	484.83	
S-54	4/10/2009	497.53	--	Frozen	--	—	Frozen
S-54	9/3/2009	497.53	--	12.98	--	484.55	
S-54	4/25/2011	497.53	--	13.54	--	483.99	
S-54	10/21/2011	497.53	--	13.87	--	483.66	
S-54	2/15/2012	496.98	--	13.82	--	483.16	
S-54	4/19/2012	496.98	--	13.26	--	483.72	
S-54	7/30/2012	496.98	No LNAPL	12.14	0.00	484.84	
S-54	11/1/2012	496.98	No LNAPL	13.40	0.00	483.58	
S-54	1/24/2013	497.01	No LNAPL	13.23	0.00	483.78	
S-54	4/24/2013	497.01	--	13.46	--	483.55	
S-54	8/1/2013	497.01	--	12.02	--	484.99	
S-54	10/1/2013	497.01	--	13.19	--	483.82	
South Gravel Pit	4/19/2012	—	—	-9.30	—	—	Depth of water observed on 12 feet staff gauge
South Gravel Pit	7/31/2012	481.51	—	-11.07	—	492.58	Depth of water observed on 12 feet staff gauge
South Gravel Pit	11/2/2012	481.51	—	-9.55	—	491.06	Depth of water observed on 12 feet staff gauge
South Gravel Pit	1/24/2013	481.51	—	-8.56	—	490.07	Depth of water observed on 12 feet staff gauge
South Gravel Pit	4/24/2013	481.51	—	-9.79	—	491.30	Depth of water observed on 12 feet staff gauge
South Gravel Pit	8/1/2013	481.51	—	-11.70	—	493.21	Depth of water observed on 12 feet staff gauge
South Gravel Pit	10/1/2013	481.51	—	-9.80	—	491.31	Depth of water observed on 12 feet staff gauge
South Gravel Pit	3/18/2014	481.48	—	-9.10	—	490.58	Depth of water observed on 12 feet staff gauge
South Gravel Pit	4/25/2014	481.58	—	-4.34	—	485.92	Depth of water observed on 12 feet staff gauge
South Gravel Pit	5/20/2014	481.58	—	-6.95	—	488.53	Depth of water observed on 12 feet staff gauge
South Gravel Pit	6/4/2014	481.58	—	-6.90	—	488.48	Depth of water observed on 12 feet staff gauge
South Gravel Pit	6/11/2014	481.58	—	-6.75	—	488.33	Depth of water observed on 12 feet staff gauge
South Gravel Pit	9/9/2014	481.58	—	-8.50	—	490.08	Depth of water observed on 12 feet staff gauge
South Gravel Pit	11/20/2014	481.58	—	-8.67	—	490.25	Depth of water observed on 12 feet staff gauge
South Gravel Pit	3/19/2015	481.58	—	-7.97	—	489.55	Depth of water observed on 12 feet staff gauge
South Gravel Pit	6/10/2015	481.58	—	-8.13	—	489.71	Depth of water observed on 12 feet staff gauge
South Gravel Pit	8/13/2015	481.58	—	-8.41	—	489.99	Depth of water observed on 12 feet staff gauge
South Gravel Pit	11/19/2015	481.61	—	-8.20	—	489.81	Depth of water observed on 12 feet staff gauge
South Gravel Pit	3/22/2016	481.61	—	-8.66	—	490.27	Depth of water observed on 12 feet staff gauge

Appendix A-1
Historical Groundwater Elevation and LNAPL Thickness Data

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	Water Table Elevation‡ (feet MSL)	Notes
South Gravel Pit	9/13/2016	481.61	—	-9.04	—	490.65	Depth of water observed on 12 feet staff gauge
South Gravel Pit	3/14/2017	481.62	—	-10.28	—	491.90	Depth of water observed on 12 feet staff gauge

General Notes:

MW-148-80/100/A-15/B-30/C-55/D-150 are offsite wells, but are reported along with the onsite data

Acronyms and Abbreviations

‡ = At locations where the LNAPL specific gravity has not been determined, the LNAPL specific gravity of 0.8 is used to calculate the corrected groundwater elevation.

-- = A water sounder was used to measure the depth to water

— = Not measured or incalculable

BOW = bottom of well

BOC = below top of casing (measuring point)

CMT = continuous multichannel tubing

DTP = depth to product

DTW = depth to water

gpm = gallons per minute

ft = feet

LNAPL = light non-aqueous phase liquid

NPT = North Pole Terminal

MSL = mean sea level

No LNAPL = an interface probe was used to measure depth to water; LNAPL was not observed

SAP = sampling and analysis plan

sheen = LNAPL thickness was less than 0.01 feet and was not detected with an air/product/water interface probe; product was detected visually on rinse water

SWI = Shannon and Wilson, Inc.

Appendix A-2
Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-101A-25	Onsite	10-55	04/07/1987	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	05/06/1987	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	08/26/1987	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	10/06/1987	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	12/17/1987	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	01/25/1988	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	02/23/1988	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	03/22/1988	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	04/11/1988	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	05/18/1988	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	06/14/1988	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	07/26/1988	ND	ND	--	ND
MW-101A-25	Onsite	10-55	08/25/1988	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	09/29/1988	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	11/28/1988	6.00	ND	ND	ND
MW-101A-25	Onsite	10-55	12/21/1988	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	02/09/1989	ND	0.200	ND	ND
MW-101A-25	Onsite	10-55	03/07/1989	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	04/17/1989	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	05/30/1989	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	06/22/1989	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	07/19/1989	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	08/08/1989	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	09/28/1989	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	10/19/1989	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	11/14/1989	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	02/21/1990	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	05/22/1990	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	08/27/1990	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	11/26/1990	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	03/28/1991	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	06/24/1991	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	09/17/1991	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	03/18/1992	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	06/16/1992	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	09/21/1992	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	12/09/1992	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	03/02/1993	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	06/22/1993	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	09/09/1993	ND	ND	ND	0.600
MW-101A-25	Onsite	10-55	03/24/1994	1.00	ND	ND	ND
MW-101A-25	Onsite	10-55	06/28/1994	0.600	ND	ND	ND
MW-101A-25	Onsite	10-55	09/19/1994	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	03/27/1995	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	09/14/1995	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	03/21/1996	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	09/26/1996	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	03/18/1997	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	09/25/1997	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	03/24/1998	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	09/22/1998	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	03/22/1999	ND	ND	ND	ND

Appendix A-2
Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-101A-25	Onsite	10-55	09/14/1999	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	03/15/2000	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	09/19/2000	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	03/13/2001	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	05/10/2001	<0.500	<2.00	<2.00	3.89
MW-101A-25	Onsite	10-55	04/03/2002	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	04/29/2003	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	04/23/2004	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	09/08/2004	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	05/18/2005	ND	ND	ND	ND
MW-101A-25	Onsite	10-55	04/17/2007	<1.00	<1.00	<1.00	<3.00
MW-101A-25	Onsite	10-55	04/03/2008	<1.00	<1.00	<1.00	<2.00
MW-101A-25	Onsite	10-55	04/09/2009	<0.150	<0.620	<0.620	<1.24*
MW-101A-25	Onsite	10-55	04/05/2010	<0.500	<2.00	<2.00	<4.00*
MW-101A-25	Onsite	10-55	04/12/2011	<0.400	<1.00	<1.00	<3.00*
MW-101A-25	Onsite	10-55	10/16/2011	<0.240	<0.620	<0.620	<1.86*
MW-101A-25	Onsite	10-55	05/03/2012	<0.240	<0.620	<0.620	<1.86*
MW-101A-25	Onsite	10-55	04/17/2013	<0.240	<0.620	<0.620	<1.86*
MW-101A-25	Onsite	10-55	07/22/2014	<0.200	<0.500	<0.500	<1.50
MW-101A-25	Onsite	10-55	07/31/2015	<0.200	<0.500	<0.500	<1.50
MW-101A-25	Onsite	10-55	07/19/2016	<0.200	<0.500	<0.500	<1.50
MW-101A-25	Onsite	10-55	08/07/2017	<0.200	<0.500	<0.500	<1.50
MW-101A-25	Onsite	10-55	11/15/2017	<0.200	<0.500	<0.500	<1.50
MW-101-60	Onsite	10-55	04/07/1987	ND	ND	ND	ND
MW-101-60	Onsite	10-55	05/06/1987	ND	ND	ND	ND
MW-101-60	Onsite	10-55	08/26/1987	ND	ND	ND	ND
MW-101-60	Onsite	10-55	10/06/1987	ND	ND	ND	ND
MW-101-60	Onsite	10-55	12/17/1987	2.20	ND	ND	ND
MW-101-60	Onsite	10-55	01/25/1988	0.760	ND	ND	ND
MW-101-60	Onsite	10-55	02/23/1988	ND	ND	ND	ND
MW-101-60	Onsite	10-55	03/22/1988	ND	ND	ND	ND
MW-101-60	Onsite	10-55	04/11/1988	ND	ND	ND	ND
MW-101-60	Onsite	10-55	05/18/1988	ND	ND	ND	ND
MW-101-60	Onsite	10-55	06/14/1988	ND	ND	ND	ND
MW-101-60	Onsite	10-55	07/26/1988	ND	ND	--	ND
MW-101-60	Onsite	10-55	08/25/1988	ND	ND	ND	ND
MW-101-60	Onsite	10-55	09/29/1988	ND	ND	ND	ND
MW-101-60	Onsite	10-55	12/21/1988	ND	ND	ND	ND
MW-101-60	Onsite	10-55	02/09/1989	ND	ND	ND	ND
MW-101-60	Onsite	10-55	03/07/1989	ND	ND	ND	ND
MW-101-60	Onsite	10-55	04/17/1989	ND	ND	ND	ND
MW-101-60	Onsite	10-55	05/30/1989	ND	ND	ND	ND
MW-101-60	Onsite	10-55	06/22/1989	ND	ND	ND	ND
MW-101-60	Onsite	10-55	07/19/1989	ND	ND	ND	ND
MW-101-60	Onsite	10-55	08/08/1989	ND	ND	ND	ND
MW-101-60	Onsite	10-55	09/28/1989	ND	ND	ND	ND
MW-101-60	Onsite	10-55	10/19/1989	ND	ND	ND	ND
MW-101-60	Onsite	10-55	11/14/1989	0.880	0.800	ND	ND
MW-101-60	Onsite	10-55	02/21/1990	4.10	3.10	ND	1.10
MW-101-60	Onsite	10-55	03/28/1990	ND	ND	ND	ND
MW-101-60	Onsite	10-55	05/22/1990	9.70	8.30	0.570	1.40
MW-101-60	Onsite	10-55	06/26/1990	ND	ND	ND	ND

Appendix A-2
Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-101-60	Onsite	10-55	08/27/1990	ND	ND	ND	ND
MW-101-60	Onsite	10-55	11/26/1990	ND	ND	ND	ND
MW-101-60	Onsite	10-55	03/28/1991	ND	ND	ND	ND
MW-101-60	Onsite	10-55	06/24/1991	ND	ND	ND	ND
MW-101-60	Onsite	10-55	09/17/1991	ND	ND	ND	ND
MW-101-60	Onsite	10-55	12/11/1991	ND	ND	ND	ND
MW-101-60	Onsite	10-55	03/18/1992	ND	ND	ND	ND
MW-101-60	Onsite	10-55	06/16/1992	ND	ND	ND	ND
MW-101-60	Onsite	10-55	09/21/1992	ND	ND	ND	ND
MW-101-60	Onsite	10-55	12/09/1992	ND	ND	ND	ND
MW-101-60	Onsite	10-55	03/02/1993	ND	ND	ND	ND
MW-101-60	Onsite	10-55	06/22/1993	ND	ND	ND	ND
MW-101-60	Onsite	10-55	09/09/1993	0.400	ND	ND	ND
MW-101-60	Onsite	10-55	12/20/1993	4.00	2.00	ND	0.900
MW-101-60	Onsite	10-55	03/24/1994	0.800	ND	ND	ND
MW-101-60	Onsite	10-55	06/28/1994	ND	ND	ND	ND
MW-101-60	Onsite	10-55	09/19/1994	ND	ND	ND	ND
MW-101-60	Onsite	10-55	03/27/1995	ND	ND	ND	ND
MW-101-60	Onsite	10-55	09/14/1995	ND	ND	ND	ND
MW-101-60	Onsite	10-55	03/21/1996	ND	ND	ND	ND
MW-101-60	Onsite	10-55	09/26/1996	ND	ND	ND	ND
MW-101-60	Onsite	10-55	03/18/1997	ND	ND	ND	ND
MW-101-60	Onsite	10-55	09/25/1997	ND	ND	ND	ND
MW-101-60	Onsite	10-55	03/24/1998	ND	ND	ND	ND
MW-101-60	Onsite	10-55	09/22/1998	ND	ND	ND	ND
MW-101-60	Onsite	10-55	03/22/1999	ND	ND	ND	ND
MW-101-60	Onsite	10-55	09/14/1999	ND	ND	ND	ND
MW-101-60	Onsite	10-55	03/15/2000	ND	ND	ND	ND
MW-101-60	Onsite	10-55	09/19/2000	ND	ND	ND	ND
MW-101-60	Onsite	10-55	03/13/2001	ND	ND	ND	ND
MW-101-60	Onsite	10-55	05/10/2001	<0.500	<2.00	<2.00	<4.00
MW-101-60	Onsite	10-55	04/03/2002	ND	ND	ND	ND
MW-101-60	Onsite	10-55	04/29/2003	ND	ND	ND	ND
MW-101-60	Onsite	10-55	04/23/2004	ND	ND	ND	ND
MW-101-60	Onsite	10-55	09/08/2004	ND	ND	ND	ND
MW-101-60	Onsite	10-55	05/18/2005	ND	ND	ND	ND
MW-101-60	Onsite	10-55	04/17/2007	<1.00	<1.00	<1.00	<3.00
MW-101-60	Onsite	10-55	04/03/2008	<1.00	<1.00	<1.00	<2.00
MW-101-60	Onsite	10-55	04/09/2009	<0.150	<0.620	<0.620	<1.24*
MW-101-60	Onsite	10-55	04/05/2010	<0.500	<2.00	<2.00	<4.00*
MW-102-70	Onsite	55-90	04/07/1987	ND	ND	ND	ND
MW-102-70	Onsite	55-90	05/06/1987	ND	ND	ND	ND
MW-102-70	Onsite	55-90	08/26/1987	ND	ND	ND	ND
MW-102-70	Onsite	55-90	10/06/1987	ND	ND	ND	ND
MW-102-70	Onsite	55-90	01/26/1988	ND	ND	ND	ND
MW-102-70	Onsite	55-90	04/11/1988	ND	ND	ND	ND
MW-102-70	Onsite	55-90	05/18/1988	0.550	ND	ND	ND
MW-102-70	Onsite	55-90	06/14/1988	0.590	ND	ND	ND
MW-102-70	Onsite	55-90	07/26/1988	ND	ND	--	ND
MW-102-70	Onsite	55-90	08/25/1988	ND	ND	ND	ND
MW-102-70	Onsite	55-90	09/28/1988	17.0	ND	ND	ND
MW-102-70	Onsite	55-90	11/29/1988	6.00	ND	1.00	ND

Appendix A-2
Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-102-70	Onsite	55-90	02/09/1989	1.10	ND	ND	ND
MW-102-70	Onsite	55-90	04/17/1989	ND	ND	ND	ND
MW-102-70	Onsite	55-90	05/30/1989	ND	ND	ND	ND
MW-102-70	Onsite	55-90	06/22/1989	ND	ND	ND	ND
MW-102-70	Onsite	55-90	08/08/1989	ND	ND	ND	ND
MW-102-70	Onsite	55-90	09/28/1989	ND	ND	ND	ND
MW-102-70	Onsite	55-90	10/18/1989	ND	ND	ND	ND
MW-102-70	Onsite	55-90	11/16/1989	0.880	0.800	ND	ND
MW-102-70	Onsite	55-90	02/19/1990	9.00	6.80	0.710	3.30
MW-102-70	Onsite	55-90	03/19/1990	ND	ND	ND	ND
MW-102-70	Onsite	55-90	03/28/1990	ND	ND	ND	ND
MW-102-70	Onsite	55-90	04/19/1990	ND	ND	ND	ND
MW-102-70	Onsite	55-90	05/23/1990	ND	0.560	ND	ND
MW-102-70	Onsite	55-90	08/27/1990	ND	ND	ND	ND
MW-102-70	Onsite	55-90	11/26/1990	0.650	0.660	ND	ND
MW-102-70	Onsite	55-90	12/18/1990	ND	0.660	ND	0.570
MW-102-70	Onsite	55-90	01/22/1991	0.700	0.970	0.570	0.910
MW-102-70	Onsite	55-90	03/27/1991	ND	ND	0.590	ND
MW-102-70	Onsite	55-90	06/24/1991	ND	ND	ND	ND
MW-102-70	Onsite	55-90	09/17/1991	ND	ND	ND	ND
MW-102-70	Onsite	55-90	03/16/1992	ND	ND	ND	ND
MW-102-70	Onsite	55-90	06/16/1992	ND	ND	ND	ND
MW-102-70	Onsite	55-90	09/23/1992	ND	ND	ND	ND
MW-102-70	Onsite	55-90	12/09/1992	ND	ND	ND	ND
MW-102-70	Onsite	55-90	03/01/1993	ND	ND	ND	ND
MW-102-70	Onsite	55-90	06/22/1993	ND	ND	ND	ND
MW-102-70	Onsite	55-90	09/08/1993	ND	ND	ND	ND
MW-102-70	Onsite	55-90	12/21/1993	ND	ND	ND	ND
MW-102-70	Onsite	55-90	03/25/1994	ND	ND	ND	ND
MW-102-70	Onsite	55-90	09/20/1994	ND	ND	ND	ND
MW-102-70	Onsite	55-90	03/28/1995	ND	ND	ND	ND
MW-102-70	Onsite	55-90	09/13/1995	ND	ND	ND	ND
MW-102-70	Onsite	55-90	03/27/1996	ND	ND	ND	ND
MW-102-70	Onsite	55-90	09/24/1996	ND	ND	ND	ND
MW-102-70	Onsite	55-90	03/20/1997	ND	ND	ND	ND
MW-102-70	Onsite	55-90	09/22/1997	ND	ND	ND	ND
MW-102-70	Onsite	55-90	03/25/1998	ND	ND	ND	ND
MW-102-70	Onsite	55-90	09/24/1998	ND	ND	ND	ND
MW-102-70	Onsite	55-90	03/24/1999	ND	ND	ND	ND
MW-102-70	Onsite	55-90	09/15/1999	ND	ND	ND	ND
MW-102-70	Onsite	55-90	03/15/2000	ND	ND	ND	ND
MW-102-70	Onsite	55-90	09/19/2000	ND	ND	ND	ND
MW-102-70	Onsite	55-90	03/14/2001	ND	ND	ND	ND
MW-102-70	Onsite	55-90	10/10/2001	ND	ND	ND	1.30
MW-102-70	Onsite	55-90	04/09/2002	ND	ND	ND	ND
MW-102-70	Onsite	55-90	04/29/2003	ND	ND	ND	ND
MW-102-70	Onsite	55-90	04/23/2004	ND	ND	ND	ND
MW-102-70	Onsite	55-90	09/08/2004	ND	ND	ND	ND
MW-102-70	Onsite	55-90	04/22/2005	ND	ND	ND	ND
MW-102-70	Onsite	55-90	04/18/2007	<1.00	<1.00	<1.00	<3.00
MW-102-70	Onsite	55-90	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-102-70	Onsite	55-90	04/09/2009	<0.150	<0.620	<0.620	<1.24*

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-102-70	Onsite	55-90	04/02/2010	<0.500	<2.00	<2.00	<4.00*
MW-104-65	Onsite	10-55	04/07/1987	0.600	0.200	ND	ND
MW-104-65	Onsite	10-55	05/06/1987	0.810	ND	ND	ND
MW-104-65	Onsite	10-55	08/26/1987	ND	ND	ND	ND
MW-104-65	Onsite	10-55	10/06/1987	ND	ND	ND	ND
MW-104-65	Onsite	10-55	04/29/1988	ND	ND	ND	ND
MW-104-65	Onsite	10-55	05/18/1988	ND	ND	ND	ND
MW-104-65	Onsite	10-55	06/14/1988	ND	ND	ND	ND
MW-104-65	Onsite	10-55	07/26/1988	ND	ND	--	ND
MW-104-65	Onsite	10-55	08/25/1988	ND	ND	ND	ND
MW-104-65	Onsite	10-55	09/28/1988	ND	ND	ND	ND
MW-104-65	Onsite	10-55	06/22/1989	ND	ND	ND	ND
MW-104-65	Onsite	10-55	08/08/1989	ND	ND	ND	ND
MW-104-65	Onsite	10-55	10/18/1989	6.40	1.30	ND	1.10
MW-104-65	Onsite	10-55	11/16/1989	7.70	ND	ND	ND
MW-104-65	Onsite	10-55	01/09/1990	10.0	4.30	0.750	3.30
MW-104-65	Onsite	10-55	02/19/1990	4.60	0.600	ND	ND
MW-104-65	Onsite	10-55	03/15/1990	9.00	ND	ND	ND
MW-104-65	Onsite	10-55	03/28/1990	15.0	ND	ND	ND
MW-104-65	Onsite	10-55	04/20/1990	20.0	ND	ND	ND
MW-104-65	Onsite	10-55	05/22/1990	19.0	ND	ND	ND
MW-104-65	Onsite	10-55	08/27/1990	15.0	ND	ND	ND
MW-104-65	Onsite	10-55	03/28/1991	ND	ND	ND	ND
MW-104-65	Onsite	10-55	09/16/1991	ND	ND	ND	ND
MW-104-65	Onsite	10-55	03/16/1992	ND	ND	ND	ND
MW-104-65	Onsite	10-55	06/16/1992	ND	ND	ND	ND
MW-104-65	Onsite	10-55	09/23/1992	ND	ND	ND	ND
MW-104-65	Onsite	10-55	12/09/1992	ND	ND	ND	ND
MW-104-65	Onsite	10-55	03/01/1993	ND	ND	ND	ND
MW-104-65	Onsite	10-55	06/22/1993	ND	ND	ND	ND
MW-104-65	Onsite	10-55	09/08/1993	ND	ND	ND	ND
MW-104-65	Onsite	10-55	12/21/1993	ND	ND	ND	ND
MW-104-65	Onsite	10-55	03/25/1994	ND	ND	ND	ND
MW-104-65	Onsite	10-55	09/20/1994	ND	ND	ND	ND
MW-104-65	Onsite	10-55	03/28/1995	ND	ND	ND	ND
MW-104-65	Onsite	10-55	09/13/1995	ND	ND	ND	ND
MW-104-65	Onsite	10-55	03/27/1996	ND	ND	ND	ND
MW-104-65	Onsite	10-55	09/24/1996	ND	ND	ND	ND
MW-104-65	Onsite	10-55	03/19/1997	ND	ND	ND	ND
MW-104-65	Onsite	10-55	09/22/1997	ND	ND	ND	ND
MW-104-65	Onsite	10-55	03/25/1998	ND	ND	ND	ND
MW-104-65	Onsite	10-55	09/24/1998	ND	ND	ND	ND
MW-104-65	Onsite	10-55	03/24/1999	ND	ND	ND	ND
MW-104-65	Onsite	10-55	09/15/1999	ND	ND	ND	ND
MW-104-65	Onsite	10-55	03/15/2000	ND	ND	ND	ND
MW-104-65	Onsite	10-55	09/20/2000	ND	ND	ND	ND
MW-104-65	Onsite	10-55	03/14/2001	ND	ND	ND	ND
MW-104-65	Onsite	10-55	04/09/2002	ND	ND	ND	ND
MW-104-65	Onsite	10-55	05/07/2003	ND	ND	ND	ND
MW-104-65	Onsite	10-55	04/23/2004	ND	ND	ND	ND
MW-104-65	Onsite	10-55	09/08/2004	ND	ND	ND	ND
MW-104-65	Onsite	10-55	04/22/2005	ND	ND	ND	ND

**Appendix A-2
Historical BTEX Analytical Results**

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-104-65	Onsite	10-55	04/18/2007	<1.00	<1.00	<1.00	<3.00
MW-104-65	Onsite	10-55	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-104-65	Onsite	10-55	04/09/2009	<0.150	<0.620	<0.620	<1.24*
MW-104-65	Onsite	10-55	04/02/2010	<0.500	<2.00	<2.00	<4.00*
MW-105A-25	Onsite	10-55	04/07/1987	0.930	ND	ND	ND
MW-105A-25	Onsite	10-55	05/06/1987	1.10	ND	ND	ND
MW-105A-25	Onsite	10-55	08/26/1987	1.80	ND	ND	ND
MW-105A-25	Onsite	10-55	10/06/1987	1.00	ND	ND	ND
MW-105A-25	Onsite	10-55	12/17/1987	14.0	ND	ND	ND
MW-105A-25	Onsite	10-55	01/25/1988	12.0	ND	ND	ND
MW-105A-25	Onsite	10-55	02/23/1988	11.0	ND	ND	ND
MW-105A-25	Onsite	10-55	03/22/1988	8.70	ND	ND	ND
MW-105A-25	Onsite	10-55	04/11/1988	15.0	ND	ND	ND
MW-105A-25	Onsite	10-55	05/18/1988	6.20	ND	ND	ND
MW-105A-25	Onsite	10-55	06/14/1988	4.60	ND	ND	ND
MW-105A-25	Onsite	10-55	07/26/1988	ND	ND	--	ND
MW-105A-25	Onsite	10-55	08/25/1988	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	09/29/1988	0.600	ND	ND	ND
MW-105A-25	Onsite	10-55	11/28/1988	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	12/21/1988	10.0	7.00	ND	2.00
MW-105A-25	Onsite	10-55	02/09/1989	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	03/07/1989	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	04/17/1989	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	05/30/1989	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	06/22/1989	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	07/19/1989	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	08/08/1989	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	09/28/1989	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	10/19/1989	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	11/14/1989	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	02/21/1990	12.0	8.90	0.790	4.10
MW-105A-25	Onsite	10-55	05/24/1990	ND	0.880	ND	ND
MW-105A-25	Onsite	10-55	08/27/1990	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	04/01/1991	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	09/17/1991	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	03/18/1992	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	09/23/1992	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	03/03/1993	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	09/08/1993	0.600	ND	ND	0.600
MW-105A-25	Onsite	10-55	03/28/1994	11.0	ND	ND	ND
MW-105A-25	Onsite	10-55	09/19/1994	66.0	ND	ND	ND
MW-105A-25	Onsite	10-55	03/27/1995	200	ND	ND	ND
MW-105A-25	Onsite	10-55	09/19/1995	270	ND	ND	ND
MW-105A-25	Onsite	10-55	03/25/1996	78.4	ND	ND	ND
MW-105A-25	Onsite	10-55	09/26/1996	92.7	ND	ND	ND
MW-105A-25	Onsite	10-55	03/19/1997	12.0	ND	ND	ND
MW-105A-25	Onsite	10-55	09/24/1997	4.00	ND	ND	ND
MW-105A-25	Onsite	10-55	03/23/1998	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	09/24/1998	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	03/23/1999	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	09/14/1999	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	03/14/2000	ND	ND	ND	ND

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North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-105A-25	Onsite	10-55	09/20/2000	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	03/14/2001	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	05/10/2001	<0.500	2.37	2.21	9.04
MW-105A-25	Onsite	10-55	06/13/2001	<0.500	<2.00	<2.00	<4.00
MW-105A-25	Onsite	10-55	10/10/2001	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	04/10/2002	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	10/08/2002	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	04/29/2003	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	10/05/2003	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	04/23/2004	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	09/08/2004	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	04/22/2005	ND	ND	ND	ND
MW-105A-25	Onsite	10-55	10/17/2006	<0.114	<0.127	<0.125	<0.118*
MW-105A-25	Onsite	10-55	04/18/2007	<1.00	<1.00	<1.00	<3.00
MW-105A-25	Onsite	10-55	10/16/2007	<1.00	<1.00	<1.00	<3.00
MW-105A-25	Onsite	10-55	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-105A-25	Onsite	10-55	10/02/2008	<1.00	<1.00	<1.00	<2.00
MW-105A-25	Onsite	10-55	04/09/2009	<0.150	<0.620	<0.620	<1.24*
MW-105A-25	Onsite	10-55	10/02/2009	<0.500	<2.00	<2.00	<4.00*
MW-105A-25	Onsite	10-55	04/06/2010	<0.500	<2.00	<2.00	<4.00*
MW-105A-25	Onsite	10-55	10/07/2010	<0.400	<1.00	<1.00	<3.00*
MW-105A-25	Onsite	10-55	04/18/2011	<0.400	<1.00	<1.00	<3.00*
MW-105A-25	Onsite	10-55	05/04/2012	<0.240	<0.620	<0.620	<1.86*
MW-105A-25	Onsite	10-55	05/22/2013	<0.410B*	0.390J	<0.620	1.26J*
MW-105A-25	Onsite	10-55	08/20/2014	<0.200	<0.500	<0.500	<1.50
MW-105A-25	Onsite	10-55	08/04/2015	0.420	<0.500	<0.500	<1.50
MW-105A-25	Onsite	10-55	10/02/2015	<0.200	<0.500	<0.500	<1.50
MW-105A-25	Onsite	10-55	07/26/2016	<0.200	<0.500	<0.500	<1.50
MW-105-65	Onsite	10-55	04/07/1987	ND	ND	ND	ND
MW-105-65	Onsite	10-55	05/06/1987	ND	ND	ND	ND
MW-105-65	Onsite	10-55	08/26/1987	ND	ND	ND	ND
MW-105-65	Onsite	10-55	10/06/1987	ND	ND	ND	ND
MW-105-65	Onsite	10-55	12/17/1987	ND	ND	ND	ND
MW-105-65	Onsite	10-55	01/25/1988	ND	ND	ND	ND
MW-105-65	Onsite	10-55	02/23/1988	ND	ND	ND	ND
MW-105-65	Onsite	10-55	03/22/1988	ND	ND	ND	ND
MW-105-65	Onsite	10-55	04/11/1988	ND	ND	ND	ND
MW-105-65	Onsite	10-55	05/18/1988	ND	ND	ND	ND
MW-105-65	Onsite	10-55	06/14/1988	ND	ND	ND	ND
MW-105-65	Onsite	10-55	07/26/1988	ND	ND	ND	ND
MW-105-65	Onsite	10-55	08/25/1988	ND	ND	ND	ND
MW-105-65	Onsite	10-55	09/29/1988	ND	ND	ND	ND
MW-105-65	Onsite	10-55	11/28/1988	ND	ND	ND	ND
MW-105-65	Onsite	10-55	12/21/1988	ND	ND	ND	ND
MW-105-65	Onsite	10-55	02/09/1989	ND	ND	ND	ND
MW-105-65	Onsite	10-55	03/07/1989	ND	ND	ND	ND
MW-105-65	Onsite	10-55	04/17/1989	ND	ND	ND	ND
MW-105-65	Onsite	10-55	05/30/1989	ND	ND	ND	ND
MW-105-65	Onsite	10-55	06/22/1989	ND	ND	ND	ND
MW-105-65	Onsite	10-55	07/19/1989	ND	ND	ND	ND
MW-105-65	Onsite	10-55	08/08/1989	ND	ND	ND	ND
MW-105-65	Onsite	10-55	09/28/1989	ND	ND	ND	ND

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Flint Hills Resources Alaska, LLC
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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-105-65	Onsite	10-55	10/19/1989	ND	ND	ND	ND
MW-105-65	Onsite	10-55	11/14/1989	4.10	4.00	ND	1.30
MW-105-65	Onsite	10-55	02/21/1990	41.0	41.0	4.20	18.0
MW-105-65	Onsite	10-55	05/24/1990	7.90	12.0	1.20	5.80
MW-105-65	Onsite	10-55	08/27/1990	ND	ND	ND	ND
MW-105-65	Onsite	10-55	04/01/1991	ND	ND	ND	ND
MW-105-65	Onsite	10-55	09/17/1991	ND	ND	ND	ND
MW-105-65	Onsite	10-55	03/18/1992	ND	ND	ND	ND
MW-105-65	Onsite	10-55	09/23/1992	ND	ND	ND	ND
MW-105-65	Onsite	10-55	03/03/1993	ND	ND	ND	ND
MW-105-65	Onsite	10-55	09/08/1993	ND	ND	ND	ND
MW-105-65	Onsite	10-55	03/28/1994	ND	ND	ND	ND
MW-105-65	Onsite	10-55	09/19/1994	ND	ND	ND	ND
MW-105-65	Onsite	10-55	03/29/1995	ND	ND	ND	ND
MW-105-65	Onsite	10-55	09/19/1995	ND	ND	ND	ND
MW-105-65	Onsite	10-55	03/25/1996	ND	ND	ND	ND
MW-105-65	Onsite	10-55	09/26/1996	ND	ND	ND	ND
MW-105-65	Onsite	10-55	03/19/1997	ND	ND	ND	ND
MW-105-65	Onsite	10-55	09/25/1997	ND	ND	ND	ND
MW-105-65	Onsite	10-55	03/23/1998	ND	ND	ND	ND
MW-105-65	Onsite	10-55	09/24/1998	ND	ND	ND	ND
MW-105-65	Onsite	10-55	03/23/1999	ND	ND	ND	ND
MW-105-65	Onsite	10-55	09/14/1999	ND	ND	ND	ND
MW-105-65	Onsite	10-55	03/14/2000	ND	ND	ND	ND
MW-105-65	Onsite	10-55	09/20/2000	ND	ND	ND	ND
MW-105-65	Onsite	10-55	03/14/2001	ND	ND	ND	ND
MW-105-65	Onsite	10-55	05/10/2001	1.64	9.46	6.46	44.3
MW-105-65	Onsite	10-55	06/13/2001	<0.500	<2.00	<2.00	<4.00
MW-105-65	Onsite	10-55	10/10/2001	ND	ND	ND	ND
MW-105-65	Onsite	10-55	04/10/2002	ND	ND	ND	ND
MW-105-65	Onsite	10-55	10/08/2002	ND	ND	ND	ND
MW-105-65	Onsite	10-55	04/29/2003	ND	ND	ND	ND
MW-105-65	Onsite	10-55	10/05/2003	ND	ND	ND	ND
MW-105-65	Onsite	10-55	04/23/2004	ND	ND	ND	ND
MW-105-65	Onsite	10-55	09/08/2004	ND	ND	ND	ND
MW-105-65	Onsite	10-55	04/22/2005	ND	ND	ND	ND
MW-105-65	Onsite	10-55	10/17/2006	<0.114	<0.127	<0.125	<0.118*
MW-105-65	Onsite	10-55	04/18/2007	<1.00	<1.00	<1.00	<3.00
MW-105-65	Onsite	10-55	10/16/2007	<1.00	<1.00	<1.00	<3.00
MW-105-65	Onsite	10-55	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-105-65	Onsite	10-55	10/02/2008	<1.00	<1.00	<1.00	<2.00
MW-105-65	Onsite	10-55	04/09/2009	<0.150	<0.620	<0.620	<1.24*
MW-105-65	Onsite	10-55	10/02/2009	<0.500	<2.00	<2.00	<4.00*
MW-105-65	Onsite	10-55	04/06/2010	<0.500	<2.00	<2.00	<4.00*
MW-105-65	Onsite	10-55	10/07/2010	<0.400	<1.00	<1.00	<3.00*
MW-106-25	Onsite	10-55	10/06/1987	ND	ND	ND	ND
MW-106-25	Onsite	10-55	12/17/1987	ND	ND	ND	ND
MW-106-25	Onsite	10-55	01/26/1988	ND	0.640	ND	ND
MW-106-25	Onsite	10-55	02/23/1988	ND	ND	ND	ND
MW-106-25	Onsite	10-55	03/22/1988	ND	ND	ND	ND
MW-106-25	Onsite	10-55	04/11/1988	ND	ND	ND	ND
MW-106-25	Onsite	10-55	05/18/1988	ND	ND	ND	ND

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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-106-25	Onsite	10-55	06/14/1988	ND	ND	ND	ND
MW-106-25	Onsite	10-55	07/26/1988	ND	ND	--	ND
MW-106-25	Onsite	10-55	08/24/1988	ND	ND	ND	ND
MW-106-25	Onsite	10-55	09/28/1988	ND	ND	ND	ND
MW-106-25	Onsite	10-55	11/28/1988	ND	ND	ND	ND
MW-106-25	Onsite	10-55	12/22/1988	ND	ND	ND	ND
MW-106-25	Onsite	10-55	02/08/1989	ND	1.70	0.300	1.40
MW-106-25	Onsite	10-55	03/07/1989	0.600	1.30	0.300	1.50
MW-106-25	Onsite	10-55	05/30/1989	ND	ND	ND	ND
MW-106-25	Onsite	10-55	06/22/1989	ND	ND	ND	ND
MW-106-25	Onsite	10-55	07/19/1989	ND	ND	ND	ND
MW-106-25	Onsite	10-55	08/08/1989	ND	ND	ND	ND
MW-106-25	Onsite	10-55	09/28/1989	ND	ND	ND	ND
MW-106-25	Onsite	10-55	10/19/1989	ND	ND	ND	ND
MW-106-25	Onsite	10-55	11/14/1989	ND	ND	ND	ND
MW-106-25	Onsite	10-55	02/21/1990	ND	ND	ND	ND
MW-106-25	Onsite	10-55	05/24/1990	ND	0.710	ND	ND
MW-106-25	Onsite	10-55	07/31/1990	ND	ND	ND	ND
MW-106-25	Onsite	10-55	08/27/1990	ND	ND	ND	ND
MW-106-25	Onsite	10-55	09/19/1990	ND	ND	ND	ND
MW-106-25	Onsite	10-55	10/24/1990	ND	ND	ND	ND
MW-106-25	Onsite	10-55	11/27/1990	4.30	ND	ND	0.730
MW-106-25	Onsite	10-55	12/18/1990	6.10	ND	ND	1.60
MW-106-25	Onsite	10-55	01/22/1991	3.10	ND	ND	1.50
MW-106-25	Onsite	10-55	02/20/1991	1.90	ND	ND	ND
MW-106-25	Onsite	10-55	03/28/1991	1.20	ND	ND	ND
MW-106-25	Onsite	10-55	04/30/1991	ND	ND	ND	ND
MW-106-25	Onsite	10-55	05/31/1991	ND	ND	ND	ND
MW-106-25	Onsite	10-55	06/24/1991	0.700	ND	ND	ND
MW-106-25	Onsite	10-55	07/31/1991	ND	ND	ND	ND
MW-106-25	Onsite	10-55	08/30/1991	ND	ND	ND	ND
MW-106-25	Onsite	10-55	09/17/1991	ND	ND	ND	ND
MW-106-25	Onsite	10-55	10/22/1991	ND	ND	ND	ND
MW-106-25	Onsite	10-55	11/18/1991	ND	ND	ND	ND
MW-106-25	Onsite	10-55	12/11/1991	3.30	2.90	ND	1.70
MW-106-25	Onsite	10-55	01/31/1992	2.60	1.60	ND	ND
MW-106-25	Onsite	10-55	02/25/1992	ND	ND	ND	ND
MW-106-25	Onsite	10-55	03/18/1992	ND	ND	ND	ND
MW-106-25	Onsite	10-55	04/14/1992	ND	ND	ND	ND
MW-106-25	Onsite	10-55	05/05/1992	ND	ND	ND	ND
MW-106-25	Onsite	10-55	06/16/1992	ND	ND	ND	ND
MW-106-25	Onsite	10-55	07/16/1992	ND	ND	ND	ND
MW-106-25	Onsite	10-55	08/31/1992	ND	2.00	ND	3.00
MW-106-25	Onsite	10-55	09/21/1992	ND	ND	ND	ND
MW-106-25	Onsite	10-55	10/26/1992	ND	ND	ND	ND
MW-106-25	Onsite	10-55	11/09/1992	ND	ND	ND	ND
MW-106-25	Onsite	10-55	12/09/1992	ND	ND	ND	ND
MW-106-25	Onsite	10-55	01/27/1993	ND	ND	ND	ND
MW-106-25	Onsite	10-55	02/12/1993	ND	ND	ND	ND
MW-106-25	Onsite	10-55	03/02/1993	ND	ND	ND	ND
MW-106-25	Onsite	10-55	04/20/1993	ND	ND	ND	ND
MW-106-25	Onsite	10-55	05/24/1993	ND	ND	ND	ND

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-106-25	Onsite	10-55	06/22/1993	ND	ND	ND	ND
MW-106-25	Onsite	10-55	07/27/1993	ND	ND	ND	ND
MW-106-25	Onsite	10-55	08/20/1993	ND	ND	ND	ND
MW-106-25	Onsite	10-55	09/09/1993	ND	ND	ND	ND
MW-106-25	Onsite	10-55	10/15/1993	ND	ND	ND	ND
MW-106-25	Onsite	10-55	11/08/1993	ND	ND	ND	ND
MW-106-25	Onsite	10-55	12/20/1993	ND	ND	ND	ND
MW-106-25	Onsite	10-55	01/17/1994	ND	ND	ND	ND
MW-106-25	Onsite	10-55	02/04/1994	ND	ND	ND	ND
MW-106-25	Onsite	10-55	03/24/1994	ND	ND	ND	ND
MW-106-25	Onsite	10-55	04/28/1994	ND	ND	ND	ND
MW-106-25	Onsite	10-55	05/25/1994	ND	ND	ND	ND
MW-106-25	Onsite	10-55	06/28/1994	ND	ND	ND	ND
MW-106-25	Onsite	10-55	07/29/1994	ND	ND	ND	ND
MW-106-25	Onsite	10-55	08/24/1994	ND	ND	ND	ND
MW-106-25	Onsite	10-55	09/19/1994	ND	ND	ND	ND
MW-106-25	Onsite	10-55	10/06/1994	ND	ND	ND	ND
MW-106-25	Onsite	10-55	11/04/1994	ND	ND	ND	ND
MW-106-25	Onsite	10-55	12/13/1994	ND	ND	ND	ND
MW-106-25	Onsite	10-55	01/04/1995	ND	ND	ND	ND
MW-106-25	Onsite	10-55	02/06/1995	ND	ND	ND	ND
MW-106-25	Onsite	10-55	02/27/1995	ND	ND	ND	ND
MW-106-25	Onsite	10-55	03/20/1995	ND	ND	ND	ND
MW-106-25	Onsite	10-55	04/20/1995	ND	ND	ND	ND
MW-106-25	Onsite	10-55	05/24/1995	ND	ND	ND	ND
MW-106-25	Onsite	10-55	06/28/1995	ND	ND	ND	ND
MW-106-25	Onsite	10-55	07/24/1995	ND	ND	ND	ND
MW-106-25	Onsite	10-55	08/16/1995	ND	ND	ND	ND
MW-106-25	Onsite	10-55	09/14/1995	ND	ND	ND	ND
MW-106-25	Onsite	10-55	10/24/1995	ND	ND	ND	ND
MW-106-25	Onsite	10-55	11/28/1995	ND	ND	ND	ND
MW-106-25	Onsite	10-55	12/07/1995	ND	ND	ND	ND
MW-106-25	Onsite	10-55	01/29/1996	ND	ND	ND	ND
MW-106-25	Onsite	10-55	03/21/1996	ND	ND	ND	ND
MW-106-25	Onsite	10-55	04/29/1996	ND	ND	ND	ND
MW-106-25	Onsite	10-55	05/28/1996	2.00	2.00	ND	2.00
MW-106-25	Onsite	10-55	06/19/1996	ND	ND	ND	ND
MW-106-25	Onsite	10-55	07/23/1996	ND	ND	ND	ND
MW-106-25	Onsite	10-55	08/27/1996	ND	ND	ND	ND
MW-106-25	Onsite	10-55	09/17/1996	ND	ND	ND	ND
MW-106-25	Onsite	10-55	10/28/1996	ND	ND	ND	ND
MW-106-25	Onsite	10-55	11/19/1996	ND	ND	ND	ND
MW-106-25	Onsite	10-55	12/12/1996	ND	ND	ND	ND
MW-106-25	Onsite	10-55	01/30/1997	ND	ND	ND	ND
MW-106-25	Onsite	10-55	02/21/1997	ND	ND	ND	ND
MW-106-25	Onsite	10-55	03/18/1997	ND	ND	ND	ND
MW-106-25	Onsite	10-55	04/29/1997	ND	ND	ND	ND
MW-106-25	Onsite	10-55	05/29/1997	ND	ND	ND	ND
MW-106-25	Onsite	10-55	06/24/1997	ND	ND	ND	ND
MW-106-25	Onsite	10-55	07/22/1997	ND	ND	ND	ND
MW-106-25	Onsite	10-55	08/19/1997	ND	ND	ND	ND
MW-106-25	Onsite	10-55	09/16/1997	ND	ND	ND	ND

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Flint Hills Resources Alaska, LLC
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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-106-25	Onsite	10-55	10/22/1997	ND	ND	ND	ND
MW-106-25	Onsite	10-55	11/25/1997	ND	ND	ND	ND
MW-106-25	Onsite	10-55	12/12/1997	ND	ND	ND	ND
MW-106-25	Onsite	10-55	01/12/1998	ND	ND	ND	ND
MW-106-25	Onsite	10-55	02/12/1998	ND	ND	ND	ND
MW-106-25	Onsite	10-55	03/17/1998	ND	ND	ND	ND
MW-106-25	Onsite	10-55	04/27/1998	ND	ND	ND	ND
MW-106-25	Onsite	10-55	05/27/1998	ND	ND	ND	ND
MW-106-25	Onsite	10-55	06/26/1998	ND	ND	ND	ND
MW-106-25	Onsite	10-55	07/29/1998	ND	ND	ND	ND
MW-106-25	Onsite	10-55	08/24/1998	ND	ND	ND	ND
MW-106-25	Onsite	10-55	09/22/1998	ND	ND	ND	ND
MW-106-25	Onsite	10-55	10/15/1998	ND	ND	ND	ND
MW-106-25	Onsite	10-55	11/03/1998	ND	ND	ND	ND
MW-106-25	Onsite	10-55	12/01/1998	ND	ND	ND	ND
MW-106-25	Onsite	10-55	01/13/1999	ND	ND	ND	ND
MW-106-25	Onsite	10-55	02/16/1999	ND	ND	ND	ND
MW-106-25	Onsite	10-55	03/22/1999	ND	ND	ND	ND
MW-106-25	Onsite	10-55	04/28/1999	ND	ND	ND	ND
MW-106-25	Onsite	10-55	05/26/1999	ND	ND	ND	ND
MW-106-25	Onsite	10-55	06/29/1999	ND	ND	ND	ND
MW-106-25	Onsite	10-55	07/21/1999	ND	ND	ND	ND
MW-106-25	Onsite	10-55	08/18/1999	ND	ND	ND	ND
MW-106-25	Onsite	10-55	09/14/1999	ND	ND	ND	ND
MW-106-25	Onsite	10-55	10/13/1999	ND	ND	ND	ND
MW-106-25	Onsite	10-55	11/15/1999	ND	ND	ND	ND
MW-106-25	Onsite	10-55	12/21/1999	ND	ND	ND	ND
MW-106-25	Onsite	10-55	01/19/2000	ND	ND	ND	ND
MW-106-25	Onsite	10-55	02/22/2000	ND	ND	ND	ND
MW-106-25	Onsite	10-55	03/13/2000	ND	ND	ND	ND
MW-106-25	Onsite	10-55	04/04/2000	ND	ND	ND	ND
MW-106-25	Onsite	10-55	05/09/2000	ND	ND	ND	ND
MW-106-25	Onsite	10-55	06/15/2000	ND	ND	ND	ND
MW-106-25	Onsite	10-55	07/20/2000	ND	ND	ND	ND
MW-106-25	Onsite	10-55	08/28/2000	ND	ND	ND	ND
MW-106-25	Onsite	10-55	09/18/2000	ND	ND	ND	ND
MW-106-25	Onsite	10-55	10/11/2000	ND	ND	ND	ND
MW-106-25	Onsite	10-55	11/07/2000	ND	ND	ND	ND
MW-106-25	Onsite	10-55	12/12/2000	ND	ND	ND	ND
MW-106-25	Onsite	10-55	01/15/2001	ND	ND	ND	ND
MW-106-25	Onsite	10-55	02/14/2001	ND	ND	ND	ND
MW-106-25	Onsite	10-55	03/13/2001	0.800	ND	ND	ND
MW-106-25	Onsite	10-55	04/10/2001	0.900	ND	ND	ND
MW-106-25	Onsite	10-55	05/10/2001	0.698	<2.00	<2.00	<4.00
MW-106-25	Onsite	10-55	06/13/2001	0.630	ND	ND	ND
MW-106-25	Onsite	10-55	10/09/2001	ND	ND	ND	ND
MW-106-25	Onsite	10-55	04/05/2002	ND	ND	ND	ND
MW-106-25	Onsite	10-55	10/07/2002	ND	ND	ND	ND
MW-106-25	Onsite	10-55	04/29/2003	ND	ND	ND	ND
MW-106-25	Onsite	10-55	10/05/2003	ND	ND	ND	ND
MW-106-25	Onsite	10-55	04/23/2004	ND	ND	ND	ND
MW-106-25	Onsite	10-55	09/08/2004	ND	ND	ND	ND

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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-106-25	Onsite	10-55	04/21/2005	ND	ND	ND	ND
MW-106-25	Onsite	10-55	10/17/2006	<0.114	<0.127	<0.125	<0.118*
MW-106-25	Onsite	10-55	11/15/2006	<0.226	<0.202	<0.241	<0.223*
MW-106-25	Onsite	10-55	04/17/2007	<1.00	<1.00	<1.00	<3.00
MW-106-25	Onsite	10-55	09/19/2007	<1.00	<1.00	<1.00	<3.00*
MW-106-25	Onsite	10-55	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-106-25	Onsite	10-55	09/04/2008	<1.00	--	--	--
MW-106-25	Onsite	10-55	04/08/2009	<0.150	<0.620	<0.620	<1.24*
MW-106-25	Onsite	10-55	09/02/2009	<0.500	<2.00	<2.00	<4.00*
MW-106-25	Onsite	10-55	04/02/2010	<0.400	<1.00	<1.00	<3.00*
MW-106-25	Onsite	10-55	09/03/2010	<0.400	<1.00	<1.00	<3.00*
MW-106-25	Onsite	10-55	02/24/2011	<0.400	<1.00	<1.00	<3.00*
MW-106-25	Onsite	10-55	04/15/2011	<0.400	<1.00	<1.00	<3.00*
MW-106-25	Onsite	10-55	10/11/2011	<0.240	<0.620	<0.620	<1.86*
MW-106-25	Onsite	10-55	04/27/2012	<0.240	<0.620	<0.620	<1.86*
MW-106-25	Onsite	10-55	05/04/2012	<0.240	1.30	<0.620	<1.86*
MW-106-25	Onsite	10-55	11/15/2012	<0.240	<0.620	<0.620	<1.86*
MW-106-25	Onsite	10-55	05/13/2013	<0.240	<0.620	<0.620	<1.86*
MW-106-25	Onsite	10-55	05/13/2013	<0.240	<0.620	<0.620	<1.86*
MW-106-25	Onsite	10-55	03/10/2014	<0.200	<0.500	<0.500	<1.50
MW-106-25	Onsite	10-55	08/15/2014	<0.200	<0.500	<0.500	<1.50
MW-106-25	Onsite	10-55	07/31/2015	<0.200	<0.500	<0.500	<1.50
MW-106-25	Onsite	10-55	02/16/2016	<0.200	<0.500	<0.500	<1.50
MW-106-25	Onsite	10-55	07/27/2016	<0.200	<0.500	<0.500	<1.50
MW-106-25	Onsite	10-55	03/01/2017	<0.200	<0.500	<0.500	<1.50
MW-109-15	Onsite	Water Table	08/24/1988	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	09/28/1988	140	1.00	3.10	19.0
MW-109-15	Onsite	Water Table	11/30/1988	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	12/22/1988	11.0	ND	ND	ND
MW-109-15	Onsite	Water Table	11/15/1989	17.0	ND	8.80	1.20
MW-109-15	Onsite	Water Table	02/20/1990	11.0	ND	6.40	ND
MW-109-15	Onsite	Water Table	05/24/1990	9.90	0.640	6.50	1.30
MW-109-15	Onsite	Water Table	08/29/1990	0.660	ND	ND	ND
MW-109-15	Onsite	Water Table	03/26/1991	1.00	ND	ND	ND
MW-109-15	Onsite	Water Table	09/16/1991	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	03/17/1992	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	09/22/1992	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	03/02/1993	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	09/09/1993	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	03/24/1994	2.00	0.900	1.00	1.00
MW-109-15	Onsite	Water Table	09/19/1994	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	03/21/1995	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	09/14/1995	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	03/21/1996	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	09/18/1996	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	03/18/1997	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	09/16/1997	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	03/20/1998	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	09/22/1998	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	03/23/1999	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	09/14/1999	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	03/14/2000	ND	ND	ND	ND

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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-109-15	Onsite	Water Table	09/18/2000	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	03/13/2001	17.0	ND	ND	ND
MW-109-15	Onsite	Water Table	10/09/2001	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	04/03/2002	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	10/07/2002	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	04/29/2003	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	10/05/2003	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	04/23/2004	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	09/08/2004	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	04/20/2005	ND	ND	ND	ND
MW-109-15	Onsite	Water Table	10/17/2006	<0.114	<0.127	<0.125	<0.118*
MW-109-15	Onsite	Water Table	04/17/2007	<1.00	<1.00	<1.00	<3.00
MW-109-15	Onsite	Water Table	10/16/2007	<1.00	<1.00	<1.00	<3.00
MW-109-15	Onsite	Water Table	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-109-15	Onsite	Water Table	10/02/2008	<1.00	<1.00	<1.00	<2.00
MW-109-15	Onsite	Water Table	04/08/2009	<0.150	<0.620	<0.620	<1.24*
MW-109-15	Onsite	Water Table	10/01/2009	<0.500	<2.00	<2.00	<4.00*
MW-109-15	Onsite	Water Table	04/02/2010	<0.500	<2.00	<2.00	<4.00*
MW-109-15	Onsite	Water Table	10/06/2010	<0.400	<1.00	<1.00	<3.00*
MW-109-15	Onsite	Water Table	02/10/2011	<0.400	<1.00	<1.00	<3.00*
MW-109-15	Onsite	Water Table	06/01/2011	0.430	<0.310	<0.310	<0.930*
MW-109-15	Onsite	Water Table	10/17/2011	<0.240	<0.620	<0.620	<1.86*
MW-109-15	Onsite	Water Table	05/04/2012	<0.240	<0.620	<0.620	<1.86*
MW-109-15	Onsite	Water Table	11/14/2012	<0.240	<0.620	<0.620	<1.86*
MW-109-15	Onsite	Water Table	06/06/2013	<0.240	<0.620	<0.620	<1.86*
MW-109-15	Onsite	Water Table	11/01/2013	<0.240	<0.620	<0.620	<1.88
MW-109-15	Onsite	Water Table	03/10/2014	<0.200	<0.500	<0.500	<1.50
MW-109-15	Onsite	Water Table	08/19/2014	<0.200	<0.500	<0.500	<1.50
MW-109-15	Onsite	Water Table	07/31/2015	<0.200	<0.500	<0.500	<1.50
MW-109-15	Onsite	Water Table	07/20/2016	<0.200	<0.500	<0.500	<1.50
MW-110-20	Onsite	Water Table	08/24/1988	760	ND	26.0	6.60
MW-110-20	Onsite	Water Table	09/29/1988	420	3.30	21.0	ND
MW-110-20	Onsite	Water Table	11/30/1988	180	ND	4.00	ND
MW-110-20	Onsite	Water Table	12/22/1988	ND	ND	ND	ND
MW-110-20	Onsite	Water Table	11/15/1989	260	ND	ND	ND
MW-110-20	Onsite	Water Table	02/20/1990	200	ND	ND	ND
MW-110-20	Onsite	Water Table	05/24/1990	240	ND	ND	ND
MW-110-20	Onsite	Water Table	08/29/1990	220	ND	ND	ND
MW-110-20	Onsite	Water Table	03/26/1991	180	ND	ND	6.20
MW-110-20	Onsite	Water Table	09/16/1991	400	18.0	ND	ND
MW-110-20	Onsite	Water Table	03/17/1992	100	ND	ND	ND
MW-110-20	Onsite	Water Table	09/22/1992	190	55.0	25.0	190
MW-110-20	Onsite	Water Table	03/02/1993	51.0	ND	ND	1.00
MW-110-20	Onsite	Water Table	09/10/1993	120	0.500	1.00	16.0
MW-110-20	Onsite	Water Table	03/25/1994	72.0	ND	ND	5.00
MW-110-20	Onsite	Water Table	09/19/1994	78.0	0.800	1.00	36.0
MW-110-20	Onsite	Water Table	03/20/1995	39.0	ND	ND	ND
MW-110-20	Onsite	Water Table	09/14/1995	230	3.00	31.0	280
MW-110-20	Onsite	Water Table	09/18/1996	120	1.00	46.0	480
MW-110-20	Onsite	Water Table	03/18/1997	44.0	ND	ND	ND
MW-110-20	Onsite	Water Table	09/16/1997	ND	8.00	39.0	ND
MW-110-20	Onsite	Water Table	09/28/1998	490	94.0	32.0	460

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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-110-20	Onsite	Water Table	09/14/1999	5500	690	51.0	1000
MW-110-20	Onsite	Water Table	03/13/2000	950	6.00	8.00	93.0
MW-110-20	Onsite	Water Table	09/18/2000	3400	1400	38.0	580
MW-110-20	Onsite	Water Table	06/13/2001	3080	372	51.0	380
MW-110-20	Onsite	Water Table	07/11/2001	3000	1300	73.0	560
MW-110-20	Onsite	Water Table	10/09/2001	2000	1100	83.0	650
MW-110-20	Onsite	Water Table	08/14/2002	1000	410	43.0	380
MW-110-20	Onsite	Water Table	10/07/2002	830	55.0	39.0	360
MW-110-20	Onsite	Water Table	01/07/2003	330	ND	11.0	59.0
MW-110-20	Onsite	Water Table	07/10/2003	890	53.0	18.0	100
MW-110-20	Onsite	Water Table	10/05/2003	360	ND	9.40	100
MW-110-20	Onsite	Water Table	01/13/2004	160	ND	ND	23.0
MW-110-20	Onsite	Water Table	04/23/2004	211	11.0	5.00	22.0
MW-110-20	Onsite	Water Table	07/22/2004	236	ND	4.40	23.0
MW-110-20	Onsite	Water Table	09/09/2004	288	2.20	10.0	97.0
MW-110-20	Onsite	Water Table	01/29/2005	98.0	ND	ND	ND
MW-110-20	Onsite	Water Table	04/20/2005	134	ND	ND	ND
MW-110-20	Onsite	Water Table	07/26/2005	168	ND	4.90	18.0
MW-110-20	Onsite	Water Table	07/18/2006	220	23.2	19.9	27.2*
MW-110-20	Onsite	Water Table	10/17/2006	170	21.7	14.0	19.3*
MW-110-20	Onsite	Water Table	01/17/2007	101	10.6	7.91	60.3*
MW-110-20	Onsite	Water Table	07/17/2007	140	27.3	15.3	125
MW-110-20	Onsite	Water Table	10/16/2007	403	11.6	16.1	199
MW-110-20	Onsite	Water Table	01/04/2008	165	2.57	8.82	90.2
MW-110-20	Onsite	Water Table	07/01/2008	450	6.80	35.0	331
MW-110-20	Onsite	Water Table	10/02/2008	240	<2.00	8.70	140
MW-110-20	Onsite	Water Table	01/12/2009	116	<2.00	5.42	66.7*
MW-110-20	Onsite	Water Table	07/07/2009	288	<2.00	25.7	159*
MW-110-20	Onsite	Water Table	10/01/2009	120	3.15	4.07	39.6*
MW-110-20	Onsite	Water Table	01/19/2010	24.8	<2.00	<2.00	<4.00*
MW-110-20	Onsite	Water Table	07/23/2010	134	<0.620	6.57	64.0*
MW-110-20	Onsite	Water Table	10/06/2010	183	1.31	4.08	95.4*
MW-110-20	Onsite	Water Table	02/10/2011	44.3	<1.00	2.05	32.4*
MW-110-20	Onsite	Water Table	08/23/2011	128	0.750	4.45	108
MW-110-20	Onsite	Water Table	10/18/2011	111	0.390J	2.47	53.7
MW-110-20	Onsite	Water Table	02/21/2012	28.0	<0.620	0.790J	10.9
MW-110-20	Onsite	Water Table	06/15/2012	209	<0.620	6.67	51.8*
MW-110-20	Onsite	Water Table	10/18/2012	125	<0.620	0.630J	<73.5*
MW-110-20	Onsite	Water Table	10/15/2013	97.6	<0.620	1.17	73.7
MW-110-20	Onsite	Water Table	03/12/2014	5.18	<0.500	<0.500	<1.50
MW-110-20	Onsite	Water Table	09/03/2014	66.3	<0.500	0.690J	45.6
MW-110-20	Onsite	Water Table	02/20/2015	7.57	<0.500	<0.500	<1.50
MW-110-20	Onsite	Water Table	07/31/2015	39.8	<0.500	<0.500	35.8
MW-110-20	Onsite	Water Table	08/09/2016	55.2	<0.500	0.550J	108
MW-110-65	Onsite	10-55	09/04/2013	<0.240	<0.620	<0.620	<1.88
MW-111-15	Onsite	Water Table	09/27/1988	470	1.40	4.80	1.60
MW-111-15	Onsite	Water Table	11/30/1988	530	0.400	0.300	0.700
MW-111-15	Onsite	Water Table	12/22/1988	70.0	ND	ND	ND
MW-111-15	Onsite	Water Table	11/15/1989	130	ND	ND	ND
MW-111-15	Onsite	Water Table	02/20/1990	82.0	ND	ND	ND
MW-111-15	Onsite	Water Table	05/23/1990	100	ND	ND	ND
MW-111-15	Onsite	Water Table	08/29/1990	49.0	ND	ND	ND

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Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-111-15	Onsite	Water Table	04/01/1991	24.0	ND	ND	ND
MW-111-15	Onsite	Water Table	09/16/1991	4.00	ND	ND	ND
MW-111-15	Onsite	Water Table	03/17/1992	9.00	ND	ND	ND
MW-111-15	Onsite	Water Table	09/21/1992	11.0	ND	ND	ND
MW-111-15	Onsite	Water Table	09/10/1993	11.0	ND	ND	ND
MW-111-15	Onsite	Water Table	03/25/1994	20.0	ND	ND	ND
MW-111-15	Onsite	Water Table	09/19/1994	28.0	ND	ND	ND
MW-111-15	Onsite	Water Table	03/20/1995	39.0	ND	ND	ND
MW-111-15	Onsite	Water Table	09/14/1995	12.0	ND	ND	ND
MW-111-15	Onsite	Water Table	03/25/1996	13.8	ND	ND	ND
MW-111-15	Onsite	Water Table	09/18/1996	17.6	ND	ND	ND
MW-111-15	Onsite	Water Table	03/18/1997	26.0	ND	ND	ND
MW-111-15	Onsite	Water Table	09/22/1997	11.0	ND	ND	ND
MW-111-15	Onsite	Water Table	03/17/1998	7.00	ND	ND	ND
MW-111-15	Onsite	Water Table	09/22/1998	5.00	ND	ND	ND
MW-111-15	Onsite	Water Table	03/22/1999	18.0	ND	ND	ND
MW-111-15	Onsite	Water Table	09/14/1999	7.00	ND	ND	ND
MW-111-15	Onsite	Water Table	03/13/2000	3.00	ND	ND	ND
MW-111-15	Onsite	Water Table	09/18/2000	4.40	ND	ND	ND
MW-111-15	Onsite	Water Table	03/13/2001	5.00	ND	ND	ND
MW-111-15	Onsite	Water Table	10/09/2001	3.40	ND	ND	ND
MW-111-15	Onsite	Water Table	04/03/2002	3.40	ND	ND	ND
MW-111-15	Onsite	Water Table	10/07/2002	5.80	ND	ND	ND
MW-111-15	Onsite	Water Table	04/29/2003	3.70	ND	ND	ND
MW-111-15	Onsite	Water Table	10/05/2003	4.00	ND	ND	ND
MW-111-15	Onsite	Water Table	04/23/2004	16.0	ND	ND	ND
MW-111-15	Onsite	Water Table	09/09/2004	4.30	ND	ND	ND
MW-111-15	Onsite	Water Table	04/21/2005	11.0	ND	ND	ND
MW-111-15	Onsite	Water Table	10/17/2006	7.34	<0.127	<0.125	<0.118*
MW-111-15	Onsite	Water Table	04/18/2007	2.28	<1.00	<1.00	<3.00
MW-111-15	Onsite	Water Table	10/16/2007	<1.00	<1.00	<1.00	<3.00
MW-111-15	Onsite	Water Table	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-111-15	Onsite	Water Table	10/02/2008	3.10	<1.00	<1.00	<2.00
MW-111-15	Onsite	Water Table	04/08/2009	<0.150	<0.620	<0.620	<1.24*
MW-111-15	Onsite	Water Table	10/01/2009	0.591	<2.00	<2.00	<4.00*
MW-111-15	Onsite	Water Table	04/02/2010	0.650	<2.00	<2.00	<4.00*
MW-111-15	Onsite	Water Table	10/12/2010	2.96	<0.310	<0.310	<0.930*
MW-111-15	Onsite	Water Table	02/24/2011	1.06	<1.00	<1.00	<3.00*
MW-111-15	Onsite	Water Table	04/14/2011	1.30	<1.00	<1.00	<3.00*
MW-111-15	Onsite	Water Table	10/11/2011	1.05	<0.620	<0.620	<1.86*
MW-113-15	Onsite	Water Table	09/27/1988	170	ND	3.00	ND
MW-113-15	Onsite	Water Table	11/30/1988	ND	ND	ND	ND
MW-113-15	Onsite	Water Table	12/22/1988	82.0	ND	3.00	ND
MW-113-15	Onsite	Water Table	11/15/1989	230	ND	ND	ND
MW-113-15	Onsite	Water Table	02/21/1990	170	ND	ND	ND
MW-113-15	Onsite	Water Table	05/24/1990	140	ND	ND	ND
MW-113-15	Onsite	Water Table	08/28/1990	79.0	ND	ND	ND
MW-113-15	Onsite	Water Table	04/01/1991	110	ND	ND	ND
MW-113-15	Onsite	Water Table	09/17/1991	160	ND	ND	ND
MW-113-15	Onsite	Water Table	03/17/1992	200	ND	ND	ND
MW-113-15	Onsite	Water Table	09/21/1992	160	ND	ND	ND
MW-113-15	Onsite	Water Table	03/02/1993	240	ND	ND	ND

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-113-15	Onsite	Water Table	09/08/1993	350	7.00	0.500	1.00
MW-113-15	Onsite	Water Table	03/28/1994	280	4.00	1.30	3.60
MW-113-15	Onsite	Water Table	09/19/1994	180	ND	ND	0.800
MW-113-15	Onsite	Water Table	03/20/1995	280	ND	ND	ND
MW-113-15	Onsite	Water Table	09/14/1995	230	ND	ND	ND
MW-113-15	Onsite	Water Table	03/25/1996	139	ND	ND	ND
MW-113-15	Onsite	Water Table	09/18/1996	18.7	ND	ND	ND
MW-113-15	Onsite	Water Table	03/18/1997	24.0	ND	ND	ND
MW-113-15	Onsite	Water Table	09/16/1997	4.00	ND	ND	ND
MW-113-15	Onsite	Water Table	03/17/1998	3.00	ND	ND	ND
MW-113-15	Onsite	Water Table	09/22/1998	ND	ND	ND	ND
MW-113-15	Onsite	Water Table	03/22/1999	ND	ND	ND	ND
MW-113-15	Onsite	Water Table	09/14/1999	19.0	ND	ND	ND
MW-113-15	Onsite	Water Table	03/13/2000	93.0	ND	ND	5.00
MW-113-15	Onsite	Water Table	09/18/2000	1.70	ND	ND	ND
MW-113-15	Onsite	Water Table	03/13/2001	ND	ND	ND	ND
MW-113-15	Onsite	Water Table	10/09/2001	ND	ND	ND	ND
MW-113-15	Onsite	Water Table	04/03/2002	ND	ND	ND	ND
MW-113-15	Onsite	Water Table	10/07/2002	0.810	ND	ND	ND
MW-113-15	Onsite	Water Table	04/29/2003	3.30	ND	ND	ND
MW-113-15	Onsite	Water Table	10/05/2003	ND	ND	ND	ND
MW-113-15	Onsite	Water Table	04/23/2004	ND	ND	ND	ND
MW-113-15	Onsite	Water Table	09/09/2004	ND	ND	ND	ND
MW-113-15	Onsite	Water Table	04/22/2005	ND	ND	ND	ND
MW-113-15	Onsite	Water Table	10/17/2006	<0.114	<0.127	<0.125	<0.118*
MW-113-15	Onsite	Water Table	04/18/2007	<1.00	<1.00	<1.00	<3.00
MW-113-15	Onsite	Water Table	10/17/2007	<1.00	<1.00	<1.00	<3.00
MW-113-15	Onsite	Water Table	04/02/2008	1.90	<1.00	<1.00	<2.00
MW-113-15	Onsite	Water Table	10/02/2008	<1.00	<1.00	<1.00	<2.00
MW-113-15	Onsite	Water Table	04/09/2009	8.56	<0.620	<0.620	<1.24*
MW-113-15	Onsite	Water Table	10/01/2009	<0.500	<2.00	<2.00	<4.00*
MW-113-15	Onsite	Water Table	04/02/2010	<0.500	<2.00	<2.00	<4.00*
MW-113-15	Onsite	Water Table	10/06/2010	<0.400	<1.00	<1.00	<3.00*
MW-113-15	Onsite	Water Table	02/08/2011	<0.400	<1.00	<1.00	<3.00*
MW-113-15	Onsite	Water Table	04/14/2011	<0.400	<1.00	<1.00	<3.00*
MW-113-15	Onsite	Water Table	08/17/2011	<0.226	<0.266	<0.175	<0.364
MW-113-15	Onsite	Water Table	10/14/2011	<0.240	<0.620	<0.620	<1.88
MW-113-15	Onsite	Water Table	02/14/2012	1.70	<0.620	3.40	7.40
MW-113-15	Onsite	Water Table	05/17/2012	0.440	<0.620	1.72	2.16J
MW-113-15	Onsite	Water Table	11/14/2012	0.150J	<0.620	3.70	<1.86*
MW-113-15	Onsite	Water Table	05/20/2013	<0.240	<0.620	<0.620	<1.86*
MW-113-15	Onsite	Water Table	10/22/2013	<0.240	<0.620	<0.620	<1.88
MW-113-15	Onsite	Water Table	02/28/2014	<0.200	<0.500	<0.500	<1.50
MW-113-15	Onsite	Water Table	07/31/2014	<0.200	<0.500	<0.500	<1.50
MW-113-15	Onsite	Water Table	04/23/2015	0.240J	<0.500	<0.500	<1.50
MW-113-15	Onsite	Water Table	07/28/2015	<0.200	<0.500	<0.500	<1.50
MW-113-15	Onsite	Water Table	02/04/2016	<0.200	<0.500	<0.500	<1.50
MW-113-15	Onsite	Water Table	08/08/2016	<0.200	<0.500	<0.500	<1.50
MW-115-15	Onsite	Water Table	09/27/1988	19000	2300	830	5000
MW-115-15	Onsite	Water Table	11/30/1988	1200	190	350	910
MW-115-15	Onsite	Water Table	12/22/1988	1000	64.0	350	330
MW-115-15	Onsite	Water Table	11/16/1989	8300	600	840	3700

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-115-15	Onsite	Water Table	02/20/1990	9800	ND	830	3800
MW-115-15	Onsite	Water Table	05/24/1990	22000	11000	2200	11000
MW-115-15	Onsite	Water Table	08/29/1990	12000	1300	1200	5300
MW-115-15	Onsite	Water Table	03/26/1991	14000	ND	1400	6700
MW-115-15	Onsite	Water Table	09/17/1991	7700	ND	190	690
MW-115-15	Onsite	Water Table	03/17/1992	5700	7.00	490	2700
MW-115-15	Onsite	Water Table	09/22/1992	10000	6.60	1200	5900
MW-115-15	Onsite	Water Table	03/03/1993	3500	2.00	460	2300
MW-115-15	Onsite	Water Table	09/10/1993	5000	4.00	610	2900
MW-115-15	Onsite	Water Table	03/28/1994	3500	ND	350	1700
MW-115-15	Onsite	Water Table	09/21/1994	3600	ND	330	1700
MW-115-15	Onsite	Water Table	03/21/1995	2600	5.10	200	800
MW-115-15	Onsite	Water Table	09/19/1995	9900	ND	900	5600
MW-115-15	Onsite	Water Table	03/26/1996	1900	2.30	300	800
MW-115-15	Onsite	Water Table	09/25/1996	4500	ND	300	2000
MW-115-15	Onsite	Water Table	03/19/1997	2060	ND	200	860
MW-115-15	Onsite	Water Table	09/26/1997	3200	ND	310	1600
MW-115-15	Onsite	Water Table	03/24/1998	1500	1.00	169	1200
MW-115-15	Onsite	Water Table	09/24/1998	5600	ND	230	3000
MW-115-15	Onsite	Water Table	03/24/1999	3400	ND	173	1900
MW-115-15	Onsite	Water Table	09/14/1999	4800	ND	440	3800
MW-115-15	Onsite	Water Table	03/14/2000	1900	ND	130	2200
MW-115-15	Onsite	Water Table	09/20/2000	3900	ND	240	3300
MW-115-15	Onsite	Water Table	03/13/2001	2100	ND	55.0	1900
MW-115-15	Onsite	Water Table	05/10/2001	966	<1.00	44.0	917
MW-115-15	Onsite	Water Table	04/09/2002	1500	ND	24.0	1200
MW-115-15	Onsite	Water Table	10/08/2002	13000	190	370	5800
MW-115-15	Onsite	Water Table	04/29/2003	1900	ND	ND	670
MW-115-15	Onsite	Water Table	04/23/2004	4030	ND	46.0	2610
MW-115-15	Onsite	Water Table	09/10/2004	4200	ND	54.0	1900
MW-115-15	Onsite	Water Table	04/22/2005	2240	ND	21.0	1050
MW-115-15	Onsite	Water Table	04/17/2007	2360	<10.0	<10.0	132
MW-115-15	Onsite	Water Table	04/04/2008	2700	<20.0	23.0	770
MW-115-15	Onsite	Water Table	04/10/2009	1770	<0.620	39.7	353*
MW-115-15	Onsite	Water Table	04/03/2010	1420	<20.0	<20.0	<40.0*
MW-115-15	Onsite	Water Table	05/31/2012	1530	<6.20	10.6	<360*
MW-115-15	Onsite	Water Table	04/11/2013	705	<0.620	2.87	97.6*
MW-115-15	Onsite	Water Table	11/17/2013	1600	0.490J	18.0	856
MW-116-15	Onsite	Water Table	09/27/1988	17000	11000	1000	5100
MW-116-15	Onsite	Water Table	11/30/1988	19000	11000	1300	6200
MW-116-15	Onsite	Water Table	12/22/1988	1800	ND	570	480
MW-116-15	Onsite	Water Table	11/15/1989	7700	9800	1400	6200
MW-116-15	Onsite	Water Table	02/20/1990	10000	11000	1400	6700
MW-116-15	Onsite	Water Table	05/24/1990	9700	9700	2000	7100
MW-116-15	Onsite	Water Table	08/28/1990	9600	3300	740	3600
MW-116-15	Onsite	Water Table	03/27/1991	16000	3200	1200	5700
MW-116-15	Onsite	Water Table	09/17/1991	24000	ND	270	540
MW-116-15	Onsite	Water Table	03/17/1992	24000	ND	370	3000
MW-116-15	Onsite	Water Table	09/23/1992	17000	250	1300	6400
MW-116-15	Onsite	Water Table	03/03/1993	16000	13.0	1200	5700
MW-116-15	Onsite	Water Table	09/10/1993	19000	12.0	1100	4500
MW-116-15	Onsite	Water Table	03/28/1994	20000	74.0	1200	5200

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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-116-15	Onsite	Water Table	09/21/1994	14000	46.0	990	4700
MW-116-15	Onsite	Water Table	03/21/1995	14000	ND	1100	5000
MW-116-15	Onsite	Water Table	09/19/1995	16000	17.0	1000	4000
MW-116-15	Onsite	Water Table	09/25/1996	17000	ND	830	4200
MW-116-15	Onsite	Water Table	03/19/1997	14400	ND	1000	4700
MW-116-15	Onsite	Water Table	09/26/1997	17000	ND	1100	5400
MW-116-15	Onsite	Water Table	03/24/1998	17000	20.0	950	5400
MW-116-15	Onsite	Water Table	09/24/1998	16000	13.0	960	4700
MW-116-15	Onsite	Water Table	03/24/1999	16000	ND	1000	5300
MW-116-15	Onsite	Water Table	09/14/1999	15000	290	1300	6000
MW-116-15	Onsite	Water Table	03/15/2000	15000	ND	1100	5500
MW-116-15	Onsite	Water Table	09/20/2000	12000	ND	720	5200
MW-116-15	Onsite	Water Table	03/13/2001	12000	5.00	580	4900
MW-116-15	Onsite	Water Table	05/10/2001	3960	3.14	753	2910
MW-116-15	Onsite	Water Table	04/09/2002	11000	ND	190	5600
MW-116-15	Onsite	Water Table	04/29/2003	7200	ND	120	4900
MW-116-15	Onsite	Water Table	04/23/2004	8730	5.00	198	6140
MW-116-15	Onsite	Water Table	09/10/2004	10500	5.40	108	6760
MW-116-15	Onsite	Water Table	04/22/2005	10700	ND	127	5720
MW-116-15	Onsite	Water Table	04/17/2007	856	2.41	15.8	614
MW-116-15	Onsite	Water Table	04/04/2008	8800	<10.0	260	6400
MW-116-15	Onsite	Water Table	04/10/2009	7150	<62.0	246	4640*
MW-116-15	Onsite	Water Table	04/03/2010	7000	<20.0	242	4270*
MW-116-15	Onsite	Water Table	04/13/2011	6000	<1.00	161	5090*
MW-116-15	Onsite	Water Table	10/20/2011	7470	1.42	260	4330*
MW-116-15	Onsite	Water Table	05/21/2012	5580	1.17	282	4770*
MW-116-15	Onsite	Water Table	06/12/2013	5720	<1.43B*	271	4850*
MW-116-15	Onsite	Water Table	11/17/2013	7390	1.37	346	4930
MW-116-15	Onsite	Water Table	06/04/2014	9430	3.50J	409	4250
MW-116-15	Onsite	Water Table	09/04/2014	6480	10.2	401	4720
MW-116-15	Onsite	Water Table	08/10/2015	6860	<25.0	377	5170
MW-116-15	Onsite	Water Table	02/29/2016	7740	<1.74B*	409	5270
MW-116-15	Onsite	Water Table	08/16/2016	8970	18.1	609	5110
MW-116-15	Onsite	Water Table	08/31/2017	9310	<50.0	558	4480
MW-116-15	Onsite	Water Table	11/15/2017	9060	<5.00	576	4340
MW-118-45	Onsite	10-55	03/15/1990	1100	ND	ND	ND
MW-118-45	Onsite	10-55	03/27/1990	130	ND	ND	ND
MW-118-45	Onsite	10-55	04/19/1990	1500	ND	ND	ND
MW-118-45	Onsite	10-55	05/23/1990	1300	ND	ND	ND
MW-118-45	Onsite	10-55	08/28/1990	1500	ND	ND	ND
MW-118-45	Onsite	10-55	03/28/1991	22.0	ND	ND	ND
MW-118-45	Onsite	10-55	05/31/1991	ND	ND	ND	ND
MW-118-45	Onsite	10-55	09/16/1991	ND	ND	ND	ND
MW-118-45	Onsite	10-55	03/16/1992	ND	ND	ND	ND
MW-118-45	Onsite	10-55	06/16/1992	ND	ND	ND	ND
MW-118-45	Onsite	10-55	09/23/1992	ND	ND	ND	ND
MW-118-45	Onsite	10-55	03/01/1993	2.00	ND	ND	2.00
MW-118-45	Onsite	10-55	06/22/1993	ND	ND	ND	ND
MW-118-45	Onsite	10-55	09/08/1993	ND	ND	ND	ND
MW-118-45	Onsite	10-55	03/25/1994	ND	ND	ND	ND
MW-118-45	Onsite	10-55	09/20/1994	ND	ND	ND	ND
MW-118-45	Onsite	10-55	03/27/1995	ND	ND	ND	ND

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-118-45	Onsite	10-55	09/19/1995	ND	ND	ND	ND
MW-118-45	Onsite	10-55	03/20/1996	ND	ND	ND	ND
MW-118-45	Onsite	10-55	09/25/1996	7.50	ND	ND	ND
MW-118-45	Onsite	10-55	12/17/1996	41.0	ND	ND	ND
MW-118-45	Onsite	10-55	02/26/1997	22.0	ND	ND	ND
MW-118-45	Onsite	10-55	03/19/1997	9.00	ND	ND	ND
MW-118-45	Onsite	10-55	05/29/1997	ND	ND	ND	ND
MW-118-45	Onsite	10-55	06/24/1997	ND	ND	ND	ND
MW-118-45	Onsite	10-55	09/25/1997	ND	ND	ND	ND
MW-118-45	Onsite	10-55	03/23/1998	ND	ND	ND	ND
MW-118-45	Onsite	10-55	09/23/1998	ND	ND	ND	ND
MW-118-45	Onsite	10-55	03/23/1999	ND	ND	ND	ND
MW-118-45	Onsite	10-55	09/15/1999	ND	ND	ND	ND
MW-118-45	Onsite	10-55	03/14/2000	ND	ND	ND	ND
MW-118-45	Onsite	10-55	09/20/2000	ND	ND	ND	ND
MW-118-45	Onsite	10-55	03/14/2001	ND	ND	ND	ND
MW-118-45	Onsite	10-55	04/04/2002	ND	ND	ND	ND
MW-118-45	Onsite	10-55	04/29/2003	ND	ND	ND	ND
MW-118-45	Onsite	10-55	04/23/2004	ND	ND	ND	ND
MW-118-45	Onsite	10-55	09/09/2004	ND	ND	ND	ND
MW-118-45	Onsite	10-55	04/22/2005	ND	ND	ND	ND
MW-118-45	Onsite	10-55	04/18/2007	<1.00	<1.00	<1.00	<3.00
MW-118-45	Onsite	10-55	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-118-45	Onsite	10-55	04/09/2009	<0.150	<0.620	<0.620	<1.24*
MW-118-45	Onsite	10-55	04/02/2010	<0.500	<2.00	<2.00	<4.00*
MW-124-25	Onsite	10-55	06/06/1990	4000	ND	ND	ND
MW-124-25	Onsite	10-55	06/26/1990	2500	ND	ND	140
MW-124-25	Onsite	10-55	08/28/1990	3700	ND	270	ND
MW-124-25	Onsite	10-55	03/27/1991	270	ND	18.0	ND
MW-124-25	Onsite	10-55	09/17/1991	ND	ND	ND	ND
MW-124-25	Onsite	10-55	03/17/1992	ND	ND	ND	ND
MW-124-25	Onsite	10-55	09/23/1992	ND	ND	ND	ND
MW-124-25	Onsite	10-55	03/02/1993	ND	ND	ND	ND
MW-124-25	Onsite	10-55	09/09/1993	0.300	0.500	0.400	1.00
MW-124-25	Onsite	10-55	03/25/1994	ND	ND	ND	ND
MW-124-25	Onsite	10-55	09/19/1994	ND	ND	ND	ND
MW-124-25	Onsite	10-55	03/21/1995	ND	ND	ND	ND
MW-124-25	Onsite	10-55	09/19/1995	ND	ND	ND	ND
MW-124-25	Onsite	10-55	09/18/1996	240	ND	13.0	11.0
MW-124-25	Onsite	10-55	09/26/1997	470	2.00	10.0	17.0
MW-124-25	Onsite	10-55	03/24/1998	17.0	ND	ND	ND
MW-124-25	Onsite	10-55	09/22/1998	2.00	ND	ND	ND
MW-124-25	Onsite	10-55	09/14/1999	6.00	ND	1.00	2.00
MW-124-25	Onsite	10-55	03/14/2000	ND	ND	ND	ND
MW-124-25	Onsite	10-55	09/19/2000	69.7	2.00	2.00	3.00
MW-124-25	Onsite	10-55	03/14/2001	77.0	ND	ND	ND
MW-124-25	Onsite	10-55	07/11/2001	13.0	ND	ND	ND
MW-124-25	Onsite	10-55	10/09/2001	1100	100	41.0	92.0
MW-124-25	Onsite	10-55	11/14/2001	170	ND	4.50	2.80
MW-124-25	Onsite	10-55	12/11/2001	12.0	ND	ND	ND
MW-124-25	Onsite	10-55	01/08/2002	1.10	ND	ND	ND
MW-124-25	Onsite	10-55	02/04/2002	5.20	ND	ND	ND

