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Flint Hills Resources Alaska, LLC

ANNUAL 2017 OFFSITE PLUME MONITORING REPORT

North Pole Terminal
North Pole, Alaska
DEC File Number 100.38.090

February 9, 2018

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ANNUAL 2017 OFFSITE PLUME MONITORING REPORT

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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AHL	Arctic Home Living
Arcadis	Arcadis U.S., Inc.
AWS	alternative water solution
AWS-MP	Alternative Water Solutions Program-Management Plan
Barr	Barr Engineering Company
bwt	below the water table
City	City of North Pole, Alaska
CSM	conceptual site model
FHRA	Flint Hills Resources Alaska, LLC
GAC	granular activated carbon
Offsite SAP	Offsite Sampling and Analysis Plan
Offsite PMP	Offsite Groundwater Sulfolane Plume Monitoring Plan
Pioneer Wells	Pioneer Wells Inc.
POE	point-of-entry
PWS	public water system
QA	quality assurance
QC	quality control
report	Annual 2017 Offsite Plume Monitoring Report
reporting period	January 1 through November 10, 2017
site	Flint Hills Resources Alaska, LLC North Pole Terminal located on H and H Lane in North Pole, Alaska
Water Wagon	H20 2 U, LLC
WQA	Water Quality Association
µg/L	micrograms per liter

1 INTRODUCTION

On behalf of Flint Hills Resources Alaska, LLC (FHRA), Arcadis U.S., Inc. (Arcadis) prepared this Annual 2017 Offsite Plume Monitoring Report (report) for groundwater located downgradient of the FHRA North Pole Terminal, located on H and H Lane in North Pole, Alaska (site). This report summarizes offsite field activities completed in areas beyond the site boundary from January 1 through November 10, 2017 (reporting period), as described in Section 2.

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., 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 a Qualified Environmental Professional. Samples were collected and analyzed in accordance with 18 AAC 75.355(a). Point-of-entry (POE) system sampling conducted by Arctic Home Living (AHL) was supervised by FHRA and its consultants, and the resulting sample data were reviewed and used in reports prepared by a Qualified Environmental Professional.

The site, offsite area, and the site's physical setting are described in the conceptual site model (CSM), which was presented as Appendix A of the Onsite Site Characterization Report – 2013 Addendum (Arcadis 2013). The site is shown on Figure 1-1. Offsite monitoring well locations are presented on Figure 1-2. Private well locations are shown on Figure A-1 in Appendix A.

This report represents a transition from semiannual reporting following methods and plans summarized in Section 2 of the Second Semiannual 2016 Offsite Groundwater Monitoring Report (Arcadis 2017a) to annual reporting following the Offsite Groundwater Sulfolane Plume Monitoring Plan (Offsite PMP, Arcadis 2017b). In addition, annual reporting for the Alternative Water Solutions Program is now included in this comprehensive report. Sampling of POE systems will continue until construction the City of North Pole's expanded public water system (PWS) is completed, after which the alternative water supply systems will be phased out (Arcadis 2017b).

2 CURRENT GROUNDWATER MONITORING PROGRAM AND METHODS

A quarterly groundwater monitoring event was conducted in first quarter 2017 following methods and plans summarized in Section 2 of the Second Semiannual 2016 Offsite Groundwater Monitoring Report (Arcadis 2017a). In June 2017, the Offsite Groundwater Sulfolane Plume Monitoring Plan (Offsite PMP, Arcadis 2017b) was approved by ADEC. The Offsite PMP, which adjusted the network and frequency for sampling offsite monitoring wells, was implemented in second and third quarter 2017 and is shown on Figure 2-1. Data from the first quarter groundwater monitoring event are included in Appendix B.

2.1 Plume Monitoring Plan - Monitoring Well Sampling

Annual groundwater monitoring in 2017 was conducted based on the network of monitoring wells and private wells listed in the Offsite PMP and in accordance with methods included in the Offsite Sampling and Analysis Plan (Offsite SAP; provided as Appendix A of the Offsite PMP [Arcadis 2017b]). This reporting period also included monitoring of wells that are on a biennial or every-five-year sampling schedule. Table 2-1 summarizes the offsite field activities completed during the reporting period. Offsite monitoring well locations are shown on Figure 1-2. The Offsite PMP monitoring locations are shown on Figure 2-1.

Groundwater monitoring data are used to monitor offsite dissolved-phase sulfolane concentrations and groundwater movement. Sulfolane is the only offsite contaminant of concern.

2.2 Plume Monitoring Plan - Private Well Sampling

During this reporting period, samples were collected from private wells in the Offsite PMP throughout second and third quarters. In second quarter 2017, groundwater samples were collected from PW-2219. PW-2219 was installed by the owners as a replacement for PW-624 in 2015. PW-624, which was part of the Offsite PMP, is no longer connected and will be replaced with PW-2219 in the Offsite PMP going forward. During third quarter 2017, FHRA collected initial groundwater samples from two other newly installed private wells, PW-2233 and PW-2234. Private wells PW-2233 and PW-2234 replace existing wells PW-867 and PW-283, respectively, and will be part of the Offsite PMP going forward. Initial samples were collected from PW-250, PW-790, and PW-1812 during this reporting period; these wells are part of the Offsite PMP but had not previously been sampled.

Private wells PW-291, PW-345, PW-629, PW-760, PW-763, PW-778, PW-1181, and PW-1458 could not be sampled during the reporting period. Private wells PW-291, PW-629, PW-760, PW-763, PW-778, and PW-1181 were not sampled either due to owner refusal or following unanswered attempts at contact. A sample was collected from PW-1450 following malfunction at PW-345. The main water supply well PW-972 was sampled as a replacement for private lawn well PW-1458, located at the same property. Both PW-1450 and PW-972 are included in the Offsite PMP sulfolane monitoring network. Potential access issues were anticipated during design of the Offsite PMP network; multiple wells were selected for sampling in key areas of interest to assure that adequate data are collected to monitor the plume.

Although these wells were not able to be sampled, data from surrounding wells provided adequate representation of the plume to meet the objectives of the PMP.

2.3 Monitoring Well Maintenance Activities

No well developments were performed at offsite monitoring wells during the reporting period. Minor maintenance activities were performed as needed for the remaining offsite wells during the reporting period, including resetting monitoring well MW-332 nest wells that had frostjacked flush-mount monuments.

3 GROUNDWATER MONITORING RESULTS

Offsite groundwater impacts have been characterized and continue to be monitored through the analysis of water-level gauging data and/or groundwater samples collected from offsite monitoring wells and private wells. Groundwater level monitoring is now conducted every five years, in accordance with the Offsite PMP. Offsite monitoring well field parameters for the annual PMP event are summarized in Table 3-1, and data are summarized in Tables 3-2 through 3-5.

Historical data for groundwater elevation, sulfolane analyses, and private well analyses are included as Appendix B. Laboratory reports are provided in Appendix C. A data quality evaluation, including Alaska Department of Environmental Conservation (ADEC) quality assurance (QA)/quality control (QC) checklists, is included as Appendix D. Field data sheets are included as Appendix E.

3.1 Groundwater Elevation

Depth to water measurements were collected from monitoring wells on March 13 and 14, and September 23, 2017 for the first quarter (previous monitoring program) and every-five-year offsite groundwater elevation monitoring events, respectively. Potentiometric maps for the every-five-year monitoring event are included on Figures 3-1 through 3-4. Depth to water measurements and groundwater elevation data for the every-five-year monitoring event are summarized in Table 3-2. Depth to water measurements from the March 2017 event are included in Appendix B. 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. The average magnitude of the horizontal hydraulic gradient in offsite groundwater was calculated at approximately 0.001 foot per foot during the reporting period. This result is consistent with historical data.

3.2 Sulfolane Distribution in Offsite Groundwater

During the first quarter and annual 2017 groundwater monitoring events, samples were collected and submitted for sulfolane analysis from the offsite monitoring well network and the private well network. Results from the first quarter event are included in Appendix B. The offsite monitoring well sulfolane data from the Offsite PMP event are presented in Table 3-3. Results from private wells sampled for the first time as part of the Offsite PMP event are presented in Table 3-4 (initial sampling). Results for the private well sampling for the Offsite PMP event are presented in Table 3-5. Offsite sulfolane distribution for the annual 2017 event (Offsite PMP wells) is shown on Figures 3-5 through 3-7.

Historical and current sulfolane analytical results are included in Appendix B.

Analytical results indicated initial detections from five private wells sampled as part of the Offsite PMP; these locations were already using interim bottled water. The private wells with initial sulfolane detections are highlighted on Figures 2-1 and 3-5. These wells are located on the fringe of the plume and are in areas where the low-level detections are expected. The Offsite PMP private well sample results are presented in Tables 3-4 and 3-5.

Data for private wells included in the Offsite PMP were evaluated for potential sulfolane concentration trends through third quarter 2017; results are discussed in Section 3.3 and included in Appendix F.

3.2.1 Subpermafrost and Suprapermafrost Aquifers

Figure 3-5 shows the combined sulfolane analytical results from offsite monitoring wells and private wells that are in both the suprapermafrost and subpermafrost aquifers, for the Offsite PMP event in 2017. This figure includes private wells that do not have available or reliable well construction information and, therefore, cannot be designated to either the suprapermafrost or subpermafrost aquifer.

3.2.1.1 Offsite Sulfolane Distribution in the Suprapermafrost Aquifer

Offsite monitoring wells were sampled during first and third quarters. A subset of these wells may indicate a “mixing zone” between the suprapermafrost and subpermafrost aquifers (Arcadis 2013; hereinafter referred to as “inferred mixing zone”), as shown on Figures 3-6 and 3-7. Monitoring well results from the annual Offsite PMP event are presented in Table 3-3. Historical data are provided in Appendix B.

The highest sulfolane concentrations in the suprapermafrost aquifer are generally located in the middle of the plume, on the western side. Distribution of offsite suprapermafrost sulfolane concentrations are consistent with the CSM (Arcadis 2013). Although some areas indicate increasing trends, which is expected based on the CSM, the overall plume concentrations are decreasing.

3.2.1.2 Offsite Sulfolane Distribution in the Subpermafrost Aquifer

The Offsite PMP included sampling of select subpermafrost wells. Some suprapermafrost monitoring wells, which were installed in the mixing zone, were determined to have concentrations representative of the subpermafrost aquifer and are included as part of the subpermafrost dataset. Figure 3-7 presents sulfolane data collected during the Offsite PMP event in 2017 for Offsite monitoring wells in the mixing zone and private wells installed through the permafrost in the deep aquifer system.

Consistent with past monitoring results, the greatest sulfolane concentration in wells located within the subpermafrost aquifer to date was detected in PW-1230 (603 µg/L, with a duplicate sample result of 650 µg/L on February 24, 2017), which is located approximately one mile northwest of the northern site boundary. Private well PW-1230 has a total depth of approximately 231 feet below ground surface and is not used as a drinking water source. Overall distribution of offsite subpermafrost sulfolane concentrations are consistent with the CSM (Arcadis 2013).

3.3 Statistical Analysis of Offsite Sulfolane Data

Statistical and graphical evaluations of sulfolane concentration trends, using Mann-Kendall trend analysis, are conducted annually for monitoring and private wells included in the Offsite PMP and sampled within the reporting period. This analysis is conducted to evaluate plume migration and stability and protection of residences and businesses located outside of the area to be served by the PWS.

The Monitoring and Remediation Optimization System software, developed by the Air Force Center for Engineering and the Environment, for Mann-Kendall trend analysis was applied to offsite groundwater monitoring data collected during the reporting period from monitoring wells and private wells.

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

Parameter/Trend	Monitoring Wells	Suprapermafrost Private Wells	Subpermafrost Private Wells	Private Wells with Unknown Depth
Number of wells	42	49	15	50
All results nondetect [a]	19	42	9	40
Insufficient data points [a]	4	1	3	7
Probably decreasing	0	0	0	0
Decreasing	9	0	1	0
Probably increasing	0	1	0	1
Increasing	7	0	2	0
Stable	2	3	0	1
No trend	1	2	0	1

Notes:

[a] Wells 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."

Wells with increasing and decreasing trends that were screened within the suprapermafrost and the subpermafrost aquifers are discussed below.

3.3.1 Suprapermafrost Aquifer

Offsite monitoring wells in the suprapermafrost aquifer that displayed increasing trends are shown on Figure 1B of Appendix F. Of these, monitoring wells MW-346-15 and MW-346-65 are located within the inferred mixing zone; therefore, these wells may be influenced by subpermafrost concentrations. In general, the monitoring wells with increasing trends are located at the leading edge of the plume.

Nine monitoring wells displayed decreasing trends. A visual observation of the concentration trend plots confirms that sulfolane concentrations in these wells are continuing to decrease. The monitoring well locations with decreasing trends are located throughout the plume, with the majority of the wells located in the central and proximal portions of the detectable sulfolane plume. The decreasing sulfolane concentration trends in wells in the central and proximal portions of the plume likely represent the effects of source controls at the site.

One private well identified as being screened within the suprapermafrost aquifer displayed a probably increasing trend during the reporting period, which was confirmed through a visual observation of the

concentration trend plots (Attachment 1 of Appendix F). This well is located along the leading edge of the offsite suprapermafrost sulfolane plume.

Review of the current data from the PMP monitoring network indicates that the locations of increasing and decreasing trends within the suprapermafrost aquifer are in areas where such trends are expected and are consistent with the CSM (Arcadis 2013). The trend data support that monitoring of the current Offsite PMP network of suprapermafrost wells is protective of residences and businesses located outside of the area to be served by the PWS.

3.3.2 Subpermafrost Aquifer

Trends for wells identified as being screened in the subpermafrost zone are depicted on Figure 1C in Appendix F. The monitoring wells shown on this figure were installed in a thawed zone along Badger Slough. These monitoring wells are located in the inferred mixing zone of the subpermafrost and suprapermafrost aquifers, and appear to be representative of subpermafrost aquifer conditions. Three locations show increasing trends: PW-464 is located within the body of the plume, and MW-347-150 is in an area of likely suprapermafrost and subpermafrost mixing within the detectable subpermafrost plume. Sulfolane concentrations in private well PW-1230 also show an increasing trend, as discussed in Section 3.2.1.2. This well is located near the southern extent of the plume. The concentration trends in this well may be stabilizing.

A decreasing trend was observed in subpermafrost private well PW-358 which is located near the southeast extent of the detectable sulfolane plume.

Review of the current data from the PMP monitoring network indicates that the locations of increasing and decreasing trends within the subpermafrost aquifer are in areas where such trends are expected and are consistent with the CSM (Arcadis 2013).

3.4 Groundwater Monitoring Conclusions

Distribution of offsite sulfolane concentrations in both the suprapermafrost and subpermafrost aquifers is consistent with the CSM (Arcadis 2013). Locations within the plume that indicate increasing or decreasing trends are in areas where such trends are expected, based on the CSM (Arcadis 2013). These trend data support that monitoring of the current Offsite PMP network of wells is protective of residences and businesses located outside of the area to be served by the PWS.

4 ALTERNATIVE WATER SOLUTIONS

In 2017, FHRA continued providing alternative water solutions (AWSs) to the properties affected and potentially affected by the plume of dissolved-phase sulfolane identified in various studies performed by FHRA and ADEC. These AWS options include delivery of bottled water, bulk water tank systems, POE in-home water treatment systems, and interim bottled water. The POE maintenance monitoring is not part of the PMP monitoring network and will be discontinued once the City of North Pole's public water system is available for connection. Additional sampling conducted in 2017 included samples collected at the request of homeowners, from wells that are not included in the Offsite PMP, or the POE maintenance program.

All known private well locations are shown with well identifiers on Figure A-1 included in Appendix A. The most recent sulfolane results for all wells sampled in 2017 are depicted on Figure A-2, included in Appendix A.

4.1 2017 Groundwater Open House

On February 25, 2017, FHRA held a groundwater office open house with ADEC and the City to meet with the community and discuss the upcoming expansion of the City of North Pole's public water system to affected properties.

4.2 Alternative Water Solution Property Information

Through 2017, 347 long-term AWSs have been provided at 319 properties as shown in Table G-1 of Appendix G (note that some properties have more than one AWS). AWSs installed to date are shown on Figure G-1 and listed below:

- 164 POE treatment systems
- 120 bulk water tanks
- 35 locations with long-term bottled water options.

In addition to the solutions provided above, in 2017, interim bottled water was supplied to 252 addresses (some addresses have multiple residences). These addresses are affected properties inside the plume where the owner did not select a long-term AWS when previously offered, properties where sulfolane has not been detected, or properties located within or near the edge of the plume. Fifty-three garden tanks have also been provided to affected properties that do not have a City water connection.

A routine process was followed in 2017 to identify new construction or property transactions within the plume or at or near the edge of the sulfolane plume area. Table G-2 summarizes property transactions that were noted by FHRA in 2017.

4.3 Private Well Water Data Summary

Private wells with POE systems are monitored during each granular activated carbon (GAC) changeout. A map showing private well locations is provided as Figure A-1 in Appendix A. Table G-3 presents results

for raw water (Port A) and treated water (Port C or Port D) and identifies commercial locations. Analytical laboratory reports and ADEC QA/QC checklists for 2017 are provided in Appendices C and D, respectively.

During second quarter 2017, FHRA collected an initial sample from one newly installed private well, PW-2229. During third quarter 2017, two additional private wells were sampled for the first time: PW-2063 and PW-2146. These wells were sampled at the request of the owners and are not included as part of the Offsite PMP. Sulfolane was present at detectable concentrations at each of these locations. The private wells with initial sulfolane detections are highlighted on Figure A-2 in Appendix A. Table G-4 in Appendix G includes a summary of initial sampling results. Additionally, PW-0785 was sampled during this reporting period at the request of the owner as part of a home sale. This well has been previously sampled. The results for PW-0785 are included in Appendix B.

4.4 Point-of-Entry System Performance

POE treatment systems installed at homes use sediment filters, a softener, ultraviolet filter, and GAC vessels to remove sulfolane. The POE treatment systems also include a water meter that transmits a remote signal to allow tracking of the water usage to schedule routine maintenance, and a series of sampling ports that will allow sampling of the raw water and treated water during service visits. AHL provides maintenance of the POE treatment systems.

4.4.1 Treatment System Performance

The collected data verify that the POE systems are properly treating the groundwater and are performing as designed (Table G-3). The data also confirm that the systems are being properly operated and maintained.

Sulfolane results in the final treated water samples (Port D) were less than detection limits during the reporting period.

4.4.2 Volume of Water Treated

Water usage data were collected monthly at each POE system in 2017 to confirm water usage rates and to determine the GAC replacement schedule. This data collection is completed via remote reading of a flow totalizer unit by AHL personnel. Water usage rates were calculated and compared to the treatment volumes included in the Water Quality Association (WQA) certification, as described in the Alternative Water Solutions Program-Management Plan (AWS-MP; Barr 2014) and used to schedule GAC vessel replacements. Water usage in 2017 for each POE system is summarized in Table G-5 and totals approximately 6,480,400 gallons for 2017.

Through 2017, the POE systems have treated approximately 44,475,000 gallons of water.

4.4.3 Granular Activated Carbon Usage

As noted in Section 4.4.2, scheduling of GAC changeouts is determined by the water usage rate and raw water sulfolane concentration in accordance with the WQA certification. In 2017, changeouts were completed for 540 carbon vessels, resulting in a total volume of 1,350 cubic feet of GAC used. Change-

out and associated sampling and maintenance frequency for seven locations with C-port detections has been reviewed. The identified group of POE systems are all simplex systems, and the current changeout frequency at each location is within the limits established in the WQA certification. However, the GAC vessels were all purchased within the same time period; the manufacturer's representative recommended replacing the removable parts of the bypass valve assembly at the top of each GAC vessel. If these parts were to wear out, they could allow a small amount of water to bypass the GAC in the vessel. Replacement of these parts has been scheduled and the system maintenance provider will continue to manage this potential wear item on remaining systems, as necessary, along with other routine maintenance tasks.

4.5 Bottled and Bulk Water Supply Information

As described in Section 4.2, bottled or bulk water was provided to residents who selected these options as their AWS or received interim bottled water. Additionally, water is provided to residences with a garden tank. The source and delivery schedule for the bottled and bulk water supplies is discussed below.

4.5.1 Bottled Water

In 2017, bottled water was delivered weekly by Spring Alaska. Spring Alaska receives the water from Twin Springs Water (Alaska public water system (PWS) ID # AK312813).

Prior to delivery, Spring Alaska contacts residents weekly to confirm the number of bottles required. This allows residents receiving this service to manage delivery to their individual needs from week to week. In 2017, 130,420 gallons of water were delivered to these locations. This water volume is estimated based on water delivery invoiced in 2017. Thirty-five locations selected long-term bottled water as their AWS. In 2017, interim bottled water was provided to 252 locations that are affected properties inside the plume where the owner did not select a long-term AWS when previously offered, where sulfolane has not been detected, or are located within or near the edge of the sulfolane plume.

Spring Alaska's annual customer list was audited, and five locations previously receiving interim bottled water were removed from the list either for being inactive or no longer requiring bottled water deliveries.

4.5.2 Bulk Water Tanks

In 2017, water deliveries for bulk tanks were completed by two local suppliers who are permitted by the State of Alaska; Pioneer Wells Inc. (Pioneer Wells) and H20 2 U, LLC (Water Wagon). Pioneer Wells sources their water from either a well in Fairbanks and treats the water in a water softener system prior to delivery to affected residents (PWS ID #AK2310714), or an untreated well (upon request from homeowners) located at Fox Spring (PWS ID #AK2312156). Water Wagon sources treated water from College Utilities in Fairbanks (PWS ID# AK2310900). Homeowners currently have the option of receiving water from Pioneer Wells or Water Wagon. A total of 4,198,295 gallons of water were provided to the 120 bulk water tanks in 2017. Water volumes provided are estimated based on water deliveries invoiced in 2017.

In 2017, water was delivered weekly to commercial properties and weekly or biweekly to residential properties, as needed. One commercial greenhouse is located within the sulfolane-impacted area: Hawks Greenhouse at 2260 Old Richardson Highway. Four bulk water tanks were previously installed at

this location with a total storage capacity of 10,000 gallons. The bulk water tanks are filled by Pioneer Wells, with water sourced from an untreated well located at Fox Spring (PWS ID# AK2312156). In 2017, a total of 121,136 gallons of water were supplied to this location two or three times per week, as needed, from April through August

4.5.3 Garden Tanks

For residents that selected to have a garden tank installed, up to 2,000 gallons of water per season have been provided. In 2017, the water was supplied by Pioneer Wells, with water sourced from an untreated well located at Fox Spring (PWS ID# AK2312156), untreated well located in Fairbanks (PWS ID# A2310714), or treated water from Fairbanks (PWS ID# AK2110714). A total of 27,249 gallons of water were provided to 53 garden tanks in 2017.

5 ALTERNATIVE WATER SOLUTION PROGRAM UPDATES

5.1 Description of Issues, Problems, or Complaints

The few minor issues in 2017 were addressed as follows. A homeowner reported a system freeze while away on vacation; the system was subsequently thawed and repaired. Additionally, several homes reported ruts in their driveways following bulk water delivery. The driveways were patched either by the homeowner, or via gravel delivery.

A homeowner complained about flooding in a basement following recent tank refills. Upon further investigation, it was found that a broken fill tube caused the flooding. The fill tube was repaired in the summer of 2017. None of the maintenance issues affected the quality of potable water received by the residents.

5.2 Program Changes

There were no significant AWS program changes in 2017.

5.3 Water Quality Association Certification

The POE systems are maintained in accordance with a certification through the WQA. The current WQA certification can be viewed at: https://www.wqa.org/Find-Products/ctl/Detail/mid/1054/cid/RICHARDS_DISTRIBUTIN/sid/3/keyword/richards%20distributing

6 CONCLUSIONS

Groundwater monitoring was conducted during the first quarter and annual Offsite PMP events in 2017, in accordance with the procedures in the Offsite SAP (Arcadis 2017b). The annual Offsite PMP event was the first event conducted for the Offsite PMP monitoring networks and included wells to be sampled biennially and every five years.

Based on the monitoring data collected throughout the reporting period, the plume behaviour is consistent with previous site characterizations and the CSM (Arcadis 2013). An evaluation of sulfolane trends in the groundwater monitoring network that includes both monitoring wells and private wells shows that most of the wells with decreasing trends are located near the site boundary and center of the plume, while wells showing increasing trends are concentrated along the leading edge and distal portions of the plume. Locations within the plume that indicate increasing or decreasing trends are in areas where such trends are expected, based on the CSM (Arcadis 2013). These trend data support that monitoring of the current Offsite PMP network of wells is protective of residences and businesses located outside of the area to be served by the PWS.

In 2017, drinking water was provided to impacted residents and businesses through delivery of bottled water, delivery of bulk water, and operation of POE treatment systems. The total volumes of clean water provided by AWSs in 2017 are summarized below:

- 130,420 gallons of bottled water through delivery of bottled water.
- 4,198,295 gallons of bulk water, including delivery to residences, businesses, a greenhouse, and garden tanks.
- Treatment of approximately 6,480,400 gallons of water through POE treatment systems.

The results from 2018 monitoring activities will be submitted in an annual report in January 2019.

7 REFERENCES

Arcadis. 2013. Offsite Site Characterization Report – 2013 Addendum. December 20.

Arcadis. 2017a. Second Semiannual 2016 Offsite Groundwater Monitoring Report. January 31.

Arcadis. 2017b. Offsite Groundwater Sulfolane Plume Monitoring Plan. June.

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TABLES

Table 2-1
Offsite Field Activities

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Activity	Frequency
Groundwater Elevation Check	Semiannual
Vertical Hydraulic Gradient	Discontinued
Data Loggers	Discontinued
Residential Initial Sampling (includes call-ins)	Throughout Q2 and Q3, sampled as requested
Resample Residential Locations	Throughout Q1, Q2, and Q3, sampled annually and/or as requested
Deep (sub-permafrost) Residential-Well Sampling	Throughout Q1
Sulfolane Network Sampling - Monitoring Wells	Throughout Q1 and Q3
Well Repair and Maintenance	Routine maintenance by sampling staff
Wells Installed	0 monitoring or observation wells installed
Wells Developed	0 monitoring or observation wells developed
Initial Sulfolane Monitoring Well Sampling	No initial sampling

General Notes:
Q1 = Represents field activities conducted between January 1, 2017 and March 31, 2017
Q2 = Represents field activities conducted between April 1, 2017 and June 30, 2017
Q3 = Represents field activities conducted between July 1, 2017 and September 30, 2017