**Appendix A-2
Historical BTEX Analytical Results**

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-124-25	Onsite	10-55	03/06/2002	17.0	ND	ND	ND
MW-124-25	Onsite	10-55	04/08/2002	3.90	ND	ND	ND
MW-124-25	Onsite	10-55	05/07/2002	16.0	ND	ND	ND
MW-124-25	Onsite	10-55	07/15/2002	240	5.90	28.0	32.0
MW-124-25	Onsite	10-55	08/14/2002	220	ND	30.0	17.0
MW-124-25	Onsite	10-55	09/11/2002	460	ND	41.0	34.0
MW-124-25	Onsite	10-55	10/08/2002	220	1.10	18.0	10.5
MW-124-25	Onsite	10-55	01/07/2003	2.10	ND	ND	ND
MW-124-25	Onsite	10-55	02/05/2003	3.10	ND	ND	ND
MW-124-25	Onsite	10-55	03/05/2003	11.0	ND	ND	ND
MW-124-25	Onsite	10-55	04/29/2003	13.0	ND	ND	ND
MW-124-25	Onsite	10-55	05/07/2003	14.0	ND	ND	ND
MW-124-25	Onsite	10-55	06/04/2003	6.30	3.10	ND	3.70
MW-124-25	Onsite	10-55	07/10/2003	5.60	ND	ND	ND
MW-124-25	Onsite	10-55	08/20/2003	100	8.50	3.90	7.80
MW-124-25	Onsite	10-55	09/11/2003	130	32.0	6.70	21.0
MW-124-25	Onsite	10-55	10/05/2003	150	ND	11.0	31.0
MW-124-25	Onsite	10-55	11/11/2003	14.0	ND	ND	ND
MW-124-25	Onsite	10-55	01/13/2004	1.00	ND	ND	ND
MW-124-25	Onsite	10-55	02/17/2004	1.80	ND	ND	ND
MW-124-25	Onsite	10-55	04/23/2004	3.00	ND	ND	3.00
MW-124-25	Onsite	10-55	05/11/2004	5.00	ND	ND	ND
MW-124-25	Onsite	10-55	06/07/2004	2.00	ND	ND	ND
MW-124-25	Onsite	10-55	07/22/2004	50.0	ND	2.20	4.60
MW-124-25	Onsite	10-55	08/05/2004	103	ND	6.10	16.0
MW-124-25	Onsite	10-55	09/09/2004	120	ND	7.30	30.0
MW-124-25	Onsite	10-55	10/25/2004	13.0	ND	ND	ND
MW-124-25	Onsite	10-55	11/16/2004	3.90	ND	ND	ND
MW-124-25	Onsite	10-55	12/08/2004	0.800	ND	ND	ND
MW-124-25	Onsite	10-55	01/29/2005	ND	ND	ND	ND
MW-124-25	Onsite	10-55	02/27/2005	ND	ND	ND	ND
MW-124-25	Onsite	10-55	03/28/2005	ND	ND	ND	ND
MW-124-25	Onsite	10-55	04/20/2005	ND	ND	ND	ND
MW-124-25	Onsite	10-55	05/17/2005	5.00	ND	ND	ND
MW-124-25	Onsite	10-55	06/16/2005	4.00	ND	ND	ND
MW-124-25	Onsite	10-55	07/26/2005	13.0	ND	ND	ND
MW-124-25	Onsite	10-55	08/23/2005	55.0	ND	4.60	24.0
MW-124-25	Onsite	10-55	09/21/2005	43.0	ND	ND	11.0
MW-124-25	Onsite	10-55	06/20/2006	ND	ND	ND	ND
MW-124-25	Onsite	10-55	07/18/2006	<0.114	<0.127	<0.125	<0.118*
MW-124-25	Onsite	10-55	08/22/2006	38.0	<0.127	2.18	2.11*
MW-124-25	Onsite	10-55	09/18/2006	74.0	<0.127	2.76	3.27*
MW-124-25	Onsite	10-55	10/17/2006	86.9	<0.127	2.85	3.12*
MW-124-25	Onsite	10-55	11/15/2006	83.6	<0.202	1.70	<0.223*
MW-124-25	Onsite	10-55	12/08/2006	51.5	<0.202	<0.241	<0.223*
MW-124-25	Onsite	10-55	01/17/2007	1.81	<1.00	<1.00	<3.00
MW-124-25	Onsite	10-55	02/13/2007	3.34	<1.00	<1.00	<3.00
MW-124-25	Onsite	10-55	07/18/2007	<1.00	<1.00	<1.00	<3.00
MW-124-25	Onsite	10-55	08/21/2007	16.9	<1.00	<1.00	3.81
MW-124-25	Onsite	10-55	09/20/2007	66.9	10.2	9.52	30.0*
MW-124-25	Onsite	10-55	10/16/2007	23.5	<1.00	<1.00	<3.60*
MW-124-25	Onsite	10-55	11/12/2007	10.1	<1.00	<1.00	4.41

**Appendix A-2
Historical BTEX Analytical Results**

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Flint Hills Resources Alaska, LLC
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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-124-25	Onsite	10-55	12/06/2007	5.91	<1.00	<1.00	<3.00
MW-124-25	Onsite	10-55	01/04/2008	4.23	<1.00	<1.00	<3.00
MW-124-25	Onsite	10-55	02/12/2008	<1.00	<1.00	<1.00	<3.00
MW-124-25	Onsite	10-55	06/10/2008	1.16	<1.00	<1.00	<3.00
MW-124-25	Onsite	10-55	07/01/2008	4.10	<1.00	<1.00	<2.00
MW-124-25	Onsite	10-55	08/07/2008	38.6	1.16	7.93	67.6
MW-124-25	Onsite	10-55	09/01/2008	73.0	--	--	--
MW-124-25	Onsite	10-55	10/02/2008	92.0	14.0	36.0	110
MW-124-25	Onsite	10-55	11/06/2008	46.7	<0.500	11.1	12.6
MW-124-25	Onsite	10-55	12/04/2008	29.9	<0.500	1.26	13.7
MW-124-25	Onsite	10-55	01/14/2009	1.80	<2.00	<2.00	<4.00*
MW-124-25	Onsite	10-55	02/10/2009	5.08	<2.00	<2.00	<5.67*
MW-124-25	Onsite	10-55	07/07/2009	22.7	18.7	6.45	28.1*
MW-124-25	Onsite	10-55	08/03/2009	13.0	<0.620	<0.620	<1.24*
MW-124-25	Onsite	10-55	09/02/2009	5.23	<2.00	<2.00	<4.00*
MW-124-25	Onsite	10-55	10/02/2009	<0.500	<2.00	<2.00	<4.00*
MW-124-25	Onsite	10-55	11/03/2009	<0.500	<2.00	<2.00	<4.00*
MW-124-25	Onsite	10-55	12/01/2009	15.8	<2.00	<2.00	52.6*
MW-124-25	Onsite	10-55	01/20/2010	<0.500	<2.00	<2.00	<4.00*
MW-124-25	Onsite	10-55	02/17/2010	<0.400	<1.00	<1.00	<3.00*
MW-124-25	Onsite	10-55	03/04/2010	<0.500	<2.00	<2.00	<4.00*
MW-124-25	Onsite	10-55	06/14/2010	<0.400	<1.00	<1.00	<3.00*
MW-124-25	Onsite	10-55	07/23/2010	<0.150	<0.620	<0.620	<1.24*
MW-124-25	Onsite	10-55	08/13/2010	<0.120	<0.310	<0.310	<0.930*
MW-124-25	Onsite	10-55	09/03/2010	<0.400	<1.00	<1.00	<3.00*
MW-124-25	Onsite	10-55	10/07/2010	<0.400	<1.00	<1.00	<3.00*
MW-124-25	Onsite	10-55	11/04/2010	<0.120	<0.310	<0.310	<0.930*
MW-124-25	Onsite	10-55	02/24/2011	<0.400	<1.00	<1.00	<3.00*
MW-124-25	Onsite	10-55	06/01/2011	1.20	<0.310	<0.310	<0.930*
MW-124-25	Onsite	10-55	10/16/2011	<0.240	<0.620	<0.620	<1.86*
MW-124-25	Onsite	10-55	05/05/2012	<0.240	<0.620	<0.620	<1.86*
MW-124-25	Onsite	10-55	11/14/2012	<0.240	<0.620	<0.620	<1.86*
MW-124-25	Onsite	10-55	11/01/2013	<0.240	0.460J	0.320J	2.20J
MW-124-25	Onsite	10-55	03/26/2014	<0.200	<0.500	<0.500	<1.50
MW-124-25	Onsite	10-55	09/03/2014	4.11	1.87	2.58	15.2
MW-124-25	Onsite	10-55	08/07/2015	<0.200	<0.500	<0.500	4.21
MW-124-25	Onsite	10-55	08/15/2016	1.21	<0.500	2.19	20.2
MW-125-25	Onsite	10-55	06/06/1990	21000	10000	1300	2000
MW-125-25	Onsite	10-55	06/26/1990	24000	13000	1800	2800
MW-125-25	Onsite	10-55	08/28/1990	23000	12000	1600	3100
MW-125-25	Onsite	10-55	03/27/1991	12600	8970	1100	2440
MW-125-25	Onsite	10-55	09/17/1991	16000	19000	250	340
MW-125-25	Onsite	10-55	03/17/1992	240	270	10.0	11.0
MW-125-25	Onsite	10-55	09/23/1992	17000	17000	1600	6400
MW-125-25	Onsite	10-55	03/02/1993	4.00	ND	ND	ND
MW-125-25	Onsite	10-55	09/09/1993	34.0	ND	1.00	ND
MW-125-25	Onsite	10-55	03/25/1994	150	ND	2.00	ND
MW-125-25	Onsite	10-55	09/19/1994	370	0.500	6.60	ND
MW-125-25	Onsite	10-55	03/21/1995	240	ND	ND	ND
MW-125-25	Onsite	10-55	09/19/1995	430	11.0	2.20	3.70
MW-125-25	Onsite	10-55	03/26/1996	940	1.00	5.00	2.00
MW-125-25	Onsite	10-55	09/18/1996	3800	4.00	500	1100

**Appendix A-2
Historical BTEX Analytical Results**

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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-125-25	Onsite	10-55	03/18/1997	690	14.0	23.0	23.0
MW-125-25	Onsite	10-55	09/26/1997	184	ND	2.00	ND
MW-125-25	Onsite	10-55	03/20/1998	2600	2100	570	1800
MW-125-25	Onsite	10-55	09/22/1998	5900	8800	1040	3500
MW-125-25	Onsite	10-55	03/23/1999	4100	4800	780	2800
MW-125-25	Onsite	10-55	09/14/1999	6100	9900	1100	3900
MW-125-25	Onsite	10-55	03/14/2000	4000	3700	910	3100
MW-125-25	Onsite	10-55	09/18/2000	4800	6500	1000	3700
MW-125-25	Onsite	10-55	03/14/2001	26.0	2.00	2.00	6.00
MW-125-25	Onsite	10-55	05/10/2001	90.0	<1.00	1.68	1.77
MW-125-25	Onsite	10-55	10/09/2001	49.0	ND	1.20	1.80
MW-125-25	Onsite	10-55	04/04/2002	9.00	ND	ND	ND
MW-125-25	Onsite	10-55	10/08/2002	790	790	160	460
MW-125-25	Onsite	10-55	04/29/2003	750	ND	220	730
MW-125-25	Onsite	10-55	10/05/2003	1300	ND	310	1000
MW-125-25	Onsite	10-55	04/23/2004	1400	ND	310	1320
MW-125-25	Onsite	10-55	09/09/2004	1960	ND	304	1980
MW-125-25	Onsite	10-55	04/20/2005	744	ND	ND	931
MW-125-25	Onsite	10-55	07/18/2006	355	<0.508	6.50	106*
MW-125-25	Onsite	10-55	10/17/2006	151	<0.127	24.4	44.3*
MW-125-25	Onsite	10-55	01/17/2007	133	<4.00	<4.00	143
MW-125-25	Onsite	10-55	04/17/2007	264	<1.00	42.0	301E
MW-125-25	Onsite	10-55	07/18/2007	169	<1.00	31.7	338
MW-125-25	Onsite	10-55	10/16/2007	743	<20.0	116	1030
MW-125-25	Onsite	10-55	01/04/2008	775	7.84	109	1380
MW-125-25	Onsite	10-55	04/03/2008	620	<20.0	37.0	1180
MW-125-25	Onsite	10-55	07/01/2008	380	29.0	16.0	650
MW-125-25	Onsite	10-55	10/02/2008	890	<10.0	29.0	1200
MW-125-25	Onsite	10-55	01/14/2009	861	<100	<100	1760*
MW-125-25	Onsite	10-55	04/08/2009	630	8.48	68.7	1340*
MW-125-25	Onsite	10-55	07/07/2009	757	<2.00	82.3	1490*
MW-125-25	Onsite	10-55	10/02/2009	938	<200	350	2580*
MW-125-25	Onsite	10-55	01/21/2010	745	17.0	102	1920*
MW-125-25	Onsite	10-55	04/05/2010	575	<20.0	25.3	1370*
MW-125-25	Onsite	10-55	07/23/2010	380	<6.20	<6.20	531*
MW-125-25	Onsite	10-55	10/07/2010	771	<1.00	9.93	1150*
MW-125-25	Onsite	10-55	04/05/2011	519	<1.00	42.4	1090*
MW-125-25	Onsite	10-55	08/17/2011	559	14.0	52.4	1110
MW-125-25	Onsite	10-55	10/18/2011	406	<0.620	9.08	752
MW-125-25	Onsite	10-55	02/17/2012	83.8	<0.620	0.400J	95.9
MW-125-25	Onsite	10-55	05/22/2012	11.6	<0.620	<0.620	2.65J
MW-125-25	Onsite	10-55	11/14/2012	130	<0.620	0.910J	<1.86*
MW-125-25	Onsite	10-55	04/16/2013	53.7	<0.620	<0.620	<1.86*
MW-125-25	Onsite	10-55	11/01/2013	2.79	<0.620	<0.620	<1.88
MW-125-25	Onsite	10-55	03/04/2014	0.530	<0.500	<0.500	<1.50
MW-125-25	Onsite	10-55	08/12/2014	4.32	<0.500	<0.500	<1.50
MW-125-25	Onsite	10-55	02/20/2015	0.540	<0.500	<0.500	<1.50
MW-125-25	Onsite	10-55	08/04/2015	<0.200	<0.500	<0.500	<1.50
MW-125-25	Onsite	10-55	02/25/2016	<0.200	<0.500	<0.500	<1.50
MW-125-25	Onsite	10-55	08/18/2016	<0.200	<0.500	<0.500	<1.50
MW-125-25	Onsite	10-55	02/24/2017	<0.200	<0.500	<0.500	<1.50
MW-125-25	Onsite	10-55	08/15/2017	2.10	<0.500	<0.500	1.29J

**Appendix A-2
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Flint Hills Resources Alaska, LLC
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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-125-25	Onsite	10-55	11/16/2017	366JH*	<1.27B*	133	731
MW-126-25	Onsite	10-55	08/30/1991	1200	ND	ND	ND
MW-126-25	Onsite	10-55	09/17/1991	180	ND	ND	ND
MW-126-25	Onsite	10-55	12/11/1991	ND	ND	ND	ND
MW-126-25	Onsite	10-55	03/17/1992	ND	ND	ND	ND
MW-126-25	Onsite	10-55	05/05/1992	ND	ND	ND	ND
MW-126-25	Onsite	10-55	06/16/1992	140	ND	ND	ND
MW-126-25	Onsite	10-55	09/23/1992	76.0	ND	ND	ND
MW-126-25	Onsite	10-55	03/03/1993	ND	ND	ND	ND
MW-126-25	Onsite	10-55	06/22/1993	4.00	ND	ND	ND
MW-126-25	Onsite	10-55	09/09/1993	0.500	ND	ND	ND
MW-126-25	Onsite	10-55	12/21/1993	ND	ND	ND	ND
MW-126-25	Onsite	10-55	03/25/1994	ND	ND	ND	ND
MW-126-25	Onsite	10-55	06/28/1994	0.900	ND	ND	ND
MW-126-25	Onsite	10-55	09/20/1994	ND	ND	ND	ND
MW-126-25	Onsite	10-55	12/13/1994	ND	ND	ND	ND
MW-126-25	Onsite	10-55	03/21/1995	ND	ND	ND	ND
MW-126-25	Onsite	10-55	06/28/1995	ND	ND	ND	ND
MW-126-25	Onsite	10-55	09/19/1995	ND	ND	ND	ND
MW-126-25	Onsite	10-55	12/07/1995	10.5	ND	ND	ND
MW-126-25	Onsite	10-55	01/29/1996	ND	ND	ND	ND
MW-126-25	Onsite	10-55	03/26/1996	ND	ND	ND	ND
MW-126-25	Onsite	10-55	06/19/1996	ND	ND	ND	ND
MW-126-25	Onsite	10-55	09/18/1996	ND	ND	ND	ND
MW-126-25	Onsite	10-55	12/12/1996	ND	ND	ND	ND
MW-126-25	Onsite	10-55	03/18/1997	ND	ND	ND	ND
MW-126-25	Onsite	10-55	06/24/1997	ND	ND	ND	ND
MW-126-25	Onsite	10-55	09/25/1997	ND	ND	ND	ND
MW-126-25	Onsite	10-55	12/12/1997	ND	ND	ND	ND
MW-126-25	Onsite	10-55	03/24/1998	ND	ND	ND	ND
MW-126-25	Onsite	10-55	06/26/1998	ND	ND	ND	ND
MW-126-25	Onsite	10-55	09/22/1998	ND	ND	ND	ND
MW-126-25	Onsite	10-55	12/01/1998	ND	ND	ND	ND
MW-126-25	Onsite	10-55	03/23/1999	ND	ND	ND	ND
MW-126-25	Onsite	10-55	06/29/1999	ND	ND	ND	ND
MW-126-25	Onsite	10-55	09/14/1999	ND	ND	ND	ND
MW-126-25	Onsite	10-55	12/28/1999	ND	ND	ND	ND
MW-126-25	Onsite	10-55	03/15/2000	ND	ND	ND	ND
MW-126-25	Onsite	10-55	06/15/2000	ND	ND	ND	ND
MW-126-25	Onsite	10-55	09/19/2000	ND	ND	ND	ND
MW-126-25	Onsite	10-55	12/12/2000	3.00	ND	ND	ND
MW-126-25	Onsite	10-55	03/14/2001	ND	ND	ND	ND
MW-126-25	Onsite	10-55	06/13/2001	ND	ND	ND	ND
MW-126-25	Onsite	10-55	07/11/2001	ND	ND	ND	ND
MW-126-25	Onsite	10-55	10/09/2001	ND	ND	ND	ND
MW-126-25	Onsite	10-55	01/09/2002	ND	ND	ND	ND
MW-126-25	Onsite	10-55	04/04/2002	ND	ND	ND	ND
MW-126-25	Onsite	10-55	08/14/2002	ND	ND	ND	ND
MW-126-25	Onsite	10-55	10/08/2002	ND	ND	ND	ND
MW-126-25	Onsite	10-55	01/07/2003	ND	ND	ND	ND
MW-126-25	Onsite	10-55	04/29/2003	1.00	ND	ND	ND
MW-126-25	Onsite	10-55	07/10/2003	ND	ND	ND	ND

**Appendix A-2
Historical BTEX Analytical Results**

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-126-25	Onsite	10-55	10/05/2003	ND	ND	ND	ND
MW-126-25	Onsite	10-55	01/13/2004	ND	ND	ND	ND
MW-126-25	Onsite	10-55	04/23/2004	ND	ND	ND	ND
MW-126-25	Onsite	10-55	07/22/2004	ND	ND	ND	ND
MW-126-25	Onsite	10-55	09/09/2004	ND	ND	ND	ND
MW-126-25	Onsite	10-55	01/29/2005	ND	ND	ND	ND
MW-126-25	Onsite	10-55	04/21/2005	ND	ND	ND	ND
MW-126-25	Onsite	10-55	07/26/2005	ND	ND	ND	ND
MW-126-25	Onsite	10-55	07/18/2006	5.63	<0.127	<0.125	<0.118*
MW-126-25	Onsite	10-55	10/18/2006	<0.114	<0.127	<0.125	<0.118*
MW-126-25	Onsite	10-55	01/17/2007	<1.00	<1.00	<1.00	<3.00
MW-126-25	Onsite	10-55	04/18/2007	<1.00	<1.00	<1.00	<3.00
MW-126-25	Onsite	10-55	07/17/2007	1.52	<1.00	<1.00	<3.00
MW-126-25	Onsite	10-55	10/18/2007	<1.00	<1.00	<1.00	<3.00
MW-126-25	Onsite	10-55	01/04/2008	<1.00	<1.00	<1.00	<3.00
MW-126-25	Onsite	10-55	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-126-25	Onsite	10-55	07/01/2008	<1.00	<1.00	<1.00	<2.00
MW-126-25	Onsite	10-55	10/02/2008	<1.00	<1.00	<1.00	<2.00
MW-126-25	Onsite	10-55	01/14/2009	<0.500	<2.00	<2.00	<4.00*
MW-126-25	Onsite	10-55	04/10/2009	<0.150	<0.620	<0.620	<1.24*
MW-126-25	Onsite	10-55	07/07/2009	<0.500	<2.00	<2.00	<4.00*
MW-126-25	Onsite	10-55	10/02/2009	<0.500	<2.00	<2.00	<4.00*
MW-126-25	Onsite	10-55	01/21/2010	<0.500	<2.00	<2.00	<4.00*
MW-126-25	Onsite	10-55	04/06/2010	<0.500	<2.00	<2.00	<4.00*
MW-126-25	Onsite	10-55	07/23/2010	1.00	<0.620	<0.620	<1.24*
MW-126-25	Onsite	10-55	10/07/2010	<0.400	<1.00	<1.00	<3.00*
MW-126-25	Onsite	10-55	02/10/2011	<0.400	<1.00	<1.00	<3.00*
MW-126-25	Onsite	10-55	04/08/2011	<0.400	<1.00	<1.00	<3.00*
MW-126-25	Onsite	10-55	10/19/2011	<0.240	<0.620	<0.620	<1.86*
MW-126-25	Onsite	10-55	05/03/2012	<0.240	<0.620	<0.620	<1.86*
MW-126-25	Onsite	10-55	07/26/2012	<0.240	<0.620	<0.620	<1.86*
MW-126-25	Onsite	10-55	11/15/2012	<0.240	<0.620	<0.620	<1.86*
MW-126-25	Onsite	10-55	01/31/2013	<0.240	<0.620	<0.620	<1.86*
MW-126-25	Onsite	10-55	04/13/2013	<0.240	<0.620	<0.620	<1.86*
MW-126-25	Onsite	10-55	07/20/2013	<0.240	<0.620	<0.620	<1.88
MW-126-25	Onsite	10-55	11/16/2013	<0.200	<0.500	<0.500	<1.50
MW-126-25	Onsite	10-55	03/10/2014	<0.200	<0.500	<0.500	<1.50
MW-126-25	Onsite	10-55	04/24/2014	<0.200	<0.500	<0.500	<1.50
MW-126-25	Onsite	10-55	08/13/2014	<0.200	<0.500	<0.500	<1.50
MW-126-25	Onsite	10-55	11/06/2014	<0.200	<0.500	<0.500	<1.50
MW-126-25	Onsite	10-55	08/10/2015	<0.200	<0.500	<0.500	<1.50
MW-126-25	Onsite	10-55	08/10/2016	<0.200	<0.500	<0.500	<1.50
MW-127-25	Onsite	10-55	08/30/1991	ND	ND	ND	ND
MW-127-25	Onsite	10-55	09/17/1991	ND	ND	ND	ND
MW-127-25	Onsite	10-55	12/11/1991	ND	ND	ND	ND
MW-127-25	Onsite	10-55	03/17/1992	1.20	ND	ND	1.30
MW-127-25	Onsite	10-55	05/05/1992	ND	ND	ND	ND
MW-127-25	Onsite	10-55	06/16/1992	ND	ND	ND	ND
MW-127-25	Onsite	10-55	09/22/1992	1.60	ND	ND	1.60
MW-127-25	Onsite	10-55	03/03/1993	ND	ND	ND	ND
MW-127-25	Onsite	10-55	06/22/1993	ND	ND	ND	ND
MW-127-25	Onsite	10-55	09/09/1993	ND	ND	ND	ND

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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-127-25	Onsite	10-55	12/21/1993	ND	ND	ND	ND
MW-127-25	Onsite	10-55	03/25/1994	11.0	4.00	0.500	2.00
MW-127-25	Onsite	10-55	06/28/1994	ND	ND	ND	ND
MW-127-25	Onsite	10-55	09/20/1994	1.00	0.700	ND	ND
MW-127-25	Onsite	10-55	12/13/1994	1.00	1.50	ND	1.00
MW-127-25	Onsite	10-55	03/21/1995	0.700	ND	ND	ND
MW-127-25	Onsite	10-55	06/28/1995	ND	ND	ND	ND
MW-127-25	Onsite	10-55	09/19/1995	ND	ND	ND	ND
MW-127-25	Onsite	10-55	01/29/1996	ND	ND	ND	ND
MW-127-25	Onsite	10-55	03/26/1996	ND	ND	ND	ND
MW-127-25	Onsite	10-55	06/19/1996	ND	ND	ND	ND
MW-127-25	Onsite	10-55	09/18/1996	0.600	ND	ND	ND
MW-127-25	Onsite	10-55	12/12/1996	2.80	ND	ND	ND
MW-127-25	Onsite	10-55	03/18/1997	ND	ND	ND	ND
MW-127-25	Onsite	10-55	06/24/1997	ND	ND	ND	ND
MW-127-25	Onsite	10-55	09/25/1997	1.00	ND	ND	ND
MW-127-25	Onsite	10-55	12/12/1997	22.0	ND	ND	ND
MW-127-25	Onsite	10-55	01/12/1998	17.0	ND	ND	ND
MW-127-25	Onsite	10-55	02/12/1998	17.0	ND	ND	1.00
MW-127-25	Onsite	10-55	03/20/1998	18.0	ND	ND	3.00
MW-127-25	Onsite	10-55	04/27/1998	20.0	ND	ND	3.00
MW-127-25	Onsite	10-55	05/27/1998	35.0	ND	ND	2.00
MW-127-25	Onsite	10-55	06/26/1998	29.0	ND	1.00	3.00
MW-127-25	Onsite	10-55	08/24/1998	60.0	6.00	3.00	9.00
MW-127-25	Onsite	10-55	09/22/1998	52.0	3.00	3.00	8.00
MW-127-25	Onsite	10-55	10/15/1998	89.0	ND	5.00	15.0
MW-127-25	Onsite	10-55	11/03/1998	135	ND	7.00	16.0
MW-127-25	Onsite	10-55	12/01/1998	76.0	ND	4.00	6.00
MW-127-25	Onsite	10-55	01/13/1999	86.0	ND	3.00	3.00
MW-127-25	Onsite	10-55	02/16/1999	90.0	ND	3.00	2.00
MW-127-25	Onsite	10-55	03/23/1999	103	ND	2.00	2.00
MW-127-25	Onsite	10-55	04/28/1999	127	ND	2.00	ND
MW-127-25	Onsite	10-55	05/26/1999	142	ND	1.00	ND
MW-127-25	Onsite	10-55	06/29/1999	150	ND	ND	ND
MW-127-25	Onsite	10-55	07/21/1999	210	ND	1.00	ND
MW-127-25	Onsite	10-55	08/18/1999	210	ND	ND	ND
MW-127-25	Onsite	10-55	09/14/1999	199	ND	ND	ND
MW-127-25	Onsite	10-55	10/13/1999	180	ND	ND	ND
MW-127-25	Onsite	10-55	11/15/1999	217	ND	ND	ND
MW-127-25	Onsite	10-55	12/28/1999	261	ND	ND	ND
MW-127-25	Onsite	10-55	01/19/2000	267	ND	ND	ND
MW-127-25	Onsite	10-55	02/22/2000	260	ND	ND	ND
MW-127-25	Onsite	10-55	03/14/2000	260	ND	ND	ND
MW-127-25	Onsite	10-55	04/04/2000	270	ND	ND	ND
MW-127-25	Onsite	10-55	05/09/2000	350	ND	ND	ND
MW-127-25	Onsite	10-55	06/15/2000	190	ND	ND	ND
MW-127-25	Onsite	10-55	07/20/2000	280	ND	ND	ND
MW-127-25	Onsite	10-55	08/28/2000	360	ND	ND	ND
MW-127-25	Onsite	10-55	09/19/2000	350	ND	ND	ND
MW-127-25	Onsite	10-55	10/11/2000	180	ND	ND	ND
MW-127-25	Onsite	10-55	11/07/2000	290	ND	ND	ND
MW-127-25	Onsite	10-55	12/12/2000	370	ND	ND	ND

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North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-127-25	Onsite	10-55	01/15/2001	420	ND	ND	ND
MW-127-25	Onsite	10-55	02/14/2001	460	ND	ND	ND
MW-127-25	Onsite	10-55	03/14/2001	430	ND	ND	ND
MW-127-25	Onsite	10-55	04/10/2001	370	ND	ND	ND
MW-127-25	Onsite	10-55	05/10/2001	170	<1.00	<1.00	<2.00
MW-127-25	Onsite	10-55	06/13/2001	420	ND	ND	ND
MW-127-25	Onsite	10-55	07/10/2001	450	ND	ND	ND
MW-127-25	Onsite	10-55	08/21/2001	430	ND	ND	ND
MW-127-25	Onsite	10-55	09/12/2001	500	ND	ND	ND
MW-127-25	Onsite	10-55	10/09/2001	450	ND	ND	ND
MW-127-25	Onsite	10-55	11/14/2001	320	ND	ND	ND
MW-127-25	Onsite	10-55	12/11/2001	290	ND	ND	ND
MW-127-25	Onsite	10-55	01/09/2002	250	ND	ND	ND
MW-127-25	Onsite	10-55	02/04/2002	200	ND	ND	ND
MW-127-25	Onsite	10-55	03/06/2002	160	ND	ND	ND
MW-127-25	Onsite	10-55	04/04/2002	130	ND	ND	ND
MW-127-25	Onsite	10-55	05/07/2002	120	ND	ND	ND
MW-127-25	Onsite	10-55	07/15/2002	130	ND	ND	ND
MW-127-25	Onsite	10-55	08/14/2002	110	ND	ND	ND
MW-127-25	Onsite	10-55	09/11/2002	100	ND	ND	ND
MW-127-25	Onsite	10-55	10/08/2002	48.0	ND	ND	ND
MW-127-25	Onsite	10-55	11/19/2002	43.0	ND	ND	ND
MW-127-25	Onsite	10-55	12/03/2002	57.0	ND	ND	ND
MW-127-25	Onsite	10-55	01/07/2003	34.0	ND	ND	ND
MW-127-25	Onsite	10-55	02/05/2003	29.0	ND	ND	ND
MW-127-25	Onsite	10-55	03/05/2003	27.0	ND	ND	ND
MW-127-25	Onsite	10-55	04/29/2003	5.30	ND	ND	ND
MW-127-25	Onsite	10-55	05/07/2003	36.0	ND	ND	ND
MW-127-25	Onsite	10-55	06/04/2003	23.0	1.00	ND	ND
MW-127-25	Onsite	10-55	07/10/2003	3.00	ND	ND	ND
MW-127-25	Onsite	10-55	08/20/2003	1.30	ND	ND	ND
MW-127-25	Onsite	10-55	09/11/2003	ND	ND	ND	ND
MW-127-25	Onsite	10-55	10/05/2003	ND	ND	ND	ND
MW-127-25	Onsite	10-55	11/11/2003	ND	ND	ND	ND
MW-127-25	Onsite	10-55	01/13/2004	ND	ND	ND	ND
MW-127-25	Onsite	10-55	02/17/2004	ND	ND	ND	ND
MW-127-25	Onsite	10-55	04/23/2004	16.0	ND	ND	2.00
MW-127-25	Onsite	10-55	05/11/2004	19.0	ND	ND	ND
MW-127-25	Onsite	10-55	06/07/2004	ND	ND	ND	ND
MW-127-25	Onsite	10-55	07/22/2004	ND	ND	ND	ND
MW-127-25	Onsite	10-55	08/05/2004	ND	ND	ND	ND
MW-127-25	Onsite	10-55	09/09/2004	ND	ND	ND	ND
MW-127-25	Onsite	10-55	10/25/2004	ND	ND	ND	ND
MW-127-25	Onsite	10-55	11/16/2004	ND	ND	ND	ND
MW-127-25	Onsite	10-55	12/08/2004	ND	ND	ND	ND
MW-127-25	Onsite	10-55	01/29/2005	ND	ND	ND	ND
MW-127-25	Onsite	10-55	02/27/2005	ND	ND	ND	ND
MW-127-25	Onsite	10-55	03/28/2005	ND	ND	ND	ND
MW-127-25	Onsite	10-55	04/21/2005	ND	ND	ND	ND
MW-127-25	Onsite	10-55	05/17/2005	29.0	ND	ND	3.00
MW-127-25	Onsite	10-55	06/16/2005	ND	ND	ND	ND
MW-127-25	Onsite	10-55	07/26/2005	ND	ND	ND	ND

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Historical BTEX Analytical Results

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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-127-25	Onsite	10-55	08/23/2005	ND	ND	ND	ND
MW-127-25	Onsite	10-55	09/21/2005	ND	ND	ND	ND
MW-127-25	Onsite	10-55	07/18/2006	<0.114	<0.127	<0.125	<0.118*
MW-127-25	Onsite	10-55	10/18/2006	<0.114	<0.127	<0.125	<0.118*
MW-127-25	Onsite	10-55	01/17/2007	<1.00	<1.00	<1.00	<3.00
MW-127-25	Onsite	10-55	04/18/2007	<1.00	<1.00	<1.00	<3.00
MW-127-25	Onsite	10-55	07/17/2007	<1.00	<1.00	<1.00	<3.00
MW-127-25	Onsite	10-55	10/18/2007	<1.00	<1.00	<1.00	<3.00
MW-127-25	Onsite	10-55	01/04/2008	<1.00	<1.00	<1.00	<3.00
MW-127-25	Onsite	10-55	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-127-25	Onsite	10-55	07/01/2008	<1.00	<1.00	<1.00	<2.00
MW-127-25	Onsite	10-55	10/02/2008	0.630J	<1.00	<1.00	<2.00
MW-127-25	Onsite	10-55	12/04/2008	<0.500	<0.500	<0.500	<1.00
MW-127-25	Onsite	10-55	01/14/2009	<0.500	<2.00	<2.00	<4.00*
MW-127-25	Onsite	10-55	04/10/2009	<0.150	<0.620	<0.620	<1.24*
MW-127-25	Onsite	10-55	07/07/2009	<0.500	<2.00	<2.00	<4.00*
MW-127-25	Onsite	10-55	10/02/2009	<0.500	<2.00	<2.00	<4.00*
MW-127-25	Onsite	10-55	01/21/2010	<0.500	<2.00	<2.00	<4.00*
MW-127-25	Onsite	10-55	04/06/2010	<0.500	<2.00	<2.00	<4.00*
MW-127-25	Onsite	10-55	07/23/2010	<0.150	<0.620	<0.620	<1.24*
MW-127-25	Onsite	10-55	10/07/2010	<0.400	<1.00	<1.00	<3.00*
MW-127-25	Onsite	10-55	04/13/2011	<0.120	<0.310	<0.310	<0.930*
MW-127-25	Onsite	10-55	08/18/2011	<0.226	<0.266	<0.175	<0.364
MW-127-25	Onsite	10-55	10/20/2011	<0.240	<0.620	<0.620	<1.88
MW-127-25	Onsite	10-55	10/20/2011	<0.240	<0.620	<0.620	<1.86*
MW-127-25	Onsite	10-55	02/21/2012	0.430	<0.620	<0.620	<1.88
MW-127-25	Onsite	10-55	05/18/2012	2.09	<0.620	<0.620	2.31J
MW-127-25	Onsite	10-55	11/12/2012	<0.240	<0.620	<0.620	<1.86*
MW-127-25	Onsite	10-55	04/16/2013	<0.240	<0.620	<0.620	<1.86*
MW-127-25	Onsite	10-55	10/19/2013	54.6	<0.620	<0.620	5.07
MW-127-25	Onsite	10-55	03/07/2014	<0.200	<0.500	<0.500	<1.50
MW-127-25	Onsite	10-55	08/14/2014	2.72	<0.500	<0.500	<1.50
MW-127-25	Onsite	10-55	02/21/2015	<0.200	<0.500	<0.500	<1.50
MW-127-25	Onsite	10-55	08/07/2015	<0.200	<0.500	<0.500	<1.50
MW-127-25	Onsite	10-55	08/15/2016	<0.200	<0.500	<0.500	<1.50
MW-129-40	Onsite	10-55	10/21/1996	10.4	ND	ND	ND
MW-129-40	Onsite	10-55	12/17/1996	38.5	ND	ND	ND
MW-129-40	Onsite	10-55	02/26/1997	21.0	ND	ND	ND
MW-129-40	Onsite	10-55	03/18/1997	10.5	ND	ND	ND
MW-129-40	Onsite	10-55	04/29/1997	6.00	ND	ND	ND
MW-129-40	Onsite	10-55	05/29/1997	2.00	ND	ND	ND
MW-129-40	Onsite	10-55	06/24/1997	5.00	ND	ND	ND
MW-129-40	Onsite	10-55	07/22/1997	3.00	ND	ND	ND
MW-129-40	Onsite	10-55	09/25/1997	ND	ND	ND	ND
MW-129-40	Onsite	10-55	12/12/1997	ND	ND	ND	ND
MW-129-40	Onsite	10-55	03/23/1998	ND	ND	ND	ND
MW-129-40	Onsite	10-55	06/26/1998	ND	ND	ND	ND
MW-129-40	Onsite	10-55	09/28/1998	ND	ND	ND	ND
MW-129-40	Onsite	10-55	12/01/1998	ND	ND	ND	ND
MW-129-40	Onsite	10-55	03/23/1999	ND	ND	ND	ND
MW-129-40	Onsite	10-55	06/29/1999	ND	ND	ND	ND
MW-129-40	Onsite	10-55	09/14/1999	ND	ND	ND	ND

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-129-40	Onsite	10-55	12/28/1999	ND	ND	ND	ND
MW-129-40	Onsite	10-55	03/14/2000	ND	ND	ND	ND
MW-129-40	Onsite	10-55	06/15/2000	ND	ND	ND	ND
MW-129-40	Onsite	10-55	09/19/2000	ND	ND	ND	ND
MW-129-40	Onsite	10-55	12/12/2000	ND	ND	ND	ND
MW-129-40	Onsite	10-55	03/14/2001	ND	ND	ND	ND
MW-129-40	Onsite	10-55	06/13/2001	ND	ND	ND	ND
MW-129-40	Onsite	10-55	07/11/2001	ND	ND	ND	ND
MW-129-40	Onsite	10-55	10/09/2001	4.70	ND	ND	ND
MW-129-40	Onsite	10-55	12/11/2001	ND	ND	ND	ND
MW-129-40	Onsite	10-55	01/09/2002	ND	ND	ND	ND
MW-129-40	Onsite	10-55	02/04/2002	ND	ND	ND	ND
MW-129-40	Onsite	10-55	03/06/2002	ND	ND	ND	ND
MW-129-40	Onsite	10-55	04/04/2002	ND	ND	ND	ND
MW-129-40	Onsite	10-55	07/15/2002	ND	ND	ND	ND
MW-129-40	Onsite	10-55	08/14/2002	ND	ND	ND	ND
MW-129-40	Onsite	10-55	09/11/2002	2400	1900	490	2050
MW-129-40	Onsite	10-55	10/08/2002	ND	ND	ND	ND
MW-129-40	Onsite	10-55	11/19/2002	ND	ND	ND	ND
MW-129-40	Onsite	10-55	12/03/2002	ND	ND	ND	ND
MW-129-40	Onsite	10-55	01/07/2003	ND	ND	ND	ND
MW-129-40	Onsite	10-55	02/05/2003	ND	ND	ND	ND
MW-129-40	Onsite	10-55	03/05/2003	ND	ND	ND	ND
MW-129-40	Onsite	10-55	04/29/2003	ND	ND	ND	ND
MW-129-40	Onsite	10-55	05/07/2003	ND	ND	ND	ND
MW-129-40	Onsite	10-55	06/04/2003	ND	ND	ND	ND
MW-129-40	Onsite	10-55	07/10/2003	ND	ND	ND	ND
MW-129-40	Onsite	10-55	08/02/2003	ND	ND	ND	ND
MW-129-40	Onsite	10-55	09/11/2003	ND	ND	ND	ND
MW-129-40	Onsite	10-55	10/05/2003	ND	ND	ND	ND
MW-129-40	Onsite	10-55	11/11/2003	ND	ND	ND	ND
MW-129-40	Onsite	10-55	01/13/2004	ND	ND	ND	ND
MW-129-40	Onsite	10-55	02/17/2004	ND	ND	ND	ND
MW-129-40	Onsite	10-55	04/23/2004	ND	ND	ND	ND
MW-129-40	Onsite	10-55	05/11/2004	ND	ND	ND	ND
MW-129-40	Onsite	10-55	06/07/2004	ND	ND	ND	ND
MW-129-40	Onsite	10-55	07/22/2004	ND	ND	ND	ND
MW-129-40	Onsite	10-55	08/05/2004	ND	ND	ND	ND
MW-129-40	Onsite	10-55	09/09/2004	ND	ND	ND	ND
MW-129-40	Onsite	10-55	10/25/2004	ND	ND	ND	ND
MW-129-40	Onsite	10-55	11/16/2004	ND	ND	ND	ND
MW-129-40	Onsite	10-55	12/08/2004	ND	ND	ND	ND
MW-129-40	Onsite	10-55	01/29/2005	ND	ND	ND	ND
MW-129-40	Onsite	10-55	02/27/2005	ND	ND	ND	ND
MW-129-40	Onsite	10-55	03/28/2005	ND	ND	ND	ND
MW-129-40	Onsite	10-55	04/21/2005	ND	ND	ND	ND
MW-129-40	Onsite	10-55	05/17/2005	ND	ND	ND	ND
MW-129-40	Onsite	10-55	06/16/2005	ND	ND	ND	ND
MW-129-40	Onsite	10-55	07/26/2005	ND	ND	ND	ND
MW-129-40	Onsite	10-55	08/23/2005	ND	ND	ND	ND
MW-129-40	Onsite	10-55	07/18/2006	<0.114	<0.127	<0.125	<0.118*
MW-129-40	Onsite	10-55	10/19/2006	<0.114	<0.127	<0.125	<0.118*

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-129-40	Onsite	10-55	01/17/2007	<1.00	<1.00	<1.00	<3.00
MW-129-40	Onsite	10-55	04/18/2007	<1.00	<1.00	<1.00	<3.00
MW-129-40	Onsite	10-55	07/17/2007	<1.00	<1.00	<1.00	<3.00
MW-129-40	Onsite	10-55	09/20/2007	<1.00	<1.00	<1.00	<3.00*
MW-129-40	Onsite	10-55	01/04/2008	<1.00	<1.00	<1.00	<3.00
MW-129-40	Onsite	10-55	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-129-40	Onsite	10-55	07/01/2008	<1.00	<1.00	<1.00	<2.00
MW-129-40	Onsite	10-55	09/04/2008	<1.00	--	--	--
MW-129-40	Onsite	10-55	01/14/2009	<0.500	<2.00	<2.00	<4.00*
MW-129-40	Onsite	10-55	04/10/2009	<0.150	<0.620	<0.620	<1.24*
MW-129-40	Onsite	10-55	07/07/2009	<0.500	<2.00	<2.00	<4.00*
MW-129-40	Onsite	10-55	09/02/2009	<0.500	<2.00	<2.00	<4.00*
MW-129-40	Onsite	10-55	01/21/2010	<0.500	<2.00	<2.00	<4.00*
MW-129-40	Onsite	10-55	04/06/2010	<0.500	<2.00	<2.00	<4.00*
MW-129-40	Onsite	10-55	07/22/2010	<0.500	<2.00	<2.00	<4.00*
MW-129-40	Onsite	10-55	09/03/2010	<0.400	<1.00	<1.00	<3.00*
MW-129-40	Onsite	10-55	05/20/2013	<0.240	<0.620	<0.620	<1.86*
MW-129-40	Onsite	10-55	10/19/2013	<0.240	<0.620	<0.620	<1.88
MW-129-40	Onsite	10-55	03/02/2014	<0.200	<0.500	<0.500	<1.50
MW-129-40	Onsite	10-55	08/13/2014	<0.200	<0.500	<0.500	<1.50
MW-129-40	Onsite	10-55	02/24/2015	<0.200	<0.500	<0.500	<1.50
MW-129-40	Onsite	10-55	08/07/2015	<0.200	<0.500	<0.500	<1.50
MW-129-40	Onsite	10-55	08/10/2016	<0.200	<0.500	<0.500	<1.50
MW-130-25	Onsite	10-55	04/29/1997	650	800	310	1400
MW-130-25	Onsite	10-55	09/26/1997	1600	3000	900	4100
MW-130-25	Onsite	10-55	03/24/1998	550	810	260	1200
MW-130-25	Onsite	10-55	09/28/1998	1600	3200	740	3500
MW-130-25	Onsite	10-55	03/23/1999	270	320	77.0	340
MW-130-25	Onsite	10-55	09/14/1999	1200	2800	650	3100
MW-130-25	Onsite	10-55	03/14/2000	780	1200	310	1500
MW-130-25	Onsite	10-55	09/20/2000	950	1800	540	2600
MW-130-25	Onsite	10-55	03/14/2001	30.0	21.0	9.00	42.0
MW-130-25	Onsite	10-55	05/10/2001	55.5	15.3	5.78	25.2
MW-130-25	Onsite	10-55	07/11/2001	98.0	10.0	8.80	28.0
MW-130-25	Onsite	10-55	10/09/2001	110	22.0	15.0	41.0
MW-130-25	Onsite	10-55	01/09/2002	66.0	18.0	18.0	39.0
MW-130-25	Onsite	10-55	04/03/2002	90.0	26.0	19.0	40.0
MW-130-25	Onsite	10-55	08/14/2002	630	1500	310	1650
MW-130-25	Onsite	10-55	10/08/2002	690	2900	450	2480
MW-130-25	Onsite	10-55	01/07/2003	57.0	49.0	23.0	100
MW-130-25	Onsite	10-55	04/29/2003	74.0	60.0	21.0	80.0
MW-130-25	Onsite	10-55	07/10/2003	370	460	92.0	510
MW-130-25	Onsite	10-55	10/05/2003	770	1500	320	1700
MW-130-25	Onsite	10-55	01/13/2004	380	720	240	1300
MW-130-25	Onsite	10-55	04/23/2004	198	40.0	47.0	148
MW-130-25	Onsite	10-55	07/22/2004	113	6.20	36.0	97.0
MW-130-25	Onsite	10-55	09/10/2004	372	201	61.0	296
MW-130-25	Onsite	10-55	01/29/2005	161	12.0	51.0	186
MW-130-25	Onsite	10-55	04/20/2005	105	14.0	30.0	96.0
MW-130-25	Onsite	10-55	07/26/2005	1090	2970	551	2860
MW-130-25	Onsite	10-55	07/18/2006	89.3	95.1	37.8	50.4*
MW-130-25	Onsite	10-55	10/18/2006	496	1620	326	578*

Appendix A-2
Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-130-25	Onsite	10-55	01/17/2007	24.6	8.47	11.7	35.7*
MW-130-25	Onsite	10-55	04/17/2007	10.4	3.63	4.79	17.4
MW-130-25	Onsite	10-55	07/17/2007	106	389	92.9	327
MW-130-25	Onsite	10-55	10/16/2007	274	954	135	821
MW-130-25	Onsite	10-55	01/04/2008	2.96	1.40	1.19	3.56
MW-130-25	Onsite	10-55	04/03/2008	<1.00	1.00	<1.00	<2.00
MW-130-25	Onsite	10-55	07/01/2008	13.0	44.0	11.0	62.0
MW-130-25	Onsite	10-55	10/02/2008	140	910	230	1400
MW-130-25	Onsite	10-55	01/14/2009	2.98	<2.00	<2.00	<6.01*
MW-130-25	Onsite	10-55	04/08/2009	2.43	<0.620	<0.620	<1.24*
MW-130-25	Onsite	10-55	07/07/2009	1.59	<2.00	<2.00	6.86*
MW-130-25	Onsite	10-55	10/02/2009	12.9	6.87	7.07	28.0*
MW-130-25	Onsite	10-55	01/20/2010	18.2	2.48	10.2	38.4*
MW-130-25	Onsite	10-55	04/05/2010	11.6	<2.00	4.81	14.1*
MW-130-25	Onsite	10-55	07/26/2010	2.01	<2.00	<2.00	<4.00*
MW-130-25	Onsite	10-55	10/12/2010	2.05	<0.310	<0.310	<0.930*
MW-130-25	Onsite	10-55	11/11/2013	60.0	145	55.4	414
MW-130-25	Onsite	10-55	03/05/2014	119	247	88.8	666
MW-130-25	Onsite	10-55	09/03/2014	165	579	221	1760
MW-130-25	Onsite	10-55	02/20/2015	201	213	89.6	630
MW-130-25	Onsite	10-55	08/07/2015	386	248	123	947
MW-130-25	Onsite	10-55	03/07/2016	366	44.7	56.3	374
MW-130-25	Onsite	10-55	08/18/2016	335	546	291	2220
MW-130-25	Onsite	10-55	02/24/2017	205	30.3	31.8	266
MW-130-25	Onsite	10-55	08/03/2017	217	178	137	1130
MW-130-25	Onsite	10-55	10/20/2017	185	310	182	1450
MW-130-25	Onsite	10-55	11/15/2017	<124B*	129	102	853
MW-131-25	Onsite	10-55	07/29/1998	ND	ND	ND	ND
MW-131-25	Onsite	10-55	09/23/1998	ND	ND	ND	ND
MW-131-25	Onsite	10-55	03/24/1999	ND	ND	ND	ND
MW-131-25	Onsite	10-55	08/18/1999	ND	ND	ND	ND
MW-131-25	Onsite	10-55	09/15/1999	ND	ND	ND	ND
MW-131-25	Onsite	10-55	10/13/1999	ND	ND	ND	ND
MW-131-25	Onsite	10-55	03/13/2000	ND	ND	ND	ND
MW-131-25	Onsite	10-55	09/18/2000	ND	ND	ND	ND
MW-131-25	Onsite	10-55	12/12/2000	ND	ND	ND	ND
MW-131-25	Onsite	10-55	03/13/2001	ND	ND	ND	ND
MW-131-25	Onsite	10-55	06/13/2001	ND	ND	ND	ND
MW-131-25	Onsite	10-55	07/10/2001	ND	ND	ND	ND
MW-131-25	Onsite	10-55	10/10/2001	ND	ND	ND	ND
MW-131-25	Onsite	10-55	01/09/2002	ND	ND	ND	ND
MW-131-25	Onsite	10-55	04/08/2002	ND	ND	ND	ND
MW-131-25	Onsite	10-55	08/14/2002	ND	ND	ND	ND
MW-131-25	Onsite	10-55	10/07/2002	ND	ND	ND	ND
MW-131-25	Onsite	10-55	01/07/2003	ND	ND	ND	ND
MW-131-25	Onsite	10-55	04/29/2003	ND	ND	ND	ND
MW-131-25	Onsite	10-55	07/10/2003	ND	ND	ND	ND
MW-131-25	Onsite	10-55	10/05/2003	ND	ND	ND	ND
MW-131-25	Onsite	10-55	01/13/2004	ND	ND	ND	ND
MW-131-25	Onsite	10-55	04/23/2004	ND	ND	ND	ND
MW-131-25	Onsite	10-55	07/22/2004	ND	ND	ND	ND
MW-131-25	Onsite	10-55	09/09/2004	ND	ND	ND	ND

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Historical BTEX Analytical Results

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Flint Hills Resources Alaska, LLC
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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-131-25	Onsite	10-55	01/29/2005	ND	ND	ND	ND
MW-131-25	Onsite	10-55	04/21/2005	ND	ND	ND	ND
MW-131-25	Onsite	10-55	07/26/2005	ND	ND	ND	ND
MW-131-25	Onsite	10-55	10/17/2006	<0.114	<0.127	<0.125	<0.118*
MW-131-25	Onsite	10-55	04/18/2007	<1.00	<1.00	<1.00	<3.00
MW-131-25	Onsite	10-55	10/16/2007	<1.00	<1.00	<1.00	<3.00
MW-131-25	Onsite	10-55	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-131-25	Onsite	10-55	10/02/2008	<1.00	<1.00	<1.00	<2.00
MW-131-25	Onsite	10-55	04/08/2009	<0.150	<0.620	<0.620	<1.24*
MW-131-25	Onsite	10-55	10/01/2009	<0.500	<2.00	<2.00	<4.00*
MW-131-25	Onsite	10-55	04/02/2010	<0.500	<2.00	<2.00	<4.00*
MW-131-25	Onsite	10-55	10/06/2010	<0.400	<1.00	<1.00	<3.00*
MW-131-25	Onsite	10-55	04/08/2011	<0.120	<0.310	<0.310	<0.930*
MW-131-25	Onsite	10-55	05/05/2012	<0.240	<0.620	<0.620	<1.86*
MW-131-25	Onsite	10-55	06/06/2013	<0.240	<0.620	<0.620	<1.86*
MW-131-25	Onsite	10-55	07/25/2014	<0.200	<0.500	<0.500	<1.50
MW-131-25	Onsite	10-55	07/27/2015	<0.200	<0.500	<0.500	--
MW-131-25	Onsite	10-55	07/28/2016	<0.200	<0.500	<0.500	<1.50
MW-131-25	Onsite	10-55	07/14/2017	<1.01B*	<0.500	<0.500	<1.50
MW-132-20	Onsite	Water Table	09/15/1999	4.00	10.0	20.0	19.0
MW-132-20	Onsite	Water Table	03/15/2000	8.00	19.0	37.0	65.0
MW-132-20	Onsite	Water Table	09/20/2000	3.80	2.00	31.0	41.0
MW-132-20	Onsite	Water Table	03/14/2001	0.700	ND	4.00	3.00
MW-132-20	Onsite	Water Table	07/11/2001	0.670	ND	4.40	6.70
MW-132-20	Onsite	Water Table	10/10/2001	ND	ND	1.30	ND
MW-132-20	Onsite	Water Table	01/09/2002	0.840	ND	5.20	5.00
MW-132-20	Onsite	Water Table	04/08/2002	ND	ND	ND	ND
MW-132-20	Onsite	Water Table	08/14/2002	1.10	ND	7.00	9.30
MW-132-20	Onsite	Water Table	10/08/2002	ND	ND	ND	ND
MW-132-20	Onsite	Water Table	01/07/2003	ND	ND	ND	ND
MW-132-20	Onsite	Water Table	04/29/2003	ND	ND	ND	3.00
MW-132-20	Onsite	Water Table	07/10/2003	ND	1.10	ND	3.40
MW-132-20	Onsite	Water Table	10/05/2003	ND	ND	ND	ND
MW-132-20	Onsite	Water Table	01/13/2004	1.10	19.0	7.90	34.0
MW-132-20	Onsite	Water Table	04/23/2004	1.00	ND	ND	8.00
MW-132-20	Onsite	Water Table	07/22/2004	ND	ND	ND	6.80
MW-132-20	Onsite	Water Table	09/10/2004	ND	ND	ND	ND
MW-132-20	Onsite	Water Table	01/29/2005	ND	ND	ND	ND
MW-132-20	Onsite	Water Table	04/20/2005	ND	ND	ND	ND
MW-132-20	Onsite	Water Table	07/26/2005	ND	ND	ND	ND
MW-132-20	Onsite	Water Table	10/18/2006	<0.114	<0.127	<0.125	<0.118*
MW-132-20	Onsite	Water Table	04/17/2007	<1.00	<1.00	<1.00	<3.00
MW-132-20	Onsite	Water Table	10/16/2007	<1.00	<1.00	<1.00	<3.00
MW-132-20	Onsite	Water Table	04/03/2008	<1.00	<1.00	<1.00	2.60
MW-132-20	Onsite	Water Table	10/02/2008	<1.00	<1.00	<1.00	<2.00
MW-132-20	Onsite	Water Table	04/08/2009	<0.150	<0.620	<0.620	<1.24*
MW-132-20	Onsite	Water Table	04/06/2010	1.87	<2.00	2.99	36.2*
MW-132-20	Onsite	Water Table	10/13/2010	56.0	<100	165	2450*
MW-132-20	Onsite	Water Table	11/19/2010	0.690	<0.310	1.73	31.8*
MW-132-20	Onsite	Water Table	02/18/2011	0.990	<1.00	2.99	40.6*
MW-132-20	Onsite	Water Table	04/11/2011	1.07	<1.00	1.69	27.7*
MW-132-20	Onsite	Water Table	10/18/2011	<0.240	<0.620	<0.620	<1.93J*

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-132-20	Onsite	Water Table	05/05/2012	0.300J	<0.620	0.860J	7.17*
MW-132-20	Onsite	Water Table	04/13/2013	0.320J	<0.620	1.06	12.8*
MW-132-20	Onsite	Water Table	11/07/2013	<0.240	<0.620	1.02J*	16.4J*
MW-132-20	Onsite	Water Table	03/25/2014	0.512	<0.500	1.26	17.8
MW-132-20	Onsite	Water Table	08/11/2014	0.320J	<0.500	3.69	19.5
MW-132-20	Onsite	Water Table	08/06/2015	0.460	<0.500	2.78	32.9
MW-132-20	Onsite	Water Table	08/15/2016	0.150J	<0.500	0.330J	6.65
MW-133-20	Onsite	Water Table	09/15/1999	ND	ND	ND	ND
MW-133-20	Onsite	Water Table	03/15/2000	ND	ND	ND	ND
MW-133-20	Onsite	Water Table	09/19/2000	ND	ND	ND	ND
MW-133-20	Onsite	Water Table	03/14/2001	ND	ND	ND	ND
MW-133-20	Onsite	Water Table	05/10/2001	<0.500	<2.00	<2.00	<4.00
MW-133-20	Onsite	Water Table	10/10/2001	ND	ND	ND	ND
MW-133-20	Onsite	Water Table	10/08/2002	ND	ND	ND	ND
MW-133-20	Onsite	Water Table	04/29/2003	ND	ND	ND	ND
MW-133-20	Onsite	Water Table	10/05/2003	ND	ND	ND	ND
MW-133-20	Onsite	Water Table	04/23/2004	ND	ND	ND	ND
MW-133-20	Onsite	Water Table	09/10/2004	ND	ND	ND	ND
MW-133-20	Onsite	Water Table	04/20/2005	ND	ND	ND	ND
MW-133-20	Onsite	Water Table	04/17/2007	<1.00	<1.00	<1.00	<3.00
MW-133-20	Onsite	Water Table	04/03/2008	<1.00	<1.00	<1.00	<2.00
MW-133-20	Onsite	Water Table	04/09/2009	<0.150	<0.620	<0.620	<1.24*
MW-133-20	Onsite	Water Table	04/06/2010	<0.500	<2.00	<2.00	<4.00*
MW-133-20	Onsite	Water Table	02/18/2011	<0.400	<1.00	<1.00	<3.00*
MW-133-20	Onsite	Water Table	04/12/2011	<0.400	<1.00	<1.00	<3.00*
MW-133-20	Onsite	Water Table	08/17/2011	<0.226	<0.266	<0.175	<0.364
MW-133-20	Onsite	Water Table	10/18/2011	<0.240	<0.620	<0.620	<1.88
MW-133-20	Onsite	Water Table	02/17/2012	<0.240	<0.620	<0.620	<1.88
MW-133-20	Onsite	Water Table	05/19/2012	<0.240	<0.620	<0.620	<1.88
MW-133-20	Onsite	Water Table	11/15/2012	<0.240	<0.620	<0.620	<1.54J*
MW-133-20	Onsite	Water Table	04/26/2013	<0.240	<0.620	<0.620	<1.86*
MW-133-20	Onsite	Water Table	11/07/2013	<0.240	<0.620	<0.620	<1.88
MW-133-20	Onsite	Water Table	03/25/2014	<0.200	<0.500	<0.500	<1.50
MW-133-20	Onsite	Water Table	08/11/2014	<0.200	<0.500	<0.500	<1.50
MW-133-20	Onsite	Water Table	08/06/2015	<0.200	<0.500	<0.500	<1.50
MW-133-20	Onsite	Water Table	08/15/2016	<0.200	<0.500	<0.500	<1.50
MW-134-20	Onsite	Water Table	09/15/1999	ND	ND	ND	ND
MW-134-20	Onsite	Water Table	10/13/2000	0.700	ND	ND	ND
MW-134-20	Onsite	Water Table	10/10/2001	ND	ND	ND	ND
MW-134-20	Onsite	Water Table	10/08/2002	ND	ND	ND	ND
MW-134-20	Onsite	Water Table	10/05/2003	ND	ND	ND	ND
MW-134-20	Onsite	Water Table	09/10/2004	ND	ND	ND	ND
MW-134-20	Onsite	Water Table	10/18/2006	<0.114	<0.127	<0.125	<0.118*
MW-134-20	Onsite	Water Table	09/20/2007	<1.00	<1.00	<1.00	<3.00*
MW-134-20	Onsite	Water Table	09/04/2008	<1.00	--	--	--
MW-134-20	Onsite	Water Table	09/03/2009	<0.500	<2.00	<2.00	<4.00*
MW-134-20	Onsite	Water Table	09/15/2010	<0.400	<1.00	<1.00	<3.00*
MW-134-20	Onsite	Water Table	08/16/2011	<0.240	<0.620	<0.620	<1.86*
MW-134-20	Onsite	Water Table	08/09/2012	<0.240	<0.620	<0.620	<1.86*
MW-134-20	Onsite	Water Table	07/23/2013	<0.240	<0.620	<0.620	<1.88
MW-134-20	Onsite	Water Table	11/16/2013	<0.200	<0.500	<0.500	<3.00B*
MW-134-20	Onsite	Water Table	03/26/2014	<0.200	<0.500	<0.500	<1.50

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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-134-20	Onsite	Water Table	09/03/2014	<0.200	<0.500	<0.500	<1.50
MW-134-20	Onsite	Water Table	10/30/2014	2.84	<0.500	<0.500	1.89J
MW-134-20	Onsite	Water Table	08/07/2015	0.180J	<0.500	<0.500	<1.50
MW-134-20	Onsite	Water Table	08/17/2016	0.120J	<0.500	<0.500	<1.50
MW-135-20	Onsite	Water Table	07/19/2001	5470	3980	332	1410
MW-135-20	Onsite	Water Table	10/09/2001	14000	7600	500	2120
MW-135-20	Onsite	Water Table	11/14/2001	3000	1500	190	800
MW-135-20	Onsite	Water Table	12/11/2001	4800	2400	320	1280
MW-135-20	Onsite	Water Table	01/08/2002	5800	2600	330	1270
MW-135-20	Onsite	Water Table	02/04/2002	11000	5700	580	2300
MW-135-20	Onsite	Water Table	03/06/2002	6000	3200	390	1430
MW-135-20	Onsite	Water Table	07/15/2002	8400	4200	580	2370
MW-135-20	Onsite	Water Table	08/14/2002	8700	5100	640	2670
MW-135-20	Onsite	Water Table	10/08/2002	16000	11000	890	4200
MW-135-20	Onsite	Water Table	01/07/2003	3900	2900	290	1200
MW-135-20	Onsite	Water Table	02/05/2003	4300	3000	330	1300
MW-135-20	Onsite	Water Table	03/05/2003	4400	3300	380	1500
MW-135-20	Onsite	Water Table	06/04/2003	3600	2300	270	ND
MW-135-20	Onsite	Water Table	07/10/2003	1700	910	160	660
MW-135-20	Onsite	Water Table	08/20/2003	4700	3200	440	2000
MW-135-20	Onsite	Water Table	09/11/2003	1400	3200	570	2300
MW-135-20	Onsite	Water Table	10/05/2003	3500	2300	290	1500
MW-135-20	Onsite	Water Table	11/11/2003	8000	5600	580	2700
MW-135-20	Onsite	Water Table	01/13/2004	2100	800	170	580
MW-135-20	Onsite	Water Table	02/17/2004	2300	520	180	580
MW-135-20	Onsite	Water Table	06/07/2004	1920	242	179	577
MW-135-20	Onsite	Water Table	07/22/2004	1690	240	219	645
MW-135-20	Onsite	Water Table	08/05/2004	3260	802	396	1450
MW-135-20	Onsite	Water Table	09/09/2004	10600	6640	1170	5230
MW-135-20	Onsite	Water Table	10/25/2004	2950	1480	376	1420
MW-135-20	Onsite	Water Table	11/16/2004	1460	222	311	1020
MW-135-20	Onsite	Water Table	12/08/2004	2210	973	355	1260
MW-135-20	Onsite	Water Table	01/29/2005	1560	404	439	1220
MW-135-20	Onsite	Water Table	02/27/2005	881	231	229	859
MW-135-20	Onsite	Water Table	03/28/2005	629	99.0	133	489
MW-135-20	Onsite	Water Table	04/20/2005	1390	245	232	913
MW-135-20	Onsite	Water Table	05/17/2005	1270	248	166	629
MW-135-20	Onsite	Water Table	06/16/2005	983	109	123	461
MW-135-20	Onsite	Water Table	07/26/2005	4980	3470	628	2780
MW-135-20	Onsite	Water Table	08/23/2005	1720	784	302	1360
MW-135-20	Onsite	Water Table	09/21/2005	1910	1250	310	1370
MW-135-20	Onsite	Water Table	07/18/2006	2000	77.4	282	276*
MW-135-20	Onsite	Water Table	08/22/2006	18900	9860	1580	2030*
MW-135-20	Onsite	Water Table	09/18/2006	32200	25800	1990	2720*
MW-135-20	Onsite	Water Table	10/17/2006	18000	12300	1780	2690*
MW-135-20	Onsite	Water Table	11/15/2006	<0.226	<0.202	<0.241	<0.223*
MW-135-20	Onsite	Water Table	12/08/2006	23900	21100	2110	3240*
MW-135-20	Onsite	Water Table	01/17/2007	7660	3410	1020	5060
MW-135-20	Onsite	Water Table	07/18/2007	5940	6380	1250	5810
MW-135-20	Onsite	Water Table	08/21/2007	14800	8640	1370	6280
MW-135-20	Onsite	Water Table	09/20/2007	35700	15400	2730	13800*
MW-135-20	Onsite	Water Table	10/16/2007	19700	16400	1300	6450

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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-135-20	Onsite	Water Table	11/12/2007	3340	1290	646	3520
MW-135-20	Onsite	Water Table	12/06/2007	12000	13500	1140	5920
MW-135-20	Onsite	Water Table	01/04/2008	8810	13000	1080	5170
MW-135-20	Onsite	Water Table	02/12/2008	8730	13100	1040	5920
MW-135-20	Onsite	Water Table	07/14/2008	15000	23000	2300	10900
MW-135-20	Onsite	Water Table	08/07/2008	27400	39200	2230	10900
MW-135-20	Onsite	Water Table	09/01/2008	<500	--	--	--
MW-135-20	Onsite	Water Table	10/02/2008	23000	33000	2300	11000
MW-135-20	Onsite	Water Table	11/06/2008	13400	29700	2930	13600
MW-135-20	Onsite	Water Table	12/04/2008	15500	29500	3050	13400
MW-135-20	Onsite	Water Table	01/14/2009	11600	19100	1950	9720*
MW-135-20	Onsite	Water Table	07/07/2009	15100	30100	2750	14100*
MW-135-20	Onsite	Water Table	08/03/2009	10500	21500	2140	10800*
MW-135-20	Onsite	Water Table	09/02/2009	18500	23700	2120	10600*
MW-135-20	Onsite	Water Table	10/02/2009	10500	19800	1800	8870*
MW-135-20	Onsite	Water Table	11/03/2009	8730	17200	1340	7220*
MW-135-20	Onsite	Water Table	12/01/2009	16100	26900	2060	10400*
MW-135-20	Onsite	Water Table	01/21/2010	4310	17500	1400	6790*
MW-135-20	Onsite	Water Table	02/17/2010	4910	14500	1410	7210*
MW-135-20	Onsite	Water Table	06/14/2010	3430	2600	845	4470*
MW-135-20	Onsite	Water Table	07/23/2010	1790	789	449	2340*
MW-135-20	Onsite	Water Table	08/11/2010	3510	2620	636	3250*
MW-135-20	Onsite	Water Table	09/03/2010	1960	1660	242	1910*
MW-135-20	Onsite	Water Table	10/07/2010	3400	2130	537	3090*
MW-135-20	Onsite	Water Table	11/04/2010	3580	2150	618	3380*
MW-135-20	Onsite	Water Table	02/18/2011	1070	664	220	1420*
MW-135-20	Onsite	Water Table	10/14/2011	2430	6080	586	3100
MW-135-20	Onsite	Water Table	11/07/2013	704	9370	376	1950
MW-135-20	Onsite	Water Table	02/20/2015	1180	6000	1100	5590
MW-135-20	Onsite	Water Table	08/05/2015	922	7470	1950	13800
MW-135-20	Onsite	Water Table	02/24/2017	1570	1020	1520	8280
MW-135-20	Onsite	Water Table	07/24/2017	695	5710	1810	15100
MW-135-20	Onsite	Water Table	11/16/2017	957	9080	1890	16000
MW-136-20	Onsite	Water Table	07/11/2001	5600	1300	240	760
MW-136-20	Onsite	Water Table	10/09/2001	11000	3500	680	2370
MW-136-20	Onsite	Water Table	11/14/2001	8200	2700	490	1830
MW-136-20	Onsite	Water Table	12/11/2001	7300	1200	390	1370
MW-136-20	Onsite	Water Table	01/08/2002	6900	1200	360	1340
MW-136-20	Onsite	Water Table	02/04/2002	6500	1700	360	1380
MW-136-20	Onsite	Water Table	07/15/2002	9500	5500	620	2760
MW-136-20	Onsite	Water Table	08/14/2002	9500	5000	640	2730
MW-136-20	Onsite	Water Table	10/08/2002	17000	12000	1100	5200
MW-136-20	Onsite	Water Table	01/07/2003	5000	2500	470	2000
MW-136-20	Onsite	Water Table	02/05/2003	5300	2400	500	2200
MW-136-20	Onsite	Water Table	03/05/2003	4400	2000	400	1800
MW-136-20	Onsite	Water Table	04/29/2003	2600	860	210	960
MW-136-20	Onsite	Water Table	05/07/2003	3300	1500	310	1400
MW-136-20	Onsite	Water Table	06/04/2003	5500	2300	350	1500
MW-136-20	Onsite	Water Table	07/10/2003	4100	1400	260	1100
MW-136-20	Onsite	Water Table	08/20/2003	8800	5600	630	2800
MW-136-20	Onsite	Water Table	09/11/2003	10000	7900	800	3700
MW-136-20	Onsite	Water Table	10/05/2003	9300	6500	750	3500

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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-136-20	Onsite	Water Table	11/11/2003	9400	5900	830	4300
MW-136-20	Onsite	Water Table	01/13/2004	6100	2000	400	2200
MW-136-20	Onsite	Water Table	02/17/2004	6200	1900	400	2200
MW-136-20	Onsite	Water Table	06/07/2004	2860	589	311	1450
MW-136-20	Onsite	Water Table	07/22/2004	4220	1110	436	2020
MW-136-20	Onsite	Water Table	08/05/2004	5130	1780	387	1840
MW-136-20	Onsite	Water Table	09/09/2004	8300	4320	734	3920
MW-136-20	Onsite	Water Table	10/25/2004	9140	3960	486	2730
MW-136-20	Onsite	Water Table	11/16/2004	5780	1680	336	2140
MW-136-20	Onsite	Water Table	12/08/2004	5850	2310	367	2320
MW-136-20	Onsite	Water Table	01/29/2005	3800	1080	233	1330
MW-136-20	Onsite	Water Table	02/27/2005	3240	1000	217	1340
MW-136-20	Onsite	Water Table	03/28/2005	3330	888	198	1260
MW-136-20	Onsite	Water Table	04/20/2005	2730	806	226	1420
MW-136-20	Onsite	Water Table	05/17/2005	3330	820	412	2340
MW-136-20	Onsite	Water Table	06/16/2005	3060	731	308	1870
MW-136-20	Onsite	Water Table	07/26/2005	5860	2840	476	2600
MW-136-20	Onsite	Water Table	08/23/2005	4460	2320	432	2800
MW-136-20	Onsite	Water Table	09/21/2005	5170	2480	401	2820
MW-136-20	Onsite	Water Table	06/20/2006	6200	2220	510	761*
MW-136-20	Onsite	Water Table	07/18/2006	126	31.3	9.19	14.0*
MW-136-20	Onsite	Water Table	08/22/2006	6930	1950	520	812*
MW-136-20	Onsite	Water Table	09/18/2006	10200	3520	1050	1420*
MW-136-20	Onsite	Water Table	10/17/2006	8770	1850	843	1380*
MW-136-20	Onsite	Water Table	11/15/2006	--	1680	720	1170*
MW-136-20	Onsite	Water Table	12/08/2006	8320	1540	577	1310*
MW-136-20	Onsite	Water Table	01/17/2007	5250	1560	459	3170
MW-136-20	Onsite	Water Table	06/20/2007	9720	6600	1240	5970*
MW-136-20	Onsite	Water Table	07/18/2007	5010	2470	792	479
MW-136-20	Onsite	Water Table	08/21/2007	11300	6710	1220	5950
MW-136-20	Onsite	Water Table	09/20/2007	12900	6860	1140	7150*
MW-136-20	Onsite	Water Table	10/16/2007	6720	3400	538	3810
MW-136-20	Onsite	Water Table	11/12/2007	5020	1130	708	3200
MW-136-20	Onsite	Water Table	12/06/2007	5410	2250	368	3190
MW-136-20	Onsite	Water Table	01/04/2008	3920	1650	358	2600
MW-136-20	Onsite	Water Table	02/12/2008	5370	1920	446	2940
MW-136-20	Onsite	Water Table	06/10/2008	67.3	97.9	2070	10300
MW-136-20	Onsite	Water Table	07/14/2008	9900	9500	1400	7000
MW-136-20	Onsite	Water Table	08/07/2008	17300	25300	2370	11400
MW-136-20	Onsite	Water Table	09/01/2008	20000	--	--	--
MW-136-20	Onsite	Water Table	10/02/2008	14000	17000	1700	8400
MW-136-20	Onsite	Water Table	11/06/2008	10900	9010	1580	7550
MW-136-20	Onsite	Water Table	12/04/2008	11000	9690	1640	7300
MW-136-20	Onsite	Water Table	01/14/2009	7570	7910	1150	5730*
MW-136-20	Onsite	Water Table	06/05/2009	12200	25400	2440	12100*
MW-136-20	Onsite	Water Table	07/07/2009	11300	18000	2020	10400*
MW-136-20	Onsite	Water Table	08/03/2009	8640	<0.620	<0.620	<1.24*
MW-136-20	Onsite	Water Table	09/02/2009	10600	15100	1750	9200*
MW-136-20	Onsite	Water Table	10/02/2009	6540	5690	886	5800*
MW-136-20	Onsite	Water Table	11/03/2009	2930	2270	<1000	4400*
MW-136-20	Onsite	Water Table	12/01/2009	6000	7150	1390	7700*
MW-136-20	Onsite	Water Table	01/20/2010	3240	13700	1180	5870*

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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-136-20	Onsite	Water Table	02/17/2010	4520	4320	747	4910*
MW-136-20	Onsite	Water Table	03/04/2010	3630	3110	685	4150*
MW-136-20	Onsite	Water Table	04/05/2010	3960	4230	739	4940*
MW-136-20	Onsite	Water Table	05/03/2010	3730	4280	790	4860*
MW-136-20	Onsite	Water Table	06/14/2010	2660	2410	549	3190*
MW-136-20	Onsite	Water Table	07/23/2010	1960	1700	379	2350*
MW-136-20	Onsite	Water Table	08/11/2010	2500	2320	462	2800*
MW-136-20	Onsite	Water Table	09/03/2010	3790	2530	498	3350*
MW-136-20	Onsite	Water Table	10/07/2010	2750	2050	402	2520*
MW-136-20	Onsite	Water Table	05/07/2012	875	1720	722	1580*
MW-136-20	Onsite	Water Table	11/01/2013	1770	1820	312	1750
MW-136-20	Onsite	Water Table	03/17/2014	470	1.65J	71.5	339
MW-136-20	Onsite	Water Table	02/20/2015	1080	894	495	2590
MW-136-20	Onsite	Water Table	02/24/2017	417	311	328	1970
MW-137-20	Onsite	Water Table	11/14/2001	1400	24.0	150	267
MW-137-20	Onsite	Water Table	12/11/2001	990	36.0	67.0	55.5
MW-137-20	Onsite	Water Table	01/09/2002	330	7.70	7.40	8.70
MW-137-20	Onsite	Water Table	02/05/2002	740	3.10	5.60	5.30
MW-137-20	Onsite	Water Table	03/06/2002	690	2.50	4.80	4.50
MW-137-20	Onsite	Water Table	04/08/2002	470	ND	1.70	1.00
MW-137-20	Onsite	Water Table	05/07/2002	1900	1200	200	770
MW-137-20	Onsite	Water Table	07/15/2002	1100	350	310	1040
MW-137-20	Onsite	Water Table	08/14/2002	1200	ND	260	615
MW-137-20	Onsite	Water Table	10/08/2002	1300	540	360	1260
MW-137-20	Onsite	Water Table	01/08/2003	170	3.10	20.0	25.0
MW-137-20	Onsite	Water Table	02/05/2003	140	2.40	6.10	13.0
MW-137-20	Onsite	Water Table	03/05/2003	220	2.20	5.10	12.0
MW-137-20	Onsite	Water Table	04/29/2003	500	100	41.0	120
MW-137-20	Onsite	Water Table	05/07/2003	470	110	42.0	110
MW-137-20	Onsite	Water Table	06/04/2003	360	ND	40.0	67.0
MW-137-20	Onsite	Water Table	07/10/2003	370	20.0	14.0	ND
MW-137-20	Onsite	Water Table	08/20/2003	960	2000	360	1500
MW-137-20	Onsite	Water Table	09/11/2003	8400	5700	740	3300
MW-137-20	Onsite	Water Table	10/05/2003	1000	1800	460	1800
MW-137-20	Onsite	Water Table	11/11/2003	370	91.0	310	950
MW-137-20	Onsite	Water Table	01/13/2004	140	2.70	8.80	36.0
MW-137-20	Onsite	Water Table	02/17/2004	220	ND	ND	41.0
MW-137-20	Onsite	Water Table	04/23/2004	595	497	127	506
MW-137-20	Onsite	Water Table	05/11/2004	375	8.00	52.0	193
MW-137-20	Onsite	Water Table	06/07/2004	319	51.0	67.0	190
MW-137-20	Onsite	Water Table	07/22/2004	294	ND	2.80	20.0
MW-137-20	Onsite	Water Table	08/05/2004	390	ND	19.0	50.0
MW-137-20	Onsite	Water Table	09/09/2004	514	ND	65.0	187
MW-137-20	Onsite	Water Table	10/25/2004	452	12.0	114	463
MW-137-20	Onsite	Water Table	11/16/2004	520	ND	ND	130
MW-137-20	Onsite	Water Table	12/08/2004	244	ND	ND	ND
MW-137-20	Onsite	Water Table	01/29/2005	108	ND	ND	6.30
MW-137-20	Onsite	Water Table	02/27/2005	91.0	ND	ND	6.60
MW-137-20	Onsite	Water Table	03/28/2005	84.0	ND	ND	ND
MW-137-20	Onsite	Water Table	04/21/2005	398	646	182	763
MW-137-20	Onsite	Water Table	05/17/2005	155	216	155	457
MW-137-20	Onsite	Water Table	06/16/2005	118	ND	69.0	250

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-137-20	Onsite	Water Table	07/26/2005	256	ND	245	1160
MW-137-20	Onsite	Water Table	08/23/2005	325	2.10	79.0	394
MW-137-20	Onsite	Water Table	09/21/2005	311	ND	97.0	487
MW-137-20	Onsite	Water Table	05/16/2006	138	<0.0890	37.7	143
MW-137-20	Onsite	Water Table	06/21/2006	145	ND	37.2	14.0*
MW-137-20	Onsite	Water Table	07/18/2006	107	<0.127	11.1	3.91*
MW-137-20	Onsite	Water Table	08/22/2006	2040	746	354	560*
MW-137-20	Onsite	Water Table	09/18/2006	3170	1450	614	903*
MW-137-20	Onsite	Water Table	10/18/2006	3300	1120	600	860*
MW-137-20	Onsite	Water Table	11/16/2006	5150	155	497	674*
MW-137-20	Onsite	Water Table	12/08/2006	6280	53.9	333	579*
MW-137-20	Onsite	Water Table	01/17/2007	540	<8.00	34.5	164
MW-137-20	Onsite	Water Table	02/13/2007	294	1.14	3.97	25.7*
MW-137-20	Onsite	Water Table	03/19/2007	150	<5.00	<5.00	<15.0
MW-137-20	Onsite	Water Table	04/18/2007	321	833	302	1340
MW-137-20	Onsite	Water Table	05/22/2007	89.7	<1.00	15.9	30.3
MW-137-20	Onsite	Water Table	06/20/2007	238	5.07	93.0	267*
MW-137-20	Onsite	Water Table	07/18/2007	99.8	<1.00	13.5	101
MW-137-20	Onsite	Water Table	08/21/2007	309	<10.0	127	564
MW-137-20	Onsite	Water Table	09/20/2007	396	21.0	246	1040*
MW-137-20	Onsite	Water Table	10/18/2007	113E	1.32	132E	259E*
MW-137-20	Onsite	Water Table	11/12/2007	120	61.6	20.3	159
MW-137-20	Onsite	Water Table	12/06/2007	91.8	<1.00	1.30	38.2
MW-137-20	Onsite	Water Table	01/04/2008	164	<1.00	<1.00	37.4
MW-137-20	Onsite	Water Table	02/12/2008	155	<5.00	<5.00	<15.0
MW-137-20	Onsite	Water Table	03/05/2008	148	<1.00	<1.00	17.0
MW-137-20	Onsite	Water Table	04/02/2008	170	<1.00	<1.00	16.0
MW-137-20	Onsite	Water Table	05/07/2008	208	<1.00	13.2	92.8
MW-137-20	Onsite	Water Table	06/10/2008	260	131	121	586
MW-137-20	Onsite	Water Table	07/01/2008	400	80.0	200	1030
MW-137-20	Onsite	Water Table	08/07/2008	1780	202	275	1530
MW-137-20	Onsite	Water Table	09/01/2008	1500	--	--	--
MW-137-20	Onsite	Water Table	10/02/2008	1600	1500	550	2200
MW-137-20	Onsite	Water Table	11/06/2008	740	12.2	299	1170
MW-137-20	Onsite	Water Table	12/04/2008	809	8.39	135	685
MW-137-20	Onsite	Water Table	01/14/2009	363	3.13	10.2	201*
MW-137-20	Onsite	Water Table	02/10/2009	355	2.30	4.14	115*
MW-137-20	Onsite	Water Table	03/03/2009	286	<2.00	2.93	69.5*
MW-137-20	Onsite	Water Table	04/10/2009	216	<0.620	<0.620	34.9*
MW-137-20	Onsite	Water Table	05/06/2009	407	21.5	44.5	329*
MW-137-20	Onsite	Water Table	06/05/2009	231	<10.0	35.1	212*
MW-137-20	Onsite	Water Table	07/07/2009	190	<4.00	40.7	220*
MW-137-20	Onsite	Water Table	08/03/2009	178	169	33.5	234*
MW-137-20	Onsite	Water Table	09/02/2009	79.9	2.36	30.7	134*
MW-137-20	Onsite	Water Table	10/02/2009	8.35	<2.00	22.2	49.0*
MW-137-20	Onsite	Water Table	11/03/2009	229	<20.0	<20.0	259*
MW-137-20	Onsite	Water Table	12/01/2009	2260	26.9	106	1570*
MW-137-20	Onsite	Water Table	01/21/2010	60.4	<2.00	<2.00	<4.00*
MW-137-20	Onsite	Water Table	02/17/2010	17.3	<1.00	<1.00	<3.00*
MW-137-20	Onsite	Water Table	03/04/2010	11.0	<2.00	<2.00	<4.00*
MW-137-20	Onsite	Water Table	04/06/2010	6.21	<2.00	<2.00	<4.00*
MW-137-20	Onsite	Water Table	05/14/2010	7.21	<2.00	<2.00	<4.00*