Table 3-1
Plume Monitoring Plan - Offsite Monitoring Well Field Parameters

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Location	Date	Analysis	Depth to Ice (feet)	Depth to Water (feet)	Temperature (°C)	DO (mg/L)	Conductivity (µS/cm)	pH	ORP (mV)	Water Clarity	Sample Collection Notes
MW-150A-10	7/11/2017	S	--	4.98	3.1	3.67	277.1	7.21	-9.4	Clear	Parameters Stabilized
MW-150B-25	7/11/2017	S	--	4.89	2.1	1.62	243.9	7.34	-16.4	Clear	Parameters Stabilized
MW-165A-15	7/11/2017	S	--	4.72	1.0	3.33	199.1	6.98	-11.2	Clear	Parameters Stabilized
MW-165B-50	7/11/2017	S	--	4.53	3.1	0.46	205.5	7.55	-45.9	Clear	Parameters Stabilized
MW-166B-30	8/4/2017	S	--	8.64	0.6	1.05	251.6	7.07	-38.9	Clear	Parameters Stabilized
MW-167B-35	7/21/2017	S	--	8.63	0.3	0.05	424.1	6.76	-2.1	Clear	Parameters Stabilized
MW-171BR-40	8/4/2017	S	--	8.81	1.3	0.97	262.5	7.02	-57.3	Clear	Parameters Stabilized
MW-181A-15	7/12/2017	S	--	8.71	1.8	0.45	202.3	7.16	138.1	Clear	> 3 Well Volumes
MW-181B-50	7/12/2017	S	--	8.56	3.1	3.94	173.2	7.46	115.5	Clear	Parameters Stabilized
MW-181C-150	7/12/2017	S	--	8.52	3.5	0.03	168.8	7.56	-77.6	Clear	Parameters Stabilized
MW-185B-50	7/12/2017	S	--	6.74	3.9	0.10	204.6	7.22	-91.9	Clear	Parameters Stabilized
MW-185C-120	7/12/2017	S	--	6.71	3.8	0.12	158.6	7.24	-65.8	Clear	Parameters Stabilized
MW-190BR-60	8/16/2017	S	--	8.01	3.7	5.80	181.6	7.32	-95.2	Clear	Parameters Stabilized
MW-190-150	7/25/2017	S	--	8.05	4.0	5.90	160.0	7.58	-120.1	Clear	Parameters Stabilized
MW-191A-15	7/12/2017	S	--	4.45	2.4	0.32	195.1	7.10	146.2	Clear	Parameters Stabilized
MW-191B-60	7/12/2017	S	--	4.27	4.3	2.32	201.4	7.35	139.6	Clear	Parameters Stabilized
MW-311-15	7/12/2017	S	--	2.61	3.3	0.18	184.7	6.98	-48.2	Clear	Parameters Stabilized
MW-311-46	7/12/2017	S	--	2.51	1.0	0.27	187.2	7.19	-52.8	Clear	Parameters Stabilized
MW-313-15	7/12/2017	S	--	4.17	2.5	0.15	204.6	7.13	-56.7	Clear	Parameters Stabilized
MW-313-150	7/21/2017	S	--	4.56	3.3	0.04	160.6	7.07	-64.5	Clear	Parameters Stabilized
MW-314-15	7/12/2017	S	--	7.75	7.5	3.93	397.5	6.74	73.5	Slightly Turbid	> 3 Well Volumes
MW-314-150	7/20/2017	S	--	7.60	3.0	0.04	193.9	7.10	36.5	Clear	Parameters Stabilized
MW-327-15	7/20/2017	S	--	6.36	3.5	0.82	277.1	6.96	-2.4	Clear	Parameters Stabilized
MW-327-150	7/20/2017	S	--	6.32	3.9	0.03	166.6	7.17	82.3	Clear	Parameters Stabilized
MW-328-15	7/21/2017	S	--	7.04	2.3	0.85	283.9	6.77	24.0	Clear	Parameters Stabilized
MW-328-151	7/21/2017	S	--	7.28	2.2	0.02	151.2	7.23	-76.4	Clear	Parameters Stabilized
MW-332-41	7/12/2017	S	--	6.85	2.1	0.76	236.2	7.03	-31.5	Clear	> 3 Well Volumes
MW-332-110	7/25/2017	S	--	6.54	1.7	6.80	183.6	7.16	-38.5	Clear	Parameters Stabilized
MW-332-150	7/25/2017	S	--	6.98	1.8	6.50	182.2	7.38	-108.1	Clear	Parameters Stabilized
MW-346-15	8/1/2017	S	--	5.23	1.0	0.15	228.6	7.36	-73.6	Clear	> 3 Well Volumes
MW-346-65	8/1/2017	S	--	4.88	1.3	0.13	173.3	7.41	-52.3	Clear	Parameters Stabilized
MW-346-150	8/1/2017	S	--	4.55	2.4	0.07	153.1	7.66	-93.0	Clear	Parameters Stabilized
MW-347-65	8/1/2017	S	--	9.47	3.2	0.05	177.6	7.45	-35.3	Clear	Parameters Stabilized
MW-347-150	8/1/2017	S	--	10.3	3.5	0.11	161.6	7.66	-99.9	Clear	Parameters Stabilized
MW-349-45	7/12/2017	S	--	6.75	1.0	1.90	207.7	7.15	150.2	Clear	Parameters Stabilized
MW-352-40	8/4/2017	S	--	8.8	0.7	1.04	363.0	7.02	-59.3	Clear	Parameters Stabilized
MW-353-15	8/4/2017	S	--	5.24	2.4	0.87	282.7	7.00	-32.4	Clear	Parameters Stabilized
MW-353-65	8/4/2017	S	--	5.55	1.0	0.94	223.8	7.16	-36.7	Clear	Parameters Stabilized
MW-353-100	8/4/2017	S	--	6.81	1.0	0.97	220.8	7.12	-35.2	Clear	Parameters Stabilized

Table 3-1
Plume Monitoring Plan - Offsite Monitoring Well Field Parameters

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Location	Date	Analysis	Depth to Ice (feet)	Depth to Water (feet)	Temperature (°C)	DO (mg/L)	Conductivity (µS/cm)	pH	ORP (mV)	Water Clarity	Sample Collection Notes
MW-356-65	7/20/2017	S	--	7.24	4.3	0.05	226.2	7.12	201.9	Clear	Parameters Stabilized
MW-356-90	7/20/2017	S	--	7.30	4.3	0.21	226.2	7.01	219.0	Clear	Parameters Stabilized
MW-357-65	7/25/2017	S	--	11.78	4.1	6.10	172.9	7.49	-96.6	Clear	Parameters Stabilized
MW-357-150	7/25/2017	S	--	11.80	4.0	7.40	162.2	7.57	-113.5	Clear	Parameters Stabilized

Acronyms and Abbreviations:
-- = not applicable
> = greater than
°C = degrees Celsius
DO = dissolved oxygen
mg/L = milligrams per liter
mV = millivolts
MW = monitoring well
ORP = oxidation-reduction potential
S = sulfolane
µS/cm = microsiemens per centimeter

Table 3-2
Plume Monitoring Plan - Offsite Groundwater Elevation Monitoring Results

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Survey Date	Riser Elevation (MSL feet)	Date Measured	Depth to Water (feet)	Water Table Elevation (MSL feet)
MW-150A-10	Water Table	7/13/2017	487.27	8/23/2017	4.98	482.29
MW-150B-25	10-55	7/13/2017	487.33	8/23/2017	5.06	482.27
MW-165A-15	Water Table	7/13/2017	475.10	8/23/2017	5.12	469.98
MW-165B-50	10-55	7/13/2017	474.93	8/23/2017	4.93	470.00
MW-166B-30	10-55	7/13/2017	475.39	8/23/2017	8.70	466.69
MW-167B-35	10-55	7/13/2017	475.78	8/23/2017	8.86	466.92
MW-171BR-40	10-55	7/13/2017	485.10	8/23/2017	8.66	476.44
MW-172A-15	Water Table	7/13/2017	475.68	8/23/2017	6.19	469.49
MW-172B-150	90-160	7/13/2017	475.71	8/23/2017	6.24	469.47
MW-181A-15	Water Table	7/13/2017	475.97	8/23/2017	8.85	467.12
MW-181B-50	10-55	7/13/2017	475.90	8/23/2017	8.73	467.17
MW-181C-150	90-160	7/13/2017	476.03	8/23/2017	8.70	467.33
MW-185A-15	Water Table	7/13/2017	478.19	8/23/2017	6.76	471.43
MW-185B-50	10-55	7/13/2017	478.20	8/23/2017	6.83	471.37
MW-185C-120	90-160	7/13/2017	478.23	8/23/2017	6.80	471.43
MW-190A-15	Water Table	7/13/2017	481.50	8/23/2017	7.53	473.97
MW-190BR-60	10-55	7/13/2017	482.00	8/23/2017	8.02	473.98
MW-190-150	90-160	7/13/2017	482.04	8/23/2017	8.08	473.96
MW-191A-15	Water Table	7/13/2017	475.84	8/23/2017	4.78	471.06
MW-191B-60	10-55	7/13/2017	475.65	8/23/2017	4.63	471.02
MW-311-15	Water Table	7/13/2017	466.87	8/23/2017	3.03	463.84
MW-311-46	10-55	7/13/2017	466.77	8/23/2017	2.89	463.88
MW-313-15	Water Table	7/13/2017	465.86	8/23/2017	3.28	462.58
MW-313-150	90-160	7/13/2017	465.72	8/23/2017	2.97	462.75
MW-314-15	Water Table	7/13/2017	476.22	8/23/2017	7.94	468.28
MW-314-150	90-160	7/13/2017	476.12	8/23/2017	7.74	468.38
MW-322-150	90-160	7/13/2017	471.67	8/23/2017	8.82	462.85
MW-325-18	Water Table	7/13/2017	486.47	8/23/2017	11.32	475.15
MW-325-150	90-160	7/13/2017	486.86	8/23/2017	11.59	475.27
MW-327-15	Water Table	7/13/2017	467.42	8/23/2017	6.50	460.92
MW-327-150	90-160	7/13/2017	467.49	8/23/2017	6.42	461.07
MW-328-15	Water Table	7/13/2017	472.30	8/23/2017	7.13	465.17
MW-328-151	90-160	7/13/2017	472.61	8/23/2017	7.44	465.17
MW-332-15	Water Table	7/13/2017	481.64	8/23/2017	6.85	474.79
MW-332-41	10-55	7/13/2017	481.64	8/23/2017	6.86	474.78
MW-332-75	55-90	7/13/2017	481.34	8/23/2017	6.56	474.78
MW-332-110	90-160	7/13/2017	481.25	8/23/2017	6.54	474.71
MW-332-150	90-160	7/13/2017	481.55	8/23/2017	6.83	474.72
MW-340-18	Water Table	7/13/2017	478.68	8/23/2017	4.12	474.56
MW-340-65	10-55	7/13/2017	479.29	8/23/2017	4.57	474.72
MW-340-150	90-160	7/13/2017	479.01	8/23/2017	4.21	474.80
MW-346-15	Water Table	7/13/2017	472.73	8/23/2017	5.23	467.50
MW-346-65	10-55	7/13/2017	473.00	8/23/2017	4.86	468.14
MW-346-150	90-160	7/13/2017	472.52	8/23/2017	4.56	467.96
MW-347-20	90-160	7/13/2017	482.51	8/23/2017	10.26	472.25
MW-347-65	Water Table	7/13/2017	482.86	8/23/2017	10.61	472.25
MW-347-150	10-55	7/13/2017	481.71	8/23/2017	9.45	472.26
MW-349-45	10-55	7/13/2017	484.73	8/23/2017	6.73	478.00
MW-352-40	10-55	7/13/2017	475.20	8/23/2017	8.80	466.40
MW-353-15	Water Table	7/13/2017	480.20	8/23/2017	5.09	475.11

Table 3-2
Plume Monitoring Plan - Offsite Groundwater Elevation Monitoring Results

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Survey Date	Riser Elevation (MSL feet)	Date Measured	Depth to Water (feet)	Water Table Elevation (MSL feet)
MW-353-65	10-55	7/13/2017	480.43	8/23/2017	5.40	475.03
MW-353-100	55-90	7/13/2017	480.63	8/23/2017	5.68	474.95
MW-356-20	Water Table	7/13/2017	478.91	8/23/2017	7.49	471.42
MW-356-65	10-55	7/13/2017	478.83	8/23/2017	7.36	471.47
MW-356-90	55-90	7/13/2017	478.94	8/23/2017	7.45	471.49
MW-357-15	Water Table	7/13/2017	487.81	8/23/2017	11.84	475.97
MW-357-65	10-55	7/13/2017	487.90	8/23/2017	11.76	476.14
MW-357-150	90-160	7/13/2017	488.00	8/23/2017	11.78	476.22

Acronyms and Abbreviations:
MSL = mean sea level

Table 3-3
Plume Monitoring Plan - Offsite Monitoring Well Sulfolane Results

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Sample Date	Sample Type	Sample Name	Sulfolane (µg/L)
MW-150A-10	Water Table	7/11/2017		MW-150A-10	46.2
MW-150B-25	10-55	7/11/2017		MW-150B-25	14.6
MW-165A-15	Water Table	7/11/2017		MW-165A-15	<5.20
MW-165B-50	10-55	7/11/2017		MW-165B-50	<5.60
MW-166B-30	10-55	8/4/2017		MW-166B-30	59.7
MW-166B-30	10-55	8/4/2017	DUP	MW-266B-30	59.7
MW-167B-35	10-55	7/21/2017		MW-167B-35	14.9
MW-171BR-40	10-55	8/4/2017		MW-171BR-40	<5.10
MW-181A-15	Water Table	7/12/2017		MW-181A-15	<5.40
MW-181B-50	10-55	7/12/2017		MW-181B-50	<5.45
MW-181C-150	90-150	7/12/2017		MW-181C-150	<5.55
MW-185B-50	10-55	7/12/2017		MW-185B-50	6.60J
MW-185C-120	90-150	7/12/2017		MW-185C-120	6.75J
MW-190BR-60	10-55	7/25/2017		MW-190BR-60	<5.05
MW-190-150	90-150	7/25/2017		MW-190-150	<5.05
MW-191A-15	Water Table	7/12/2017		MW-191A-15	<5.10
MW-191B-60	10-55	7/12/2017		MW-191B-60	<5.70
MW-311-15	Water Table	7/12/2017		MW-311-15	<5.45
MW-311-46	10-55	7/12/2017		MW-311-46	<5.20
MW-313-15	Water Table	7/12/2017		MW-313-15	<5.40
MW-313-150	90-150	7/21/2017	DUP	MW-313-1150	<5.30
MW-313-150	90-150	7/21/2017		MW-313-150	<5.25
MW-314-15	Water Table	7/12/2017		MW-314-15	<6.15
MW-314-150	90-150	7/20/2017		MW-314-150	<5.15
MW-327-15	Water Table	7/20/2017		MW-327-15	<5.15
MW-327-150	90-150	7/20/2017		MW-327-150	<5.30
MW-328-15	Water Table	7/21/2017		MW-328-15	<5.30J*
MW-328-151	90-150	7/21/2017		MW-328-151	<5.15
MW-332-41	10-55	7/12/2017		MW-332-41	<5.40
MW-332-110	90-150	7/25/2017		MW-332-110	11.7
MW-332-150	90-150	7/25/2017		MW-332-150	153
MW-346-15	Water Table	8/1/2017		MW-346-15	20.8
MW-346-65	10-55	8/1/2017		MW-346-65	49.3
MW-346-150	90-150	8/1/2017		MW-346-150	<5.10
MW-347-65	10-55	8/1/2017		MW-347-65	17.9
MW-347-150	90-150	8/1/2017		MW-347-150	24.0
MW-349-45	10-55	7/12/2017		MW-349-45	12.2
MW-352-40	10-55	8/4/2017		MW-352-40	14.8
MW-352-40	10-55	8/4/2017	DUP	MW-452-40	15.0
MW-353-15	Water Table	8/4/2017		MW-353-15	86.4
MW-353-65	10-55	8/4/2017		MW-353-65	90.0
MW-353-100	55-90	8/4/2017		MW-353-100	90.9
MW-353-100	55-90	8/4/2017	DUP	MW-453-100	89.4
MW-356-65	10-55	7/20/2017		MW-356-65	<5.20
MW-356-90	55-90	7/20/2017		MW-356-90	<5.20
MW-357-65	10-55	7/25/2017		MW-357-65	<5.15
MW-357-150	90-150	7/25/2017		MW-357-150	<5.05

Acronyms and Abbreviations:
< = not detected; limit of detection (LOD) listed
DUP = field duplicate sample
J = estimated concentration detected below the laboratory limit of quantitation (LOQ). Flag applied by laboratory
J* = estimated concentration due to quality control (QC) failures or lack of field QC samples. Flag applied by Shannon & Wilson, Inc.
µg/L = micrograms per liter
UJ* = Analyte was not detected; listed LOD is approximate and may be inaccurate or imprecise. Displayed as <…J*. Flag applied by Shannon & Wilson, Inc.

Table 3-4
Plume Monitoring Plan - Private Well Sulfolane Results - Initial Sample Event

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well ID	Latitude, Longitude	Well Depth (feet)	Zone	Sample Date	Sulfolane (µg/L)	Comments
PW-0250	64.7932, -147.4060	80	55-90	5/20/2017	<5.10	
PW-0790	64.8047, -147.4145	120	90-160	8/24/2017	<5.10	
PW-1812	64.8052, -147.4541	150	90-160	6/5/2017	<5.25	
PW-2233	64.7865, -147.3754	--	--	7/10/2017	<5.25	Replaced well PW-0867
PW-2234	64.7885, -147.3951	--	--	7/26/2017	<5.15J*	Replaced well PW-0283

General Notes:
Well depth listed where information is known.
Acronyms and Abbreviations:
-- = not available
< = not detected; limit of detection (LOD) listed, flag applied by laboratory
J* = estimated concentration due to quality control (QC) failures or lack of field QC samples; flag applied by Shannon & Wilson, Inc.
µg/L = micrograms per liter

Table 3-5
Plume Monitoring Plan - Private Well Sulfolane Results

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well ID	Latitude, Longitude	Well Depth (feet)	Zone	Sample Type	Sample Date	Sulfolane (µg/L)	Comments
PW-0262	64.7909, -147.3986	200	>160	DUP	9/19/2017	<5.00	
PW-0262	64.7909, -147.3986	200	>160		9/19/2017	<5.10	
PW-0265	64.7900, -147.3958	35	10-55		7/26/2017	<5.10J*	
PW-0266	64.7900, -147.3972	40	10-55		8/8/2017	<5.10	
PW-0267	64.7900, -147.4000	60	55-90		7/14/2017	<5.40	
PW-0268	64.7900, -147.4015	--	--	DUP	9/7/2017	<5.25	
PW-0268	64.7900, -147.4015	--	--		9/7/2017	<5.90	
PW-0270	64.7889, -147.4074	--	--		8/31/2017	<5.15	
PW-0271	64.7889, -147.4054	48	10-55		7/11/2017	<5.25	
PW-0272	64.7891, -147.4043	220	>160	DUP	9/15/2017	<5.15	
PW-0272	64.7891, -147.4043	220	>160		9/15/2017	<5.15	
PW-0273	64.7893, -147.4029	170	>160		7/28/2017	<5.10	
PW-0274	64.7893, -147.4015	158	90-160		8/24/2017	<5.10	
PW-0275	64.7893, -147.3986	57	55-90		8/3/2017	<5.35	
PW-0276	64.7893, -147.3972	49	10-55		8/31/2017	<5.40	
PW-0277	64.7893, -147.3958	45	10-55		7/26/2017	3.46J*	Initial Detection
PW-0280	64.7899, -147.3940	40	10-55		7/26/2017	<5.15	
PW-0281	64.7893, -147.3939	40	10-55		7/26/2017	<5.15	
PW-0282	64.7886, -147.3941	41	10-55		8/31/2017	<5.15	
PW-0284	64.7885, -147.3968	63	55-90		8/14/2017	<5.15	
PW-0285	64.7885, -147.3982	63	55-90		8/14/2017	<5.15	
PW-0286	64.7885, -147.3996	160	>160		7/27/2017	<5.20	
PW-0287	64.7885, -147.4010	186	>160		7/27/2017	<5.10	
PW-0288	64.7882, -147.4038	200	>160		9/15/2017	<5.25	
PW-0289	64.7881, -147.4052	40	10-55		9/8/2017	<5.15	
PW-0290	64.7880, -147.4080	205	>160		8/14/2017	<5.05J*	
PW-0358	64.7662, -147.3569	105	90-160		2/18/2017	43.9	
PW-0365	64.7664, -147.3459				1/13/2017	<2.50J*	
PW-0365	64.7664, -147.3459				4/21/2017	<2.50	
PW-0365	64.7664, -147.3459				8/25/2017	<2.50	
PW-0366	64.7672, -147.3428	--	--		6/10/2017	R*	
PW-0366	64.7672, -147.3428	--	--		7/18/2017	<5.25	
PW-0366	64.7672, -147.3428	--	--		7/18/2017	<5.15J*	
PW-0367	64.7684, -147.3435	--	--		5/24/2017	<5.00	
PW-0368	64.7682, -147.3431	--	--		5/24/2017	<5.05	
PW-0369	64.7690, -147.3445	--	--		8/8/2017	<5.15	
PW-0370	64.7704, -147.3466	--	--		5/22/2017	<5.10	
PW-0371	64.7708, -147.3475	--	--		5/20/2017	<5.20	
PW-0372	64.7714, -147.3498	--	--	DUP	5/22/2017	<5.05	
PW-0372	64.7714, -147.3498	--	--		5/22/2017	<5.00	
PW-0373	64.7717, -147.3507	--	--		5/22/2017	<5.10	
PW-0374	64.7720, -147.3514	--	--		5/22/2017	<5.20	
PW-0379	64.7697, -147.3485	--	--		5/22/2017	<5.00	
PW-0464	64.7754, -147.3686	98	90-160		2/23/2017	96.5	
PW-0508	64.7764, -147.3553	80	55-90		7/11/2017	<5.10J*	
PW-0512	64.7744, -147.3534	300	>160		7/7/2017	<5.05	
PW-0513	64.7738, -147.3530	45.6	10-55		7/11/2017	<5.15	
PW-0531	64.7850, -147.3641	--	--		5/31/2017	<5.20J*	
PW-0546	64.7808, -147.3604	--	--		5/20/2017	<5.25	
PW-0547	64.7801, -147.3605	40	10-55		7/28/2017	4.99J	Initial Detection
PW-0548	64.7793, -147.3595	40	10-55		7/13/2017	<5.20	
PW-0555	64.7816, -147.3630	36	10-55	DUP	12/16/2016	3.55J	Initial Detection
PW-0555	64.7816, -147.3630	--	--		12/16/2016	3.44J	Initial Detection
PW-0555	64.7816, -147.3635	36	10-55		6/22/2017	3.32J	
PW-0555	64.7816, -147.3635	36	10-55		6/22/2017	<5.05	
PW-0587	64.7890, -147.3881	--	--		5/22/2017	<5.10	
PW-0589	64.7893, -147.3904	--	--		5/24/2017	<5.05	
PW-0591	64.7874, -147.3925	--	--		7/27/2017	<5.25	
PW-0594	64.7896, -147.3905	--	--		5/31/2017	<5.10J*	
PW-0612	64.7710, -147.4243	--	--		10/4/2017	14.5	
PW-0623	64.7671, -147.4167	--	--		9/7/2017	65.1	
PW-0627	64.7627, -147.4147	--	--		6/30/2017	<5.05	
PW-0628	64.7634, -147.4157	30	10-55		7/28/2017	<5.00	

Table 3-5
Plume Monitoring Plan - Private Well Sulfolane Results

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well ID	Latitude, Longitude	Well Depth (feet)	Zone	Sample Type	Sample Date	Sulfolane (µg/L)	Comments
PW-0630	64.7638, -147.4173	--	--		6/30/2017	3.10J	Initial Detection
PW-0749	64.7881, -147.3846	32	10-55		5/27/2017	<5.10	
PW-0750	64.7876, -147.3847	--	--		8/31/2017	<5.60	
PW-0751	64.7872, -147.3850	60	55-90		8/3/2017	<5.20	
PW-0752	64.7867, -147.3853	--	--		6/10/2017	R*	
PW-0752	64.7867, -147.3853	--	--		7/13/2017	<5.25	
PW-0752	64.7867, -147.3853	--	--		7/13/2017	<5.20	
PW-0753	64.7862, -147.3856	55	55-90		5/29/2017	<5.30	
PW-0759	64.7858, -147.3784	42	10-55		6/5/2017	8.82J	
PW-0761	64.7871, -147.3773	30	10-55		6/24/2017	<5.25	
PW-0762	64.7877, -147.3775	40	10-55		7/28/2017	<5.10	
PW-0769	64.7880, -147.3822	--	--		8/8/2017	<5.15	
PW-0770	64.7875, -147.3821	--	--		6/19/2017	<5.00	
PW-0771	64.7870, -147.3824	--	--		8/8/2017	<5.10	
PW-0772	64.7865, -147.3830	--	--		5/31/2017	<5.10	
PW-0774	64.7861, -147.3817	--	--	DUP	7/11/2017	<5.10	
PW-0774	64.7861, -147.3817	--	--		7/11/2017	<5.20	
PW-0775	64.7865, -147.3808	55	55-90		6/19/2017	<5.15	
PW-0776	64.7868, -147.3797	40	10-55		5/29/2017	<5.00	
PW-0777	64.7875, -147.3801	--	--		6/30/2017	<5.15	
PW-0859	64.7880, -147.3754	--	--		5/24/2017	<5.05	
PW-0860	64.7880, -147.3743	40	10-55		6/22/2017	<5.20	
PW-0863	64.7872, -147.3721	65	55-90		5/24/2017	<5.20	
PW-0864	64.7872, -147.3732	42	10-55	DUP	5/29/2017	<5.10J*	
PW-0864	64.7872, -147.3732	42	10-55		5/29/2017	<5.10	
PW-0865	64.7872, -147.3743	40	10-55		5/29/2017	<5.00	
PW-0866	64.7872, -147.3754	42	10-55	DUP	6/19/2017	<5.10	
PW-0866	64.7872, -147.3754	42	10-55		6/19/2017	<5.05	
PW-0868	64.7865, -147.3743	57	55-90		7/11/2017	<5.25	
PW-0869	64.7865, -147.3721	42	10-55		7/10/2017	<5.15	
PW-0870	64.7856, -147.3721	42	10-55	DUP	7/7/2017	<5.10	
PW-0870	64.7856, -147.3721	42	10-55		7/7/2017	<5.15	
PW-0871	64.7857, -147.3732	50	10-55		5/17/2017	3.47J	
PW-0872	64.7858, -147.3749	--	--		8/24/2017	4.07J*	Initial Detection
PW-0905	64.7872, -147.3709	40	10-55		8/31/2017	<5.15	
PW-0906	64.7872, -147.3697	34	10-55		7/27/2017	<5.15	
PW-0907	64.7873, -147.3684	45	10-55		6/19/2017	<5.15	
PW-0908	64.7866, -147.3684	50	10-55		6/19/2017	<5.30	
PW-0909	64.7865, -147.3697	50	10-55		7/14/2017	<5.10	
PW-0910	64.7865, -147.3709	80	55-90		7/13/2017	<5.15	
PW-0911	64.7858, -147.3684	--	--		7/10/2017	<5.15	
PW-0912	64.7851, -147.3710	42	10-55	DUP	8/14/2017	5.63J	
PW-0912	64.7851, -147.3710	42	10-55		8/14/2017	6.16J	
PW-0914	64.7843, -147.3683	--	--		6/24/2017	7.15J	
PW-0972	64.7696, -147.4319	236	>160		6/20/2017	<5.20	
PW-0973	64.7695, -147.4305	70	55-90		7/13/2017	<5.10	
PW-0974	64.7692, -147.4293	40	10-55		7/10/2017	<5.50	
PW-0976	64.7698, -147.4291	38	10-55		7/14/2017	<5.10	
PW-0977	64.7702, -147.4319	--	--	DUP	8/31/2017	<5.10	
PW-0977	64.7702, -147.4319	--	--		8/31/2017	<5.30	
PW-0978	64.7684, -147.4307	218	>160		6/20/2017	<5.05	
PW-0979	64.7683, -147.4294	--	--		9/7/2017	<5.10	
PW-0998	64.7710, -147.3517	--	--		6/20/2017	<5.10	
PW-1087	64.7686, -147.3502	--	--		6/30/2017	<5.15	
PW-1088	64.7874, -147.3886	60	55-90		6/19/2017	<5.10	
PW-1093	64.7889, -147.4064	220	>160		8/3/2017	<5.10	
PW-1185	64.7617, -147.3566	--	--		5/11/2017	<5.05	
PW-1230	64.7579, -147.3716	231	>160	DUP	2/24/2017	650	
PW-1230	64.7579, -147.3716	--	--		2/24/2017	603	
PW-1333	64.7831, -147.3648	--	--		6/20/2017	<5.10	
PW-1433	64.7670, -147.4222	--	--		8/31/2017	17.5	
PW-1450	64.7678, -147.3484	--	--		6/30/2017	<5.05	
PW-1454	64.7787, -147.3588	--	--		6/24/2017	<5.10	

Table 3-5
Plume Monitoring Plan - Private Well Sulfolane Results

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well ID	Latitude, Longitude	Well Depth (feet)	Zone	Sample Type	Sample Date	Sulfolane (µg/L)	Comments
PW-1473	64.7865, -147.3732	42	10-55		7/17/2017	<4.95	
PW-1608	64.7900, -147.3986	60	55-90		7/13/2017	<5.10	
PW-1930	64.7735, -147.3528	--	--		6/19/2017	<5.45	
PW-2205	64.7873, -147.3930	--	--		9/8/2017	<5.15	
PW-2211	64.7945, -147.4407	180	>160		7/17/2017	<5.30	
PW-2219	64.7645, -147.4148	60	55-90		3/17/2017	46.2	Replaced well PW-0624
PW-2219	64.7645, -147.4148	60	55-90		5/26/2017	48.4	Replaced well PW-0624
PW-2219	64.7645, -147.4148	60	55-90		7/21/2017	57.8	Replaced well PW-0624
PW-2219	64.7645, -147.4148	60	55-90		9/8/2017	60.0	Replaced well PW-0624