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Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-137-20	Onsite	Water Table	07/19/2010	5.25	<1.00	<1.00	<3.00*
MW-137-20	Onsite	Water Table	07/23/2010	9.09	<0.620	3.79	13.2*
MW-137-20	Onsite	Water Table	08/11/2010	7.74	<0.310	3.20	6.09*
MW-137-20	Onsite	Water Table	09/03/2010	13.6	7.90	31.5	101*
MW-137-20	Onsite	Water Table	10/07/2010	7.89	<1.00	17.3	40.7*
MW-137-20	Onsite	Water Table	11/04/2010	4.74	<0.310	7.22	<0.930*
MW-137-20	Onsite	Water Table	04/07/2011	3.34	<1.00	<1.00	<3.00*
MW-137-20	Onsite	Water Table	10/14/2011	2.50	<0.620	11.6	14.9J*
MW-137-20	Onsite	Water Table	05/07/2012	4.89	2.75	1.71	11.2*
MW-137-20	Onsite	Water Table	07/26/2012	2.02	<0.620	7.45	20.6*
MW-137-20	Onsite	Water Table	01/31/2013	0.740J*	<0.620	<0.620	<1.86*
MW-137-20	Onsite	Water Table	04/22/2013	0.380J	<0.620	<0.620	<1.86*
MW-137-20	Onsite	Water Table	07/20/2013	2.31	<0.620	2.83	10.2
MW-137-20	Onsite	Water Table	11/16/2013	<0.200	<0.500	3.73	19.4
MW-137-20	Onsite	Water Table	03/10/2014	1.56	<0.500	<0.500	<1.50
MW-137-20	Onsite	Water Table	04/24/2014	199	519	178	721
MW-137-20	Onsite	Water Table	06/05/2014	26.9	6.39	30.0	140
MW-137-20	Onsite	Water Table	08/13/2014	14.6	<0.500	17.5	93.0
MW-137-20	Onsite	Water Table	11/06/2014	2.42	<0.500	1.11	64.5
MW-137-20	Onsite	Water Table	02/24/2015	2.14	<0.500	0.680J	<1.50
MW-137-20	Onsite	Water Table	08/10/2015	3.28	<0.500	7.34	24.7
MW-137-20	Onsite	Water Table	08/15/2016	9.74	<0.500	6.33	36.5
MW-137-20	Onsite	Water Table	08/02/2017	150	93.4	128	627
MW-138-20	Onsite	Water Table	09/11/2002	53000	49000	2300	19500
MW-138-20	Onsite	Water Table	04/29/2003	43000	36000	2600	23000
MW-138-20	Onsite	Water Table	07/10/2003	36000	1800	33000	14000
MW-138-20	Onsite	Water Table	09/10/2004	39200	33700	1960	15600
MW-138-20	Onsite	Water Table	01/29/2005	36600	29900	2670	19800
MW-138-20	Onsite	Water Table	04/17/2007	38900	43900	2100	18100
MW-138-20	Onsite	Water Table	04/04/2008	27000	18000	1700	14500
MW-138-20	Onsite	Water Table	04/08/2009	29200	29100	1420	18500*
MW-138-20	Onsite	Water Table	04/03/2010	28500	17700	1180	13800*
MW-138-20	Onsite	Water Table	02/23/2012	19000	10400	1260	13000
MW-138-20	Onsite	Water Table	05/31/2012	27300	23100	1450	16100
MW-138-20	Onsite	Water Table	04/02/2013	12700	11500	894	17000*
MW-138-20	Onsite	Water Table	04/11/2016	3440	10600	634	15100
MW-139-25	Onsite	10-55	07/19/2001	110	<2.00	97.7	834
MW-139-25	Onsite	10-55	10/09/2001	220	2.20	39.0	1200
MW-139-25	Onsite	10-55	01/09/2002	140	ND	37.0	1070
MW-139-25	Onsite	10-55	04/08/2002	110	ND	35.0	740
MW-139-25	Onsite	10-55	08/14/2002	190	ND	51.0	1130
MW-139-25	Onsite	10-55	10/07/2002	250	ND	45.0	1460
MW-139-25	Onsite	10-55	01/08/2003	92.0	ND	31.0	440
MW-139-25	Onsite	10-55	04/29/2003	110	ND	55.0	540
MW-139-25	Onsite	10-55	07/10/2003	79.0	4.00	50.0	610
MW-139-25	Onsite	10-55	10/05/2003	140	ND	39.0	880
MW-139-25	Onsite	10-55	01/13/2004	78.0	ND	27.0	710
MW-139-25	Onsite	10-55	04/23/2004	80.0	ND	41.0	637
MW-139-25	Onsite	10-55	07/22/2004	96.0	ND	66.0	825
MW-139-25	Onsite	10-55	09/09/2004	180	ND	87.0	1480
MW-139-25	Onsite	10-55	01/29/2005	87.0	ND	ND	223
MW-139-25	Onsite	10-55	04/21/2005	84.0	ND	61.0	766

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Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-139-25	Onsite	10-55	07/26/2005	122	ND	109	1210
MW-139-25	Onsite	10-55	07/18/2006	51.8	<0.127	52.0	103*
MW-139-25	Onsite	10-55	10/17/2006	90.9	<0.127	63.4	249*
MW-139-25	Onsite	10-55	01/17/2007	69.0	<1.00	63.0	955
MW-139-25	Onsite	10-55	04/18/2007	72.7	<1.00	64.0	343E
MW-139-25	Onsite	10-55	07/17/2007	60.4	<1.00	58.2	241
MW-139-25	Onsite	10-55	10/16/2007	80.5	<5.00	62.4	1010
MW-139-25	Onsite	10-55	01/04/2008	82.9	<1.00	78.5	830
MW-139-25	Onsite	10-55	04/02/2008	91.0	<5.00	100	1040
MW-139-25	Onsite	10-55	07/01/2008	42.0	<1.00	65.0	553
MW-139-25	Onsite	10-55	10/02/2008	78.0	<5.00	61.0	700
MW-139-25	Onsite	10-55	04/09/2009	141	<0.620	101	904*
MW-139-25	Onsite	10-55	07/07/2009	82.6	<2.00	52.5	488*
MW-139-25	Onsite	10-55	10/01/2009	106	<2.00	66.1	832*
MW-139-25	Onsite	10-55	01/19/2010	99.3	8.25	79.6	610*
MW-139-25	Onsite	10-55	04/02/2010	46.7	3.37	42.4	377*
MW-139-25	Onsite	10-55	07/07/2010	34.4	<1.00	36.1	<21.0*
MW-139-25	Onsite	10-55	10/06/2010	67.8	<1.00	55.7	<41.0*
MW-139-25	Onsite	10-55	02/09/2011	49.2	<0.310	40.6	<6.51*
MW-139-25	Onsite	10-55	04/11/2011	43.7	<1.00	45.7	<11.0*
MW-139-25	Onsite	10-55	08/17/2011	145	<10.6	192	1940
MW-139-25	Onsite	10-55	10/12/2011	47.5	<0.620	41.8	555
MW-139-25	Onsite	10-55	02/14/2012	40.8	<0.620	33.2	478
MW-139-25	Onsite	10-55	05/21/2012	21.7	<0.620	29.5	257
MW-139-25	Onsite	10-55	11/14/2012	36.4	<0.620	36.9	<410*
MW-139-25	Onsite	10-55	05/13/2013	4.17	<0.620	6.96	74.9*
MW-139-25	Onsite	10-55	10/16/2013	36.8	0.410J	23.5	413
MW-139-25	Onsite	10-55	02/28/2014	24.7	<0.500	30.7	184
MW-139-25	Onsite	10-55	07/30/2014	16.0	<0.500	23.5	128
MW-139-25	Onsite	10-55	02/26/2015	6.67	<0.500	3.58	33.4
MW-139-25	Onsite	10-55	07/31/2015	9.91	<0.500	12.1	15.3
MW-139-25	Onsite	10-55	10/02/2015	9.37	<0.500	1.27	17.6
MW-139-25	Onsite	10-55	02/04/2016	4.16J*	<0.500	0.400J	8.07J*
MW-139-25	Onsite	10-55	07/21/2016	1.53	<0.500	0.770J	<1.50
MW-139-25	Onsite	10-55	02/28/2017	4.70	<0.500	2.67	13.9
MW-139-25	Onsite	10-55	07/14/2017	<5.43B*	<0.500	6.66	12.7
MW-139-25	Onsite	10-55	10/20/2017	11.3	<1.00	44.2	304
MW-140-25	Onsite	10-55	07/19/2001	<0.500	<2.00	<2.00	<4.00
MW-140-25	Onsite	10-55	10/10/2001	ND	ND	ND	2.10
MW-140-25	Onsite	10-55	01/09/2002	ND	ND	ND	ND
MW-140-25	Onsite	10-55	04/09/2002	ND	ND	ND	ND
MW-140-25	Onsite	10-55	08/14/2002	12.0	ND	ND	ND
MW-140-25	Onsite	10-55	10/07/2002	ND	ND	ND	ND
MW-140-25	Onsite	10-55	01/08/2003	ND	ND	ND	ND
MW-140-25	Onsite	10-55	04/29/2003	ND	ND	ND	ND
MW-140-25	Onsite	10-55	07/10/2003	ND	ND	ND	ND
MW-140-25	Onsite	10-55	10/05/2003	ND	ND	ND	ND
MW-140-25	Onsite	10-55	01/13/2004	ND	ND	ND	ND
MW-140-25	Onsite	10-55	04/23/2004	ND	ND	ND	ND
MW-140-25	Onsite	10-55	07/22/2004	0.700	ND	ND	ND
MW-140-25	Onsite	10-55	09/09/2004	ND	ND	ND	ND
MW-140-25	Onsite	10-55	01/29/2005	ND	ND	ND	ND

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-140-25	Onsite	10-55	04/22/2005	ND	ND	ND	ND
MW-140-25	Onsite	10-55	07/26/2005	ND	ND	ND	ND
MW-140-25	Onsite	10-55	07/18/2006	<0.114	<0.127	<0.125	<0.118*
MW-140-25	Onsite	10-55	10/17/2006	<0.114	<0.127	<0.125	<0.118*
MW-140-25	Onsite	10-55	01/17/2007	<1.00	<1.00	<1.00	<3.00
MW-140-25	Onsite	10-55	04/18/2007	<1.00	<1.00	<1.00	<3.00
MW-140-25	Onsite	10-55	07/17/2007	<1.00	<1.00	<1.00	<3.00
MW-140-25	Onsite	10-55	10/16/2007	<1.00	<1.00	<1.00	<3.00
MW-140-25	Onsite	10-55	01/04/2008	<1.00	<1.00	<1.00	<3.00
MW-140-25	Onsite	10-55	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-140-25	Onsite	10-55	07/01/2008	<1.00	<1.00	<1.00	<2.00
MW-140-25	Onsite	10-55	10/02/2008	0.300J	<1.00	<1.00	<2.00
MW-140-25	Onsite	10-55	01/12/2009	<0.500	<2.00	<2.00	<4.00*
MW-140-25	Onsite	10-55	04/09/2009	<0.150	<0.620	<0.620	<1.24*
MW-140-25	Onsite	10-55	07/07/2009	<0.500	<2.00	<2.00	<4.00*
MW-140-25	Onsite	10-55	10/01/2009	<0.500	<2.00	<2.00	<4.00*
MW-140-25	Onsite	10-55	01/20/2010	<0.500	<2.00	<2.00	<4.00*
MW-140-25	Onsite	10-55	04/05/2010	<0.500	<2.00	<2.00	<4.00*
MW-140-25	Onsite	10-55	07/07/2010	<0.400	<1.00	<1.00	<3.00*
MW-140-25	Onsite	10-55	10/06/2010	<0.400	<1.00	<1.00	<3.00*
MW-140-25	Onsite	10-55	02/24/2011	<0.400	<1.00	<1.00	<3.00*
MW-140-25	Onsite	10-55	04/07/2011	<0.400	<1.00	<1.00	<3.00*
MW-140-25	Onsite	10-55	10/16/2011	<0.240	<0.620	<0.620	<1.86*
MW-140-25	Onsite	10-55	05/03/2012	<0.240	<0.620	<0.620	<1.86*
MW-140-25	Onsite	10-55	04/27/2013	<0.240	<0.620	<0.620	<1.86*
MW-140-25	Onsite	10-55	10/31/2013	<0.240	<0.620	<0.620	1.08J
MW-140-25	Onsite	10-55	03/21/2014	<0.200	<0.500	<0.500	<1.50
MW-140-25	Onsite	10-55	07/30/2014	<0.200	<0.500	<0.500	<1.50
MW-140-25	Onsite	10-55	07/30/2015	<0.200	<0.500	<0.500	<1.50
MW-140-25	Onsite	10-55	07/21/2016	<0.200	<0.500	<0.500	<1.50
MW-140-25	Onsite	10-55	07/24/2017	<0.200	<0.500	<0.500	<1.50
MW-141-20	Onsite	Water Table	04/05/2002	ND	ND	ND	ND
MW-141-20	Onsite	Water Table	10/07/2002	ND	ND	ND	ND
MW-141-20	Onsite	Water Table	05/07/2003	ND	ND	ND	ND
MW-141-20	Onsite	Water Table	10/05/2003	ND	ND	ND	ND
MW-141-20	Onsite	Water Table	04/23/2004	ND	ND	ND	ND
MW-141-20	Onsite	Water Table	04/21/2005	ND	ND	ND	ND
MW-141-20	Onsite	Water Table	11/17/2006	<0.226	<0.202	<0.241	<0.223*
MW-141-20	Onsite	Water Table	04/17/2007	<1.00	<1.00	<1.00	<3.00
MW-141-20	Onsite	Water Table	09/19/2007	<1.00	<1.00	<1.00	<3.00*
MW-141-20	Onsite	Water Table	04/03/2008	<1.00	<1.00	<1.00	<2.00
MW-141-20	Onsite	Water Table	09/01/2008	<1.00	--	--	--
MW-141-20	Onsite	Water Table	04/08/2009	<0.150	<0.620	<0.620	<1.24*
MW-141-20	Onsite	Water Table	09/03/2009	<0.500	<2.00	<2.00	<4.00*
MW-141-20	Onsite	Water Table	04/02/2010	<0.400	<1.00	<1.00	<3.00*
MW-141-20	Onsite	Water Table	09/03/2010	<0.400	<1.00	<1.00	<3.00*
MW-141-20	Onsite	Water Table	02/09/2011	<0.400	<1.00	<1.00	<3.00*
MW-141-20	Onsite	Water Table	04/15/2011	<0.400	<1.00	<1.00	<3.00*
MW-141-20	Onsite	Water Table	08/17/2011	<0.226	<0.266	<0.175	<0.364
MW-141-20	Onsite	Water Table	10/14/2011	<0.240	<0.620	<0.620	<1.88
MW-141-20	Onsite	Water Table	02/14/2012	<0.240	<0.620	<0.620	<1.88
MW-141-20	Onsite	Water Table	04/27/2012	<0.240	<0.620	<0.620	<1.88

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-141-20	Onsite	Water Table	05/17/2012	<0.240	<0.620	<0.620	<1.88
MW-141-20	Onsite	Water Table	11/15/2012	<0.240	<0.620	<0.620	<1.86*
MW-141-20	Onsite	Water Table	05/08/2013	<0.240	<0.620	<0.620	<1.86*
MW-141-20	Onsite	Water Table	05/08/2013	<0.240	<0.620	<0.620	<1.86*
MW-141-20	Onsite	Water Table	03/07/2014	<0.200	<0.500	<0.500	<1.50
MW-141-20	Onsite	Water Table	07/31/2014	<0.200	<0.500	<0.500	<1.50
MW-141-20	Onsite	Water Table	08/03/2015	<0.200	<0.500	<0.500	<1.50
MW-141-20	Onsite	Water Table	02/23/2016	<0.200	<0.500	<0.500	<1.50
MW-141-20	Onsite	Water Table	08/04/2016	<0.200	<0.500	<0.500	<1.50
MW-141-20	Onsite	Water Table	03/01/2017	<0.200	<0.500	<0.500	<1.50
MW-142-20	Onsite	Water Table	08/13/2001	<1.00	1.20	<1.00	<3.00
MW-142-20	Onsite	Water Table	05/07/2002	110	2.30	ND	ND
MW-142-20	Onsite	Water Table	08/14/2002	ND	ND	ND	ND
MW-142-20	Onsite	Water Table	10/07/2002	9.80	ND	ND	2.40
MW-142-20	Onsite	Water Table	01/08/2003	8.70	ND	ND	ND
MW-142-20	Onsite	Water Table	04/29/2003	ND	ND	ND	ND
MW-142-20	Onsite	Water Table	07/10/2003	ND	ND	ND	ND
MW-142-20	Onsite	Water Table	10/05/2003	5.00	ND	ND	ND
MW-142-20	Onsite	Water Table	01/13/2004	ND	ND	ND	ND
MW-142-20	Onsite	Water Table	04/23/2004	1.00	ND	ND	ND
MW-142-20	Onsite	Water Table	07/22/2004	ND	ND	ND	ND
MW-142-20	Onsite	Water Table	09/09/2004	ND	ND	ND	ND
MW-142-20	Onsite	Water Table	01/29/2005	ND	ND	ND	ND
MW-142-20	Onsite	Water Table	04/21/2005	ND	ND	ND	ND
MW-142-20	Onsite	Water Table	07/26/2005	ND	ND	ND	ND
MW-142-20	Onsite	Water Table	07/18/2006	<0.114	<0.127	<0.125	<0.118*
MW-142-20	Onsite	Water Table	10/17/2006	<0.114	<0.127	<0.125	<0.118*
MW-142-20	Onsite	Water Table	01/17/2007	<1.00	<1.00	<1.00	<3.00
MW-142-20	Onsite	Water Table	04/18/2007	<1.00	<1.00	<1.00	<3.00
MW-142-20	Onsite	Water Table	07/17/2007	<1.00	<1.00	<1.00	<3.00
MW-142-20	Onsite	Water Table	10/16/2007	<1.00	<1.00	<1.00	<3.00
MW-142-20	Onsite	Water Table	01/04/2008	<1.00	<1.00	<1.00	<3.00
MW-142-20	Onsite	Water Table	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-142-20	Onsite	Water Table	07/01/2008	<1.00	<1.00	<1.00	<2.00
MW-142-20	Onsite	Water Table	10/02/2008	1.10	<1.00	<1.00	<2.00
MW-142-20	Onsite	Water Table	01/12/2009	0.614	<2.00	<2.00	<4.00*
MW-142-20	Onsite	Water Table	04/08/2009	0.705	<0.620	<0.620	<1.24*
MW-142-20	Onsite	Water Table	07/07/2009	<0.500	<2.00	<2.00	<4.00*
MW-142-20	Onsite	Water Table	10/01/2009	0.512	<2.00	<2.00	<4.00*
MW-142-20	Onsite	Water Table	01/19/2010	0.633	<2.00	<2.00	<4.00*
MW-142-20	Onsite	Water Table	04/02/2010	<0.500	<2.00	<2.00	<4.00*
MW-142-20	Onsite	Water Table	07/07/2010	<0.400	<1.00	<1.00	<3.00*
MW-142-20	Onsite	Water Table	10/06/2010	<0.400	<1.00	<1.00	<3.00*
MW-142-20	Onsite	Water Table	04/08/2011	<0.120	<0.310	<0.310	<0.930*
MW-142-20	Onsite	Water Table	10/18/2011	0.170J	<0.620	<0.620	<1.86*
MW-142-20	Onsite	Water Table	05/03/2012	<0.240	<0.620	<0.620	<1.86*
MW-142-20	Onsite	Water Table	11/12/2012	<0.240	<0.620	<0.620	<1.86*
MW-142-20	Onsite	Water Table	06/12/2013	<0.240	<0.620	<0.620	<1.86*
MW-142-20	Onsite	Water Table	10/15/2013	<0.240	<0.620	<0.620	<1.88
MW-142-20	Onsite	Water Table	02/28/2014	<0.200	<0.500	<0.500	<1.50
MW-142-20	Onsite	Water Table	09/03/2014	<0.200	<0.500	<0.500	<1.50
MW-142-20	Onsite	Water Table	02/26/2015	<0.200	<0.500	<0.500	<1.50

Appendix A-2
Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-142-20	Onsite	Water Table	07/31/2015	<0.200	<0.500	<0.500	<1.50
MW-142-20	Onsite	Water Table	08/09/2016	<0.200	<0.500	<0.500	<1.50
MW-142-20	Onsite	Water Table	08/09/2017	<0.200	<0.500	<0.500	<1.50
MW-142-20	Onsite	Water Table	11/16/2017	<0.200	<0.500	<0.500	<1.50
MW-143-20	Onsite	Water Table	05/16/2006	<0.136	<0.0890	<0.0990	<0.360
MW-143-20	Onsite	Water Table	06/21/2006	ND	ND	ND	ND
MW-143-20	Onsite	Water Table	07/19/2006	<0.114	<0.127	<0.125	<0.118*
MW-143-20	Onsite	Water Table	08/22/2006	<0.114	<0.127	<0.125	<0.118*
MW-143-20	Onsite	Water Table	09/18/2006	<0.114	<0.127	<0.125	<0.118*
MW-143-20	Onsite	Water Table	10/17/2006	<0.114	<0.127	<0.125	<0.118*
MW-143-20	Onsite	Water Table	11/16/2006	<0.226	<0.202	<0.241	<0.223*
MW-143-20	Onsite	Water Table	12/08/2006	<0.226	<0.202	<0.241	<0.223*
MW-143-20	Onsite	Water Table	01/17/2007	<1.00	<1.00	<1.00	<3.00
MW-143-20	Onsite	Water Table	02/13/2007	<1.00	<1.00	<1.00	<3.00
MW-143-20	Onsite	Water Table	03/19/2007	<1.00	<1.00	<1.00	<3.00
MW-143-20	Onsite	Water Table	04/17/2007	<1.00	<1.00	<1.00	<3.00
MW-143-20	Onsite	Water Table	05/22/2007	<1.00	<1.00	<1.00	<3.00
MW-143-20	Onsite	Water Table	06/20/2007	<1.00	<1.00	<1.00	<3.00*
MW-143-20	Onsite	Water Table	07/18/2007	<1.00	<1.00	<1.00	<3.00
MW-143-20	Onsite	Water Table	08/21/2007	<1.00	<1.00	<1.00	<3.00
MW-143-20	Onsite	Water Table	09/20/2007	<1.00	<1.00	<1.00	<3.00*
MW-143-20	Onsite	Water Table	10/17/2007	<1.00	<1.00	<1.00	<3.00
MW-143-20	Onsite	Water Table	11/12/2007	<1.00	<1.00	<1.00	<3.00
MW-143-20	Onsite	Water Table	12/06/2007	<1.00	<1.00	<1.00	<3.00
MW-143-20	Onsite	Water Table	01/04/2008	<1.00	<1.00	<1.00	<3.00
MW-143-20	Onsite	Water Table	03/05/2008	<1.00	<1.00	<1.00	<3.00
MW-143-20	Onsite	Water Table	04/03/2008	<1.00	<1.00	<1.00	<2.00
MW-143-20	Onsite	Water Table	05/07/2008	<1.00	<1.00	<1.00	<3.00
MW-143-20	Onsite	Water Table	06/10/2008	<1.00	<1.00	<1.00	<3.00
MW-143-20	Onsite	Water Table	07/01/2008	<1.00	<1.00	<1.00	<2.00
MW-143-20	Onsite	Water Table	10/02/2008	<1.00	<1.00	<1.00	<2.00
MW-143-20	Onsite	Water Table	01/13/2009	0.931	<2.00	<2.00	<4.00*
MW-143-20	Onsite	Water Table	02/09/2009	1.56	<2.00	<2.00	<4.00*
MW-143-20	Onsite	Water Table	03/03/2009	1.83	<2.00	<2.00	<4.00*
MW-143-20	Onsite	Water Table	04/09/2009	2.21	<0.620	<0.620	<1.24*
MW-143-20	Onsite	Water Table	05/06/2009	2.08	<0.620	<0.620	<1.24*
MW-143-20	Onsite	Water Table	06/08/2009	1.58	<2.00	<2.00	<4.00*
MW-143-20	Onsite	Water Table	07/06/2009	1.89	<2.00	<2.00	<4.00*
MW-143-20	Onsite	Water Table	08/03/2009	<0.150	<0.620	<0.620	<1.24*
MW-143-20	Onsite	Water Table	09/02/2009	1.40	<2.00	<2.00	<4.00*
MW-143-20	Onsite	Water Table	10/01/2009	<0.500	<2.00	<2.00	<4.00*
MW-143-20	Onsite	Water Table	11/03/2009	<0.500	<2.00	<2.00	<4.00*
MW-143-20	Onsite	Water Table	12/01/2009	<0.500	<2.00	<2.00	<4.00*
MW-143-20	Onsite	Water Table	01/21/2010	<0.500	<2.00	<2.00	<4.00*
MW-143-20	Onsite	Water Table	03/04/2010	<0.500	<2.00	<2.00	<4.00*
MW-143-20	Onsite	Water Table	04/05/2010	<0.500	<2.00	<2.00	<4.00*
MW-143-20	Onsite	Water Table	05/03/2010	<0.500	<2.00	<2.00	<4.00*
MW-143-20	Onsite	Water Table	06/14/2010	<0.400	<1.00	<1.00	<3.00*
MW-143-20	Onsite	Water Table	07/23/2010	<0.150	<0.620	<0.620	<1.24*
MW-143-20	Onsite	Water Table	08/10/2010	<0.150	<0.620	<0.620	<1.24*
MW-143-20	Onsite	Water Table	09/03/2010	<0.400	<1.00	<1.00	<3.00*
MW-143-20	Onsite	Water Table	10/05/2010	<0.400	<1.00	<1.00	<3.00*

Appendix A-2
Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-143-20	Onsite	Water Table	11/04/2010	<0.120	<0.310	<0.310	<0.930*
MW-143-20	Onsite	Water Table	04/08/2011	<0.120	<0.310	<0.310	<0.930*
MW-143-20	Onsite	Water Table	10/20/2011	<0.240	<0.620	<0.620	<1.86*
MW-143-20	Onsite	Water Table	05/03/2012	<0.240	<0.620	<0.620	<1.86*
MW-143-20	Onsite	Water Table	11/15/2012	<0.240	<0.620	<0.620	<1.86*
MW-143-20	Onsite	Water Table	04/18/2013	<0.240	<0.620	<0.620	<1.86*
MW-143-20	Onsite	Water Table	10/15/2013	<0.240	<0.620	<0.620	<1.88
MW-143-20	Onsite	Water Table	02/27/2014	<0.200	<0.500	<0.500	<1.50
MW-143-20	Onsite	Water Table	07/22/2014	<0.200	<0.500	<0.500	<1.50
MW-143-20	Onsite	Water Table	07/24/2015	<0.200	<0.500	<0.500	--
MW-143-20	Onsite	Water Table	07/18/2016	<0.200	<0.500	<0.500	<1.50
MW-143-20	Onsite	Water Table	08/01/2017	<0.200	0.380J	<0.500	<1.50
MW-144A-25	Onsite	10-55	05/16/2006	<0.136	<0.0890	<0.0990	<0.360
MW-144A-25	Onsite	10-55	06/20/2006	ND	ND	ND	ND
MW-144A-25	Onsite	10-55	07/18/2006	<0.114	<0.127	<0.125	<0.118*
MW-144A-25	Onsite	10-55	08/22/2006	<0.114	<0.127	<0.125	<0.118*
MW-144A-25	Onsite	10-55	09/18/2006	<0.114	<0.127	<0.125	<0.118*
MW-144A-25	Onsite	10-55	10/17/2006	<0.114	<0.127	<0.125	<0.118*
MW-144A-25	Onsite	10-55	11/15/2006	4.55	2.06	<0.241	2.19*
MW-144A-25	Onsite	10-55	12/08/2006	<0.226	<0.202	<0.241	<0.223*
MW-144A-25	Onsite	10-55	01/17/2007	<1.00	<1.00	<1.00	<3.00
MW-144A-25	Onsite	10-55	02/13/2007	<1.00	<1.00	<1.00	<3.00
MW-144A-25	Onsite	10-55	03/19/2007	<1.00	<1.00	<1.00	<3.00
MW-144A-25	Onsite	10-55	04/18/2007	<1.00	<1.00	<1.00	<3.00
MW-144A-25	Onsite	10-55	05/22/2007	<1.00	<1.00	<1.00	<3.00
MW-144A-25	Onsite	10-55	06/20/2007	<1.00	<1.00	<1.00	<3.00*
MW-144A-25	Onsite	10-55	07/17/2007	<1.00	<1.00	<1.00	<3.00
MW-144A-25	Onsite	10-55	08/21/2007	<1.00	<1.00	<1.00	<3.00
MW-144A-25	Onsite	10-55	09/20/2007	<1.00	<1.00	<1.00	<3.00*
MW-144A-25	Onsite	10-55	10/16/2007	<1.00	<1.00	<1.00	<3.00
MW-144A-25	Onsite	10-55	11/12/2007	<1.00	<1.00	<1.00	<3.00
MW-144A-25	Onsite	10-55	12/06/2007	<1.00	<1.00	<1.00	<3.00
MW-144A-25	Onsite	10-55	01/04/2008	<1.00	<1.00	<1.00	<3.00
MW-144A-25	Onsite	10-55	03/05/2008	<1.00	<1.00	<1.00	<3.00
MW-144A-25	Onsite	10-55	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-144A-25	Onsite	10-55	05/07/2008	<1.00	<1.00	<1.00	<3.00
MW-144A-25	Onsite	10-55	06/10/2008	<1.00	<1.00	<1.00	<3.00
MW-144A-25	Onsite	10-55	07/01/2008	<1.00	<1.00	<1.00	<2.00
MW-144A-25	Onsite	10-55	10/02/2008	<1.00	<1.00	<1.00	<2.00
MW-144A-25	Onsite	10-55	04/09/2009	<0.150	<0.620	<0.620	<1.24*
MW-144A-25	Onsite	10-55	07/07/2009	<0.500	<2.00	<2.00	<4.00*
MW-144A-25	Onsite	10-55	10/02/2009	1.56	5.55	<2.00	<4.00*
MW-144A-25	Onsite	10-55	01/19/2010	<0.500	<2.00	<2.00	<4.00*
MW-144A-25	Onsite	10-55	04/02/2010	<0.500	<2.00	<2.00	<4.00*
MW-144A-25	Onsite	10-55	07/23/2010	<0.150	<0.620	<0.620	<1.24*
MW-144A-25	Onsite	10-55	10/05/2010	<0.400	<1.00	<1.00	<3.00*
MW-144A-25	Onsite	10-55	02/08/2011	<0.400	<1.00	<1.00	<3.00*
MW-144A-25	Onsite	10-55	04/26/2011	<0.400	<1.00	<1.00	<3.00*
MW-144A-25	Onsite	10-55	10/14/2011	<0.240	<0.620	<0.620	<1.86*
MW-144A-25	Onsite	10-55	05/02/2012	<0.240	<0.620	<0.620	<1.86*
MW-144A-25	Onsite	10-55	11/14/2012	<0.240	<0.620	<0.620	<1.86*
MW-144A-25	Onsite	10-55	04/27/2013	<0.240	<0.620	<0.620	<1.86*

Appendix A-2
Historical BTEX Analytical Results

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-144A-25	Onsite	10-55	10/30/2013	<0.240	<0.620	<0.620	<1.88
MW-144A-25	Onsite	10-55	03/21/2014	<0.200	<0.500	<0.500	<1.50
MW-144A-25	Onsite	10-55	07/30/2014	<0.200	<0.500	<0.500	<1.50
MW-144A-25	Onsite	10-55	07/24/2015	<0.200	<0.500	<0.500	<1.50
MW-144A-25	Onsite	10-55	07/21/2016	<0.200	<0.500	<0.500	<1.50
MW-144A-25	Onsite	10-55	07/14/2017	<0.600B*	<0.500	<0.500	1.11J
MW-145-20	Onsite	Water Table	05/16/2006	<0.136	<0.0890	<0.0990	<0.360
MW-145-20	Onsite	Water Table	06/21/2006	ND	ND	ND	ND
MW-145-20	Onsite	Water Table	07/18/2006	<0.114	<0.127	<0.125	<0.118*
MW-145-20	Onsite	Water Table	08/22/2006	<0.114	<0.127	<0.125	<0.118*
MW-145-20	Onsite	Water Table	09/18/2006	<0.114	<0.127	<0.125	<0.118*
MW-145-20	Onsite	Water Table	10/18/2006	<0.114	<0.127	<0.125	<0.118*
MW-145-20	Onsite	Water Table	11/16/2006	<0.226	<0.202	<0.241	<0.223*
MW-145-20	Onsite	Water Table	12/08/2006	<0.226	<0.202	<0.241	<0.223*
MW-145-20	Onsite	Water Table	01/17/2007	<1.00	<1.00	<1.00	<3.00
MW-145-20	Onsite	Water Table	02/13/2007	<1.00	<1.00	<1.00	<3.00
MW-145-20	Onsite	Water Table	03/19/2007	<1.00	<1.00	<1.00	<3.00
MW-145-20	Onsite	Water Table	04/18/2007	<1.00	<1.00	<1.00	<3.00
MW-145-20	Onsite	Water Table	05/22/2007	<1.00	<1.00	<1.00	<3.00
MW-145-20	Onsite	Water Table	06/20/2007	<1.00	<1.00	<1.00	<3.00*
MW-145-20	Onsite	Water Table	07/17/2007	<1.00	<1.00	<1.00	<3.00
MW-145-20	Onsite	Water Table	08/21/2007	<1.00	<1.00	<1.00	<3.00
MW-145-20	Onsite	Water Table	09/20/2007	<1.00	<1.00	<1.00	<3.00*
MW-145-20	Onsite	Water Table	10/18/2007	<1.00	<1.00	<1.00	<3.00
MW-145-20	Onsite	Water Table	11/12/2007	<1.00	1.01	<1.00	<3.00
MW-145-20	Onsite	Water Table	12/06/2007	1.00	1.81	<1.00	<3.00
MW-145-20	Onsite	Water Table	03/05/2008	<1.00	<1.00	<1.00	<3.00
MW-145-20	Onsite	Water Table	04/02/2008	<1.00	<1.00	<1.00	<2.00
MW-145-20	Onsite	Water Table	05/07/2008	<1.00	<1.00	<1.00	<3.00
MW-145-20	Onsite	Water Table	06/10/2008	<1.00	<1.00	<1.00	<3.00
MW-145-20	Onsite	Water Table	07/01/2008	<1.00	<1.00	<1.00	<2.00
MW-145-20	Onsite	Water Table	10/02/2008	<1.00	<1.00	<1.00	<2.00
MW-145-20	Onsite	Water Table	01/14/2009	<0.500	<2.00	<2.00	<4.00*
MW-145-20	Onsite	Water Table	04/10/2009	<0.150	<0.620	<0.620	<1.24*
MW-145-20	Onsite	Water Table	07/07/2009	<0.500	<2.00	<2.00	<4.00*
MW-145-20	Onsite	Water Table	10/02/2009	<0.500	<2.00	<2.00	<4.00*
MW-145-20	Onsite	Water Table	01/21/2010	<0.500	<2.00	<2.00	<4.00*
MW-145-20	Onsite	Water Table	04/06/2010	<0.500	<2.00	<2.00	<4.00*
MW-145-20	Onsite	Water Table	07/22/2010	<0.500	<2.00	<2.00	<4.00*
MW-145-20	Onsite	Water Table	10/07/2010	<0.400	<1.00	<1.00	<3.00*
MW-145-20	Onsite	Water Table	02/10/2011	<0.400	<1.00	<1.00	<3.00*
MW-145-20	Onsite	Water Table	04/07/2011	<0.400	<1.00	<1.00	<3.00*
MW-145-20	Onsite	Water Table	10/19/2011	0.170J	<0.620	<0.620	<1.86*
MW-145-20	Onsite	Water Table	05/03/2012	<0.240	<0.620	<0.620	<1.86*
MW-145-20	Onsite	Water Table	07/26/2012	<0.240	<0.620	<0.620	<1.86*
MW-145-20	Onsite	Water Table	11/15/2012	<0.240	<0.620	<0.620	<1.86*
MW-145-20	Onsite	Water Table	01/31/2013	<0.240	<0.620	<0.620	<1.86*
MW-145-20	Onsite	Water Table	04/27/2013	<0.240	<0.620	<0.620	<1.86*
MW-145-20	Onsite	Water Table	07/20/2013	<0.240	<0.620	<0.620	<1.88
MW-145-20	Onsite	Water Table	10/19/2013	<0.240	<0.620	<0.620	<1.88
MW-145-20	Onsite	Water Table	03/02/2014	<0.200	<0.500	<0.500	<1.50
MW-145-20	Onsite	Water Table	06/17/2014	<0.200	<0.500	<0.500	<1.50

Appendix A-2
Historical BTEX Analytical Results

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-145-20	Onsite	Water Table	08/13/2014	<0.200	<0.500	<0.500	<1.50
MW-145-20	Onsite	Water Table	11/06/2014	<0.200	<0.500	<0.500	<1.50
MW-145-20	Onsite	Water Table	02/24/2015	<0.200	<0.500	<0.500	<1.50
MW-145-20	Onsite	Water Table	08/10/2015	<0.200	<0.500	<0.500	<1.50
MW-145-20	Onsite	Water Table	08/10/2016	<0.200	<0.500	<0.500	<1.50
MW-145-20	Onsite	Water Table	08/10/2017	<0.200	<0.500	<0.500	<1.50
MW-145-20	Onsite	Water Table	11/16/2017	<0.860B*	7.21	<1.45B*	<11.1B*
MW-146A-15	Onsite	Water Table	10/05/2008	<0.500	<2.00	<2.00	<4.00*
MW-147A-15	Onsite	Water Table	10/05/2008	<0.500	<2.00	<2.00	<4.00*
MW-148A-15	Offsite	Water Table	10/04/2008	<0.500	<2.00	<2.00	<4.00*
MW-148A-15	Offsite	Water Table	04/21/2009	<0.150	<0.620	<0.620	<1.24*
MW-148A-15	Offsite	Water Table	04/08/2011	<0.120	<0.310	<0.310	<0.930*
MW-148A-15	Offsite	Water Table	08/18/2011	<0.226	<0.266	<0.175	<0.364
MW-148A-15	Offsite	Water Table	10/07/2011	<0.240	<0.620	<0.620	<1.88
MW-148A-15	Offsite	Water Table	02/12/2012	<0.240	<0.620	<0.620	<1.88
MW-148A-15	Offsite	Water Table	05/03/2012	<0.240	<0.620	<0.620	<1.86*
MW-148A-15	Offsite	Water Table	10/22/2012	<0.240	<0.620	<0.620	<1.86*
MW-148A-15	Offsite	Water Table	05/06/2013	<0.240	<0.620	<0.620	<1.86*
MW-148A-15	Offsite	Water Table	10/11/2013	<0.240	<0.620	<0.620	<1.88
MW-148A-15	Offsite	Water Table	04/09/2014	<0.200	<0.500	<0.500	<1.50
MW-148A-15	Offsite	Water Table	08/04/2014	<0.200	<0.500	<0.500	<1.50
MW-148A-15	Offsite	Water Table	07/17/2015	<0.200	<0.500	<0.500	<1.50
MW-148B-30	Offsite	10-55	04/21/2009	<0.150	<0.620	<0.620	<1.24*
MW-148B-30	Offsite	10-55	04/08/2011	<0.120	<0.310	<0.310	<0.930*
MW-148B-30	Offsite	10-55	10/07/2011	<0.240	<0.620	<0.620	<1.86*
MW-148B-30	Offsite	10-55	05/01/2012	<0.240	<0.620	<0.620	<1.86*
MW-148B-30	Offsite	10-55	11/11/2012	<0.240	<0.620	<0.620	<1.86*
MW-148B-30	Offsite	10-55	04/15/2013	<0.240	<0.620	<0.620	<1.86*
MW-148B-30	Offsite	10-55	10/11/2013	<0.240	<0.620	<0.620	<1.88
MW-149A-15	Onsite	Water Table	10/04/2008	<0.500	<2.00	<2.00	<4.00*
MW-149A-15	Onsite	Water Table	04/21/2009	<0.150	<0.620	<0.620	<1.24*
MW-149A-15	Onsite	Water Table	04/18/2011	<0.400	<1.00	<1.00	<3.00*
MW-149A-15	Onsite	Water Table	08/18/2011	<0.226	<0.266	<0.175	<0.364
MW-149A-15	Onsite	Water Table	10/13/2011	<0.240	<0.620	<0.620	<1.88
MW-149A-15	Onsite	Water Table	02/12/2012	<0.240	<0.620	<0.620	<1.88
MW-149A-15	Onsite	Water Table	05/17/2012	<0.240	<0.620	<0.620	<1.88
MW-149A-15	Onsite	Water Table	11/10/2012	<0.240	<0.620	<0.620	<1.56J*
MW-149A-15	Onsite	Water Table	04/10/2013	<0.240	<0.620	<0.620	<1.86*
MW-149A-15	Onsite	Water Table	10/09/2013	<0.240	<0.620	<0.620	<1.88
MW-149A-15	Onsite	Water Table	03/24/2014	<0.200	<0.500	<0.500	<1.50
MW-149A-15	Onsite	Water Table	07/26/2014	<0.200	<0.500	<0.500	<1.50
MW-149A-15	Onsite	Water Table	07/17/2015	<0.200	<0.500	<0.500	<1.50
MW-149A-15	Onsite	Water Table	07/10/2017	<0.200	<0.500	<0.500	<1.50
MW-149B-20	Onsite	Water Table	04/21/2009	<0.150	<0.620	<0.620	<1.24*
MW-149B-20	Onsite	Water Table	04/18/2011	<0.400	<1.00	<1.00	<3.00*
MW-149B-20	Onsite	Water Table	10/13/2011	<0.240	<0.620	<0.620	<1.86*
MW-149B-20	Onsite	Water Table	05/17/2012	<0.240	<0.620	<0.620	<1.88
MW-149B-20	Onsite	Water Table	11/10/2012	<0.240	<0.620	<0.620	<1.86*
MW-149B-20	Onsite	Water Table	04/10/2013	<0.240	<0.620	<0.620	<1.86*
MW-149B-20	Onsite	Water Table	10/09/2013	<0.240	<0.620	<0.620	<1.88
MW-153A-15	Offsite	Water Table	04/13/2011	<0.120	<0.310	<0.310	<0.930*
MW-153A-15	Offsite	Water Table	08/18/2011	<0.226	<0.266	<0.175	<0.364

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-153A-15	Offsite	Water Table	10/12/2011	<0.240	<0.620	<0.620	<1.88
MW-153A-15	Offsite	Water Table	02/13/2012	<0.240	<0.620	<0.620	<1.88
MW-153A-15	Offsite	Water Table	05/10/2012	<0.240	<0.620	<0.620	<1.88
MW-153A-15	Offsite	Water Table	11/14/2012	<0.240	<0.620	<0.620	<1.86*
MW-153A-15	Offsite	Water Table	04/09/2013	<0.240	<0.620	<0.620	<1.86*
MW-153A-15	Offsite	Water Table	10/11/2013	<0.240	<0.620	<0.620	<1.88
MW-153A-15	Offsite	Water Table	04/10/2014	<0.200	<0.500	<0.500	<1.50
MW-153A-15	Offsite	Water Table	10/10/2014	<0.200	<0.500	<0.500	<1.50
MW-153B-55	Offsite	10-55	04/13/2011	<0.120	<0.310	<0.310	<0.930*
MW-153B-55	Offsite	10-55	10/12/2011	<0.240	<0.620	<0.620	<1.86*
MW-153B-55	Offsite	10-55	11/14/2012	<0.240	<0.620	<0.620	<1.86*
MW-153B-55	Offsite	10-55	05/09/2013	<0.240	<0.620	<0.620	<1.86*
MW-153B-55	Offsite	10-55	10/11/2013	<0.240	<0.620	<0.620	<1.88
MW-154A-75	Onsite	55-90	11/15/2012	<0.240	<0.620	<0.620	<1.86*
MW-154A-75	Onsite	55-90	02/01/2013	<0.240	<0.620	<0.620	<1.86*
MW-154A-75	Onsite	55-90	05/20/2013	0.290J	0.360J	0.320J	<1.86*
MW-154A-75	Onsite	55-90	10/17/2013	<0.240	0.390J	<0.620	<1.88
MW-154B-95	Onsite	55-90	11/15/2012	<0.240	<0.620	<0.620	<1.86*
MW-154B-95	Onsite	55-90	02/01/2013	0.150J	<1.00B*	<0.620	<1.86*
MW-154B-95	Onsite	55-90	05/17/2013	<0.240	<0.620	<0.620	<1.86*
MW-154B-95	Onsite	55-90	10/17/2013	<0.240	0.310J	<0.620	<1.88
MW-173A-15	Onsite	Water Table	04/09/2010	<0.400	<1.00	<1.00	<3.00*
MW-173B-150	Onsite	90-160	04/09/2010	<0.400	<1.00	<1.00	<3.00*
MW-174-15	Onsite	Water Table	04/04/2013	0.490	0.740J	<0.620	1.25J*
MW-174-15	Onsite	Water Table	10/23/2013	<0.240	<0.620	<0.620	<1.88
MW-174B-90	Onsite	55-90	02/14/2012	<0.240	<0.620	<0.620	<1.88
MW-175-90	Onsite	55-90	11/14/2012	<0.240	<0.620	<0.620	<1.86*
MW-175-90	Onsite	55-90	02/05/2013	<0.240	<0.620	<0.620	<1.86*
MW-175-90	Onsite	55-90	11/04/2013	<0.240	<0.620	<0.620	<1.88
MW-176A-15	Onsite	Water Table	05/22/2012	295	362	130	803
MW-176A-15	Onsite	Water Table	12/12/2012	116	63.8	92.5	694*
MW-176A-15	Onsite	Water Table	04/02/2013	180	187	131	896*
MW-176A-15	Onsite	Water Table	11/11/2013	76.8	78.6	150	1140
MW-176A-15	Onsite	Water Table	07/13/2017	139	7.61	28.7	164
MW-176B-50	Onsite	10-55	12/12/2012	<0.240	<0.620	<0.620	<1.86*
MW-176B-50	Onsite	10-55	01/12/2013	<0.240	<0.620	<0.620	<1.86*
MW-176C-90	Onsite	55-90	12/12/2012	<0.240	0.330J	<0.620	<1.86*
MW-176C-90	Onsite	55-90	01/14/2013	<0.240	<0.620	<0.620	<1.86*
MW-178B-50	Onsite	10-55	12/13/2012	<0.240	<0.620	<0.620	<1.86*
MW-178C-90	Onsite	55-90	12/13/2012	<0.240	<0.620	<0.620	<1.86*
MW-179A-15	Onsite	Water Table	10/11/2011	0.220J	<0.620	<0.620	<1.81J*
MW-179A-15	Onsite	Water Table	11/12/2013	<0.200	0.320J	<0.500	1.04J
MW-179A-15	Onsite	Water Table	08/14/2014	2.55	<0.500	<0.500	<1.50
MW-179A-15	Onsite	Water Table	08/06/2015	<0.200	<0.500	<0.500	<1.50
MW-179A-15	Onsite	Water Table	08/12/2016	<0.200	<0.500	<0.500	<1.50
MW-179B-50	Onsite	10-55	08/09/2013	<0.240	<0.620	<0.620	<1.88
MW-179C-90	Onsite	55-90	08/09/2013	<0.240	<0.620	<0.620	<1.88
MW-180A-15	Onsite	Water Table	11/04/2011	4.51	<0.620	18.9	30.7*
MW-180A-15	Onsite	Water Table	11/12/2012	0.210J	2.06	24.1	77.4*
MW-180A-15	Onsite	Water Table	11/11/2013	0.930	1.96	34.4J*	57.6J*
MW-180A-15	Onsite	Water Table	03/25/2014	0.148J	<0.500	9.02	14.6
MW-180A-15	Onsite	Water Table	08/13/2014	0.680	<0.500	44.7	114

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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-180A-15	Onsite	Water Table	08/07/2015	0.450	<0.500	1.72	4.09
MW-180A-15	Onsite	Water Table	08/12/2016	0.380J	<0.500	5.27	8.28
MW-180A-15	Onsite	Water Table	08/16/2017	1.55	<0.500	3.07	7.65
MW-180A-15	Onsite	Water Table	11/15/2017	1.51	<0.500	11.1	23.3
MW-180B-50	Onsite	10-55	11/12/2012	<0.240	<0.620	<0.620	<1.86*
MW-180C-90	Onsite	55-90	11/12/2012	<0.240	<0.620	<0.620	<1.86*
MW-186A-15	Onsite	Water Table	05/24/2013	58.3	1.04	75.2	269*
MW-186A-15	Onsite	Water Table	11/05/2013	2.19	<0.620	17.4	117
MW-186A-15	Onsite	Water Table	08/05/2015	<0.200	<0.500	0.620J	8.90
MW-186B-60	Onsite	10-55	11/15/2012	<0.240	<0.620	<0.620	<1.86*
MW-186B-60	Onsite	10-55	01/12/2013	<0.240	<0.620	<0.620	<1.86*
MW-186B-60	Onsite	10-55	05/22/2013	<0.400B*	0.320J	0.310J	<1.86*
MW-186B-60	Onsite	10-55	11/05/2013	<0.240	<0.620	<0.620	<1.88
MW-186E-75	Onsite	55-90	05/22/2013	<0.400B*	0.340J	0.340J	<1.86*
MW-186E-75	Onsite	55-90	11/05/2013	0.720	0.440J	0.530J	2.05J
MW-186C-100	Onsite	55-90	11/12/2012	<0.240	<0.620	<0.620	<1.86*
MW-186C-100	Onsite	55-90	02/28/2013	<0.240	<0.620	<0.620	<1.86*
MW-192A-15	Onsite	Water Table	05/05/2012	<0.240	<0.620	<0.620	<1.86*
MW-192A-15	Onsite	Water Table	04/27/2013	<0.240	<0.620	<0.620	<1.86*
MW-192A-15	Onsite	Water Table	08/20/2014	<0.200	<0.500	<0.500	<1.50
MW-192A-15	Onsite	Water Table	08/04/2015	<0.200	<0.500	<0.500	<1.50
MW-192A-15	Onsite	Water Table	10/02/2015	<0.200	<0.500	<0.500	<1.50
MW-192A-15	Onsite	Water Table	07/26/2016	<0.200	<0.500	<0.500	<1.50
MW-192A-15	Onsite	Water Table	08/16/2017	<0.200	<0.500	<0.500	<1.50
MW-192A-15	Onsite	Water Table	11/15/2017	<0.200J*	<0.500J*	<0.500J*	<1.50J*
MW-196-15	Onsite	Water Table	05/04/2012	<0.240	<0.620	<0.620	<1.86*
MW-196-15	Onsite	Water Table	06/06/2013	<0.240	<0.620	<0.620	<1.86*
MW-196-15	Onsite	Water Table	08/20/2014	<0.200	<0.500	<0.500	<1.50
MW-196-15	Onsite	Water Table	08/04/2015	<0.200	<0.500	<0.500	<1.50
MW-196-15	Onsite	Water Table	08/09/2016	<0.200	<0.500	<0.500	<1.50
MW-199-150	Onsite	90-160	10/30/2013	<0.240	<0.620	<0.620	<1.88
MW-301-CMT-10	Onsite	Water Table	07/30/2015	<0.200	<0.500	<0.500	<1.50
MW-301-CMT-10	Onsite	Water Table	07/15/2016	<0.200	<0.500	<0.500	<1.50
MW-301-CMT-20	Onsite	Water Table	07/30/2015	<0.200	<0.500	<0.500	<1.50
MW-301-CMT-20	Onsite	Water Table	07/15/2016	<0.200	<0.500	<0.500	<1.50
MW-302-CMT-10	Onsite	Water Table	07/21/2015	<0.200	<0.500	<0.500	<1.50
MW-302-CMT-10	Onsite	Water Table	07/14/2016	<0.200	<0.500	<0.500	<1.50
MW-302-CMT-20	Onsite	Water Table	07/21/2015	<0.200	<0.500	<0.500	<1.50
MW-302-CMT-20	Onsite	Water Table	07/14/2016	<0.200	<0.500	<0.500	<1.50
MW-303-CMT-9	Onsite	Water Table	07/29/2015	<0.200	<0.500	<0.500	<1.50
MW-303-CMT-9	Onsite	Water Table	07/14/2016	<0.200	<0.500	<0.500	<1.50
MW-303-CMT-19	Onsite	Water Table	07/29/2015	<0.200	<0.500	<0.500	<1.50
MW-303-CMT-19	Onsite	Water Table	07/14/2016	<0.200	<0.500	<0.500	<1.50
MW-303-CMT-19	Onsite	Water Table	07/28/2017	<0.200	<0.500	<0.500	<1.50
MW-304-CMT-10	Onsite	Water Table	08/01/2015	<0.200	<0.500	<0.500	<1.50
MW-304-CMT-10	Onsite	Water Table	07/21/2016	<0.200	<0.500	<0.500	<1.50
MW-304-15	Onsite	Water Table	07/28/2015	<0.200	<0.500	<0.500	<1.50
MW-304-15	Onsite	Water Table	07/22/2016	<0.200	<0.500	<0.500	<1.50
MW-304-CMT-20	Onsite	Water Table	08/01/2015	<0.200	<0.500	<0.500	<1.50
MW-304-CMT-20	Onsite	Water Table	10/02/2015	<0.200	<0.500	<0.500	<1.50
MW-304-CMT-20	Onsite	Water Table	07/21/2016	<0.200	<0.500	<0.500	<1.50
MW-304-CMT-20	Onsite	Water Table	07/28/2017	<0.200	<0.500	<0.500	<1.50

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Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-304-CMT-40	Onsite	10-55	10/02/2015	<0.200	<0.500	<0.500	<1.50
MW-304-CMT-60	Onsite	10-55	10/02/2015	<0.200	<0.500	<0.500	<1.50
MW-305-CMT-28	Onsite	10-55	07/27/2017	<0.200	<0.500	<0.500	<1.50
MW-309-15	Onsite	Water Table	05/16/2013	<0.240	<0.620	<0.620	<1.86*
MW-309-15	Onsite	Water Table	10/22/2013	<0.240	<0.620	<0.620	<1.88
MW-309-15	Onsite	Water Table	03/03/2014	<0.200	<0.500	<0.500	<1.50
MW-309-15	Onsite	Water Table	08/02/2014	<0.200	<0.500	<0.500	<1.50
MW-309-15	Onsite	Water Table	02/26/2015	<0.200	<0.500	<0.500	<1.50
MW-309-15	Onsite	Water Table	07/29/2015	<0.200	<0.500	<0.500	<1.50
MW-309-15	Onsite	Water Table	07/19/2016	<0.200	<0.500	<0.500	<1.50
MW-309-66	Onsite	10-55	05/16/2013	<0.240	<0.620	<0.620	<1.86*
MW-309-66	Onsite	10-55	10/22/2013	<0.240	<0.620	<0.620	<1.88
MW-321-15	Onsite	Water Table	04/22/2013	58.2	<0.620	<0.620	<1.86*
MW-321-15	Onsite	Water Table	10/25/2013	53.4	<0.620	<0.620	<1.88
MW-321-15	Onsite	Water Table	02/28/2014	52.3	0.360J	<0.500	<1.50
MW-321-15	Onsite	Water Table	08/29/2014	32.7	<0.500	<0.500	<1.50
MW-321-15	Onsite	Water Table	08/03/2015	87.1	<1.00B*	<0.500	<1.50
MW-321-15	Onsite	Water Table	02/17/2016	210	<1000B*	0.880J	33.1
MW-321-15	Onsite	Water Table	08/11/2016	138	1.15	0.360J	4.42
MW-321-15	Onsite	Water Table	02/28/2017	175	0.320J	<0.500	8.02
MW-321-15	Onsite	Water Table	08/08/2017	140	0.880J	<0.500	1.09J
MW-321-15	Onsite	Water Table	11/15/2017	181	<0.500	<0.500	2.08J
MW-334-15	Onsite	Water Table	12/13/2012	<0.240	6340	745	4030*
MW-334-15	Onsite	Water Table	01/31/2013	2430	4420	610	3480*
MW-334-15	Onsite	Water Table	04/01/2013	3690	5730	859	4650*
MW-334-15	Onsite	Water Table	07/23/2013	6010	10800	1090	6390
MW-334-15	Onsite	Water Table	11/07/2013	649	1580	326	1820
MW-334-15	Onsite	Water Table	04/21/2014	337	1000	169	1010
MW-334-15	Onsite	Water Table	07/25/2017	854	2800	814	5010
MW-334-65	Onsite	10-55	12/13/2012	0.290J	0.490J	<0.620	<1.86*
MW-334-65	Onsite	10-55	01/31/2013	<0.240	<0.620	<0.620	<1.86*
MW-334-65	Onsite	10-55	05/21/2013	<0.720B*	0.620J	<0.620	1.14J*
MW-334-65	Onsite	10-55	11/06/2013	<0.240	<0.620	<0.620	<1.88
MW-336-15	Onsite	Water Table	10/09/2013	14900	3360	700J	8350
MW-336-20	Onsite	Water Table	10/09/2013	15300	<620	<620	4720
MW-336-20	Onsite	Water Table	08/26/2014	24600	1290	500	9590
MW-336-20	Onsite	Water Table	10/30/2014	23700	326	483	9280
MW-336-20	Onsite	Water Table	08/11/2015	14500	337	192	6510
MW-336-20	Onsite	Water Table	08/15/2016	<0.200	6510	1960	12200
MW-336-20	Onsite	Water Table	08/15/2017	16400	3840	676	10800
MW-336-20	Onsite	Water Table	11/15/2017	18700	152	394	6640
MW-336-35	Onsite	10-55	10/09/2013	28.1	1.15	<0.620	5.09
MW-336-35	Onsite	10-55	08/26/2014	55.0	<0.500	<0.500	<1.50
MW-336-35	Onsite	10-55	10/30/2014	27.1	<0.500	<0.500	<1.50
MW-336-35	Onsite	10-55	08/11/2015	14.4	<0.500	<0.500	<1.50
MW-336-35	Onsite	10-55	10/02/2015	46.1	<0.500	2.04	<3.00B*
MW-336-35	Onsite	10-55	08/15/2016	76.8	<0.500	1.09	3.50
MW-336-55	Onsite	10-55	10/09/2013	1.09	<0.620	<0.620	<1.88
MW-336-55	Onsite	10-55	08/26/2014	1.00	<0.500	<0.500	<1.50
MW-336-55	Onsite	10-55	10/30/2014	<0.200	<0.500	<0.500	<1.50
MW-336-55	Onsite	10-55	08/11/2015	0.580J*	<0.500	<0.500	<1.50
MW-336-55	Onsite	10-55	10/02/2015	<0.200	<0.500	<0.500	<1.50

Appendix A-2
Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-336-55	Onsite	10-55	08/15/2016	<0.200	<0.500	<0.500	<1.50
MW-337-20	Onsite	Water Table	06/05/2014	7390	1770	239	2420
MW-337-20	Onsite	Water Table	08/26/2014	18600	7380	1030	8400
MW-337-20	Onsite	Water Table	10/30/2014	17400	5310	894	8300
MW-337-20	Onsite	Water Table	08/11/2015	16900	7320	847	9180
MW-337-20	Onsite	Water Table	08/17/2016	<0.200	<0.500	1530	14300
MW-344-15	Onsite	Water Table	10/22/2013	2.45	<0.620	<0.620	<1.88
MW-344-15	Onsite	Water Table	02/27/2014	<0.200	<0.500	<0.500	<1.50
MW-344-15	Onsite	Water Table	07/31/2014	0.760	<0.500	<0.500	<1.50
MW-344-15	Onsite	Water Table	02/19/2015	<0.200	<0.500	<0.500	<1.50
MW-344-15	Onsite	Water Table	07/30/2015	<0.200	<0.500	<0.500	<1.50
MW-344-15	Onsite	Water Table	08/11/2016	<0.200	<0.500	<0.500	<1.50
MW-344-15	Onsite	Water Table	07/24/2017	<0.200	<0.500	<0.500	<1.50
MW-344-55	Onsite	10-55	01/27/2014	<0.200	<0.500	<0.500	<1.50
MW-344-55	Onsite	10-55	07/31/2014	<0.200	<0.500	<0.500	<1.50
MW-344-55	Onsite	10-55	02/19/2015	0.300J	<0.500	<0.500	<1.50
MW-344-55	Onsite	10-55	07/30/2015	<0.200	<0.500	<0.500	<1.50
MW-344-55	Onsite	10-55	02/16/2016	2.31	<0.500	<0.500	<1.50
MW-344-55	Onsite	10-55	08/11/2016	<0.200	<0.500	<0.500	<1.50
MW-344-55	Onsite	10-55	02/28/2017	<0.200	<0.500	<0.500	<1.50
MW-345-15	Onsite	Water Table	10/22/2013	10.9	<0.620	0.780J	1.55J
MW-345-15	Onsite	Water Table	02/27/2014	<0.200	<0.500	<0.500	<1.50
MW-345-15	Onsite	Water Table	07/31/2014	0.880	<0.500	0.840J	<1.50
MW-345-15	Onsite	Water Table	02/25/2015	<0.200	<0.500	<0.500	<1.50
MW-345-15	Onsite	Water Table	07/24/2015	<0.200	<0.500	<0.500	<1.50
MW-345-15	Onsite	Water Table	07/22/2016	<0.200	<0.500	<0.500	<1.50
MW-345-15	Onsite	Water Table	07/24/2017	150	15.8	20.4	123
MW-345-15	Onsite	Water Table	10/24/2017	950	0.640J	155	624
MW-345-55	Onsite	10-55	01/27/2014	<0.200	<0.500	<0.500	<1.50
MW-345-55	Onsite	10-55	07/31/2014	<0.200	<0.500	<0.500	<1.50
MW-345-55	Onsite	10-55	02/25/2015	<0.200	<0.500	<0.500	<1.50
MW-345-55	Onsite	10-55	07/24/2015	<0.200	<0.500	<0.500	<1.50
MW-345-55	Onsite	10-55	07/22/2016	<0.200	<0.500	<0.500	<1.50
MW-348-15	Onsite	Water Table	08/15/2013	6.53	0.310J	76.2	295
MW-348-65	Onsite	10-55	08/15/2013	<0.240	<0.620	<0.620	<1.88
MW-351-15	Onsite	Water Table	02/27/2014	<0.200	<0.500	<0.500	<1.50
MW-351-15	Onsite	Water Table	07/23/2014	<0.200	<0.500	<0.500	<1.50
MW-351-15	Onsite	Water Table	02/20/2015	<0.200	<0.500	<0.500	<1.50
MW-351-15	Onsite	Water Table	08/03/2015	<0.200	<0.500	<0.500	<1.50
MW-351-15	Onsite	Water Table	07/19/2016	<0.200	<0.500	<0.500	<1.50
MW-351-15	Onsite	Water Table	08/01/2017	<0.200	<0.500	<0.500	<1.50
MW-351-55	Onsite	10-55	02/27/2014	<0.200	<0.500	<0.500	<1.50
MW-351-55	Onsite	10-55	07/23/2014	<0.200	<0.500	<0.500	<1.50
MW-351-55	Onsite	10-55	02/20/2015	<0.200	<0.500	<0.500	<1.50
MW-351-55	Onsite	10-55	08/03/2015	<0.200	<0.500	<0.500	<1.50
MW-351-55	Onsite	10-55	07/19/2016	<0.200	<0.500	<0.500	<1.50
MW-354-35	Onsite	10-55	10/11/2013	<0.240	<0.620	4.04	24.0
MW-354-65	Onsite	10-55	10/11/2013	<0.240	<0.620	<0.620	<1.88
MW-355-15	Onsite	Water Table	11/25/2013	<0.200	<0.500	<0.500	<1.50
MW-355-15	Onsite	Water Table	10/10/2013	<0.240	<0.620	<0.620	<1.88
MW-355-55	Onsite	10-55	11/25/2013	<0.200	<0.500	<0.500	<1.50
MW-355-55	Onsite	10-55	10/10/2013	<0.240	<0.620	<0.620	<1.88

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-358-15	Onsite	Water Table	07/23/2015	<0.200	<0.500	<0.500	<1.50
MW-358-15	Onsite	Water Table	07/18/2016	<0.200	<0.500	<0.500	<1.50
MW-358-15	Onsite	Water Table	08/01/2017	<0.200	<0.500	<0.500	<1.50
MW-358-20	Onsite	Water Table	07/23/2015	<0.200	<0.500	<0.500	<1.50
MW-358-20	Onsite	Water Table	07/18/2016	<0.200	<0.500	<0.500	<1.50
MW-359-15	Onsite	Water Table	07/20/2015	<0.200	<0.500	<0.500	<1.50
MW-359-15	Onsite	Water Table	07/14/2016	<0.200	<0.500	<0.500	<1.50
MW-360-15	Onsite	Water Table	07/20/2015	<0.200	<0.500	<0.500	<1.50
MW-360-15	Onsite	Water Table	07/14/2016	<0.200	<0.500	<0.500	<1.50
MW-360-15	Onsite	Water Table	07/11/2017	<0.200	<0.500	<0.500	<1.50
MW-361-15	Onsite	Water Table	02/03/2014	<0.200	<0.500	<0.500	<1.50
MW-361-15	Onsite	Water Table	08/10/2015	0.660	<0.500	<0.500	<1.50
MW-362-15	Onsite	Water Table	07/18/2016	<0.200	<0.500	<0.500	<1.50
MW-363-15	Onsite	Water Table	07/17/2015	<0.200	<0.500	<0.500	<1.50
MW-363-15	Onsite	Water Table	07/25/2016	<0.200	<0.500	<0.500	<1.50
MW-364-15	Onsite	Water Table	07/17/2015	<0.200	<0.500	<0.500	<1.50
MW-364-15	Onsite	Water Table	07/25/2016	<0.200	<0.500	<0.500	<1.50
MW-365-15	Onsite	Water Table	01/30/2014	<0.200	<0.500	<0.500	<1.50
MW-366-15	Onsite	Water Table	01/30/2014	376	534	281	1140
MW-367-15	Onsite	Water Table	02/03/2014	<0.200	<0.500	<0.500	<1.50
MW-368-15	Onsite	Water Table	01/06/2014	<0.200	<0.500	<0.500	<1.50
MW-369-16	Onsite	Water Table	08/19/2014	<0.200	<0.500	<0.500	<1.50
MW-369-16	Onsite	Water Table	02/19/2015	<0.200	<0.500	<0.500	<1.50
MW-369-16	Onsite	Water Table	07/31/2015	<0.200	<0.500	<0.500	<1.50
MW-369-16	Onsite	Water Table	07/20/2016	<0.200	<0.500	<0.500	<1.50
MW-369-16	Onsite	Water Table	08/16/2017	<0.200	<0.500	<0.500	<1.50
MW-369-16	Onsite	Water Table	11/15/2017	<0.200	<0.500	<0.500	<1.50
MW-370-15	Onsite	Water Table	01/22/2014	<0.200	<0.500	<0.500	<1.50
MW-370-15	Onsite	Water Table	08/02/2014	<0.200	<0.500	<0.500	<1.50
MW-370-15	Onsite	Water Table	02/25/2015	<0.200	<0.500	<0.500	<1.50
MW-370-15	Onsite	Water Table	07/29/2015	<0.200	<0.500	<0.500	<1.50
MW-370-15	Onsite	Water Table	07/19/2016	<0.200	<0.500	<0.500	<1.50
MW-370-55	Onsite	10-55	01/22/2014	<0.200	<0.500	<0.500	<1.50
MW-371-15	Onsite	Water Table	07/25/2014	<0.200	<0.500	<0.500	<1.50
MW-371-15	Onsite	Water Table	02/20/2015	<0.200	<0.500	<0.500	<1.50
MW-371-15	Onsite	Water Table	07/24/2015	<0.200	<0.500	<0.500	--
MW-371-15	Onsite	Water Table	07/15/2016	<0.200	<0.500	<0.500	<1.50
MW-371-55	Onsite	10-55	07/25/2014	<0.200	<0.500	<0.500	<1.50
MW-371-75	Onsite	55-90	07/25/2014	<0.200	<0.500	<0.500	<1.50
MW-371-125	Onsite	90-160	07/25/2014	<0.200	<0.500	<0.500	<1.50
O-1	Onsite	Water Table	10/20/2011	<0.240	<0.620	1.32	<1.86*
O-2	Onsite	Water Table	05/02/2013	79.4	5.07	258	1260*
O-2	Onsite	Water Table	11/16/2013	275J*	5.64J*	376	1940
O-2	Onsite	Water Table	08/20/2014	29.3	0.360J	152	539
O-2	Onsite	Water Table	07/24/2017	58.1	0.570J	78.1	426
O-3	Onsite	Water Table	10/19/2011	6.34	<0.620	<0.620	56.7*
O-3	Onsite	Water Table	05/09/2013	5.06	0.480J	0.310J	20.4*
O-3	Onsite	Water Table	11/16/2013	1.47	<0.500	<0.500	4.35
O-3	Onsite	Water Table	03/10/2014	13.6	<0.500	<0.500	45.1
O-3	Onsite	Water Table	08/13/2014	0.630	<0.500	<0.500	3.55
O-3	Onsite	Water Table	02/24/2015	<0.200	<0.500	<0.500	<1.50
O-3	Onsite	Water Table	08/10/2015	0.830	<0.500	<0.500	<1.50

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
O-3	Onsite	Water Table	03/01/2016	<0.200	<0.500	<0.500	<1.50
O-3	Onsite	Water Table	08/15/2016	<0.200	<0.500	<0.500	<1.50
O-3	Onsite	Water Table	08/02/2017	1.41	<0.500	<0.500	1.34J
O-4	Onsite	Water Table	10/19/2011	<0.240	<0.620	<0.620	<1.86*
O-4	Onsite	Water Table	05/21/2013	<0.400B*	0.360J	0.720J	1.77J*
O-4	Onsite	Water Table	10/16/2013	<0.240	<0.620	1.38	2.72J
O-4	Onsite	Water Table	02/28/2014	<0.200	<0.500	1.49	3.06
O-4	Onsite	Water Table	07/30/2014	<0.200	<0.500	1.89	4.85
O-4	Onsite	Water Table	02/26/2015	<0.200	<0.500	1.19	2.48J
O-4	Onsite	Water Table	07/31/2015	<0.200	<0.500	<0.500	1.11J
O-4	Onsite	Water Table	02/17/2016	<0.200	<0.500	0.360J	<1.50
O-4	Onsite	Water Table	08/04/2016	<0.200	<0.500	<0.500	<1.50
O-4	Onsite	Water Table	02/28/2017	<0.200	<0.500	<0.500	<1.50
O-4	Onsite	Water Table	07/14/2017	<0.200	<0.500	<0.500	<1.50
O-5	Onsite	Water Table	10/19/2011	9.22	<0.620	2.27	5.27J*
O-5	Onsite	Water Table	10/16/2013	<0.240	<0.620	6.89	10.9
O-5	Onsite	Water Table	02/28/2014	<0.200	<0.500	<0.500	<1.50
O-5	Onsite	Water Table	08/01/2014	8.97	<0.500	<0.500	<1.50
O-5	Onsite	Water Table	02/19/2015	1.88	<0.500	<0.500	<1.50
O-5	Onsite	Water Table	07/31/2015	<0.200	<0.500	<0.500	<1.50
O-5	Onsite	Water Table	02/17/2016	0.160J	<0.500	<0.500	<1.50
O-5	Onsite	Water Table	08/04/2016	0.160J	<0.500	<0.500	<1.50
O-5	Onsite	Water Table	02/28/2017	<0.200	<0.500	<0.500	<1.50
O-5-65	Onsite	10-55	07/29/2013	<0.240	<0.620	<0.620	<1.88
O-5-65	Onsite	10-55	10/16/2013	<0.240	<0.620	<0.620	<1.88
O-6	Onsite	Water Table	10/19/2011	<0.240	<0.620	<0.620	<1.86*
O-6	Onsite	Water Table	05/10/2013	<0.240	<0.620	<0.620	<1.86*
O-6	Onsite	Water Table	10/22/2013	<0.240	<0.620	<0.620	<1.88
O-6	Onsite	Water Table	02/28/2014	<0.200	<0.500	<0.500	<1.50
O-6	Onsite	Water Table	07/31/2014	<0.200	<0.500	<0.500	<1.50
O-6	Onsite	Water Table	02/19/2015	<0.200	<0.500	<0.500	<1.50
O-6	Onsite	Water Table	07/24/2015	<0.200	<0.500	<0.500	<1.50
O-6	Onsite	Water Table	08/08/2016	<0.200	<0.500	<0.500	<1.50
O-8	Onsite	Water Table	10/20/2011	<0.240	<0.620	<0.620	<1.86*
O-11	Onsite	Water Table	08/06/2013	56.0	3.90J	482	2950
O-12	Onsite	Water Table	10/19/2011	0.820	<0.620	<0.620	<1.86*
O-12	Onsite	Water Table	05/07/2012	<0.240	0.480J	<0.620	<1.86*
O-12	Onsite	Water Table	08/09/2012	<0.240	<0.620	<0.620	<1.86*
O-12	Onsite	Water Table	11/15/2012	<0.240	<0.620	<0.620	<1.86*
O-12	Onsite	Water Table	01/14/2013	<0.240	<0.620	<0.620	<1.86*
O-12	Onsite	Water Table	05/09/2013	<0.240	<0.620	<0.620	1.35J*
O-12	Onsite	Water Table	08/08/2013	16.9	<0.620	3.80	16.1
O-12	Onsite	Water Table	10/19/2013	<0.240	<0.620	<0.620	1.41J
O-12	Onsite	Water Table	03/07/2014	4.81	<0.500	<0.500	10.7
O-12	Onsite	Water Table	04/24/2014	0.600	<0.500	0.350J	1.67J
O-12	Onsite	Water Table	08/13/2014	<0.200	<0.500	<0.500	<1.50
O-12	Onsite	Water Table	10/30/2014	<0.200	<0.500	<0.500	2.52J
O-12	Onsite	Water Table	02/21/2015	2.43	<0.500	2.81	8.66
O-12	Onsite	Water Table	08/10/2015	5.90	<0.500	2.57	14.3
O-12	Onsite	Water Table	10/02/2015	1.46J*	<0.500	1.94J*	9.18JH*
O-12	Onsite	Water Table	02/29/2016	<1.16B*	<0.500	0.490J	3.58
O-12	Onsite	Water Table	08/10/2016	<0.200	<0.500	<0.500	<1.50

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**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
O-12	Onsite	Water Table	02/25/2017	3.01	<0.500	0.322J	<1.50
O-12-65	Onsite	10-55	08/15/2013	<0.240	<0.620	<0.620	<1.88
O-12-65	Onsite	10-55	10/19/2013	<0.240	<0.620	<0.620	<1.88
O-12-65	Onsite	10-55	10/11/2013	<0.240	<0.620	<0.620	<1.88
O-13	Onsite	Water Table	08/06/2013	3200	30.3	938	5940
O-14	Onsite	Water Table	10/20/2011	<0.240	<0.620	<0.620	<1.86*
O-14	Onsite	Water Table	08/09/2012	<0.240	<0.620	<0.620	<1.86*
O-14	Onsite	Water Table	02/05/2013	<0.240	<0.620	<0.620	<1.86*
O-14	Onsite	Water Table	08/29/2013	<0.240	<0.620	<0.620	<1.88
O-14	Onsite	Water Table	11/25/2013	<0.200	<0.500	<0.500	<1.50
O-14	Onsite	Water Table	03/26/2014	<0.200	<0.500	<0.500	<1.50
O-14	Onsite	Water Table	09/03/2014	<0.200	<0.500	<0.500	<1.50
O-14	Onsite	Water Table	10/30/2014	<0.200	<0.500	<0.500	<1.50
O-14	Onsite	Water Table	08/07/2015	<0.200	<0.500	<0.500	<1.50
O-14	Onsite	Water Table	08/17/2016	<0.200	<0.500	<0.500	<1.50
O-15	Onsite	Water Table	10/20/2011	<0.240	<0.620	<0.620	<1.86*
O-15	Onsite	Water Table	08/16/2017	<0.200	<0.500	<0.500	<1.50
O-15	Onsite	Water Table	11/16/2017	<0.200	<0.500	<0.500	<1.50
O-16	Onsite	Water Table	10/20/2011	5.10	<0.620	0.440J	<1.86*
O-16	Onsite	Water Table	12/11/2012	2.34	<0.620	1.14	<2.87*
O-16	Onsite	Water Table	11/15/2013	2.88	<0.500	<0.500	<1.50
O-16	Onsite	Water Table	03/26/2014	2.12	<0.500	<0.500	<1.50
O-16	Onsite	Water Table	09/03/2014	1.87	<0.500	0.400J	<1.50
O-16	Onsite	Water Table	08/11/2015	2.28	<0.500	<0.500	<1.50
O-16	Onsite	Water Table	08/16/2016	2.55	<0.500	<0.500	<1.50
O-17	Onsite	Water Table	10/19/2011	<0.240	<0.620	<0.620	<1.86*
O-17	Onsite	Water Table	05/07/2012	<0.240	<0.620	<0.620	<1.86*
O-17	Onsite	Water Table	05/09/2013	<0.240	<0.620	<0.620	<1.86*
O-17	Onsite	Water Table	11/15/2013	<0.200	<0.500	<0.500	<1.50
O-17	Onsite	Water Table	03/26/2014	<0.200	<0.500	<0.500	<1.50
O-17	Onsite	Water Table	08/14/2014	<0.200	<0.500	<0.500	<1.50
O-17	Onsite	Water Table	08/10/2015	0.520	<0.500	<0.500	<1.50
O-17	Onsite	Water Table	08/17/2016	<0.200	<0.500	<0.500	1.57J
O-18	Onsite	Water Table	10/20/2011	<0.240	<0.620	<0.620	<1.86*
O-18	Onsite	Water Table	05/07/2012	0.360J	<0.620	<0.620	<1.86*
O-18	Onsite	Water Table	11/15/2013	<0.200	<0.500	<0.500	<1.50
O-18	Onsite	Water Table	03/26/2014	0.146J	<0.500	<0.500	<1.50
O-18	Onsite	Water Table	08/26/2014	<0.200	<0.500	<0.500	<1.50
O-18	Onsite	Water Table	08/10/2015	<0.200	<0.500	<0.500	<1.50
O-18	Onsite	Water Table	08/17/2016	<0.200	<0.500	<0.500	<1.50
O-19	Onsite	Water Table	06/04/2013	42.9	5.34	31.0	117*
O-19	Onsite	Water Table	11/07/2013	12.8	45.5	59.4	742
O-19	Onsite	Water Table	08/21/2014	97.3	0.540J	12.0	92.7
O-19	Onsite	Water Table	08/04/2015	48.4	<0.500	3.78	88.0
O-19-55	Onsite	10-55	01/03/2014	<0.200	<1.00B*	<1.00B*	<3.70B*
O-19-55	Onsite	10-55	08/14/2014	0.320J	<0.500	<0.500	<1.50
O-19-55	Onsite	10-55	02/20/2015	<0.200	<0.500	<0.500	<1.50
O-19-55	Onsite	10-55	08/04/2015	<0.200	<0.500	<0.500	<1.50
O-19-55	Onsite	10-55	08/15/2016	<0.200	<0.500	<0.500	<1.50
O-19-90	Onsite	55-90	01/03/2014	<0.200	<0.500	<0.500	<1.50
O-20	Onsite	Water Table	10/20/2011	1420	2.59	179	1700*
O-21	Onsite	Water Table	10/20/2011	2100	0.490J	403	2850*

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
O-22	Onsite	Water Table	02/22/2012	<0.240	<0.620	<0.620	<1.86*
O-23	Onsite	Water Table	02/22/2012	<0.240	<0.620	<0.620	<1.86*
O-24	Onsite	Water Table	02/22/2012	4.01	<0.620	<0.620	<1.86*
O-24	Onsite	Water Table	05/09/2013	1.42	<0.620	<0.620	<1.86*
O-24	Onsite	Water Table	11/16/2013	20.4	<0.500	<0.500	<1.50
O-24	Onsite	Water Table	03/07/2014	2.73J*	<0.500	<0.500	<1.50
O-24	Onsite	Water Table	08/13/2014	31.8	<0.500	<0.500	<1.50
O-24	Onsite	Water Table	02/21/2015	21.8	<0.500	<0.500	<1.50
O-24	Onsite	Water Table	08/11/2015	56.4	<0.500	<0.500	<1.50
O-24	Onsite	Water Table	02/29/2016	28.9J*	<0.500	<0.500	<1.50
O-24	Onsite	Water Table	08/15/2016	34.1	<0.500	<0.500	<1.50
O-24	Onsite	Water Table	02/25/2017	10.3	<0.500	<0.500	<1.50
O-24	Onsite	Water Table	07/10/2017	58.5	<0.500	<0.500	<1.50
O-24-65	Onsite	10-55	10/11/2013	<0.240	<0.620	<0.620	<1.88
O-25	Onsite	Water Table	02/22/2012	179	<0.620	10.6	83.1*
O-25	Onsite	Water Table	10/02/2015	28.4	<0.500	<0.500	<3.00B*
O-26	Onsite	Water Table	02/22/2012	11.3	<0.620	1.08	241J*
O-26	Onsite	Water Table	05/08/2013	9.60	<0.620	0.760J	97.0J*
O-26	Onsite	Water Table	11/16/2013	1.31	<0.500	<0.500	12.3
O-26	Onsite	Water Table	03/02/2014	4.18	<0.500	<0.500	10.0
O-26	Onsite	Water Table	08/13/2014	<0.200	<0.500	<0.500	<1.50
O-26	Onsite	Water Table	02/21/2015	<0.200	<0.500	<0.500	<1.50
O-26	Onsite	Water Table	08/11/2015	<0.200	<0.500	<0.500	<1.50
O-26	Onsite	Water Table	08/10/2016	<0.200	<0.500	<0.500	<1.50
O-26-65	Onsite	10-55	02/27/2014	<0.200	<0.500	<0.500	<1.50
O-27	Onsite	Water Table	02/22/2012	4.54	<0.620	5.18	33.3*
O-27	Onsite	Water Table	05/30/2013	8.80	<6.20	23.5	193*
O-27	Onsite	Water Table	08/09/2013	12.1	<0.620	31.8	182
O-27	Onsite	Water Table	10/30/2013	19.9	0.390J	42.0	183
O-27-65	Onsite	10-55	12/04/2013	<0.200	<0.500	<0.500	<1.50
O-28	Onsite	Water Table	02/22/2012	<0.240	<0.620	<0.620	<1.86*
O-29	Onsite	Water Table	02/22/2012	<0.240	<0.620	<0.620	<1.86*
O-32	Onsite	Water Table	10/01/2013	<0.240	<0.620	0.380J	2.77J
R-21	Onsite	Water Table	01/17/2012	106	26.3	38.1	235*
R-21	Onsite	Water Table	02/15/2012	110	28.3	36.9	218*
R-21	Onsite	Water Table	03/19/2012	76.9	25.7	28.3	161*
R-21	Onsite	Water Table	04/18/2012	114	80.9	56.4	309*
R-21	Onsite	Water Table	05/16/2012	90.4	101	43.4	246*
R-21	Onsite	Water Table	06/18/2012	100	34.4	48.3	226*
R-21	Onsite	Water Table	07/17/2012	132	25.7	43.7	226*
R-21	Onsite	Water Table	08/09/2012	115	22.7	34.1	188*
R-21	Onsite	Water Table	09/13/2012	101	15.9	27.3	154*
R-21	Onsite	Water Table	10/16/2012	85.1	14.4	22.2	138*
R-21	Onsite	Water Table	11/13/2012	83.5	22.5	33.3	217*
R-21	Onsite	Water Table	12/11/2012	63.8	12.1	29.5	177*
R-21	Onsite	Water Table	01/15/2013	60.4	9.89	23.2	146*
R-21	Onsite	Water Table	02/18/2013	59.8	11.9	24.4	134*
R-21	Onsite	Water Table	03/12/2013	97.1	108	47.1	327*
R-21	Onsite	Water Table	04/10/2013	43.0	11.8	18.2	103*
R-21	Onsite	Water Table	05/13/2013	53.5	30.5	29.6	157*
R-21	Onsite	Water Table	06/11/2013	57.0	20.9	27.4	158*
R-21	Onsite	Water Table	06/03/2013	54.7	44.6	44.8	324*