General Notes:
Well depth listed where information is known.
Acronyms and Abbreviations:
-- = not available
< = not detected, limit of detection (LOD) listed; flag applied by laboratory
> = greater than
DUP = duplicate sample
J = estimated concentration detected below the laboratory limit of quantitation (LOQ). Flag applied by laboratory.
J* = estimated concentration due to quality control (QC) failures or lack of field QC samples. Flag applied by Shannon & Wilson, Inc.
R* = Result is rejected due to compounding QC failures; flag applied by Shannon & Wilson, Inc.
µg/L = micrograms per liter

FIGURES

LEGEND:

FHRA PROPERTY BOUNDARY

0 0.5 Miles

GRAPHIC SCALE

Note:
-Image provided courtesy of Pictometry International 2012

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA

ANNUAL 2017 OFFSITE PLUME MONITORING REPORT

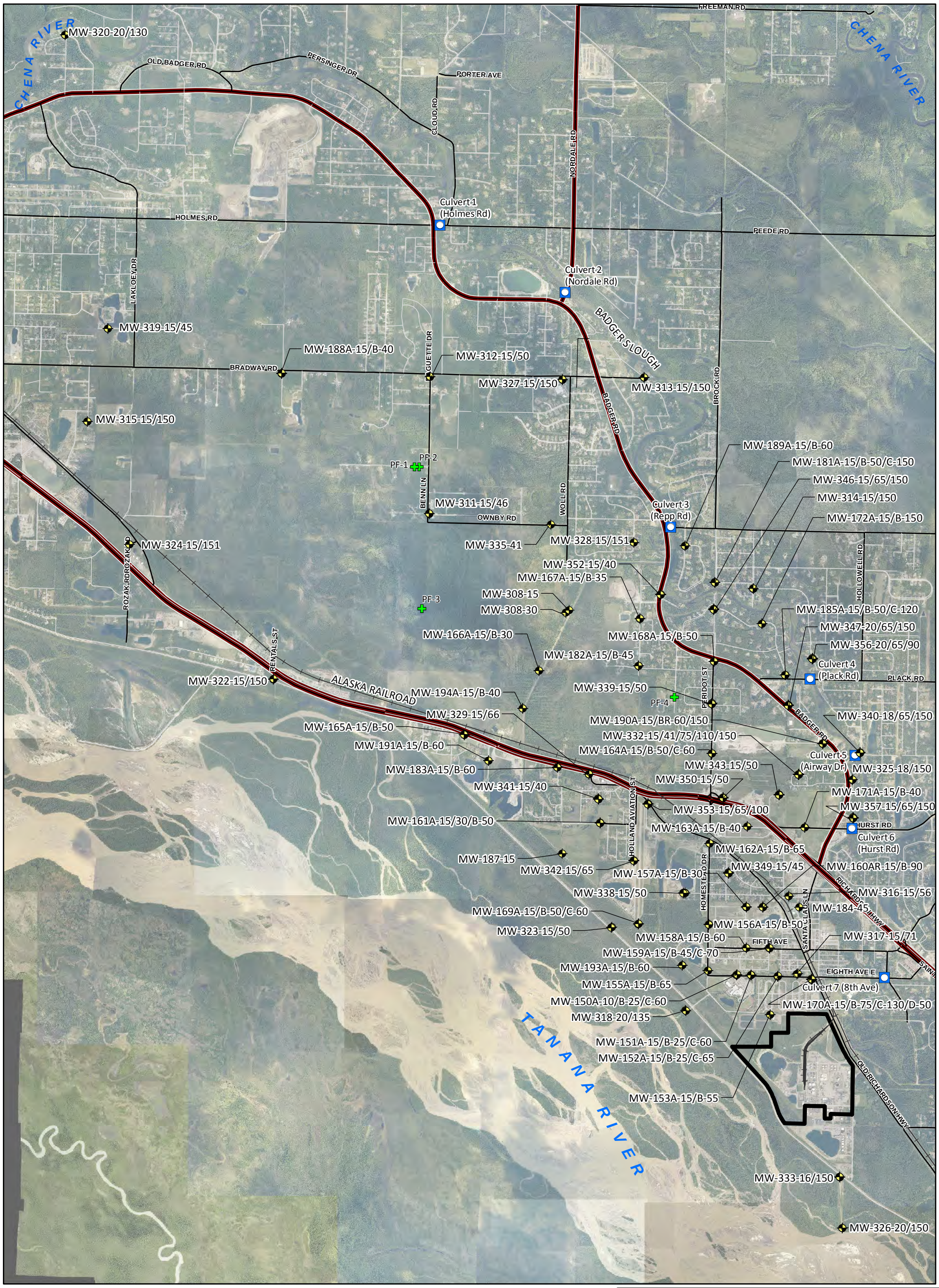
SITE LOCATION

ARCADIS

FIGURE
1-1

CITY: Citrix DIV/GROUP: IM/DV DB: K Sinsabaugh LD: G France
Path: Z:\GISProjects_ENV\FHR\FHR_AK\NorthPoleRefinery\GW_Monitoring\2017_Q3\MXD\2017AnnualOffsite\Fig 1-1 SiteLocation.mxd Date: 10/11/2017 Time: 1:48:13 PM

CITY: Citrix DIV/GROUP: IM/DV DB: K Sinsabaugh LD: G France
Path: Z:\GISProjects_ENV\FHR\FHR_AK\NorthPoleRefinery\GW_Monitoring\2017_Q3\MXD\2017AnnualOffsite\Fig 1-2 SitePlan_Offsite.mxd Date: 11/1/2017 Time: 9:46:43 AM



Legend:

- Monitoring Well
- Permafrost Boring
- Culvert
- FHRA Property Boundary
- Highway
- Major Road
- Local Road
- Rail Line

0 3,000 6,000 Feet
GRAPHIC SCALE

Note:
-Image provided courtesy of Pictometry International 2012

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA

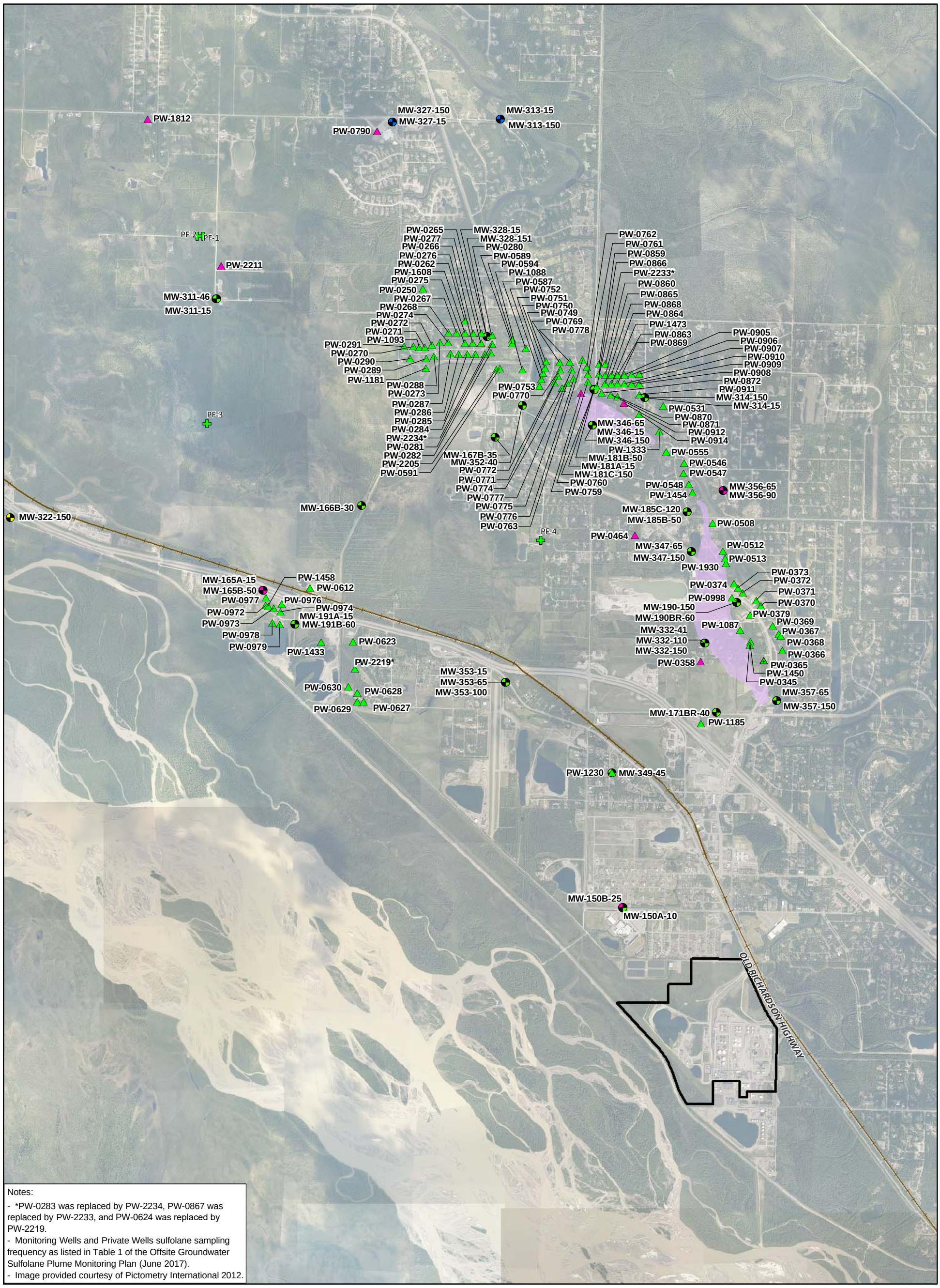
ANNUAL 2017 OFFSITE PLUME MONITORING REPORT

SITE PLAN - OFFSITE

ARCADIS

FIGURE
1-2

CITY: Citrix DIV/GROUP: IM/DV DB: K Sinsabaugh LD: G France
Path: Z:\GISProjects_ENV\FHR\FHR_AK\NorthPoleRefinery\GW_Monitoring\2017_Q4\MXD\2017AnnualOffsite\Fig 2-1 PlumeMonitoringPlanNetworkOffsite.mxd Date: 2/7/2018 Time: 8:13:26 AM



Notes:
- *PW-0283 was replaced by PW-2234, PW-0867 was replaced by PW-2233, and PW-0624 was replaced by PW-2219.
- Monitoring Wells and Private Wells sulfolane sampling frequency as listed in Table 1 of the Offsite Groundwater Sulfolane Plume Monitoring Plan (June 2017).
- Image provided courtesy of Pictometry International 2012.

Legend

- Monitoring Well
- Private Well
- Point-of-entry treatment system sample collected
- Permafrost Boring
- Inferred Suprapermafrost and Subpermafrost Mixing Zone
- FHRA Property Boundary

MW-332-150 Monitoring Well Location ID
PW-0627 Private Well Location ID

Well Sampling Frequency
- Annual
- Every 2 years
- Every 5 years
- Gauging Only

0 2,500 5,000
SCALE IN FEET

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA
ANNUAL 2017 OFFSITE PLUME MONITORING REPORT

OFFSITE PLUME MONITORING PLAN NETWORK

ARCADIS

FIGURE 2-1

CITY: Citrix DIV/GROUP: IM/DV DB: K. Sinsabaugh LD: G FRANCE
Path: Z:\GISProjects_ENV\FHR\FHR_AK\NorthPoleRefinery\GW_Monitoring\2017_Q4\MXD\2017AnnualOffsite\Fig 3-1 Annual GW_Contours-Off-Site_WaterTable.mxd Date: 2/5/2018 Time: 2:51:31 PM

Legend

- Monitoring Well
- Permafrost Boring
- FHRA Property Boundary
- 480 — Groundwater Elevation Contours in Feet Above Mean Sea Level (Dashed where Inferred)

Notes:
- Results for groundwater elevation are in feet above mean sea level
- Contours depicted reflect regional groundwater gradient. Groundwater flow may be locally influenced by the presence of permafrost. The 2013 Site Characterization Reports (ARCADIS U.S., Inc. 2013a and 2013b) provide additional information on subsurface conditions including permafrost.
- Refer to the Second Semiannual 2017 Onsite Groundwater Monitoring Report for the onsite contours
- Image provided courtesy of Pictometry International 2012

0 3,000 6,000
SCALE IN FEET

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA

ANNUAL 2017 OFFSITE PLUME MONITORING REPORT

2017 EVERY-FIVE-YEAR GROUNDWATER CONTOUR MAP – OFFSITE WELLS AT WATER TABLE

ARCADIS

FIGURE
3-1

CITY: Citrix DIV/GROUP: IM/DV DB: K. Sinsabaugh LD: G FRANCE
Path: Z:\GISProjects_ENV\FHR\FHR_AK\NorthPoleRefinery\GW_Monitoring\2017_Q4\MXD\2017AnnualOffsite\Fig 3-2 Annual GW_Contours-Off-Site_10-55ft.mxd Date: 2/5/2018 Time: 2:53:11 PM

Legend

- Monitoring Well
- Permafrost Boring
- FHRA Property Boundary
- 480 — Groundwater Elevation Contours in Feet Above Mean Sea Level (Dashed where Inferred)

Notes:
- Results for groundwater elevation are in feet above mean sea level
- Contours depicted reflect regional groundwater gradient. Groundwater flow may be locally influenced by the presence of permafrost. The 2013 Site Characterization Reports (ARCADIS U.S., Inc. 2013a and 2013b) provide additional information on subsurface conditions including permafrost.
- Refer to the Second Semiannual 2017 Onsite Groundwater Monitoring Report for the onsite contours.
- Image provided courtesy of Pictometry International 2012