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
R-21	Onsite	Water Table	06/03/2013	51.1	36.3	36.9	236*
R-21	Onsite	Water Table	06/04/2013	48.7	24.0	30.6	166*
R-21	Onsite	Water Table	06/04/2013	50.1	24.0	31.1	168*
R-21	Onsite	Water Table	06/05/2013	47.9	19.6	25.9	163*
R-21	Onsite	Water Table	06/06/2013	47.8	21.1	26.8	165*
R-21	Onsite	Water Table	07/24/2013	68.2	16.2	22.8	132
R-21	Onsite	Water Table	08/14/2013	66.9	16.4	20.5	123
R-21	Onsite	Water Table	09/17/2013	83.8	19.9	21.4	143
R-21	Onsite	Water Table	10/18/2013	68.4	5.29	13.2	85.7
R-21	Onsite	Water Table	11/14/2013	76.6	39.9	29.9	176
R-21	Onsite	Water Table	12/19/2013	70.9	16.6	37.6	241
R-21	Onsite	Water Table	01/16/2014	53.4	12.5	18.0	120
R-21	Onsite	Water Table	02/13/2014	44.1	11.2	18.8	125
R-21	Onsite	Water Table	03/13/2014	37.8	8.41	17.1	110
R-21	Onsite	Water Table	04/17/2014	57.3	39.6	20.1	147
R-21	Onsite	Water Table	05/15/2014	65.1	25.5	33.0	185
R-21	Onsite	Water Table	06/23/2014	82.6	33.7	28.3	203
R-21	Onsite	Water Table	07/23/2014	120	61.5	34.3	243
R-21	Onsite	Water Table	08/27/2014	97.7	29.6	28.1	208
R-21	Onsite	Water Table	09/18/2014	96.8	26.8	25.5	206
R-21	Onsite	Water Table	10/16/2014	71.8	9.63	19.3	172
R-21	Onsite	Water Table	11/12/2014	67.7	5.90	15.8	158
R-21	Onsite	Water Table	12/10/2014	59.7	4.27	17.6	141
R-21	Onsite	Water Table	01/12/2015	52.7	3.40	14.4	157
R-21	Onsite	Water Table	02/11/2015	44.6	3.27	13.4	116
R-21	Onsite	Water Table	03/11/2015	47.2	20.6	23.6	191
R-21	Onsite	Water Table	06/22/2015	49.8	15.1	23.9	193
R-21	Onsite	Water Table	07/08/2015	72.9	24.8	28.7	232
R-21	Onsite	Water Table	10/06/2015	83.2	21.3	19.8	165
R-21	Onsite	Water Table	01/06/2016	44.2	26.1J*	24.8J*	152
R-21	Onsite	Water Table	02/04/2016	36.0	27.8	65.7	532
R-21	Onsite	Water Table	03/02/2016	34.9	22.1	18.5	153
R-21	Onsite	Water Table	04/14/2016	56.5	25.9	29.5	231
R-21	Onsite	Water Table	05/05/2016	37.0	28.0	26.5	234J*
R-21	Onsite	Water Table	06/01/2016	44.2	27.9	39.3	323
R-21	Onsite	Water Table	07/06/2016	52.2	21.1	27.3	213
R-21	Onsite	Water Table	08/05/2016	102	47.8	33.1	250
R-21	Onsite	Water Table	09/06/2016	82.1	22.5	24.3	202
R-21	Onsite	Water Table	10/03/2016	87.5	11.0	21.2	190
R-21	Onsite	Water Table	11/03/2016	89.2	9.50J	23.1	241
R-21	Onsite	Water Table	12/01/2016	64.6	5.30J	16.5	159
R-21	Onsite	Water Table	01/05/2017	61.4	6.90J	17.5	179
R-21	Onsite	Water Table	02/01/2017	53.3	9.00J	19.4	172
R-21	Onsite	Water Table	03/01/2017	49.1	46.0	74.2	604
R-21	Onsite	Water Table	04/05/2017	36.0	12.9	19.7	214
R-21	Onsite	Water Table	05/03/2017	40.6	22.6	20.5	175
R-21	Onsite	Water Table	06/06/2017	42.0	15.5J*	20.1	167J*
R-21	Onsite	Water Table	07/06/2017	69.5	29.6	25.6	200
R-32	Onsite	Water Table	12/03/2010	<131000	<252000	1.40E+06	1.11e+007*
R-33	Onsite	Water Table	12/03/2010	<128000	1.21E+06	754000	1.04e+007*
R-35R	Onsite	Water Table	01/17/2012	28.5	25.2	21.6	65.6*
R-35R	Onsite	Water Table	02/15/2012	23.7	23.1	19.6	61.4*

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Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
R-35R	Onsite	Water Table	03/19/2012	21.9	24.3	15.3	51.7*
R-35R	Onsite	Water Table	04/18/2012	63.9	70.1	51.9	176*
R-35R	Onsite	Water Table	05/16/2012	26.5	19.5	29.1	88.4*
R-35R	Onsite	Water Table	06/18/2012	67.5	90.5	80.5	279*
R-35R	Onsite	Water Table	07/17/2012	54.3	38.2	69.3	182*
R-35R	Onsite	Water Table	08/09/2012	40.5	29.0	56.4	125*
R-35R	Onsite	Water Table	09/13/2012	24.1	7.31	26.5	67.0*
R-35R	Onsite	Water Table	10/16/2012	21.7	3.64	17.8	49.5*
R-35R	Onsite	Water Table	11/13/2012	35.2	24.5	36.4	96.0*
R-35R	Onsite	Water Table	12/11/2012	31.3	5.92	22.4	55.9*
R-35R	Onsite	Water Table	01/15/2013	18.9	3.98	17.1	46.9*
R-35R	Onsite	Water Table	02/18/2013	17.3	7.19	15.8	44.6*
R-35R	Onsite	Water Table	03/12/2013	16.2	7.45	12.3	35.6*
R-35R	Onsite	Water Table	04/10/2013	13.1	7.76	10.1	29.6*
R-35R	Onsite	Water Table	05/13/2013	31.4	40.6	27.1	72.4*
R-35R	Onsite	Water Table	06/11/2013	54.4	45.9	50.4	164*
R-35R	Onsite	Water Table	06/03/2013	43.3	18.7	31.0	109*
R-35R	Onsite	Water Table	06/03/2013	44.4	37.8	39.4	133*
R-35R	Onsite	Water Table	06/04/2013	44.8	55.1	44.3	146*
R-35R	Onsite	Water Table	06/04/2013	41.9	53.9	42.4	140*
R-35R	Onsite	Water Table	06/05/2013	48.5	55.4	46.2	155*
R-35R	Onsite	Water Table	06/06/2013	48.4	55.3	47.2	164*
R-35R	Onsite	Water Table	07/24/2013	32.0	18.6	33.9	78.4
R-35R	Onsite	Water Table	08/14/2013	33.8	26.4	40.7	96.1
R-35R	Onsite	Water Table	09/17/2013	28.3	12.3	32.1	78.0
R-35R	Onsite	Water Table	10/18/2013	16.3	3.00	8.28	25.1
R-35R	Onsite	Water Table	11/14/2013	18.8	0.960J	10.7	29.8
R-35R	Onsite	Water Table	12/19/2013	30.6	5.09	16.9	54.4
R-35R	Onsite	Water Table	01/16/2014	18.1	3.14	10.9	35.3
R-35R	Onsite	Water Table	02/13/2014	11.5	3.43	7.01	25.3
R-35R	Onsite	Water Table	03/13/2014	9.59	1.34	4.68	20.2
R-35R	Onsite	Water Table	04/17/2014	8.28	0.990J	4.25	19.5
R-35R	Onsite	Water Table	05/15/2014	28.9	10.5	13.9	49.5
R-35R	Onsite	Water Table	06/23/2014	38.2	10.2	17.8	74.6
R-35R	Onsite	Water Table	07/23/2014	67.5	32.8	37.8	120
R-35R	Onsite	Water Table	08/27/2014	53.4	22.8	21.5	69.7
R-35R	Onsite	Water Table	09/18/2014	64.6	18.1	21.2	70.1
R-35R	Onsite	Water Table	10/16/2014	58.9	10.8	13.1	46.7
R-35R	Onsite	Water Table	11/12/2014	65.9	7.95	11.5	42.3
R-35R	Onsite	Water Table	12/10/2014	45.8	3.98	7.16	31.2
R-35R	Onsite	Water Table	01/12/2015	24.5	1.60	4.41	17.6
R-35R	Onsite	Water Table	02/11/2015	17.9	0.910J	2.41	10.4
R-35R	Onsite	Water Table	03/11/2015	23.7	1.59	5.33	26.0
R-35R	Onsite	Water Table	03/11/2015	23.7	1.59	5.33	26.0
R-35R	Onsite	Water Table	06/22/2015	29.7	3.19	11.1	51.2
R-35R	Onsite	Water Table	07/08/2015	41.2	4.25	16.3	77.7
R-35R	Onsite	Water Table	10/06/2015	4.64	0.370J	0.500J	2.59J
R-35R	Onsite	Water Table	01/06/2016	41.3	1.86	14.2	68.1
R-35R	Onsite	Water Table	02/04/2016	30.1	0.460J	11.6	54.2
R-35R	Onsite	Water Table	03/02/2016	31.2	<0.500	8.72	43.8
R-35R	Onsite	Water Table	04/14/2016	32.8	4.30	16.0	69.5
R-35R	Onsite	Water Table	05/05/2016	28.0	1.55	9.66	43.8

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Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
R-35R	Onsite	Water Table	06/01/2016	34.9	9.22	17.6	74.0
R-35R	Onsite	Water Table	07/06/2016	33.4	8.51	27.0	92.0
R-35R	Onsite	Water Table	08/05/2016	18.7	8.79	13.4	38.5
R-35R	Onsite	Water Table	09/06/2016	18.2	8.38	10.4	34.1
R-35R	Onsite	Water Table	10/03/2016	24.6	7.28	12.8	45.4
R-35R	Onsite	Water Table	11/03/2016	43.1	5.91	21.5	83.2
R-35R	Onsite	Water Table	12/01/2016	31.8	2.56	18.1	65.1
R-35R	Onsite	Water Table	01/05/2017	29.2	2.64	16.8	65.1
R-35R	Onsite	Water Table	02/01/2017	22.3	1.86	12.4	49.0
R-35R	Onsite	Water Table	03/01/2017	19.5	1.38	11.4	45.1
R-35R	Onsite	Water Table	04/05/2017	14.8	1.37	9.07	36.4
R-35R	Onsite	Water Table	05/03/2017	16.1	1.93	12.4	43.3
R-35R	Onsite	Water Table	06/06/2017	17.0	4.44	10.3	37.7
R-35R	Onsite	Water Table	07/06/2017	32.3	9.44	18.8	63.5
R-35R	Onsite	Water Table	07/27/2017	72.5	1.93	37.1	92.7
R-39	Onsite	Water Table	01/17/2012	46.3	16.5	10.2	70.4*
R-39	Onsite	Water Table	02/15/2012	37.1	14.4	9.39	61.8*
R-39	Onsite	Water Table	03/19/2012	26.5	11.0	7.18	40.4*
R-39	Onsite	Water Table	04/18/2012	22.6	8.24	7.76	36.1*
R-39	Onsite	Water Table	05/16/2012	23.3	4.24	7.44	32.3*
R-39	Onsite	Water Table	06/18/2012	70.1	81.3	23.0	138*
R-39	Onsite	Water Table	07/17/2012	58.4	66.6	21.2	121*
R-39	Onsite	Water Table	08/09/2012	58.9	30.2	23.4	126*
R-39	Onsite	Water Table	09/13/2012	46.1	7.42	13.4	88.4*
R-39	Onsite	Water Table	10/16/2012	38.4	5.87	7.53	60.6*
R-39	Onsite	Water Table	11/13/2012	44.5	26.7	10.9	75.4*
R-39	Onsite	Water Table	12/11/2012	39.1	16.9	9.94	56.5*
R-39	Onsite	Water Table	01/15/2013	21.7	8.32	7.07	45.3*
R-39	Onsite	Water Table	02/18/2013	19.0	7.93	6.78	40.0*
R-39	Onsite	Water Table	03/12/2013	13.1	4.01	3.74	20.5*
R-39	Onsite	Water Table	04/10/2013	11.2	3.49	3.88	19.4*
R-40	Onsite	Water Table	01/17/2012	232	195	58.2	270*
R-40	Onsite	Water Table	02/15/2012	216	222	53.0	217*
R-40	Onsite	Water Table	03/19/2012	228	312	45.7	240*
R-40	Onsite	Water Table	04/18/2012	225	395	61.8	321*
R-40	Onsite	Water Table	05/16/2012	194	256	63.3	269*
R-40	Onsite	Water Table	06/18/2012	272	353	68.7	354*
R-40	Onsite	Water Table	07/17/2012	349	367	84.0	410*
R-40	Onsite	Water Table	08/09/2012	311	329	75.2	356*
R-40	Onsite	Water Table	09/13/2012	253	263	69.3	336*
R-40	Onsite	Water Table	10/16/2012	227	269	61.6	308*
R-40	Onsite	Water Table	11/13/2012	221	281	65.3	299*
R-40	Onsite	Water Table	12/11/2012	156	160	52.0	233*
R-40	Onsite	Water Table	01/15/2013	187	243	43.6	333*
R-40	Onsite	Water Table	02/18/2013	635	866	195	958*
R-40	Onsite	Water Table	03/12/2013	154	198	44.2	214*
R-40	Onsite	Water Table	04/10/2013	112	159	43.6	188*
R-40	Onsite	Water Table	01/12/2015	163	118	87.2	400
R-40	Onsite	Water Table	02/09/2015	370	747	159	897
R-40	Onsite	Water Table	02/11/2015	264	461	125	695
R-40	Onsite	Water Table	03/11/2015	195	532	130	767
R-40	Onsite	Water Table	06/22/2015	178	338	95.8	518

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
R-40	Onsite	Water Table	07/08/2015	247	592	133	908
R-40	Onsite	Water Table	10/06/2015	237	318	142	790
R-40	Onsite	Water Table	01/06/2016	126	142	83.9	416
R-40	Onsite	Water Table	02/04/2016	132	123	84.8	398
R-40	Onsite	Water Table	03/16/2016	96.4	108	59.4	308
R-40	Onsite	Water Table	04/27/2016	78.0	71.8	48.3	234
R-40	Onsite	Water Table	05/05/2016	95.7	81.0	52.0	249
R-40	Onsite	Water Table	06/01/2016	101	111	55.6	275
R-40	Onsite	Water Table	07/06/2016	138	208	69.8	401
R-40	Onsite	Water Table	08/05/2016	170	230	93.4	524
R-40	Onsite	Water Table	09/06/2016	146	182	89.8	474
R-40	Onsite	Water Table	10/03/2016	189	137	119	542
R-40	Onsite	Water Table	11/03/2016	161	148	97.6	455
R-40	Onsite	Water Table	12/01/2016	105	89.2	70.0	286
R-40	Onsite	Water Table	01/05/2017	98.1	81.0	65.2	269
R-40	Onsite	Water Table	02/01/2017	93.6	80.7	58.6	238
R-40	Onsite	Water Table	03/01/2017	69.8	61.6	45.7	194
R-40	Onsite	Water Table	04/05/2017	65.6	61.2	46.9	204
R-40	Onsite	Water Table	05/03/2017	70.4	97.7	51.1	283
R-40	Onsite	Water Table	06/06/2017	82.3	102	56.0	273
R-40	Onsite	Water Table	07/06/2017	84.7	119	67.0	339
R-42	Onsite	Water Table	01/17/2012	4.88	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	02/15/2012	6.09	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	03/19/2012	6.05	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	04/18/2012	7.30	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	05/16/2012	7.79	0.540J	0.370J	<1.30J*
R-42	Onsite	Water Table	06/18/2012	7.05	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	07/17/2012	6.05	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	08/09/2012	5.77	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	09/13/2012	6.83	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	10/16/2012	6.99	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	11/13/2012	6.13	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	12/11/2012	4.55	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	01/15/2013	5.88	0.380J	<0.620	<1.86*
R-42	Onsite	Water Table	02/18/2013	5.81	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	03/12/2013	6.32	<0.620	<0.620	1.02J*
R-42	Onsite	Water Table	04/10/2013	5.65	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	05/13/2013	9.44	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	06/11/2013	3.32	<0.620	<0.620	1.26J*
R-42	Onsite	Water Table	05/31/2013	<0.240	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	05/31/2013	<0.240	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	05/31/2013	<0.240	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	05/31/2013	<0.240	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	05/31/2013	<0.240	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	06/03/2013	<0.240	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	06/03/2013	2.15	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	06/04/2013	3.05	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	06/04/2013	3.13	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	06/05/2013	3.11	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	06/06/2013	3.27	<0.620	<0.620	<1.86*
R-42	Onsite	Water Table	07/24/2013	2.38	<0.620	<0.620	<2.00
R-42	Onsite	Water Table	08/14/2013	1.32	<0.620	<0.620	<2.00

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
R-42	Onsite	Water Table	09/17/2013	1.52	<0.620	<0.620	<2.00
R-42	Onsite	Water Table	10/18/2013	1.75	<0.620	<0.620	<2.00
R-42	Onsite	Water Table	11/14/2013	1.29	<0.500	<0.500	<1.00
R-42	Onsite	Water Table	12/19/2013	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	01/16/2014	0.730	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	02/13/2014	0.450	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	03/13/2014	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	04/17/2014	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	05/15/2014	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	06/23/2014	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	06/27/2014	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	07/21/2014	1.33	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	08/18/2014	1.94	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	09/17/2014	3.97	<0.500	0.460J	<1.50
R-42	Onsite	Water Table	10/16/2014	5.33	<0.500	0.480J	1.15J
R-42	Onsite	Water Table	11/11/2014	4.00	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	12/10/2014	1.62	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	01/13/2015	0.250J	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	01/14/2015	0.250J	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	02/10/2015	0.150J	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	03/10/2015	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	06/22/2015	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	07/06/2015	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	10/07/2015	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	01/05/2016	0.420	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	02/02/2016	0.220J	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	03/01/2016	0.230J	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	04/06/2016	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	05/04/2016	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	06/03/2016	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	07/07/2016	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	08/04/2016	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	09/06/2016	0.850	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	10/03/2016	0.290J	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	11/03/2016	0.410	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	12/01/2016	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	01/05/2017	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	02/01/2017	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	03/01/2017	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	04/05/2017	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	05/03/2017	<0.200	<0.500	<0.500	<1.50
R-42	Onsite	Water Table	06/06/2017	<0.200	0.400J	<0.500	<1.50
R-42	Onsite	Water Table	07/06/2017	<0.200	<0.500	<0.500	<1.50
R-42-surface	Onsite	Water Table	01/14/2015	0.270J	<0.500	<0.500	<1.50
R-43	Onsite	Water Table	05/13/2013	66.3	4.03	5.74	32.9*
R-43	Onsite	Water Table	06/11/2013	69.7	17.4	7.27	40.2*
R-43	Onsite	Water Table	05/29/2013	50.6	6.24	3.83	22.9*
R-43	Onsite	Water Table	05/29/2013	46.0	8.58	4.31	22.5*
R-43	Onsite	Water Table	05/29/2013	48.3	8.49	4.43	23.1*
R-43	Onsite	Water Table	05/29/2013	42.1	7.31	4.15	21.6*
R-43	Onsite	Water Table	05/29/2013	50.1	8.43	4.44	24.7*
R-43	Onsite	Water Table	06/03/2013	91.5	17.2	8.05	40.2*

Appendix A-2
Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
R-43	Onsite	Water Table	06/03/2013	76.4	12.8	6.80	37.6*
R-43	Onsite	Water Table	06/04/2013	66.7	13.5	7.08	38.8*
R-43	Onsite	Water Table	06/04/2013	74.2	14.4	7.36	40.3*
R-43	Onsite	Water Table	06/05/2013	61.9	13.2	6.15	38.2*
R-43	Onsite	Water Table	06/06/2013	70.0	13.9	6.71	39.2*
R-43	Onsite	Water Table	07/24/2013	44.3	8.29	4.62	21.4
R-43	Onsite	Water Table	08/14/2013	40.4	6.77	4.66	17.5
R-43	Onsite	Water Table	09/17/2013	49.0	8.43	6.21	21.8
R-43	Onsite	Water Table	10/18/2013	50.1	10.4	6.49	21.5
R-43	Onsite	Water Table	11/14/2013	47.9	9.48	5.23	20.9
R-43	Onsite	Water Table	12/19/2013	62.5	9.48	5.59	28.3
R-43	Onsite	Water Table	01/16/2014	52.1	10.5	4.46	20.3
R-43	Onsite	Water Table	02/13/2014	51.6	9.84	4.52	19.6
R-43	Onsite	Water Table	03/13/2014	44.1	8.43	4.15	18.0
R-43	Onsite	Water Table	04/17/2014	28.7	5.66	2.27	11.5
R-43	Onsite	Water Table	05/15/2014	44.7	8.31	4.30	18.9
R-43	Onsite	Water Table	06/23/2014	33.5	5.90	2.74	12.3
R-43	Onsite	Water Table	08/27/2014	59.8	13.0	10.1	40.0
R-43	Onsite	Water Table	09/18/2014	115	42.8	19.2	95.6
R-43	Onsite	Water Table	10/16/2014	82.7	21.9	18.2	69.7
R-43	Onsite	Water Table	11/12/2014	61.9	<0.500	10.4	18.9
R-43	Onsite	Water Table	12/10/2014	60.6	1.12	8.71	19.7
R-43	Onsite	Water Table	01/12/2015	55.3	2.99	7.08	22.8
R-43	Onsite	Water Table	02/11/2015	47.6	5.44	5.40	22.4
R-43	Onsite	Water Table	03/11/2015	50.3	7.74	6.65	30.1
R-43	Onsite	Water Table	06/22/2015	51.8	10.7	9.90	40.1
R-43	Onsite	Water Table	07/08/2015	52.9	10.5	9.68	42.3
R-43	Onsite	Water Table	10/06/2015	60.1	9.69	7.68	44.4
R-43	Onsite	Water Table	01/06/2016	43.0	8.44	5.36	27.3
R-43	Onsite	Water Table	02/04/2016	40.6	8.03	4.90	27.6
R-43	Onsite	Water Table	03/02/2016	38.8	6.68	4.25	24.7
R-43	Onsite	Water Table	04/14/2016	40.4	7.16	4.98	31.1
R-43	Onsite	Water Table	05/05/2016	39.3	7.17	4.84	27.7
R-43	Onsite	Water Table	06/01/2016	34.4	9.40	13.8	107
R-43	Onsite	Water Table	07/06/2016	35.1	7.55	5.58	29.6
R-43	Onsite	Water Table	08/05/2016	45.1	8.48	6.52	34.4
R-43	Onsite	Water Table	09/06/2016	52.4	9.57	6.51	39.6
R-43	Onsite	Water Table	10/03/2016	50.4	6.38	6.64	40.2
R-43	Onsite	Water Table	11/03/2016	61.6	9.11	8.45	47.9
R-43	Onsite	Water Table	12/01/2016	47.1	7.76	5.81	33.8
R-43	Onsite	Water Table	01/05/2017	43.7	7.99	5.27	30.9
R-43	Onsite	Water Table	02/01/2017	33.2	5.28	3.65	20.8
R-43	Onsite	Water Table	03/01/2017	37.0	7.58	4.65	28.9
R-43	Onsite	Water Table	04/05/2017	29.2	6.69	3.45	22.9
R-43	Onsite	Water Table	05/03/2017	28.5	8.11	3.78	24.8
R-43	Onsite	Water Table	06/06/2017	32.8	9.04	5.18	30.1
R-43	Onsite	Water Table	07/06/2017	39.3	9.02	6.40	35.5
R-44	Onsite	Water Table	05/13/2013	3.46	0.310J	3.92	18.9*
R-44	Onsite	Water Table	06/11/2013	9.30	2.45	9.40	43.7*
R-44	Onsite	Water Table	06/01/2013	1.54	6.05	2.32	22.1*
R-44	Onsite	Water Table	06/01/2013	3.30	1.42	3.19	14.4*
R-44	Onsite	Water Table	06/01/2013	4.40	1.02	4.52J*	17.6J**

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
R-44	Onsite	Water Table	06/01/2013	4.48	0.680J	4.31	16.4*
R-44	Onsite	Water Table	06/01/2013	4.56	0.870J	4.63	18.2*
R-44	Onsite	Water Table	06/03/2013	4.68	1.15	4.20	17.6*
R-44	Onsite	Water Table	06/03/2013	4.83	4.75	4.45	17.2*
R-44	Onsite	Water Table	06/04/2013	4.26	0.540J	4.17	16.6*
R-44	Onsite	Water Table	06/04/2013	4.61	0.560J	4.71	19.1*
R-44	Onsite	Water Table	06/05/2013	5.10	1.23	5.36	21.6*
R-44	Onsite	Water Table	06/06/2013	5.59	0.940J	6.02	26.0*
R-44	Onsite	Water Table	07/24/2013	9.73	3.88	8.18	28.0
R-44	Onsite	Water Table	08/14/2013	17.9	9.37	9.99	29.6
R-44	Onsite	Water Table	09/17/2013	33.1	7.66	11.4	32.8
R-44	Onsite	Water Table	10/18/2013	46.5	1.39	7.88	20.3
R-44	Onsite	Water Table	11/14/2013	36.7	1.40	5.70	8.24
R-44	Onsite	Water Table	12/19/2013	36.5	2.88	8.35	26.4
R-44	Onsite	Water Table	01/16/2014	20.9	1.18	4.86	8.54
R-44	Onsite	Water Table	02/13/2014	24.6	1.58	5.11	8.41
R-44	Onsite	Water Table	03/13/2014	19.2	1.00	3.79	5.73
R-44	Onsite	Water Table	04/17/2014	15.7	0.445J	2.65	4.01
R-44	Onsite	Water Table	05/15/2014	24.1	0.640J	8.76	16.9
R-44	Onsite	Water Table	06/23/2014	35.2	0.830J	8.59	19.8
R-44	Onsite	Water Table	07/23/2014	48.4	1.97	55.7	285
R-44	Onsite	Water Table	08/27/2014	43.3	1.13	12.4	36.1
R-44	Onsite	Water Table	09/18/2014	45.1	0.540J	9.60	22.2
R-44	Onsite	Water Table	10/16/2014	38.7	<0.500	7.18	16.5
R-44	Onsite	Water Table	11/12/2014	31.7	<0.500	3.44	8.61
R-44	Onsite	Water Table	12/10/2014	26.2	<0.500	2.52	8.67
R-44	Onsite	Water Table	01/12/2015	22.8	<0.500	1.44	5.66
R-44	Onsite	Water Table	02/11/2015	14.5	<0.500	0.830J	3.94
R-44	Onsite	Water Table	03/11/2015	18.7	<0.500	1.05	5.69
R-44	Onsite	Water Table	06/22/2015	13.3	<0.500	2.86	10.8
R-44	Onsite	Water Table	07/08/2015	13.3	<0.500	3.06	13.6
R-44	Onsite	Water Table	10/06/2015	31.4	<0.500	2.89	15.7
R-44	Onsite	Water Table	01/06/2016	11.1	<0.500	0.540J	3.82
R-44	Onsite	Water Table	02/04/2016	8.13	<0.500	<0.500	2.55J
R-44	Onsite	Water Table	03/02/2016	7.62	<0.500	<0.500	1.99J
R-44	Onsite	Water Table	04/14/2016	6.40	<0.500	<0.500	1.60J
R-44	Onsite	Water Table	05/05/2016	6.32	<0.500	<0.500	1.74J
R-44	Onsite	Water Table	06/01/2016	6.79	<0.500	0.470J	2.55J
R-44	Onsite	Water Table	07/06/2016	6.19	<0.500	3.63	30.5
R-44	Onsite	Water Table	08/10/2016	6.87	<0.500	5.89	24.7
R-44	Onsite	Water Table	09/06/2016	4.64	<0.500	0.930J	5.50
R-44	Onsite	Water Table	10/03/2016	5.96	<0.500	1.59	16.4
R-44	Onsite	Water Table	11/03/2016	6.06	<0.500	0.580J	2.69J
R-44	Onsite	Water Table	12/01/2016	2.31	<0.500	<0.500	1.27J
R-44	Onsite	Water Table	01/05/2017	1.85	<0.500	<0.500	1.20J
R-44	Onsite	Water Table	02/01/2017	1.54	<0.500	<0.500	<1.50
R-44	Onsite	Water Table	03/01/2017	1.26	<0.500	<0.500	1.17J
R-44	Onsite	Water Table	04/05/2017	1.54	<0.500	<0.500	<1.50
R-44	Onsite	Water Table	05/03/2017	1.26	<0.500	0.420J	2.07J
R-44	Onsite	Water Table	06/06/2017	1.78	<0.500	1.46	5.37
R-44	Onsite	Water Table	07/06/2017	3.04	<0.500	1.76	4.89
R-45	Onsite	Water Table	05/13/2013	165	240	53.9	307*

Appendix A-2
Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
R-45	Onsite	Water Table	06/11/2013	311	335	64.4	274*
R-45	Onsite	Water Table	05/30/2013	176	568	210	1150*
R-45	Onsite	Water Table	05/30/2013	179	284	91.0	466*
R-45	Onsite	Water Table	05/30/2013	176	273	84.6	429*
R-45	Onsite	Water Table	05/30/2013	175	186	47.6	230*
R-45	Onsite	Water Table	05/30/2013	185	224	46.7	238*
R-45	Onsite	Water Table	06/03/2013	166	246	84.9	427*
R-45	Onsite	Water Table	06/03/2013	135	139	49.5	190*
R-45	Onsite	Water Table	06/04/2013	223	272	49.4	245*
R-45	Onsite	Water Table	06/04/2013	216	257	46.8	230*
R-45	Onsite	Water Table	06/05/2013	245	279	54.1	262*
R-45	Onsite	Water Table	06/06/2013	285	323	56.3	281*
R-45	Onsite	Water Table	07/24/2013	251	186	49.7	186
R-45	Onsite	Water Table	08/14/2013	323	186	47.7	221
R-45	Onsite	Water Table	09/17/2013	229	131	47.0	189
R-45	Onsite	Water Table	10/18/2013	165	62.0	29.0	108
R-45	Onsite	Water Table	11/14/2013	549	3020	794	4500
R-45	Onsite	Water Table	12/19/2013	223	242	62.0	197
R-45	Onsite	Water Table	01/16/2014	172	151	32.2	145
R-45	Onsite	Water Table	02/13/2014	112	77.5	23.3	104
R-45	Onsite	Water Table	03/13/2014	89.4	64.4	22.2	102
R-45	Onsite	Water Table	04/17/2014	102	112	36.1	197
R-45	Onsite	Water Table	05/15/2014	212	195	36.5	188
R-45	Onsite	Water Table	06/23/2014	182	140	24.1	151
R-45	Onsite	Water Table	07/23/2014	443	469	71.0	384
R-45	Onsite	Water Table	08/27/2014	413	457	79.8	423
R-45	Onsite	Water Table	09/18/2014	326	351	69.8	374
R-45	Onsite	Water Table	10/16/2014	230	197	44.3	267
R-45	Onsite	Water Table	11/12/2014	170	108	35.7	205
R-45	Onsite	Water Table	12/10/2014	167	101	48.2	204
R-45	Onsite	Water Table	01/12/2015	129	70.5	30.1	169
R-45	Onsite	Water Table	03/11/2015	129	115	50.1	259
R-45	Onsite	Water Table	06/22/2015	120	48.9	23.7	94.3
R-45	Onsite	Water Table	07/08/2015	193	125	35.3	168
R-45	Onsite	Water Table	10/06/2015	219	142	40.2	201
R-45	Onsite	Water Table	01/06/2016	100	58.8	25.7	142
R-45	Onsite	Water Table	02/04/2016	76.3	46.5	23.6	129
R-45	Onsite	Water Table	03/02/2016	76.0	182	103	723
R-45	Onsite	Water Table	04/14/2016	57.8	60.2	36.2	242
R-45	Onsite	Water Table	05/05/2016	73.4	24.8	15.0	75.1
R-45	Onsite	Water Table	06/01/2016	99.8	62.6	24.7	146
R-45	Onsite	Water Table	07/06/2016	180	112	35.8	192
R-45	Onsite	Water Table	08/05/2016	471	477	88.3	482
R-45	Onsite	Water Table	09/06/2016	344	297	52.8	302
R-45	Onsite	Water Table	10/03/2016	269	192	48.5	284
R-45	Onsite	Water Table	11/03/2016	157	117	56.5	324
R-45	Onsite	Water Table	12/01/2016	131	72.2	34.0	185
R-45	Onsite	Water Table	01/05/2017	110	91.9	52.9	330
R-45	Onsite	Water Table	02/01/2017	87.6	58.5	34.4	205
R-45	Onsite	Water Table	03/01/2017	73.8	51.1	34.0	211
R-45	Onsite	Water Table	04/05/2017	60.6	39.6	27.5	182
R-45	Onsite	Water Table	05/03/2017	50.0	35.3	23.3	125

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
R-45	Onsite	Water Table	06/06/2017	94.4	47.3	24.2	142
R-45	Onsite	Water Table	07/06/2017	293	243	58.8	309
R-46	Onsite	Water Table	05/13/2013	53.1	46.2	12.7	81.1*
R-46	Onsite	Water Table	06/11/2013	40.9	89.6	20.1	160*
R-46	Onsite	Water Table	06/03/2013	36.5	63.2	17.2	125*
R-46	Onsite	Water Table	06/03/2013	36.4	58.6	19.4	136*
R-46	Onsite	Water Table	06/04/2013	37.2	59.3	20.6	152*
R-46	Onsite	Water Table	06/04/2013	38.8	65.3	21.4	158*
R-46	Onsite	Water Table	06/05/2013	40.9	64.9	20.8	164*
R-46	Onsite	Water Table	06/06/2013	46.2	82.1	22.3	174*
R-46	Onsite	Water Table	07/24/2013	41.4	61.3	23.3	144
R-46	Onsite	Water Table	08/14/2013	65.2	65.2	29.3	159
R-46	Onsite	Water Table	09/17/2013	62.5	57.4	26.6	193
R-46	Onsite	Water Table	10/18/2013	69.9	64.3	16.5	163
R-46	Onsite	Water Table	11/14/2013	61.1	58.4	12.8	136
R-46	Onsite	Water Table	12/19/2013	46.3	53.8	20.2	107
R-46	Onsite	Water Table	01/16/2014	39.5	47.1	11.3	96.2
R-46	Onsite	Water Table	02/13/2014	45.3	52.1	12.0	108
R-46	Onsite	Water Table	03/13/2014	35.5	42.2	10.1	93.8
R-46	Onsite	Water Table	04/17/2014	28.8	39.0	7.91	76.3
R-46	Onsite	Water Table	05/15/2014	65.7	166	39.7	189
R-46	Onsite	Water Table	06/23/2014	53.0	119	22.4	147
R-46	Onsite	Water Table	07/23/2014	69.8	124	39.3	247
R-46	Onsite	Water Table	08/27/2014	115	135	48.7	303
R-46	Onsite	Water Table	09/18/2014	114	127	45.1	307
R-46	Onsite	Water Table	10/16/2014	140	141	41.4	354
R-46	Onsite	Water Table	11/12/2014	104	101	27.9	224
R-46	Onsite	Water Table	12/10/2014	90.4	84.5	30.8	210
R-46	Onsite	Water Table	01/12/2015	93.3	90.9	29.4	236
R-46	Onsite	Water Table	02/11/2015	94.5	87.9	27.9	222
R-46	Onsite	Water Table	03/11/2015	74.5	71.6	28.7	212
R-46	Onsite	Water Table	06/22/2015	73.5	128	39.5	250
R-46	Onsite	Water Table	07/08/2015	75.6	112	38.3	297
R-46	Onsite	Water Table	10/06/2015	93.6	85.8	36.4	367
R-46	Onsite	Water Table	01/06/2016	67.4	67.7	26.1	227
R-46	Onsite	Water Table	02/04/2016	58.2	68.6	23.4	183
R-46	Onsite	Water Table	03/02/2016	54.3	65.5	20.3	179
R-46	Onsite	Water Table	04/14/2016	60.8	81.7	24.3	248
R-46	Onsite	Water Table	05/05/2016	47.1	62.2	18.7	177
R-46	Onsite	Water Table	06/01/2016	57.1	78.5	23.4	227
R-46	Onsite	Water Table	07/06/2016	45.2	51.9	21.8	186
R-46	Onsite	Water Table	08/05/2016	55.9	81.5	30.4	241
R-46	Onsite	Water Table	09/06/2016	66.8	77.5	25.9	252
R-46	Onsite	Water Table	10/03/2016	78.9	88.5	31.6	311
R-46	Onsite	Water Table	11/03/2016	71.1	75.7	31.8	282
R-46	Onsite	Water Table	12/01/2016	42.5	43.8	18.8	185
R-46	Onsite	Water Table	01/05/2017	49.8	61.0	21.6	192
R-46	Onsite	Water Table	02/01/2017	37.8	46.2	14.8	146
R-46	Onsite	Water Table	03/01/2017	39.8	48.8	20.3	200
R-46	Onsite	Water Table	04/05/2017	27.6	30.0	13.4	138
R-46	Onsite	Water Table	05/03/2017	27.7	29.8	15.1	143
R-46	Onsite	Water Table	06/06/2017	27.4	39.6	18.1	137

**Appendix A-2
Historical BTEX Analytical Results**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
R-46	Onsite	Water Table	07/06/2017	37.2	61.3	26.7	209
R-47	Onsite	10-55	06/26/2014	<0.200	0.940J	<0.500	<1.50
R-47	Onsite	10-55	06/27/2014	<0.200	<0.500	<0.500	<1.50
R-47	Onsite	10-55	07/03/2014	<0.200	<0.500	<0.500	<1.50
R-47	Onsite	10-55	07/21/2014	<0.200	<0.500	<0.500	<1.50
R-47	Onsite	10-55	08/18/2014	<0.200	0.330J	<0.500	<1.50
R-47	Onsite	10-55	09/17/2014	<0.200	<0.500	<0.500	<1.50
R-47	Onsite	10-55	10/15/2014	0.260J	<0.500	<0.500	<1.50
R-47	Onsite	10-55	11/11/2014	0.350J	<0.500	<0.500	<1.50
R-47	Onsite	10-55	12/09/2014	0.310J	<0.500	<0.500	<1.50
R-47	Onsite	10-55	01/13/2015	0.290J	<0.500	<0.500	<1.50
R-47	Onsite	10-55	01/14/2015	0.300J	<0.500	<0.500	<1.50
R-47	Onsite	10-55	02/10/2015	0.210J	<0.500	<0.500	<1.50
R-47	Onsite	10-55	03/10/2015	<0.200	<0.500	<0.500	<1.50
R-47	Onsite	10-55	06/22/2015	<0.200	<0.500	<0.500	<1.50
R-47	Onsite	10-55	07/06/2015	<0.200	<0.500	<0.500	<1.50
R-47	Onsite	10-55	10/07/2015	<0.200	<0.500	<0.500	<1.50
R-47	Onsite	10-55	01/05/2016	0.440	<0.500	<0.500	<1.50
R-47	Onsite	10-55	02/02/2016	0.380J	<0.500	<0.500	<1.50
R-47	Onsite	10-55	03/01/2016	0.560	<0.500	<0.500	<1.50
R-47	Onsite	10-55	04/06/2016	0.280J	<0.500	<0.500	<1.50
R-47	Onsite	10-55	05/04/2016	0.200J	<0.500	<0.500	<1.50
R-47	Onsite	10-55	06/03/2016	<0.200	<0.500	<0.500	<1.50
R-47	Onsite	10-55	07/07/2016	<0.200	<0.500	<0.500	<1.50
R-47	Onsite	10-55	08/04/2016	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	06/26/2014	<0.200	0.970J	<0.500	<1.50
R-48	Onsite	10-55	06/27/2014	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	07/03/2014	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	07/21/2014	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	08/18/2014	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	09/17/2014	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	10/15/2014	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	11/11/2014	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	12/09/2014	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	01/13/2015	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	01/14/2015	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	02/10/2015	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	03/10/2015	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	06/22/2015	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	07/06/2015	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	10/07/2015	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	01/05/2016	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	02/02/2016	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	03/01/2016	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	04/06/2016	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	05/04/2016	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	06/03/2016	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	07/07/2016	<0.200	<0.500	<0.500	<1.50
R-48	Onsite	10-55	08/04/2016	<0.200	<0.500	<0.500	<1.50
S-9	Onsite	Water Table	05/18/2012	0.170J	<0.620	<0.620	<1.30J*
S-9	Onsite	Water Table	07/26/2012	0.880	<0.620	<0.620	<1.86*
S-9	Onsite	Water Table	12/13/2012	<0.240	<0.620	<0.620	<1.86*

Appendix A-2
Historical BTEX Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Benzene	Toluene	Ethylbenzene	Total Xylenes
				(µg/L)	(µg/L)	(µg/L)	(µg/L)
S-9	Onsite	Water Table	01/11/2013	<0.240	<0.620	<0.620	<1.86*
S-9	Onsite	Water Table	04/12/2013	<0.240	<0.620	<0.620	<1.86*
S-9	Onsite	Water Table	08/06/2013	12.4	<0.620	<0.620	1.72J
S-9	Onsite	Water Table	10/19/2013	36.8	<0.620	<0.620	3.67
S-9	Onsite	Water Table	03/02/2014	0.220J	<0.500	<0.500	<1.50
S-9	Onsite	Water Table	04/24/2014	<0.200	<0.500	<0.500	<1.50
S-9	Onsite	Water Table	08/13/2014	5.41	<0.500	<0.500	<1.50
S-9	Onsite	Water Table	10/30/2014	<0.200	<0.500	<0.500	<1.50
S-9	Onsite	Water Table	08/11/2015	3.06	<0.500	<0.500	<1.50
S-9	Onsite	Water Table	10/02/2015	5.02	<0.500	<0.500	<1.50
S-9	Onsite	Water Table	08/10/2016	<0.200	<0.500	<0.500	<1.50
S-9	Onsite	Water Table	08/02/2017	7.34	<0.500	<0.500	<1.50
S-19	Onsite	Water Table	09/03/2008	<0.500	<2.00	<2.00	<4.00*
S-23	Onsite	Water Table	04/06/2011	1.17	<1.00	2.14	<3.00*
S-41R	Onsite	Water Table	09/02/2008	2400	41.0	33.2	347*
S-41R	Onsite	Water Table	04/14/2011	1240	2.91	9.61	414*
S-41R	Onsite	Water Table	01/30/2014	2410	6.84	5.79	277
S-43	Onsite	Water Table	06/12/2013	2.87	0.390J	0.430J	5.45*
S-43	Onsite	Water Table	11/04/2013	954	18.0J	76.0	727
S-43	Onsite	Water Table	02/20/2015	805	<12.5	39.5	1010
S-43	Onsite	Water Table	08/05/2015	100	0.660J	21.2	288
S-43	Onsite	Water Table	02/27/2017	106	<0.500	12.3	366
S-44	Onsite	Water Table	05/22/2012	460	766	168	1060*
S-44	Onsite	Water Table	05/02/2013	830	1140	311	1850*
S-44	Onsite	Water Table	11/04/2013	1420	780	532	2470
S-44	Onsite	Water Table	08/20/2014	1480	2100	746	3580
S-50	Onsite	Water Table	09/02/2008	3010	3480	569	5910*
S-50	Onsite	Water Table	05/02/2013	570	1080	199	2810*
S-51	Onsite	Water Table	08/05/2015	976	2.48	23.9	646

General Notes:

Higher result of field-duplicate pair is reported.

Date listed is the sample date for recent samples; prior to 2006 however, the date listed is likely the event date as sample dates were not always available.

MW-148A-15/B-30 and MW-153A-15/B-55 are offsite wells, but are reported along with the onsite data

Acronyms and Abbreviations:

< = not detected, LOD or limit of quantitation (LOQ for older data) listed; flag applied by laboratory

* = total xylenes calculated in database (total value not supplied by lab in original report); flag applied by Shannon & Wilson, Inc.

-- = not analyzed/reported

B* = result is considered not detected at the LOQ or reported concentration (higher value), due to contamination identified in a blank QC sample. Flag is reported as <...B*. Flag applied by Shannon & Wilson, Inc.

E = result was above laboratory calibration range, flag applied by laboratory

J = estimated concentration, detected above the detection limit (DL) and below the LOQ; flag applied by laboratory

J* = result is considered estimated (no direction of bias), due to QC failures or sample-handling anomalies; flag applied by Shannon & Wilson, Inc.

JH* = result is considered estimated (biased high), due to QC failures or sample-handling anomalies; flag applied by Shannon & Wilson, Inc.

ND = analyte not detected, unknown limit of detection (LOD)

µg/L = micrograms per liter

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
AS-MW-8	Onsite	Water Table	11/07/2014	17.7
MW-101A-25	Onsite	10-55	04/19/2006	360
MW-101A-25	Onsite	10-55	05/16/2006	410
MW-101A-25	Onsite	10-55	06/21/2006	390
MW-101A-25	Onsite	10-55	07/19/2006	320
MW-101A-25	Onsite	10-55	11/16/2006	260
MW-101A-25	Onsite	10-55	12/08/2006	380
MW-101A-25	Onsite	10-55	01/15/2007	250
MW-101A-25	Onsite	10-55	02/13/2007	270
MW-101A-25	Onsite	10-55	03/19/2007	360
MW-101A-25	Onsite	10-55	04/17/2007	251
MW-101A-25	Onsite	10-55	05/22/2007	204
MW-101A-25	Onsite	10-55	06/20/2007	316
MW-101A-25	Onsite	10-55	07/18/2007	231
MW-101A-25	Onsite	10-55	08/21/2007	214
MW-101A-25	Onsite	10-55	09/20/2007	266
MW-101A-25	Onsite	10-55	10/17/2007	251
MW-101A-25	Onsite	10-55	11/15/2007	313
MW-101A-25	Onsite	10-55	01/03/2008	127
MW-101A-25	Onsite	10-55	02/13/2008	185
MW-101A-25	Onsite	10-55	03/05/2008	156
MW-101A-25	Onsite	10-55	04/03/2008	149
MW-101A-25	Onsite	10-55	05/08/2008	153
MW-101A-25	Onsite	10-55	06/10/2008	156
MW-101A-25	Onsite	10-55	07/01/2008	129
MW-101A-25	Onsite	10-55	08/07/2008	150
MW-101A-25	Onsite	10-55	09/04/2008	193
MW-101A-25	Onsite	10-55	10/02/2008	140
MW-101A-25	Onsite	10-55	11/06/2008	129
MW-101A-25	Onsite	10-55	12/04/2008	131
MW-101A-25	Onsite	10-55	01/13/2009	110
MW-101A-25	Onsite	10-55	02/09/2009	101
MW-101A-25	Onsite	10-55	03/03/2009	121
MW-101A-25	Onsite	10-55	04/09/2009	87.9
MW-101A-25	Onsite	10-55	05/06/2009	77.8
MW-101A-25	Onsite	10-55	06/05/2009	96.8
MW-101A-25	Onsite	10-55	07/06/2009	110
MW-101A-25	Onsite	10-55	08/03/2009	72.0
MW-101A-25	Onsite	10-55	09/02/2009	78.1
MW-101A-25	Onsite	10-55	10/01/2009	72.5
MW-101A-25	Onsite	10-55	11/03/2009	86.4
MW-101A-25	Onsite	10-55	12/01/2009	80.8
MW-101A-25	Onsite	10-55	01/21/2010	90.6
MW-101A-25	Onsite	10-55	02/12/2010	55.5
MW-101A-25	Onsite	10-55	03/04/2010	63.8
MW-101A-25	Onsite	10-55	04/05/2010	54.4
MW-101A-25	Onsite	10-55	05/03/2010	60.5
MW-101A-25	Onsite	10-55	07/19/2010	53.1
MW-101A-25	Onsite	10-55	07/16/2010	66.7
MW-101A-25	Onsite	10-55	08/10/2010	67.1
MW-101A-25	Onsite	10-55	09/02/2010	54.0
MW-101A-25	Onsite	10-55	10/05/2010	67.6

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-101A-25	Onsite	10-55	11/04/2010	67.6
MW-101A-25	Onsite	10-55	02/25/2011	55.7
MW-101A-25	Onsite	10-55	04/12/2011	37.0
MW-101A-25	Onsite	10-55	08/15/2011	70.7
MW-101A-25	Onsite	10-55	02/21/2012	73.3
MW-101A-25	Onsite	10-55	05/03/2012	48.6JL *
MW-101A-25	Onsite	10-55	07/24/2012	63.5
MW-101A-25	Onsite	10-55	01/21/2013	52.3
MW-101A-25	Onsite	10-55	04/17/2013	44.0
MW-101A-25	Onsite	10-55	07/25/2013	52.6
MW-101A-25	Onsite	10-55	10/14/2013	49.2
MW-101A-25	Onsite	10-55	07/22/2014	39.3
MW-101A-25	Onsite	10-55	02/18/2015	6.96J
MW-101A-25	Onsite	10-55	04/15/2015	5.06J
MW-101A-25	Onsite	10-55	07/31/2015	4.08J
MW-101A-25	Onsite	10-55	02/12/2016	3.67J
MW-101A-25	Onsite	10-55	07/19/2016	<5.10
MW-101A-25	Onsite	10-55	02/14/2017	10.3
MW-101-60	Onsite	10-55	04/19/2006	100
MW-101-60	Onsite	10-55	05/16/2006	160
MW-101-60	Onsite	10-55	06/21/2006	160
MW-101-60	Onsite	10-55	07/19/2006	96.0
MW-101-60	Onsite	10-55	01/15/2007	120
MW-101-60	Onsite	10-55	04/17/2007	123
MW-101-60	Onsite	10-55	07/18/2007	109
MW-101-60	Onsite	10-55	10/17/2007	80.9
MW-101-60	Onsite	10-55	01/03/2008	65.6
MW-101-60	Onsite	10-55	04/03/2008	70.6
MW-101-60	Onsite	10-55	07/01/2008	53.8
MW-101-60	Onsite	10-55	10/02/2008	44.0
MW-101-60	Onsite	10-55	04/09/2009	32.1
MW-101-60	Onsite	10-55	07/06/2009	46.3
MW-101-60	Onsite	10-55	08/03/2009	34.9
MW-101-60	Onsite	10-55	10/01/2009	20.8
MW-101-60	Onsite	10-55	01/21/2010	38.8
MW-101-60	Onsite	10-55	04/05/2010	14.7
MW-101-60	Onsite	10-55	07/16/2010	29.4
MW-101-60	Onsite	10-55	10/05/2010	23.8
MW-101-60	Onsite	10-55	02/09/2011	18.6
MW-101-60	Onsite	10-55	04/12/2011	21.1
MW-101-60	Onsite	10-55	08/15/2011	40.7
MW-101-60	Onsite	10-55	10/11/2011	35.6
MW-101-60	Onsite	10-55	02/21/2012	37.0
MW-101-60	Onsite	10-55	05/03/2012	32.9JL *
MW-101-60	Onsite	10-55	07/24/2012	33.7
MW-101-60	Onsite	10-55	04/17/2013	18.5
MW-101-60	Onsite	10-55	07/25/2013	20.0
MW-101-60	Onsite	10-55	10/14/2013	19.4
MW-101-60	Onsite	10-55	07/23/2014	18.2
MW-101-60	Onsite	10-55	02/18/2015	3.50J
MW-101-60	Onsite	10-55	04/15/2015	<5.40
MW-101-60	Onsite	10-55	07/21/2015	<5.00

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-101-60	Onsite	10-55	07/14/2016	<5.10
MW-102-70	Onsite	55-90	04/18/2006	<10.0
MW-102-70	Onsite	55-90	05/16/2006	<10.0
MW-102-70	Onsite	55-90	06/20/2006	<10.0
MW-102-70	Onsite	55-90	07/18/2006	<10.0
MW-102-70	Onsite	55-90	04/18/2007	<10.3
MW-102-70	Onsite	55-90	10/16/2007	<10.5
MW-102-70	Onsite	55-90	04/02/2008	<10.2
MW-102-70	Onsite	55-90	10/01/2008	<10.0
MW-102-70	Onsite	55-90	04/09/2009	<10.2
MW-102-70	Onsite	55-90	08/03/2009	<10.4
MW-102-70	Onsite	55-90	10/01/2009	<10.3
MW-102-70	Onsite	55-90	04/02/2010	<10.0
MW-102-70	Onsite	55-90	10/06/2010	<10.3
MW-104-65	Onsite	10-55	08/03/2009	<10.9
MW-104-65	Onsite	10-55	02/08/2011	<10.2
MW-104-65	Onsite	10-55	04/01/2011	<10.5
MW-104-65	Onsite	10-55	10/11/2011	<6.20
MW-104-65	Onsite	10-55	05/02/2012	<6.32
MW-104-65	Onsite	10-55	11/14/2012	<6.20
MW-104-65	Onsite	10-55	04/23/2013	<6.20
MW-104-65	Onsite	10-55	10/31/2013	<6.20
MW-104-65	Onsite	10-55	07/28/2014	<5.40J*
MW-104-65	Onsite	10-55	07/30/2015	<5.00
MW-105A-25	Onsite	10-55	09/03/2008	<10.5
MW-105A-25	Onsite	10-55	04/18/2011	<11.1
MW-105A-25	Onsite	10-55	10/17/2011	<6.20
MW-105A-25	Onsite	10-55	05/04/2012	<6.20
MW-105A-25	Onsite	10-55	07/19/2012	<6.32
MW-105A-25	Onsite	10-55	09/17/2012	155
MW-105A-25	Onsite	10-55	10/11/2012	<6.20
MW-105A-25	Onsite	10-55	05/22/2013	<6.20
MW-105A-25	Onsite	10-55	08/20/2014	<5.25
MW-105A-25	Onsite	10-55	08/04/2015	R*
MW-105A-25	Onsite	10-55	07/26/2016	<5.15
MW-105-65	Onsite	10-55	09/03/2008	<10.6
MW-105-65	Onsite	10-55	04/18/2011	<11.0
MW-105-65	Onsite	10-55	10/17/2011	<6.40
MW-105-65	Onsite	10-55	05/04/2012	<6.20
MW-105-65	Onsite	10-55	07/19/2012	<6.32
MW-105-65	Onsite	10-55	11/12/2012	<6.66
MW-105-65	Onsite	10-55	01/14/2013	<6.88
MW-105-65	Onsite	10-55	05/22/2013	<6.32
MW-105-65	Onsite	10-55	07/23/2013	<6.20
MW-105-65	Onsite	10-55	10/28/2013	<6.20
MW-105-65	Onsite	10-55	08/29/2014	<5.00
MW-105-65	Onsite	10-55	08/04/2015	<5.00
MW-105-65	Onsite	10-55	07/26/2016	<5.05
MW-106-25	Onsite	10-55	08/22/2006	<100
MW-106-25	Onsite	10-55	09/18/2006	110
MW-106-25	Onsite	10-55	04/17/2007	<10.8
MW-106-25	Onsite	10-55	09/19/2007	<10.0

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-106-25	Onsite	10-55	04/02/2008	<10.2
MW-106-25	Onsite	10-55	09/04/2008	<10.4
MW-106-25	Onsite	10-55	04/08/2009	<10.0
MW-106-25	Onsite	10-55	09/02/2009	<11.1
MW-106-25	Onsite	10-55	04/02/2010	<10.0
MW-106-25	Onsite	10-55	09/03/2010	<10.0
MW-106-25	Onsite	10-55	02/24/2011	<10.9
MW-106-25	Onsite	10-55	04/15/2011	<10.9
MW-106-25	Onsite	10-55	10/11/2011	<6.20
MW-106-25	Onsite	10-55	04/27/2012	<6.74
MW-106-25	Onsite	10-55	05/04/2012	<6.20J*
MW-106-25	Onsite	10-55	11/15/2012	<6.20
MW-106-25	Onsite	10-55	05/13/2013	<6.46
MW-106-25	Onsite	10-55	03/10/2014	<5.00
MW-106-25	Onsite	10-55	03/17/2014	<5.00
MW-106-25	Onsite	10-55	04/04/2014	<5.00
MW-106-25	Onsite	10-55	04/05/2014	<5.00
MW-106-25	Onsite	10-55	04/06/2014	<5.00
MW-106-25	Onsite	10-55	04/07/2014	<5.00
MW-106-25	Onsite	10-55	04/09/2014	<5.00
MW-106-25	Onsite	10-55	04/10/2014	<5.40
MW-106-25	Onsite	10-55	04/11/2014	<5.00
MW-106-25	Onsite	10-55	04/12/2014	<5.00
MW-106-25	Onsite	10-55	04/13/2014	<5.00
MW-106-25	Onsite	10-55	04/14/2014	<5.00
MW-106-25	Onsite	10-55	04/15/2014	<5.25
MW-106-25	Onsite	10-55	04/16/2014	<5.15
MW-106-25	Onsite	10-55	04/17/2014	<5.25
MW-106-25	Onsite	10-55	04/18/2014	<5.25
MW-106-25	Onsite	10-55	04/19/2014	<5.30
MW-106-25	Onsite	10-55	04/20/2014	<5.00
MW-106-25	Onsite	10-55	04/21/2014	<5.00
MW-106-25	Onsite	10-55	04/22/2014	<5.20
MW-106-25	Onsite	10-55	04/23/2014	<5.25
MW-106-25	Onsite	10-55	08/15/2014	<5.25
MW-106-25	Onsite	10-55	02/20/2015	<5.00
MW-106-25	Onsite	10-55	07/31/2015	<5.00
MW-106-25	Onsite	10-55	07/27/2016	<5.15
MW-109-15	Onsite	Water Table	04/18/2006	11.0
MW-109-15	Onsite	Water Table	05/16/2006	13.0
MW-109-15	Onsite	Water Table	06/20/2006	<10.0
MW-109-15	Onsite	Water Table	07/18/2006	<10.0
MW-109-15	Onsite	Water Table	01/15/2007	28.0
MW-109-15	Onsite	Water Table	04/17/2007	<10.8
MW-109-15	Onsite	Water Table	07/17/2007	<10.8
MW-109-15	Onsite	Water Table	10/16/2007	<10.4
MW-109-15	Onsite	Water Table	01/03/2008	64.0
MW-109-15	Onsite	Water Table	04/02/2008	<10.4
MW-109-15	Onsite	Water Table	07/01/2008	<10.3
MW-109-15	Onsite	Water Table	10/02/2008	<10.0
MW-109-15	Onsite	Water Table	01/12/2009	<10.4
MW-109-15	Onsite	Water Table	04/08/2009	<10.4

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-109-15	Onsite	Water Table	07/07/2009	<10.0
MW-109-15	Onsite	Water Table	10/01/2009	<10.5
MW-109-15	Onsite	Water Table	01/19/2010	14.8
MW-109-15	Onsite	Water Table	04/02/2010	<10.4
MW-109-15	Onsite	Water Table	07/16/2010	<10.0
MW-109-15	Onsite	Water Table	10/06/2010	<10.0
MW-109-15	Onsite	Water Table	02/10/2011	<11.6
MW-109-15	Onsite	Water Table	06/01/2011	<3.10
MW-109-15	Onsite	Water Table	10/17/2011	<6.20
MW-109-15	Onsite	Water Table	05/04/2012	<6.20
MW-109-15	Onsite	Water Table	11/14/2012	<6.60
MW-109-15	Onsite	Water Table	06/06/2013	<6.20
MW-109-15	Onsite	Water Table	11/01/2013	<6.46
MW-109-15	Onsite	Water Table	08/19/2014	<5.45
MW-109-15	Onsite	Water Table	07/31/2015	<5.00
MW-109-15	Onsite	Water Table	07/20/2016	<5.10
MW-110-20	Onsite	Water Table	07/18/2006	11000
MW-110-20	Onsite	Water Table	08/22/2006	11000
MW-110-20	Onsite	Water Table	09/18/2006	8800
MW-110-20	Onsite	Water Table	11/15/2006	4100
MW-110-20	Onsite	Water Table	12/08/2006	4600
MW-110-20	Onsite	Water Table	01/17/2007	4100
MW-110-20	Onsite	Water Table	07/17/2007	4050
MW-110-20	Onsite	Water Table	08/21/2007	7600
MW-110-20	Onsite	Water Table	10/16/2007	7740
MW-110-20	Onsite	Water Table	11/15/2007	4300
MW-110-20	Onsite	Water Table	12/07/2007	4070
MW-110-20	Onsite	Water Table	01/04/2008	2310
MW-110-20	Onsite	Water Table	07/01/2008	4700
MW-110-20	Onsite	Water Table	08/07/2008	12100
MW-110-20	Onsite	Water Table	09/04/2008	5500
MW-110-20	Onsite	Water Table	10/02/2008	4200
MW-110-20	Onsite	Water Table	11/06/2008	2820
MW-110-20	Onsite	Water Table	12/04/2008	2160
MW-110-20	Onsite	Water Table	01/12/2009	979
MW-110-20	Onsite	Water Table	07/07/2009	2850
MW-110-20	Onsite	Water Table	08/03/2009	1280
MW-110-20	Onsite	Water Table	09/02/2009	1280
MW-110-20	Onsite	Water Table	10/01/2009	822
MW-110-20	Onsite	Water Table	11/03/2009	515
MW-110-20	Onsite	Water Table	12/22/2009	227
MW-110-20	Onsite	Water Table	01/19/2010	251
MW-110-20	Onsite	Water Table	07/23/2010	668
MW-110-20	Onsite	Water Table	08/11/2010	1160
MW-110-20	Onsite	Water Table	09/02/2010	1270
MW-110-20	Onsite	Water Table	10/06/2010	1390
MW-110-20	Onsite	Water Table	11/04/2010	1580
MW-110-20	Onsite	Water Table	02/10/2011	233
MW-110-20	Onsite	Water Table	08/23/2011	1240
MW-110-20	Onsite	Water Table	10/18/2011	1150
MW-110-20	Onsite	Water Table	02/21/2012	317JL*
MW-110-20	Onsite	Water Table	06/15/2012	1740

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-110-20	Onsite	Water Table	07/26/2012	1340J*
MW-110-20	Onsite	Water Table	10/18/2012	608
MW-110-20	Onsite	Water Table	01/11/2013	398
MW-110-20	Onsite	Water Table	07/30/2013	538
MW-110-20	Onsite	Water Table	10/15/2013	448
MW-110-20	Onsite	Water Table	03/12/2014	81.6
MW-110-20	Onsite	Water Table	04/25/2014	3310
MW-110-20	Onsite	Water Table	05/28/2014	1090
MW-110-20	Onsite	Water Table	06/04/2014	899
MW-110-20	Onsite	Water Table	09/03/2014	702
MW-110-20	Onsite	Water Table	10/28/2014	621
MW-110-20	Onsite	Water Table	02/20/2015	158
MW-110-20	Onsite	Water Table	04/23/2015	215
MW-110-20	Onsite	Water Table	07/31/2015	285
MW-110-20	Onsite	Water Table	10/20/2015	435
MW-110-20	Onsite	Water Table	02/17/2016	106
MW-110-20	Onsite	Water Table	04/11/2016	90.5
MW-110-20	Onsite	Water Table	08/09/2016	357J*
MW-110-20	Onsite	Water Table	10/20/2016	302
MW-110-20	Onsite	Water Table	02/16/2017	69.2
MW-110-20	Onsite	Water Table	04/10/2017	62.2
MW-110-65	Onsite	10-55	09/04/2013	<6.50
MW-110-65	Onsite	10-55	10/25/2013	<6.52
MW-110-65	Onsite	10-55	03/12/2014	<5.30
MW-110-65	Onsite	10-55	04/22/2014	<5.00
MW-110-65	Onsite	10-55	08/29/2014	<5.25
MW-110-65	Onsite	10-55	10/28/2014	<5.00
MW-110-65	Onsite	10-55	07/31/2015	<5.20J*
MW-110-65	Onsite	10-55	08/09/2016	4.01J
MW-111-15	Onsite	Water Table	08/22/2006	120
MW-111-15	Onsite	Water Table	09/18/2006	<100
MW-111-15	Onsite	Water Table	04/18/2007	115
MW-111-15	Onsite	Water Table	10/16/2007	91.1
MW-111-15	Onsite	Water Table	04/02/2008	80.9
MW-111-15	Onsite	Water Table	10/02/2008	85.0
MW-111-15	Onsite	Water Table	04/08/2009	49.1
MW-111-15	Onsite	Water Table	10/01/2009	49.4
MW-111-15	Onsite	Water Table	04/02/2010	38.9
MW-111-15	Onsite	Water Table	10/12/2010	55.4
MW-111-15	Onsite	Water Table	02/24/2011	51.0
MW-111-15	Onsite	Water Table	04/14/2011	40.6
MW-111-15	Onsite	Water Table	10/11/2011	78.2
MW-113-15	Onsite	Water Table	04/18/2006	250
MW-113-15	Onsite	Water Table	05/16/2006	280
MW-113-15	Onsite	Water Table	06/21/2006	290
MW-113-15	Onsite	Water Table	07/18/2006	190
MW-113-15	Onsite	Water Table	01/16/2007	250
MW-113-15	Onsite	Water Table	04/18/2007	257
MW-113-15	Onsite	Water Table	07/17/2007	526
MW-113-15	Onsite	Water Table	10/17/2007	153
MW-113-15	Onsite	Water Table	01/03/2008	122
MW-113-15	Onsite	Water Table	04/02/2008	158

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-113-15	Onsite	Water Table	07/01/2008	528
MW-113-15	Onsite	Water Table	10/02/2008	72.0
MW-113-15	Onsite	Water Table	01/12/2009	108
MW-113-15	Onsite	Water Table	04/09/2009	118
MW-113-15	Onsite	Water Table	07/07/2009	112
MW-113-15	Onsite	Water Table	10/01/2009	81.5
MW-113-15	Onsite	Water Table	01/19/2010	90.3
MW-113-15	Onsite	Water Table	04/02/2010	98.1
MW-113-15	Onsite	Water Table	07/22/2010	118
MW-113-15	Onsite	Water Table	10/06/2010	143
MW-113-15	Onsite	Water Table	02/08/2011	121
MW-113-15	Onsite	Water Table	04/14/2011	68.9
MW-113-15	Onsite	Water Table	08/17/2011	115
MW-113-15	Onsite	Water Table	10/14/2011	118
MW-113-15	Onsite	Water Table	02/14/2012	203
MW-113-15	Onsite	Water Table	05/17/2012	266JL*
MW-113-15	Onsite	Water Table	07/26/2012	335
MW-113-15	Onsite	Water Table	11/14/2012	310
MW-113-15	Onsite	Water Table	01/14/2013	283
MW-113-15	Onsite	Water Table	05/20/2013	234
MW-113-15	Onsite	Water Table	07/18/2013	199
MW-113-15	Onsite	Water Table	10/22/2013	61.6
MW-113-15	Onsite	Water Table	02/28/2014	63.7
MW-113-15	Onsite	Water Table	04/21/2014	55.0
MW-113-15	Onsite	Water Table	07/31/2014	46.4
MW-113-15	Onsite	Water Table	11/07/2014	57.5
MW-113-15	Onsite	Water Table	04/23/2015	177
MW-113-15	Onsite	Water Table	07/28/2015	153
MW-113-15	Onsite	Water Table	10/20/2015	69.1
MW-113-15	Onsite	Water Table	02/04/2016	90.9
MW-113-15	Onsite	Water Table	04/11/2016	120
MW-113-15	Onsite	Water Table	08/08/2016	119
MW-113-15	Onsite	Water Table	10/20/2016	62.2
MW-113-15	Onsite	Water Table	02/27/2017	30.2
MW-113-15	Onsite	Water Table	04/10/2017	26.8
MW-115-15	Onsite	Water Table	05/17/2006	310
MW-115-15	Onsite	Water Table	06/21/2006	700
MW-115-15	Onsite	Water Table	07/19/2006	500
MW-115-15	Onsite	Water Table	01/16/2007	770
MW-115-15	Onsite	Water Table	04/17/2007	413
MW-115-15	Onsite	Water Table	07/19/2007	447
MW-115-15	Onsite	Water Table	10/17/2007	220
MW-115-15	Onsite	Water Table	01/03/2008	79.4
MW-115-15	Onsite	Water Table	04/04/2008	94.7
MW-115-15	Onsite	Water Table	07/01/2008	91.4
MW-115-15	Onsite	Water Table	10/03/2008	75.0
MW-115-15	Onsite	Water Table	01/13/2009	42.6
MW-115-15	Onsite	Water Table	04/10/2009	33.1
MW-115-15	Onsite	Water Table	07/07/2009	34.2
MW-115-15	Onsite	Water Table	10/02/2009	<10.6
MW-115-15	Onsite	Water Table	01/20/2010	<10.8
MW-115-15	Onsite	Water Table	04/03/2010	<105

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-115-15	Onsite	Water Table	05/31/2012	15.6
MW-115-15	Onsite	Water Table	04/11/2013	10.2
MW-115-15	Onsite	Water Table	11/17/2013	13.7
MW-115-15	Onsite	Water Table	03/27/2014	5.56J
MW-115-15	Onsite	Water Table	09/03/2014	10.1
MW-115-15	Onsite	Water Table	02/24/2015	5.91J
MW-115-15	Onsite	Water Table	08/07/2015	9.02JL*
MW-115-15	Onsite	Water Table	02/26/2016	5.12J
MW-115-15	Onsite	Water Table	08/17/2016	<5.05
MW-116-15	Onsite	Water Table	05/17/2006	40.0
MW-116-15	Onsite	Water Table	06/21/2006	43.0
MW-116-15	Onsite	Water Table	07/19/2006	27.0
MW-116-15	Onsite	Water Table	01/16/2007	38.0
MW-116-15	Onsite	Water Table	04/17/2007	38.0
MW-116-15	Onsite	Water Table	07/19/2007	<105
MW-116-15	Onsite	Water Table	10/17/2007	37.7
MW-116-15	Onsite	Water Table	01/03/2008	21.1
MW-116-15	Onsite	Water Table	04/04/2008	33.0
MW-116-15	Onsite	Water Table	07/01/2008	46.1
MW-116-15	Onsite	Water Table	10/03/2008	69.0
MW-116-15	Onsite	Water Table	01/13/2009	24.5
MW-116-15	Onsite	Water Table	04/10/2009	25.6
MW-116-15	Onsite	Water Table	07/07/2009	20.3
MW-116-15	Onsite	Water Table	10/02/2009	<10.6
MW-116-15	Onsite	Water Table	01/20/2010	<10.5
MW-116-15	Onsite	Water Table	04/03/2010	11.4
MW-116-15	Onsite	Water Table	07/26/2010	13.4
MW-116-15	Onsite	Water Table	10/14/2010	<10.6
MW-116-15	Onsite	Water Table	04/13/2011	41.8
MW-116-15	Onsite	Water Table	10/20/2011	28.2JH*
MW-116-15	Onsite	Water Table	05/21/2012	27.6
MW-116-15	Onsite	Water Table	06/12/2013	47.4
MW-116-15	Onsite	Water Table	11/17/2013	45.5
MW-116-15	Onsite	Water Table	06/04/2014	47.8
MW-116-15	Onsite	Water Table	09/04/2014	38.5
MW-116-15	Onsite	Water Table	08/10/2015	35.5JL*
MW-116-15	Onsite	Water Table	10/22/2015	54.6
MW-116-15	Onsite	Water Table	02/29/2016	9.50JL*
MW-116-15	Onsite	Water Table	08/16/2016	11.2J*
MW-118-45	Onsite	10-55	04/18/2006	<10.0
MW-118-45	Onsite	10-55	04/18/2007	<10.8
MW-118-45	Onsite	10-55	10/16/2007	<10.3
MW-118-45	Onsite	10-55	04/02/2008	<10.3
MW-118-45	Onsite	10-55	10/01/2008	<10.4
MW-118-45	Onsite	10-55	04/09/2009	<10.2
MW-118-45	Onsite	10-55	10/01/2009	<10.3
MW-118-45	Onsite	10-55	04/02/2010	<10.4
MW-124-25	Onsite	10-55	06/20/2006	<10.0
MW-124-25	Onsite	10-55	07/18/2006	<10.0
MW-124-25	Onsite	10-55	10/16/2007	<10.6
MW-124-25	Onsite	10-55	10/02/2008	<11.0
MW-124-25	Onsite	10-55	10/02/2009	<10.4

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-124-25	Onsite	10-55	10/07/2010	<10.3
MW-125-25	Onsite	10-55	09/02/2008	<10.6
MW-125-25	Onsite	10-55	08/17/2011	24.5
MW-125-25	Onsite	10-55	10/18/2011	11.1
MW-125-25	Onsite	10-55	02/17/2012	<7.12
MW-125-25	Onsite	10-55	05/22/2012	<6.32
MW-125-25	Onsite	10-55	08/08/2012	<6.74
MW-125-25	Onsite	10-55	11/14/2012	<6.20
MW-125-25	Onsite	10-55	02/02/2013	<6.40
MW-125-25	Onsite	10-55	04/16/2013	<6.40
MW-125-25	Onsite	10-55	07/20/2013	<6.20
MW-125-25	Onsite	10-55	11/01/2013	<6.20
MW-125-25	Onsite	10-55	03/04/2014	<5.00
MW-125-25	Onsite	10-55	04/23/2014	<5.15
MW-125-25	Onsite	10-55	08/12/2014	<5.25
MW-125-25	Onsite	10-55	10/23/2014	<5.00
MW-125-25	Onsite	10-55	02/20/2015	3.32J
MW-125-25	Onsite	10-55	04/23/2015	<5.00
MW-125-25	Onsite	10-55	08/04/2015	<5.00
MW-125-25	Onsite	10-55	10/22/2015	<5.00
MW-125-25	Onsite	10-55	02/25/2016	3.14J
MW-125-25	Onsite	10-55	08/18/2016	<5.05
MW-125-25	Onsite	10-55	02/24/2017	<5.10
MW-125-25	Onsite	10-55	04/11/2017	<5.55J*
MW-126-25	Onsite	10-55	09/03/2008	<10.5
MW-127-25	Onsite	10-55	04/18/2006	110
MW-127-25	Onsite	10-55	04/18/2007	216
MW-127-25	Onsite	10-55	10/18/2007	291
MW-127-25	Onsite	10-55	04/02/2008	372
MW-127-25	Onsite	10-55	10/02/2008	290
MW-127-25	Onsite	10-55	04/10/2009	341
MW-127-25	Onsite	10-55	10/02/2009	146
MW-127-25	Onsite	10-55	04/06/2010	209
MW-127-25	Onsite	10-55	10/07/2010	199
MW-127-25	Onsite	10-55	03/09/2011	147
MW-127-25	Onsite	10-55	04/12/2011	138
MW-127-25	Onsite	10-55	08/18/2011	176
MW-127-25	Onsite	10-55	10/20/2011	142
MW-127-25	Onsite	10-55	02/21/2012	74.4
MW-127-25	Onsite	10-55	05/18/2012	81.6
MW-127-25	Onsite	10-55	08/08/2012	75.0
MW-127-25	Onsite	10-55	11/12/2012	55.1
MW-127-25	Onsite	10-55	01/11/2013	51.0
MW-127-25	Onsite	10-55	04/16/2013	36.1
MW-127-25	Onsite	10-55	07/20/2013	23.5
MW-127-25	Onsite	10-55	10/19/2013	18.7
MW-127-25	Onsite	10-55	03/07/2014	8.67J
MW-127-25	Onsite	10-55	04/24/2014	8.22J
MW-127-25	Onsite	10-55	08/14/2014	7.44J
MW-127-25	Onsite	10-55	10/30/2014	7.56J
MW-127-25	Onsite	10-55	02/21/2015	3.27J
MW-127-25	Onsite	10-55	04/24/2015	4.88J

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Historical Sulfolane Summary**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-127-25	Onsite	10-55	08/07/2015	4.33J
MW-127-25	Onsite	10-55	10/21/2015	4.28J
MW-127-25	Onsite	10-55	03/01/2016	<5.00
MW-127-25	Onsite	10-55	04/08/2016	<5.15
MW-127-25	Onsite	10-55	08/15/2016	4.62J*
MW-127-25	Onsite	10-55	10/21/2016	4.49J
MW-127-25	Onsite	10-55	02/27/2017	<5.20
MW-127-25	Onsite	10-55	04/11/2017	<5.40
MW-127-25	Onsite	10-55	08/02/2017	<5.05
MW-127-25	Onsite	10-55	10/19/2017	7.04J
MW-129-40	Onsite	10-55	04/18/2006	<10.0
MW-129-40	Onsite	10-55	04/18/2007	<10.8
MW-129-40	Onsite	10-55	09/20/2007	<10.9
MW-129-40	Onsite	10-55	04/02/2008	<10.2
MW-129-40	Onsite	10-55	09/04/2008	<10.4
MW-129-40	Onsite	10-55	04/10/2009	<10.3
MW-129-40	Onsite	10-55	09/02/2009	<10.0
MW-129-40	Onsite	10-55	04/06/2010	<20.6
MW-129-40	Onsite	10-55	09/03/2010	<10.3
MW-129-40	Onsite	10-55	02/10/2011	<10.7
MW-129-40	Onsite	10-55	04/07/2011	<10.7
MW-129-40	Onsite	10-55	10/19/2011	<6.20
MW-129-40	Onsite	10-55	05/03/2012	<6.32
MW-129-40	Onsite	10-55	11/15/2012	<6.20
MW-129-40	Onsite	10-55	01/31/2013	<6.60
MW-129-40	Onsite	10-55	05/20/2013	<6.20
MW-129-40	Onsite	10-55	07/20/2013	<6.20
MW-129-40	Onsite	10-55	10/19/2013	<6.20
MW-129-40	Onsite	10-55	03/02/2014	<5.15
MW-129-40	Onsite	10-55	04/24/2014	<5.00
MW-129-40	Onsite	10-55	08/13/2014	<5.20
MW-129-40	Onsite	10-55	11/04/2014	<5.00
MW-129-40	Onsite	10-55	02/24/2015	<5.00
MW-129-40	Onsite	10-55	04/24/2015	<5.15
MW-129-40	Onsite	10-55	08/07/2015	<5.00
MW-129-40	Onsite	10-55	10/21/2015	<5.25
MW-129-40	Onsite	10-55	03/01/2016	<5.05
MW-129-40	Onsite	10-55	08/10/2016	<5.50
MW-129-40	Onsite	10-55	02/25/2017	<5.50
MW-130-25	Onsite	10-55	02/10/2011	930
MW-130-25	Onsite	10-55	04/06/2011	629
MW-130-25	Onsite	10-55	10/19/2011	1080
MW-130-25	Onsite	10-55	12/13/2011	1130
MW-130-25	Onsite	10-55	02/07/2012	993
MW-130-25	Onsite	10-55	05/19/2012	1210
MW-130-25	Onsite	10-55	07/23/2012	994
MW-130-25	Onsite	10-55	10/22/2012	854
MW-130-25	Onsite	10-55	01/11/2013	899
MW-130-25	Onsite	10-55	04/12/2013	776
MW-130-25	Onsite	10-55	07/21/2013	734
MW-130-25	Onsite	10-55	11/11/2013	750
MW-130-25	Onsite	10-55	03/05/2014	809

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-130-25	Onsite	10-55	05/14/2014	990
MW-130-25	Onsite	10-55	09/03/2014	1140JL*
MW-130-25	Onsite	10-55	10/22/2014	1680
MW-130-25	Onsite	10-55	02/20/2015	841
MW-130-25	Onsite	10-55	04/23/2015	562
MW-130-25	Onsite	10-55	08/07/2015	249
MW-130-25	Onsite	10-55	10/22/2015	76.3
MW-130-25	Onsite	10-55	03/07/2016	265
MW-130-25	Onsite	10-55	04/08/2016	176
MW-130-25	Onsite	10-55	08/18/2016	143
MW-130-25	Onsite	10-55	10/20/2016	147
MW-130-25	Onsite	10-55	02/24/2017	204J*
MW-130-25	Onsite	10-55	04/11/2017	181
MW-130-25	Onsite	10-55	08/03/2017	134
MW-130-25	Onsite	10-55	10/20/2017	77.3
MW-131-25	Onsite	10-55	04/18/2006	67.0
MW-131-25	Onsite	10-55	05/16/2006	96.0
MW-131-25	Onsite	10-55	06/20/2006	88.0
MW-131-25	Onsite	10-55	07/18/2006	44.0
MW-131-25	Onsite	10-55	11/15/2006	62.0
MW-131-25	Onsite	10-55	12/08/2006	92.0
MW-131-25	Onsite	10-55	01/15/2007	81.0
MW-131-25	Onsite	10-55	02/13/2007	91.0
MW-131-25	Onsite	10-55	03/19/2007	27.0
MW-131-25	Onsite	10-55	04/18/2007	75.4
MW-131-25	Onsite	10-55	05/22/2007	59.8
MW-131-25	Onsite	10-55	06/20/2007	74.6
MW-131-25	Onsite	10-55	07/17/2007	59.0
MW-131-25	Onsite	10-55	08/21/2007	69.9
MW-131-25	Onsite	10-55	09/20/2007	46.0
MW-131-25	Onsite	10-55	10/16/2007	39.7
MW-131-25	Onsite	10-55	11/12/2007	55.7
MW-131-25	Onsite	10-55	12/07/2007	44.0
MW-131-25	Onsite	10-55	01/03/2008	49.6
MW-131-25	Onsite	10-55	02/12/2008	66.1
MW-131-25	Onsite	10-55	03/05/2008	69.8
MW-131-25	Onsite	10-55	04/02/2008	75.2
MW-131-25	Onsite	10-55	05/07/2008	89.9
MW-131-25	Onsite	10-55	06/10/2008	79.1
MW-131-25	Onsite	10-55	07/01/2008	76.7
MW-131-25	Onsite	10-55	08/07/2008	54.0
MW-131-25	Onsite	10-55	09/04/2008	58.9
MW-131-25	Onsite	10-55	10/02/2008	37.0
MW-131-25	Onsite	10-55	11/06/2008	61.3
MW-131-25	Onsite	10-55	12/04/2008	64.0
MW-131-25	Onsite	10-55	01/12/2009	53.9
MW-131-25	Onsite	10-55	02/09/2009	74.4
MW-131-25	Onsite	10-55	03/03/2009	87.0
MW-131-25	Onsite	10-55	04/08/2009	66.9
MW-131-25	Onsite	10-55	05/06/2009	35.0
MW-131-25	Onsite	10-55	06/05/2009	39.7
MW-131-25	Onsite	10-55	07/07/2009	63.8

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-131-25	Onsite	10-55	08/03/2009	36.7
MW-131-25	Onsite	10-55	09/02/2009	53.1
MW-131-25	Onsite	10-55	10/01/2009	35.1
MW-131-25	Onsite	10-55	11/03/2009	77.5
MW-131-25	Onsite	10-55	12/01/2009	59.3
MW-131-25	Onsite	10-55	01/19/2010	66.8
MW-131-25	Onsite	10-55	02/12/2010	52.9
MW-131-25	Onsite	10-55	03/04/2010	70.1
MW-131-25	Onsite	10-55	04/02/2010	54.2
MW-131-25	Onsite	10-55	05/03/2010	56.4
MW-131-25	Onsite	10-55	07/19/2010	68.9
MW-131-25	Onsite	10-55	07/23/2010	76.3
MW-131-25	Onsite	10-55	08/10/2010	42.9
MW-131-25	Onsite	10-55	09/02/2010	42.4
MW-131-25	Onsite	10-55	10/06/2010	41.5
MW-131-25	Onsite	10-55	11/04/2010	46.4
MW-131-25	Onsite	10-55	03/09/2011	36.8
MW-131-25	Onsite	10-55	04/08/2011	32.7
MW-131-25	Onsite	10-55	08/12/2011	36.8
MW-131-25	Onsite	10-55	10/18/2011	37.3
MW-131-25	Onsite	10-55	02/13/2012	43.6
MW-131-25	Onsite	10-55	05/05/2012	30.5
MW-131-25	Onsite	10-55	07/24/2012	27.1
MW-131-25	Onsite	10-55	11/14/2012	24.8
MW-131-25	Onsite	10-55	01/11/2013	21.3
MW-131-25	Onsite	10-55	06/06/2013	13.7
MW-131-25	Onsite	10-55	07/18/2013	10.8
MW-131-25	Onsite	10-55	10/22/2013	6.47J
MW-131-25	Onsite	10-55	02/28/2014	5.75J
MW-131-25	Onsite	10-55	04/22/2014	5.56J
MW-131-25	Onsite	10-55	07/25/2014	5.36J
MW-131-25	Onsite	10-55	10/28/2014	<5.00
MW-131-25	Onsite	10-55	02/26/2015	<5.00
MW-131-25	Onsite	10-55	04/22/2015	<5.00
MW-131-25	Onsite	10-55	07/27/2015	<5.00
MW-131-25	Onsite	10-55	07/28/2016	<5.15
MW-132-20	Onsite	Water Table	04/19/2006	<10.0
MW-132-20	Onsite	Water Table	04/17/2007	<11.0
MW-132-20	Onsite	Water Table	10/16/2007	<11.1
MW-132-20	Onsite	Water Table	04/03/2008	<10.3
MW-132-20	Onsite	Water Table	10/02/2008	<10.0
MW-132-20	Onsite	Water Table	04/08/2009	<10.2
MW-132-20	Onsite	Water Table	10/12/2009	<10.0
MW-132-20	Onsite	Water Table	04/06/2010	<10.3
MW-132-20	Onsite	Water Table	10/13/2010	<10.5
MW-132-20	Onsite	Water Table	02/18/2011	<10.9
MW-132-20	Onsite	Water Table	04/11/2011	<10.5
MW-132-20	Onsite	Water Table	10/18/2011	<6.20
MW-132-20	Onsite	Water Table	05/05/2012	<6.20
MW-132-20	Onsite	Water Table	04/13/2013	<6.20
MW-132-20	Onsite	Water Table	11/07/2013	<6.20
MW-132-20	Onsite	Water Table	08/11/2014	<5.10