0 3,000 6,000
SCALE IN FEET

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA

ANNUAL 2017 OFFSITE PLUME MONITORING REPORT

2017 EVERY-FIVE-YEAR GROUNDWATER CONTOUR MAP – OFFSITE WELLS 10 TO 55 FEET BELOW WATER TABLE

ARCADIS

FIGURE
3-2

CITY: Citrix DIV/GROUP: IM/DV DB: K. Sinsabaugh LD: G FRANCE
Path: Z:\GISProjects_ENV\FHR\FHR_AK\NorthPoleRefinery\GW_Monitoring\2017_Q4\MXD\2017AnnualOffsite\Fig 3-3 Annual GW_Contours-Off-Site_55-90ft.mxd Date: 2/5/2018 Time: 1:49:27 PM

Legend

Monitoring Well

FHRA Property Boundary

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

Notes:
- Results for groundwater elevation are in feet above mean sea level
- Contours depicted reflect regional groundwater gradient. Groundwater flow may be locally influenced by the presence of permafrost. The 2013 Site Characterization Reports (ARCADIS U.S., Inc. 2013a and 2013b) provide additional information on subsurface conditions including permafrost.
- Refer to the Second Semiannual 2017 Onsite Groundwater Monitoring Report for the onsite contours.
- Image provided courtesy of Pictometry International 2012

0 3,000 6,000
SCALE IN FEET

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA

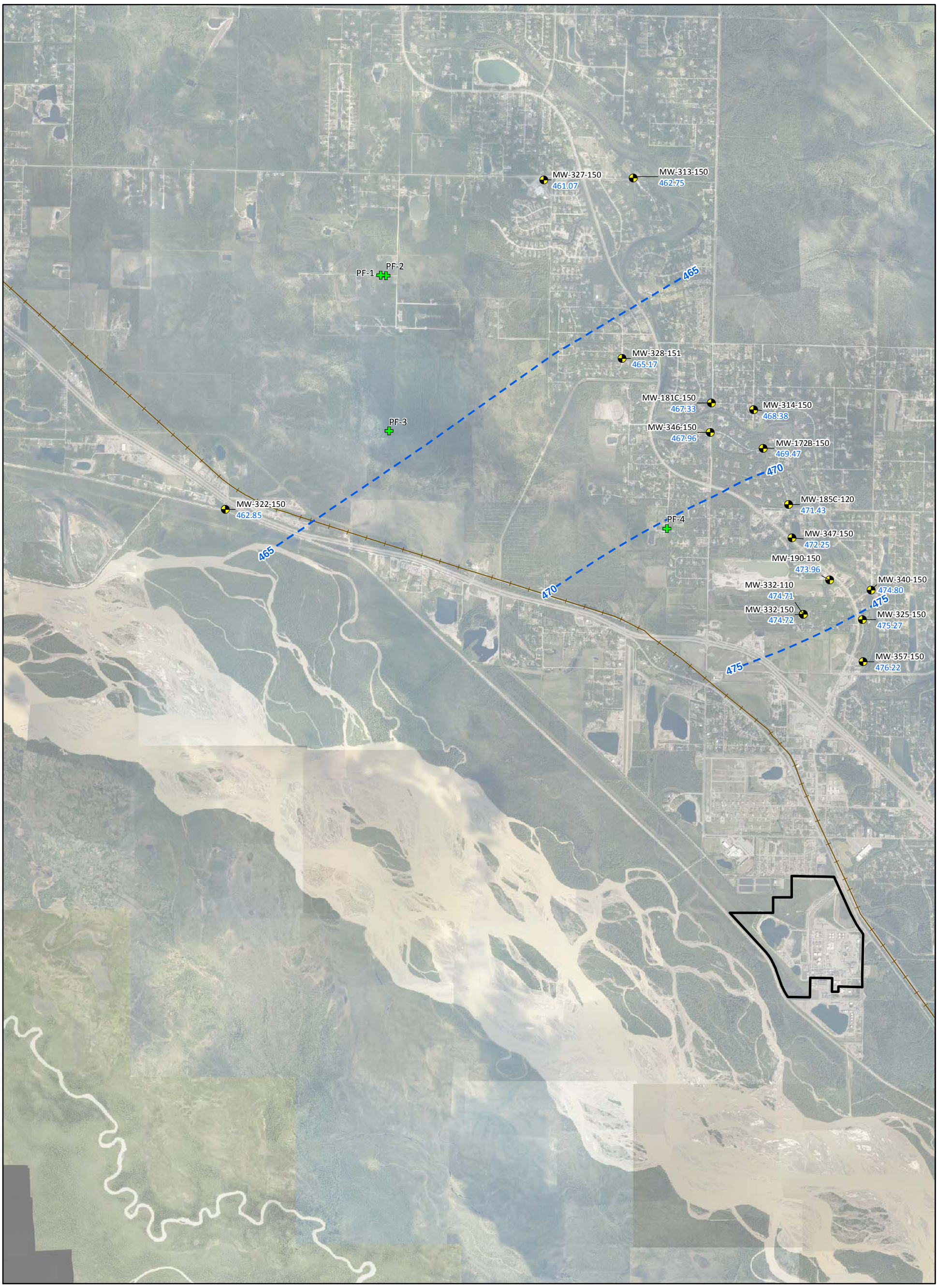
ANNUAL 2017 OFFSITE PLUME MONITORING REPORT

2017 EVERY-FIVE-YEAR GROUNDWATER CONTOUR MAP – OFFSITE WELLS 55 TO 90 FEET BELOW WATER TABLE

ARCADIS

FIGURE
3-3

CITY: Citrix DIV/GROUP: IM/DV DB: K. Sinsabaugh LD: G FRANCE
Path: Z:\GISProjects_ENV\FHR\FHR_AK\NorthPoleRefinery\GW_Monitoring\2017_Q4\MXD\2017AnnualOffsite\Fig 3-4 Annual GW_Contours-Off-Site_90-160ft.mxd Date: 2/5/2018 Time: 1:52:58 PM



Legend

- Permafrost Boring
- FHRA Property Boundary
- 475 — Groundwater Elevation Contours in Feet Above Mean Sea Level (Dashed where Inferred)

Notes:
- Results for groundwater elevation are in feet above mean sea level
- Contours depicted reflect regional groundwater gradient. Groundwater flow may be locally influenced by the presence of permafrost. The 2013 Site Characterization Reports (ARCADIS U.S., Inc. 2013a and 2013b) provide additional information on subsurface conditions including permafrost.
- Refer to the Second Semiannual 2017 Onsite Groundwater Monitoring Report for the onsite contours
-Image provided courtesy of Pictometry International 2012

0 3,000 6,000
SCALE IN FEET

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA

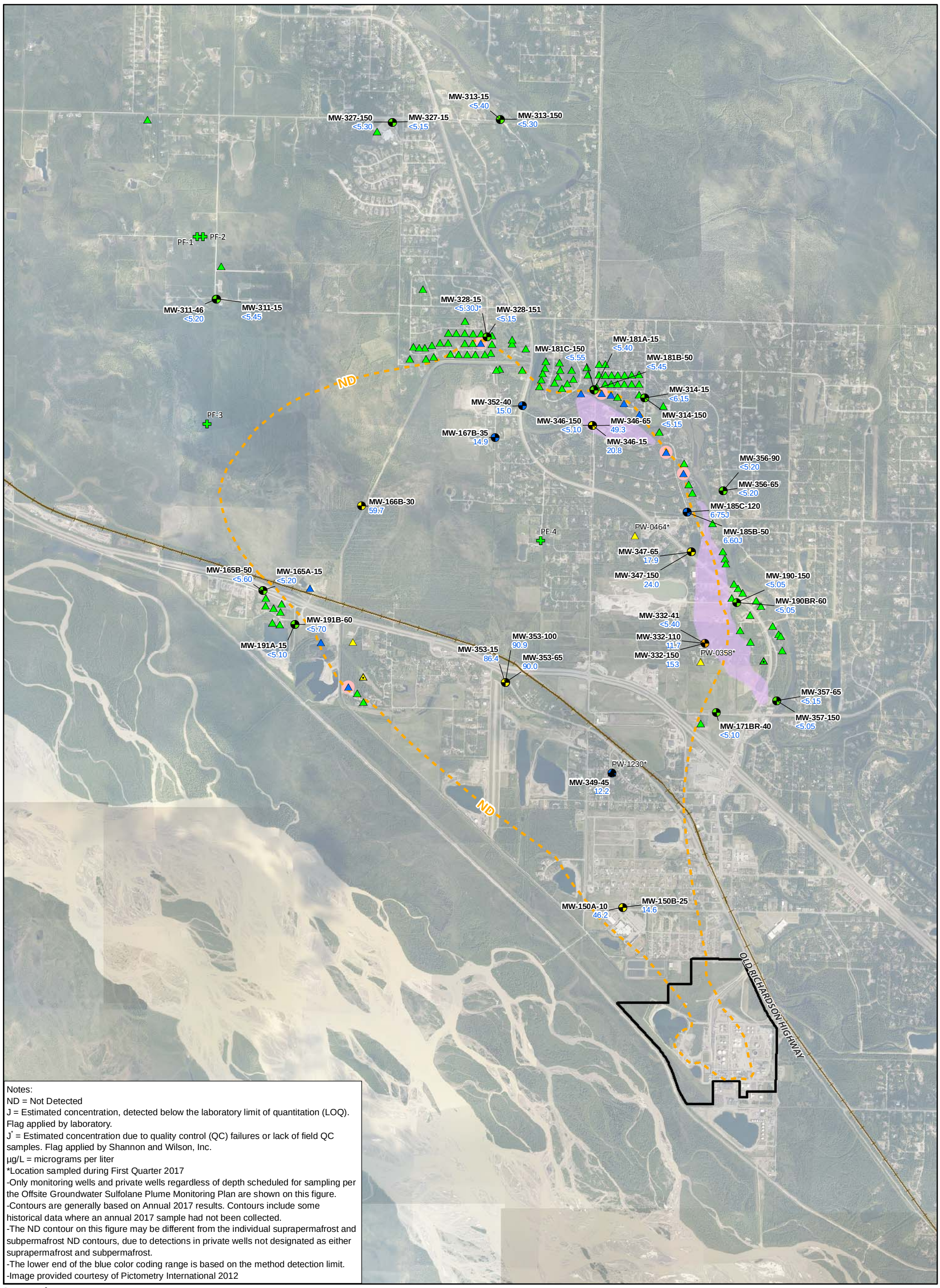
ANNUAL 2017 OFFSITE PLUME MONITORING REPORT

2017 EVERY-FIVE-YEAR GROUNDWATER CONTOUR MAP – OFFSITE WELLS 90 TO 160 FEET BELOW WATER TABLE

ARCADIS

FIGURE
3-4

CITY: Citrix DIV/GROUP: IM/DV DB: K Sinsabaugh LD: G France
Path: Z:\GISProjects_ENV\FHR\FHR_AK\NorthPoleRefinery\GW_Monitoring\2017_Q4\MXD\2017AnnualOffsite\Fig 3-5 Annual AppExtentSulfolaneImpactsOffsiteMWPW.mxd Date: 2/5/2018 Time: 7:26:14 PM



Notes:
ND = Not Detected
J = Estimated concentration, detected below the laboratory limit of quantitation (LOQ). Flag applied by laboratory.
J* = Estimated concentration due to quality control (QC) failures or lack of field QC samples. Flag applied by Shannon and Wilson, Inc.
µg/L = micrograms per liter
*Location sampled during First Quarter 2017
-Only monitoring wells and private wells regardless of depth scheduled for sampling per the Offsite Groundwater Sulfolane Plume Monitoring Plan are shown on this figure.
-Contours are generally based on Annual 2017 results. Contours include some historical data where an annual 2017 sample had not been collected.
-The ND contour on this figure may be different from the individual suprapermafrost and subpermafrost ND contours, due to detections in private wells not designated as either suprapermafrost and subpermafrost.
-The lower end of the blue color coding range is based on the method detection limit.
-Image provided courtesy of Pictometry International 2012

Legend

- Monitoring Well
- Private Well
- Point-of-entry treatment system sample collected
- Approximate Sulfolane Isopleth Regardless of Depth in µg/L
- Permafrost Boring
- Initial Detection
- Inferred Suprapermafrost and Subpermafrost Mixing Zone
- FHRA Property Boundary

MW-332-150 Monitoring Well Location ID
153 Sulfolane Concentration (µg/L)
< Not detected: detection limit listed

Private Well Sulfolane Results

- Not Detected
- 1.0 - Less Than 20 µg/L
- 20 - 100 µg/L
- 100 - 200 µg/L
- 200 - 300 µg/L
- 300 - 400 µg/L
- Greater than 400 µg/L

Monitoring Well Sulfolane Results

- Not Detected
- 3.1 - Less Than 20 µg/L
- 20 - 100 µg/L
- 100 - 200 µg/L

0 2,500 5,000
SCALE IN FEET

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA

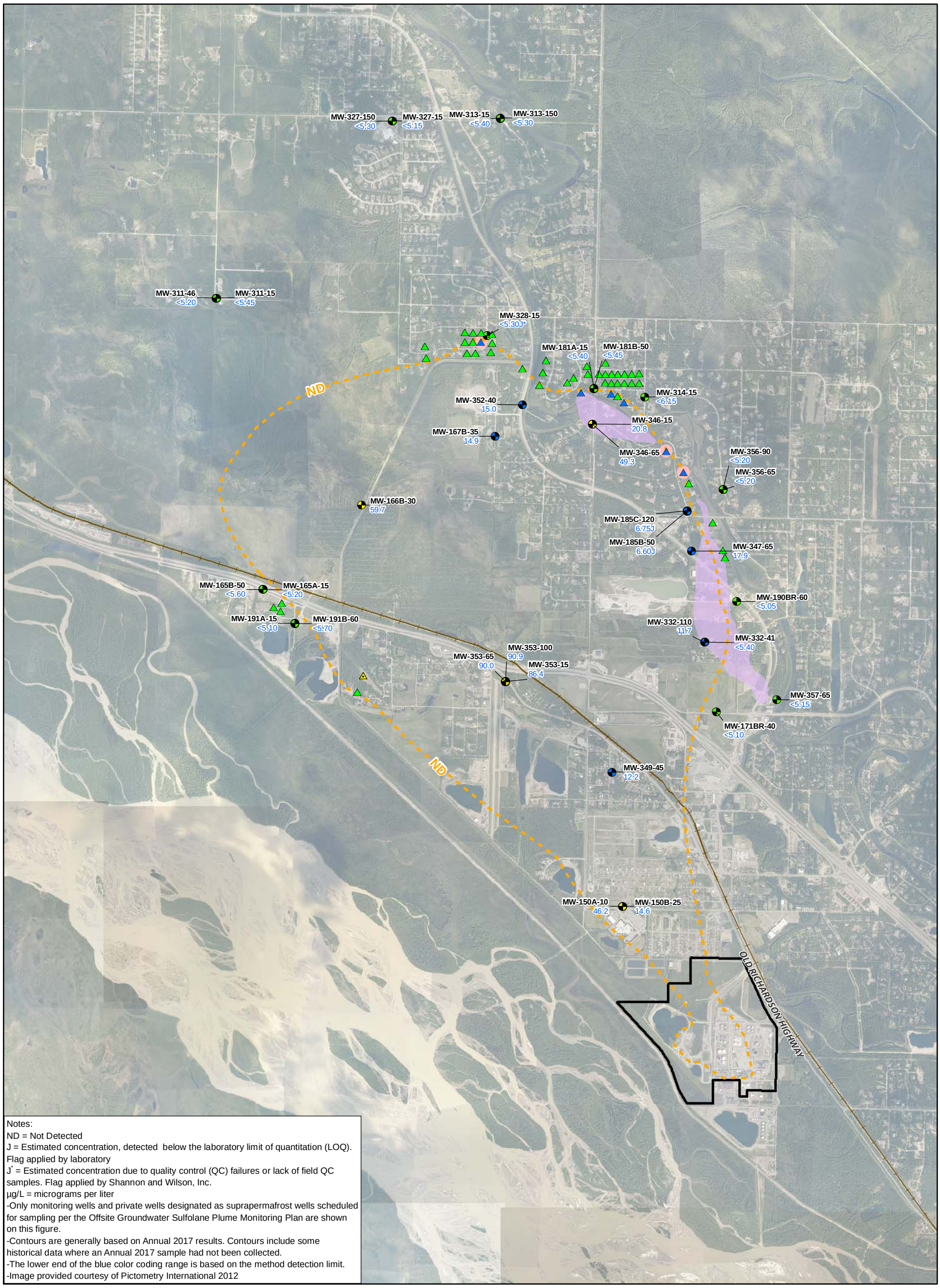
ANNUAL 2017 OFFSITE PLUME MONITORING REPORT

ANNUAL 2017 APPROXIMATE EXTENT OF SULFOLANE IMPACTS

ARCADIS

FIGURE
3-5

CITY: Citrix DIV/GROUP: IM/DV DB: K Sinsabaugh LD: G France
Path: Z:\GISProjects_ENV\FHR\FHR_AK\NorthPoleRefinery\GW_Monitoring\2017_Q4\MXD\2017AnnualOffsite\Fig 3-6 Annual OffsiteGWAnalyticalResults_SupraPermafrost.mxd Date: 2/5/2018 Time: 7:17:42 PM



Notes:
ND = Not Detected
J = Estimated concentration, detected below the laboratory limit of quantitation (LOQ). Flag applied by laboratory
J* = Estimated concentration due to quality control (QC) failures or lack of field QC samples. Flag applied by Shannon and Wilson, Inc.
µg/L = micrograms per liter
-Only monitoring wells and private wells designated as suprapermafrost wells scheduled for sampling per the Offsite Groundwater Sulfolane Plume Monitoring Plan are shown on this figure.
-Contours are generally based on Annual 2017 results. Contours include some historical data where an Annual 2017 sample had not been collected.
-The lower end of the blue color coding range is based on the method detection limit.
-Image provided courtesy of Pictometry International 2012

Legend

- Monitoring Well
- Private Well
- Point-of-entry treatment system sample collected
- Initial Detection
- Approximate Sulfolane Isopleth in µg/L
- Inferred Suprapermafrost and Subpermafrost Mixing Zone
- FHRA Property Boundary

MW-353-15 Monitoring Well Location ID
86.4 Sulfolane Concentration (µg/L)
< Not detected: detection limit listed

Private Well Sulfolane Results
- Not Detected
- 1.0 - Less Than 20 µg/L
- 20 - 100 µg/L

Monitoring Well Sulfolane Results
- Not Detected
- 3.1 - Less Than 20 µg/L
- 20 - 100 µg/L

0 2,500 5,000
SCALE IN FEET

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA

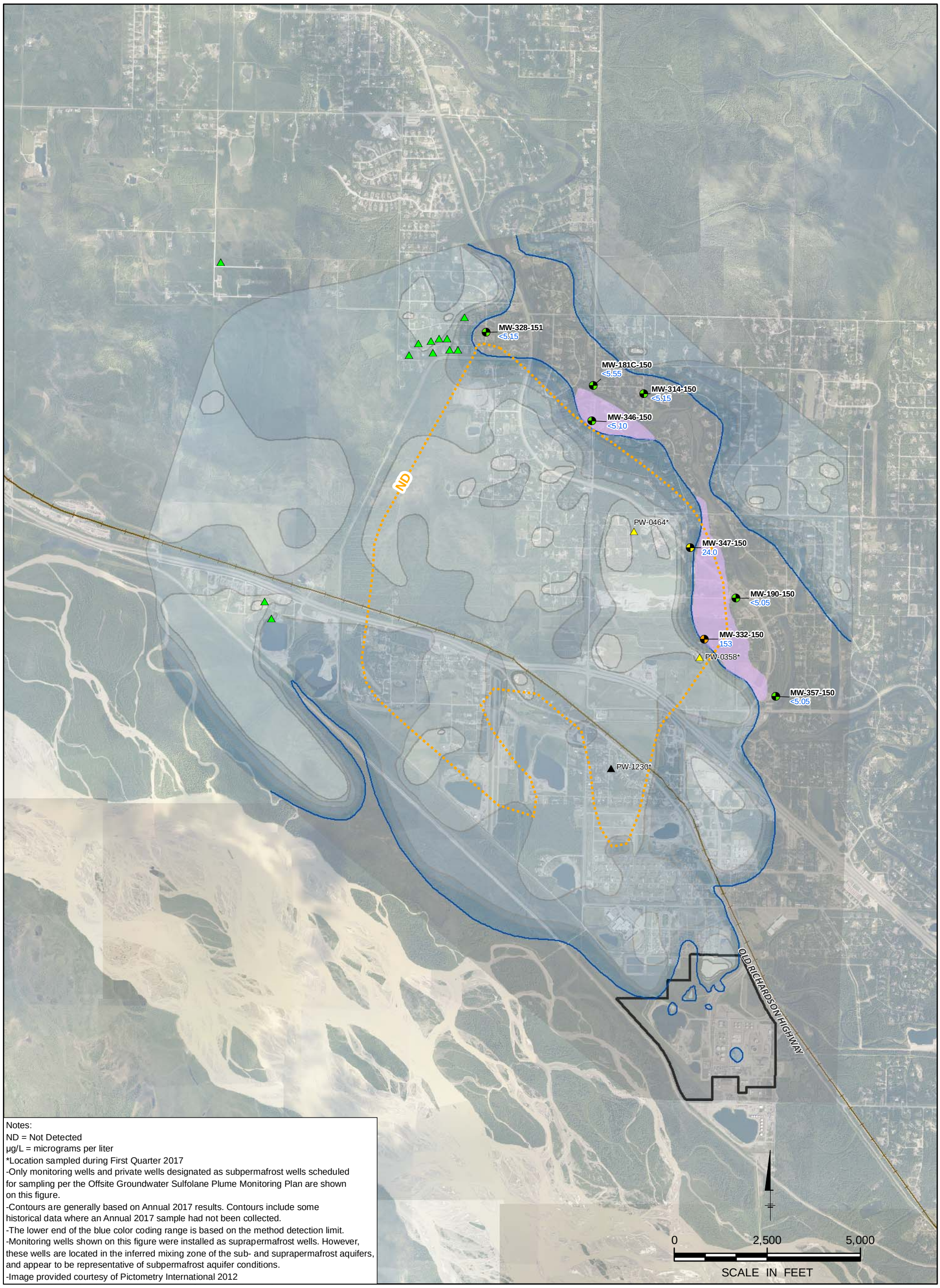
ANNUAL 2017 OFFSITE PLUME MONITORING REPORT

ANNUAL 2017 GROUNDWATER ANALYTICAL RESULTS IN THE SUPRAPERMAFROST AQUIFER

ARCADIS

FIGURE 3-6

CITY: Citrix DIV/GROUP: IM/DV DB: K Sinsabaugh LD: G France
Path: Z:\GISProjects_ENV\FHR\FHR_AK\NorthPoleRefinery\GW_Monitoring\2017_Q4\MXD\2017AnnualOffsite\Fig 3-7 Annual OffsiteGWAnalyticalResults_SubPermafrost.mxd Date: 2/8/2018 Time: 2:57:56 PM



Notes:
ND = Not Detected
µg/L = micrograms per liter
*Location sampled during First Quarter 2017
-Only monitoring wells and private wells designated as subpermafrost wells scheduled for sampling per the Offsite Groundwater Sulfolane Plume Monitoring Plan are shown on this figure.
-Contours are generally based on Annual 2017 results. Contours include some historical data where an Annual 2017 sample had not been collected.
-The lower end of the blue color coding range is based on the method detection limit.
-Monitoring wells shown on this figure were installed as suprapermafrost wells. However, these wells are located in the inferred mixing zone of the sub- and suprapermafrost aquifers, and appear to be representative of subpermafrost aquifer conditions.
-Image provided courtesy of Pictometry International 2012

Legend

- Monitoring Well
- Private Well
- Point-of-entry treatment system sample collected
- Approximate Sulfolane Isopleth in µg/L
- Inferred Suprapermafrost and Subpermafrost Mixing Zone
- FHRA Property Boundary
- MW-332-150 Monitoring Well Location ID
- 153 Sulfolane Concentration (µg/L)
- < Not detected: detection limit listed

Private Well Sulfolane Results
- Not Detected
- 1.0 - Less Than 20 µg/L
- 20 - 100 µg/L
- 100 - 200 µg/L
- 200 - 300 µg/L
- 300 - 400 µg/L
- Greater than 400 µg/L

Monitoring Well Sulfolane Results
- Not Detected
- 3.1 - Less Than 20 µg/L
- 20 - 100 µg/L
- 100 - 200 µg/L

Depth to Permafrost in feet
- < 10
- 10 - 30
- 30 - 60
- 60 - 90
- 90 - 120
- 120 - 150
- > 150

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA

ANNUAL 2017 OFFSITE PLUME MONITORING REPORT

ANNUAL 2017 GROUNDWATER ANALYTICAL RESULTS IN THE SUBPERMAFROST AQUIFER

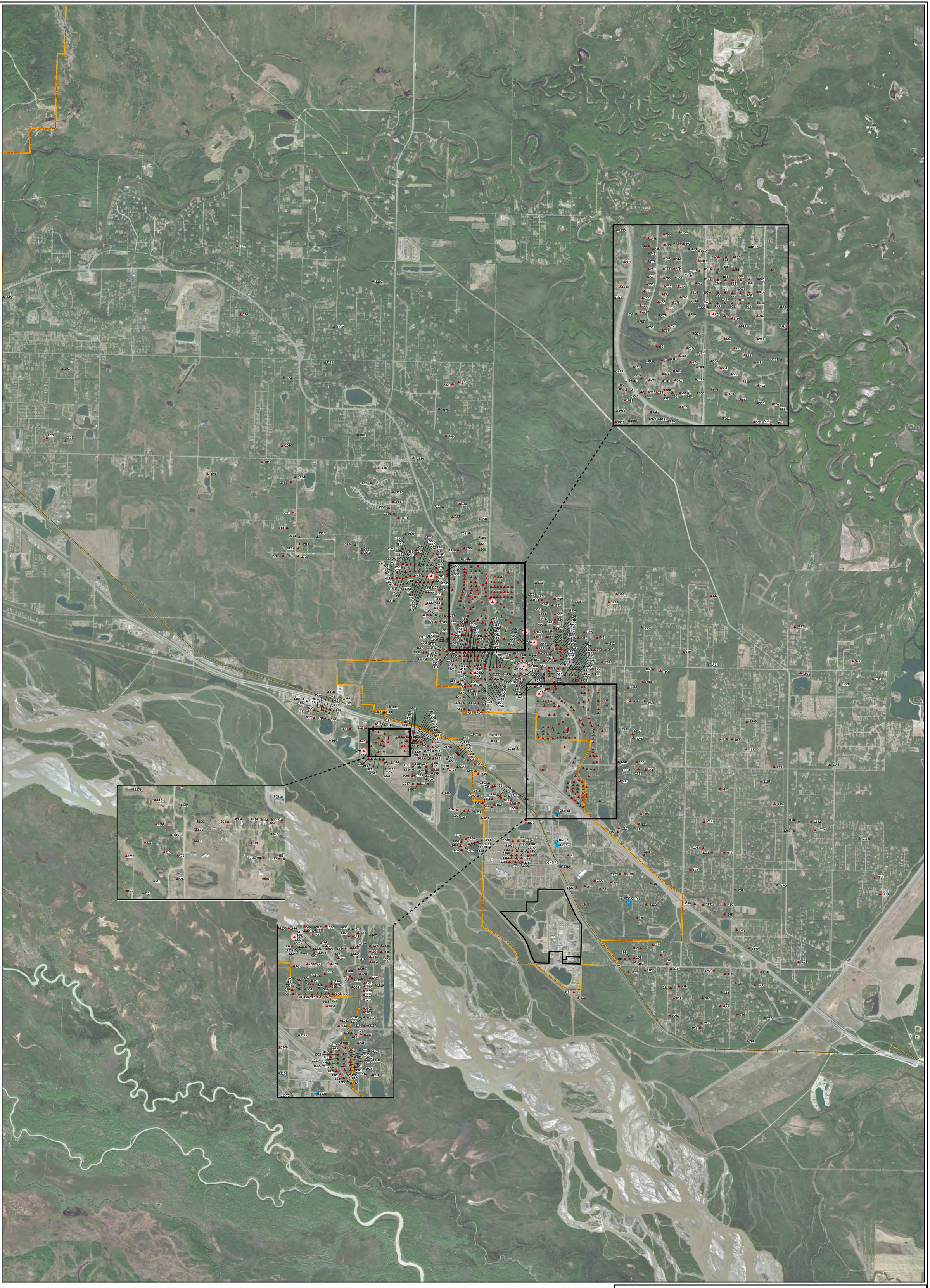
ARCADIS

FIGURE 3-7

APPENDIX A

Supplemental Figures

CITY: Citrix DIV/GROUP: ENV/IM DB: K Sinsabaugh LD: G FRANCE
Path: Z:\GISProjects_ENV\FHR\FHR_AK\NorthPoleRefinery\GW_Monitoring\2017_Q3\MXD\2017AnnualOffsite\AppendixA PrivateWells_SizeD_3Q17.mxd Date: 11/20/2017 Time: 10:21:53 AM