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Historical Sulfolane Summary

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-132-20	Onsite	Water Table	08/06/2015	<5.00J*
MW-132-20	Onsite	Water Table	08/15/2016	<5.30J*
MW-133-20	Onsite	Water Table	08/17/2011	<6.20
MW-133-20	Onsite	Water Table	10/18/2011	<6.40
MW-133-20	Onsite	Water Table	02/17/2012	<6.74
MW-133-20	Onsite	Water Table	05/19/2012	<6.32J*
MW-133-20	Onsite	Water Table	08/08/2012	<6.20
MW-133-20	Onsite	Water Table	11/15/2012	<6.60
MW-133-20	Onsite	Water Table	02/02/2013	<6.46
MW-133-20	Onsite	Water Table	04/26/2013	<6.52
MW-133-20	Onsite	Water Table	07/21/2013	<6.60
MW-133-20	Onsite	Water Table	11/07/2013	<6.32
MW-133-20	Onsite	Water Table	08/11/2014	<5.00
MW-133-20	Onsite	Water Table	08/06/2015	<5.00
MW-133-20	Onsite	Water Table	08/15/2016	<5.40J*
MW-134-20	Onsite	Water Table	09/20/2007	115
MW-134-20	Onsite	Water Table	09/04/2008	26.2
MW-134-20	Onsite	Water Table	09/03/2009	<10.5
MW-134-20	Onsite	Water Table	09/15/2010	<10.0
MW-134-20	Onsite	Water Table	08/16/2011	<6.52
MW-134-20	Onsite	Water Table	08/09/2012	<6.20
MW-134-20	Onsite	Water Table	07/23/2013	<6.20
MW-134-20	Onsite	Water Table	11/16/2013	<5.10
MW-134-20	Onsite	Water Table	09/03/2014	<5.00
MW-134-20	Onsite	Water Table	08/07/2015	7.85J
MW-134-20	Onsite	Water Table	02/29/2016	<5.10
MW-134-20	Onsite	Water Table	08/17/2016	<5.05
MW-135-20	Onsite	Water Table	07/14/2008	24.6
MW-135-20	Onsite	Water Table	10/14/2011	<6.20
MW-135-20	Onsite	Water Table	08/01/2012	15.4
MW-135-20	Onsite	Water Table	01/31/2013	<6.74
MW-135-20	Onsite	Water Table	07/21/2013	6.39J
MW-135-20	Onsite	Water Table	11/07/2013	<6.20
MW-135-20	Onsite	Water Table	03/14/2014	<5.20
MW-135-20	Onsite	Water Table	09/03/2014	<5.00
MW-135-20	Onsite	Water Table	02/20/2015	<5.30
MW-135-20	Onsite	Water Table	08/05/2015	3.14J
MW-135-20	Onsite	Water Table	02/26/2016	<5.00J*
MW-135-20	Onsite	Water Table	08/18/2016	4.55J
MW-135-20	Onsite	Water Table	02/24/2017	<5.40
MW-136-20	Onsite	Water Table	07/14/2008	<10.4
MW-137-20	Onsite	Water Table	07/14/2008	<10.5
MW-138-20	Onsite	Water Table	05/17/2006	4500
MW-138-20	Onsite	Water Table	06/21/2006	2200
MW-138-20	Onsite	Water Table	11/16/2006	<2100
MW-138-20	Onsite	Water Table	12/08/2006	1800
MW-138-20	Onsite	Water Table	01/15/2007	7800
MW-138-20	Onsite	Water Table	02/13/2007	11000
MW-138-20	Onsite	Water Table	03/19/2007	7700
MW-138-20	Onsite	Water Table	04/17/2007	5430
MW-138-20	Onsite	Water Table	05/22/2007	4840
MW-138-20	Onsite	Water Table	06/20/2007	1090

**Appendix A-3
Historical Sulfolane Summary**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-138-20	Onsite	Water Table	07/19/2007	528
MW-138-20	Onsite	Water Table	08/21/2007	<230
MW-138-20	Onsite	Water Table	09/20/2007	325
MW-138-20	Onsite	Water Table	10/17/2007	2780
MW-138-20	Onsite	Water Table	11/12/2007	<3200
MW-138-20	Onsite	Water Table	01/03/2008	779
MW-138-20	Onsite	Water Table	02/12/2008	1140
MW-138-20	Onsite	Water Table	03/05/2008	4690
MW-138-20	Onsite	Water Table	04/04/2008	5120
MW-138-20	Onsite	Water Table	05/07/2008	1950
MW-138-20	Onsite	Water Table	06/10/2008	3160
MW-138-20	Onsite	Water Table	07/01/2008	<100
MW-138-20	Onsite	Water Table	08/07/2008	<10.0
MW-138-20	Onsite	Water Table	09/04/2008	1290
MW-138-20	Onsite	Water Table	10/01/2008	1280
MW-138-20	Onsite	Water Table	11/06/2008	1410
MW-138-20	Onsite	Water Table	12/04/2008	1770
MW-138-20	Onsite	Water Table	01/12/2009	<104
MW-138-20	Onsite	Water Table	02/10/2009	1460
MW-138-20	Onsite	Water Table	03/03/2009	3120
MW-138-20	Onsite	Water Table	04/08/2009	<5100
MW-138-20	Onsite	Water Table	05/06/2009	1840
MW-138-20	Onsite	Water Table	06/05/2009	1780
MW-138-20	Onsite	Water Table	07/07/2009	900
MW-138-20	Onsite	Water Table	08/03/2009	813
MW-138-20	Onsite	Water Table	09/02/2009	131
MW-138-20	Onsite	Water Table	10/02/2009	<447
MW-138-20	Onsite	Water Table	11/03/2009	<222
MW-138-20	Onsite	Water Table	12/01/2009	2910
MW-138-20	Onsite	Water Table	01/19/2010	4010
MW-138-20	Onsite	Water Table	02/17/2010	7380
MW-138-20	Onsite	Water Table	03/04/2010	9690
MW-138-20	Onsite	Water Table	04/03/2010	10700
MW-138-20	Onsite	Water Table	06/14/2010	3040
MW-138-20	Onsite	Water Table	02/23/2012	523
MW-138-20	Onsite	Water Table	05/31/2012	1350JL*
MW-138-20	Onsite	Water Table	08/02/2012	116
MW-138-20	Onsite	Water Table	12/13/2012	1210
MW-138-20	Onsite	Water Table	01/12/2013	1680JL*
MW-138-20	Onsite	Water Table	04/02/2013	1200JL*
MW-138-20	Onsite	Water Table	09/04/2013	32.3J
MW-138-20	Onsite	Water Table	11/14/2013	1250
MW-138-20	Onsite	Water Table	03/12/2014	1140J*
MW-138-20	Onsite	Water Table	04/22/2014	529
MW-138-20	Onsite	Water Table	09/03/2014	34.0J*
MW-138-20	Onsite	Water Table	10/30/2014	377
MW-138-20	Onsite	Water Table	08/11/2015	27.2J*
MW-138-20	Onsite	Water Table	10/28/2015	70.0
MW-138-20	Onsite	Water Table	04/11/2016	12.2
MW-138-20	Onsite	Water Table	08/17/2016	52.8
MW-138-20	Onsite	Water Table	10/26/2016	739
MW-138-20	Onsite	Water Table	04/13/2017	16900JL*

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-139-25	Onsite	10-55	04/18/2006	450
MW-139-25	Onsite	10-55	05/16/2006	530
MW-139-25	Onsite	10-55	06/20/2006	580
MW-139-25	Onsite	10-55	07/18/2006	450
MW-139-25	Onsite	10-55	11/15/2006	340
MW-139-25	Onsite	10-55	12/08/2006	580
MW-139-25	Onsite	10-55	01/17/2007	530
MW-139-25	Onsite	10-55	02/13/2007	650
MW-139-25	Onsite	10-55	03/19/2007	380
MW-139-25	Onsite	10-55	04/18/2007	765
MW-139-25	Onsite	10-55	05/22/2007	500
MW-139-25	Onsite	10-55	06/20/2007	498
MW-139-25	Onsite	10-55	07/17/2007	414
MW-139-25	Onsite	10-55	08/21/2007	427
MW-139-25	Onsite	10-55	09/20/2007	543
MW-139-25	Onsite	10-55	10/16/2007	447
MW-139-25	Onsite	10-55	11/12/2007	435
MW-139-25	Onsite	10-55	12/07/2007	487
MW-139-25	Onsite	10-55	01/03/2008	480
MW-139-25	Onsite	10-55	02/12/2008	507
MW-139-25	Onsite	10-55	03/05/2008	741
MW-139-25	Onsite	10-55	04/02/2008	700
MW-139-25	Onsite	10-55	05/07/2008	612
MW-139-25	Onsite	10-55	06/10/2008	691
MW-139-25	Onsite	10-55	07/01/2008	93.9
MW-139-25	Onsite	10-55	08/07/2008	601
MW-139-25	Onsite	10-55	09/04/2008	591
MW-139-25	Onsite	10-55	10/02/2008	540
MW-139-25	Onsite	10-55	11/06/2008	528
MW-139-25	Onsite	10-55	12/04/2008	567
MW-139-25	Onsite	10-55	01/12/2009	472
MW-139-25	Onsite	10-55	02/10/2009	624
MW-139-25	Onsite	10-55	03/03/2009	706
MW-139-25	Onsite	10-55	04/09/2009	578
MW-139-25	Onsite	10-55	05/06/2009	450
MW-139-25	Onsite	10-55	06/05/2009	649
MW-139-25	Onsite	10-55	07/07/2009	636
MW-139-25	Onsite	10-55	08/03/2009	303
MW-139-25	Onsite	10-55	09/02/2009	447
MW-139-25	Onsite	10-55	10/01/2009	331
MW-139-25	Onsite	10-55	11/03/2009	535
MW-139-25	Onsite	10-55	12/01/2009	395
MW-139-25	Onsite	10-55	01/19/2010	447
MW-139-25	Onsite	10-55	02/12/2010	345
MW-139-25	Onsite	10-55	03/04/2010	400
MW-139-25	Onsite	10-55	04/02/2010	358
MW-139-25	Onsite	10-55	05/03/2010	630
MW-139-25	Onsite	10-55	07/19/2010	411
MW-139-25	Onsite	10-55	07/07/2010	361
MW-139-25	Onsite	10-55	08/10/2010	427
MW-139-25	Onsite	10-55	09/02/2010	337
MW-139-25	Onsite	10-55	10/06/2010	439

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-139-25	Onsite	10-55	11/05/2010	374
MW-139-25	Onsite	10-55	02/09/2011	279
MW-139-25	Onsite	10-55	04/11/2011	201
MW-139-25	Onsite	10-55	08/17/2011	258
MW-139-25	Onsite	10-55	10/12/2011	326JL*
MW-139-25	Onsite	10-55	02/14/2012	265
MW-139-25	Onsite	10-55	05/21/2012	318
MW-139-25	Onsite	10-55	07/26/2012	271
MW-139-25	Onsite	10-55	11/14/2012	218
MW-139-25	Onsite	10-55	01/11/2013	150
MW-139-25	Onsite	10-55	05/13/2013	94.1
MW-139-25	Onsite	10-55	07/18/2013	137
MW-139-25	Onsite	10-55	10/16/2013	160
MW-139-25	Onsite	10-55	02/28/2014	83.3
MW-139-25	Onsite	10-55	04/16/2014	66.3
MW-139-25	Onsite	10-55	07/30/2014	65.3
MW-139-25	Onsite	10-55	10/25/2014	41.2
MW-139-25	Onsite	10-55	02/26/2015	31.7
MW-139-25	Onsite	10-55	04/22/2015	28.4
MW-139-25	Onsite	10-55	07/31/2015	27.8
MW-139-25	Onsite	10-55	10/02/2015	24.6
MW-139-25	Onsite	10-55	02/04/2016	27.3
MW-139-25	Onsite	10-55	04/28/2016	27.4
MW-139-25	Onsite	10-55	07/21/2016	21.8
MW-139-25	Onsite	10-55	10/14/2016	24.0
MW-139-25	Onsite	10-55	02/28/2017	27.7
MW-139-25	Onsite	10-55	04/10/2017	27.6
MW-139-25	Onsite	10-55	07/14/2017	25.9
MW-139-25	Onsite	10-55	10/20/2017	55.8
MW-140-25	Onsite	10-55	09/04/2008	<10.4
MW-141-20	Onsite	Water Table	05/22/2007	<10.0
MW-141-20	Onsite	Water Table	06/20/2007	<10.0
MW-141-20	Onsite	Water Table	07/17/2007	198
MW-141-20	Onsite	Water Table	11/12/2007	<10.0
MW-141-20	Onsite	Water Table	01/03/2008	<10.1
MW-141-20	Onsite	Water Table	04/03/2008	<10.2
MW-141-20	Onsite	Water Table	07/01/2008	<10.3
MW-141-20	Onsite	Water Table	10/01/2008	<10.6
MW-141-20	Onsite	Water Table	01/12/2009	<10.3
MW-141-20	Onsite	Water Table	04/08/2009	<10.2
MW-141-20	Onsite	Water Table	07/06/2009	<10.3
MW-141-20	Onsite	Water Table	10/01/2009	<10.0
MW-141-20	Onsite	Water Table	01/18/2010	<10.3
MW-141-20	Onsite	Water Table	04/02/2010	<10.4
MW-141-20	Onsite	Water Table	07/22/2010	<10.5
MW-141-20	Onsite	Water Table	10/06/2010	<10.8
MW-141-20	Onsite	Water Table	02/09/2011	<10.9
MW-141-20	Onsite	Water Table	04/15/2011	<10.5
MW-141-20	Onsite	Water Table	08/17/2011	<7.12
MW-141-20	Onsite	Water Table	10/14/2011	<6.20
MW-141-20	Onsite	Water Table	02/14/2012	<6.96
MW-141-20	Onsite	Water Table	04/27/2012	<6.40

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-141-20	Onsite	Water Table	05/17/2012	<6.52
MW-141-20	Onsite	Water Table	07/26/2012	<6.20
MW-141-20	Onsite	Water Table	11/15/2012	<6.20
MW-141-20	Onsite	Water Table	02/02/2013	<6.20
MW-141-20	Onsite	Water Table	05/08/2013	<6.20
MW-141-20	Onsite	Water Table	07/25/2013	<6.20
MW-141-20	Onsite	Water Table	03/07/2014	<5.00
MW-141-20	Onsite	Water Table	07/31/2014	<5.25
MW-141-20	Onsite	Water Table	04/07/2015	<5.00
MW-141-20	Onsite	Water Table	08/03/2015	<5.00
MW-141-20	Onsite	Water Table	08/04/2016	<5.45
MW-142-20	Onsite	Water Table	04/18/2006	450
MW-142-20	Onsite	Water Table	05/16/2006	450
MW-142-20	Onsite	Water Table	06/20/2006	450
MW-142-20	Onsite	Water Table	07/18/2006	230
MW-142-20	Onsite	Water Table	11/15/2006	310
MW-142-20	Onsite	Water Table	12/08/2006	580
MW-142-20	Onsite	Water Table	01/17/2007	560
MW-142-20	Onsite	Water Table	02/13/2007	670
MW-142-20	Onsite	Water Table	03/19/2007	550
MW-142-20	Onsite	Water Table	04/18/2007	527
MW-142-20	Onsite	Water Table	05/22/2007	415
MW-142-20	Onsite	Water Table	06/20/2007	399
MW-142-20	Onsite	Water Table	07/17/2007	307
MW-142-20	Onsite	Water Table	08/21/2007	277
MW-142-20	Onsite	Water Table	09/20/2007	283
MW-142-20	Onsite	Water Table	10/16/2007	371
MW-142-20	Onsite	Water Table	11/12/2007	331
MW-142-20	Onsite	Water Table	12/07/2007	376
MW-142-20	Onsite	Water Table	01/04/2008	371
MW-142-20	Onsite	Water Table	02/12/2008	318
MW-142-20	Onsite	Water Table	03/05/2008	669
MW-142-20	Onsite	Water Table	04/02/2008	432
MW-142-20	Onsite	Water Table	05/07/2008	422
MW-142-20	Onsite	Water Table	06/10/2008	524
MW-142-20	Onsite	Water Table	07/01/2008	78.6
MW-142-20	Onsite	Water Table	08/07/2008	287
MW-142-20	Onsite	Water Table	09/04/2008	538
MW-142-20	Onsite	Water Table	10/02/2008	610
MW-142-20	Onsite	Water Table	11/06/2008	667
MW-142-20	Onsite	Water Table	12/04/2008	650
MW-142-20	Onsite	Water Table	01/12/2009	422
MW-142-20	Onsite	Water Table	02/09/2009	759
MW-142-20	Onsite	Water Table	03/03/2009	861
MW-142-20	Onsite	Water Table	04/08/2009	562
MW-142-20	Onsite	Water Table	05/06/2009	458
MW-142-20	Onsite	Water Table	06/05/2009	589
MW-142-20	Onsite	Water Table	07/07/2009	570
MW-142-20	Onsite	Water Table	08/03/2009	370
MW-142-20	Onsite	Water Table	09/02/2009	485
MW-142-20	Onsite	Water Table	10/01/2009	423
MW-142-20	Onsite	Water Table	11/03/2009	580

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-142-20	Onsite	Water Table	12/01/2009	476
MW-142-20	Onsite	Water Table	01/19/2010	562
MW-142-20	Onsite	Water Table	02/12/2010	498
MW-142-20	Onsite	Water Table	03/04/2010	510
MW-142-20	Onsite	Water Table	04/02/2010	380
MW-142-20	Onsite	Water Table	05/03/2010	689
MW-142-20	Onsite	Water Table	07/19/2010	559
MW-142-20	Onsite	Water Table	07/07/2010	527
MW-142-20	Onsite	Water Table	08/11/2010	398
MW-142-20	Onsite	Water Table	09/02/2010	392
MW-142-20	Onsite	Water Table	10/06/2010	514
MW-142-20	Onsite	Water Table	11/05/2010	689
MW-142-20	Onsite	Water Table	03/09/2011	455
MW-142-20	Onsite	Water Table	04/08/2011	335
MW-142-20	Onsite	Water Table	08/12/2011	379
MW-142-20	Onsite	Water Table	10/18/2011	489
MW-142-20	Onsite	Water Table	02/14/2012	383
MW-142-20	Onsite	Water Table	05/03/2012	369
MW-142-20	Onsite	Water Table	07/19/2012	275
MW-142-20	Onsite	Water Table	09/17/2012	321
MW-142-20	Onsite	Water Table	11/12/2012	284
MW-142-20	Onsite	Water Table	01/06/2013	248
MW-142-20	Onsite	Water Table	03/06/2013	235
MW-142-20	Onsite	Water Table	06/12/2013	215
MW-142-20	Onsite	Water Table	07/18/2013	183
MW-142-20	Onsite	Water Table	10/15/2013	192
MW-142-20	Onsite	Water Table	02/28/2014	142
MW-142-20	Onsite	Water Table	04/16/2014	124
MW-142-20	Onsite	Water Table	09/03/2014	102
MW-142-20	Onsite	Water Table	10/25/2014	110
MW-142-20	Onsite	Water Table	02/26/2015	89.5
MW-142-20	Onsite	Water Table	04/18/2015	70.8
MW-142-20	Onsite	Water Table	07/31/2015	44.1
MW-142-20	Onsite	Water Table	10/16/2015	47.2
MW-142-20	Onsite	Water Table	02/04/2016	40.6
MW-142-20	Onsite	Water Table	04/08/2016	33.4
MW-142-20	Onsite	Water Table	08/09/2016	20.0
MW-142-20	Onsite	Water Table	10/14/2016	22.5
MW-142-20	Onsite	Water Table	02/16/2017	18.4
MW-142-20	Onsite	Water Table	04/10/2017	17.6
MW-142-20	Onsite	Water Table	08/09/2017	15.8
MW-142-65	Onsite	10-55	12/06/2013	6.63J
MW-142-65	Onsite	10-55	03/13/2014	5.35J
MW-142-65	Onsite	10-55	04/16/2014	5.71J
MW-142-65	Onsite	10-55	07/25/2014	5.49J
MW-142-65	Onsite	10-55	10/15/2014	3.22J
MW-142-65	Onsite	10-55	02/17/2015	<5.00
MW-142-65	Onsite	10-55	07/24/2015	4.70J
MW-142-65	Onsite	10-55	02/23/2016	4.21J
MW-142-65	Onsite	10-55	07/15/2016	4.76J
MW-142-65	Onsite	10-55	02/28/2017	7.23J
MW-142-150	Onsite	90-160	12/06/2013	<5.00

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-142-150	Onsite	90-160	03/13/2014	<5.00
MW-142-150	Onsite	90-160	04/16/2014	<5.20
MW-142-150	Onsite	90-160	07/25/2014	<5.00
MW-142-150	Onsite	90-160	10/15/2014	<5.00
MW-142-150	Onsite	90-160	07/24/2015	<5.15
MW-142-150	Onsite	90-160	07/15/2016	<5.10
MW-143-20	Onsite	Water Table	04/19/2006	290
MW-143-20	Onsite	Water Table	05/16/2006	360
MW-143-20	Onsite	Water Table	06/21/2006	380
MW-143-20	Onsite	Water Table	07/19/2006	<120
MW-143-20	Onsite	Water Table	11/16/2006	150
MW-143-20	Onsite	Water Table	12/08/2006	290
MW-143-20	Onsite	Water Table	01/17/2007	350
MW-143-20	Onsite	Water Table	02/13/2007	400
MW-143-20	Onsite	Water Table	03/19/2007	360
MW-143-20	Onsite	Water Table	04/17/2007	297
MW-143-20	Onsite	Water Table	05/22/2007	522
MW-143-20	Onsite	Water Table	06/20/2007	88.5
MW-143-20	Onsite	Water Table	07/18/2007	51.0
MW-143-20	Onsite	Water Table	08/21/2007	142
MW-143-20	Onsite	Water Table	09/20/2007	94.1
MW-143-20	Onsite	Water Table	10/17/2007	42.5
MW-143-20	Onsite	Water Table	11/12/2007	228
MW-143-20	Onsite	Water Table	01/04/2008	192
MW-143-20	Onsite	Water Table	02/13/2008	249
MW-143-20	Onsite	Water Table	03/05/2008	355
MW-143-20	Onsite	Water Table	04/03/2008	246
MW-143-20	Onsite	Water Table	05/07/2008	200
MW-143-20	Onsite	Water Table	06/10/2008	149
MW-143-20	Onsite	Water Table	07/01/2008	136
MW-143-20	Onsite	Water Table	08/07/2008	12.9
MW-143-20	Onsite	Water Table	09/04/2008	33.3
MW-143-20	Onsite	Water Table	10/02/2008	52.0
MW-143-20	Onsite	Water Table	11/06/2008	189
MW-143-20	Onsite	Water Table	12/04/2008	215
MW-143-20	Onsite	Water Table	01/13/2009	171
MW-143-20	Onsite	Water Table	02/09/2009	132
MW-143-20	Onsite	Water Table	03/03/2009	280
MW-143-20	Onsite	Water Table	04/09/2009	111
MW-143-20	Onsite	Water Table	05/06/2009	111
MW-143-20	Onsite	Water Table	06/08/2009	102
MW-143-20	Onsite	Water Table	07/06/2009	98.2
MW-143-20	Onsite	Water Table	08/03/2009	105
MW-143-20	Onsite	Water Table	09/02/2009	44.8
MW-143-20	Onsite	Water Table	10/01/2009	59.1
MW-143-20	Onsite	Water Table	11/03/2009	172
MW-143-20	Onsite	Water Table	12/01/2009	155
MW-143-20	Onsite	Water Table	01/21/2010	145
MW-143-20	Onsite	Water Table	02/12/2010	163
MW-143-20	Onsite	Water Table	03/04/2010	179
MW-143-20	Onsite	Water Table	04/05/2010	137
MW-143-20	Onsite	Water Table	05/03/2010	107

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-143-20	Onsite	Water Table	06/14/2010	89.8
MW-143-20	Onsite	Water Table	07/23/2010	79.4
MW-143-20	Onsite	Water Table	08/10/2010	37.8
MW-143-20	Onsite	Water Table	09/03/2010	32.2
MW-143-20	Onsite	Water Table	10/05/2010	56.4
MW-143-20	Onsite	Water Table	11/04/2010	68.7
MW-143-20	Onsite	Water Table	03/09/2011	134
MW-143-20	Onsite	Water Table	04/08/2011	76.1
MW-143-20	Onsite	Water Table	08/12/2011	58.0
MW-143-20	Onsite	Water Table	10/20/2011	56.4
MW-143-20	Onsite	Water Table	02/08/2012	117
MW-143-20	Onsite	Water Table	05/03/2012	35.8JL*
MW-143-20	Onsite	Water Table	08/15/2012	36.8
MW-143-20	Onsite	Water Table	11/15/2012	70.1
MW-143-20	Onsite	Water Table	01/21/2013	66.6
MW-143-20	Onsite	Water Table	04/18/2013	64.7
MW-143-20	Onsite	Water Table	07/25/2013	26.1
MW-143-20	Onsite	Water Table	10/15/2013	15.7
MW-143-20	Onsite	Water Table	02/27/2014	21.9
MW-143-20	Onsite	Water Table	04/15/2014	17.5
MW-143-20	Onsite	Water Table	07/22/2014	5.25J
MW-143-20	Onsite	Water Table	10/15/2014	5.56J
MW-143-20	Onsite	Water Table	02/18/2015	16.4
MW-143-20	Onsite	Water Table	04/16/2015	14.3
MW-143-20	Onsite	Water Table	07/24/2015	7.61J
MW-143-20	Onsite	Water Table	02/09/2016	12.3
MW-143-20	Onsite	Water Table	07/18/2016	7.33J
MW-143-20	Onsite	Water Table	02/14/2017	8.88J
MW-144A-25	Onsite	10-55	04/18/2006	<10.0
MW-144A-25	Onsite	10-55	04/18/2007	<10.6
MW-144A-25	Onsite	10-55	10/16/2007	<10.5
MW-144A-25	Onsite	10-55	04/02/2008	<10.3
MW-144A-25	Onsite	10-55	10/02/2008	<10.0
MW-144A-25	Onsite	10-55	04/09/2009	<10.2
MW-144A-25	Onsite	10-55	10/02/2009	<10.3
MW-144A-25	Onsite	10-55	04/02/2010	<10.5
MW-144A-25	Onsite	10-55	10/05/2010	<10.4
MW-144A-25	Onsite	10-55	02/08/2011	<11.0
MW-144A-25	Onsite	10-55	04/26/2011	<10.9
MW-144A-25	Onsite	10-55	10/14/2011	<6.20
MW-144A-25	Onsite	10-55	05/02/2012	<6.20J*
MW-144A-25	Onsite	10-55	11/14/2012	<6.20
MW-144A-25	Onsite	10-55	04/27/2013	<6.40
MW-144A-25	Onsite	10-55	10/30/2013	<6.20
MW-144A-25	Onsite	10-55	07/30/2014	<5.00
MW-144A-25	Onsite	10-55	07/24/2015	<5.00
MW-144A-25	Onsite	10-55	07/21/2016	<5.10
MW-144BR-90	Onsite	55-90	10/20/2010	<10.0
MW-144BR-90	Onsite	55-90	02/08/2011	<11.5
MW-144BR-90	Onsite	55-90	04/13/2011	<10.5
MW-144BR-90	Onsite	55-90	08/15/2011	<6.20
MW-144BR-90	Onsite	55-90	10/13/2011	<6.20

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-144BR-90	Onsite	55-90	11/04/2011	<6.32
MW-144BR-90	Onsite	55-90	02/21/2012	<6.96
MW-144BR-90	Onsite	55-90	05/02/2012	<6.32
MW-144BR-90	Onsite	55-90	08/07/2012	<6.88
MW-144BR-90	Onsite	55-90	11/14/2012	<6.60
MW-144BR-90	Onsite	55-90	02/04/2013	<6.74
MW-144BR-90	Onsite	55-90	05/01/2013	<6.20
MW-144BR-90	Onsite	55-90	08/15/2013	<6.20
MW-144BR-90	Onsite	55-90	10/30/2013	<6.32
MW-144BR-90	Onsite	55-90	07/29/2014	<5.20
MW-144BR-90	Onsite	55-90	07/24/2015	<5.10
MW-144BR-90	Onsite	55-90	07/21/2016	<5.05
MW-145-20	Onsite	Water Table	04/18/2006	<10.0
MW-145-20	Onsite	Water Table	04/18/2007	<10.9
MW-145-20	Onsite	Water Table	10/18/2007	<10.6
MW-145-20	Onsite	Water Table	04/02/2008	<10.3
MW-145-20	Onsite	Water Table	10/02/2008	<11.0
MW-145-20	Onsite	Water Table	04/10/2009	<10.4
MW-145-20	Onsite	Water Table	10/02/2009	<10.4
MW-145-20	Onsite	Water Table	04/06/2010	<10.4
MW-145-20	Onsite	Water Table	10/07/2010	<10.3
MW-145-20	Onsite	Water Table	02/10/2011	<10.9
MW-145-20	Onsite	Water Table	04/07/2011	<10.8
MW-145-20	Onsite	Water Table	10/19/2011	<6.20
MW-145-20	Onsite	Water Table	05/03/2012	<6.32
MW-145-20	Onsite	Water Table	11/15/2012	<6.20
MW-145-20	Onsite	Water Table	01/31/2013	<6.20
MW-145-20	Onsite	Water Table	04/27/2013	<6.40
MW-145-20	Onsite	Water Table	07/20/2013	<6.20
MW-145-20	Onsite	Water Table	10/19/2013	<6.46
MW-145-20	Onsite	Water Table	03/02/2014	<5.00
MW-145-20	Onsite	Water Table	06/17/2014	<5.00
MW-145-20	Onsite	Water Table	08/13/2014	<5.00
MW-145-20	Onsite	Water Table	11/06/2014	<5.00
MW-145-20	Onsite	Water Table	02/24/2015	<5.00
MW-145-20	Onsite	Water Table	04/24/2015	<5.00
MW-145-20	Onsite	Water Table	08/10/2015	<5.00
MW-145-20	Onsite	Water Table	10/21/2015	<5.10
MW-145-20	Onsite	Water Table	03/01/2016	<5.10
MW-145-20	Onsite	Water Table	08/10/2016	<5.05
MW-145-20	Onsite	Water Table	02/27/2017	<5.40
MW-145-20	Onsite	Water Table	08/10/2017	<5.20
MW-146A-15	Onsite	Water Table	10/05/2008	<10.4
MW-146A-15	Onsite	Water Table	01/15/2009	<10.3
MW-146A-15	Onsite	Water Table	04/09/2009	<10.0
MW-146A-15	Onsite	Water Table	07/07/2009	<10.3
MW-146A-15	Onsite	Water Table	10/01/2009	<10.8
MW-146A-15	Onsite	Water Table	01/21/2010	<10.8
MW-146A-15	Onsite	Water Table	04/05/2010	<10.3
MW-146A-15	Onsite	Water Table	07/22/2010	<11.0
MW-146A-15	Onsite	Water Table	10/06/2010	<10.6
MW-146A-15	Onsite	Water Table	11/12/2013	<5.25

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-146B-30	Onsite	10-55	10/05/2008	<10.5
MW-146B-30	Onsite	10-55	01/15/2009	<10.4
MW-146B-30	Onsite	10-55	04/09/2009	<10.3
MW-146B-30	Onsite	10-55	07/07/2009	<10.0
MW-146B-30	Onsite	10-55	10/01/2009	<11.1
MW-146B-30	Onsite	10-55	01/21/2010	<10.9
MW-146B-30	Onsite	10-55	04/05/2010	<10.9
MW-146B-30	Onsite	10-55	07/21/2010	<10.0
MW-146B-30	Onsite	10-55	10/06/2010	<10.5
MW-146B-30	Onsite	10-55	11/12/2013	<5.30
MW-147A-15	Onsite	Water Table	10/05/2008	<10.4
MW-147A-15	Onsite	Water Table	01/15/2009	<10.2
MW-147A-15	Onsite	Water Table	04/09/2009	<10.9
MW-147A-15	Onsite	Water Table	07/07/2009	<10.0
MW-147A-15	Onsite	Water Table	10/01/2009	<10.5
MW-147A-15	Onsite	Water Table	01/18/2010	<10.5
MW-147A-15	Onsite	Water Table	04/05/2010	<10.3
MW-147A-15	Onsite	Water Table	07/22/2010	<10.0
MW-147A-15	Onsite	Water Table	10/06/2010	<10.6
MW-147A-15	Onsite	Water Table	11/12/2013	<5.45
MW-147B-25	Onsite	10-55	10/05/2008	<10.5
MW-147B-25	Onsite	10-55	01/15/2009	<10.3
MW-147B-25	Onsite	10-55	04/09/2009	<10.6
MW-147B-25	Onsite	10-55	07/06/2009	<10.4
MW-147B-25	Onsite	10-55	10/01/2009	<10.3
MW-147B-25	Onsite	10-55	01/18/2010	<10.0
MW-147B-25	Onsite	10-55	04/05/2010	<10.2
MW-147B-25	Onsite	10-55	07/22/2010	<10.5
MW-147B-25	Onsite	10-55	10/06/2010	<10.5
MW-147B-25	Onsite	10-55	02/24/2011	<11.3
MW-147B-25	Onsite	10-55	04/29/2011	<11.0
MW-147B-25	Onsite	10-55	08/15/2011	<6.20
MW-147B-25	Onsite	10-55	10/11/2011	<6.20
MW-147B-25	Onsite	10-55	02/13/2012	<6.66
MW-147B-25	Onsite	10-55	05/02/2012	<6.40
MW-147B-25	Onsite	10-55	07/24/2012	<6.74
MW-147B-25	Onsite	10-55	02/01/2013	<6.60
MW-147B-25	Onsite	10-55	04/23/2013	<6.20
MW-147B-25	Onsite	10-55	07/25/2013	<6.32
MW-147B-25	Onsite	10-55	10/28/2013	<6.20
MW-147B-25	Onsite	10-55	03/21/2014	<5.40
MW-147B-25	Onsite	10-55	04/18/2014	<5.00
MW-147B-25	Onsite	10-55	07/29/2014	<5.00
MW-147B-25	Onsite	10-55	10/18/2014	<5.00
MW-147B-25	Onsite	10-55	08/03/2015	<5.40
MW-147B-25	Onsite	10-55	07/20/2016	<4.71
MW-148A-15	Offsite	Water Table	10/04/2008	133
MW-148A-15	Offsite	Water Table	01/15/2009	334
MW-148A-15	Offsite	Water Table	02/10/2009	342
MW-148A-15	Offsite	Water Table	03/03/2009	348
MW-148A-15	Offsite	Water Table	04/21/2009	264
MW-148A-15	Offsite	Water Table	05/06/2009	12.2

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-148A-15	Offsite	Water Table	06/08/2009	<10.0
MW-148A-15	Offsite	Water Table	07/07/2009	63.5
MW-148A-15	Offsite	Water Table	08/03/2009	105
MW-148A-15	Offsite	Water Table	09/02/2009	14.5
MW-148A-15	Offsite	Water Table	10/01/2009	61.5
MW-148A-15	Offsite	Water Table	11/03/2009	121
MW-148A-15	Offsite	Water Table	12/01/2009	203
MW-148A-15	Offsite	Water Table	01/22/2010	202
MW-148A-15	Offsite	Water Table	02/17/2010	176
MW-148A-15	Offsite	Water Table	03/04/2010	184
MW-148A-15	Offsite	Water Table	04/06/2010	177
MW-148A-15	Offsite	Water Table	05/14/2010	84.1
MW-148A-15	Offsite	Water Table	06/14/2010	<10.0
MW-148A-15	Offsite	Water Table	07/22/2010	143
MW-148A-15	Offsite	Water Table	08/11/2010	149
MW-148A-15	Offsite	Water Table	09/02/2010	37.0
MW-148A-15	Offsite	Water Table	10/13/2010	64.6
MW-148A-15	Offsite	Water Table	11/08/2010	54.4
MW-148A-15	Offsite	Water Table	12/30/2010	173
MW-148A-15	Offsite	Water Table	03/07/2011	132
MW-148A-15	Offsite	Water Table	04/08/2011	113
MW-148A-15	Offsite	Water Table	08/18/2011	182
MW-148A-15	Offsite	Water Table	10/07/2011	139
MW-148A-15	Offsite	Water Table	02/12/2012	212
MW-148A-15	Offsite	Water Table	05/03/2012	155
MW-148A-15	Offsite	Water Table	07/23/2012	190
MW-148A-15	Offsite	Water Table	10/22/2012	96.9
MW-148A-15	Offsite	Water Table	01/02/2013	194
MW-148A-15	Offsite	Water Table	03/02/2013	180
MW-148A-15	Offsite	Water Table	05/06/2013	102
MW-148A-15	Offsite	Water Table	07/09/2013	95.0
MW-148A-15	Offsite	Water Table	10/11/2013	32.8
MW-148A-15	Offsite	Water Table	01/21/2014	97.5
MW-148A-15	Offsite	Water Table	04/09/2014	104
MW-148A-15	Offsite	Water Table	08/04/2014	<5.40
MW-148A-15	Offsite	Water Table	10/09/2014	3.41J
MW-148A-15	Offsite	Water Table	01/15/2015	34.6
MW-148A-15	Offsite	Water Table	04/08/2015	26.4
MW-148A-15	Offsite	Water Table	07/17/2015	16.1
MW-148A-15	Offsite	Water Table	10/14/2015	<5.00
MW-148A-15	Offsite	Water Table	02/08/2016	18.7J*
MW-148A-15	Offsite	Water Table	07/25/2016	26.7
MW-148A-15	Offsite	Water Table	02/13/2017	20.6
MW-148A-15	Offsite	Water Table	07/10/2017	14.2
MW-148B-30	Offsite	10-55	10/04/2008	143
MW-148B-30	Offsite	10-55	01/15/2009	298
MW-148B-30	Offsite	10-55	02/10/2009	338
MW-148B-30	Offsite	10-55	03/03/2009	390
MW-148B-30	Offsite	10-55	04/21/2009	263
MW-148B-30	Offsite	10-55	05/06/2009	159
MW-148B-30	Offsite	10-55	06/05/2009	276
MW-148B-30	Offsite	10-55	07/07/2009	308

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Historical Sulfolane Summary**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-148B-30	Offsite	10-55	08/03/2009	140
MW-148B-30	Offsite	10-55	09/02/2009	210
MW-148B-30	Offsite	10-55	10/01/2009	165
MW-148B-30	Offsite	10-55	11/03/2009	323
MW-148B-30	Offsite	10-55	12/01/2009	244
MW-148B-30	Offsite	10-55	01/22/2010	252
MW-148B-30	Offsite	10-55	02/17/2010	284
MW-148B-30	Offsite	10-55	03/03/2010	255
MW-148B-30	Offsite	10-55	04/06/2010	239
MW-148B-30	Offsite	10-55	05/14/2010	330
MW-148B-30	Offsite	10-55	07/19/2010	219
MW-148B-30	Offsite	10-55	07/22/2010	230
MW-148B-30	Offsite	10-55	08/11/2010	284
MW-148B-30	Offsite	10-55	09/02/2010	219
MW-148B-30	Offsite	10-55	10/13/2010	316
MW-148B-30	Offsite	10-55	11/08/2010	209
MW-148B-30	Offsite	10-55	12/30/2010	243
MW-148B-30	Offsite	10-55	03/07/2011	501
MW-148B-30	Offsite	10-55	04/08/2011	205
MW-148B-30	Offsite	10-55	08/12/2011	251
MW-148B-30	Offsite	10-55	10/07/2011	284
MW-148B-30	Offsite	10-55	02/12/2012	252
MW-148B-30	Offsite	10-55	05/01/2012	237
MW-148B-30	Offsite	10-55	07/23/2012	214
MW-148B-30	Offsite	10-55	11/11/2012	193
MW-148B-30	Offsite	10-55	01/12/2013	174
MW-148B-30	Offsite	10-55	04/15/2013	140
MW-148B-30	Offsite	10-55	07/09/2013	136
MW-148B-30	Offsite	10-55	10/11/2013	112
MW-148B-30	Offsite	10-55	01/21/2014	92.9
MW-148B-30	Offsite	10-55	04/03/2014	87.8
MW-148B-30	Offsite	10-55	08/04/2014	100
MW-148B-30	Offsite	10-55	10/09/2014	83.9
MW-148B-30	Offsite	10-55	01/15/2015	64.5
MW-148B-30	Offsite	10-55	04/08/2015	46.7
MW-148B-30	Offsite	10-55	07/17/2015	41.7
MW-148B-30	Offsite	10-55	10/14/2015	38.4
MW-148B-30	Offsite	10-55	02/08/2016	28.3
MW-148B-30	Offsite	10-55	07/25/2016	19.9
MW-148B-30	Offsite	10-55	02/13/2017	13.7
MW-148B-30	Offsite	10-55	07/10/2017	11.0
MW-148C-55	Offsite	10-55	10/05/2011	170
MW-148C-55	Offsite	10-55	02/12/2012	139
MW-148C-55	Offsite	10-55	05/01/2012	143
MW-148C-55	Offsite	10-55	07/23/2012	129
MW-148C-55	Offsite	10-55	10/31/2012	109
MW-148C-55	Offsite	10-55	01/10/2013	102
MW-148C-55	Offsite	10-55	04/05/2013	76.2JL*
MW-148C-55	Offsite	10-55	07/09/2013	75.4
MW-148C-55	Offsite	10-55	10/11/2013	63.8
MW-148C-55	Offsite	10-55	01/21/2014	67.8
MW-148C-55	Offsite	10-55	04/03/2014	46.3

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-148C-55	Offsite	10-55	07/11/2014	47.3
MW-148C-55	Offsite	10-55	10/09/2014	36.2
MW-148C-55	Offsite	10-55	01/15/2015	32.6
MW-148C-55	Offsite	10-55	04/08/2015	25.5
MW-148C-55	Offsite	10-55	07/17/2015	23.7
MW-148C-55	Offsite	10-55	10/14/2015	18.1
MW-148C-55	Offsite	10-55	02/08/2016	15.9
MW-148C-55	Offsite	10-55	07/25/2016	13.1
MW-148C-55	Offsite	10-55	02/13/2017	9.78J
MW-148C-55	Offsite	10-55	07/10/2017	8.43J
MW-148-80	Offsite	55-90	10/31/2013	13.6
MW-148-80	Offsite	55-90	01/21/2014	6.97J
MW-148-80	Offsite	55-90	04/03/2014	6.78J
MW-148-80	Offsite	55-90	07/11/2014	8.20J
MW-148-80	Offsite	55-90	10/10/2014	10.2J
MW-148-80	Offsite	55-90	01/15/2015	6.83J
MW-148-80	Offsite	55-90	07/17/2015	<5.20J*
MW-148-80	Offsite	55-90	02/08/2016	4.30J
MW-148-80	Offsite	55-90	07/25/2016	<5.05
MW-148-80	Offsite	55-90	02/13/2017	<5.10
MW-148-80	Offsite	55-90	07/12/2017	<5.30
MW-148-100	Offsite	55-90	10/31/2013	<6.66
MW-148-100	Offsite	55-90	01/21/2014	<5.40
MW-148-100	Offsite	55-90	04/03/2014	<5.25
MW-148-100	Offsite	55-90	07/12/2014	<5.20
MW-148-100	Offsite	55-90	10/09/2014	<5.25
MW-148-100	Offsite	55-90	07/17/2015	<5.30
MW-148-100	Offsite	55-90	07/25/2016	<5.10
MW-148D-150	Offsite	90-160	10/05/2011	<6.20
MW-148D-150	Offsite	90-160	02/18/2012	<6.82
MW-148D-150	Offsite	90-160	05/01/2012	<6.96
MW-148D-150	Offsite	90-160	07/23/2012	<6.20
MW-148D-150	Offsite	90-160	10/31/2012	<6.20
MW-148D-150	Offsite	90-160	01/10/2013	<6.52
MW-148D-150	Offsite	90-160	03/02/2013	<6.88
MW-148D-150	Offsite	90-160	07/09/2013	<6.20
MW-148D-150	Offsite	90-160	10/11/2013	<6.20
MW-148D-150	Offsite	90-160	01/21/2014	<5.20
MW-148D-150	Offsite	90-160	04/03/2014	<5.00
MW-148D-150	Offsite	90-160	07/11/2014	<5.20
MW-148D-150	Offsite	90-160	10/09/2014	<5.10
MW-148D-150	Offsite	90-160	07/17/2015	<5.50
MW-148D-150	Offsite	90-160	07/25/2016	<5.10
MW-149A-15	Onsite	Water Table	10/04/2008	<10.0
MW-149A-15	Onsite	Water Table	01/15/2009	18.0
MW-149A-15	Onsite	Water Table	02/10/2009	36.9
MW-149A-15	Onsite	Water Table	03/03/2009	48.5
MW-149A-15	Onsite	Water Table	04/21/2009	35.3
MW-149A-15	Onsite	Water Table	05/06/2009	30.5
MW-149A-15	Onsite	Water Table	06/05/2009	<10.3
MW-149A-15	Onsite	Water Table	07/07/2009	<10.3
MW-149A-15	Onsite	Water Table	08/03/2009	29.9

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-149A-15	Onsite	Water Table	09/02/2009	<10.4
MW-149A-15	Onsite	Water Table	10/01/2009	<10.5
MW-149A-15	Onsite	Water Table	11/03/2009	<10.4
MW-149A-15	Onsite	Water Table	12/01/2009	<10.0
MW-149A-15	Onsite	Water Table	01/22/2010	<10.4
MW-149A-15	Onsite	Water Table	02/17/2010	<10.3
MW-149A-15	Onsite	Water Table	03/03/2010	10.9
MW-149A-15	Onsite	Water Table	04/06/2010	<10.3
MW-149A-15	Onsite	Water Table	05/14/2010	<10.0
MW-149A-15	Onsite	Water Table	06/14/2010	24.3
MW-149A-15	Onsite	Water Table	07/22/2010	38.5
MW-149A-15	Onsite	Water Table	08/11/2010	26.4
MW-149A-15	Onsite	Water Table	09/02/2010	13.4
MW-149A-15	Onsite	Water Table	10/13/2010	<10.9
MW-149A-15	Onsite	Water Table	11/08/2010	<10.0
MW-149A-15	Onsite	Water Table	03/07/2011	15.5
MW-149A-15	Onsite	Water Table	04/18/2011	<11.1
MW-149A-15	Onsite	Water Table	08/18/2011	<6.66
MW-149A-15	Onsite	Water Table	10/13/2011	<6.20
MW-149A-15	Onsite	Water Table	02/12/2012	<6.88
MW-149A-15	Onsite	Water Table	05/17/2012	<6.74
MW-149A-15	Onsite	Water Table	07/31/2012	<6.60
MW-149A-15	Onsite	Water Table	11/10/2012	<6.20
MW-149A-15	Onsite	Water Table	01/10/2013	<6.46
MW-149A-15	Onsite	Water Table	04/10/2013	<6.32
MW-149A-15	Onsite	Water Table	07/09/2013	<6.20
MW-149A-15	Onsite	Water Table	10/09/2013	<6.46
MW-149A-15	Onsite	Water Table	03/24/2014	<5.00
MW-149A-15	Onsite	Water Table	04/30/2014	<5.20
MW-149A-15	Onsite	Water Table	07/26/2014	<5.00
MW-149A-15	Onsite	Water Table	10/10/2014	<5.20
MW-149A-15	Onsite	Water Table	07/17/2015	<5.00
MW-149A-15	Onsite	Water Table	07/25/2016	<5.00
MW-149A-15	Onsite	Water Table	07/10/2017	<5.25
MW-149B-20	Onsite	Water Table	10/04/2008	<10.5
MW-149B-20	Onsite	Water Table	01/15/2009	<10.3
MW-149B-20	Onsite	Water Table	02/10/2009	<10.0
MW-149B-20	Onsite	Water Table	03/03/2009	17.5
MW-149B-20	Onsite	Water Table	04/21/2009	26.4
MW-149B-20	Onsite	Water Table	05/06/2009	28.5
MW-149B-20	Onsite	Water Table	06/05/2009	19.5
MW-149B-20	Onsite	Water Table	07/07/2009	20.8
MW-149B-20	Onsite	Water Table	08/03/2009	14.6
MW-149B-20	Onsite	Water Table	09/02/2009	17.8
MW-149B-20	Onsite	Water Table	10/01/2009	<10.5
MW-149B-20	Onsite	Water Table	11/03/2009	<10.5
MW-149B-20	Onsite	Water Table	12/01/2009	<10.4
MW-149B-20	Onsite	Water Table	01/22/2010	<10.3
MW-149B-20	Onsite	Water Table	02/17/2010	<10.3
MW-149B-20	Onsite	Water Table	03/03/2010	<10.0
MW-149B-20	Onsite	Water Table	04/06/2010	<10.2
MW-149B-20	Onsite	Water Table	05/14/2010	<10.0

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-149B-20	Onsite	Water Table	07/19/2010	<10.6
MW-149B-20	Onsite	Water Table	07/22/2010	15.0
MW-149B-20	Onsite	Water Table	08/11/2010	12.7
MW-149B-20	Onsite	Water Table	09/02/2010	18.7
MW-149B-20	Onsite	Water Table	10/13/2010	<10.5
MW-149B-20	Onsite	Water Table	11/08/2010	<10.0
MW-149B-20	Onsite	Water Table	02/12/2012	<6.82
MW-149B-20	Onsite	Water Table	05/17/2012	<6.20
MW-149B-20	Onsite	Water Table	07/23/2012	<6.74
MW-149B-20	Onsite	Water Table	11/10/2012	<6.52
MW-149B-20	Onsite	Water Table	01/10/2013	<6.52
MW-149B-20	Onsite	Water Table	04/10/2013	<6.46
MW-149B-20	Onsite	Water Table	07/09/2013	<6.20
MW-149B-20	Onsite	Water Table	10/09/2013	<6.20
MW-149B-20	Onsite	Water Table	03/24/2014	<5.00
MW-149B-20	Onsite	Water Table	04/30/2014	<5.15
MW-149B-20	Onsite	Water Table	07/26/2014	<5.25
MW-149B-20	Onsite	Water Table	10/10/2014	<5.30
MW-149B-20	Onsite	Water Table	07/17/2015	<5.00
MW-149B-20	Onsite	Water Table	07/25/2016	<5.05
MW-154A-75	Onsite	55-90	10/12/2009	42.6
MW-154A-75	Onsite	55-90	01/21/2010	42.1
MW-154A-75	Onsite	55-90	02/17/2010	35.4
MW-154A-75	Onsite	55-90	03/17/2010	42.0
MW-154A-75	Onsite	55-90	04/30/2010	60.5
MW-154A-75	Onsite	55-90	05/04/2010	27.3
MW-154A-75	Onsite	55-90	07/19/2010	36.2
MW-154A-75	Onsite	55-90	07/07/2010	18.8
MW-154A-75	Onsite	55-90	08/11/2010	10.3
MW-154A-75	Onsite	55-90	10/07/2010	22.1
MW-154A-75	Onsite	55-90	11/05/2010	42.5
MW-154A-75	Onsite	55-90	01/31/2011	<10.2
MW-154A-75	Onsite	55-90	04/26/2011	14.3
MW-154A-75	Onsite	55-90	08/10/2011	8.85J
MW-154A-75	Onsite	55-90	10/13/2011	33.1
MW-154A-75	Onsite	55-90	02/14/2012	25.6
MW-154A-75	Onsite	55-90	05/03/2012	23.2
MW-154A-75	Onsite	55-90	08/09/2012	12.6
MW-154A-75	Onsite	55-90	11/15/2012	18.5
MW-154A-75	Onsite	55-90	02/01/2013	15.3
MW-154A-75	Onsite	55-90	05/20/2013	15.2
MW-154A-75	Onsite	55-90	07/17/2013	3.70J
MW-154A-75	Onsite	55-90	10/17/2013	3.93J
MW-154A-75	Onsite	55-90	03/05/2014	<5.00
MW-154A-75	Onsite	55-90	04/21/2014	3.93J
MW-154A-75	Onsite	55-90	08/05/2014	9.59J
MW-154A-75	Onsite	55-90	10/25/2014	7.63J
MW-154A-75	Onsite	55-90	02/26/2015	11.5
MW-154A-75	Onsite	55-90	04/22/2015	13.9
MW-154A-75	Onsite	55-90	08/14/2015	7.84J
MW-154A-75	Onsite	55-90	10/16/2015	13.2
MW-154A-75	Onsite	55-90	02/04/2016	11.9

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-154A-75	Onsite	55-90	04/08/2016	11.4
MW-154A-75	Onsite	55-90	07/29/2016	5.78J
MW-154A-75	Onsite	55-90	10/18/2016	20.3
MW-154A-75	Onsite	55-90	02/14/2017	11.2J
MW-154A-75	Onsite	55-90	04/10/2017	10.8
MW-154B-95	Onsite	55-90	02/23/2010	<10.6
MW-154B-95	Onsite	55-90	03/17/2010	56.2
MW-154B-95	Onsite	55-90	04/30/2010	46.5
MW-154B-95	Onsite	55-90	05/04/2010	49.2
MW-154B-95	Onsite	55-90	07/19/2010	53.3
MW-154B-95	Onsite	55-90	07/26/2010	44.3
MW-154B-95	Onsite	55-90	08/11/2010	58.6
MW-154B-95	Onsite	55-90	10/07/2010	29.8
MW-154B-95	Onsite	55-90	11/05/2010	39.1
MW-154B-95	Onsite	55-90	04/26/2011	24.5
MW-154B-95	Onsite	55-90	08/10/2011	29.0
MW-154B-95	Onsite	55-90	10/13/2011	35.1
MW-154B-95	Onsite	55-90	02/14/2012	19.6
MW-154B-95	Onsite	55-90	05/21/2012	59.3
MW-154B-95	Onsite	55-90	08/01/2012	103
MW-154B-95	Onsite	55-90	11/15/2012	94.3
MW-154B-95	Onsite	55-90	02/01/2013	79.3
MW-154B-95	Onsite	55-90	05/17/2013	70.4
MW-154B-95	Onsite	55-90	07/17/2013	67.1
MW-154B-95	Onsite	55-90	10/17/2013	26.8
MW-154B-95	Onsite	55-90	03/05/2014	30.5
MW-154B-95	Onsite	55-90	04/21/2014	22.2
MW-154B-95	Onsite	55-90	08/19/2014	11.6
MW-154B-95	Onsite	55-90	10/25/2014	14.6
MW-154B-95	Onsite	55-90	02/26/2015	14.9
MW-154B-95	Onsite	55-90	04/18/2015	17.9
MW-154B-95	Onsite	55-90	08/14/2015	9.48J
MW-154B-95	Onsite	55-90	10/16/2015	17.1
MW-154B-95	Onsite	55-90	02/04/2016	13.9
MW-154B-95	Onsite	55-90	04/08/2016	6.86J
MW-154B-95	Onsite	55-90	07/29/2016	6.96J
MW-154B-95	Onsite	55-90	10/18/2016	21.8
MW-154B-95	Onsite	55-90	02/14/2017	20.0
MW-154B-95	Onsite	55-90	04/10/2017	14.9
MW-154B-95	Onsite	55-90	07/25/2017	18.8
MW-154B-95	Onsite	55-90	10/20/2017	83.2
MW-173A-15	Onsite	Water Table	04/09/2010	<10.0
MW-173A-15	Onsite	Water Table	05/04/2010	<10.0
MW-173A-15	Onsite	Water Table	06/14/2010	<10.0
MW-173A-15	Onsite	Water Table	07/07/2010	<10.0
MW-173A-15	Onsite	Water Table	08/06/2010	<10.3
MW-173A-15	Onsite	Water Table	10/05/2010	<10.8
MW-173A-15	Onsite	Water Table	11/05/2010	<10.0
MW-173A-15	Onsite	Water Table	02/08/2011	<11.0
MW-173A-15	Onsite	Water Table	04/01/2011	<10.6
MW-173A-15	Onsite	Water Table	08/10/2011	<6.20
MW-173A-15	Onsite	Water Table	10/12/2011	<6.20

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-173A-15	Onsite	Water Table	02/13/2012	<7.04
MW-173A-15	Onsite	Water Table	05/02/2012	<6.20
MW-173A-15	Onsite	Water Table	07/25/2012	<6.20
MW-173A-15	Onsite	Water Table	02/01/2013	<6.66
MW-173A-15	Onsite	Water Table	04/25/2013	<6.20
MW-173A-15	Onsite	Water Table	07/18/2013	<6.32
MW-173A-15	Onsite	Water Table	10/29/2013	<6.20
MW-173A-15	Onsite	Water Table	07/28/2014	<5.20J*
MW-173A-15	Onsite	Water Table	07/23/2015	<5.00
MW-173A-15	Onsite	Water Table	07/27/2016	<5.20
MW-173B-150	Onsite	90-160	04/09/2010	<10.0
MW-173B-150	Onsite	90-160	05/04/2010	<10.1
MW-173B-150	Onsite	90-160	06/14/2010	<10.3
MW-173B-150	Onsite	90-160	07/26/2010	<10.0
MW-173B-150	Onsite	90-160	08/06/2010	<10.0
MW-173B-150	Onsite	90-160	10/05/2010	<10.3
MW-173B-150	Onsite	90-160	11/05/2010	<10.0
MW-173B-150	Onsite	90-160	02/08/2011	<11.3
MW-173B-150	Onsite	90-160	04/13/2011	<10.6
MW-173B-150	Onsite	90-160	08/10/2011	<6.20
MW-173B-150	Onsite	90-160	10/11/2011	<6.20
MW-173B-150	Onsite	90-160	02/13/2012	<6.88
MW-173B-150	Onsite	90-160	05/02/2012	<6.20
MW-173B-150	Onsite	90-160	08/06/2012	<6.82
MW-173B-150	Onsite	90-160	03/06/2013	<6.20
MW-173B-150	Onsite	90-160	04/23/2013	<6.20
MW-173B-150	Onsite	90-160	07/18/2013	<6.32
MW-173B-150	Onsite	90-160	10/29/2013	<6.32
MW-173B-150	Onsite	90-160	07/28/2014	<5.00J*
MW-173B-150	Onsite	90-160	07/23/2015	<5.15
MW-173B-150	Onsite	90-160	07/29/2016	<5.10
MW-174-15	Onsite	Water Table	04/04/2013	66.4
MW-174-15	Onsite	Water Table	10/23/2013	55.4
MW-174-15	Onsite	Water Table	03/20/2014	46.9
MW-174-15	Onsite	Water Table	04/22/2014	43.3
MW-174-15	Onsite	Water Table	08/28/2014	182
MW-174-15	Onsite	Water Table	10/22/2014	57.8
MW-174-15	Onsite	Water Table	02/20/2015	35.9
MW-174-15	Onsite	Water Table	04/24/2015	36.3
MW-174-15	Onsite	Water Table	07/29/2015	58.8
MW-174-15	Onsite	Water Table	10/21/2015	180J*
MW-174-15	Onsite	Water Table	02/11/2016	27.9
MW-174-15	Onsite	Water Table	07/20/2016	146
MW-174-15	Onsite	Water Table	02/25/2017	12.1
MW-174A-50	Onsite	10-55	10/20/2010	32.4
MW-174A-50	Onsite	10-55	01/27/2011	66.7
MW-174A-50	Onsite	10-55	04/13/2011	41.0
MW-174A-50	Onsite	10-55	08/15/2011	43.5
MW-174A-50	Onsite	10-55	10/13/2011	37.3
MW-174A-50	Onsite	10-55	02/14/2012	41.6
MW-174A-50	Onsite	10-55	05/04/2012	34.6
MW-174A-50	Onsite	10-55	07/25/2012	31.5

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-174A-50	Onsite	10-55	10/16/2012	21.9
MW-174A-50	Onsite	10-55	02/02/2013	18.4
MW-174A-50	Onsite	10-55	05/01/2013	11.0
MW-174A-50	Onsite	10-55	07/17/2013	14.7
MW-174A-50	Onsite	10-55	10/23/2013	9.30J
MW-174A-50	Onsite	10-55	03/20/2014	9.18J
MW-174A-50	Onsite	10-55	04/22/2014	11.7
MW-174A-50	Onsite	10-55	08/28/2014	9.13J
MW-174A-50	Onsite	10-55	10/22/2014	6.17J
MW-174A-50	Onsite	10-55	02/24/2015	4.92J
MW-174A-50	Onsite	10-55	07/29/2015	6.80J
MW-174A-50	Onsite	10-55	02/11/2016	3.18J
MW-174A-50	Onsite	10-55	07/20/2016	4.63J
MW-174A-50	Onsite	10-55	02/25/2017	<5.30
MW-174B-90	Onsite	55-90	10/20/2010	<10.0
MW-174B-90	Onsite	55-90	01/27/2011	<10.3
MW-174B-90	Onsite	55-90	04/08/2011	<12.0
MW-174B-90	Onsite	55-90	08/15/2011	<6.20
MW-174B-90	Onsite	55-90	10/13/2011	<6.20
MW-174B-90	Onsite	55-90	02/14/2012	<6.74
MW-174B-90	Onsite	55-90	08/03/2012	<6.52
MW-174B-90	Onsite	55-90	02/02/2013	<6.74
MW-174B-90	Onsite	55-90	05/01/2013	<6.40
MW-174B-90	Onsite	55-90	07/17/2013	<6.20
MW-174B-90	Onsite	55-90	10/23/2013	<6.20
MW-174B-90	Onsite	55-90	03/20/2014	<5.00
MW-174B-90	Onsite	55-90	09/03/2014	<5.20
MW-174B-90	Onsite	55-90	07/29/2015	<5.00
MW-174B-90	Onsite	55-90	08/09/2016	5.30J
MW-175-90	Onsite	55-90	10/21/2010	<10.2
MW-175-90	Onsite	55-90	04/12/2011	<10.6
MW-175-90	Onsite	55-90	08/16/2011	<6.96
MW-175-90	Onsite	55-90	10/19/2011	<6.20
MW-175-90	Onsite	55-90	02/21/2012	<6.88
MW-175-90	Onsite	55-90	06/14/2012	<6.40
MW-175-90	Onsite	55-90	07/26/2012	<6.66
MW-175-90	Onsite	55-90	11/14/2012	<6.20
MW-175-90	Onsite	55-90	02/05/2013	<6.20
MW-175-90	Onsite	55-90	05/21/2013	<6.20
MW-175-90	Onsite	55-90	08/08/2013	<6.20
MW-175-90	Onsite	55-90	11/04/2013	<6.20
MW-175-90	Onsite	55-90	03/05/2014	<5.00J*
MW-175-90	Onsite	55-90	04/23/2014	<5.40
MW-175-90	Onsite	55-90	08/12/2014	<5.00
MW-175-90	Onsite	55-90	11/06/2014	<5.00
MW-175-90	Onsite	55-90	02/20/2015	<5.00
MW-175-90	Onsite	55-90	04/23/2015	<5.10
MW-175-90	Onsite	55-90	08/05/2015	<5.00
MW-175-90	Onsite	55-90	10/22/2015	<5.15
MW-175-90	Onsite	55-90	02/23/2016	<5.10
MW-175-90	Onsite	55-90	08/19/2016	<5.05
MW-175-90	Onsite	55-90	02/24/2017	<5.05

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-176A-15	Onsite	Water Table	10/25/2010	2050
MW-176A-15	Onsite	Water Table	05/22/2012	3420
MW-176A-15	Onsite	Water Table	08/02/2012	2230
MW-176A-15	Onsite	Water Table	12/12/2012	2070
MW-176A-15	Onsite	Water Table	01/12/2013	1800JL*
MW-176A-15	Onsite	Water Table	04/02/2013	1360
MW-176A-15	Onsite	Water Table	08/07/2013	1340JL*
MW-176A-15	Onsite	Water Table	11/11/2013	1510JL*
MW-176A-15	Onsite	Water Table	03/11/2014	1280JL*
MW-176A-15	Onsite	Water Table	06/04/2014	1480
MW-176A-15	Onsite	Water Table	09/03/2014	1300
MW-176A-15	Onsite	Water Table	10/29/2014	1490
MW-176A-15	Onsite	Water Table	02/21/2015	1870
MW-176A-15	Onsite	Water Table	04/21/2015	2300
MW-176A-15	Onsite	Water Table	08/06/2015	2080
MW-176A-15	Onsite	Water Table	10/28/2015	3060
MW-176A-15	Onsite	Water Table	02/22/2016	1880
MW-176A-15	Onsite	Water Table	04/11/2016	2190J*
MW-176A-15	Onsite	Water Table	08/16/2016	1010
MW-176A-15	Onsite	Water Table	10/26/2016	1620
MW-176A-15	Onsite	Water Table	03/10/2017	1720
MW-176A-15	Onsite	Water Table	07/13/2017	1540
MW-176B-50	Onsite	10-55	10/25/2010	<10.0
MW-176B-50	Onsite	10-55	01/31/2011	<11.6
MW-176B-50	Onsite	10-55	08/02/2012	<6.82
MW-176B-50	Onsite	10-55	12/12/2012	<6.60
MW-176B-50	Onsite	10-55	01/12/2013	<6.74
MW-176B-50	Onsite	10-55	08/07/2013	<6.40
MW-176B-50	Onsite	10-55	11/11/2013	3.61J
MW-176B-50	Onsite	10-55	03/07/2014	<5.45
MW-176B-50	Onsite	10-55	04/23/2014	<5.00
MW-176B-50	Onsite	10-55	08/14/2014	<5.00
MW-176B-50	Onsite	10-55	10/24/2014	10.2
MW-176B-50	Onsite	10-55	02/21/2015	<5.00
MW-176B-50	Onsite	10-55	08/05/2015	<5.25
MW-176B-50	Onsite	10-55	08/15/2016	<5.05J*
MW-176C-90	Onsite	55-90	10/22/2010	<10.0
MW-176C-90	Onsite	55-90	12/30/2010	<12.0
MW-176C-90	Onsite	55-90	08/16/2011	<6.46
MW-176C-90	Onsite	55-90	10/19/2011	<6.20
MW-176C-90	Onsite	55-90	02/17/2012	<7.46
MW-176C-90	Onsite	55-90	07/25/2012	<6.20
MW-176C-90	Onsite	55-90	12/12/2012	<6.20
MW-176C-90	Onsite	55-90	01/14/2013	<6.74
MW-176C-90	Onsite	55-90	08/07/2013	<6.20
MW-176C-90	Onsite	55-90	11/27/2013	<5.00
MW-176C-90	Onsite	55-90	03/07/2014	<5.25
MW-176C-90	Onsite	55-90	08/14/2014	<5.15
MW-176C-90	Onsite	55-90	08/05/2015	<5.00
MW-176C-90	Onsite	55-90	08/15/2016	<5.05J*
MW-177-90	Onsite	55-90	10/27/2010	<10.0
MW-177-90	Onsite	55-90	08/16/2011	<6.60

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-177-90	Onsite	55-90	10/13/2011	<6.20
MW-177-90	Onsite	55-90	07/26/2012	<6.20
MW-177-90	Onsite	55-90	07/23/2013	<6.20
MW-177-90	Onsite	55-90	10/31/2013	<6.20
MW-177-90	Onsite	55-90	08/28/2014	<5.25
MW-177-90	Onsite	55-90	08/04/2015	<5.00
MW-177-90	Onsite	55-90	08/10/2016	<5.10
MW-178A-15	Onsite	Water Table	10/22/2010	124
MW-178A-15	Onsite	Water Table	01/27/2011	236
MW-178A-15	Onsite	Water Table	08/17/2011	144
MW-178A-15	Onsite	Water Table	10/14/2011	100
MW-178A-15	Onsite	Water Table	07/24/2012	63.6
MW-178A-15	Onsite	Water Table	12/13/2012	27.2
MW-178A-15	Onsite	Water Table	07/19/2013	26.8
MW-178A-15	Onsite	Water Table	11/07/2013	25.0
MW-178A-15	Onsite	Water Table	03/06/2014	21.4
MW-178A-15	Onsite	Water Table	08/05/2014	7.77J
MW-178A-15	Onsite	Water Table	10/27/2014	6.92J
MW-178A-15	Onsite	Water Table	08/05/2015	6.53J
MW-178A-15	Onsite	Water Table	02/29/2016	8.12JL*
MW-178A-15	Onsite	Water Table	08/12/2016	3.88JH*
MW-178B-50	Onsite	10-55	10/22/2010	237
MW-178B-50	Onsite	10-55	01/27/2011	72.9
MW-178B-50	Onsite	10-55	08/15/2011	52.2
MW-178B-50	Onsite	10-55	10/14/2011	243
MW-178B-50	Onsite	10-55	07/24/2012	153
MW-178B-50	Onsite	10-55	12/13/2012	304
MW-178B-50	Onsite	10-55	07/19/2013	85.6
MW-178B-50	Onsite	10-55	11/11/2013	211
MW-178B-50	Onsite	10-55	03/06/2014	74.7
MW-178B-50	Onsite	10-55	06/04/2014	91.9
MW-178B-50	Onsite	10-55	08/05/2014	101
MW-178B-50	Onsite	10-55	10/27/2014	273
MW-178B-50	Onsite	10-55	08/05/2015	195
MW-178B-50	Onsite	10-55	10/21/2015	293J*
MW-178B-50	Onsite	10-55	02/29/2016	231
MW-178B-50	Onsite	10-55	08/12/2016	178JH*
MW-178B-50	Onsite	10-55	10/20/2016	170
MW-178C-90	Onsite	55-90	10/22/2010	<10.0
MW-178C-90	Onsite	55-90	08/15/2011	<6.20
MW-178C-90	Onsite	55-90	10/14/2011	<6.20
MW-178C-90	Onsite	55-90	07/25/2012	<6.32
MW-178C-90	Onsite	55-90	12/13/2012	<6.32
MW-178C-90	Onsite	55-90	07/19/2013	<6.52
MW-178C-90	Onsite	55-90	11/15/2013	<5.00
MW-178C-90	Onsite	55-90	03/06/2014	<5.00
MW-178C-90	Onsite	55-90	08/09/2014	<5.15
MW-178C-90	Onsite	55-90	08/06/2015	<5.00
MW-178C-90	Onsite	55-90	08/12/2016	<5.05
MW-179A-15	Onsite	Water Table	10/21/2010	29.3
MW-179A-15	Onsite	Water Table	08/15/2011	25.4
MW-179A-15	Onsite	Water Table	10/11/2011	18.4

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-179A-15	Onsite	Water Table	07/24/2012	4.83J
MW-179A-15	Onsite	Water Table	07/19/2013	9.79J
MW-179A-15	Onsite	Water Table	11/12/2013	5.37J
MW-179A-15	Onsite	Water Table	08/14/2014	6.28J
MW-179A-15	Onsite	Water Table	10/27/2014	6.26J
MW-179A-15	Onsite	Water Table	08/06/2015	9.66J
MW-179A-15	Onsite	Water Table	02/29/2016	5.86J
MW-179A-15	Onsite	Water Table	08/12/2016	<5.10
MW-179B-50	Onsite	10-55	10/21/2010	<10.2
MW-179B-50	Onsite	10-55	08/15/2011	3.40J
MW-179B-50	Onsite	10-55	10/14/2011	4.80J
MW-179B-50	Onsite	10-55	07/24/2012	<6.20
MW-179B-50	Onsite	10-55	08/09/2013	3.64J
MW-179B-50	Onsite	10-55	11/12/2013	6.08J
MW-179B-50	Onsite	10-55	08/12/2014	7.68J
MW-179B-50	Onsite	10-55	08/06/2015	4.92J
MW-179B-50	Onsite	10-55	02/29/2016	3.51J
MW-179B-50	Onsite	10-55	08/12/2016	8.79JH*
MW-179C-90	Onsite	55-90	10/21/2010	<10.0
MW-179C-90	Onsite	55-90	08/15/2011	<6.66
MW-179C-90	Onsite	55-90	10/14/2011	<6.20
MW-179C-90	Onsite	55-90	07/25/2012	<6.26
MW-179C-90	Onsite	55-90	08/09/2013	<6.20
MW-179C-90	Onsite	55-90	11/15/2013	<5.10
MW-179C-90	Onsite	55-90	08/14/2014	<5.15
MW-179C-90	Onsite	55-90	08/06/2015	<5.00
MW-179C-90	Onsite	55-90	08/12/2016	5.41J
MW-179D-135	Onsite	90-160	08/23/2011	<6.20
MW-179D-135	Onsite	90-160	08/07/2012	<6.40
MW-179D-135	Onsite	90-160	07/19/2013	<6.52
MW-179D-135	Onsite	90-160	11/12/2013	<5.00
MW-179D-135	Onsite	90-160	08/14/2014	<5.30
MW-179D-135	Onsite	90-160	08/06/2015	<5.00
MW-180A-15	Onsite	Water Table	10/25/2010	<10.0
MW-180A-15	Onsite	Water Table	01/27/2011	<10.5
MW-180A-15	Onsite	Water Table	08/15/2011	<6.46
MW-180A-15	Onsite	Water Table	11/04/2011	<6.20
MW-180A-15	Onsite	Water Table	07/24/2012	<6.20
MW-180A-15	Onsite	Water Table	11/12/2012	<6.20
MW-180A-15	Onsite	Water Table	08/07/2013	<6.20
MW-180A-15	Onsite	Water Table	11/11/2013	<5.10
MW-180A-15	Onsite	Water Table	03/25/2014	<5.00
MW-180A-15	Onsite	Water Table	08/13/2014	<5.20
MW-180A-15	Onsite	Water Table	08/07/2015	<5.00
MW-180A-15	Onsite	Water Table	08/12/2016	<5.20
MW-180B-50	Onsite	10-55	10/25/2010	<10.0
MW-180B-50	Onsite	10-55	01/27/2011	<11.1
MW-180B-50	Onsite	10-55	08/15/2011	<6.88
MW-180B-50	Onsite	10-55	10/24/2011	<6.20
MW-180B-50	Onsite	10-55	07/24/2012	<6.20
MW-180B-50	Onsite	10-55	11/12/2012	<6.46
MW-180B-50	Onsite	10-55	08/07/2013	<6.20

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-180B-50	Onsite	10-55	11/11/2013	<5.00
MW-180B-50	Onsite	10-55	08/13/2014	<5.35
MW-180B-50	Onsite	10-55	08/06/2015	<5.00
MW-180B-50	Onsite	10-55	08/12/2016	<5.10
MW-180C-90	Onsite	55-90	10/25/2010	<10.1
MW-180C-90	Onsite	55-90	01/27/2011	<10.4
MW-180C-90	Onsite	55-90	06/01/2011	<3.10
MW-180C-90	Onsite	55-90	08/15/2011	<6.20
MW-180C-90	Onsite	55-90	10/24/2011	<6.20
MW-180C-90	Onsite	55-90	07/26/2012	<6.66
MW-180C-90	Onsite	55-90	11/12/2012	<6.20
MW-180C-90	Onsite	55-90	08/07/2013	<6.46
MW-180C-90	Onsite	55-90	11/11/2013	<5.00
MW-180C-90	Onsite	55-90	08/13/2014	<5.35
MW-180C-90	Onsite	55-90	08/07/2015	<5.00
MW-180C-90	Onsite	55-90	08/12/2016	<5.05
MW-186A-15	Onsite	Water Table	05/07/2012	559
MW-186A-15	Onsite	Water Table	08/01/2012	360
MW-186A-15	Onsite	Water Table	12/13/2012	313
MW-186A-15	Onsite	Water Table	01/12/2013	284
MW-186A-15	Onsite	Water Table	05/24/2013	251
MW-186A-15	Onsite	Water Table	07/23/2013	171
MW-186A-15	Onsite	Water Table	11/05/2013	163
MW-186A-15	Onsite	Water Table	03/11/2014	177JL*
MW-186A-15	Onsite	Water Table	04/16/2014	161
MW-186A-15	Onsite	Water Table	09/03/2014	177
MW-186A-15	Onsite	Water Table	10/29/2014	231
MW-186A-15	Onsite	Water Table	02/20/2015	190JL*
MW-186A-15	Onsite	Water Table	04/21/2015	164
MW-186A-15	Onsite	Water Table	08/05/2015	203
MW-186A-15	Onsite	Water Table	10/15/2015	224
MW-186A-15	Onsite	Water Table	02/22/2016	182
MW-186A-15	Onsite	Water Table	04/11/2016	182
MW-186A-15	Onsite	Water Table	08/18/2016	166
MW-186A-15	Onsite	Water Table	10/25/2016	195
MW-186A-15	Onsite	Water Table	02/22/2017	187
MW-186A-15	Onsite	Water Table	04/13/2017	182
MW-186A-15	Onsite	Water Table	07/13/2017	155
MW-186A-15	Onsite	Water Table	10/18/2017	237
MW-186B-60	Onsite	10-55	09/07/2011	33.6
MW-186B-60	Onsite	10-55	10/12/2011	35.8
MW-186B-60	Onsite	10-55	02/21/2012	24.6
MW-186B-60	Onsite	10-55	08/01/2012	23.4
MW-186B-60	Onsite	10-55	11/15/2012	25.2
MW-186B-60	Onsite	10-55	01/12/2013	26.9
MW-186B-60	Onsite	10-55	05/22/2013	25.9
MW-186B-60	Onsite	10-55	07/02/2013	17.3
MW-186B-60	Onsite	10-55	11/05/2013	23.2
MW-186B-60	Onsite	10-55	03/04/2014	18.5
MW-186B-60	Onsite	10-55	04/22/2014	21.3
MW-186B-60	Onsite	10-55	08/12/2014	31.3
MW-186B-60	Onsite	10-55	10/23/2014	27.4

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-186B-60	Onsite	10-55	02/20/2015	30.4
MW-186B-60	Onsite	10-55	04/23/2015	27.4
MW-186B-60	Onsite	10-55	08/03/2015	22.3
MW-186B-60	Onsite	10-55	10/15/2015	37.7
MW-186B-60	Onsite	10-55	02/05/2016	23.9
MW-186B-60	Onsite	10-55	04/07/2016	23.4
MW-186B-60	Onsite	10-55	08/12/2016	28.2JH*
MW-186B-60	Onsite	10-55	10/20/2016	33.7
MW-186B-60	Onsite	10-55	02/22/2017	16.2
MW-186B-60	Onsite	10-55	04/11/2017	13.3
MW-186B-60	Onsite	10-55	07/12/2017	12.7
MW-186E-75	Onsite	55-90	04/27/2012	7.62J
MW-186E-75	Onsite	55-90	08/01/2012	11.2
MW-186E-75	Onsite	55-90	11/15/2012	16.7
MW-186E-75	Onsite	55-90	01/12/2013	15.4
MW-186E-75	Onsite	55-90	05/22/2013	13.9
MW-186E-75	Onsite	55-90	08/20/2013	11.7
MW-186E-75	Onsite	55-90	11/05/2013	8.30J
MW-186E-75	Onsite	55-90	03/04/2014	7.38J
MW-186E-75	Onsite	55-90	04/22/2014	9.62J
MW-186E-75	Onsite	55-90	08/12/2014	9.68J
MW-186E-75	Onsite	55-90	10/23/2014	7.64J
MW-186E-75	Onsite	55-90	02/20/2015	7.03J
MW-186E-75	Onsite	55-90	04/23/2015	6.89J
MW-186E-75	Onsite	55-90	08/03/2015	9.03J
MW-186E-75	Onsite	55-90	10/15/2015	12.8
MW-186E-75	Onsite	55-90	02/05/2016	20.5
MW-186E-75	Onsite	55-90	04/07/2016	7.37J
MW-186E-75	Onsite	55-90	08/12/2016	11.2JH*
MW-186E-75	Onsite	55-90	10/20/2016	14.7
MW-186E-75	Onsite	55-90	02/22/2017	7.80J
MW-186E-75	Onsite	55-90	04/13/2017	6.93J
MW-186E-75	Onsite	55-90	08/03/2017	7.17J
MW-186E-75	Onsite	55-90	10/19/2017	15.2
MW-186C-100	Onsite	55-90	09/07/2011	<6.20
MW-186C-100	Onsite	55-90	10/19/2011	<6.20
MW-186C-100	Onsite	55-90	02/21/2012	<6.74
MW-186C-100	Onsite	55-90	06/14/2012	<6.20
MW-186C-100	Onsite	55-90	08/01/2012	<6.20
MW-186C-100	Onsite	55-90	11/12/2012	<6.20
MW-186C-100	Onsite	55-90	02/28/2013	<6.66
MW-186C-100	Onsite	55-90	05/21/2013	<6.20
MW-186C-100	Onsite	55-90	07/02/2013	<6.20
MW-186C-100	Onsite	55-90	11/05/2013	<6.32
MW-186C-100	Onsite	55-90	08/12/2014	<5.05
MW-186C-100	Onsite	55-90	08/03/2015	<5.10
MW-186C-100	Onsite	55-90	08/12/2016	5.88JH*
MW-186D-135	Onsite	90-160	02/21/2012	<6.66
MW-186D-135	Onsite	90-160	06/14/2012	<6.52
MW-186D-135	Onsite	90-160	08/01/2012	<6.20
MW-186D-135	Onsite	90-160	11/12/2012	<6.20
MW-186D-135	Onsite	90-160	03/06/2013	<6.20

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Historical Sulfolane Summary

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-186D-135	Onsite	90-160	05/10/2013	<6.20
MW-186D-135	Onsite	90-160	07/02/2013	<6.20
MW-186D-135	Onsite	90-160	11/05/2013	<6.32
MW-186D-135	Onsite	90-160	08/12/2014	<5.00
MW-186D-135	Onsite	90-160	08/03/2015	<5.00
MW-192A-15	Onsite	Water Table	10/10/2011	<6.20
MW-192A-15	Onsite	Water Table	05/05/2012	<6.46J*
MW-192A-15	Onsite	Water Table	10/15/2012	<6.20
MW-192A-15	Onsite	Water Table	04/27/2013	<6.20
MW-192A-15	Onsite	Water Table	08/20/2014	<5.15
MW-192A-15	Onsite	Water Table	08/04/2015	<5.00
MW-192A-15	Onsite	Water Table	07/26/2016	<5.10J*
MW-192B-55	Onsite	10-55	10/10/2011	<6.20
MW-192B-55	Onsite	10-55	05/04/2012	<6.20
MW-192B-55	Onsite	10-55	05/10/2013	<6.20
MW-192B-55	Onsite	10-55	08/20/2014	<5.20
MW-192B-55	Onsite	10-55	08/04/2015	<5.00J*
MW-192B-55	Onsite	10-55	07/26/2016	<5.05
MW-195A-15	Onsite	Water Table	10/15/2011	319
MW-195A-15	Onsite	Water Table	02/18/2012	240
MW-195A-15	Onsite	Water Table	05/04/2012	210
MW-195A-15	Onsite	Water Table	07/25/2012	198
MW-195A-15	Onsite	Water Table	11/15/2012	174
MW-195A-15	Onsite	Water Table	02/04/2013	162
MW-195A-15	Onsite	Water Table	04/23/2013	174
MW-195A-15	Onsite	Water Table	08/06/2013	201
MW-195A-15	Onsite	Water Table	10/23/2013	213
MW-195A-15	Onsite	Water Table	03/04/2014	136
MW-195A-15	Onsite	Water Table	04/29/2014	127
MW-195A-15	Onsite	Water Table	08/15/2014	135
MW-195A-15	Onsite	Water Table	10/28/2014	186
MW-195A-15	Onsite	Water Table	02/20/2015	152
MW-195A-15	Onsite	Water Table	04/24/2015	129
MW-195A-15	Onsite	Water Table	07/30/2015	87.5
MW-195A-15	Onsite	Water Table	10/21/2015	746J*
MW-195A-15	Onsite	Water Table	02/09/2016	421
MW-195A-15	Onsite	Water Table	04/07/2016	277
MW-195A-15	Onsite	Water Table	07/20/2016	816
MW-195A-15	Onsite	Water Table	10/19/2016	503
MW-195A-15	Onsite	Water Table	02/16/2017	170
MW-195A-15	Onsite	Water Table	04/10/2017	134
MW-195B-150	Onsite	90-160	02/18/2012	<6.60
MW-195B-150	Onsite	90-160	06/14/2012	<6.20
MW-195B-150	Onsite	90-160	07/27/2012	<6.40
MW-195B-150	Onsite	90-160	10/15/2012	<6.20
MW-195B-150	Onsite	90-160	03/11/2013	<6.20
MW-195B-150	Onsite	90-160	04/23/2013	<6.20
MW-195B-150	Onsite	90-160	08/06/2013	<6.20
MW-195B-150	Onsite	90-160	10/23/2013	<6.20
MW-195B-150	Onsite	90-160	08/15/2014	<5.55
MW-195B-150	Onsite	90-160	07/30/2015	<5.15J*
MW-196-15	Onsite	Water Table	10/15/2011	<6.20

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-196-15	Onsite	Water Table	02/17/2012	<6.66
MW-196-15	Onsite	Water Table	05/04/2012	<6.20
MW-196-15	Onsite	Water Table	08/03/2012	<6.46
MW-196-15	Onsite	Water Table	12/11/2012	<6.46
MW-196-15	Onsite	Water Table	02/02/2013	<6.40
MW-196-15	Onsite	Water Table	06/06/2013	<6.20
MW-196-15	Onsite	Water Table	07/30/2013	<6.46
MW-196-15	Onsite	Water Table	10/15/2013	<6.96
MW-196-15	Onsite	Water Table	08/20/2014	<5.40
MW-196-15	Onsite	Water Table	08/04/2015	<5.00
MW-196-15	Onsite	Water Table	08/09/2016	3.27J
MW-197A-65	Onsite	10-55	06/12/2012	<6.20
MW-197A-65	Onsite	10-55	08/03/2012	<6.46
MW-197A-65	Onsite	10-55	11/14/2012	<6.20
MW-197A-65	Onsite	10-55	02/04/2013	<6.60
MW-197A-65	Onsite	10-55	04/25/2013	<6.20
MW-197A-65	Onsite	10-55	07/21/2013	<6.20
MW-197A-65	Onsite	10-55	11/04/2013	<6.20
MW-197A-65	Onsite	10-55	03/25/2014	<5.25
MW-197A-65	Onsite	10-55	04/23/2014	<5.00
MW-197A-65	Onsite	10-55	08/13/2014	<5.00
MW-197A-65	Onsite	10-55	10/23/2014	<5.00
MW-197A-65	Onsite	10-55	08/04/2015	<5.15
MW-197A-65	Onsite	10-55	08/18/2016	<5.05
MW-197B-150	Onsite	90-160	02/21/2012	<6.60
MW-197B-150	Onsite	90-160	06/14/2012	<6.20
MW-197B-150	Onsite	90-160	08/06/2012	<6.46
MW-197B-150	Onsite	90-160	03/08/2013	<6.46
MW-197B-150	Onsite	90-160	04/25/2013	<6.20
MW-197B-150	Onsite	90-160	07/21/2013	<6.20
MW-197B-150	Onsite	90-160	11/04/2013	<6.20
MW-197B-150	Onsite	90-160	08/13/2014	<5.35
MW-197B-150	Onsite	90-160	08/04/2015	<5.00
MW-198-150	Onsite	90-160	02/22/2012	R*
MW-198-150	Onsite	90-160	04/20/2012	<6.20
MW-198-150	Onsite	90-160	08/07/2012	<6.46
MW-198-150	Onsite	90-160	08/23/2013	<6.32
MW-198-150	Onsite	90-160	11/15/2013	<5.00
MW-198-150	Onsite	90-160	03/24/2014	<5.00
MW-198-150	Onsite	90-160	04/24/2014	<5.00
MW-198-150	Onsite	90-160	09/01/2014	<5.00
MW-198-150	Onsite	90-160	10/29/2014	<5.00
MW-198-150	Onsite	90-160	08/11/2015	<5.00
MW-199-150	Onsite	90-160	02/18/2012	<6.60
MW-199-150	Onsite	90-160	06/14/2012	<6.74J*
MW-199-150	Onsite	90-160	08/07/2012	<6.20
MW-199-150	Onsite	90-160	03/08/2013	<6.66
MW-199-150	Onsite	90-160	04/25/2013	<6.32
MW-199-150	Onsite	90-160	07/18/2013	<6.20
MW-199-150	Onsite	90-160	10/30/2013	<6.32
MW-199-150	Onsite	90-160	02/28/2014	<5.00
MW-199-150	Onsite	90-160	04/21/2014	<5.00

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-199-150	Onsite	90-160	08/01/2014	<5.00
MW-199-150	Onsite	90-160	10/28/2014	<5.00
MW-199-150	Onsite	90-160	02/24/2015	<5.00
MW-199-150	Onsite	90-160	04/23/2015	<5.00
MW-199-150	Onsite	90-160	07/31/2015	<5.00J*
MW-199-150	Onsite	90-160	10/20/2015	<5.05
MW-199-150	Onsite	90-160	02/12/2016	<5.25
MW-199-150	Onsite	90-160	08/09/2016	<5.10
MW-199-150	Onsite	90-160	02/14/2017	<5.50
MW-300-150	Onsite	90-160	02/18/2012	<6.82
MW-300-150	Onsite	90-160	06/14/2012	<6.46
MW-300-150	Onsite	90-160	08/07/2012	<6.32
MW-300-150	Onsite	90-160	03/11/2013	<6.40
MW-300-150	Onsite	90-160	05/14/2013	<6.20
MW-300-150	Onsite	90-160	07/23/2013	<6.20
MW-300-150	Onsite	90-160	11/06/2013	<6.20
MW-300-150	Onsite	90-160	09/04/2014	<5.00
MW-300-150	Onsite	90-160	08/07/2015	<5.00
MW-301-CMT-10	Onsite	Water Table	11/08/2011	<6.20
MW-301-CMT-10	Onsite	Water Table	08/14/2012	<6.40J*
MW-301-CMT-10	Onsite	Water Table	12/09/2012	<6.66
MW-301-CMT-10	Onsite	Water Table	01/22/2013	<6.66
MW-301-CMT-10	Onsite	Water Table	07/31/2013	<6.20
MW-301-CMT-10	Onsite	Water Table	10/16/2013	<6.20
MW-301-CMT-10	Onsite	Water Table	03/11/2014	<5.75
MW-301-CMT-10	Onsite	Water Table	04/17/2014	<5.25J*
MW-301-CMT-10	Onsite	Water Table	07/17/2014	<5.00
MW-301-CMT-10	Onsite	Water Table	10/20/2014	<5.00
MW-301-CMT-10	Onsite	Water Table	07/30/2015	<5.00
MW-301-CMT-10	Onsite	Water Table	07/15/2016	<5.15
MW-301-CMT-20	Onsite	Water Table	11/07/2011	<6.20
MW-301-CMT-20	Onsite	Water Table	08/14/2012	<6.40
MW-301-CMT-20	Onsite	Water Table	12/09/2012	<6.60
MW-301-CMT-20	Onsite	Water Table	01/22/2013	<6.46
MW-301-CMT-20	Onsite	Water Table	07/31/2013	<6.32
MW-301-CMT-20	Onsite	Water Table	10/16/2013	<6.20
MW-301-CMT-20	Onsite	Water Table	03/11/2014	<5.50
MW-301-CMT-20	Onsite	Water Table	04/17/2014	<5.00
MW-301-CMT-20	Onsite	Water Table	07/17/2014	<5.20
MW-301-CMT-20	Onsite	Water Table	10/20/2014	<5.00J*
MW-301-CMT-20	Onsite	Water Table	07/30/2015	<5.00
MW-301-CMT-20	Onsite	Water Table	07/15/2016	<5.00
MW-301-CMT-20	Onsite	Water Table	07/26/2017	<5.40
MW-301-CMT-20	Onsite	Water Table	10/16/2017	<5.15
MW-301-CMT-30	Onsite	10-55	11/07/2011	<6.20
MW-301-CMT-30	Onsite	10-55	08/14/2012	<6.32
MW-301-CMT-30	Onsite	10-55	01/22/2013	<6.52
MW-301-CMT-30	Onsite	10-55	07/31/2013	<6.20
MW-301-CMT-30	Onsite	10-55	10/16/2013	<6.20
MW-301-CMT-30	Onsite	10-55	03/11/2014	<5.45
MW-301-CMT-30	Onsite	10-55	04/17/2014	<5.00
MW-301-CMT-30	Onsite	10-55	07/17/2014	<5.40

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-301-CMT-30	Onsite	10-55	10/20/2014	<5.00
MW-301-CMT-30	Onsite	10-55	07/30/2015	<5.00
MW-301-CMT-30	Onsite	10-55	07/15/2016	<5.00
MW-301-CMT-40	Onsite	10-55	11/07/2011	3.24J
MW-301-CMT-40	Onsite	10-55	03/30/2012	<6.20
MW-301-CMT-40	Onsite	10-55	08/14/2012	<6.40
MW-301-CMT-40	Onsite	10-55	12/09/2012	<6.74
MW-301-CMT-40	Onsite	10-55	01/22/2013	<6.46
MW-301-CMT-40	Onsite	10-55	07/31/2013	<6.46
MW-301-CMT-40	Onsite	10-55	10/16/2013	<6.20
MW-301-CMT-40	Onsite	10-55	03/11/2014	<5.45
MW-301-CMT-40	Onsite	10-55	04/17/2014	<5.25
MW-301-CMT-40	Onsite	10-55	07/17/2014	<5.25
MW-301-CMT-40	Onsite	10-55	10/20/2014	<5.00
MW-301-CMT-40	Onsite	10-55	07/30/2015	<5.15
MW-301-CMT-40	Onsite	10-55	07/15/2016	<5.10
MW-301-CMT-50	Onsite	10-55	11/07/2011	5.35J
MW-301-CMT-50	Onsite	10-55	03/30/2012	6.53J
MW-301-CMT-50	Onsite	10-55	06/06/2012	7.71J
MW-301-CMT-50	Onsite	10-55	08/14/2012	7.96J
MW-301-CMT-50	Onsite	10-55	01/22/2013	3.89J
MW-301-CMT-50	Onsite	10-55	07/31/2013	<6.40
MW-301-CMT-50	Onsite	10-55	10/16/2013	<6.20
MW-301-CMT-50	Onsite	10-55	03/11/2014	3.88J
MW-301-CMT-50	Onsite	10-55	04/17/2014	3.79J
MW-301-CMT-50	Onsite	10-55	07/17/2014	3.89J
MW-301-CMT-50	Onsite	10-55	10/20/2014	<5.00
MW-301-CMT-50	Onsite	10-55	02/26/2015	<5.00
MW-301-CMT-50	Onsite	10-55	07/30/2015	<5.00
MW-301-CMT-50	Onsite	10-55	07/15/2016	<5.10
MW-301-60	Onsite	10-55	11/10/2011	7.02J
MW-301-60	Onsite	10-55	03/30/2012	13.6
MW-301-60	Onsite	10-55	06/06/2012	12.3
MW-301-60	Onsite	10-55	08/16/2012	7.08J
MW-301-60	Onsite	10-55	01/14/2013	4.64J
MW-301-60	Onsite	10-55	07/31/2013	3.71J
MW-301-60	Onsite	10-55	10/16/2013	3.73J
MW-301-60	Onsite	10-55	03/07/2014	4.71J
MW-301-60	Onsite	10-55	04/17/2014	5.36J
MW-301-60	Onsite	10-55	07/29/2014	5.70J*
MW-301-60	Onsite	10-55	10/27/2014	3.95J
MW-301-60	Onsite	10-55	02/17/2015	5.29J
MW-301-60	Onsite	10-55	04/18/2015	4.30J
MW-301-60	Onsite	10-55	07/28/2015	<5.00J*
MW-301-60	Onsite	10-55	02/17/2016	3.38J
MW-301-60	Onsite	10-55	07/21/2016	3.78J
MW-301-60	Onsite	10-55	02/14/2017	<5.95
MW-301-60	Onsite	10-55	07/14/2017	<5.05
MW-301-60	Onsite	10-55	10/16/2017	<5.05
MW-301-70	Onsite	55-90	10/17/2011	5.72J
MW-301-70	Onsite	55-90	03/30/2012	11.6
MW-301-70	Onsite	55-90	06/06/2012	10.3J

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-301-70	Onsite	55-90	08/16/2012	6.27J
MW-301-70	Onsite	55-90	01/15/2013	4.31JL*
MW-301-70	Onsite	55-90	04/16/2013	4.71J
MW-301-70	Onsite	55-90	07/31/2013	<6.20
MW-301-70	Onsite	55-90	10/16/2013	5.63J
MW-301-70	Onsite	55-90	03/07/2014	4.92J
MW-301-70	Onsite	55-90	04/17/2014	4.96J
MW-301-70	Onsite	55-90	07/29/2014	5.60J
MW-301-70	Onsite	55-90	10/27/2014	3.26J
MW-301-70	Onsite	55-90	02/17/2015	4.55J
MW-301-70	Onsite	55-90	04/18/2015	4.61J
MW-301-70	Onsite	55-90	07/28/2015	<5.15
MW-301-70	Onsite	55-90	02/17/2016	<5.25
MW-301-70	Onsite	55-90	07/21/2016	<5.40
MW-302-CMT-10	Onsite	Water Table	11/10/2011	55.5
MW-302-CMT-10	Onsite	Water Table	03/26/2012	66.1
MW-302-CMT-10	Onsite	Water Table	06/06/2012	32.7
MW-302-CMT-10	Onsite	Water Table	08/15/2012	62.2
MW-302-CMT-10	Onsite	Water Table	01/22/2013	56.6
MW-302-CMT-10	Onsite	Water Table	04/17/2013	50.1
MW-302-CMT-10	Onsite	Water Table	08/28/2013	43.3
MW-302-CMT-10	Onsite	Water Table	10/14/2013	37.2
MW-302-CMT-10	Onsite	Water Table	03/12/2014	46.6
MW-302-CMT-10	Onsite	Water Table	04/15/2014	41.7
MW-302-CMT-10	Onsite	Water Table	07/16/2014	14.4
MW-302-CMT-10	Onsite	Water Table	10/20/2014	19.9
MW-302-CMT-10	Onsite	Water Table	02/19/2015	17.3
MW-302-CMT-10	Onsite	Water Table	04/16/2015	11.4
MW-302-CMT-10	Onsite	Water Table	07/21/2015	6.04J
MW-302-CMT-10	Onsite	Water Table	02/08/2016	3.64J
MW-302-CMT-10	Onsite	Water Table	07/14/2016	3.25J
MW-302-CMT-10	Onsite	Water Table	02/17/2017	5.82J
MW-302-CMT-20	Onsite	Water Table	11/10/2011	76.2
MW-302-CMT-20	Onsite	Water Table	03/26/2012	66.1
MW-302-CMT-20	Onsite	Water Table	06/06/2012	70.3
MW-302-CMT-20	Onsite	Water Table	08/15/2012	68.5
MW-302-CMT-20	Onsite	Water Table	12/09/2012	59.4
MW-302-CMT-20	Onsite	Water Table	01/22/2013	61.0
MW-302-CMT-20	Onsite	Water Table	04/17/2013	46.4
MW-302-CMT-20	Onsite	Water Table	08/28/2013	47.4
MW-302-CMT-20	Onsite	Water Table	10/14/2013	52.7
MW-302-CMT-20	Onsite	Water Table	03/12/2014	45.2
MW-302-CMT-20	Onsite	Water Table	04/15/2014	42.9
MW-302-CMT-20	Onsite	Water Table	07/16/2014	36.2
MW-302-CMT-20	Onsite	Water Table	10/20/2014	19.4
MW-302-CMT-20	Onsite	Water Table	02/19/2015	8.48J
MW-302-CMT-20	Onsite	Water Table	04/16/2015	5.03J
MW-302-CMT-20	Onsite	Water Table	07/21/2015	3.98J
MW-302-CMT-20	Onsite	Water Table	02/08/2016	<5.20
MW-302-CMT-20	Onsite	Water Table	07/14/2016	<5.05
MW-302-CMT-20	Onsite	Water Table	10/19/2016	3.38J
MW-302-CMT-20	Onsite	Water Table	02/17/2017	9.99J

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-302-CMT-20	Onsite	Water Table	04/10/2017	10.7J
MW-302-CMT-20	Onsite	Water Table	07/31/2017	12.8
MW-302-CMT-20	Onsite	Water Table	10/17/2017	11.6
MW-302-CMT-30	Onsite	10-55	11/10/2011	63.0
MW-302-CMT-30	Onsite	10-55	03/26/2012	59.0
MW-302-CMT-30	Onsite	10-55	06/06/2012	50.3
MW-302-CMT-30	Onsite	10-55	01/22/2013	52.3
MW-302-CMT-30	Onsite	10-55	04/17/2013	37.8
MW-302-CMT-30	Onsite	10-55	08/28/2013	43.9
MW-302-CMT-30	Onsite	10-55	10/14/2013	43.4
MW-302-CMT-30	Onsite	10-55	03/12/2014	42.8
MW-302-CMT-30	Onsite	10-55	04/15/2014	40.0
MW-302-CMT-30	Onsite	10-55	07/16/2014	38.6
MW-302-CMT-30	Onsite	10-55	10/20/2014	24.2
MW-302-CMT-30	Onsite	10-55	02/19/2015	7.94J
MW-302-CMT-30	Onsite	10-55	04/16/2015	5.01J
MW-302-CMT-30	Onsite	10-55	07/21/2015	5.14J
MW-302-CMT-30	Onsite	10-55	02/08/2016	3.54J
MW-302-CMT-30	Onsite	10-55	07/14/2016	3.50J
MW-302-CMT-30	Onsite	10-55	02/17/2017	6.97J
MW-302-CMT-40	Onsite	10-55	11/10/2011	33.2
MW-302-CMT-40	Onsite	10-55	03/26/2012	28.5
MW-302-CMT-40	Onsite	10-55	06/06/2012	21.9
MW-302-CMT-40	Onsite	10-55	12/09/2012	18.1
MW-302-CMT-40	Onsite	10-55	01/22/2013	17.4
MW-302-CMT-40	Onsite	10-55	04/17/2013	13.7
MW-302-CMT-40	Onsite	10-55	08/28/2013	14.9
MW-302-CMT-40	Onsite	10-55	10/14/2013	14.9
MW-302-CMT-40	Onsite	10-55	03/12/2014	15.4
MW-302-CMT-40	Onsite	10-55	04/15/2014	14.0
MW-302-CMT-40	Onsite	10-55	07/16/2014	12.4
MW-302-CMT-40	Onsite	10-55	10/20/2014	21.8
MW-302-CMT-40	Onsite	10-55	02/19/2015	<5.00
MW-302-CMT-40	Onsite	10-55	04/16/2015	<5.25
MW-302-CMT-40	Onsite	10-55	07/21/2015	<5.15
MW-302-CMT-40	Onsite	10-55	07/14/2016	<5.05
MW-302-CMT-50	Onsite	10-55	11/10/2011	33.1
MW-302-CMT-50	Onsite	10-55	03/26/2012	28.4
MW-302-CMT-50	Onsite	10-55	06/06/2012	26.3
MW-302-CMT-50	Onsite	10-55	01/22/2013	20.5
MW-302-CMT-50	Onsite	10-55	04/17/2013	16.0
MW-302-CMT-50	Onsite	10-55	08/28/2013	17.9
MW-302-CMT-50	Onsite	10-55	10/14/2013	17.9
MW-302-CMT-50	Onsite	10-55	03/12/2014	17.3
MW-302-CMT-50	Onsite	10-55	04/15/2014	16.5
MW-302-CMT-50	Onsite	10-55	07/16/2014	14.7
MW-302-CMT-50	Onsite	10-55	10/20/2014	<5.00
MW-302-CMT-50	Onsite	10-55	02/19/2015	3.17J
MW-302-CMT-50	Onsite	10-55	04/16/2015	<5.10
MW-302-CMT-50	Onsite	10-55	07/21/2015	<5.00
MW-302-CMT-50	Onsite	10-55	07/14/2016	<5.10
MW-302-CMT-50	Onsite	10-55	07/31/2017	4.46J

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-302-CMT-50	Onsite	10-55	10/17/2017	4.70J
MW-302-70	Onsite	55-90	11/10/2011	28.7
MW-302-70	Onsite	55-90	03/26/2012	32.7
MW-302-70	Onsite	55-90	06/06/2012	31.0
MW-302-70	Onsite	55-90	08/15/2012	27.4
MW-302-70	Onsite	55-90	01/22/2013	21.6
MW-302-70	Onsite	55-90	04/17/2013	17.1
MW-302-70	Onsite	55-90	08/28/2013	17.2
MW-302-70	Onsite	55-90	10/14/2013	16.4
MW-302-70	Onsite	55-90	03/13/2014	16.9
MW-302-70	Onsite	55-90	04/16/2014	16.1
MW-302-70	Onsite	55-90	07/22/2014	15.7
MW-302-70	Onsite	55-90	10/16/2014	7.15J
MW-302-70	Onsite	55-90	02/18/2015	4.15J
MW-302-70	Onsite	55-90	04/16/2015	<5.00
MW-302-70	Onsite	55-90	07/21/2015	<5.10
MW-302-70	Onsite	55-90	07/14/2016	<5.05
MW-302-70	Onsite	55-90	02/14/2017	4.50J
MW-302-80	Onsite	55-90	11/10/2011	3.39J
MW-302-80	Onsite	55-90	03/26/2012	27.6
MW-302-80	Onsite	55-90	06/06/2012	26.1
MW-302-80	Onsite	55-90	08/15/2012	23.8
MW-302-80	Onsite	55-90	01/21/2013	18.0
MW-302-80	Onsite	55-90	04/17/2013	14.9
MW-302-80	Onsite	55-90	08/28/2013	16.6
MW-302-80	Onsite	55-90	10/14/2013	14.7
MW-302-80	Onsite	55-90	03/13/2014	14.3
MW-302-80	Onsite	55-90	04/16/2014	12.3
MW-302-80	Onsite	55-90	07/21/2014	18.4
MW-302-80	Onsite	55-90	10/16/2014	7.23J
MW-302-80	Onsite	55-90	02/18/2015	3.94J
MW-302-80	Onsite	55-90	04/16/2015	<5.15
MW-302-80	Onsite	55-90	07/21/2015	<5.15
MW-302-80	Onsite	55-90	07/14/2016	<5.15
MW-302-80	Onsite	55-90	08/01/2017	3.86J
MW-302-80	Onsite	55-90	10/16/2017	3.20J
MW-302-95	Onsite	55-90	06/07/2012	<6.26
MW-302-95	Onsite	55-90	08/15/2012	<6.20
MW-302-95	Onsite	55-90	01/21/2013	<6.46
MW-302-95	Onsite	55-90	04/17/2013	<6.20
MW-302-95	Onsite	55-90	08/28/2013	<6.32
MW-302-95	Onsite	55-90	10/14/2013	<6.20
MW-302-95	Onsite	55-90	03/13/2014	<5.00
MW-302-95	Onsite	55-90	04/16/2014	<5.20
MW-302-95	Onsite	55-90	07/21/2014	<5.00
MW-302-95	Onsite	55-90	10/16/2014	<5.00
MW-302-95	Onsite	55-90	07/21/2015	<5.00
MW-302-95	Onsite	55-90	07/14/2016	<5.25
MW-302-110	Onsite	90-160	11/10/2011	<6.20
MW-302-110	Onsite	90-160	03/26/2012	<6.20
MW-302-110	Onsite	90-160	06/06/2012	<6.52
MW-302-110	Onsite	90-160	08/15/2012	<6.20

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-302-110	Onsite	90-160	01/21/2013	<6.32
MW-302-110	Onsite	90-160	03/22/2013	<6.40
MW-302-110	Onsite	90-160	08/28/2013	<6.20
MW-302-110	Onsite	90-160	10/14/2013	<6.20
MW-302-110	Onsite	90-160	03/13/2014	<5.00
MW-302-110	Onsite	90-160	07/23/2014	<5.00
MW-302-110	Onsite	90-160	07/21/2015	<5.00
MW-302-110	Onsite	90-160	07/14/2016	<5.05
MW-303-CMT-9	Onsite	Water Table	11/11/2011	4.22J
MW-303-CMT-9	Onsite	Water Table	03/27/2012	5.25J
MW-303-CMT-9	Onsite	Water Table	06/07/2012	<6.32
MW-303-CMT-9	Onsite	Water Table	08/15/2012	<6.20
MW-303-CMT-9	Onsite	Water Table	12/09/2012	6.07J
MW-303-CMT-9	Onsite	Water Table	01/21/2013	9.56J
MW-303-CMT-9	Onsite	Water Table	04/18/2013	6.77J
MW-303-CMT-9	Onsite	Water Table	08/08/2013	6.87J
MW-303-CMT-9	Onsite	Water Table	10/15/2013	<6.32
MW-303-CMT-9	Onsite	Water Table	03/13/2014	<5.00
MW-303-CMT-9	Onsite	Water Table	04/15/2014	<5.15
MW-303-CMT-9	Onsite	Water Table	07/16/2014	<5.20
MW-303-CMT-9	Onsite	Water Table	10/18/2014	<5.40
MW-303-CMT-9	Onsite	Water Table	02/19/2015	<5.00
MW-303-CMT-9	Onsite	Water Table	04/16/2015	<5.10
MW-303-CMT-9	Onsite	Water Table	07/29/2015	<5.10
MW-303-CMT-9	Onsite	Water Table	07/14/2016	<5.00
MW-303-CMT-19	Onsite	Water Table	11/11/2011	123
MW-303-CMT-19	Onsite	Water Table	03/27/2012	94.6
MW-303-CMT-19	Onsite	Water Table	06/07/2012	97.8
MW-303-CMT-19	Onsite	Water Table	08/15/2012	56.7
MW-303-CMT-19	Onsite	Water Table	12/09/2012	61.2
MW-303-CMT-19	Onsite	Water Table	01/21/2013	69.9
MW-303-CMT-19	Onsite	Water Table	04/18/2013	61.6
MW-303-CMT-19	Onsite	Water Table	08/08/2013	59.2
MW-303-CMT-19	Onsite	Water Table	10/15/2013	44.4
MW-303-CMT-19	Onsite	Water Table	03/13/2014	54.2
MW-303-CMT-19	Onsite	Water Table	04/15/2014	48.9
MW-303-CMT-19	Onsite	Water Table	07/16/2014	32.0
MW-303-CMT-19	Onsite	Water Table	10/18/2014	25.1
MW-303-CMT-19	Onsite	Water Table	02/19/2015	19.7
MW-303-CMT-19	Onsite	Water Table	04/16/2015	18.8
MW-303-CMT-19	Onsite	Water Table	07/29/2015	12.8
MW-303-CMT-19	Onsite	Water Table	10/20/2015	10.4
MW-303-CMT-19	Onsite	Water Table	02/16/2016	11.1J
MW-303-CMT-19	Onsite	Water Table	07/14/2016	9.40J
MW-303-CMT-19	Onsite	Water Table	02/17/2017	8.40J
MW-303-CMT-19	Onsite	Water Table	07/28/2017	9.82J
MW-303-CMT-19	Onsite	Water Table	10/17/2017	10.8
MW-303-CMT-29	Onsite	10-55	11/11/2011	88.5
MW-303-CMT-29	Onsite	10-55	03/27/2012	57.9
MW-303-CMT-29	Onsite	10-55	06/07/2012	54.3
MW-303-CMT-29	Onsite	10-55	08/15/2012	61.5
MW-303-CMT-29	Onsite	10-55	01/21/2013	37.6

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-303-CMT-29	Onsite	10-55	04/18/2013	33.6
MW-303-CMT-29	Onsite	10-55	08/08/2013	29.3
MW-303-CMT-29	Onsite	10-55	10/15/2013	51.2
MW-303-CMT-29	Onsite	10-55	03/13/2014	20.2
MW-303-CMT-29	Onsite	10-55	04/15/2014	18.6
MW-303-CMT-29	Onsite	10-55	07/16/2014	31.7J*
MW-303-CMT-29	Onsite	10-55	10/18/2014	24.7
MW-303-CMT-29	Onsite	10-55	02/19/2015	9.56J
MW-303-CMT-29	Onsite	10-55	04/16/2015	8.96J
MW-303-CMT-29	Onsite	10-55	07/29/2015	8.46J*
MW-303-CMT-29	Onsite	10-55	02/16/2016	9.42J
MW-303-CMT-29	Onsite	10-55	07/14/2016	6.11J
MW-303-CMT-29	Onsite	10-55	02/17/2017	5.68J
MW-303-CMT-39	Onsite	10-55	11/11/2011	47.5
MW-303-CMT-39	Onsite	10-55	03/27/2012	28.6
MW-303-CMT-39	Onsite	10-55	06/07/2012	27.8
MW-303-CMT-39	Onsite	10-55	08/15/2012	22.1
MW-303-CMT-39	Onsite	10-55	12/09/2012	35.2
MW-303-CMT-39	Onsite	10-55	01/21/2013	21.9
MW-303-CMT-39	Onsite	10-55	04/18/2013	19.0
MW-303-CMT-39	Onsite	10-55	08/08/2013	14.8
MW-303-CMT-39	Onsite	10-55	10/15/2013	13.4
MW-303-CMT-39	Onsite	10-55	03/13/2014	9.42J
MW-303-CMT-39	Onsite	10-55	04/15/2014	8.74J
MW-303-CMT-39	Onsite	10-55	07/16/2014	7.89J
MW-303-CMT-39	Onsite	10-55	10/18/2014	6.16J
MW-303-CMT-39	Onsite	10-55	02/19/2015	5.67J
MW-303-CMT-39	Onsite	10-55	04/16/2015	4.76J
MW-303-CMT-39	Onsite	10-55	07/29/2015	3.85J
MW-303-CMT-39	Onsite	10-55	02/12/2016	5.32J
MW-303-CMT-39	Onsite	10-55	07/14/2016	3.49J
MW-303-CMT-39	Onsite	10-55	02/17/2017	5.14J*
MW-303-CMT-39	Onsite	10-55	07/28/2017	4.25J
MW-303-CMT-39	Onsite	10-55	10/17/2017	9.67J
MW-303-CMT-49	Onsite	10-55	11/11/2011	29.3
MW-303-CMT-49	Onsite	10-55	03/27/2012	20.8
MW-303-CMT-49	Onsite	10-55	06/07/2012	18.7
MW-303-CMT-49	Onsite	10-55	08/15/2012	20.9
MW-303-CMT-49	Onsite	10-55	01/21/2013	17.1
MW-303-CMT-49	Onsite	10-55	04/18/2013	12.4
MW-303-CMT-49	Onsite	10-55	08/08/2013	13.3
MW-303-CMT-49	Onsite	10-55	10/15/2013	11.8
MW-303-CMT-49	Onsite	10-55	03/13/2014	7.97J
MW-303-CMT-49	Onsite	10-55	04/15/2014	7.98J
MW-303-CMT-49	Onsite	10-55	07/16/2014	8.25J
MW-303-CMT-49	Onsite	10-55	10/18/2014	4.49J
MW-303-CMT-49	Onsite	10-55	02/19/2015	3.36J
MW-303-CMT-49	Onsite	10-55	04/16/2015	<5.00
MW-303-CMT-49	Onsite	10-55	07/29/2015	3.34J
MW-303-CMT-49	Onsite	10-55	02/16/2016	<6.30
MW-303-CMT-49	Onsite	10-55	07/14/2016	<5.05
MW-303-CMT-59	Onsite	10-55	11/11/2011	26.8

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-303-CMT-59	Onsite	10-55	03/27/2012	17.0
MW-303-CMT-59	Onsite	10-55	06/07/2012	16.3
MW-303-CMT-59	Onsite	10-55	08/15/2012	15.1
MW-303-CMT-59	Onsite	10-55	01/21/2013	12.2
MW-303-CMT-59	Onsite	10-55	04/18/2013	10.1
MW-303-CMT-59	Onsite	10-55	08/08/2013	8.87J
MW-303-CMT-59	Onsite	10-55	10/15/2013	9.56J
MW-303-CMT-59	Onsite	10-55	03/13/2014	5.91J
MW-303-CMT-59	Onsite	10-55	04/15/2014	5.58J
MW-303-CMT-59	Onsite	10-55	07/16/2014	5.99J
MW-303-CMT-59	Onsite	10-55	10/18/2014	4.06J
MW-303-CMT-59	Onsite	10-55	02/19/2015	<5.00
MW-303-CMT-59	Onsite	10-55	07/29/2015	<5.00
MW-303-CMT-59	Onsite	10-55	07/14/2016	<5.10
MW-303-CMT-59	Onsite	10-55	07/28/2017	<5.45
MW-303-CMT-59	Onsite	10-55	10/17/2017	9.38J
MW-303-70	Onsite	55-90	11/11/2011	19.3
MW-303-70	Onsite	55-90	03/27/2012	14.8
MW-303-70	Onsite	55-90	06/07/2012	10.7J
MW-303-70	Onsite	55-90	08/15/2012	9.79J
MW-303-70	Onsite	55-90	01/21/2013	6.64J
MW-303-70	Onsite	55-90	04/18/2013	6.78J
MW-303-70	Onsite	55-90	08/08/2013	5.70J
MW-303-70	Onsite	55-90	10/15/2013	5.95J
MW-303-70	Onsite	55-90	03/13/2014	4.62J
MW-303-70	Onsite	55-90	04/15/2014	4.23J
MW-303-70	Onsite	55-90	07/22/2014	3.89J
MW-303-70	Onsite	55-90	10/15/2014	3.19J
MW-303-70	Onsite	55-90	02/19/2015	<5.00
MW-303-70	Onsite	55-90	07/22/2015	<5.00
MW-303-70	Onsite	55-90	07/18/2016	<5.25
MW-303-80	Onsite	55-90	11/11/2011	10.2
MW-303-80	Onsite	55-90	03/27/2012	5.38J
MW-303-80	Onsite	55-90	06/07/2012	3.61J
MW-303-80	Onsite	55-90	08/15/2012	<6.20
MW-303-80	Onsite	55-90	01/21/2013	<6.20
MW-303-80	Onsite	55-90	04/18/2013	<6.20
MW-303-80	Onsite	55-90	08/08/2013	<6.20
MW-303-80	Onsite	55-90	10/15/2013	<6.20
MW-303-80	Onsite	55-90	03/13/2014	<5.00
MW-303-80	Onsite	55-90	04/15/2014	<5.30
MW-303-80	Onsite	55-90	07/22/2014	<5.00
MW-303-80	Onsite	55-90	10/15/2014	<5.00
MW-303-80	Onsite	55-90	02/19/2015	<5.00
MW-303-80	Onsite	55-90	07/22/2015	<5.00
MW-303-80	Onsite	55-90	07/18/2016	<5.30
MW-303-80	Onsite	55-90	08/01/2017	<5.05
MW-303-80	Onsite	55-90	10/16/2017	<5.10
MW-303-95	Onsite	55-90	06/07/2012	<6.20
MW-303-95	Onsite	55-90	08/15/2012	<6.20
MW-303-95	Onsite	55-90	01/21/2013	<6.20
MW-303-95	Onsite	55-90	04/18/2013	<6.20

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-303-95	Onsite	55-90	08/08/2013	<6.20
MW-303-95	Onsite	55-90	10/15/2013	<6.20
MW-303-95	Onsite	55-90	03/13/2014	<5.00
MW-303-95	Onsite	55-90	04/15/2014	<5.20
MW-303-95	Onsite	55-90	07/22/2014	<5.00
MW-303-95	Onsite	55-90	10/15/2014	<5.00
MW-303-95	Onsite	55-90	07/22/2015	<5.00J*
MW-303-95	Onsite	55-90	07/18/2016	<5.25
MW-303-130	Onsite	90-160	11/11/2011	<6.20
MW-303-130	Onsite	90-160	03/27/2012	<6.20
MW-303-130	Onsite	90-160	06/07/2012	<6.88
MW-303-130	Onsite	90-160	08/16/2012	<6.20
MW-303-130	Onsite	90-160	01/21/2013	<7.04
MW-303-130	Onsite	90-160	03/22/2013	<6.46
MW-303-130	Onsite	90-160	07/25/2013	<6.64
MW-303-130	Onsite	90-160	10/15/2013	<6.20
MW-303-130	Onsite	90-160	03/13/2014	<5.00
MW-303-130	Onsite	90-160	07/22/2014	<5.00
MW-303-130	Onsite	90-160	07/24/2015	<5.00
MW-303-130	Onsite	90-160	07/18/2016	<5.15
MW-304-CMT-10	Onsite	Water Table	08/14/2012	<6.66
MW-304-CMT-10	Onsite	Water Table	07/11/2013	<6.88
MW-304-CMT-10	Onsite	Water Table	07/29/2014	5.04J
MW-304-CMT-10	Onsite	Water Table	08/01/2015	36.9
MW-304-CMT-10	Onsite	Water Table	07/21/2016	27.0
MW-304-15	Onsite	Water Table	04/27/2012	412
MW-304-15	Onsite	Water Table	08/14/2012	284
MW-304-15	Onsite	Water Table	12/10/2012	299
MW-304-15	Onsite	Water Table	01/14/2013	337
MW-304-15	Onsite	Water Table	06/10/2013	248
MW-304-15	Onsite	Water Table	07/30/2013	296
MW-304-15	Onsite	Water Table	11/18/2013	352
MW-304-15	Onsite	Water Table	03/13/2014	316
MW-304-15	Onsite	Water Table	05/14/2014	232
MW-304-15	Onsite	Water Table	07/24/2014	99.1J*
MW-304-15	Onsite	Water Table	10/25/2014	120
MW-304-15	Onsite	Water Table	02/26/2015	113
MW-304-15	Onsite	Water Table	04/22/2015	74.3
MW-304-15	Onsite	Water Table	07/28/2015	40.6
MW-304-15	Onsite	Water Table	10/16/2015	18.1
MW-304-15	Onsite	Water Table	02/08/2016	31.5
MW-304-15	Onsite	Water Table	04/06/2016	19.4
MW-304-15	Onsite	Water Table	07/22/2016	10.9
MW-304-15	Onsite	Water Table	10/14/2016	12.0
MW-304-15	Onsite	Water Table	02/13/2017	12.8
MW-304-15	Onsite	Water Table	04/10/2017	8.09J
MW-304-CMT-20	Onsite	Water Table	11/03/2011	262
MW-304-CMT-20	Onsite	Water Table	03/30/2012	300
MW-304-CMT-20	Onsite	Water Table	06/07/2012	295
MW-304-CMT-20	Onsite	Water Table	08/14/2012	208
MW-304-CMT-20	Onsite	Water Table	12/10/2012	5.00J
MW-304-CMT-20	Onsite	Water Table	01/31/2013	3.45J

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-304-CMT-20	Onsite	Water Table	04/17/2013	6.53J
MW-304-CMT-20	Onsite	Water Table	07/11/2013	<6.20
MW-304-CMT-20	Onsite	Water Table	11/19/2013	46.4
MW-304-CMT-20	Onsite	Water Table	03/12/2014	182
MW-304-CMT-20	Onsite	Water Table	04/16/2014	87.6
MW-304-CMT-20	Onsite	Water Table	07/29/2014	12.6
MW-304-CMT-20	Onsite	Water Table	10/28/2014	144
MW-304-CMT-20	Onsite	Water Table	02/26/2015	100
MW-304-CMT-20	Onsite	Water Table	04/19/2015	104
MW-304-CMT-20	Onsite	Water Table	08/01/2015	117
MW-304-CMT-20	Onsite	Water Table	10/02/2015	76.8
MW-304-CMT-20	Onsite	Water Table	02/08/2016	67.1
MW-304-CMT-20	Onsite	Water Table	04/11/2016	45.8
MW-304-CMT-20	Onsite	Water Table	07/21/2016	34.0
MW-304-CMT-20	Onsite	Water Table	10/19/2016	44.4
MW-304-CMT-20	Onsite	Water Table	02/16/2017	22.0
MW-304-CMT-20	Onsite	Water Table	04/11/2017	12.5
MW-304-CMT-20	Onsite	Water Table	07/28/2017	10.5
MW-304-CMT-20	Onsite	Water Table	10/17/2017	8.34J
MW-304-CMT-30	Onsite	10-55	11/03/2011	215JL*
MW-304-CMT-30	Onsite	10-55	03/30/2012	155
MW-304-CMT-30	Onsite	10-55	06/07/2012	118
MW-304-CMT-30	Onsite	10-55	08/14/2012	104
MW-304-CMT-30	Onsite	10-55	12/14/2012	79.5
MW-304-CMT-30	Onsite	10-55	01/31/2013	81.9
MW-304-CMT-30	Onsite	10-55	04/17/2013	63.4
MW-304-CMT-30	Onsite	10-55	07/11/2013	63.1
MW-304-CMT-30	Onsite	10-55	11/19/2013	41.6
MW-304-CMT-30	Onsite	10-55	03/12/2014	33.0
MW-304-CMT-30	Onsite	10-55	04/16/2014	29.3
MW-304-CMT-30	Onsite	10-55	07/29/2014	24.4
MW-304-CMT-30	Onsite	10-55	10/28/2014	17.4
MW-304-CMT-30	Onsite	10-55	02/26/2015	8.52J
MW-304-CMT-30	Onsite	10-55	04/19/2015	5.84J
MW-304-CMT-30	Onsite	10-55	08/01/2015	5.29J
MW-304-CMT-30	Onsite	10-55	02/08/2016	4.69J
MW-304-CMT-30	Onsite	10-55	07/21/2016	<5.15
MW-304-CMT-30	Onsite	10-55	02/16/2017	<6.00
MW-304-CMT-40	Onsite	10-55	11/03/2011	172
MW-304-CMT-40	Onsite	10-55	03/30/2012	113
MW-304-CMT-40	Onsite	10-55	06/07/2012	81.2
MW-304-CMT-40	Onsite	10-55	08/14/2012	78.7
MW-304-CMT-40	Onsite	10-55	01/31/2013	67.1
MW-304-CMT-40	Onsite	10-55	04/17/2013	52.0JL*
MW-304-CMT-40	Onsite	10-55	07/11/2013	49.2
MW-304-CMT-40	Onsite	10-55	11/19/2013	25.4
MW-304-CMT-40	Onsite	10-55	03/12/2014	18.3
MW-304-CMT-40	Onsite	10-55	04/16/2014	15.1
MW-304-CMT-40	Onsite	10-55	07/29/2014	10.4J
MW-304-CMT-40	Onsite	10-55	10/28/2014	8.36J
MW-304-CMT-40	Onsite	10-55	02/26/2015	3.74J
MW-304-CMT-40	Onsite	10-55	04/19/2015	<5.15

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-304-CMT-40	Onsite	10-55	08/01/2015	<5.00
MW-304-CMT-40	Onsite	10-55	07/21/2016	<5.15
MW-304-CMT-40	Onsite	10-55	07/28/2017	<5.40
MW-304-CMT-40	Onsite	10-55	10/17/2017	<5.15
MW-304-CMT-50	Onsite	10-55	11/03/2011	24.2
MW-304-CMT-50	Onsite	10-55	03/30/2012	10.7
MW-304-CMT-50	Onsite	10-55	06/07/2012	5.11J
MW-304-CMT-50	Onsite	10-55	08/14/2012	12.3
MW-304-CMT-50	Onsite	10-55	12/14/2012	11.4
MW-304-CMT-50	Onsite	10-55	01/31/2013	10.8
MW-304-CMT-50	Onsite	10-55	04/17/2013	7.57J
MW-304-CMT-50	Onsite	10-55	07/11/2013	10.2
MW-304-CMT-50	Onsite	10-55	11/19/2013	<5.00
MW-304-CMT-50	Onsite	10-55	03/12/2014	<5.00
MW-304-CMT-50	Onsite	10-55	04/16/2014	<5.20
MW-304-CMT-50	Onsite	10-55	07/29/2014	<5.20
MW-304-CMT-50	Onsite	10-55	10/28/2014	<5.00
MW-304-CMT-50	Onsite	10-55	02/26/2015	<5.10
MW-304-CMT-50	Onsite	10-55	04/19/2015	<5.00
MW-304-CMT-50	Onsite	10-55	08/01/2015	<5.00
MW-304-CMT-50	Onsite	10-55	07/21/2016	<5.20
MW-304-CMT-60	Onsite	10-55	11/03/2011	12.8
MW-304-CMT-60	Onsite	10-55	03/30/2012	4.67J
MW-304-CMT-60	Onsite	10-55	06/07/2012	<6.52
MW-304-CMT-60	Onsite	10-55	08/14/2012	5.77J
MW-304-CMT-60	Onsite	10-55	12/14/2012	6.45J
MW-304-CMT-60	Onsite	10-55	01/31/2013	5.43J
MW-304-CMT-60	Onsite	10-55	04/17/2013	4.07J
MW-304-CMT-60	Onsite	10-55	07/11/2013	4.47J
MW-304-CMT-60	Onsite	10-55	11/19/2013	<5.10
MW-304-CMT-60	Onsite	10-55	03/12/2014	<5.00
MW-304-CMT-60	Onsite	10-55	04/16/2014	<5.15
MW-304-CMT-60	Onsite	10-55	07/29/2014	<5.45
MW-304-CMT-60	Onsite	10-55	10/28/2014	<5.00
MW-304-CMT-60	Onsite	10-55	02/26/2015	<5.15
MW-304-CMT-60	Onsite	10-55	08/01/2015	<5.00
MW-304-CMT-60	Onsite	10-55	07/21/2016	<5.10
MW-304-CMT-60	Onsite	10-55	07/28/2017	<5.45
MW-304-CMT-60	Onsite	10-55	10/17/2017	<5.15
MW-304-70	Onsite	55-90	10/25/2011	22.3
MW-304-70	Onsite	55-90	03/30/2012	7.98J
MW-304-70	Onsite	55-90	06/07/2012	3.71J
MW-304-70	Onsite	55-90	08/14/2012	3.89J
MW-304-70	Onsite	55-90	12/14/2012	4.79J
MW-304-70	Onsite	55-90	01/22/2013	4.47J
MW-304-70	Onsite	55-90	04/16/2013	4.13J
MW-304-70	Onsite	55-90	07/30/2013	<6.20
MW-304-70	Onsite	55-90	11/18/2013	<5.00
MW-304-70	Onsite	55-90	03/14/2014	<5.15
MW-304-70	Onsite	55-90	04/16/2014	<5.15
MW-304-70	Onsite	55-90	07/24/2014	<5.00
MW-304-70	Onsite	55-90	10/25/2014	<5.00

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-304-70	Onsite	55-90	02/26/2015	<5.20
MW-304-70	Onsite	55-90	07/28/2015	<5.00
MW-304-70	Onsite	55-90	07/27/2016	<5.00
MW-304-80	Onsite	55-90	11/12/2011	6.65J
MW-304-80	Onsite	55-90	03/30/2012	<6.20
MW-304-80	Onsite	55-90	06/07/2012	<6.66
MW-304-80	Onsite	55-90	08/14/2012	<6.20
MW-304-80	Onsite	55-90	12/14/2012	4.66J
MW-304-80	Onsite	55-90	01/14/2013	4.68J
MW-304-80	Onsite	55-90	04/16/2013	3.28J
MW-304-80	Onsite	55-90	08/28/2013	3.53J
MW-304-80	Onsite	55-90	10/15/2013	<6.20
MW-304-80	Onsite	55-90	03/14/2014	<5.00
MW-304-80	Onsite	55-90	04/16/2014	<5.20
MW-304-80	Onsite	55-90	07/24/2014	<5.00J*
MW-304-80	Onsite	55-90	10/25/2014	<5.25
MW-304-80	Onsite	55-90	02/26/2015	<5.00
MW-304-80	Onsite	55-90	07/28/2015	<5.15
MW-304-80	Onsite	55-90	07/22/2016	<5.15
MW-304-80	Onsite	55-90	07/25/2017	<5.20J*
MW-304-80	Onsite	55-90	10/16/2017	<5.10
MW-304-96	Onsite	55-90	04/24/2012	4.46J
MW-304-96	Onsite	55-90	08/14/2012	4.03J
MW-304-96	Onsite	55-90	12/14/2012	4.65J
MW-304-96	Onsite	55-90	01/14/2013	5.05J
MW-304-96	Onsite	55-90	04/16/2013	4.24J
MW-304-96	Onsite	55-90	07/30/2013	3.21J
MW-304-96	Onsite	55-90	10/15/2013	<6.20
MW-304-96	Onsite	55-90	03/14/2014	<5.00
MW-304-96	Onsite	55-90	04/16/2014	<5.00
MW-304-96	Onsite	55-90	07/24/2014	<5.15
MW-304-96	Onsite	55-90	10/25/2014	<5.35
MW-304-96	Onsite	55-90	02/26/2015	<5.00
MW-304-96	Onsite	55-90	07/28/2015	<5.00
MW-304-96	Onsite	55-90	07/27/2016	<5.10
MW-304-125	Onsite	90-160	10/25/2011	<6.20
MW-304-125	Onsite	90-160	03/30/2012	<6.20
MW-304-125	Onsite	90-160	06/07/2012	<6.66
MW-304-125	Onsite	90-160	08/16/2012	<6.20
MW-304-125	Onsite	90-160	01/14/2013	<6.74
MW-304-125	Onsite	90-160	04/16/2013	<6.20
MW-304-125	Onsite	90-160	07/30/2013	<6.32
MW-304-125	Onsite	90-160	10/16/2013	<6.32
MW-304-125	Onsite	90-160	03/14/2014	<5.00
MW-304-125	Onsite	90-160	07/24/2014	<5.25
MW-304-125	Onsite	90-160	07/28/2015	<5.15
MW-304-125	Onsite	90-160	07/22/2016	<5.10
MW-304-150	Onsite	90-160	02/22/2012	<7.30
MW-304-150	Onsite	90-160	06/14/2012	<6.52
MW-304-150	Onsite	90-160	08/16/2012	<6.20
MW-304-150	Onsite	90-160	01/22/2013	<6.52
MW-304-150	Onsite	90-160	04/16/2013	<6.20

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-304-150	Onsite	90-160	07/30/2013	<6.20
MW-304-150	Onsite	90-160	11/18/2013	<5.00
MW-304-150	Onsite	90-160	07/25/2014	<5.00
MW-304-150	Onsite	90-160	07/28/2015	<5.00
MW-304-150	Onsite	90-160	07/27/2016	<5.05
MW-305-CMT-8	Onsite	Water Table	07/17/2014	<5.25
MW-305-CMT-18	Onsite	Water Table	11/08/2011	23.5
MW-305-CMT-18	Onsite	Water Table	03/31/2012	28.2
MW-305-CMT-18	Onsite	Water Table	06/05/2012	23.7
MW-305-CMT-18	Onsite	Water Table	08/13/2012	21.4
MW-305-CMT-18	Onsite	Water Table	12/10/2012	10.0J
MW-305-CMT-18	Onsite	Water Table	01/17/2013	8.98J
MW-305-CMT-18	Onsite	Water Table	04/19/2013	5.80JL*
MW-305-CMT-18	Onsite	Water Table	07/11/2013	5.09J
MW-305-CMT-18	Onsite	Water Table	11/18/2013	3.80J
MW-305-CMT-18	Onsite	Water Table	03/13/2014	3.87J
MW-305-CMT-18	Onsite	Water Table	04/16/2014	<5.30
MW-305-CMT-18	Onsite	Water Table	07/17/2014	<5.80
MW-305-CMT-18	Onsite	Water Table	10/20/2014	<5.00
MW-305-CMT-18	Onsite	Water Table	02/26/2015	<5.15
MW-305-CMT-18	Onsite	Water Table	04/19/2015	<5.15
MW-305-CMT-18	Onsite	Water Table	07/30/2015	<5.00
MW-305-CMT-18	Onsite	Water Table	07/22/2016	<5.80
MW-305-CMT-28	Onsite	10-55	11/08/2011	53.8
MW-305-CMT-28	Onsite	10-55	03/31/2012	23.8
MW-305-CMT-28	Onsite	10-55	06/05/2012	23.5
MW-305-CMT-28	Onsite	10-55	08/13/2012	14.1
MW-305-CMT-28	Onsite	10-55	01/17/2013	14.0
MW-305-CMT-28	Onsite	10-55	04/19/2013	11.2
MW-305-CMT-28	Onsite	10-55	07/11/2013	13.2
MW-305-CMT-28	Onsite	10-55	11/18/2013	6.71J
MW-305-CMT-28	Onsite	10-55	03/13/2014	4.11J
MW-305-CMT-28	Onsite	10-55	04/16/2014	3.68J
MW-305-CMT-28	Onsite	10-55	07/17/2014	4.60J
MW-305-CMT-28	Onsite	10-55	10/20/2014	<5.00
MW-305-CMT-28	Onsite	10-55	02/26/2015	<5.20
MW-305-CMT-28	Onsite	10-55	07/30/2015	<5.00
MW-305-CMT-28	Onsite	10-55	07/22/2016	<5.70
MW-305-CMT-28	Onsite	10-55	07/27/2017	<5.25
MW-305-CMT-28	Onsite	10-55	10/17/2017	<5.10
MW-305-CMT-38	Onsite	10-55	11/08/2011	10.9
MW-305-CMT-38	Onsite	10-55	03/31/2012	<7.12
MW-305-CMT-38	Onsite	10-55	06/05/2012	<6.52
MW-305-CMT-38	Onsite	10-55	08/13/2012	<6.20
MW-305-CMT-38	Onsite	10-55	12/10/2012	<6.52
MW-305-CMT-38	Onsite	10-55	01/17/2013	<6.40
MW-305-CMT-38	Onsite	10-55	04/19/2013	<6.40
MW-305-CMT-38	Onsite	10-55	07/11/2013	<6.88
MW-305-CMT-38	Onsite	10-55	11/18/2013	<5.10
MW-305-CMT-38	Onsite	10-55	03/13/2014	<5.00
MW-305-CMT-38	Onsite	10-55	04/16/2014	<5.00
MW-305-CMT-38	Onsite	10-55	07/17/2014	<5.20

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-305-CMT-38	Onsite	10-55	10/20/2014	<5.00
MW-305-CMT-38	Onsite	10-55	07/30/2015	<5.15
MW-305-CMT-38	Onsite	10-55	07/27/2016	<5.70
MW-305-CMT-48	Onsite	10-55	11/08/2011	7.67J
MW-305-CMT-48	Onsite	10-55	03/31/2012	<6.20
MW-305-CMT-48	Onsite	10-55	06/05/2012	<6.46
MW-305-CMT-48	Onsite	10-55	08/13/2012	<6.20
MW-305-CMT-48	Onsite	10-55	01/17/2013	<6.52
MW-305-CMT-48	Onsite	10-55	04/19/2013	<6.46
MW-305-CMT-48	Onsite	10-55	07/11/2013	<6.20
MW-305-CMT-48	Onsite	10-55	11/18/2013	<5.00
MW-305-CMT-48	Onsite	10-55	03/13/2014	<5.00
MW-305-CMT-48	Onsite	10-55	07/17/2014	<5.00
MW-305-CMT-48	Onsite	10-55	07/30/2015	<5.10
MW-305-CMT-48	Onsite	10-55	07/27/2016	<5.60
MW-305-CMT-48	Onsite	10-55	07/27/2017	<5.30
MW-305-CMT-48	Onsite	10-55	10/17/2017	<5.05
MW-305-CMT-58	Onsite	10-55	11/08/2011	4.96J
MW-305-CMT-58	Onsite	10-55	03/31/2012	<6.20
MW-305-CMT-58	Onsite	10-55	06/05/2012	<6.74
MW-305-CMT-58	Onsite	10-55	08/13/2012	<6.20
MW-305-CMT-58	Onsite	10-55	01/17/2013	<6.40
MW-305-CMT-58	Onsite	10-55	04/19/2013	<6.52
MW-305-CMT-58	Onsite	10-55	07/11/2013	<6.74
MW-305-CMT-58	Onsite	10-55	11/18/2013	<5.00
MW-305-CMT-58	Onsite	10-55	03/13/2014	<5.00
MW-305-CMT-58	Onsite	10-55	07/17/2014	<5.30
MW-305-CMT-58	Onsite	10-55	07/30/2015	<5.10
MW-305-CMT-58	Onsite	10-55	07/27/2016	<5.15
MW-305-70	Onsite	55-90	10/25/2011	<6.20
MW-305-70	Onsite	55-90	04/02/2012	<6.52
MW-305-70	Onsite	55-90	06/05/2012	<6.74
MW-305-70	Onsite	55-90	08/13/2012	<6.20
MW-305-70	Onsite	55-90	11/14/2012	<6.74
MW-305-70	Onsite	55-90	01/15/2013	<6.20
MW-305-70	Onsite	55-90	04/16/2013	<6.20
MW-305-70	Onsite	55-90	07/18/2013	<6.20
MW-305-70	Onsite	55-90	11/18/2013	<5.00
MW-305-70	Onsite	55-90	03/14/2014	<5.00
MW-305-70	Onsite	55-90	07/25/2014	<5.15
MW-305-70	Onsite	55-90	07/27/2015	<5.00
MW-305-70	Onsite	55-90	07/27/2016	<5.15
MW-305-80	Onsite	55-90	11/12/2011	<6.20
MW-305-80	Onsite	55-90	04/02/2012	<6.52
MW-305-80	Onsite	55-90	06/05/2012	<6.52
MW-305-80	Onsite	55-90	08/13/2012	<6.20
MW-305-80	Onsite	55-90	01/15/2013	<6.20
MW-305-80	Onsite	55-90	04/16/2013	<6.20
MW-305-80	Onsite	55-90	07/18/2013	<6.20
MW-305-80	Onsite	55-90	11/18/2013	<5.10
MW-305-80	Onsite	55-90	03/14/2014	<5.00
MW-305-80	Onsite	55-90	07/25/2014	<5.25

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-305-80	Onsite	55-90	07/27/2015	<5.20
MW-305-80	Onsite	55-90	07/27/2016	<5.10
MW-305-100	Onsite	55-90	10/17/2011	4.45J
MW-305-100	Onsite	55-90	04/02/2012	<6.74
MW-305-100	Onsite	55-90	06/05/2012	<6.88
MW-305-100	Onsite	55-90	08/13/2012	<6.20
MW-305-100	Onsite	55-90	02/01/2013	<6.20
MW-305-100	Onsite	55-90	03/22/2013	<6.46
MW-305-100	Onsite	55-90	07/18/2013	<6.46
MW-305-100	Onsite	55-90	11/18/2013	<5.00
MW-305-100	Onsite	55-90	03/21/2014	<5.00
MW-305-100	Onsite	55-90	07/25/2014	<5.20
MW-305-100	Onsite	55-90	07/27/2015	<5.00
MW-305-100	Onsite	55-90	07/27/2016	<5.05
MW-306-CMT-10	Onsite	Water Table	08/13/2012	<6.20
MW-306-CMT-10	Onsite	Water Table	12/10/2012	<6.40
MW-306-CMT-10	Onsite	Water Table	02/11/2013	<6.66
MW-306-CMT-10	Onsite	Water Table	04/18/2013	<6.40
MW-306-CMT-10	Onsite	Water Table	07/11/2013	<6.82
MW-306-CMT-10	Onsite	Water Table	07/29/2014	<5.00
MW-306-CMT-10	Onsite	Water Table	10/20/2014	<5.00
MW-306-CMT-10	Onsite	Water Table	07/31/2015	<5.00
MW-306-CMT-10	Onsite	Water Table	07/22/2016	<5.40
MW-306-15	Onsite	Water Table	06/07/2012	<6.20
MW-306-15	Onsite	Water Table	08/14/2012	<6.20
MW-306-15	Onsite	Water Table	02/02/2013	<6.46
MW-306-15	Onsite	Water Table	04/18/2013	<6.20
MW-306-15	Onsite	Water Table	07/18/2013	<6.20
MW-306-15	Onsite	Water Table	10/17/2013	<6.20
MW-306-15	Onsite	Water Table	07/28/2014	<5.00J*
MW-306-15	Onsite	Water Table	07/27/2015	<5.00
MW-306-15	Onsite	Water Table	07/20/2016	<4.71
MW-306-CMT-20	Onsite	Water Table	11/09/2011	<6.20
MW-306-CMT-20	Onsite	Water Table	03/31/2012	<6.20
MW-306-CMT-20	Onsite	Water Table	06/05/2012	<6.52
MW-306-CMT-20	Onsite	Water Table	08/13/2012	<6.20
MW-306-CMT-20	Onsite	Water Table	12/10/2012	<7.04
MW-306-CMT-20	Onsite	Water Table	02/11/2013	<6.66
MW-306-CMT-20	Onsite	Water Table	04/18/2013	<6.40
MW-306-CMT-20	Onsite	Water Table	08/05/2013	<6.20
MW-306-CMT-20	Onsite	Water Table	10/17/2013	<6.20
MW-306-CMT-20	Onsite	Water Table	07/18/2014	<5.25
MW-306-CMT-20	Onsite	Water Table	07/31/2015	<5.10
MW-306-CMT-20	Onsite	Water Table	07/22/2016	<5.80
MW-306-CMT-30	Onsite	10-55	11/09/2011	<6.20
MW-306-CMT-30	Onsite	10-55	03/31/2012	<6.96
MW-306-CMT-30	Onsite	10-55	06/05/2012	<6.46
MW-306-CMT-30	Onsite	10-55	08/13/2012	<6.20
MW-306-CMT-30	Onsite	10-55	02/11/2013	<6.66
MW-306-CMT-30	Onsite	10-55	04/18/2013	<6.20
MW-306-CMT-30	Onsite	10-55	08/05/2013	<6.20
MW-306-CMT-30	Onsite	10-55	10/17/2013	<6.20

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-306-CMT-30	Onsite	10-55	07/18/2014	<5.55
MW-306-CMT-30	Onsite	10-55	07/31/2015	<5.00
MW-306-CMT-30	Onsite	10-55	07/22/2016	<5.80
MW-306-CMT-40	Onsite	10-55	11/09/2011	<6.20
MW-306-CMT-40	Onsite	10-55	06/05/2012	<6.52
MW-306-CMT-40	Onsite	10-55	08/13/2012	<6.20J*
MW-306-CMT-40	Onsite	10-55	12/10/2012	<6.66
MW-306-CMT-40	Onsite	10-55	02/11/2013	<6.20
MW-306-CMT-40	Onsite	10-55	04/18/2013	<6.20
MW-306-CMT-40	Onsite	10-55	08/05/2013	<6.32
MW-306-CMT-40	Onsite	10-55	10/17/2013	<6.20
MW-306-CMT-40	Onsite	10-55	07/18/2014	<5.20
MW-306-CMT-40	Onsite	10-55	07/31/2015	<5.15
MW-306-CMT-40	Onsite	10-55	07/22/2016	<5.70
MW-306-CMT-50	Onsite	10-55	11/09/2011	<6.20
MW-306-CMT-50	Onsite	10-55	06/05/2012	<6.46
MW-306-CMT-50	Onsite	10-55	08/13/2012	<6.20
MW-306-CMT-50	Onsite	10-55	02/11/2013	<6.66
MW-306-CMT-50	Onsite	10-55	04/18/2013	<6.40
MW-306-CMT-50	Onsite	10-55	08/05/2013	<6.20
MW-306-CMT-50	Onsite	10-55	10/17/2013	<6.20
MW-306-CMT-50	Onsite	10-55	07/18/2014	<5.20
MW-306-CMT-50	Onsite	10-55	07/31/2015	<5.15
MW-306-CMT-50	Onsite	10-55	07/22/2016	<5.60
MW-306-CMT-60	Onsite	10-55	11/09/2011	<6.20
MW-306-CMT-60	Onsite	10-55	06/05/2012	<6.20
MW-306-CMT-60	Onsite	10-55	08/13/2012	<6.20
MW-306-CMT-60	Onsite	10-55	02/11/2013	<6.74
MW-306-CMT-60	Onsite	10-55	04/18/2013	<6.46
MW-306-CMT-60	Onsite	10-55	08/05/2013	<6.20
MW-306-CMT-60	Onsite	10-55	10/17/2013	<6.20
MW-306-CMT-60	Onsite	10-55	07/18/2014	<5.20
MW-306-CMT-60	Onsite	10-55	07/31/2015	<5.20
MW-306-CMT-60	Onsite	10-55	07/22/2016	<5.60
MW-306-70	Onsite	55-90	11/12/2011	<6.20
MW-306-70	Onsite	55-90	04/02/2012	<6.40
MW-306-70	Onsite	55-90	06/05/2012	<6.52
MW-306-70	Onsite	55-90	08/13/2012	<6.20
MW-306-70	Onsite	55-90	02/02/2013	<6.60
MW-306-70	Onsite	55-90	04/18/2013	<6.20
MW-306-70	Onsite	55-90	07/18/2013	<6.20
MW-306-70	Onsite	55-90	10/17/2013	<6.20
MW-306-70	Onsite	55-90	07/28/2014	<5.00J*
MW-306-70	Onsite	55-90	07/27/2015	<5.00
MW-306-70	Onsite	55-90	07/26/2016	<5.10
MW-306-80	Onsite	55-90	11/12/2011	<6.20
MW-306-80	Onsite	55-90	04/02/2012	<6.60
MW-306-80	Onsite	55-90	06/05/2012	<6.20
MW-306-80	Onsite	55-90	08/14/2012	<6.20
MW-306-80	Onsite	55-90	02/02/2013	<6.88
MW-306-80	Onsite	55-90	04/18/2013	<6.20
MW-306-80	Onsite	55-90	07/18/2013	<6.20

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-306-80	Onsite	55-90	10/17/2013	<6.20
MW-306-80	Onsite	55-90	07/28/2014	<5.00J*
MW-306-80	Onsite	55-90	07/27/2015	<5.00
MW-306-80	Onsite	55-90	07/26/2016	<5.15
MW-306-100	Onsite	55-90	10/17/2011	<6.52
MW-306-100	Onsite	55-90	04/02/2012	<6.40
MW-306-100	Onsite	55-90	06/05/2012	<6.74
MW-306-100	Onsite	55-90	08/13/2012	<6.20
MW-306-100	Onsite	55-90	02/02/2013	<6.74
MW-306-100	Onsite	55-90	04/18/2013	<6.20
MW-306-100	Onsite	55-90	07/18/2013	<6.20
MW-306-100	Onsite	55-90	10/17/2013	<6.20
MW-306-100	Onsite	55-90	07/28/2014	<5.00J*
MW-306-100	Onsite	55-90	07/27/2015	<5.00
MW-306-100	Onsite	55-90	07/26/2016	<5.15
MW-306-150	Onsite	90-160	10/17/2011	<6.20
MW-306-150	Onsite	90-160	04/02/2012	<6.60
MW-306-150	Onsite	90-160	06/05/2012	<6.82
MW-306-150	Onsite	90-160	08/16/2012	<6.20
MW-306-150	Onsite	90-160	03/08/2013	<6.52
MW-306-150	Onsite	90-160	04/18/2013	<6.20
MW-306-150	Onsite	90-160	07/18/2013	<6.20
MW-306-150	Onsite	90-160	10/17/2013	<6.20
MW-306-150	Onsite	90-160	07/28/2014	<5.00J*
MW-306-150	Onsite	90-160	08/13/2015	<5.00
MW-306-150	Onsite	90-160	07/26/2016	<5.05
MW-307-150	Onsite	90-160	08/06/2012	<6.40
MW-307-150	Onsite	90-160	11/12/2012	<6.20
MW-307-150	Onsite	90-160	07/20/2013	<6.20
MW-307-150	Onsite	90-160	11/01/2013	<6.20
MW-307-150	Onsite	90-160	03/25/2014	<5.70
MW-307-150	Onsite	90-160	04/23/2014	<5.15
MW-307-150	Onsite	90-160	09/04/2014	<5.00
MW-307-150	Onsite	90-160	10/23/2014	<5.25
MW-307-150	Onsite	90-160	08/05/2015	<5.15
MW-309-15	Onsite	Water Table	04/27/2012	88.5
MW-309-15	Onsite	Water Table	07/25/2012	66.6
MW-309-15	Onsite	Water Table	11/11/2012	77.2
MW-309-15	Onsite	Water Table	01/31/2013	74.3
MW-309-15	Onsite	Water Table	05/16/2013	68.0
MW-309-15	Onsite	Water Table	07/17/2013	65.9
MW-309-15	Onsite	Water Table	10/22/2013	21.6
MW-309-15	Onsite	Water Table	03/03/2014	51.9
MW-309-15	Onsite	Water Table	04/22/2014	45.1
MW-309-15	Onsite	Water Table	08/02/2014	15.7
MW-309-15	Onsite	Water Table	10/27/2014	34.1
MW-309-15	Onsite	Water Table	02/26/2015	41.1
MW-309-15	Onsite	Water Table	04/22/2015	44.5
MW-309-15	Onsite	Water Table	07/29/2015	33.7
MW-309-15	Onsite	Water Table	10/16/2015	20.4
MW-309-15	Onsite	Water Table	02/11/2016	34.2
MW-309-15	Onsite	Water Table	04/06/2016	32.2

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-309-15	Onsite	Water Table	07/19/2016	26.5
MW-309-15	Onsite	Water Table	10/14/2016	25.0
MW-309-15	Onsite	Water Table	02/17/2017	31.0
MW-309-15	Onsite	Water Table	04/10/2017	32.2
MW-309-15	Onsite	Water Table	08/08/2017	31.2
MW-309-66	Onsite	10-55	04/24/2012	24.2
MW-309-66	Onsite	10-55	07/31/2012	21.8
MW-309-66	Onsite	10-55	11/11/2012	16.6
MW-309-66	Onsite	10-55	01/31/2013	14.3
MW-309-66	Onsite	10-55	05/16/2013	12.4
MW-309-66	Onsite	10-55	07/17/2013	11.2
MW-309-66	Onsite	10-55	10/22/2013	10.3
MW-309-66	Onsite	10-55	03/03/2014	8.82J
MW-309-66	Onsite	10-55	04/22/2014	7.84J
MW-309-66	Onsite	10-55	08/02/2014	7.83J
MW-309-66	Onsite	10-55	10/27/2014	4.72J
MW-309-66	Onsite	10-55	02/26/2015	<5.20
MW-309-66	Onsite	10-55	04/22/2015	<5.00
MW-309-66	Onsite	10-55	07/28/2015	<5.25
MW-309-66	Onsite	10-55	10/16/2015	<5.35
MW-309-66	Onsite	10-55	02/11/2016	<5.05
MW-309-66	Onsite	10-55	07/19/2016	<5.20
MW-309-66	Onsite	10-55	02/17/2017	6.85J
MW-309-150	Onsite	90-160	04/24/2012	<6.20
MW-309-150	Onsite	90-160	07/31/2012	<6.60
MW-309-150	Onsite	90-160	11/11/2012	<6.40
MW-309-150	Onsite	90-160	01/31/2013	<6.46
MW-309-150	Onsite	90-160	04/29/2013	<6.32
MW-309-150	Onsite	90-160	07/17/2013	<6.40
MW-309-150	Onsite	90-160	10/22/2013	<6.36
MW-309-150	Onsite	90-160	08/02/2014	<5.00
MW-309-150	Onsite	90-160	07/29/2015	<5.00
MW-310-15	Onsite	Water Table	04/27/2012	264
MW-310-15	Onsite	Water Table	07/25/2012	252
MW-310-15	Onsite	Water Table	11/15/2012	235
MW-310-15	Onsite	Water Table	02/01/2013	242
MW-310-15	Onsite	Water Table	05/16/2013	227
MW-310-15	Onsite	Water Table	07/17/2013	205
MW-310-15	Onsite	Water Table	10/16/2013	201
MW-310-15	Onsite	Water Table	03/03/2014	193
MW-310-15	Onsite	Water Table	04/22/2014	163
MW-310-15	Onsite	Water Table	07/29/2014	202
MW-310-15	Onsite	Water Table	10/21/2014	185
MW-310-15	Onsite	Water Table	02/20/2015	198
MW-310-15	Onsite	Water Table	04/24/2015	192
MW-310-15	Onsite	Water Table	07/31/2015	153
MW-310-15	Onsite	Water Table	10/21/2015	203J*
MW-310-15	Onsite	Water Table	02/09/2016	196
MW-310-15	Onsite	Water Table	07/20/2016	196
MW-310-15	Onsite	Water Table	02/25/2017	200
MW-310-15	Onsite	Water Table	07/10/2017	158
MW-310-65	Onsite	10-55	04/27/2012	<6.20

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-310-65	Onsite	10-55	08/01/2012	<6.46
MW-310-65	Onsite	10-55	11/15/2012	<6.20
MW-310-65	Onsite	10-55	02/01/2013	<6.40
MW-310-65	Onsite	10-55	04/29/2013	<6.20
MW-310-65	Onsite	10-55	07/17/2013	<6.20
MW-310-65	Onsite	10-55	10/16/2013	<6.40
MW-310-65	Onsite	10-55	03/03/2014	<5.00
MW-310-65	Onsite	10-55	04/22/2014	<5.00
MW-310-65	Onsite	10-55	07/29/2014	<5.00
MW-310-65	Onsite	10-55	10/21/2014	<5.00
MW-310-65	Onsite	10-55	07/31/2015	<5.10
MW-310-65	Onsite	10-55	07/20/2016	<5.10
MW-310-110	Onsite	90-160	06/06/2012	<6.20
MW-310-110	Onsite	90-160	08/01/2012	<6.20
MW-310-110	Onsite	90-160	02/01/2013	<6.66
MW-310-110	Onsite	90-160	05/16/2013	<6.20
MW-310-110	Onsite	90-160	07/17/2013	<6.60
MW-310-110	Onsite	90-160	10/28/2013	<6.20
MW-310-110	Onsite	90-160	07/29/2014	<5.30
MW-310-110	Onsite	90-160	07/31/2015	<5.00
MW-310-110	Onsite	90-160	08/10/2016	<5.25
MW-321-15	Onsite	Water Table	06/06/2012	199
MW-321-15	Onsite	Water Table	07/27/2012	158J*
MW-321-15	Onsite	Water Table	10/15/2012	140
MW-321-15	Onsite	Water Table	01/12/2013	170
MW-321-15	Onsite	Water Table	04/22/2013	160
MW-321-15	Onsite	Water Table	08/06/2013	125
MW-321-15	Onsite	Water Table	10/25/2013	126
MW-321-15	Onsite	Water Table	02/28/2014	111
MW-321-15	Onsite	Water Table	04/22/2014	105
MW-321-15	Onsite	Water Table	06/04/2014	91.4
MW-321-15	Onsite	Water Table	08/29/2014	61.7
MW-321-15	Onsite	Water Table	10/22/2014	92.9
MW-321-15	Onsite	Water Table	02/20/2015	93.9
MW-321-15	Onsite	Water Table	04/23/2015	88.0
MW-321-15	Onsite	Water Table	08/03/2015	62.8
MW-321-15	Onsite	Water Table	10/21/2015	52.1J*
MW-321-15	Onsite	Water Table	02/17/2016	58.3
MW-321-15	Onsite	Water Table	08/11/2016	46.4
MW-321-15	Onsite	Water Table	02/28/2017	36.2
MW-321-65	Onsite	10-55	06/06/2012	3.50J
MW-321-65	Onsite	10-55	07/27/2012	3.54J
MW-321-65	Onsite	10-55	12/13/2012	<6.32
MW-321-65	Onsite	10-55	01/12/2013	<6.60
MW-321-65	Onsite	10-55	04/25/2013	<6.20
MW-321-65	Onsite	10-55	08/06/2013	<6.20
MW-321-65	Onsite	10-55	10/25/2013	<6.46
MW-321-65	Onsite	10-55	03/26/2014	<5.30
MW-321-65	Onsite	10-55	04/22/2014	<5.00
MW-321-65	Onsite	10-55	09/03/2014	<5.15
MW-321-65	Onsite	10-55	10/22/2014	<5.00
MW-321-65	Onsite	10-55	08/03/2015	<5.00

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-321-65	Onsite	10-55	08/11/2016	6.64J*
MW-321-151	Onsite	90-160	06/06/2012	<6.20
MW-321-151	Onsite	90-160	07/27/2012	<6.20
MW-321-151	Onsite	90-160	12/13/2012	<7.12
MW-321-151	Onsite	90-160	01/12/2013	<6.20
MW-321-151	Onsite	90-160	04/26/2013	<6.40
MW-321-151	Onsite	90-160	07/30/2013	<6.20
MW-321-151	Onsite	90-160	10/25/2013	<7.04
MW-321-151	Onsite	90-160	09/03/2014	<5.15
MW-321-151	Onsite	90-160	08/03/2015	<5.00
MW-330-20	Onsite	Water Table	06/07/2012	355
MW-330-20	Onsite	Water Table	07/25/2012	541
MW-330-20	Onsite	Water Table	11/15/2012	269
MW-330-20	Onsite	Water Table	02/01/2013	191
MW-330-20	Onsite	Water Table	04/19/2013	108J*
MW-330-20	Onsite	Water Table	07/17/2013	298
MW-330-20	Onsite	Water Table	10/23/2013	300
MW-330-20	Onsite	Water Table	03/03/2014	155
MW-330-20	Onsite	Water Table	04/29/2014	130
MW-330-20	Onsite	Water Table	08/15/2014	277
MW-330-20	Onsite	Water Table	10/18/2014	350
MW-330-20	Onsite	Water Table	02/17/2015	238
MW-330-20	Onsite	Water Table	04/24/2015	185
MW-330-20	Onsite	Water Table	07/28/2015	193
MW-330-20	Onsite	Water Table	10/15/2015	399
MW-330-20	Onsite	Water Table	02/09/2016	344
MW-330-20	Onsite	Water Table	04/11/2016	297
MW-330-20	Onsite	Water Table	07/20/2016	358
MW-330-20	Onsite	Water Table	10/18/2016	829
MW-330-20	Onsite	Water Table	02/25/2017	780
MW-330-20	Onsite	Water Table	04/10/2017	677
MW-330-20	Onsite	Water Table	07/10/2017	473
MW-330-65	Onsite	10-55	06/07/2012	<6.20
MW-330-65	Onsite	10-55	07/27/2012	<6.20
MW-330-65	Onsite	10-55	11/15/2012	<6.20
MW-330-65	Onsite	10-55	02/01/2013	<6.88
MW-330-65	Onsite	10-55	04/19/2013	<6.46
MW-330-65	Onsite	10-55	07/17/2013	<6.32
MW-330-65	Onsite	10-55	10/23/2013	<6.20
MW-330-65	Onsite	10-55	03/03/2014	<5.00
MW-330-65	Onsite	10-55	08/15/2014	<5.00
MW-330-65	Onsite	10-55	07/28/2015	<5.00
MW-330-65	Onsite	10-55	07/20/2016	<4.90
MW-330-150	Onsite	90-160	06/06/2012	<6.52
MW-330-150	Onsite	90-160	07/27/2012	<6.82
MW-330-150	Onsite	90-160	02/01/2013	<6.66J*
MW-330-150	Onsite	90-160	04/19/2013	<6.20
MW-330-150	Onsite	90-160	07/17/2013	<6.32
MW-330-150	Onsite	90-160	10/23/2013	<6.60
MW-330-150	Onsite	90-160	08/15/2014	<5.00
MW-330-150	Onsite	90-160	07/29/2015	<5.20
MW-331-150	Onsite	90-160	06/12/2012	<6.20

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-331-150	Onsite	90-160	08/06/2012	<6.66
MW-331-150	Onsite	90-160	11/11/2012	<6.46
MW-331-150	Onsite	90-160	03/08/2013	<6.74
MW-331-150	Onsite	90-160	04/23/2013	<6.20
MW-331-150	Onsite	90-160	08/06/2013	<6.20
MW-331-150	Onsite	90-160	10/30/2013	<6.20
MW-331-150	Onsite	90-160	07/28/2014	<5.20J*
MW-331-150	Onsite	90-160	07/23/2015	<5.00
MW-334-15	Onsite	Water Table	08/28/2012	354
MW-334-15	Onsite	Water Table	12/13/2012	265
MW-334-15	Onsite	Water Table	01/31/2013	189
MW-334-15	Onsite	Water Table	04/01/2013	205
MW-334-15	Onsite	Water Table	07/23/2013	72.4
MW-334-15	Onsite	Water Table	11/07/2013	30.9
MW-334-15	Onsite	Water Table	02/27/2014	38.7
MW-334-15	Onsite	Water Table	04/21/2014	18.2
MW-334-15	Onsite	Water Table	09/03/2014	91.4
MW-334-15	Onsite	Water Table	11/10/2014	37.8
MW-334-15	Onsite	Water Table	02/21/2015	77.6
MW-334-15	Onsite	Water Table	04/29/2015	67.1
MW-334-15	Onsite	Water Table	08/11/2015	64.4
MW-334-15	Onsite	Water Table	10/28/2015	72.8
MW-334-15	Onsite	Water Table	02/25/2016	61.5
MW-334-15	Onsite	Water Table	04/11/2016	21.3
MW-334-15	Onsite	Water Table	08/18/2016	50.8
MW-334-15	Onsite	Water Table	10/25/2016	66.4
MW-334-15	Onsite	Water Table	02/27/2017	71.9JL*
MW-334-15	Onsite	Water Table	04/12/2017	45.6
MW-334-15	Onsite	Water Table	07/25/2017	126
MW-334-15	Onsite	Water Table	08/31/2017	181
MW-334-15	Onsite	Water Table	09/20/2017	149
MW-334-15	Onsite	Water Table	10/25/2017	121
MW-334-65	Onsite	10-55	08/28/2012	6.21J
MW-334-65	Onsite	10-55	12/13/2012	5.63J
MW-334-65	Onsite	10-55	01/31/2013	4.42J
MW-334-65	Onsite	10-55	05/21/2013	3.16J
MW-334-65	Onsite	10-55	07/23/2013	<6.20
MW-334-65	Onsite	10-55	11/06/2013	<6.40
MW-334-65	Onsite	10-55	03/04/2014	<5.20
MW-334-65	Onsite	10-55	04/23/2014	3.30J
MW-334-65	Onsite	10-55	08/13/2014	<5.25
MW-334-65	Onsite	10-55	10/24/2014	<5.00
MW-334-65	Onsite	10-55	02/20/2015	<5.00J*
MW-334-65	Onsite	10-55	04/23/2015	<5.10
MW-334-65	Onsite	10-55	08/04/2015	4.47J
MW-334-65	Onsite	10-55	10/22/2015	<5.00
MW-334-65	Onsite	10-55	02/18/2016	<5.00
MW-334-65	Onsite	10-55	04/08/2016	<5.10
MW-334-65	Onsite	10-55	08/12/2016	5.06JH*
MW-334-65	Onsite	10-55	10/20/2016	<5.00
MW-334-65	Onsite	10-55	02/24/2017	<5.10
MW-334-65	Onsite	10-55	04/13/2017	<5.10

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Historical Sulfolane Summary**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-334-65	Onsite	10-55	08/03/2017	5.32J
MW-334-65	Onsite	10-55	10/19/2017	7.14J
MW-334-85	Onsite	55-90	11/01/2013	<6.40
MW-334-85	Onsite	55-90	03/04/2014	<5.00
MW-334-85	Onsite	55-90	04/23/2014	<5.55
MW-334-85	Onsite	55-90	08/13/2014	<5.20
MW-334-85	Onsite	55-90	10/24/2014	<5.00
MW-334-85	Onsite	55-90	08/04/2015	<5.00
MW-334-85	Onsite	55-90	08/12/2016	7.22JH*
MW-336-15	Onsite	Water Table	10/09/2013	17600
MW-336-15	Onsite	Water Table	09/03/2014	13400JL*
MW-336-15	Onsite	Water Table	10/30/2014	10900
MW-336-15	Onsite	Water Table	08/07/2015	18100JL*
MW-336-15	Onsite	Water Table	10/28/2015	7830
MW-336-15	Onsite	Water Table	08/17/2016	8070J*
MW-336-15	Onsite	Water Table	10/26/2016	4200
MW-336-20	Onsite	Water Table	10/09/2013	34800
MW-336-20	Onsite	Water Table	08/26/2014	32500JL*
MW-336-20	Onsite	Water Table	10/30/2014	27700
MW-336-20	Onsite	Water Table	08/11/2015	22500JL*
MW-336-20	Onsite	Water Table	10/22/2015	14300JL*
MW-336-20	Onsite	Water Table	08/15/2016	11500JL*
MW-336-20	Onsite	Water Table	10/21/2016	4940
MW-336-20	Onsite	Water Table	08/15/2017	10400JL*
MW-336-35	Onsite	10-55	10/09/2013	377
MW-336-35	Onsite	10-55	08/26/2014	440
MW-336-35	Onsite	10-55	10/30/2014	282
MW-336-35	Onsite	10-55	08/11/2015	268
MW-336-35	Onsite	10-55	10/02/2015	403
MW-336-35	Onsite	10-55	10/22/2015	292
MW-336-35	Onsite	10-55	08/15/2016	451J*
MW-336-35	Onsite	10-55	10/21/2016	247
MW-336-55	Onsite	10-55	10/09/2013	4.32J
MW-336-55	Onsite	10-55	08/26/2014	<5.00
MW-336-55	Onsite	10-55	10/30/2014	4.25J
MW-336-55	Onsite	10-55	08/11/2015	<5.00
MW-336-55	Onsite	10-55	08/15/2016	<5.15J*
MW-337-20	Onsite	Water Table	06/05/2014	5810
MW-337-20	Onsite	Water Table	08/26/2014	8800JL*
MW-337-20	Onsite	Water Table	10/30/2014	5410
MW-337-20	Onsite	Water Table	08/11/2015	4860JL*
MW-337-20	Onsite	Water Table	10/22/2015	2960JL*
MW-337-20	Onsite	Water Table	08/17/2016	1930JL*
MW-337-20	Onsite	Water Table	10/21/2016	1700
MW-344-15	Onsite	Water Table	07/30/2013	104
MW-344-15	Onsite	Water Table	10/22/2013	51.6
MW-344-15	Onsite	Water Table	02/27/2014	55.3
MW-344-15	Onsite	Water Table	04/22/2014	50.6
MW-344-15	Onsite	Water Table	07/31/2014	28.3
MW-344-15	Onsite	Water Table	10/22/2014	38.7
MW-344-15	Onsite	Water Table	02/19/2015	85.3
MW-344-15	Onsite	Water Table	04/24/2015	51.4

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-344-15	Onsite	Water Table	07/30/2015	42.6
MW-344-15	Onsite	Water Table	10/20/2015	26.9
MW-344-15	Onsite	Water Table	02/16/2016	63.4
MW-344-15	Onsite	Water Table	04/07/2016	56.5
MW-344-15	Onsite	Water Table	08/11/2016	27.6
MW-344-15	Onsite	Water Table	10/19/2016	31.1
MW-344-15	Onsite	Water Table	02/27/2017	45.9
MW-344-15	Onsite	Water Table	04/11/2017	49.9
MW-344-15	Onsite	Water Table	07/24/2017	17.8
MW-344-15	Onsite	Water Table	08/29/2017	11.4
MW-344-15	Onsite	Water Table	09/19/2017	18.9
MW-344-15	Onsite	Water Table	10/24/2017	20.6
MW-344-55	Onsite	10-55	01/27/2014	7.57J
MW-344-55	Onsite	10-55	04/22/2014	7.01J
MW-344-55	Onsite	10-55	07/31/2014	5.58J
MW-344-55	Onsite	10-55	10/22/2014	<5.30
MW-344-55	Onsite	10-55	02/19/2015	5.37J
MW-344-55	Onsite	10-55	04/24/2015	3.91J
MW-344-55	Onsite	10-55	07/30/2015	3.67J
MW-344-55	Onsite	10-55	10/20/2015	3.64J
MW-344-55	Onsite	10-55	02/16/2016	4.57J
MW-344-55	Onsite	10-55	04/07/2016	<5.30
MW-344-55	Onsite	10-55	08/11/2016	3.13J
MW-344-55	Onsite	10-55	10/19/2016	3.18J
MW-344-55	Onsite	10-55	02/28/2017	<5.30
MW-344-55	Onsite	10-55	04/11/2017	4.80J
MW-344-75	Onsite	55-90	11/01/2013	<6.46
MW-344-75	Onsite	55-90	02/27/2014	<5.20
MW-344-75	Onsite	55-90	04/22/2014	<5.00
MW-344-75	Onsite	55-90	07/31/2014	<5.00
MW-344-75	Onsite	55-90	10/22/2014	<5.00
MW-344-75	Onsite	55-90	02/17/2015	<5.00
MW-344-75	Onsite	55-90	04/24/2015	<5.00
MW-344-75	Onsite	55-90	07/30/2015	<5.40
MW-344-75	Onsite	55-90	10/20/2015	<5.00
MW-344-75	Onsite	55-90	02/16/2016	<5.00
MW-344-75	Onsite	55-90	08/11/2016	<5.15
MW-344-75	Onsite	55-90	02/27/2017	<5.10
MW-345-15	Onsite	Water Table	07/29/2013	165
MW-345-15	Onsite	Water Table	10/22/2013	98.8
MW-345-15	Onsite	Water Table	02/27/2014	43.3
MW-345-15	Onsite	Water Table	07/31/2014	11.5
MW-345-15	Onsite	Water Table	10/23/2014	16.7
MW-345-15	Onsite	Water Table	02/25/2015	22.9
MW-345-15	Onsite	Water Table	07/24/2015	15.0
MW-345-15	Onsite	Water Table	10/15/2015	20.4
MW-345-15	Onsite	Water Table	02/04/2016	13.5
MW-345-15	Onsite	Water Table	04/06/2016	13.8
MW-345-15	Onsite	Water Table	07/22/2016	8.61J
MW-345-15	Onsite	Water Table	10/19/2016	14.1
MW-345-15	Onsite	Water Table	02/13/2017	8.10J
MW-345-15	Onsite	Water Table	07/24/2017	61.0

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-345-15	Onsite	Water Table	08/29/2017	173
MW-345-15	Onsite	Water Table	09/20/2017	252
MW-345-15	Onsite	Water Table	10/24/2017	256
MW-345-55	Onsite	10-55	01/27/2014	19.3
MW-345-55	Onsite	10-55	07/31/2014	25.5
MW-345-55	Onsite	10-55	10/23/2014	19.7
MW-345-55	Onsite	10-55	02/25/2015	23.2
MW-345-55	Onsite	10-55	07/24/2015	33.0
MW-345-55	Onsite	10-55	10/15/2015	30.8
MW-345-55	Onsite	10-55	02/04/2016	26.8
MW-345-55	Onsite	10-55	07/22/2016	31.1
MW-345-55	Onsite	10-55	10/19/2016	36.7
MW-345-55	Onsite	10-55	02/14/2017	32.1
MW-345-55	Onsite	10-55	07/14/2017	28.7
MW-345-55	Onsite	10-55	10/20/2017	49.6
MW-345-75	Onsite	55-90	11/01/2013	7.03J
MW-345-75	Onsite	55-90	02/27/2014	9.38J
MW-345-75	Onsite	55-90	07/31/2014	13.1
MW-345-75	Onsite	55-90	10/23/2014	9.89J
MW-345-75	Onsite	55-90	07/24/2015	18.9
MW-345-75	Onsite	55-90	10/15/2015	16.6
MW-345-75	Onsite	55-90	02/04/2016	13.2
MW-345-75	Onsite	55-90	07/22/2016	21.1
MW-345-75	Onsite	55-90	10/19/2016	22.2
MW-348-15	Onsite	Water Table	08/15/2013	1660JL*
MW-348-15	Onsite	Water Table	11/15/2013	1280
MW-348-15	Onsite	Water Table	03/11/2014	951
MW-348-15	Onsite	Water Table	04/22/2014	1210
MW-348-15	Onsite	Water Table	09/02/2014	722
MW-348-15	Onsite	Water Table	10/29/2014	565
MW-348-15	Onsite	Water Table	02/21/2015	600
MW-348-15	Onsite	Water Table	04/21/2015	209
MW-348-15	Onsite	Water Table	08/06/2015	1220
MW-348-15	Onsite	Water Table	10/28/2015	541
MW-348-15	Onsite	Water Table	02/22/2016	682
MW-348-15	Onsite	Water Table	08/17/2016	770
MW-348-15	Onsite	Water Table	03/10/2017	988
MW-348-65	Onsite	10-55	08/15/2013	6.04J
MW-348-65	Onsite	10-55	11/15/2013	8.25J
MW-348-65	Onsite	10-55	03/11/2014	5.87J
MW-348-65	Onsite	10-55	04/22/2014	4.95J
MW-348-65	Onsite	10-55	08/09/2014	6.29J
MW-348-65	Onsite	10-55	10/28/2014	12.1
MW-348-65	Onsite	10-55	02/21/2015	14.4
MW-348-65	Onsite	10-55	08/06/2015	14.4
MW-348-65	Onsite	10-55	03/03/2016	30.9
MW-348-65	Onsite	10-55	08/11/2016	15.4
MW-348-65	Onsite	10-55	11/16/2016	18.4
MW-348-65	Onsite	10-55	02/27/2017	9.83J
MW-348-65	Onsite	10-55	04/11/2017	7.52J
MW-351-15	Onsite	Water Table	02/26/2014	40.0
MW-351-15	Onsite	Water Table	04/16/2014	47.8

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-351-15	Onsite	Water Table	07/23/2014	11.4
MW-351-15	Onsite	Water Table	10/16/2014	<5.00
MW-351-15	Onsite	Water Table	02/20/2015	38.1
MW-351-15	Onsite	Water Table	04/22/2015	34.6
MW-351-15	Onsite	Water Table	08/03/2015	7.94J
MW-351-15	Onsite	Water Table	10/16/2015	<5.05
MW-351-15	Onsite	Water Table	02/11/2016	<5.30
MW-351-15	Onsite	Water Table	04/07/2016	<5.05
MW-351-15	Onsite	Water Table	07/19/2016	<5.00
MW-351-15	Onsite	Water Table	10/19/2016	<5.05
MW-351-15	Onsite	Water Table	01/25/2017	4.32J
MW-351-15	Onsite	Water Table	04/10/2017	8.41J
MW-351-55	Onsite	10-55	01/02/2014	15.5
MW-351-55	Onsite	10-55	04/16/2014	18.4
MW-351-55	Onsite	10-55	07/23/2014	4.07J
MW-351-55	Onsite	10-55	10/16/2014	4.53J
MW-351-55	Onsite	10-55	02/20/2015	<5.15J*
MW-351-55	Onsite	10-55	04/22/2015	<5.10
MW-351-55	Onsite	10-55	08/03/2015	<5.15
MW-351-55	Onsite	10-55	10/16/2015	3.47J
MW-351-55	Onsite	10-55	02/11/2016	<5.10
MW-351-55	Onsite	10-55	07/19/2016	<5.10
MW-351-55	Onsite	10-55	10/19/2016	5.57J
MW-351-55	Onsite	10-55	01/25/2017	6.06J
MW-351-55	Onsite	10-55	04/10/2017	5.01J
MW-351-75	Onsite	55-90	02/26/2014	9.07J
MW-351-75	Onsite	55-90	04/17/2014	9.71J
MW-351-75	Onsite	55-90	07/23/2014	<5.00
MW-351-75	Onsite	55-90	10/16/2014	<5.00
MW-351-75	Onsite	55-90	02/19/2015	<5.00
MW-351-75	Onsite	55-90	04/22/2015	<5.00
MW-351-75	Onsite	55-90	07/29/2015	<5.00
MW-351-75	Onsite	55-90	10/16/2015	<5.10
MW-351-75	Onsite	55-90	02/11/2016	<5.10
MW-351-75	Onsite	55-90	07/19/2016	<5.05
MW-351-75	Onsite	55-90	10/19/2016	<5.10
MW-351-75	Onsite	55-90	01/25/2017	<5.10
MW-351-75	Onsite	55-90	04/11/2017	<5.15
MW-351-150	Onsite	90-160	01/02/2014	<5.25
MW-351-150	Onsite	90-160	04/16/2014	<5.00
MW-351-150	Onsite	90-160	07/23/2014	<5.00
MW-351-150	Onsite	90-160	10/16/2014	<5.25
MW-351-150	Onsite	90-160	02/19/2015	<5.00
MW-351-150	Onsite	90-160	04/22/2015	<5.00
MW-351-150	Onsite	90-160	07/29/2015	<5.00
MW-351-150	Onsite	90-160	10/16/2015	<5.10
MW-351-150	Onsite	90-160	02/11/2016	<5.05
MW-351-150	Onsite	90-160	07/19/2016	<5.00
MW-351-150	Onsite	90-160	01/25/2017	<5.05
MW-354-15	Onsite	Water Table	10/11/2013	1060
MW-354-15	Onsite	Water Table	03/11/2014	792
MW-354-15	Onsite	Water Table	04/22/2014	201

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-354-15	Onsite	Water Table	09/02/2014	480
MW-354-15	Onsite	Water Table	10/29/2014	378
MW-354-15	Onsite	Water Table	02/21/2015	414
MW-354-15	Onsite	Water Table	04/21/2015	7.52J
MW-354-15	Onsite	Water Table	08/06/2015	216
MW-354-15	Onsite	Water Table	10/28/2015	381
MW-354-15	Onsite	Water Table	02/26/2016	436
MW-354-15	Onsite	Water Table	08/17/2016	134
MW-354-15	Onsite	Water Table	02/28/2017	352
MW-354-35	Onsite	10-55	10/11/2013	849
MW-354-35	Onsite	10-55	03/06/2014	879
MW-354-35	Onsite	10-55	04/22/2014	840
MW-354-35	Onsite	10-55	08/09/2014	808
MW-354-35	Onsite	10-55	10/28/2014	672
MW-354-35	Onsite	10-55	02/21/2015	862
MW-354-35	Onsite	10-55	04/23/2015	1010
MW-354-35	Onsite	10-55	08/06/2015	940
MW-354-35	Onsite	10-55	10/21/2015	813J*
MW-354-35	Onsite	10-55	02/25/2016	741
MW-354-35	Onsite	10-55	08/10/2016	867
MW-354-35	Onsite	10-55	02/24/2017	444
MW-354-35	Onsite	10-55	07/12/2017	371
MW-354-65	Onsite	10-55	10/11/2013	<6.74
MW-354-65	Onsite	10-55	03/06/2014	<5.15
MW-354-65	Onsite	10-55	04/22/2014	<5.00
MW-354-65	Onsite	10-55	08/09/2014	<5.20
MW-354-65	Onsite	10-55	10/28/2014	<5.00
MW-354-65	Onsite	10-55	08/06/2015	10.2
MW-354-65	Onsite	10-55	02/25/2016	<5.05
MW-354-65	Onsite	10-55	08/10/2016	8.29J
MW-354-65	Onsite	10-55	02/24/2017	<5.45
MW-355-15	Onsite	Water Table	11/25/2013	5.69J
MW-355-15	Onsite	Water Table	10/10/2013	4.60J
MW-355-15	Onsite	Water Table	03/04/2014	3.49J
MW-355-15	Onsite	Water Table	04/22/2014	<5.00
MW-355-15	Onsite	Water Table	08/20/2014	17.6
MW-355-15	Onsite	Water Table	10/21/2014	77.0
MW-355-15	Onsite	Water Table	02/17/2015	37.3
MW-355-15	Onsite	Water Table	05/15/2015	18.2
MW-355-15	Onsite	Water Table	07/28/2015	22.8
MW-355-15	Onsite	Water Table	10/15/2015	10.9
MW-355-15	Onsite	Water Table	02/23/2016	29.7
MW-355-15	Onsite	Water Table	04/07/2016	24.3
MW-355-15	Onsite	Water Table	07/20/2016	6.21J*
MW-355-15	Onsite	Water Table	10/18/2016	6.81J
MW-355-15	Onsite	Water Table	02/27/2017	<5.25
MW-355-15	Onsite	Water Table	04/11/2017	<5.00
MW-355-55	Onsite	10-55	11/25/2013	<5.00
MW-355-55	Onsite	10-55	10/10/2013	<6.40
MW-355-55	Onsite	10-55	03/04/2014	<5.15
MW-355-55	Onsite	10-55	04/22/2014	<5.00
MW-355-55	Onsite	10-55	08/20/2014	<5.25

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Historical Sulfolane Summary**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-355-55	Onsite	10-55	10/21/2014	<5.00
MW-355-55	Onsite	10-55	07/28/2015	<5.00
MW-355-55	Onsite	10-55	02/23/2016	<5.00
MW-355-55	Onsite	10-55	07/20/2016	<5.15
MW-355-55	Onsite	10-55	02/27/2017	<5.10
MW-358-15	Onsite	Water Table	11/05/2013	<6.70
MW-358-15	Onsite	Water Table	03/11/2014	3.43J
MW-358-15	Onsite	Water Table	04/15/2014	3.85J
MW-358-15	Onsite	Water Table	07/21/2014	<5.00
MW-358-15	Onsite	Water Table	10/15/2014	<5.20
MW-358-15	Onsite	Water Table	02/16/2015	<5.00
MW-358-15	Onsite	Water Table	07/23/2015	<5.10
MW-358-15	Onsite	Water Table	07/18/2016	<5.10
MW-358-20	Onsite	Water Table	11/05/2013	24.7
MW-358-20	Onsite	Water Table	03/11/2014	29.5
MW-358-20	Onsite	Water Table	04/15/2014	28.8
MW-358-20	Onsite	Water Table	07/21/2014	18.8
MW-358-20	Onsite	Water Table	10/15/2014	12.0
MW-358-20	Onsite	Water Table	02/16/2015	17.9
MW-358-20	Onsite	Water Table	04/15/2015	15.8
MW-358-20	Onsite	Water Table	07/23/2015	8.81J
MW-358-20	Onsite	Water Table	10/19/2015	3.47J
MW-358-20	Onsite	Water Table	02/09/2016	5.68J
MW-358-20	Onsite	Water Table	07/18/2016	4.04J
MW-358-20	Onsite	Water Table	01/26/2017	4.68J
MW-358-20	Onsite	Water Table	08/08/2017	7.81J
MW-358-40	Onsite	10-55	11/05/2013	39.0
MW-358-40	Onsite	10-55	03/11/2014	34.8
MW-358-40	Onsite	10-55	04/15/2014	33.2
MW-358-40	Onsite	10-55	07/21/2014	26.5
MW-358-40	Onsite	10-55	10/15/2014	23.6
MW-358-40	Onsite	10-55	02/16/2015	19.9
MW-358-40	Onsite	10-55	04/15/2015	18.7
MW-358-40	Onsite	10-55	07/22/2015	14.1
MW-358-40	Onsite	10-55	10/19/2015	8.02J
MW-358-40	Onsite	10-55	02/09/2016	5.60J
MW-358-40	Onsite	10-55	07/18/2016	4.98J
MW-358-40	Onsite	10-55	01/26/2017	3.86J
MW-358-40	Onsite	10-55	07/11/2017	<5.15
MW-358-60	Onsite	10-55	11/04/2013	25.2
MW-358-60	Onsite	10-55	03/11/2014	23.6
MW-358-60	Onsite	10-55	04/15/2014	22.4
MW-358-60	Onsite	10-55	07/21/2014	25.0
MW-358-60	Onsite	10-55	10/15/2014	20.4
MW-358-60	Onsite	10-55	02/16/2015	10.6
MW-358-60	Onsite	10-55	04/15/2015	8.15J
MW-358-60	Onsite	10-55	07/22/2015	5.55J
MW-358-60	Onsite	10-55	02/09/2016	<5.15
MW-358-60	Onsite	10-55	07/19/2016	3.62J
MW-358-60	Onsite	10-55	01/26/2017	3.85J
MW-358-60	Onsite	10-55	07/11/2017	7.09J
MW-358-150	Onsite	90-160	11/04/2013	<6.40

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-358-150	Onsite	90-160	03/11/2014	<5.00
MW-358-150	Onsite	90-160	04/15/2014	<5.00
MW-358-150	Onsite	90-160	07/21/2014	<5.00
MW-358-150	Onsite	90-160	10/15/2014	<5.00
MW-358-150	Onsite	90-160	07/22/2015	<5.15
MW-358-150	Onsite	90-160	07/19/2016	<5.00
MW-359-15	Onsite	Water Table	01/02/2014	38.5
MW-359-15	Onsite	Water Table	04/15/2014	25.1
MW-359-15	Onsite	Water Table	07/18/2014	12.0
MW-359-15	Onsite	Water Table	10/14/2014	9.66J
MW-359-15	Onsite	Water Table	02/16/2015	22.8
MW-359-15	Onsite	Water Table	04/15/2015	18.3
MW-359-15	Onsite	Water Table	07/20/2015	13.8
MW-359-15	Onsite	Water Table	10/19/2015	5.10J
MW-359-15	Onsite	Water Table	02/08/2016	11.9
MW-359-15	Onsite	Water Table	04/07/2016	8.36J
MW-359-15	Onsite	Water Table	07/14/2016	5.73J
MW-359-15	Onsite	Water Table	10/19/2016	4.15J
MW-359-15	Onsite	Water Table	01/26/2017	8.34J
MW-359-15	Onsite	Water Table	08/08/2017	5.36J
MW-359-35	Onsite	10-55	02/26/2014	52.4
MW-359-35	Onsite	10-55	01/02/2014	54.7
MW-359-35	Onsite	10-55	04/14/2014	50.2
MW-359-35	Onsite	10-55	07/18/2014	45.8
MW-359-35	Onsite	10-55	10/14/2014	44.4
MW-359-35	Onsite	10-55	02/16/2015	41.1
MW-359-35	Onsite	10-55	04/15/2015	36.9
MW-359-35	Onsite	10-55	07/20/2015	28.0J*
MW-359-35	Onsite	10-55	10/19/2015	23.3
MW-359-35	Onsite	10-55	02/08/2016	23.3
MW-359-35	Onsite	10-55	07/14/2016	18.7
MW-359-35	Onsite	10-55	01/26/2017	15.6
MW-359-35	Onsite	10-55	08/08/2017	13.8
MW-359-60	Onsite	10-55	11/05/2013	16.9
MW-359-60	Onsite	10-55	02/26/2014	12.6
MW-359-60	Onsite	10-55	04/15/2014	10.0
MW-359-60	Onsite	10-55	07/18/2014	11.1
MW-359-60	Onsite	10-55	10/14/2014	8.75J
MW-359-60	Onsite	10-55	02/16/2015	7.67J
MW-359-60	Onsite	10-55	07/20/2015	6.06J
MW-359-60	Onsite	10-55	02/08/2016	6.58J
MW-359-60	Onsite	10-55	07/14/2016	4.41J
MW-359-60	Onsite	10-55	01/26/2017	7.37J
MW-359-60	Onsite	10-55	07/11/2017	7.20J
MW-359-80	Onsite	55-90	01/02/2014	3.93J
MW-359-80	Onsite	55-90	04/14/2014	3.50J
MW-359-80	Onsite	55-90	07/18/2014	<5.50
MW-359-80	Onsite	55-90	10/14/2014	<5.20
MW-359-80	Onsite	55-90	02/16/2015	<5.15
MW-359-80	Onsite	55-90	07/20/2015	<5.00
MW-359-80	Onsite	55-90	07/14/2016	<4.71
MW-359-80	Onsite	55-90	07/11/2017	<5.10

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-359-150	Onsite	90-160	11/05/2013	<6.60
MW-359-150	Onsite	90-160	02/26/2014	<5.00
MW-359-150	Onsite	90-160	04/15/2014	<5.55
MW-359-150	Onsite	90-160	07/18/2014	<5.00
MW-359-150	Onsite	90-160	10/14/2014	<5.20
MW-359-150	Onsite	90-160	07/20/2015	<5.25
MW-359-150	Onsite	90-160	07/14/2016	<5.15
MW-360-15	Onsite	Water Table	11/13/2013	21.7
MW-360-15	Onsite	Water Table	02/25/2014	30.6
MW-360-15	Onsite	Water Table	04/14/2014	32.0
MW-360-15	Onsite	Water Table	07/17/2014	11.5
MW-360-15	Onsite	Water Table	10/14/2014	7.63J
MW-360-15	Onsite	Water Table	07/20/2015	5.57J
MW-360-15	Onsite	Water Table	02/08/2016	8.73J
MW-360-15	Onsite	Water Table	07/14/2016	<5.05
MW-360-15	Onsite	Water Table	01/26/2017	3.76J
MW-360-15	Onsite	Water Table	07/11/2017	<5.15
MW-360-35	Onsite	10-55	11/13/2013	82.6
MW-360-35	Onsite	10-55	02/25/2014	74.3
MW-360-35	Onsite	10-55	04/14/2014	70.8
MW-360-35	Onsite	10-55	07/17/2014	61.1
MW-360-35	Onsite	10-55	10/14/2014	42.9
MW-360-35	Onsite	10-55	02/16/2015	28.7
MW-360-35	Onsite	10-55	04/15/2015	28.8
MW-360-35	Onsite	10-55	07/20/2015	24.6
MW-360-35	Onsite	10-55	10/16/2015	22.4
MW-360-35	Onsite	10-55	02/08/2016	14.4
MW-360-35	Onsite	10-55	07/14/2016	11.5
MW-360-35	Onsite	10-55	01/26/2017	8.16J*
MW-360-35	Onsite	10-55	07/11/2017	5.97J
MW-360-50	Onsite	10-55	11/11/2013	92.7
MW-360-50	Onsite	10-55	02/25/2014	90.6
MW-360-50	Onsite	10-55	04/14/2014	88.8J*
MW-360-50	Onsite	10-55	07/17/2014	73.4
MW-360-50	Onsite	10-55	10/14/2014	54.7
MW-360-50	Onsite	10-55	02/16/2015	43.8
MW-360-50	Onsite	10-55	04/15/2015	39.5
MW-360-50	Onsite	10-55	07/20/2015	32.5
MW-360-50	Onsite	10-55	10/16/2015	27.5
MW-360-50	Onsite	10-55	02/08/2016	20.0
MW-360-50	Onsite	10-55	07/14/2016	16.8
MW-360-50	Onsite	10-55	01/26/2017	9.85J
MW-360-50	Onsite	10-55	07/11/2017	7.55J
MW-360-80	Onsite	55-90	11/15/2013	6.52J
MW-360-80	Onsite	55-90	02/25/2014	<5.00
MW-360-80	Onsite	55-90	04/14/2014	<5.00
MW-360-80	Onsite	55-90	07/17/2014	<5.45
MW-360-80	Onsite	55-90	10/14/2014	4.68J
MW-360-80	Onsite	55-90	07/20/2015	<5.20
MW-360-80	Onsite	55-90	02/08/2016	<5.10
MW-360-80	Onsite	55-90	07/14/2016	<5.05
MW-360-80	Onsite	55-90	07/11/2017	3.13J

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-360-150	Onsite	90-160	11/14/2013	<6.52
MW-360-150	Onsite	90-160	02/25/2014	<5.00
MW-360-150	Onsite	90-160	04/14/2014	<5.00
MW-360-150	Onsite	90-160	07/17/2014	<5.00
MW-360-150	Onsite	90-160	10/14/2014	<5.20
MW-360-150	Onsite	90-160	07/20/2015	<5.15
MW-360-150	Onsite	90-160	07/14/2016	<5.00
MW-361-15	Onsite	Water Table	02/03/2014	<5.25
MW-361-15	Onsite	Water Table	04/23/2014	<5.15
MW-361-15	Onsite	Water Table	08/26/2014	<5.00
MW-361-15	Onsite	Water Table	10/29/2014	<5.00
MW-361-15	Onsite	Water Table	08/10/2015	33.7
MW-361-15	Onsite	Water Table	10/22/2015	11.7
MW-361-15	Onsite	Water Table	02/29/2016	<5.10
MW-361-15	Onsite	Water Table	08/15/2016	<5.15
MW-361-15	Onsite	Water Table	10/21/2016	<5.15
MW-361-15	Onsite	Water Table	02/23/2017	<5.10
MW-362-15	Onsite	Water Table	12/10/2013	<5.40
MW-362-15	Onsite	Water Table	03/19/2014	<5.00
MW-362-15	Onsite	Water Table	04/17/2014	<5.20
MW-362-15	Onsite	Water Table	07/24/2014	<5.00
MW-362-15	Onsite	Water Table	10/15/2014	<5.00
MW-362-15	Onsite	Water Table	07/23/2015	<5.00
MW-362-15	Onsite	Water Table	07/18/2016	<5.05
MW-362-15	Onsite	Water Table	08/08/2017	<5.10
MW-362-25	Onsite	10-55	12/10/2013	<5.50
MW-362-25	Onsite	10-55	03/12/2014	<5.00
MW-362-25	Onsite	10-55	04/17/2014	<5.00
MW-362-25	Onsite	10-55	07/24/2014	<5.15J*
MW-362-25	Onsite	10-55	10/15/2014	<5.00
MW-362-25	Onsite	10-55	07/23/2015	<5.10
MW-362-25	Onsite	10-55	07/18/2016	<5.10
MW-362-35	Onsite	10-55	12/10/2013	<5.00
MW-362-35	Onsite	10-55	03/12/2014	<5.00
MW-362-35	Onsite	10-55	04/17/2014	<5.00
MW-362-35	Onsite	10-55	07/24/2014	<5.00
MW-362-35	Onsite	10-55	10/15/2014	<5.00
MW-362-35	Onsite	10-55	07/23/2015	<5.10
MW-362-35	Onsite	10-55	07/18/2016	<5.05
MW-362-50	Onsite	10-55	12/10/2013	<5.00
MW-362-50	Onsite	10-55	03/19/2014	<5.00
MW-362-50	Onsite	10-55	04/17/2014	<5.00
MW-362-50	Onsite	10-55	07/24/2014	<5.00
MW-362-50	Onsite	10-55	10/15/2014	<5.25
MW-362-50	Onsite	10-55	07/23/2015	<5.00
MW-362-50	Onsite	10-55	07/18/2016	<5.10
MW-362-50	Onsite	10-55	07/12/2017	<5.25
MW-362-80	Onsite	55-90	12/10/2013	3.85J
MW-362-80	Onsite	55-90	03/12/2014	5.61J
MW-362-80	Onsite	55-90	04/17/2014	5.36J
MW-362-80	Onsite	55-90	07/24/2014	4.20J
MW-362-80	Onsite	55-90	10/15/2014	3.41J

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-362-80	Onsite	55-90	02/17/2015	3.99J
MW-362-80	Onsite	55-90	07/23/2015	4.46J
MW-362-80	Onsite	55-90	02/11/2016	<5.00
MW-362-80	Onsite	55-90	07/19/2016	4.74J
MW-362-80	Onsite	55-90	02/28/2017	<5.15
MW-362-150	Onsite	90-160	11/14/2013	<6.36
MW-362-150	Onsite	90-160	03/19/2014	<5.00
MW-362-150	Onsite	90-160	04/17/2014	<5.20
MW-362-150	Onsite	90-160	07/24/2014	<5.00
MW-362-150	Onsite	90-160	10/15/2014	<5.00
MW-362-150	Onsite	90-160	07/23/2015	<5.00
MW-362-150	Onsite	90-160	07/19/2016	<5.15
MW-363-15	Onsite	Water Table	11/12/2013	<6.74
MW-363-15	Onsite	Water Table	03/26/2014	<5.30
MW-363-15	Onsite	Water Table	04/30/2014	<5.00
MW-363-15	Onsite	Water Table	07/30/2014	<5.15
MW-363-15	Onsite	Water Table	10/10/2014	<5.40
MW-363-15	Onsite	Water Table	07/17/2015	<5.25
MW-363-15	Onsite	Water Table	07/25/2016	<5.25
MW-364-15	Onsite	Water Table	01/07/2014	32.2
MW-364-15	Onsite	Water Table	04/04/2014	22.7
MW-364-15	Onsite	Water Table	07/16/2014	<5.00
MW-364-15	Onsite	Water Table	10/10/2014	6.24J
MW-364-15	Onsite	Water Table	01/15/2015	9.52J
MW-364-15	Onsite	Water Table	04/08/2015	6.24J
MW-364-15	Onsite	Water Table	07/17/2015	3.25J
MW-364-15	Onsite	Water Table	02/08/2016	<5.10
MW-364-15	Onsite	Water Table	07/25/2016	<5.50
MW-364-15	Onsite	Water Table	08/08/2017	<5.15
MW-364-30	Onsite	10-55	01/07/2014	25.8
MW-364-30	Onsite	10-55	04/04/2014	22.3
MW-364-30	Onsite	10-55	07/16/2014	17.3
MW-364-30	Onsite	10-55	10/10/2014	9.91J
MW-364-30	Onsite	10-55	01/15/2015	6.52J
MW-364-30	Onsite	10-55	04/08/2015	4.23J
MW-364-30	Onsite	10-55	07/17/2015	4.09J
MW-364-30	Onsite	10-55	02/08/2016	<5.25
MW-364-30	Onsite	10-55	07/25/2016	<5.05
MW-364-30	Onsite	10-55	08/08/2017	<5.00
MW-364-65	Onsite	10-55	11/18/2013	9.60J
MW-364-65	Onsite	10-55	11/22/2013	10.1J
MW-364-65	Onsite	10-55	02/24/2014	8.94J
MW-364-65	Onsite	10-55	04/04/2014	7.51J
MW-364-65	Onsite	10-55	07/16/2014	4.60J
MW-364-65	Onsite	10-55	10/10/2014	3.38J
MW-364-65	Onsite	10-55	01/15/2015	3.29J
MW-364-65	Onsite	10-55	07/17/2015	<5.00
MW-364-65	Onsite	10-55	02/08/2016	<5.05
MW-364-65	Onsite	10-55	07/25/2016	<5.15
MW-364-65	Onsite	10-55	07/12/2017	3.46J
MW-364-90	Onsite	55-90	01/07/2014	13.8
MW-364-90	Onsite	55-90	04/04/2014	10.5

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-364-90	Onsite	55-90	07/16/2014	7.48J
MW-364-90	Onsite	55-90	10/10/2014	5.91J
MW-364-90	Onsite	55-90	01/15/2015	4.80J
MW-364-90	Onsite	55-90	07/17/2015	<5.15
MW-364-90	Onsite	55-90	02/08/2016	3.52J
MW-364-90	Onsite	55-90	07/25/2016	<5.10
MW-364-90	Onsite	55-90	02/13/2017	<5.15
MW-364-90	Onsite	55-90	07/12/2017	3.62J
MW-364-150	Onsite	90-160	11/22/2013	<5.00
MW-364-150	Onsite	90-160	02/24/2014	<5.00
MW-364-150	Onsite	90-160	04/04/2014	<5.00
MW-364-150	Onsite	90-160	07/16/2014	<5.00
MW-364-150	Onsite	90-160	10/10/2014	<5.00
MW-364-150	Onsite	90-160	07/17/2015	<5.00
MW-364-150	Onsite	90-160	07/25/2016	<5.05
MW-365-15	Onsite	Water Table	01/30/2014	<5.00
MW-365-15	Onsite	Water Table	04/29/2014	<5.00
MW-365-15	Onsite	Water Table	09/01/2014	<5.25
MW-365-15	Onsite	Water Table	10/29/2014	<5.00
MW-365-15	Onsite	Water Table	08/11/2015	<5.00J*
MW-365-15	Onsite	Water Table	08/17/2016	<5.05
MW-366-15	Onsite	Water Table	01/30/2014	<5.00
MW-366-15	Onsite	Water Table	04/24/2014	4.65J
MW-366-15	Onsite	Water Table	09/02/2014	<5.20
MW-366-15	Onsite	Water Table	10/30/2014	<5.10
MW-366-15	Onsite	Water Table	02/24/2015	<5.40
MW-366-15	Onsite	Water Table	08/07/2015	5.70J
MW-366-15	Onsite	Water Table	02/26/2016	<5.20
MW-366-15	Onsite	Water Table	08/17/2016	<5.25
MW-367-15	Onsite	Water Table	02/03/2014	<5.30
MW-367-15	Onsite	Water Table	04/22/2014	<5.40
MW-367-15	Onsite	Water Table	08/26/2014	<5.00
MW-367-15	Onsite	Water Table	10/29/2014	<5.00
MW-367-15	Onsite	Water Table	08/10/2015	<5.00
MW-367-15	Onsite	Water Table	08/15/2016	<5.05J*
MW-368-15	Onsite	Water Table	01/06/2014	<5.55
MW-368-15	Onsite	Water Table	04/22/2014	<5.55
MW-368-15	Onsite	Water Table	08/26/2014	<5.00
MW-368-15	Onsite	Water Table	10/29/2014	<5.00
MW-368-15	Onsite	Water Table	08/10/2015	<5.00
MW-368-15	Onsite	Water Table	08/15/2016	<5.15J*
MW-369-16	Onsite	Water Table	06/10/2014	90.4
MW-369-16	Onsite	Water Table	08/19/2014	88.0
MW-369-16	Onsite	Water Table	10/24/2014	67.7
MW-369-16	Onsite	Water Table	02/19/2015	77.9
MW-369-16	Onsite	Water Table	04/25/2015	88.2
MW-369-16	Onsite	Water Table	07/31/2015	68.7
MW-369-16	Onsite	Water Table	10/20/2015	60.9
MW-369-16	Onsite	Water Table	02/11/2016	72.6
MW-369-16	Onsite	Water Table	04/08/2016	78.0
MW-369-16	Onsite	Water Table	07/20/2016	66.4
MW-369-16	Onsite	Water Table	10/20/2016	71.3

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-369-16	Onsite	Water Table	02/25/2017	92.6
MW-369-16	Onsite	Water Table	04/11/2017	98.4
MW-369-55	Onsite	10-55	06/10/2014	27.6
MW-369-55	Onsite	10-55	08/19/2014	36.6
MW-369-55	Onsite	10-55	10/24/2014	40.4
MW-369-55	Onsite	10-55	02/17/2015	33.7
MW-369-55	Onsite	10-55	04/25/2015	28.6
MW-369-55	Onsite	10-55	07/31/2015	23.1
MW-369-55	Onsite	10-55	10/20/2015	24.6
MW-369-55	Onsite	10-55	02/11/2016	29.6
MW-369-55	Onsite	10-55	04/08/2016	26.1
MW-369-55	Onsite	10-55	07/20/2016	19.0
MW-369-55	Onsite	10-55	10/20/2016	20.8
MW-369-55	Onsite	10-55	02/25/2017	17.0
MW-369-55	Onsite	10-55	04/11/2017	14.4
MW-369-75	Onsite	55-90	06/10/2014	8.91J
MW-369-75	Onsite	55-90	08/19/2014	7.96J*
MW-369-75	Onsite	55-90	10/24/2014	9.43J
MW-369-75	Onsite	55-90	02/17/2015	4.90J
MW-369-75	Onsite	55-90	04/25/2015	4.19J
MW-369-75	Onsite	55-90	07/31/2015	<5.00
MW-369-75	Onsite	55-90	10/20/2015	6.16J
MW-369-75	Onsite	55-90	02/11/2016	<5.05
MW-369-75	Onsite	55-90	04/08/2016	<5.20
MW-369-75	Onsite	55-90	07/20/2016	<5.15
MW-369-75	Onsite	55-90	10/20/2016	7.75J
MW-369-75	Onsite	55-90	02/25/2017	6.29J
MW-370-15	Onsite	Water Table	01/22/2014	40.4
MW-370-15	Onsite	Water Table	04/18/2014	45.7
MW-370-15	Onsite	Water Table	08/02/2014	19.4
MW-370-15	Onsite	Water Table	10/21/2014	<5.00
MW-370-15	Onsite	Water Table	02/25/2015	3.79J
MW-370-15	Onsite	Water Table	04/17/2015	<5.10
MW-370-15	Onsite	Water Table	07/29/2015	<5.00
MW-370-15	Onsite	Water Table	10/17/2015	<5.20
MW-370-15	Onsite	Water Table	02/11/2016	5.65J
MW-370-15	Onsite	Water Table	07/19/2016	<5.00
MW-370-15	Onsite	Water Table	10/18/2016	34.8
MW-370-15	Onsite	Water Table	02/17/2017	29.4
MW-370-15	Onsite	Water Table	04/10/2017	27.4
MW-370-55	Onsite	10-55	01/22/2014	19.4
MW-370-55	Onsite	10-55	04/25/2014	22.8
MW-370-55	Onsite	10-55	08/02/2014	9.59J
MW-370-55	Onsite	10-55	10/21/2014	9.78J
MW-370-55	Onsite	10-55	02/25/2015	8.35J
MW-370-55	Onsite	10-55	04/17/2015	7.05J
MW-370-55	Onsite	10-55	07/29/2015	6.74J*
MW-370-55	Onsite	10-55	10/17/2015	6.37J
MW-370-55	Onsite	10-55	02/11/2016	6.89J
MW-370-55	Onsite	10-55	04/06/2016	7.68J
MW-370-55	Onsite	10-55	07/19/2016	6.42J
MW-370-55	Onsite	10-55	10/18/2016	11.4

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Historical Sulfolane Summary

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-370-55	Onsite	10-55	02/17/2017	9.36J
MW-370-55	Onsite	10-55	04/10/2017	8.69J
MW-370-75	Onsite	55-90	01/21/2014	<5.20
MW-370-75	Onsite	55-90	04/18/2014	<5.00
MW-370-75	Onsite	55-90	08/02/2014	<5.00
MW-370-75	Onsite	55-90	10/21/2014	<5.00J*
MW-370-75	Onsite	55-90	02/25/2015	<5.25
MW-370-75	Onsite	55-90	04/17/2015	<5.00
MW-370-75	Onsite	55-90	07/29/2015	<5.00J*
MW-370-75	Onsite	55-90	10/17/2015	<5.15
MW-370-75	Onsite	55-90	02/11/2016	<5.00
MW-370-75	Onsite	55-90	07/19/2016	<5.05
MW-370-75	Onsite	55-90	02/17/2017	<5.15
MW-371-15	Onsite	Water Table	06/05/2014	32.0
MW-371-15	Onsite	Water Table	07/25/2014	71.0
MW-371-15	Onsite	Water Table	10/17/2014	15.1
MW-371-15	Onsite	Water Table	02/20/2015	5.99JL*
MW-371-15	Onsite	Water Table	04/17/2015	7.73J
MW-371-15	Onsite	Water Table	07/24/2015	7.04J
MW-371-15	Onsite	Water Table	10/19/2015	5.27J
MW-371-15	Onsite	Water Table	02/11/2016	6.14J
MW-371-15	Onsite	Water Table	04/07/2016	4.78J
MW-371-15	Onsite	Water Table	07/15/2016	3.52J
MW-371-15	Onsite	Water Table	10/19/2016	6.38J
MW-371-15	Onsite	Water Table	02/14/2017	24.8
MW-371-15	Onsite	Water Table	04/10/2017	19.4
MW-371-15	Onsite	Water Table	07/11/2017	18.9
MW-371-55	Onsite	10-55	06/06/2014	5.50JL*
MW-371-55	Onsite	10-55	07/25/2014	7.18J
MW-371-55	Onsite	10-55	10/17/2014	4.83J
MW-371-55	Onsite	10-55	02/19/2015	4.75J
MW-371-55	Onsite	10-55	04/17/2015	4.15J
MW-371-55	Onsite	10-55	07/24/2015	3.40J
MW-371-55	Onsite	10-55	10/19/2015	<5.15
MW-371-55	Onsite	10-55	02/11/2016	<5.30
MW-371-55	Onsite	10-55	04/07/2016	<5.10
MW-371-55	Onsite	10-55	07/15/2016	<5.05
MW-371-55	Onsite	10-55	10/19/2016	<5.10
MW-371-55	Onsite	10-55	02/14/2017	3.21J
MW-371-75	Onsite	55-90	06/06/2014	5.41JL*
MW-371-75	Onsite	55-90	07/25/2014	4.86J
MW-371-75	Onsite	55-90	10/17/2014	5.29J
MW-371-75	Onsite	55-90	02/19/2015	4.47J
MW-371-75	Onsite	55-90	04/17/2015	3.80J
MW-371-75	Onsite	55-90	07/24/2015	<5.00
MW-371-75	Onsite	55-90	10/19/2015	<5.00
MW-371-75	Onsite	55-90	02/11/2016	3.36J
MW-371-75	Onsite	55-90	04/07/2016	3.32J
MW-371-75	Onsite	55-90	07/15/2016	<5.10
MW-371-75	Onsite	55-90	10/19/2016	3.48J
MW-371-75	Onsite	55-90	02/14/2017	<5.10
MW-371-75	Onsite	55-90	04/11/2017	<5.10

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Flint Hills Resources Alaska, LLC
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Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
MW-371-125	Onsite	90-160	06/06/2014	<5.45J*
MW-371-125	Onsite	90-160	07/25/2014	<5.00
MW-371-125	Onsite	90-160	10/17/2014	<5.00
MW-371-125	Onsite	90-160	02/19/2015	<5.00
MW-371-125	Onsite	90-160	04/17/2015	<5.10
MW-371-125	Onsite	90-160	07/24/2015	<5.00
MW-371-125	Onsite	90-160	10/19/2015	<5.10
MW-371-125	Onsite	90-160	02/11/2016	<5.15
MW-371-125	Onsite	90-160	07/15/2016	<5.00
MW-371-125	Onsite	90-160	02/14/2017	<5.15
MW-372-15	Onsite	Water Table	10/22/2015	676
MW-372-15	Onsite	Water Table	02/09/2016	886
MW-372-15	Onsite	Water Table	04/07/2016	634
MW-372-15	Onsite	Water Table	07/27/2016	379J*
MW-372-15	Onsite	Water Table	10/18/2016	908
MW-372-15	Onsite	Water Table	02/16/2017	977
MW-372-15	Onsite	Water Table	04/11/2017	1060
MW-372-15	Onsite	Water Table	07/10/2017	1510
MW-373-15	Onsite	Water Table	10/23/2015	608
MW-373-15	Onsite	Water Table	02/09/2016	14.8
MW-373-15	Onsite	Water Table	04/07/2016	12.1
MW-373-15	Onsite	Water Table	07/27/2016	34.4
MW-373-15	Onsite	Water Table	10/18/2016	193
MW-373-15	Onsite	Water Table	02/17/2017	9.01J
MW-373-15	Onsite	Water Table	04/10/2017	4.69J
O-1	Onsite	Water Table	10/20/2011	10400
O-1	Onsite	Water Table	08/01/2012	4940
O-1	Onsite	Water Table	12/13/2012	6090
O-1	Onsite	Water Table	01/14/2013	6520JL*
O-1	Onsite	Water Table	07/30/2013	6590
O-1	Onsite	Water Table	11/11/2013	5080JL*
O-1	Onsite	Water Table	03/07/2014	6110JL*
O-1	Onsite	Water Table	07/09/2014	89.3
O-1	Onsite	Water Table	10/28/2014	4200
O-1	Onsite	Water Table	08/05/2015	2640
O-1	Onsite	Water Table	10/21/2015	2480
O-1	Onsite	Water Table	02/29/2016	3450JL*
O-1	Onsite	Water Table	08/11/2016	2200
O-1	Onsite	Water Table	07/12/2017	1990
O-2	Onsite	Water Table	02/12/2013	374
O-2	Onsite	Water Table	05/02/2013	348
O-2	Onsite	Water Table	09/05/2013	111
O-2	Onsite	Water Table	11/16/2013	95.6
O-2	Onsite	Water Table	03/11/2014	89.1
O-2	Onsite	Water Table	04/16/2014	108
O-2	Onsite	Water Table	08/20/2014	147
O-2	Onsite	Water Table	10/30/2014	154
O-2	Onsite	Water Table	02/24/2015	189
O-2	Onsite	Water Table	04/21/2015	190
O-2	Onsite	Water Table	08/07/2015	147
O-2	Onsite	Water Table	10/27/2015	168J*
O-2	Onsite	Water Table	02/26/2016	187

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Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
O-2	Onsite	Water Table	04/11/2016	178
O-2	Onsite	Water Table	08/17/2016	164
O-2	Onsite	Water Table	10/25/2016	181
O-2	Onsite	Water Table	02/24/2017	172
O-2	Onsite	Water Table	04/12/2017	166
O-2	Onsite	Water Table	07/24/2017	199
O-2	Onsite	Water Table	08/29/2017	277
O-2	Onsite	Water Table	09/20/2017	253
O-2	Onsite	Water Table	10/25/2017	238
O-3	Onsite	Water Table	10/19/2011	10.1J
O-3	Onsite	Water Table	11/15/2012	11.1
O-3	Onsite	Water Table	02/02/2013	9.98J
O-3	Onsite	Water Table	05/09/2013	8.02J
O-3	Onsite	Water Table	08/08/2013	<6.52
O-3	Onsite	Water Table	11/16/2013	<5.00
O-3	Onsite	Water Table	03/10/2014	6.44J
O-3	Onsite	Water Table	04/24/2014	5.87J
O-3	Onsite	Water Table	08/13/2014	<5.20
O-3	Onsite	Water Table	11/06/2014	<5.00
O-3	Onsite	Water Table	02/24/2015	<5.00
O-3	Onsite	Water Table	04/29/2015	<5.30
O-3	Onsite	Water Table	08/10/2015	<5.00
O-3	Onsite	Water Table	10/21/2015	<5.10
O-3	Onsite	Water Table	03/01/2016	<5.05
O-3	Onsite	Water Table	08/15/2016	<5.05J*
O-3	Onsite	Water Table	02/27/2017	<5.15
O-4	Onsite	Water Table	10/19/2011	112
O-4	Onsite	Water Table	11/09/2012	149
O-4	Onsite	Water Table	02/28/2013	210
O-4	Onsite	Water Table	05/21/2013	194
O-4	Onsite	Water Table	08/06/2013	172
O-4	Onsite	Water Table	10/16/2013	172
O-4	Onsite	Water Table	02/28/2014	70.7
O-4	Onsite	Water Table	04/22/2014	54.3
O-4	Onsite	Water Table	07/30/2014	19.8
O-4	Onsite	Water Table	10/28/2014	14.8
O-4	Onsite	Water Table	02/26/2015	10.3
O-4	Onsite	Water Table	04/18/2015	9.88J
O-4	Onsite	Water Table	07/31/2015	5.05J
O-4	Onsite	Water Table	10/16/2015	5.21J
O-4	Onsite	Water Table	02/17/2016	4.81J
O-4	Onsite	Water Table	04/08/2016	4.87J
O-4	Onsite	Water Table	08/04/2016	<5.20
O-4	Onsite	Water Table	10/14/2016	<5.05
O-4	Onsite	Water Table	02/28/2017	4.77J
O-4	Onsite	Water Table	04/10/2017	5.77J
O-5	Onsite	Water Table	10/19/2011	171
O-5	Onsite	Water Table	08/07/2013	247
O-5	Onsite	Water Table	10/16/2013	130
O-5	Onsite	Water Table	02/28/2014	161
O-5	Onsite	Water Table	04/21/2014	180
O-5	Onsite	Water Table	08/01/2014	101

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Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
O-5	Onsite	Water Table	10/28/2014	105
O-5	Onsite	Water Table	02/19/2015	256
O-5	Onsite	Water Table	04/23/2015	239
O-5	Onsite	Water Table	07/31/2015	207
O-5	Onsite	Water Table	10/20/2015	108J*
O-5	Onsite	Water Table	02/17/2016	196
O-5	Onsite	Water Table	06/16/2016	205
O-5	Onsite	Water Table	08/04/2016	95.7
O-5	Onsite	Water Table	10/14/2016	97.0
O-5	Onsite	Water Table	02/28/2017	158J*
O-5	Onsite	Water Table	04/10/2017	154
O-5-65	Onsite	10-55	07/29/2013	<6.20
O-5-65	Onsite	10-55	10/16/2013	<6.32
O-5-65	Onsite	10-55	02/28/2014	<5.00
O-5-65	Onsite	10-55	04/21/2014	<5.15
O-5-65	Onsite	10-55	08/01/2014	6.18J
O-5-65	Onsite	10-55	10/28/2014	11.9
O-5-65	Onsite	10-55	02/17/2015	7.94J
O-5-65	Onsite	10-55	04/23/2015	11.0
O-5-65	Onsite	10-55	07/31/2015	<5.20
O-5-65	Onsite	10-55	10/20/2015	9.37J
O-5-65	Onsite	10-55	02/17/2016	4.61J
O-5-65	Onsite	10-55	06/16/2016	4.23J
O-5-65	Onsite	10-55	08/04/2016	<5.75
O-5-65	Onsite	10-55	10/18/2016	12.4
O-5-65	Onsite	10-55	02/28/2017	3.49J
O-5-65	Onsite	10-55	04/10/2017	3.79J
O-6	Onsite	Water Table	10/19/2011	198
O-6	Onsite	Water Table	11/09/2012	8.18J
O-6	Onsite	Water Table	02/11/2013	28.8
O-6	Onsite	Water Table	05/10/2013	21.9
O-6	Onsite	Water Table	08/07/2013	23.9
O-6	Onsite	Water Table	10/22/2013	13.1
O-6	Onsite	Water Table	02/28/2014	13.9
O-6	Onsite	Water Table	04/22/2014	18.9
O-6	Onsite	Water Table	07/31/2014	17.2
O-6	Onsite	Water Table	10/23/2014	40.4
O-6	Onsite	Water Table	02/19/2015	15.8
O-6	Onsite	Water Table	04/23/2015	13.2
O-6	Onsite	Water Table	07/24/2015	15.4
O-6	Onsite	Water Table	10/21/2015	16.2
O-6	Onsite	Water Table	02/08/2016	58.4
O-6	Onsite	Water Table	06/16/2016	24.6
O-6	Onsite	Water Table	08/08/2016	25.4
O-6	Onsite	Water Table	10/18/2016	27.0
O-6	Onsite	Water Table	02/27/2017	14.7
O-6	Onsite	Water Table	04/11/2017	15.9
O-8	Onsite	Water Table	10/20/2011	13.0
O-11	Onsite	Water Table	08/06/2013	252J*
O-11	Onsite	Water Table	08/02/2017	52.0
O-11	Onsite	Water Table	10/18/2017	129
O-12	Onsite	Water Table	10/19/2011	309

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Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
O-12	Onsite	Water Table	11/15/2012	103
O-12	Onsite	Water Table	01/14/2013	75.0
O-12	Onsite	Water Table	05/09/2013	74.4
O-12	Onsite	Water Table	08/08/2013	91.1
O-12	Onsite	Water Table	10/19/2013	40.4
O-12	Onsite	Water Table	03/07/2014	25.8
O-12	Onsite	Water Table	04/24/2014	16.8
O-12	Onsite	Water Table	08/13/2014	8.06J
O-12	Onsite	Water Table	10/30/2014	<5.00
O-12	Onsite	Water Table	02/21/2015	7.20J
O-12	Onsite	Water Table	04/24/2015	5.10J
O-12	Onsite	Water Table	08/10/2015	3.94J
O-12	Onsite	Water Table	10/02/2015	<5.10
O-12	Onsite	Water Table	02/29/2016	4.30J
O-12	Onsite	Water Table	06/16/2016	3.85J
O-12	Onsite	Water Table	08/10/2016	<5.20
O-12	Onsite	Water Table	10/21/2016	<5.00
O-12	Onsite	Water Table	02/25/2017	<5.40
O-12	Onsite	Water Table	04/11/2017	<5.55
O-12	Onsite	Water Table	08/02/2017	<5.20
O-12	Onsite	Water Table	10/19/2017	<10.4
O-12-65	Onsite	10-55	08/15/2013	<6.82
O-12-65	Onsite	10-55	10/19/2013	<6.20
O-12-65	Onsite	10-55	10/11/2013	<6.56
O-12-65	Onsite	10-55	03/07/2014	<5.00
O-12-65	Onsite	10-55	04/24/2014	<5.20
O-12-65	Onsite	10-55	08/12/2014	<5.30
O-12-65	Onsite	10-55	10/30/2014	<5.00
O-12-65	Onsite	10-55	02/21/2015	<5.15
O-12-65	Onsite	10-55	04/24/2015	<5.10
O-12-65	Onsite	10-55	08/10/2015	<5.00
O-12-65	Onsite	10-55	10/21/2015	<5.30
O-12-65	Onsite	10-55	02/29/2016	<5.10
O-12-65	Onsite	10-55	08/09/2016	<5.10
O-12-65	Onsite	10-55	02/25/2017	<5.40
O-13	Onsite	Water Table	08/06/2013	192
O-13	Onsite	Water Table	08/02/2017	29.5
O-13	Onsite	Water Table	10/18/2017	23.8JL*
O-14	Onsite	Water Table	10/20/2011	<6.40
O-14	Onsite	Water Table	08/09/2012	<6.20
O-14	Onsite	Water Table	02/05/2013	<6.40
O-14	Onsite	Water Table	08/29/2013	<6.20
O-14	Onsite	Water Table	11/25/2013	<5.00
O-14	Onsite	Water Table	09/03/2014	<5.25
O-14	Onsite	Water Table	08/07/2015	7.32J
O-14	Onsite	Water Table	08/17/2016	<5.10
O-15	Onsite	Water Table	10/20/2011	<6.20
O-16	Onsite	Water Table	10/20/2011	<6.20
O-16	Onsite	Water Table	04/20/2012	<6.66
O-17	Onsite	Water Table	10/19/2011	346
O-18	Onsite	Water Table	10/20/2011	23.4
O-19	Onsite	Water Table	02/12/2013	683

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Flint Hills Resources Alaska, LLC
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Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
O-19	Onsite	Water Table	06/04/2013	722JL*
O-19	Onsite	Water Table	07/23/2013	803
O-19	Onsite	Water Table	11/07/2013	745
O-19	Onsite	Water Table	03/11/2014	524
O-19	Onsite	Water Table	04/16/2014	724
O-19	Onsite	Water Table	08/21/2014	575
O-19	Onsite	Water Table	10/22/2014	609J*
O-19	Onsite	Water Table	02/20/2015	488
O-19	Onsite	Water Table	04/20/2015	530
O-19	Onsite	Water Table	08/04/2015	593
O-19	Onsite	Water Table	10/23/2015	561
O-19	Onsite	Water Table	02/22/2016	531
O-19	Onsite	Water Table	06/16/2016	487
O-19	Onsite	Water Table	08/18/2016	427
O-19	Onsite	Water Table	10/25/2016	491
O-19	Onsite	Water Table	02/22/2017	428
O-19	Onsite	Water Table	04/12/2017	395
O-19	Onsite	Water Table	07/13/2017	337
O-19	Onsite	Water Table	10/18/2017	295
O-19-55	Onsite	10-55	01/03/2014	27.0
O-19-55	Onsite	10-55	04/22/2014	28.7
O-19-55	Onsite	10-55	08/14/2014	42.5
O-19-55	Onsite	10-55	10/24/2014	38.8
O-19-55	Onsite	10-55	02/20/2015	37.4
O-19-55	Onsite	10-55	04/23/2015	31.6
O-19-55	Onsite	10-55	08/04/2015	26.9
O-19-55	Onsite	10-55	10/22/2015	53.4
O-19-55	Onsite	10-55	02/05/2016	30.3
O-19-55	Onsite	10-55	06/16/2016	23.2
O-19-55	Onsite	10-55	08/15/2016	27.6J*
O-19-55	Onsite	10-55	10/20/2016	37.5
O-19-55	Onsite	10-55	02/22/2017	17.6
O-19-55	Onsite	10-55	04/11/2017	13.3
O-19-90	Onsite	55-90	01/03/2014	<5.00
O-19-90	Onsite	55-90	04/22/2014	<5.00
O-19-90	Onsite	55-90	08/14/2014	<5.20
O-19-90	Onsite	55-90	10/24/2014	<5.00
O-19-90	Onsite	55-90	02/20/2015	<5.00
O-19-90	Onsite	55-90	04/23/2015	<5.15
O-19-90	Onsite	55-90	08/04/2015	<5.00
O-19-90	Onsite	55-90	10/22/2015	4.67J
O-19-90	Onsite	55-90	02/05/2016	3.21J
O-19-90	Onsite	55-90	08/15/2016	4.06J
O-19-90	Onsite	55-90	02/22/2017	<5.50
O-19-90	Onsite	55-90	04/13/2017	<5.05
O-19-90	Onsite	55-90	08/03/2017	<5.10
O-19-90	Onsite	55-90	10/19/2017	<10.4
O-20	Onsite	Water Table	10/20/2011	1920
O-20	Onsite	Water Table	03/25/2014	1070
O-20	Onsite	Water Table	04/22/2014	810
O-20	Onsite	Water Table	08/09/2014	573
O-20	Onsite	Water Table	10/28/2014	915

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Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
O-20	Onsite	Water Table	02/24/2015	1140
O-20	Onsite	Water Table	08/05/2015	677
O-20	Onsite	Water Table	10/21/2015	720
O-20	Onsite	Water Table	03/03/2016	617
O-20	Onsite	Water Table	08/11/2016	383
O-21	Onsite	Water Table	10/20/2011	136
O-22	Onsite	Water Table	02/22/2012	<7.38
O-23	Onsite	Water Table	02/22/2012	<6.88
O-24	Onsite	Water Table	02/22/2012	<7.12
O-24	Onsite	Water Table	11/14/2012	5.02J
O-24	Onsite	Water Table	02/02/2013	<6.40
O-24	Onsite	Water Table	05/09/2013	<6.40
O-24	Onsite	Water Table	08/08/2013	<6.20
O-24	Onsite	Water Table	11/16/2013	3.43J
O-24	Onsite	Water Table	03/07/2014	<5.00
O-24	Onsite	Water Table	04/24/2014	<5.00
O-24	Onsite	Water Table	08/13/2014	<5.00
O-24	Onsite	Water Table	10/30/2014	4.04J
O-24	Onsite	Water Table	02/21/2015	<5.00
O-24	Onsite	Water Table	04/29/2015	<5.00
O-24	Onsite	Water Table	08/11/2015	<5.00
O-24	Onsite	Water Table	10/21/2015	3.78J*
O-24	Onsite	Water Table	02/29/2016	<5.10
O-24	Onsite	Water Table	06/16/2016	<5.10
O-24	Onsite	Water Table	08/15/2016	<5.15J*
O-24	Onsite	Water Table	10/21/2016	4.12J
O-24	Onsite	Water Table	02/25/2017	<5.40
O-24	Onsite	Water Table	07/10/2017	<5.30
O-24-65	Onsite	10-55	10/11/2013	<6.60
O-24-65	Onsite	10-55	03/07/2014	<5.00
O-24-65	Onsite	10-55	04/24/2014	<5.15
O-24-65	Onsite	10-55	08/12/2014	<5.70J*
O-24-65	Onsite	10-55	10/30/2014	<5.45
O-24-65	Onsite	10-55	02/21/2015	<5.00
O-24-65	Onsite	10-55	04/29/2015	<5.15
O-24-65	Onsite	10-55	08/11/2015	<5.00
O-24-65	Onsite	10-55	10/21/2015	<5.20
O-24-65	Onsite	10-55	02/29/2016	<5.00
O-24-65	Onsite	10-55	08/15/2016	<5.00J*
O-24-65	Onsite	10-55	02/25/2017	<5.20
O-25	Onsite	Water Table	02/22/2012	145
O-26	Onsite	Water Table	02/22/2012	892
O-26	Onsite	Water Table	11/14/2012	671
O-26	Onsite	Water Table	01/14/2013	488
O-26	Onsite	Water Table	05/08/2013	468
O-26	Onsite	Water Table	07/02/2013	376
O-26	Onsite	Water Table	11/16/2013	218
O-26	Onsite	Water Table	03/02/2014	297
O-26	Onsite	Water Table	04/24/2014	261
O-26	Onsite	Water Table	08/13/2014	196
O-26	Onsite	Water Table	10/30/2014	194
O-26	Onsite	Water Table	02/21/2015	116

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
O-26	Onsite	Water Table	04/24/2015	86.0
O-26	Onsite	Water Table	08/11/2015	57.8
O-26	Onsite	Water Table	10/21/2015	27.4
O-26	Onsite	Water Table	03/01/2016	46.2
O-26	Onsite	Water Table	06/16/2016	30.7
O-26	Onsite	Water Table	08/10/2016	14.3
O-26	Onsite	Water Table	10/21/2016	38.7
O-26	Onsite	Water Table	02/24/2017	15.3
O-26	Onsite	Water Table	04/11/2017	13.8
O-26	Onsite	Water Table	07/10/2017	11.5
O-26-65	Onsite	10-55	03/02/2014	<5.00
O-26-65	Onsite	10-55	02/27/2014	<5.20
O-26-65	Onsite	10-55	04/24/2014	<5.15
O-26-65	Onsite	10-55	08/12/2014	<5.25
O-26-65	Onsite	10-55	10/30/2014	<5.00
O-26-65	Onsite	10-55	02/21/2015	<5.00
O-26-65	Onsite	10-55	04/24/2015	<5.00
O-26-65	Onsite	10-55	08/11/2015	<5.00J*
O-26-65	Onsite	10-55	10/21/2015	<5.10
O-26-65	Onsite	10-55	03/01/2016	<5.05
O-26-65	Onsite	10-55	08/10/2016	<5.05
O-26-65	Onsite	10-55	02/24/2017	<5.10
O-26-65	Onsite	10-55	07/10/2017	<5.30
O-27	Onsite	Water Table	02/22/2012	160
O-27	Onsite	Water Table	03/12/2014	18.5
O-27	Onsite	Water Table	04/16/2014	14.4
O-27	Onsite	Water Table	08/19/2014	29.9
O-27	Onsite	Water Table	10/28/2014	27.9
O-27	Onsite	Water Table	02/24/2015	26.2
O-27	Onsite	Water Table	04/21/2015	23.7
O-27	Onsite	Water Table	08/07/2015	22.0
O-27	Onsite	Water Table	10/15/2015	23.1
O-27	Onsite	Water Table	02/26/2016	24.5
O-27	Onsite	Water Table	04/11/2016	20.9
O-27	Onsite	Water Table	08/17/2016	23.2
O-27	Onsite	Water Table	10/25/2016	24.1
O-27	Onsite	Water Table	02/17/2017	22.4
O-27	Onsite	Water Table	04/12/2017	17.6
O-27	Onsite	Water Table	07/13/2017	15.5J*
O-27	Onsite	Water Table	10/18/2017	61.7JL*
O-27-65	Onsite	10-55	12/04/2013	5.94J
O-27-65	Onsite	10-55	03/21/2014	<5.00
O-27-65	Onsite	10-55	04/25/2014	<5.35
O-27-65	Onsite	10-55	08/14/2014	9.80J
O-27-65	Onsite	10-55	10/28/2014	10.2
O-27-65	Onsite	10-55	02/25/2015	14.4
O-27-65	Onsite	10-55	07/31/2015	7.25J
O-27-65	Onsite	10-55	02/18/2016	13.4
O-27-65	Onsite	10-55	07/28/2016	6.45J
O-27-65	Onsite	10-55	10/18/2016	19.1
O-27-65	Onsite	10-55	02/16/2017	9.76J
O-27-65	Onsite	10-55	04/10/2017	8.95J

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
O-27-65	Onsite	10-55	07/10/2017	7.37J
O-27-150	Onsite	90-160	12/03/2013	<5.00
O-27-150	Onsite	90-160	03/21/2014	<5.40
O-27-150	Onsite	90-160	04/25/2014	<5.45
O-27-150	Onsite	90-160	08/14/2014	<5.55
O-27-150	Onsite	90-160	10/28/2014	<5.00
O-27-150	Onsite	90-160	07/31/2015	<5.15
O-27-150	Onsite	90-160	07/28/2016	<5.10
O-28	Onsite	Water Table	02/22/2012	72.5
O-29	Onsite	Water Table	02/22/2012	<6.66
O-30	Onsite	Water Table	08/28/2012	<6.74
O-31	Onsite	Water Table	10/01/2013	R*
O-31	Onsite	Water Table	03/17/2014	16.9
O-31	Onsite	Water Table	04/16/2014	15.0
O-31	Onsite	Water Table	08/20/2014	<5.00
O-31	Onsite	Water Table	10/30/2014	<5.70
O-31	Onsite	Water Table	02/24/2015	3.45J
O-31	Onsite	Water Table	04/21/2015	6.94J
O-31	Onsite	Water Table	08/07/2015	<5.00J*
O-31	Onsite	Water Table	02/26/2016	5.02J
O-31	Onsite	Water Table	08/17/2016	<5.05
O-31	Onsite	Water Table	02/24/2017	3.71J
O-31	Onsite	Water Table	07/13/2017	<5.20
O-31	Onsite	Water Table	10/18/2017	<10.5
O-32	Onsite	Water Table	10/01/2013	376
O-32	Onsite	Water Table	03/14/2014	416
O-32	Onsite	Water Table	04/16/2014	396
O-32	Onsite	Water Table	08/19/2014	112
O-32	Onsite	Water Table	10/22/2014	387
O-32	Onsite	Water Table	02/19/2015	481
O-32	Onsite	Water Table	04/21/2015	418
O-32	Onsite	Water Table	08/04/2015	15.7
O-32	Onsite	Water Table	10/26/2015	306
O-32	Onsite	Water Table	02/22/2016	430
O-32	Onsite	Water Table	08/18/2016	<5.00
O-32	Onsite	Water Table	02/23/2017	374
O-33	Onsite	Water Table	10/07/2013	61.3
O-33	Onsite	Water Table	03/17/2014	36.1
O-33	Onsite	Water Table	04/16/2014	35.6
O-33	Onsite	Water Table	08/20/2014	31.7
O-33	Onsite	Water Table	10/29/2014	44.2
O-33	Onsite	Water Table	02/19/2015	23.1
O-33	Onsite	Water Table	04/20/2015	15.0
O-33	Onsite	Water Table	08/05/2015	23.5
O-33	Onsite	Water Table	10/27/2015	40.5
O-33	Onsite	Water Table	02/26/2016	27.0
O-33	Onsite	Water Table	08/16/2016	29.2
O-33	Onsite	Water Table	02/23/2017	11.2
O-34	Onsite	Water Table	10/10/2013	1700JL*
O-34	Onsite	Water Table	03/15/2014	1210
O-34	Onsite	Water Table	04/21/2014	1300
O-34	Onsite	Water Table	09/02/2014	896

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
O-34	Onsite	Water Table	10/29/2014	976
O-34	Onsite	Water Table	02/19/2015	927
O-34	Onsite	Water Table	04/20/2015	930
O-34	Onsite	Water Table	08/07/2015	833
O-34	Onsite	Water Table	10/27/2015	954
O-34	Onsite	Water Table	02/22/2016	963
O-34	Onsite	Water Table	08/16/2016	813
O-34	Onsite	Water Table	03/10/2017	620
O-34	Onsite	Water Table	07/13/2017	511
O-35	Onsite	Water Table	10/10/2013	11.3
O-35	Onsite	Water Table	03/14/2014	<5.15
O-35	Onsite	Water Table	04/21/2014	<5.20
O-35	Onsite	Water Table	09/02/2014	6.99J
O-35	Onsite	Water Table	10/29/2014	8.32J
O-35	Onsite	Water Table	02/19/2015	<5.00
O-35	Onsite	Water Table	08/07/2015	<5.00
O-35	Onsite	Water Table	08/16/2016	<5.10
O-36	Onsite	Water Table	10/07/2013	<6.20J*
O-36	Onsite	Water Table	03/12/2014	<5.15
O-36	Onsite	Water Table	04/16/2014	<5.50
O-36	Onsite	Water Table	08/21/2014	<5.00
O-36	Onsite	Water Table	10/29/2014	<5.15
O-36	Onsite	Water Table	08/06/2015	<5.15
O-36	Onsite	Water Table	08/18/2016	<5.00J*
O-37	Onsite	Water Table	10/07/2013	7.71JL*
O-37	Onsite	Water Table	03/12/2014	<5.00
O-37	Onsite	Water Table	04/21/2014	<5.40
O-37	Onsite	Water Table	08/25/2014	5.25J
O-37	Onsite	Water Table	10/29/2014	9.05J
O-37	Onsite	Water Table	02/19/2015	3.95J
O-37	Onsite	Water Table	08/06/2015	<5.40
O-37	Onsite	Water Table	02/26/2016	<5.20
O-37	Onsite	Water Table	08/18/2016	<5.05
O-38	Onsite	Water Table	10/08/2013	260
O-38	Onsite	Water Table	03/15/2014	109
O-38	Onsite	Water Table	04/21/2014	39.7
O-38	Onsite	Water Table	08/25/2014	<5.00
O-38	Onsite	Water Table	10/29/2014	<5.15
O-38	Onsite	Water Table	02/19/2015	<5.45
O-38	Onsite	Water Table	04/20/2015	<5.15J*
O-38	Onsite	Water Table	08/06/2015	<5.20
O-38	Onsite	Water Table	08/18/2016	<5.05
R-14	Onsite	Water Table	09/24/2001	3000
R-14	Onsite	Water Table	10/01/2001	3000
R-14A	Onsite	Water Table	01/09/2002	4000
R-14A	Onsite	Water Table	01/14/2002	5000
R-14A	Onsite	Water Table	01/21/2002	4000
R-14A	Onsite	Water Table	01/28/2002	3000
R-14A	Onsite	Water Table	02/11/2002	6000
R-14A	Onsite	Water Table	02/18/2002	5000
R-14A	Onsite	Water Table	03/04/2002	6000
R-14A	Onsite	Water Table	03/11/2002	6000

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Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
R-14A	Onsite	Water Table	03/18/2002	6000
R-14A	Onsite	Water Table	03/25/2002	6000
R-14A	Onsite	Water Table	04/03/2002	6000
R-14A	Onsite	Water Table	04/08/2002	6000
R-14A	Onsite	Water Table	04/16/2002	6000
R-14A	Onsite	Water Table	04/23/2002	6000
R-14A	Onsite	Water Table	05/07/2002	5000
R-14A	Onsite	Water Table	07/15/2002	5100
R-21	Onsite	Water Table	05/16/2006	710
R-21	Onsite	Water Table	06/21/2006	770
R-21	Onsite	Water Table	07/19/2006	750
R-21	Onsite	Water Table	01/15/2007	1200
R-21	Onsite	Water Table	04/18/2007	960
R-21	Onsite	Water Table	07/17/2007	843
R-21	Onsite	Water Table	10/18/2007	1270
R-21	Onsite	Water Table	01/03/2008	879
R-21	Onsite	Water Table	04/03/2008	1180
R-21	Onsite	Water Table	07/14/2008	945
R-21	Onsite	Water Table	10/01/2008	1370
R-21	Onsite	Water Table	01/12/2009	729
R-21	Onsite	Water Table	04/09/2009	931
R-21	Onsite	Water Table	07/07/2009	666
R-21	Onsite	Water Table	10/01/2009	466
R-21	Onsite	Water Table	01/19/2010	758
R-21	Onsite	Water Table	04/05/2010	574
R-21	Onsite	Water Table	07/26/2010	492
R-21	Onsite	Water Table	04/06/2011	274
R-21	Onsite	Water Table	01/17/2012	355
R-21	Onsite	Water Table	02/15/2012	413
R-21	Onsite	Water Table	03/19/2012	304
R-21	Onsite	Water Table	04/18/2012	315
R-21	Onsite	Water Table	05/16/2012	302
R-21	Onsite	Water Table	06/18/2012	268
R-21	Onsite	Water Table	07/17/2012	399
R-21	Onsite	Water Table	08/09/2012	441
R-21	Onsite	Water Table	09/13/2012	356
R-21	Onsite	Water Table	10/16/2012	344
R-21	Onsite	Water Table	11/13/2012	336
R-21	Onsite	Water Table	12/11/2012	314
R-21	Onsite	Water Table	01/15/2013	303
R-21	Onsite	Water Table	02/18/2013	279
R-21	Onsite	Water Table	03/12/2013	369
R-21	Onsite	Water Table	04/10/2013	236
R-21	Onsite	Water Table	05/13/2013	277JL*
R-21	Onsite	Water Table	06/03/2013	410JL*
R-21	Onsite	Water Table	06/03/2013	337
R-21	Onsite	Water Table	06/04/2013	297
R-21	Onsite	Water Table	06/04/2013	309
R-21	Onsite	Water Table	06/05/2013	307
R-21	Onsite	Water Table	06/06/2013	284
R-21	Onsite	Water Table	06/11/2013	273
R-21	Onsite	Water Table	07/24/2013	309

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Flint Hills Resources Alaska, LLC
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Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
R-21	Onsite	Water Table	08/14/2013	307
R-21	Onsite	Water Table	09/17/2013	288
R-21	Onsite	Water Table	10/18/2013	269
R-21	Onsite	Water Table	11/14/2013	251
R-21	Onsite	Water Table	12/19/2013	328
R-21	Onsite	Water Table	01/16/2014	269
R-21	Onsite	Water Table	02/13/2014	241
R-21	Onsite	Water Table	03/13/2014	243
R-21	Onsite	Water Table	04/17/2014	257
R-21	Onsite	Water Table	05/15/2014	262
R-21	Onsite	Water Table	06/23/2014	244
R-21	Onsite	Water Table	07/23/2014	262
R-21	Onsite	Water Table	08/27/2014	250
R-21	Onsite	Water Table	09/18/2014	289
R-21	Onsite	Water Table	10/16/2014	265
R-21	Onsite	Water Table	11/12/2014	267
R-21	Onsite	Water Table	12/10/2014	279
R-21	Onsite	Water Table	01/12/2015	220
R-21	Onsite	Water Table	02/11/2015	226
R-21	Onsite	Water Table	03/11/2015	219
R-21	Onsite	Water Table	04/06/2015	223
R-21	Onsite	Water Table	05/13/2015	212
R-21	Onsite	Water Table	06/08/2015	264
R-21	Onsite	Water Table	07/08/2015	286
R-21	Onsite	Water Table	10/06/2015	270
R-21	Onsite	Water Table	01/06/2016	217
R-21	Onsite	Water Table	02/04/2016	242
R-21	Onsite	Water Table	03/02/2016	230
R-21	Onsite	Water Table	04/14/2016	214
R-21	Onsite	Water Table	05/05/2016	233
R-21	Onsite	Water Table	06/01/2016	452JL*
R-21	Onsite	Water Table	07/06/2016	272
R-21	Onsite	Water Table	08/05/2016	245
R-21	Onsite	Water Table	09/06/2016	256
R-21	Onsite	Water Table	10/03/2016	247
R-21	Onsite	Water Table	11/03/2016	256
R-21	Onsite	Water Table	12/01/2016	239
R-21	Onsite	Water Table	01/05/2017	235J*
R-21	Onsite	Water Table	02/01/2017	223
R-21	Onsite	Water Table	03/01/2017	211JL*
R-21	Onsite	Water Table	04/05/2017	211
R-21	Onsite	Water Table	05/03/2017	194
R-21	Onsite	Water Table	06/06/2017	184J*
R-21	Onsite	Water Table	07/26/2017	328
R-21	Onsite	Water Table	07/06/2017	189
R-21	Onsite	Water Table	08/29/2017	236
R-21	Onsite	Water Table	09/19/2017	328
R-21	Onsite	Water Table	10/26/2017	279
R-32	Onsite	Water Table	12/03/2010	<12900
R-32	Onsite	Water Table	04/01/2013	<62.0
R-32R	Onsite	Water Table	10/08/2013	1100
R-32R	Onsite	Water Table	03/17/2014	1090

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
R-32R	Onsite	Water Table	04/21/2014	976
R-32R	Onsite	Water Table	09/02/2014	818
R-32R	Onsite	Water Table	10/29/2014	841
R-32R	Onsite	Water Table	02/19/2015	854
R-32R	Onsite	Water Table	04/20/2015	891
R-32R	Onsite	Water Table	08/06/2015	697JL*
R-32R	Onsite	Water Table	10/27/2015	770
R-32R	Onsite	Water Table	02/22/2016	743
R-32R	Onsite	Water Table	08/16/2016	344
R-32R	Onsite	Water Table	02/23/2017	570
R-33	Onsite	Water Table	12/06/2010	<13100
R-35R	Onsite	Water Table	01/17/2012	123
R-35R	Onsite	Water Table	02/15/2012	127
R-35R	Onsite	Water Table	03/19/2012	118
R-35R	Onsite	Water Table	04/18/2012	110
R-35R	Onsite	Water Table	05/16/2012	113
R-35R	Onsite	Water Table	06/18/2012	112
R-35R	Onsite	Water Table	07/17/2012	131
R-35R	Onsite	Water Table	08/09/2012	131
R-35R	Onsite	Water Table	09/13/2012	147
R-35R	Onsite	Water Table	10/16/2012	121
R-35R	Onsite	Water Table	11/13/2012	139
R-35R	Onsite	Water Table	12/11/2012	125
R-35R	Onsite	Water Table	01/15/2013	124
R-35R	Onsite	Water Table	02/18/2013	124
R-35R	Onsite	Water Table	03/12/2013	124
R-35R	Onsite	Water Table	04/10/2013	111
R-35R	Onsite	Water Table	05/13/2013	100
R-35R	Onsite	Water Table	06/03/2013	106
R-35R	Onsite	Water Table	06/03/2013	104
R-35R	Onsite	Water Table	06/04/2013	116
R-35R	Onsite	Water Table	06/04/2013	118
R-35R	Onsite	Water Table	06/05/2013	118
R-35R	Onsite	Water Table	06/06/2013	112
R-35R	Onsite	Water Table	06/11/2013	107
R-35R	Onsite	Water Table	07/24/2013	114
R-35R	Onsite	Water Table	08/14/2013	126
R-35R	Onsite	Water Table	09/17/2013	119
R-35R	Onsite	Water Table	10/18/2013	106
R-35R	Onsite	Water Table	11/14/2013	94.9
R-35R	Onsite	Water Table	12/19/2013	91.9
R-35R	Onsite	Water Table	01/16/2014	82.9
R-35R	Onsite	Water Table	02/13/2014	78.8
R-35R	Onsite	Water Table	03/13/2014	72.8
R-35R	Onsite	Water Table	04/17/2014	84.2
R-35R	Onsite	Water Table	05/15/2014	73.3
R-35R	Onsite	Water Table	06/23/2014	62.2
R-35R	Onsite	Water Table	07/23/2014	77.9
R-35R	Onsite	Water Table	08/27/2014	57.3
R-35R	Onsite	Water Table	09/18/2014	53.6
R-35R	Onsite	Water Table	10/16/2014	39.1
R-35R	Onsite	Water Table	11/12/2014	41.8

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
R-35R	Onsite	Water Table	12/10/2014	38.0
R-35R	Onsite	Water Table	01/12/2015	37.9
R-35R	Onsite	Water Table	02/11/2015	39.4
R-35R	Onsite	Water Table	03/11/2015	42.8
R-35R	Onsite	Water Table	04/06/2015	41.9
R-35R	Onsite	Water Table	05/13/2015	45.2
R-35R	Onsite	Water Table	06/08/2015	51.6
R-35R	Onsite	Water Table	07/08/2015	56.0
R-35R	Onsite	Water Table	10/06/2015	39.3
R-35R	Onsite	Water Table	01/06/2016	52.3
R-35R	Onsite	Water Table	02/04/2016	45.8
R-35R	Onsite	Water Table	03/02/2016	53.2
R-35R	Onsite	Water Table	04/14/2016	41.7
R-35R	Onsite	Water Table	05/05/2016	49.2
R-35R	Onsite	Water Table	06/01/2016	51.1
R-35R	Onsite	Water Table	07/06/2016	56.2
R-35R	Onsite	Water Table	08/05/2016	52.5
R-35R	Onsite	Water Table	09/06/2016	53.3
R-35R	Onsite	Water Table	10/03/2016	46.9
R-35R	Onsite	Water Table	11/03/2016	50.7
R-35R	Onsite	Water Table	12/01/2016	42.0
R-35R	Onsite	Water Table	01/05/2017	36.1
R-35R	Onsite	Water Table	02/01/2017	35.0
R-35R	Onsite	Water Table	03/01/2017	33.7
R-35R	Onsite	Water Table	04/05/2017	32.0
R-35R	Onsite	Water Table	05/03/2017	30.2
R-35R	Onsite	Water Table	06/06/2017	23.1
R-35R	Onsite	Water Table	07/27/2017	28.9
R-35R	Onsite	Water Table	07/06/2017	25.9
R-35R	Onsite	Water Table	08/30/2017	9.71J
R-35R	Onsite	Water Table	09/20/2017	13.5
R-35R	Onsite	Water Table	10/25/2017	9.14J
R-39	Onsite	Water Table	01/17/2012	<6.20
R-39	Onsite	Water Table	02/15/2012	<6.52
R-39	Onsite	Water Table	03/19/2012	<6.20
R-39	Onsite	Water Table	04/18/2012	<6.20
R-39	Onsite	Water Table	05/16/2012	<6.20
R-39	Onsite	Water Table	06/18/2012	<6.20
R-39	Onsite	Water Table	07/17/2012	<6.46
R-39	Onsite	Water Table	08/09/2012	<6.20
R-39	Onsite	Water Table	09/13/2012	<6.60
R-39	Onsite	Water Table	10/16/2012	<6.20
R-39	Onsite	Water Table	11/13/2012	<6.20
R-39	Onsite	Water Table	12/11/2012	<6.40
R-39	Onsite	Water Table	01/15/2013	<6.52
R-39	Onsite	Water Table	02/18/2013	<6.40
R-39	Onsite	Water Table	03/12/2013	<6.52
R-39	Onsite	Water Table	04/10/2013	<6.20
R-40	Onsite	Water Table	01/17/2012	68.4
R-40	Onsite	Water Table	02/15/2012	69.2
R-40	Onsite	Water Table	03/19/2012	54.9
R-40	Onsite	Water Table	04/18/2012	48.0

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
R-40	Onsite	Water Table	05/16/2012	38.7
R-40	Onsite	Water Table	06/18/2012	39.4
R-40	Onsite	Water Table	07/17/2012	49.8
R-40	Onsite	Water Table	08/09/2012	47.8
R-40	Onsite	Water Table	09/13/2012	48.3
R-40	Onsite	Water Table	10/16/2012	50.9
R-40	Onsite	Water Table	11/13/2012	44.2
R-40	Onsite	Water Table	12/11/2012	40.7
R-40	Onsite	Water Table	01/15/2013	41.6
R-40	Onsite	Water Table	02/18/2013	39.1
R-40	Onsite	Water Table	03/12/2013	39.5
R-40	Onsite	Water Table	04/10/2013	36.3
R-40	Onsite	Water Table	12/29/2014	21.5
R-40	Onsite	Water Table	01/05/2015	32.3
R-40	Onsite	Water Table	01/07/2015	33.5
R-40	Onsite	Water Table	01/12/2015	28.7
R-40	Onsite	Water Table	01/14/2015	34.6
R-40	Onsite	Water Table	01/19/2015	36.5
R-40	Onsite	Water Table	01/21/2015	30.6
R-40	Onsite	Water Table	02/02/2015	28.8
R-40	Onsite	Water Table	02/04/2015	33.1
R-40	Onsite	Water Table	02/09/2015	32.9
R-40	Onsite	Water Table	02/11/2015	33.5
R-40	Onsite	Water Table	02/18/2015	32.4
R-40	Onsite	Water Table	02/25/2015	32.3
R-40	Onsite	Water Table	03/02/2015	31.1
R-40	Onsite	Water Table	03/04/2015	34.1
R-40	Onsite	Water Table	03/09/2015	31.8
R-40	Onsite	Water Table	03/11/2015	30.9
R-40	Onsite	Water Table	04/06/2015	32.1
R-40	Onsite	Water Table	05/13/2015	29.4
R-40	Onsite	Water Table	06/08/2015	29.4
R-40	Onsite	Water Table	07/08/2015	31.6
R-40	Onsite	Water Table	10/06/2015	34.3
R-40	Onsite	Water Table	01/06/2016	27.6
R-40	Onsite	Water Table	02/04/2016	22.4
R-40	Onsite	Water Table	03/16/2016	18.2
R-40	Onsite	Water Table	04/27/2016	21.7
R-40	Onsite	Water Table	05/05/2016	24.8
R-40	Onsite	Water Table	06/01/2016	22.7
R-40	Onsite	Water Table	07/06/2016	20.9
R-40	Onsite	Water Table	08/05/2016	27.0
R-40	Onsite	Water Table	09/06/2016	27.3
R-40	Onsite	Water Table	10/03/2016	29.1
R-40	Onsite	Water Table	11/03/2016	23.9
R-40	Onsite	Water Table	12/01/2016	26.2
R-40	Onsite	Water Table	01/05/2017	23.0
R-40	Onsite	Water Table	02/01/2017	20.2
R-40	Onsite	Water Table	03/01/2017	22.6
R-40	Onsite	Water Table	04/05/2017	21.0
R-40	Onsite	Water Table	05/03/2017	20.3
R-40	Onsite	Water Table	06/06/2017	17.6JL*

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
R-40	Onsite	Water Table	08/15/2017	52.9
R-40	Onsite	Water Table	07/06/2017	15.2
R-40	Onsite	Water Table	10/20/2017	86.4
R-42	Onsite	Water Table	01/17/2012	59.1
R-42	Onsite	Water Table	02/15/2012	69.8
R-42	Onsite	Water Table	03/19/2012	60.4
R-42	Onsite	Water Table	04/18/2012	65.6
R-42	Onsite	Water Table	05/16/2012	70.8
R-42	Onsite	Water Table	06/18/2012	61.8
R-42	Onsite	Water Table	07/17/2012	50.2
R-42	Onsite	Water Table	08/09/2012	57.4J*
R-42	Onsite	Water Table	09/13/2012	54.2
R-42	Onsite	Water Table	10/16/2012	52.6
R-42	Onsite	Water Table	11/13/2012	52.5
R-42	Onsite	Water Table	12/11/2012	50.4
R-42	Onsite	Water Table	01/15/2013	47.0
R-42	Onsite	Water Table	02/18/2013	39.7
R-42	Onsite	Water Table	03/12/2013	43.5
R-42	Onsite	Water Table	04/10/2013	38.2
R-42	Onsite	Water Table	05/13/2013	29.4
R-42	Onsite	Water Table	05/31/2013	14.5
R-42	Onsite	Water Table	05/31/2013	19.5
R-42	Onsite	Water Table	05/31/2013	19.7
R-42	Onsite	Water Table	05/31/2013	24.4
R-42	Onsite	Water Table	05/31/2013	27.5
R-42	Onsite	Water Table	05/31/2013	28.3
R-42	Onsite	Water Table	06/03/2013	19.9
R-42	Onsite	Water Table	06/03/2013	25.7
R-42	Onsite	Water Table	06/04/2013	24.4
R-42	Onsite	Water Table	06/04/2013	26.5
R-42	Onsite	Water Table	06/05/2013	27.7
R-42	Onsite	Water Table	06/06/2013	28.1
R-42	Onsite	Water Table	06/11/2013	27.6
R-42	Onsite	Water Table	07/24/2013	21.9
R-42	Onsite	Water Table	08/14/2013	20.0
R-42	Onsite	Water Table	09/17/2013	19.2
R-42	Onsite	Water Table	10/18/2013	20.3
R-42	Onsite	Water Table	11/14/2013	21.6
R-42	Onsite	Water Table	12/19/2013	25.3
R-42	Onsite	Water Table	01/16/2014	23.0
R-42	Onsite	Water Table	02/13/2014	20.7
R-42	Onsite	Water Table	03/13/2014	22.0
R-42	Onsite	Water Table	04/17/2014	21.3
R-42	Onsite	Water Table	05/15/2014	18.9
R-42	Onsite	Water Table	06/23/2014	21.2
R-42	Onsite	Water Table	06/27/2014	18.9
R-42	Onsite	Water Table	07/21/2014	20.1
R-42	Onsite	Water Table	08/18/2014	23.4
R-42	Onsite	Water Table	09/17/2014	28.0
R-42	Onsite	Water Table	10/16/2014	30.3
R-42	Onsite	Water Table	11/11/2014	31.7
R-42	Onsite	Water Table	12/02/2014	30.5

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
R-42	Onsite	Water Table	12/10/2014	29.6
R-42	Onsite	Water Table	01/13/2015	28.9
R-42	Onsite	Water Table	02/10/2015	29.4
R-42	Onsite	Water Table	03/10/2015	31.2
R-42	Onsite	Water Table	04/07/2015	32.2
R-42	Onsite	Water Table	05/13/2015	26.3
R-42	Onsite	Water Table	06/10/2015	26.2
R-42	Onsite	Water Table	07/06/2015	21.0JL *
R-42	Onsite	Water Table	10/07/2015	26.0
R-42	Onsite	Water Table	01/05/2016	23.4
R-42	Onsite	Water Table	02/02/2016	24.2
R-42	Onsite	Water Table	03/01/2016	23.2
R-42	Onsite	Water Table	04/06/2016	25.0
R-42	Onsite	Water Table	05/04/2016	27.9
R-42	Onsite	Water Table	06/03/2016	23.2
R-42	Onsite	Water Table	07/07/2016	18.2
R-42	Onsite	Water Table	08/04/2016	17.1
R-42	Onsite	Water Table	09/06/2016	17.8
R-42	Onsite	Water Table	10/03/2016	20.8
R-42	Onsite	Water Table	11/03/2016	19.2
R-42	Onsite	Water Table	12/01/2016	16.5
R-42	Onsite	Water Table	01/05/2017	14.6J*
R-42	Onsite	Water Table	02/01/2017	16.9
R-42	Onsite	Water Table	03/01/2017	16.0
R-42	Onsite	Water Table	04/05/2017	16.5
R-42	Onsite	Water Table	05/03/2017	16.1
R-42	Onsite	Water Table	06/06/2017	15.4
R-42	Onsite	Water Table	07/06/2017	15.6
R-43	Onsite	Water Table	05/13/2013	118
R-43	Onsite	Water Table	05/29/2013	119
R-43	Onsite	Water Table	05/29/2013	117
R-43	Onsite	Water Table	05/29/2013	121
R-43	Onsite	Water Table	05/29/2013	121
R-43	Onsite	Water Table	05/29/2013	118
R-43	Onsite	Water Table	05/29/2013	125
R-43	Onsite	Water Table	06/03/2013	150
R-43	Onsite	Water Table	06/03/2013	140
R-43	Onsite	Water Table	06/04/2013	140
R-43	Onsite	Water Table	06/04/2013	145
R-43	Onsite	Water Table	06/04/2013	139
R-43	Onsite	Water Table	06/05/2013	128
R-43	Onsite	Water Table	06/06/2013	127
R-43	Onsite	Water Table	06/11/2013	109
R-43	Onsite	Water Table	07/24/2013	81.3
R-43	Onsite	Water Table	08/14/2013	69.1
R-43	Onsite	Water Table	09/17/2013	65.9
R-43	Onsite	Water Table	10/18/2013	66.6
R-43	Onsite	Water Table	11/14/2013	71.5
R-43	Onsite	Water Table	12/19/2013	124
R-43	Onsite	Water Table	01/16/2014	88.3
R-43	Onsite	Water Table	02/13/2014	78.2
R-43	Onsite	Water Table	03/13/2014	70.1

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
R-43	Onsite	Water Table	04/17/2014	73.0
R-43	Onsite	Water Table	05/15/2014	73.5
R-43	Onsite	Water Table	06/23/2014	79.1
R-43	Onsite	Water Table	08/27/2014	94.2
R-43	Onsite	Water Table	09/18/2014	94.8
R-43	Onsite	Water Table	10/16/2014	88.2
R-43	Onsite	Water Table	11/12/2014	97.8
R-43	Onsite	Water Table	12/10/2014	97.4
R-43	Onsite	Water Table	01/12/2015	99.2
R-43	Onsite	Water Table	02/11/2015	89.9
R-43	Onsite	Water Table	03/11/2015	101
R-43	Onsite	Water Table	04/06/2015	106
R-43	Onsite	Water Table	05/13/2015	99.9
R-43	Onsite	Water Table	06/08/2015	92.1
R-43	Onsite	Water Table	07/08/2015	92.3
R-43	Onsite	Water Table	10/06/2015	99.7
R-43	Onsite	Water Table	01/06/2016	81.3
R-43	Onsite	Water Table	02/04/2016	86.7
R-43	Onsite	Water Table	03/02/2016	83.7
R-43	Onsite	Water Table	04/14/2016	104
R-43	Onsite	Water Table	05/05/2016	97.4
R-43	Onsite	Water Table	06/01/2016	123
R-43	Onsite	Water Table	07/06/2016	85.6
R-43	Onsite	Water Table	08/05/2016	77.2
R-43	Onsite	Water Table	09/06/2016	91.7
R-43	Onsite	Water Table	10/03/2016	110
R-43	Onsite	Water Table	11/03/2016	99.7
R-43	Onsite	Water Table	12/01/2016	89.5
R-43	Onsite	Water Table	01/05/2017	87.6J*
R-43	Onsite	Water Table	02/01/2017	86.1
R-43	Onsite	Water Table	03/01/2017	77.9
R-43	Onsite	Water Table	04/05/2017	85.4
R-43	Onsite	Water Table	05/03/2017	79.2
R-43	Onsite	Water Table	06/06/2017	76.1
R-43	Onsite	Water Table	07/06/2017	73.6
R-44	Onsite	Water Table	05/13/2013	63.1
R-44	Onsite	Water Table	06/01/2013	46.7
R-44	Onsite	Water Table	06/01/2013	62.5
R-44	Onsite	Water Table	06/01/2013	64.7
R-44	Onsite	Water Table	06/01/2013	64.5
R-44	Onsite	Water Table	06/01/2013	69.9
R-44	Onsite	Water Table	06/01/2013	74.1
R-44	Onsite	Water Table	06/03/2013	82.6
R-44	Onsite	Water Table	06/03/2013	80.1
R-44	Onsite	Water Table	06/04/2013	80.2
R-44	Onsite	Water Table	06/04/2013	76.4
R-44	Onsite	Water Table	06/04/2013	78.7
R-44	Onsite	Water Table	06/05/2013	71.1
R-44	Onsite	Water Table	06/06/2013	70.4
R-44	Onsite	Water Table	06/11/2013	58.6
R-44	Onsite	Water Table	07/24/2013	47.9
R-44	Onsite	Water Table	08/14/2013	45.7

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
R-44	Onsite	Water Table	09/17/2013	40.9
R-44	Onsite	Water Table	10/18/2013	37.7
R-44	Onsite	Water Table	11/14/2013	37.7
R-44	Onsite	Water Table	12/19/2013	55.1
R-44	Onsite	Water Table	01/16/2014	43.4
R-44	Onsite	Water Table	02/13/2014	42.7
R-44	Onsite	Water Table	03/13/2014	45.3
R-44	Onsite	Water Table	04/17/2014	49.1
R-44	Onsite	Water Table	05/15/2014	45.7
R-44	Onsite	Water Table	06/23/2014	51.5
R-44	Onsite	Water Table	07/23/2014	61.2JL *
R-44	Onsite	Water Table	08/27/2014	53.0
R-44	Onsite	Water Table	09/18/2014	45.5
R-44	Onsite	Water Table	10/16/2014	40.6
R-44	Onsite	Water Table	11/12/2014	40.0
R-44	Onsite	Water Table	12/10/2014	42.3
R-44	Onsite	Water Table	01/12/2015	42.8
R-44	Onsite	Water Table	02/11/2015	44.6
R-44	Onsite	Water Table	03/11/2015	47.1
R-44	Onsite	Water Table	04/06/2015	49.2
R-44	Onsite	Water Table	05/13/2015	49.8
R-44	Onsite	Water Table	06/08/2015	41.2
R-44	Onsite	Water Table	07/08/2015	43.8
R-44	Onsite	Water Table	10/06/2015	52.2
R-44	Onsite	Water Table	01/06/2016	38.2J*
R-44	Onsite	Water Table	02/04/2016	35.4
R-44	Onsite	Water Table	03/02/2016	33.8
R-44	Onsite	Water Table	04/14/2016	41.8
R-44	Onsite	Water Table	05/05/2016	37.0
R-44	Onsite	Water Table	06/01/2016	34.1
R-44	Onsite	Water Table	07/06/2016	36.2
R-44	Onsite	Water Table	08/10/2016	51.1
R-44	Onsite	Water Table	09/06/2016	46.7
R-44	Onsite	Water Table	10/03/2016	57.3
R-44	Onsite	Water Table	11/03/2016	44.2
R-44	Onsite	Water Table	12/01/2016	41.9
R-44	Onsite	Water Table	01/05/2017	39.3
R-44	Onsite	Water Table	02/01/2017	38.9
R-44	Onsite	Water Table	03/01/2017	34.4
R-44	Onsite	Water Table	04/05/2017	33.7
R-44	Onsite	Water Table	05/03/2017	32.0J*
R-44	Onsite	Water Table	06/06/2017	29.2JL *
R-44	Onsite	Water Table	07/06/2017	27.4
R-45	Onsite	Water Table	05/13/2013	37.9
R-45	Onsite	Water Table	05/30/2013	44.0
R-45	Onsite	Water Table	05/30/2013	42.7
R-45	Onsite	Water Table	05/30/2013	45.6
R-45	Onsite	Water Table	05/30/2013	43.9
R-45	Onsite	Water Table	05/30/2013	43.7
R-45	Onsite	Water Table	05/30/2013	39.3
R-45	Onsite	Water Table	06/03/2013	47.3
R-45	Onsite	Water Table	06/03/2013	46.8

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Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
R-45	Onsite	Water Table	06/04/2013	45.3
R-45	Onsite	Water Table	06/04/2013	42.8
R-45	Onsite	Water Table	06/05/2013	42.5
R-45	Onsite	Water Table	06/06/2013	41.9
R-45	Onsite	Water Table	06/11/2013	45.8
R-45	Onsite	Water Table	07/24/2013	44.6
R-45	Onsite	Water Table	08/14/2013	45.3
R-45	Onsite	Water Table	09/17/2013	42.9
R-45	Onsite	Water Table	10/18/2013	42.6
R-45	Onsite	Water Table	11/14/2013	40.4
R-45	Onsite	Water Table	12/19/2013	70.8
R-45	Onsite	Water Table	01/16/2014	52.3
R-45	Onsite	Water Table	02/13/2014	50.3
R-45	Onsite	Water Table	03/13/2014	46.7
R-45	Onsite	Water Table	04/17/2014	60.1
R-45	Onsite	Water Table	05/15/2014	60.5
R-45	Onsite	Water Table	06/23/2014	57.0
R-45	Onsite	Water Table	07/23/2014	71.1
R-45	Onsite	Water Table	08/27/2014	64.5
R-45	Onsite	Water Table	09/18/2014	57.4
R-45	Onsite	Water Table	10/16/2014	50.0
R-45	Onsite	Water Table	11/12/2014	52.4
R-45	Onsite	Water Table	12/10/2014	49.2
R-45	Onsite	Water Table	01/12/2015	43.5
R-45	Onsite	Water Table	03/11/2015	41.1
R-45	Onsite	Water Table	04/06/2015	41.9
R-45	Onsite	Water Table	05/13/2015	39.7
R-45	Onsite	Water Table	06/08/2015	42.3
R-45	Onsite	Water Table	07/08/2015	45.3
R-45	Onsite	Water Table	10/06/2015	61.9
R-45	Onsite	Water Table	01/06/2016	43.1
R-45	Onsite	Water Table	02/04/2016	37.7
R-45	Onsite	Water Table	03/02/2016	34.8
R-45	Onsite	Water Table	04/14/2016	43.0
R-45	Onsite	Water Table	05/05/2016	37.6
R-45	Onsite	Water Table	06/01/2016	36.8JL*
R-45	Onsite	Water Table	07/06/2016	34.7
R-45	Onsite	Water Table	08/05/2016	38.3
R-45	Onsite	Water Table	09/06/2016	48.8
R-45	Onsite	Water Table	10/03/2016	54.6
R-45	Onsite	Water Table	11/03/2016	46.7
R-45	Onsite	Water Table	12/01/2016	41.0
R-45	Onsite	Water Table	01/05/2017	37.4
R-45	Onsite	Water Table	02/01/2017	36.7
R-45	Onsite	Water Table	03/01/2017	30.7JL*
R-45	Onsite	Water Table	04/05/2017	34.2
R-45	Onsite	Water Table	05/03/2017	32.1
R-45	Onsite	Water Table	06/06/2017	26.7J*
R-45	Onsite	Water Table	07/06/2017	29.3
R-46	Onsite	Water Table	05/13/2013	6.20JL*
R-46	Onsite	Water Table	06/03/2013	<6.60
R-46	Onsite	Water Table	06/03/2013	<6.66

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
R-46	Onsite	Water Table	06/04/2013	<6.20
R-46	Onsite	Water Table	06/04/2013	<6.20
R-46	Onsite	Water Table	06/04/2013	<6.20
R-46	Onsite	Water Table	06/05/2013	<6.20
R-46	Onsite	Water Table	06/06/2013	<6.20
R-46	Onsite	Water Table	06/11/2013	<6.20
R-46	Onsite	Water Table	07/24/2013	<6.20
R-46	Onsite	Water Table	08/14/2013	<6.32
R-46	Onsite	Water Table	09/17/2013	<6.32
R-46	Onsite	Water Table	10/18/2013	<6.36
R-46	Onsite	Water Table	11/14/2013	<5.20
R-46	Onsite	Water Table	12/19/2013	<5.00
R-46	Onsite	Water Table	01/16/2014	<5.30
R-46	Onsite	Water Table	02/13/2014	<5.00
R-46	Onsite	Water Table	03/13/2014	<5.20
R-46	Onsite	Water Table	04/17/2014	<5.00
R-46	Onsite	Water Table	05/15/2014	<5.00
R-46	Onsite	Water Table	06/23/2014	<5.60
R-46	Onsite	Water Table	07/23/2014	<5.25
R-46	Onsite	Water Table	08/27/2014	<5.45
R-46	Onsite	Water Table	09/18/2014	<5.20
R-46	Onsite	Water Table	10/16/2014	<5.00
R-46	Onsite	Water Table	11/12/2014	<5.00
R-46	Onsite	Water Table	12/10/2014	<5.10
R-46	Onsite	Water Table	01/12/2015	<5.00
R-46	Onsite	Water Table	02/11/2015	<5.00
R-46	Onsite	Water Table	03/11/2015	<5.00
R-46	Onsite	Water Table	04/06/2015	<5.00
R-46	Onsite	Water Table	05/13/2015	<5.00
R-46	Onsite	Water Table	06/08/2015	<5.15
R-46	Onsite	Water Table	07/08/2015	<5.00
R-46	Onsite	Water Table	10/06/2015	<5.05
R-46	Onsite	Water Table	01/06/2016	<5.05
R-46	Onsite	Water Table	02/04/2016	<5.15
R-46	Onsite	Water Table	03/02/2016	<5.15
R-46	Onsite	Water Table	04/14/2016	<5.30
R-46	Onsite	Water Table	05/05/2016	<5.05
R-46	Onsite	Water Table	06/01/2016	<5.00
R-46	Onsite	Water Table	07/06/2016	<5.05
R-46	Onsite	Water Table	08/05/2016	<5.20
R-46	Onsite	Water Table	09/06/2016	<5.05
R-46	Onsite	Water Table	10/03/2016	<5.05
R-46	Onsite	Water Table	11/03/2016	<5.10
R-46	Onsite	Water Table	12/01/2016	<5.10
R-46	Onsite	Water Table	01/05/2017	<5.05
R-46	Onsite	Water Table	02/01/2017	<5.05
R-46	Onsite	Water Table	03/01/2017	<5.20
R-46	Onsite	Water Table	04/05/2017	<5.00
R-46	Onsite	Water Table	05/03/2017	<5.20
R-46	Onsite	Water Table	06/06/2017	<5.25
R-46	Onsite	Water Table	07/06/2017	<5.20
R-47	Onsite	10-55	06/26/2014	21.7

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
R-47	Onsite	10-55	06/27/2014	20.2
R-47	Onsite	10-55	07/03/2014	18.9
R-47	Onsite	10-55	07/21/2014	14.4
R-47	Onsite	10-55	08/18/2014	12.0
R-47	Onsite	10-55	09/17/2014	12.8
R-47	Onsite	10-55	10/15/2014	11.8
R-47	Onsite	10-55	11/11/2014	11.9
R-47	Onsite	10-55	12/02/2014	12.0
R-47	Onsite	10-55	01/13/2015	12.6
R-47	Onsite	10-55	02/10/2015	10.8
R-47	Onsite	10-55	03/10/2015	9.67J
R-47	Onsite	10-55	04/07/2015	8.66J
R-47	Onsite	10-55	05/13/2015	7.29J
R-47	Onsite	10-55	06/10/2015	5.07J
R-47	Onsite	10-55	07/06/2015	22.9
R-47	Onsite	10-55	08/04/2015	6.70J
R-47	Onsite	10-55	10/07/2015	8.81J
R-47	Onsite	10-55	01/05/2016	8.27J
R-47	Onsite	10-55	02/02/2016	8.13J
R-47	Onsite	10-55	03/01/2016	7.85J*
R-47	Onsite	10-55	04/06/2016	<5.15
R-47	Onsite	10-55	05/04/2016	8.01J
R-47	Onsite	10-55	06/03/2016	7.20J
R-47	Onsite	10-55	07/07/2016	7.96J
R-47	Onsite	10-55	08/04/2016	6.82J
R-48	Onsite	10-55	06/26/2014	31.6
R-48	Onsite	10-55	06/27/2014	33.6
R-48	Onsite	10-55	07/07/2016	16.4
R-48	Onsite	10-55	08/04/2016	17.5
S-9	Onsite	Water Table	09/03/2008	262
S-19	Onsite	Water Table	09/03/2008	<10.4
S-20	Onsite	Water Table	04/18/2007	5570
S-20	Onsite	Water Table	10/17/2007	<515
S-20	Onsite	Water Table	04/03/2008	9400
S-20	Onsite	Water Table	10/01/2008	6320
S-20	Onsite	Water Table	04/10/2009	3750
S-20	Onsite	Water Table	10/02/2009	<16700
S-20	Onsite	Water Table	04/06/2010	<6600
S-21	Onsite	Water Table	04/19/2006	870
S-21	Onsite	Water Table	05/17/2006	<21.0
S-21	Onsite	Water Table	06/21/2006	<100
S-21	Onsite	Water Table	07/19/2006	<59.0
S-21	Onsite	Water Table	01/15/2007	760
S-21	Onsite	Water Table	07/18/2007	<113
S-21	Onsite	Water Table	10/18/2007	<419
S-21	Onsite	Water Table	01/03/2008	<119
S-21	Onsite	Water Table	04/03/2008	3160
S-21	Onsite	Water Table	07/01/2008	<100
S-21	Onsite	Water Table	10/01/2008	<10.2
S-21	Onsite	Water Table	01/12/2009	<5640
S-21	Onsite	Water Table	04/08/2009	<699
S-21	Onsite	Water Table	07/07/2009	<10.5

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
S-21	Onsite	Water Table	10/02/2009	<258
S-21	Onsite	Water Table	01/20/2010	<206
S-21	Onsite	Water Table	04/06/2010	<16800
S-21	Onsite	Water Table	05/22/2012	<7.04
S-21	Onsite	Water Table	05/02/2013	<6.40
S-21	Onsite	Water Table	11/04/2013	4.45J
S-21	Onsite	Water Table	03/27/2014	4.25J
S-21	Onsite	Water Table	08/25/2014	5.44J
S-21	Onsite	Water Table	02/19/2015	4.14J
S-21	Onsite	Water Table	08/06/2015	4.02JL*
S-21	Onsite	Water Table	02/26/2016	6.00J
S-21	Onsite	Water Table	08/18/2016	6.75JL*
S-21	Onsite	Water Table	02/28/2017	5.42JL*
S-39	Onsite	Water Table	08/20/2013	7.14JL*
S-39	Onsite	Water Table	04/16/2014	5.73J
S-39	Onsite	Water Table	10/22/2014	7.64J
S-39	Onsite	Water Table	08/18/2016	R*
S-39	Onsite	Water Table	04/13/2017	5.23J
S-41R	Onsite	Water Table	05/17/2006	150
S-41R	Onsite	Water Table	06/21/2006	140
S-41R	Onsite	Water Table	07/19/2006	<110
S-41R	Onsite	Water Table	10/17/2007	222
S-41R	Onsite	Water Table	04/04/2008	97.2
S-41R	Onsite	Water Table	10/03/2008	370
S-41R	Onsite	Water Table	04/10/2009	112
S-41R	Onsite	Water Table	10/02/2009	122
S-41R	Onsite	Water Table	04/03/2010	138
S-41R	Onsite	Water Table	10/14/2010	366
S-41R	Onsite	Water Table	04/14/2011	1090
S-41R	Onsite	Water Table	01/30/2014	134
S-41R	Onsite	Water Table	04/24/2014	111
S-41R	Onsite	Water Table	09/04/2014	111
S-41R	Onsite	Water Table	10/29/2014	74.3
S-41R	Onsite	Water Table	02/25/2015	31.7
S-41R	Onsite	Water Table	04/22/2015	38.3
S-41R	Onsite	Water Table	08/10/2015	94.6
S-41R	Onsite	Water Table	10/22/2015	111
S-41R	Onsite	Water Table	02/29/2016	76.3JL*
S-41R	Onsite	Water Table	08/16/2016	83.4
S-41R	Onsite	Water Table	02/23/2017	64.6
S-43	Onsite	Water Table	02/12/2013	<6.66
S-43	Onsite	Water Table	06/12/2013	3.98J
S-43	Onsite	Water Table	08/20/2013	7.55J
S-43	Onsite	Water Table	11/04/2013	4.94J
S-43	Onsite	Water Table	03/11/2014	8.00JN*
S-43	Onsite	Water Table	04/21/2014	8.33J
S-43	Onsite	Water Table	09/02/2014	35.2
S-43	Onsite	Water Table	10/29/2014	10.9
S-43	Onsite	Water Table	02/20/2015	6.97J
S-43	Onsite	Water Table	04/20/2015	5.18J
S-43	Onsite	Water Table	08/05/2015	5.86J
S-43	Onsite	Water Table	10/27/2015	4.14J

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
S-43	Onsite	Water Table	02/26/2016	6.50J
S-43	Onsite	Water Table	06/16/2016	6.00J
S-43	Onsite	Water Table	08/18/2016	8.23J
S-43	Onsite	Water Table	10/25/2016	6.99J
S-43	Onsite	Water Table	02/27/2017	5.26J
S-43	Onsite	Water Table	04/12/2017	5.11J
S-44	Onsite	Water Table	11/04/2013	<7.30
S-44	Onsite	Water Table	02/21/2015	8.56J
S-50	Onsite	Water Table	04/19/2006	3000
S-50	Onsite	Water Table	06/21/2006	4400
S-50	Onsite	Water Table	07/19/2006	12000
S-50	Onsite	Water Table	11/15/2006	2600
S-50	Onsite	Water Table	12/08/2006	4900
S-50	Onsite	Water Table	01/15/2007	3700
S-50	Onsite	Water Table	02/13/2007	3600
S-50	Onsite	Water Table	03/19/2007	4100
S-50	Onsite	Water Table	06/20/2007	3450
S-50	Onsite	Water Table	07/17/2007	3600
S-50	Onsite	Water Table	08/21/2007	2920
S-50	Onsite	Water Table	09/20/2007	2680
S-50	Onsite	Water Table	10/18/2007	3650
S-50	Onsite	Water Table	11/12/2007	2380
S-50	Onsite	Water Table	12/07/2007	2340
S-50	Onsite	Water Table	01/03/2008	2710
S-50	Onsite	Water Table	02/12/2008	2380
S-50	Onsite	Water Table	03/05/2008	2890
S-50	Onsite	Water Table	04/03/2008	2900
S-50	Onsite	Water Table	05/07/2008	2680
S-50	Onsite	Water Table	06/10/2008	3120
S-50	Onsite	Water Table	07/01/2008	1720
S-50	Onsite	Water Table	08/07/2008	694
S-50	Onsite	Water Table	09/02/2008	1990
S-50	Onsite	Water Table	10/01/2008	1960
S-50	Onsite	Water Table	11/06/2008	2020
S-50	Onsite	Water Table	12/04/2008	2190
S-50	Onsite	Water Table	01/12/2009	914
S-50	Onsite	Water Table	02/10/2009	2500
S-50	Onsite	Water Table	03/03/2009	1190
S-50	Onsite	Water Table	04/08/2009	1770
S-50	Onsite	Water Table	05/06/2009	1350
S-50	Onsite	Water Table	06/05/2009	1210
S-50	Onsite	Water Table	07/07/2009	1690
S-50	Onsite	Water Table	08/03/2009	1190
S-50	Onsite	Water Table	09/03/2009	1260
S-50	Onsite	Water Table	10/01/2009	1230
S-50	Onsite	Water Table	11/06/2009	1730
S-50	Onsite	Water Table	12/22/2009	1070
S-50	Onsite	Water Table	01/20/2010	1590
S-50	Onsite	Water Table	02/17/2010	1520
S-50	Onsite	Water Table	03/04/2010	1210
S-50	Onsite	Water Table	04/05/2010	884
S-50	Onsite	Water Table	06/14/2010	1240

Appendix A-3
Historical Sulfolane Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Sulfolane (µg/L)
S-50	Onsite	Water Table	05/02/2013	817
S-50	Onsite	Water Table	03/17/2014	902
S-50	Onsite	Water Table	08/21/2014	458
S-50	Onsite	Water Table	02/20/2015	588
S-50	Onsite	Water Table	05/15/2015	579
S-50	Onsite	Water Table	08/11/2015	558
S-50	Onsite	Water Table	10/23/2015	254
S-50	Onsite	Water Table	02/25/2016	560
S-50	Onsite	Water Table	08/18/2016	151JL*
S-50	Onsite	Water Table	02/27/2017	309
S-51	Onsite	Water Table	05/22/2012	1010
S-51	Onsite	Water Table	08/01/2012	1180
S-51	Onsite	Water Table	02/12/2013	847
S-51	Onsite	Water Table	04/01/2013	862JL*
S-51	Onsite	Water Table	08/29/2013	589JL*
S-51	Onsite	Water Table	11/06/2013	770
S-51	Onsite	Water Table	03/15/2014	816
S-51	Onsite	Water Table	04/16/2014	811
S-51	Onsite	Water Table	08/19/2014	638
S-51	Onsite	Water Table	10/29/2014	456
S-51	Onsite	Water Table	02/20/2015	599
S-51	Onsite	Water Table	04/20/2015	606
S-51	Onsite	Water Table	08/05/2015	555
S-51	Onsite	Water Table	10/26/2015	387
S-51	Onsite	Water Table	02/22/2016	571
S-51	Onsite	Water Table	06/16/2016	527
S-51	Onsite	Water Table	08/18/2016	491
S-51	Onsite	Water Table	10/26/2016	335
S-51	Onsite	Water Table	02/27/2017	333
S-51	Onsite	Water Table	04/12/2017	482
S-51	Onsite	Water Table	07/13/2017	460
S-51	Onsite	Water Table	10/18/2017	299
S-54	Onsite	Water Table	09/03/2008	<10.0

General Notes:

Higher result of a field-duplicate pair is reported.

Date listed is the sample date for recent samples. Prior to 2006, however, the date listed is likely the event date as sample dates were not always available.

MW-148-80/100/A-15/B-30/C-55/D-150 are offsite wells, but are reported along with the onsite data

Acronyms and Abbreviations:

< = not detected; limit of detection (LOD) or limit of quantitation (LOQ; for older data) listed

J = estimated concentration, detected above the detection limit (DL) and below the limit of quantitation (LOQ)

J* = result is considered estimated (no direction of bias), due to QC failures or sample-handling anomalies; flag applied by Shannon & Wilson, Inc.

JH* = result is considered estimated, biased high. Flag applied by Shannon & Wilson, Inc.

JL* = result is considered estimated, biased low. Flag applied by Shannon & Wilson, Inc.

JN* = result is considered estimated and analyte was tentatively identified. Flag applied by Shannon & Wilson, Inc.

R* = result is rejected due to significant QC failures or interference. Flag applied by Shannon & Wilson, Inc.

µg/L = micrograms per liter

UJ* = analyte was not detected; listed limit of detection (LOD) is approximate and may be inaccurate or imprecise; displayed as <...J*. Flag applied by Shannon & Wilson, Inc.

Appendix A-4
Historical COC Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Gasoline Range Organics (mg/L)	Diesel Range Organics (mg/L)
MW-101A-25	Onsite	10-55	05/10/2001	<0.0900	1.20
MW-101A-25	Onsite	10-55	07/26/2001	--	1.43
MW-101A-25	Onsite	10-55	07/31/2015	<0.0500	<0.300
MW-101A-25	Onsite	10-55	12/18/2015	<0.0500	<0.283
MW-101A-25	Onsite	10-55	07/19/2016	<0.0500	<0.288
MW-101A-25	Onsite	10-55	08/07/2017	<0.0500	<0.288
MW-101A-25	Onsite	10-55	11/15/2017	<0.0500	<0.283
MW-101-60	Onsite	10-55	05/10/2001	<0.0900	0.818
MW-101-60	Onsite	10-55	07/26/2001	--	0.946
MW-105A-25	Onsite	10-55	05/10/2001	<0.0900	<0.495
MW-105A-25	Onsite	10-55	06/13/2001	<0.0900	--
MW-105A-25	Onsite	10-55	08/04/2015	<0.0500	<0.300
MW-105A-25	Onsite	10-55	10/02/2015	<0.0500	<0.545B*
MW-105A-25	Onsite	10-55	12/18/2015	<0.0500	<0.588B*
MW-105A-25	Onsite	10-55	07/26/2016	<0.0500	<0.278
MW-105-65	Onsite	10-55	05/10/2001	0.153	<0.495
MW-105-65	Onsite	10-55	06/13/2001	<0.0900	--
MW-106-25	Onsite	10-55	05/10/2001	<0.0900	<0.495
MW-106-25	Onsite	10-55	07/31/2015	<0.0500	<0.344
MW-106-25	Onsite	10-55	02/16/2016	<0.100B*	<0.273
MW-106-25	Onsite	10-55	07/27/2016	<0.0500	<0.283
MW-106-25	Onsite	10-55	03/01/2017	<0.0500	<0.313
MW-109-15	Onsite	Water Table	07/31/2015	<0.0500	<0.300
MW-109-15	Onsite	Water Table	07/20/2016	<0.0500	<0.278
MW-110-20	Onsite	Water Table	06/13/2001	8.69	2.87
MW-110-20	Onsite	Water Table	08/23/2011	0.867	2.15
MW-110-20	Onsite	Water Table	10/18/2011	0.408	1.41
MW-110-20	Onsite	Water Table	02/21/2012	0.111	0.458J
MW-110-20	Onsite	Water Table	06/15/2012	0.799	2.49
MW-110-20	Onsite	Water Table	09/03/2014	0.438	1.33
MW-110-20	Onsite	Water Table	02/20/2015	0.0548J	0.504J
MW-110-20	Onsite	Water Table	07/31/2015	0.359	0.985
MW-110-20	Onsite	Water Table	08/09/2016	0.451	0.961J*
MW-113-15	Onsite	Water Table	08/17/2011	<0.0620	<0.372
MW-113-15	Onsite	Water Table	10/14/2011	<0.0620	0.285J
MW-113-15	Onsite	Water Table	02/14/2012	0.0686J	0.295J
MW-113-15	Onsite	Water Table	05/17/2012	0.0461J	0.438J
MW-113-15	Onsite	Water Table	05/20/2013	<0.100B*	0.372JL*
MW-113-15	Onsite	Water Table	07/31/2014	<0.100B*	<0.600B*
MW-113-15	Onsite	Water Table	04/23/2015	<0.0500	0.389J
MW-113-15	Onsite	Water Table	07/28/2015	<0.0500	0.189J
MW-113-15	Onsite	Water Table	02/04/2016	<0.0500	0.356J
MW-113-15	Onsite	Water Table	08/08/2016	<0.0500	<0.283
MW-115-15	Onsite	Water Table	05/10/2001	5.62	2.44
MW-116-15	Onsite	Water Table	05/10/2001	36.8	4.57
MW-116-15	Onsite	Water Table	08/10/2015	27.9	8.06J*
MW-116-15	Onsite	Water Table	12/18/2015	24.8JH*	14.3
MW-116-15	Onsite	Water Table	02/29/2016	27.2	9.12
MW-116-15	Onsite	Water Table	08/16/2016	28.5	7.99
MW-116-15	Onsite	Water Table	08/31/2017	28.8	8.77

Appendix A-4
Historical COC Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Gasoline Range Organics (mg/L)	Diesel Range Organics (mg/L)
MW-116-15	Onsite	Water Table	11/15/2017	24.0	5.00
MW-124-25	Onsite	10-55	08/07/2015	0.0317J	<0.268
MW-124-25	Onsite	10-55	08/15/2016	0.0710J	<0.278
MW-125-25	Onsite	10-55	05/10/2001	0.214	<0.495
MW-125-25	Onsite	10-55	08/17/2011	5.12	0.537J
MW-125-25	Onsite	10-55	10/18/2011	2.85	<0.600B*
MW-125-25	Onsite	10-55	02/17/2012	0.431	<0.376
MW-125-25	Onsite	10-55	05/22/2012	0.0681J	<0.417B*
MW-125-25	Onsite	10-55	04/16/2013	0.123	<0.625B*
MW-125-25	Onsite	10-55	08/12/2014	0.0348J	0.283J
MW-125-25	Onsite	10-55	02/20/2015	0.0400J	0.399J
MW-125-25	Onsite	10-55	08/04/2015	0.0512J	<0.300
MW-125-25	Onsite	10-55	12/18/2015	0.0355J	<0.566B*
MW-125-25	Onsite	10-55	02/25/2016	<0.0500	0.313J
MW-125-25	Onsite	10-55	08/18/2016	0.0323J	0.227J
MW-125-25	Onsite	10-55	02/24/2017	<0.0500	<0.566B*
MW-125-25	Onsite	10-55	08/15/2017	<0.0500	0.179J
MW-125-25	Onsite	10-55	11/16/2017	4.84	<0.923B*
MW-126-25	Onsite	10-55	08/10/2015	<0.0500	<0.278
MW-126-25	Onsite	10-55	08/10/2016	<0.0500	<0.273
MW-127-25	Onsite	10-55	05/10/2001	1.01	<0.495
MW-127-25	Onsite	10-55	08/18/2011	<0.0620	<0.392
MW-127-25	Onsite	10-55	10/20/2011	<0.0620	<0.360
MW-127-25	Onsite	10-55	02/21/2012	<0.0620	<0.360
MW-127-25	Onsite	10-55	05/18/2012	<0.0620	<0.360
MW-127-25	Onsite	10-55	04/16/2013	<0.0620	<0.360
MW-127-25	Onsite	10-55	08/14/2014	<0.0500	0.315J
MW-127-25	Onsite	10-55	02/21/2015	<0.0500	0.221J
MW-127-25	Onsite	10-55	08/07/2015	<0.0500	<0.278
MW-127-25	Onsite	10-55	08/15/2016	<0.0500	<0.283
MW-129-40	Onsite	10-55	02/24/2015	<0.0500	<0.300
MW-129-40	Onsite	10-55	08/07/2015	0.0315J	<0.268
MW-129-40	Onsite	10-55	08/10/2016	<0.0500	<0.278
MW-130-25	Onsite	10-55	05/10/2001	0.678	1.66
MW-130-25	Onsite	10-55	02/20/2015	3.24JH*	7.29
MW-130-25	Onsite	10-55	08/07/2015	4.63	6.10
MW-130-25	Onsite	10-55	12/18/2015	2.36JH*	4.10
MW-130-25	Onsite	10-55	03/07/2016	2.05JH*	5.09
MW-130-25	Onsite	10-55	08/18/2016	7.76	15.6
MW-130-25	Onsite	10-55	02/24/2017	1.52JH*	4.09
MW-130-25	Onsite	10-55	08/03/2017	4.17	4.41
MW-130-25	Onsite	10-55	10/20/2017	5.80	5.13
MW-130-25	Onsite	10-55	11/15/2017	3.91JH*	2.89
MW-131-25	Onsite	10-55	07/27/2015	<0.0500	<0.300
MW-131-25	Onsite	10-55	07/28/2016	<0.0500	<0.283
MW-131-25	Onsite	10-55	07/14/2017	<0.0500	<0.278
MW-132-20	Onsite	Water Table	08/06/2015	0.284	<0.288
MW-132-20	Onsite	Water Table	08/15/2016	0.0568J	<0.300
MW-133-20	Onsite	Water Table	05/10/2001	<0.0900	<0.495
MW-133-20	Onsite	Water Table	08/17/2011	<0.0620	<0.360

Appendix A-4
Historical COC Analytical Results

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Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Gasoline Range Organics (mg/L)	Diesel Range Organics (mg/L)
MW-133-20	Onsite	Water Table	10/18/2011	<0.0620	<0.360
MW-133-20	Onsite	Water Table	02/17/2012	<0.0620	<0.376
MW-133-20	Onsite	Water Table	05/19/2012	<0.0620	<0.360
MW-133-20	Onsite	Water Table	04/26/2013	<0.0620	<0.372
MW-133-20	Onsite	Water Table	08/11/2014	<0.100B*	<0.300
MW-133-20	Onsite	Water Table	08/06/2015	<0.0500	<0.288
MW-133-20	Onsite	Water Table	08/15/2016	<0.0500	<0.283
MW-134-20	Onsite	Water Table	08/07/2015	0.0339J	<0.278
MW-134-20	Onsite	Water Table	08/17/2016	<0.0527B*	<0.278
MW-135-20	Onsite	Water Table	07/19/2001	32.9	3.38
MW-135-20	Onsite	Water Table	10/14/2011	20.8	1.52
MW-135-20	Onsite	Water Table	02/20/2015	23.2	1.72
MW-135-20	Onsite	Water Table	08/05/2015	51.6	2.91
MW-135-20	Onsite	Water Table	02/24/2017	23.0	2.47
MW-135-20	Onsite	Water Table	07/24/2017	42.4	4.28
MW-135-20	Onsite	Water Table	11/16/2017	50.1	4.09
MW-136-20	Onsite	Water Table	02/20/2015	8.98	1.22
MW-136-20	Onsite	Water Table	02/24/2017	6.47	<0.734B*
MW-137-20	Onsite	Water Table	02/24/2015	0.0510J	0.347J
MW-137-20	Onsite	Water Table	08/10/2015	0.126	0.224J
MW-137-20	Onsite	Water Table	08/15/2016	0.152JH*	0.219J
MW-137-20	Onsite	Water Table	08/02/2017	2.14JH*	1.00
MW-138-20	Onsite	Water Table	02/23/2012	80.7	22.1
MW-138-20	Onsite	Water Table	05/31/2012	128	29.8
MW-138-20	Onsite	Water Table	04/02/2013	72.4	50.1
MW-138-20	Onsite	Water Table	04/11/2016	115	5.68
MW-139-25	Onsite	10-55	07/19/2001	2.98	1.59
MW-139-25	Onsite	10-55	08/17/2011	2.11	1.97
MW-139-25	Onsite	10-55	10/12/2011	1.93JH*	1.86
MW-139-25	Onsite	10-55	02/14/2012	1.52JH*	1.08
MW-139-25	Onsite	10-55	05/21/2012	1.29JH*	1.39
MW-139-25	Onsite	10-55	05/13/2013	0.432	0.617
MW-139-25	Onsite	10-55	07/30/2014	0.466JH*	<1.13B*
MW-139-25	Onsite	10-55	02/26/2015	0.191	0.695
MW-139-25	Onsite	10-55	07/31/2015	0.205JH*	1.09
MW-139-25	Onsite	10-55	10/02/2015	0.202JH*	0.953JH*
MW-139-25	Onsite	10-55	02/04/2016	0.107JH*	0.489J
MW-139-25	Onsite	10-55	07/21/2016	0.0537J	0.323J
MW-139-25	Onsite	10-55	02/28/2017	0.118JH*	0.509J
MW-139-25	Onsite	10-55	07/14/2017	0.125JH*	0.561J
MW-139-25	Onsite	10-55	10/20/2017	1.10JH*	1.69
MW-140-25	Onsite	10-55	07/19/2001	<0.0900	<0.505
MW-140-25	Onsite	10-55	07/30/2015	<0.0500	<0.300
MW-140-25	Onsite	10-55	07/21/2016	<0.0500	<0.278
MW-140-25	Onsite	10-55	07/24/2017	0.0722J	<0.273
MW-141-20	Onsite	Water Table	08/17/2011	<0.0620	<0.418
MW-141-20	Onsite	Water Table	10/14/2011	<0.0620	0.227J
MW-141-20	Onsite	Water Table	02/14/2012	<0.0620	<0.376
MW-141-20	Onsite	Water Table	04/27/2012	<0.0620	<0.360
MW-141-20	Onsite	Water Table	05/17/2012	<0.0620	<0.360

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North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Gasoline Range Organics (mg/L)	Diesel Range Organics (mg/L)
MW-141-20	Onsite	Water Table	05/08/2013	<0.100B*	<0.360
MW-141-20	Onsite	Water Table	07/31/2014	<0.100B*	<0.600B*
MW-141-20	Onsite	Water Table	08/03/2015	<0.100B*	<0.300
MW-141-20	Onsite	Water Table	02/23/2016	<0.0500	<0.294
MW-141-20	Onsite	Water Table	08/04/2016	0.0440J	<0.588B*
MW-141-20	Onsite	Water Table	03/01/2017	<0.0500	<0.306
MW-142-20	Onsite	Water Table	08/13/2001	0.0850	0.568
MW-142-20	Onsite	Water Table	02/26/2015	0.0530J	0.326J
MW-142-20	Onsite	Water Table	07/31/2015	<0.100B*	<0.300
MW-142-20	Onsite	Water Table	12/18/2015	0.0413J	<0.566B*
MW-142-20	Onsite	Water Table	08/09/2016	<0.0500	<0.278
MW-142-20	Onsite	Water Table	08/09/2017	<0.0500	<0.283
MW-142-20	Onsite	Water Table	11/16/2017	<0.0500	0.231J
MW-143-20	Onsite	Water Table	07/24/2015	<0.0500	<0.300
MW-143-20	Onsite	Water Table	07/18/2016	<0.0500	<0.288
MW-143-20	Onsite	Water Table	08/01/2017	<0.0500	<0.283
MW-144A-25	Onsite	10-55	07/24/2015	<0.0500	<0.300
MW-144A-25	Onsite	10-55	07/21/2016	<0.0500	<0.283
MW-144A-25	Onsite	10-55	07/14/2017	<0.0500	<0.283
MW-145-20	Onsite	Water Table	02/24/2015	<0.0500	<0.300
MW-145-20	Onsite	Water Table	08/10/2015	<0.0500	<0.288
MW-145-20	Onsite	Water Table	12/18/2015	<0.0500	<0.283
MW-145-20	Onsite	Water Table	08/10/2016	<0.0500	<0.288
MW-145-20	Onsite	Water Table	08/10/2017	<0.0500	<0.288
MW-145-20	Onsite	Water Table	11/16/2017	<0.0500	<0.283
MW-146A-15	Onsite	Water Table	10/05/2008	<0.100	--
MW-147A-15	Onsite	Water Table	10/05/2008	<0.100	--
MW-148A-15	Onsite	Water Table	10/04/2008	<0.100	--
MW-148A-15	Onsite	Water Table	08/18/2011	<0.0620	<0.396
MW-148A-15	Onsite	Water Table	10/07/2011	<0.0620	0.313NPS*
MW-148A-15	Onsite	Water Table	02/12/2012	<0.0620	0.276J NPS*
MW-148A-15	Onsite	Water Table	05/06/2013	<0.100B*	0.252J
MW-148A-15	Onsite	Water Table	08/04/2014	<0.0500	<0.300
MW-148A-15	Onsite	Water Table	07/17/2015	<0.0500	<0.625B*
MW-149A-15	Onsite	Water Table	10/04/2008	<0.100	--
MW-149A-15	Onsite	Water Table	08/18/2011	<0.0620	<0.378
MW-149A-15	Onsite	Water Table	10/13/2011	<0.0620	0.247NPS*
MW-149A-15	Onsite	Water Table	02/12/2012	<0.0620	0.226J NPS*
MW-149A-15	Onsite	Water Table	05/17/2012	<0.0620	<0.360
MW-149A-15	Onsite	Water Table	04/10/2013	<0.0620	<0.600B*
MW-149A-15	Onsite	Water Table	07/26/2014	<0.0500	<0.600B*
MW-149A-15	Onsite	Water Table	07/17/2015	<0.0500	<0.600B*
MW-149A-15	Onsite	Water Table	07/10/2017	<0.0500	<0.305
MW-149B-20	Onsite	Water Table	05/17/2012	<0.0620	0.207J
MW-153A-15	Offsite	Water Table	08/18/2011	<0.0620	<0.378
MW-153A-15	Offsite	Water Table	10/12/2011	<0.0620	<0.360
MW-153A-15	Offsite	Water Table	02/13/2012	<0.0620	0.496J NPS*
MW-153A-15	Offsite	Water Table	05/10/2012	0.0313J	<0.600B*
MW-153A-15	Offsite	Water Table	04/09/2013	<0.0620	<0.600B*
MW-153A-15	Offsite	Water Table	08/08/2014	<0.100B*	<0.300

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Flint Hills Resources Alaska, LLC
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Well ID	Proximity	Zone	Date	Gasoline Range Organics (mg/L)	Diesel Range Organics (mg/L)
MW-169C-60	Offsite	10-55	03/22/2013	<0.100B*	<0.372
MW-169C-60	Offsite	10-55	07/26/2014	<0.0500	<0.600B*
MW-173A-15	Onsite	Water Table	04/09/2010	<0.100	<1.60
MW-173B-150	Onsite	90-160	04/09/2010	<0.100	<1.60
MW-174B-90	Onsite	55-90	02/14/2012	<0.0620	<0.376
MW-174B-90	Onsite	55-90	05/01/2013	<0.100B*	<0.360
MW-174B-90	Onsite	55-90	09/03/2014	<0.0500	<0.300
MW-176A-15	Onsite	Water Table	05/22/2012	4.03	3.45
MW-176A-15	Onsite	Water Table	04/02/2013	4.46	5.40
MW-176A-15	Onsite	Water Table	07/13/2017	1.14	4.67
MW-176B-50	Onsite	10-55	08/14/2014	<0.0500	0.274J
MW-179A-15	Onsite	Water Table	08/06/2015	<0.0500	<0.288
MW-179A-15	Onsite	Water Table	08/12/2016	<0.0500	<0.283
MW-180A-15	Onsite	Water Table	08/07/2015	0.136	1.05
MW-180A-15	Onsite	Water Table	12/18/2015	<0.153B*	<0.588B*
MW-180A-15	Onsite	Water Table	08/12/2016	0.304	<0.283
MW-180A-15	Onsite	Water Table	08/16/2017	0.0806J	0.204J
MW-180A-15	Onsite	Water Table	11/15/2017	0.273	0.469J
MW-186A-15	Onsite	Water Table	08/05/2015	0.106	0.194J
MW-192A-15	Onsite	Water Table	08/04/2015	<0.0500	<0.300
MW-192A-15	Onsite	Water Table	10/02/2015	<0.0500	<0.273
MW-192A-15	Onsite	Water Table	07/26/2016	<0.0500	<0.294
MW-192A-15	Onsite	Water Table	08/16/2017	<0.0500	<0.288
MW-192A-15	Onsite	Water Table	11/15/2017	<0.0500	<0.283
MW-196-15	Onsite	Water Table	08/04/2015	<0.0500	<0.300
MW-196-15	Onsite	Water Table	12/18/2015	<0.0500	<0.273
MW-196-15	Onsite	Water Table	08/09/2016	<0.0500	<0.288
MW-301-CMT-10	Onsite	Water Table	07/30/2015	<0.0500	<0.300
MW-301-CMT-10	Onsite	Water Table	07/15/2016	<0.0500	<0.273
MW-301-CMT-20	Onsite	Water Table	07/30/2015	<0.0500	<0.300
MW-301-CMT-20	Onsite	Water Table	07/15/2016	<0.0500	<0.273
MW-302-CMT-10	Onsite	Water Table	07/21/2015	<0.0500	<0.300
MW-302-CMT-10	Onsite	Water Table	07/14/2016	<0.0500	<0.283
MW-302-CMT-20	Onsite	Water Table	07/21/2015	<0.0500	<0.300
MW-302-CMT-20	Onsite	Water Table	07/14/2016	<0.0500	<0.273
MW-303-CMT-9	Onsite	Water Table	07/29/2015	<0.0500	<0.300
MW-303-CMT-9	Onsite	Water Table	07/14/2016	<0.0500	<0.273
MW-303-CMT-19	Onsite	Water Table	07/29/2015	<0.0500	<0.300
MW-303-CMT-19	Onsite	Water Table	07/14/2016	<0.0500	<0.283
MW-303-CMT-19	Onsite	Water Table	07/28/2017	<0.0500	<0.294
MW-304-CMT-10	Onsite	Water Table	08/01/2015	<0.0500	<0.300
MW-304-CMT-10	Onsite	Water Table	07/21/2016	<0.0500	<0.288
MW-304-15	Onsite	Water Table	07/28/2015	<0.0500	<0.300
MW-304-15	Onsite	Water Table	07/22/2016	<0.0500	<0.283
MW-304-CMT-20	Onsite	Water Table	08/01/2015	<0.0500	<0.300
MW-304-CMT-20	Onsite	Water Table	10/02/2015	<0.0500	<0.577B*
MW-304-CMT-20	Onsite	Water Table	07/21/2016	<0.0500	<0.294
MW-304-CMT-20	Onsite	Water Table	07/28/2017	<0.0500	<0.294
MW-304-CMT-40	Onsite	10-55	10/02/2015	<0.0500	<0.556B*
MW-304-CMT-60	Onsite	10-55	10/02/2015	<0.0500	<0.278

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North Pole Terminal, North Pole, Alaska**

Well ID	Proximity	Zone	Date	Gasoline Range Organics (mg/L)	Diesel Range Organics (mg/L)
MW-305-CMT-28	Onsite	10-55	07/27/2017	<0.0500	<0.308
MW-309-15	Onsite	Water Table	02/26/2015	<0.0500	0.208J
MW-309-15	Onsite	Water Table	07/29/2015	<0.0500	<0.300
MW-309-15	Onsite	Water Table	07/19/2016	<0.0500	<0.278
MW-321-15	Onsite	Water Table	08/03/2015	<0.219B*	0.212J
MW-321-15	Onsite	Water Table	12/18/2015	0.448	<0.617B*
MW-321-15	Onsite	Water Table	02/17/2016	0.691	0.409J
MW-321-15	Onsite	Water Table	08/11/2016	0.322	<0.283
MW-321-15	Onsite	Water Table	02/28/2017	0.431	0.373J
MW-321-15	Onsite	Water Table	08/08/2017	0.352	0.561J
MW-321-15	Onsite	Water Table	11/15/2017	0.389	0.277J
MW-334-15	Onsite	Water Table	07/25/2017	13.4	5.01
MW-336-20	Onsite	Water Table	08/11/2015	41.0	13.3J*
MW-336-20	Onsite	Water Table	12/18/2015	76.1	11.7
MW-336-20	Onsite	Water Table	08/15/2016	66.4	9.37
MW-336-20	Onsite	Water Table	08/15/2017	53.1	9.60
MW-336-20	Onsite	Water Table	11/15/2017	43.0	10.8
MW-336-35	Onsite	10-55	08/11/2015	0.0502J	<0.268J*
MW-336-35	Onsite	10-55	10/02/2015	<0.123B*	<0.536B*
MW-336-35	Onsite	10-55	08/15/2016	0.176	<0.288
MW-336-55	Onsite	10-55	08/11/2015	0.0313J	<0.278
MW-336-55	Onsite	10-55	10/02/2015	<0.0500	<0.288
MW-336-55	Onsite	10-55	08/15/2016	0.0354J	<0.294
MW-337-20	Onsite	Water Table	08/11/2015	64.9	10.6J*
MW-337-20	Onsite	Water Table	08/17/2016	83.9	12.5
MW-344-15	Onsite	Water Table	02/19/2015	<0.0500	0.380J
MW-344-15	Onsite	Water Table	07/30/2015	<0.0500	<0.300
MW-344-15	Onsite	Water Table	08/11/2016	<0.0500	<0.283
MW-344-15	Onsite	Water Table	07/24/2017	0.0538J	0.391J
MW-344-55	Onsite	10-55	02/19/2015	<0.0500	<0.300
MW-344-55	Onsite	10-55	07/30/2015	<0.0500	<0.300
MW-344-55	Onsite	10-55	02/16/2016	<0.100B*	<0.294
MW-344-55	Onsite	10-55	08/11/2016	<0.0500	<0.283
MW-344-55	Onsite	10-55	02/28/2017	<0.0500	<0.294
MW-345-15	Onsite	Water Table	02/25/2015	0.0504J	0.438J
MW-345-15	Onsite	Water Table	07/24/2015	0.0429J	<0.300
MW-345-15	Onsite	Water Table	07/22/2016	<0.0500	<0.288
MW-345-15	Onsite	Water Table	07/24/2017	0.554	0.541J
MW-345-15	Onsite	Water Table	10/24/2017	3.27	1.51
MW-345-55	Onsite	10-55	02/25/2015	<0.0500	0.310J
MW-345-55	Onsite	10-55	07/24/2015	<0.0500	<0.300
MW-345-55	Onsite	10-55	07/22/2016	<0.0500	<0.283
MW-351-15	Onsite	Water Table	02/20/2015	<0.0500	0.233J
MW-351-15	Onsite	Water Table	08/03/2015	<0.0500	<0.300
MW-351-15	Onsite	Water Table	07/19/2016	<0.0500	<0.288
MW-351-15	Onsite	Water Table	08/01/2017	<0.0500	<0.278
MW-351-55	Onsite	10-55	02/20/2015	<0.0500	0.194J
MW-351-55	Onsite	10-55	08/03/2015	<0.0500	<0.300
MW-351-55	Onsite	10-55	07/19/2016	<0.0500	<0.294
MW-358-15	Onsite	Water Table	07/23/2015	<0.0500	<0.300

Appendix A-4
Historical COC Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Gasoline Range Organics (mg/L)	Diesel Range Organics (mg/L)
MW-358-15	Onsite	Water Table	07/18/2016	<0.0500	<0.288
MW-358-15	Onsite	Water Table	08/01/2017	<0.0500	0.224J
MW-358-20	Onsite	Water Table	07/23/2015	<0.0500	<0.300
MW-358-20	Onsite	Water Table	07/18/2016	<0.0500	<0.273
MW-359-15	Onsite	Water Table	07/20/2015	<0.0500	<0.600B*
MW-359-15	Onsite	Water Table	07/14/2016	<0.0500	<0.300
MW-360-15	Onsite	Water Table	07/20/2015	<0.0500	<0.600B*
MW-360-15	Onsite	Water Table	07/14/2016	<0.0500	<0.278
MW-360-15	Onsite	Water Table	07/11/2017	<0.0500	<0.288
MW-361-15	Onsite	Water Table	08/10/2015	<0.0500	<0.268J*
MW-362-15	Onsite	Water Table	07/18/2016	<0.0500	<0.294
MW-363-15	Onsite	Water Table	07/17/2015	<0.0500	<0.600B*
MW-363-15	Onsite	Water Table	07/25/2016	<0.0500	<0.300
MW-364-15	Onsite	Water Table	07/17/2015	<0.0500	<0.600B*
MW-364-15	Onsite	Water Table	07/25/2016	<0.0500	<0.308
MW-369-16	Onsite	Water Table	02/19/2015	<0.0500	0.210J
MW-369-16	Onsite	Water Table	07/31/2015	<0.0500	<0.321
MW-369-16	Onsite	Water Table	12/18/2015	<0.0500	<0.566B*
MW-369-16	Onsite	Water Table	07/20/2016	<0.0500	<0.300
MW-369-16	Onsite	Water Table	08/16/2017	<0.0500	<0.288
MW-369-16	Onsite	Water Table	11/15/2017	<0.0500	0.191J
MW-370-15	Onsite	Water Table	02/25/2015	<0.0500	0.191J
MW-370-15	Onsite	Water Table	07/29/2015	<0.0500	<0.300
MW-370-15	Onsite	Water Table	07/19/2016	<0.0500	<0.300
MW-371-15	Onsite	Water Table	02/20/2015	<0.0500	0.188J
MW-371-15	Onsite	Water Table	07/24/2015	<0.0500	<0.305
MW-371-15	Onsite	Water Table	07/15/2016	<0.0500	<0.283
O-2	Onsite	Water Table	07/24/2017	2.40JH*	2.07
O-3	Onsite	Water Table	02/24/2015	<0.0500	0.264J
O-3	Onsite	Water Table	08/10/2015	<0.0500	<0.278
O-3	Onsite	Water Table	03/01/2016	<0.0500	<0.283
O-3	Onsite	Water Table	08/15/2016	<0.0500	<0.300
O-3	Onsite	Water Table	08/02/2017	<0.0500	<0.318
O-4	Onsite	Water Table	02/26/2015	0.0661J	0.292J
O-4	Onsite	Water Table	07/31/2015	<0.100B*	<0.300
O-4	Onsite	Water Table	02/17/2016	<0.100B*	<0.273
O-4	Onsite	Water Table	08/04/2016	<0.0500	<0.588B*
O-4	Onsite	Water Table	02/28/2017	<0.0500	<0.294
O-4	Onsite	Water Table	07/14/2017	<0.0500	<0.278
O-5	Onsite	Water Table	02/19/2015	0.0444J	0.449J
O-5	Onsite	Water Table	07/31/2015	<0.100B*	0.355J
O-5	Onsite	Water Table	02/17/2016	<0.100B*	0.378J
O-5	Onsite	Water Table	08/04/2016	0.0503J	<0.748B*
O-5	Onsite	Water Table	02/28/2017	0.0418J	0.387J
O-6	Onsite	Water Table	02/19/2015	<0.0500	0.381J
O-6	Onsite	Water Table	07/24/2015	<0.0500	<0.300
O-6	Onsite	Water Table	08/08/2016	<0.0500	<0.278
O-12	Onsite	Water Table	02/21/2015	0.0670J	0.354J
O-12	Onsite	Water Table	08/10/2015	0.0926J	<0.300
O-12	Onsite	Water Table	10/02/2015	<0.100B*	<0.556B*

Appendix A-4
Historical COC Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Gasoline Range Organics (mg/L)	Diesel Range Organics (mg/L)
O-12	Onsite	Water Table	02/29/2016	<0.100B*	<0.283
O-12	Onsite	Water Table	08/10/2016	<0.0500	0.250J
O-12	Onsite	Water Table	02/25/2017	<0.100B*	<0.588B*
O-14	Onsite	Water Table	08/07/2015	<0.0500	<0.278
O-14	Onsite	Water Table	08/17/2016	<0.0500	<0.300
O-15	Onsite	Water Table	08/16/2017	<0.0500	<0.294
O-15	Onsite	Water Table	11/16/2017	<0.0500	<0.300
O-16	Onsite	Water Table	08/11/2015	1.47J*	0.316J
O-16	Onsite	Water Table	08/16/2016	1.14J*	<0.294
O-17	Onsite	Water Table	08/10/2015	<0.0500	<0.573B*
O-17	Onsite	Water Table	08/17/2016	0.0528J	<0.259
O-18	Onsite	Water Table	08/10/2015	<0.100B*	<0.538B*
O-18	Onsite	Water Table	08/17/2016	<0.0500	0.240J
O-19	Onsite	Water Table	08/04/2015	0.559	0.679
O-19-55	Onsite	10-55	02/20/2015	0.0339J	<0.300
O-19-55	Onsite	10-55	08/04/2015	<0.0500	<0.300
O-19-55	Onsite	10-55	08/15/2016	<0.0500	<0.300
O-24	Onsite	Water Table	02/21/2015	0.0622J	0.333J
O-24	Onsite	Water Table	08/11/2015	0.123	0.248J
O-24	Onsite	Water Table	02/29/2016	<0.104B*	0.335J
O-24	Onsite	Water Table	08/15/2016	0.0944J	0.180J
O-24	Onsite	Water Table	02/25/2017	<0.100B*	<0.615B*
O-24	Onsite	Water Table	07/10/2017	0.0728J	<0.283
O-25	Onsite	Water Table	10/02/2015	<0.100B*	<0.556B*
O-26	Onsite	Water Table	02/21/2015	0.0478J	0.277J
O-26	Onsite	Water Table	08/11/2015	0.0417J	<0.288
O-26	Onsite	Water Table	08/10/2016	<0.0500	<0.283
R-32	Onsite	Water Table	12/03/2010	22100	---
R-33	Onsite	Water Table	12/06/2010	57000	---
R-35R	Onsite	Water Table	07/27/2017	<1.37B*	0.853
S-9	Onsite	Water Table	08/11/2015	0.0450J	<0.268
S-9	Onsite	Water Table	10/02/2015	<0.100B*	<0.581B*
S-9	Onsite	Water Table	08/10/2016	<0.0500	<0.278
S-9	Onsite	Water Table	08/02/2017	0.0353J	<0.294
S-19	Onsite	Water Table	09/03/2008	<0.100	--
S-41R	Onsite	Water Table	09/02/2008	4.90	--
S-43	Onsite	Water Table	02/20/2015	5.13	2.22
S-43	Onsite	Water Table	08/05/2015	2.26JH*	0.694
S-43	Onsite	Water Table	02/27/2017	2.56JH*	0.827

Appendix A-4
Historical COC Analytical Results

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Proximity	Zone	Date	Gasoline Range Organics (mg/L)	Diesel Range Organics (mg/L)
S-50	Onsite	Water Table	09/02/2008	24.1	--
S-51	Onsite	Water Table	08/05/2015	4.11	2.56

General Notes:

Higher result of field-duplicate pair is reported.

Date listed is the sample date for recent samples; prior to 2006 however, the date listed is likely the event date as sample dates were not always available for older samples.

MW-148A-15, MW-153A-15, and MW-169C-60 are offsite wells, but are reported along with the onsite data

Acronyms and Abbreviations:

--- = information not provided because results were not obtained.

< = not detected; limit of detection (LOD) or limit of quantitation (LOQ; for older data) listed

J = estimated concentration, detected above the detection limit (DL) and below the limit of quantitation (LOQ)

J* = result is considered estimated (no direction of bias), due to QC failures or sample-handling anomalies; flag applied by Shannon & Wilson, Inc.

JH* = result is considered estimated, biased high. Flag applied by Shannon & Wilson, Inc.

JL* = result is considered estimated, biased low. Flag applied by Shannon & Wilson, Inc.

mg/L = milligrams per liter

NPS* = no petroleum signature, sample result is likely due to naturally-occurring organics

UB* = result is considered not detected at the limit of quantitation (LOQ) or reported concentration (higher value), due to contamination identified in a blank QC sample. Flag is reported as <...B*. Flag applied by Shannon & Wilson, Inc.

**Appendix A-5
Historical Geochemistry Summary**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Location	Zone	Date	Nitrate (mg/L)	Nitrite (mg/L)	Nitrate+Nitrite (mg/L)	Hardness as CaCO3 (mg/L)	Sulfate (mg/L)	Total Organic Carbon (mg/L)	Chemical Oxygen Demand (mg/L)	Biological Oxygen Demand (mg/L)	Alkalinity (mg/L)	HCO3 Alkalinity (mg/L)	CO3 Alkalinity (mg/L)	OH Alkalinity (mg/L)	Nitrogen Kjeldahl (mg/L)	Total Phosphorus (mg/L)	Methane (mg/L)
AS-MW-6	Water Table	10/12/2012	---	---	3.86	---	62.1	---	---	---	---	---	---	---	---	---	ND
AS-MW-8	Water Table	05/14/2013	---	---	---	---	---	---	<12.4	<4.00	---	---	---	---	---	---	---
MW-105A-25	10-55	10/11/2011	<0.0620	<0.0620	---	186	38.0	2.05	---	---	144	144	<6.20	<6.20	<1.00B*	<0.0620	0.0796
MW-105A-25	10-55	05/04/2012	---	---	---	184	39.2	1.95	---	---	140	140	<6.20	<6.20	---	---	0.0527
MW-105A-25	10-55	07/19/2012	<0.0620	---	---	---	41.1	---	---	---	---	---	---	---	---	---	0.00705
MW-105A-25	10-55	09/17/2012	---	---	0.0900J	---	39.8	---	---	---	---	---	---	---	---	---	0.0467
MW-105A-25	10-55	11/12/2012	---	---	---	169	39.3	1.93	---	---	142	142	<6.20	<6.20	---	---	0.0352
MW-105A-25	10-55	05/22/2013	---	---	---	175	39.0	1.82	---	---	148	148	<6.20	<6.20	---	---	0.0600
MW-105-65	10-55	10/11/2011	<0.0620	<0.0620	---	156	43.4	1.12	---	---	117	117	<6.20	<6.20	<1.00B*	<0.0620	<0.00656
MW-105-65	10-55	05/04/2012	---	---	---	163	44.3	1.13	---	---	116	116	<6.20	<6.20	---	---	ND
MW-105-65	10-55	11/12/2012	---	---	---	147	44.6	1.16	---	---	123	123	<6.20	<6.20	---	---	ND
MW-105-65	10-55	05/22/2013	---	---	---	153	43.0	1.15	---	---	123	123	<6.20	<6.20	---	---	0.000910J
MW-105-65	10-55	08/29/2014	---	---	---	---	44.1	0.958	---	---	122	122	<5.00	<5.00	---	---	---
MW-109-15	Water Table	10/11/2011	<0.0620	<0.0620	---	172	36.0	1.70	---	---	145	145	<6.20	<6.20	<1.02B*	0.0310J	<0.00656
MW-109-15	Water Table	05/04/2012	---	---	---	167	39.4	1.31	---	---	122	122	<6.20	<6.20	---	---	ND
MW-109-15	Water Table	11/14/2012	---	---	---	166	39.8	1.38	---	---	136	136	<6.20	<6.20	---	---	ND
MW-109-15	Water Table	06/06/2013	---	---	---	149	39.8	1.28	---	---	123	123	<6.20	<6.20	---	---	0.000830J
MW-110-20	Water Table	10/11/2011	<0.0620	<0.0620	---	189	4.56	8.05	---	---	183	183	<6.20	<6.20	2.23	0.0660	2.29
MW-110-20	Water Table	06/15/2012	---	---	---	210	7.01	9.25	---	---	203	203	<6.20	<6.20	---	---	2.80
MW-110-20	Water Table	10/18/2012	---	---	---	178	10.5	10.1	---	---	110	110	<6.20	<6.20	---	---	2.55
MW-116-15	Water Table	10/11/2011	0.0520J	<0.0620	---	179	0.184	22.5	---	---	224	224	<6.20	<6.20	<3.46B*	0.0628	4.88
MW-116-15	Water Table	05/21/2012	---	---	---	201	0.459	24.4	---	---	220	220	<6.20	<6.20	---	---	8.81
MW-116-15	Water Table	06/12/2013	---	---	---	189	1.02	14.9	---	---	237	237	<6.20	<6.20	---	---	11.0
MW-127-25	10-55	03/09/2011	<0.0310	<0.0310	---	157	38.0	2.26	---	---	143	143	<3.10	<3.10	<0.310	<0.00310	---
MW-127-25	10-55	04/13/2011	<0.0310	<0.0310	---	162	36.8	2.32	---	---	142	142	<3.10	<3.10	<0.310	0.0306	---
MW-127-25	10-55	08/18/2011	<0.0620	<0.0620	---	184	34.7	3.17	---	---	156	156	<6.20	<6.20	<0.620	<0.00620	---
MW-127-25	10-55	10/11/2011	<0.0620	<0.0620	---	187	30.3	3.08	---	---	160	160	<6.20	<6.20	<1.00B*	0.0338J	0.225
MW-127-25	10-55	05/18/2012	---	---	---	184	31.7	2.53	---	---	153	153	<6.20	<6.20	---	---	0.145
MW-127-25	10-55	11/12/2012	---	---	---	172	32.9	2.58	---	---	152	152	<6.20	<6.20	---	---	0.169
MW-127-25	10-55	04/16/2013	---	---	---	805J*	38.1	2.13	---	---	141	141	<6.20	<6.20	---	---	0.150
MW-130-25	10-55	05/19/2012	---	---	---	---	10.6	17.7	---	---	192	192	<6.20	<6.20	---	---	ND
MW-130-25	10-55	07/23/2012	<0.0620	---	---	---	18.1	---	---	---	---	---	---	---	---	---	1.17
MW-130-25	10-55	10/22/2012	---	---	<0.143B*	---	15.4	---	---	---	---	---	---	---	---	---	1.26
MW-131-25	10-55	03/09/2011	<0.0310	<0.0310	---	193	37.1	2.08	---	---	168	168	<3.10	<3.10	<0.310	<0.0310	---
MW-131-25	10-55	04/08/2011	<0.0310	<0.0310	---	179	35.9	2.19	---	---	164	164	<3.10	<3.10	<0.310	<0.00310	---
MW-131-25	10-55	08/12/2011	<0.0620	<0.0620	---	202	38.6	2.24	---	---	164	164	<6.20	<6.20	<0.620	<0.00620	---
MW-131-25	10-55	10/11/2011	<0.0620	<0.0620	---	196	37.0	2.21	---	---	167	167	<6.20	<6.20	<1.00B*	0.0446J	0.0253
MW-131-25	10-55	05/05/2012	---	---	---	209	37.6	1.80	---	---	157	157	<6.20	<6.20	---	---	0.0454
MW-131-25	10-55	11/14/2012	---	---	---	195	37.5	1.86	---	---	159	159	<6.20	<6.20	---	---	0.0740
MW-131-25	10-55	06/06/2013	---	---	---	189	37.7	1.79	---	---	153	153	<6.20	<6.20	---	---	0.0540
MW-138-20	Water Table	05/31/2012	---	---	---	---	17.4	103	---	---	213	213	<6.20	<6.20	---	---	---
MW-139-25	10-55	05/13/2013	---	---	---	---	---	---	13.9J	2.72	---	---	---	---	---	---	---
MW-142-20	Water Table	03/09/2011	<0.0310	<0.0310	---	185	18.2	4.17	---	---	193	193	<3.10	<3.10	<0.310	<0.0310	---
MW-142-20	Water Table	04/08/2011	<0.0310	<0.0310	---	190	17.0	4.38	---	---	190	190	<3.10	<3.10	<0.310	0.0627	---
MW-142-20	Water Table	08/12/2011	<0.0620	<0.0620	---	181	21.1	4.04	---	---	173	173	<6.20	<6.20	<0.620	<0.00620	---
MW-142-20	Water Table	10/11/2011	0.0380J	<0.0620	---	193	12.4	4.50	---	---	196	196	<6.20	<6.20	<1.09B*	0.00655J	0.236
MW-142-20	Water Table	05/03/2012	---	---	---	188	18.8	4.00	---	---	182	182	<6.20	<6.20	---	---	---
MW-142-20	Water Table	07/19/2012	<0.0620	---	---	---	24.2	---	---	---	---	---	---	---	---	---	0.106
MW-142-20	Water Table	09/17/2012	---	---	0.0860J	---	20.2	---	---	---	---	---	---	---	---	---	0.404
MW-142-20	Water Table	11/12/2012	---	---	---	173	18.1	3.78	---	---	187	187	<6.20	<6.20	---	---	0.447
MW-142-20	Water Table	06/12/2013	---	---	---	179	23.8	3.21	16.0J	<4.00	177	177	<6.20	<6.20	---	---	0.290
MW-142-20	Water Table	09/03/2014	---	---	---	---	21.3	3.35	---	---	186	186	<5.00	<5.00	---	---	---
MW-143-20	Water Table	03/09/2011	<0.0310	<0.0310	---	186	29.9	3.22	---	---	167	167	<3.10	<3.10	<0.310	<0.0310	---

**Appendix A-5
Historical Geochemistry Summary**

**Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska**

Location	Zone	Date	Nitrate (mg/L)	Nitrite (mg/L)	Nitrate+Nitrite (mg/L)	Hardness as CaCO3 (mg/L)	Sulfate (mg/L)	Total Organic Carbon (mg/L)	Chemical Oxygen Demand (mg/L)	Biological Oxygen Demand (mg/L)	Alkalinity (mg/L)	HCO3 Alkalinity (mg/L)	CO3 Alkalinity (mg/L)	OH Alkalinity (mg/L)	Nitrogen Kjeldahl (mg/L)	Total Phosphorus (mg/L)	Methane (mg/L)
MW-143-20	Water Table	04/08/2011	<0.0310	<0.0310	---	180	29.2	3.18	---	---	165	165	<3.10	<3.10	<0.310	<0.0310	---
MW-143-20	Water Table	08/12/2011	0.0505J	<0.0620	---	205	29.2	3.14	---	---	167	167	<6.20	<6.20	<0.620	<0.00620	---
MW-143-20	Water Table	10/11/2011	0.0980J	<0.0620	---	211	28.1	3.16	---	---	185	185	<6.20	<6.20	<1.00B*	<0.0620	0.0143
MW-143-20	Water Table	05/03/2012	---	---	---	180	33.3	2.33	---	---	150	150	<6.20	<6.20	---	---	0.0203
MW-143-20	Water Table	11/15/2012	---	---	---	164	36.3	2.37	---	---	147	147	<6.20	<6.20	---	---	0.0890
MW-143-20	Water Table	04/18/2013	---	---	---	158	38.9	2.27	---	---	147	147	<6.20	<6.20	---	---	0.0430
MW-148A-15	Water Table	03/07/2011	<0.0310	<0.0310	---	166	20.9	9.56	---	---	152	152	<3.10	<3.10	<0.310	<0.00310	---
MW-148A-15	Water Table	04/08/2011	<0.0310	<0.0310	---	162	19.4	10.2	---	---	148	148	<3.10	<3.10	<0.310	<0.00310	---
MW-148A-15	Water Table	08/18/2011	<0.0620	<0.0620	---	171	19.9	11.1	---	---	141	141	<6.20	<6.20	0.489J	<0.0124	---
MW-148A-15	Water Table	10/11/2011	<0.0620	<0.0620	---	162	18.1	15.4	---	---	134	134	<6.20	<6.20	<1.00B*	<0.310	0.0384
MW-148A-15	Water Table	05/03/2012	---	---	---	160	19.2	11.4	---	---	133	133	<6.20	<6.20	---	---	---
MW-148A-15	Water Table	07/23/2012	<0.0620	---	---	---	20.4	---	---	---	---	---	---	---	---	---	0.00427
MW-148A-15	Water Table	10/22/2012	---	---	<0.100B*	---	---	---	---	---	---	---	---	---	---	---	---
MW-148A-15	Water Table	10/22/2012	---	---	---	144	17.3	15.8	---	---	134	134	<6.20	<6.20	---	---	0.0571
MW-148A-15	Water Table	05/06/2013	---	---	---	147	18.8	12.6	---	---	132	132	<6.20	<6.20	---	---	0.0210
MW-148A-15	Water Table	08/04/2014	---	---	---	---	21.0	9.00	---	---	97.0	97.0	<5.00	<5.00	---	---	---
MW-148B-30	10-55	03/07/2011	<0.0310	<0.0310	---	186	32.2	3.41	---	---	166	166	<3.10	<3.10	<0.310	<0.00310	---
MW-148B-30	10-55	04/08/2011	<0.0310	<0.0310	---	185	30.9	3.44	---	---	164	164	<3.10	<3.10	<0.310	0.0122	---
MW-148B-30	10-55	08/12/2011	0.0730J	<0.0620	---	194	32.4	3.66	---	---	162	162	<6.20	<6.20	0.893J	0.0132	---
MW-148B-30	10-55	10/11/2011	<0.0620	<0.0620	---	193	32.5	3.30	---	---	160	160	<6.20	<6.20	<1.00B*	<0.124	0.00929
MW-148B-30	10-55	05/01/2012	---	---	---	194	32.3	3.12	---	---	160	160	<6.20	<6.20	---	---	0.00625
MW-148B-30	10-55	11/11/2012	---	---	---	189	33.4	3.02	---	---	161	161	<6.20	<6.20	---	---	ND
MW-148B-30	10-55	04/15/2013	---	---	---	894	35.7	2.95	---	---	155	155	<6.20	<6.20	---	---	0.0150
MW-148B-30	10-55	08/04/2014	---	---	---	---	36.3	3.09	---	---	162	162	<5.00	<5.00	---	---	---
MW-154B-95	55-90	05/21/2012	---	---	---	---	42.3	1.42	---	---	117	117	<6.20	<6.20	---	---	---
MW-176A-15	Water Table	05/22/2012	---	---	---	261	2.72	9.85	---	---	226	226	<6.20	<6.20	---	---	2.18
MW-176A-15	Water Table	12/12/2012	---	---	---	286	2.53	11.3	---	---	220	220	<6.20	<6.20	---	---	3.00
MW-176A-15	Water Table	04/02/2013	---	---	---	259	6.16	9.39	---	---	233	233	<6.20	<6.20	---	---	2.30
MW-176B-50	10-55	12/12/2012	---	---	---	152	46.0	1.17	---	---	124	124	<6.20	<6.20	---	---	0.00450
MW-180A-15	Water Table	10/11/2011	<0.0620	<0.0620	---	195	39.1	2.27	---	---	145	145	<6.20	<6.20	<1.80B*	<0.124	<0.00656
MW-180A-15	Water Table	11/12/2012	---	---	---	188	43.2	2.66	---	---	143	143	<6.20	<6.20	---	---	ND
MW-180B-50	10-55	10/11/2011	<0.0620	<0.0620	---	151	44.2	<1.13B*	---	---	119	119	<6.20	<6.20	<1.06B*	0.00479J	<0.00656
MW-180B-50	10-55	11/12/2012	---	---	---	150	45.4	1.11	---	---	117	117	<6.20	<6.20	---	---	ND
MW-304-15	Water Table	06/10/2013	---	---	---	---	---	---	11.7J	<4.00	---	---	---	---	---	---	---
MW-304-CMT-20	Water Table	06/07/2012	---	---	---	---	25.1	4.02	---	---	194	194	<6.20	<6.20	---	---	---
MW-309-15	Water Table	11/25/2013	---	---	---	---	---	3.58	---	---	---	---	---	---	---	---	---
MW-310-15	Water Table	11/25/2013	---	---	---	---	---	6.43	---	---	---	---	---	---	---	---	---
O-1	Water Table	08/01/2012	---	---	---	---	14.1	5.97	---	---	154	154	<6.20	<6.20	---	---	---

Appendix A-5
Historical Geochemistry Summary

Second Semiannual 2017 Onsite Groundwater Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Location	Zone	Date	Nitrate (mg/L)	Nitrite (mg/L)	Nitrate+Nitrite (mg/L)	Hardness as CaCO3 (mg/L)	Sulfate (mg/L)	Total Organic Carbon (mg/L)	Chemical Oxygen Demand (mg/L)	Biological Oxygen Demand (mg/L)	Alkalinity (mg/L)	HCO3 Alkalinity (mg/L)	CO3 Alkalinity (mg/L)	OH Alkalinity (mg/L)	Nitrogen Kjeldahl (mg/L)	Total Phosphorus (mg/L)	Methane (mg/L)
O-26	Water Table	05/08/2013	---	---	---	---	---	---	33.2	6.32	---	---	---	---	---	---	---

General Notes:

Higher result of a field-duplicate pair is reported.
MW-148A-15/B-30 are offsite wells, but are reported along with the onsite data

Acronyms and Abbreviations:

--- = analytical results are not available
< = not detected, LOD or limit of quantitation (LOQ; for older data) listed; flag applied by the laboratory
B* = result is considered not detect due to a detection in a blank quality control sample, the reported value is the LOQ or the detected concentration, whichever values is higher; displayed as <...B*, flag applied by Shannon & Wilson, Inc.
CO₃ = carbonate
HCO₃ = bicarbonate
J = estimated concentration, detected above the detection limit (DL) and below the limit of quantitation (LOQ); flag applied by the laboratory
J* = result is considered estimated, no bias; flag applied by Shannon & Wilson, Inc.
mg/L = milligrams per liter
ND = analyte not detected, unknown limit of detection (LOD)
OH = hydroxide