Legend

- Private Wells
- Municipal Wells
- Initial Detection
- Statewide Railroads
- North Pole City Boundary
- FHRA Property Boundary

Notes:
-Private wells shown have been assigned a PW-ID because a sample has been collected
-Municipal wells CNP-5F and CNP-4F are labeled as private wells PW-1491 and PW-1492, respectively on this figure
-Image provided courtesy of Pictometry International 2012

0 1,200 2,400 4,800
Feet

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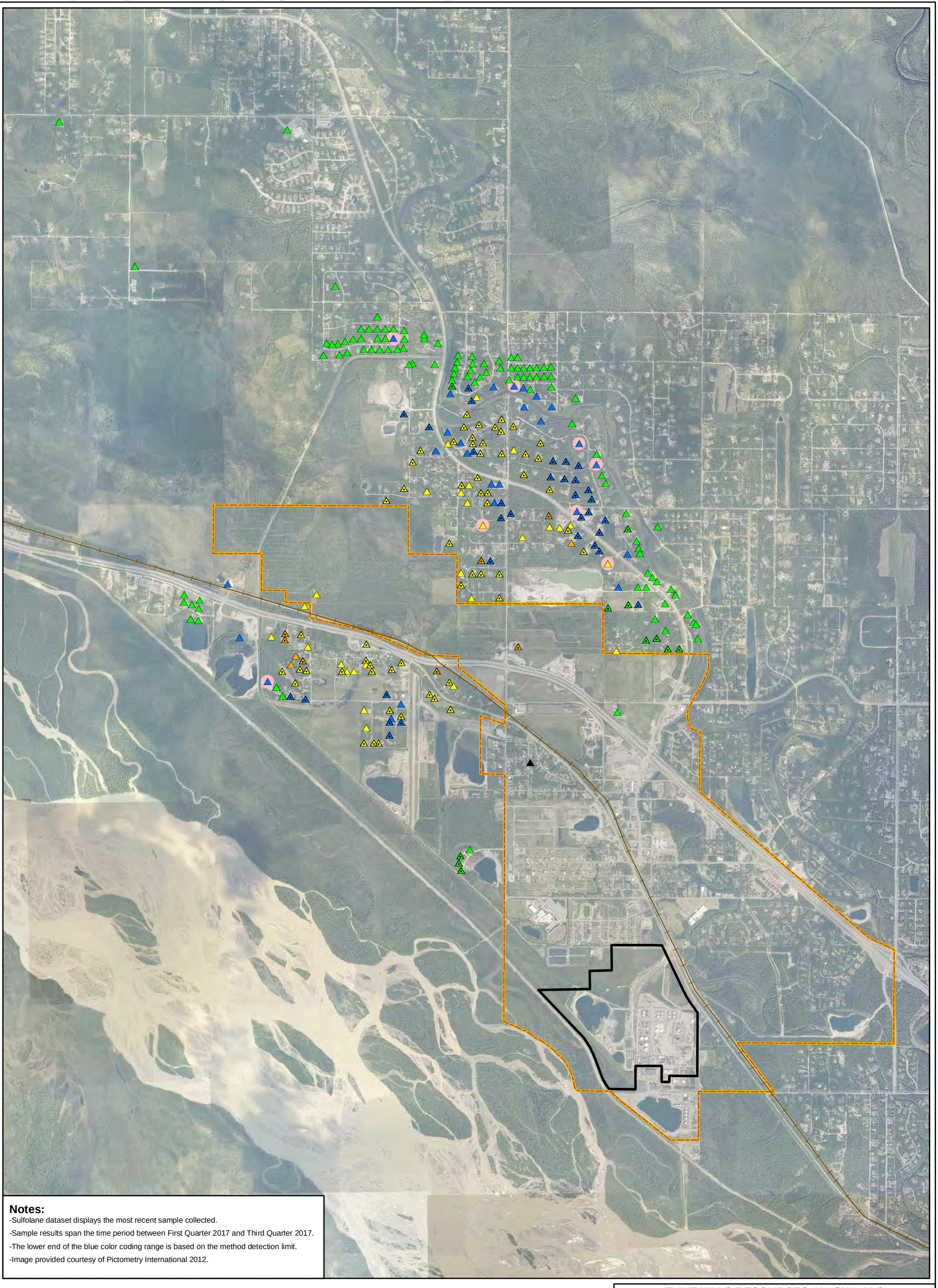
NORTH POLE TERMINAL, NORTH POLE, ALASKA
ANNUAL 2017 OFFSITE PLUME MONITORING REPORT

PRIVATE WELL LOCATION MAP

ARCADIS

APPENDIX
A-1

CITY: Citrix DIV/GROUP: IM/DV DB: K Sinsabaugh LD: G France
Path: Z:\GISProjects_ENV\FHR\FHR_AK\NorthPoleRefinery\GW_Monitoring\2017_Q4\MXD\2017AnnualOffsite\Fig A-2 PrivateWell_Sulfolane.mxd Date: 2/5/2018 Time: 1:47:17 PM



Notes:
-Sulfolane dataset displays the most recent sample collected.
-Sample results span the time period between First Quarter 2017 and Third Quarter 2017.
-The lower end of the blue color coding range is based on the method detection limit.
-Image provided courtesy of Pictometry International 2012.

LEGEND:

- Private Well
- Point-of-entry treatment system sample collected
- Initial Detection
- North Pole City Boundary
- FHRA Property Boundary

Private Well Sulfolane Results

- Not Detected
- 1.0 - Less Than 20 µg/L
- 20 - 100 µg/L
- 100 - 200 µg/L
- 200 - 300 µg/L
- 300 - 400 µg/L
- Greater than 400 µg/L

0 2,500 5,000
SCALE IN FEET

FLINT HILLS RESOURCES ALASKA, LLC
NORTH POLE TERMINAL, NORTH POLE, ALASKA

ANNUAL 2017 OFFSITE PLUME MONITORING REPORT

PRIVATE WELL SULFOLANE RESULTS

ARCADIS

FIGURE
A-2

APPENDIX B

Historical Data Tables for Groundwater Elevation, Sulfolane, and Private Wells Parameters

Appendix B-1
Historical Groundwater Elevation Data

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-150A-10	1/22/2010	—	5.90	—	
MW-150A-10	2/17/2010	—	5.92	—	
MW-150A-10	3/17/2010	—	5.93	—	
MW-150A-10	4/29/2010	—	5.98	—	
MW-150A-10	5/25/2010	—	6.06	—	
MW-150A-10	8/3/2010	—	5.08	—	
MW-150A-10	9/9/2010	—	5.34	—	
MW-150A-10	10/19/2010	—	6.27	—	
MW-150A-10	11/12/2010	—	5.91	—	
MW-150A-10	1/24/2011	—	5.40	—	
MW-150A-10	2/2/2011	—	5.52	—	
MW-150A-10	4/27/2011	—	—	—	Monument full of water
MW-150A-10	5/27/2011	—	Frozen	—	Frozen w/data logger
MW-150A-10	7/14/2011	—	4.83	—	
MW-150A-10	10/21/2011	—	6.14	—	
MW-150A-10	2/15/2012	487.03	6.06	480.97	
MW-150A-10	4/19/2012	487.03	5.40	481.63	
MW-150A-10	7/30/2012	487.03	4.64	482.39	
MW-150A-10	11/1/2012	487.03	5.78	481.25	
MW-150A-10	1/24/2013	487.14	6.46	480.68	
MW-150A-10	4/24/2013	487.14	—	—	Monument and casing were filled with water
MW-150A-10	8/2/2013	487.14	4.65	482.49	
MW-150A-10	10/1/2013	487.14	5.58	481.56	
MW-150A-10	3/18/2014	487.14	5.89	481.25	
MW-150A-10	6/11/2014	487.13	5.75	481.38	
MW-150A-10	9/9/2014	487.13	4.79	482.34	
MW-150A-10	11/20/2014	487.13	5.57	481.56	
MW-150A-10	3/18/2015	487.13	5.93	481.20	
MW-150A-10	6/11/2015	487.13	5.61	481.52	
MW-150A-10	8/12/2015	487.27	4.73	482.54	
MW-150A-10	11/19/2015	487.27	5.69	481.58	
MW-150A-10	3/22/2016	487.27	6.21	481.06	
MW-150A-10	9/13/2016	487.33	4.99	482.34	
MW-150A-10	2/22/2017	487.33	5.95	481.38	
MW-150A-10	3/14/2017	487.33	5.92	481.41	
MW-150A-10	7/11/2017	487.27	4.98	482.29	
MW-150A-10	8/23/2017	487.27	4.98	482.29	
MW-150B-25	1/22/2010	487.12	6.00	481.12	
MW-150B-25	2/17/2010	487.12	6.01	481.11	
MW-150B-25	3/17/2010	487.12	6.02	481.10	
MW-150B-25	4/29/2010	487.12	6.08	481.04	
MW-150B-25	5/25/2010	487.12	6.16	480.96	
MW-150B-25	8/3/2010	487.12	5.15	481.97	
MW-150B-25	9/9/2010	487.12	5.45	481.67	
MW-150B-25	10/19/2010	487.12	6.33	480.79	
MW-150B-25	11/12/2010	487.12	6.02	481.10	
MW-150B-25	2/2/2011	487.12	5.62	481.50	
MW-150B-25	4/27/2011	487.12	5.33	481.79	
MW-150B-25	7/14/2011	487.12	4.70	482.42	
MW-150B-25	10/21/2011	487.12	6.32	480.80	
MW-150B-25	2/15/2012	487.20	6.22	480.98	
MW-150B-25	4/19/2012	487.20	5.53	481.67	
MW-150B-25	7/30/2012	487.20	4.78	482.42	
MW-150B-25	11/1/2012	487.20	5.56	481.64	
MW-150B-25	1/24/2013	486.95	6.29	480.66	
MW-150B-25	4/24/2013	486.95	5.59	481.36	
MW-150B-25	8/2/2013	486.95	4.69	482.26	
MW-150B-25	10/1/2013	486.95	5.63	481.32	
MW-150B-25	3/18/2014	486.95	5.96	480.99	
MW-150B-25	6/11/2014	487.20	5.81	481.39	
MW-150B-25	9/9/2014	487.20	4.83	482.37	

Appendix B-1
Historical Groundwater Elevation Data

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-150B-25	11/20/2014	487.20	5.64	481.56	
MW-150B-25	3/18/2015	487.20	5.99	481.21	
MW-150B-25	6/11/2015	487.20	5.69	481.51	
MW-150B-25	8/12/2015	487.40	4.81	482.59	
MW-150B-25	11/19/2015	487.40	5.86	481.54	
MW-150B-25	3/22/2016	487.40	6.30	481.10	
MW-150B-25	9/13/2016	487.42	5.09	482.33	
MW-150B-25	2/22/2017	487.42	5.99	481.43	
MW-150B-25	3/14/2017	487.42	5.97	481.45	
MW-150B-25	7/11/2017	487.33	4.89	482.44	
MW-150B-25	8/23/2017	487.33	5.06	482.27	
MW-150C-60	2/22/2017	486.7	5.29	481.41	
MW-151A-15	1/25/2010	—	5.45	—	
MW-151A-15	2/17/2010	—	5.42	—	
MW-151A-15	3/15/2010	—	5.40	—	
MW-151A-15	4/29/2010	—	5.43	—	
MW-151A-15	5/25/2010	—	6.30	—	
MW-151A-15	8/3/2010	—	4.45	—	
MW-151A-15	9/9/2010	—	5.08	—	
MW-151A-15	10/19/2010	—	5.69	—	
MW-151A-15	11/11/2010	—	5.50	—	
MW-151A-15	12/4/2010	—	5.91	—	
MW-151A-15	2/10/2011	—	5.11	—	
MW-151A-15	3/25/2011	—	5.12	—	
MW-151A-15	4/27/2011	—	—	—	Monument full of water w/data logger
MW-151A-15	5/25/2011	—	5.12	—	
MW-151A-15	7/14/2011	—	4.21	—	
MW-151A-15	10/21/2011	—	5.81	—	
MW-151A-15	2/16/2012	487.09	5.85	481.24	
MW-151A-15	4/19/2012	487.09	5.05	482.04	
MW-151A-15	7/30/2012	487.09	4.25	482.84	
MW-151A-15	11/1/2012	487.09	5.35	481.74	
MW-151A-15	1/24/2013	487.22	5.19	482.03	
MW-151A-15	4/24/2013	487.19	5.41	481.78	
MW-151A-15	8/1/2013	487.27	Frozen	—	Well was frozen with a data logger suspended from well plug--the well could not be opened.
MW-151A-15	10/1/2013	487.27	5.32	481.95	
MW-151B-25	1/25/2010	486.95	5.47	481.48	
MW-151B-25	2/17/2010	486.95	5.40	481.55	
MW-151B-25	3/16/2010	486.95	5.40	481.55	
MW-151B-25	4/29/2010	486.95	5.43	481.52	
MW-151B-25	5/25/2010	486.95	5.20	481.75	
MW-151B-25	6/28/2010	486.95	4.80	482.15	
MW-151B-25	8/3/2010	486.95	4.47	482.48	
MW-151B-25	9/9/2010	486.95	5.38	481.57	
MW-151B-25	10/19/2010	486.95	5.70	481.25	
MW-151B-25	11/11/2010	486.95	5.48	481.47	
MW-151B-25	12/4/2010	486.95	4.95	482.00	
MW-151B-25	2/18/2011	486.95	5.20	481.75	
MW-151B-25	3/25/2011	486.95	5.14	481.81	
MW-151B-25	4/27/2011	486.95	—	—	Monument full of water w/data logger
MW-151B-25	5/25/2011	486.95	5.12	481.83	
MW-151B-25	7/14/2011	486.95	4.22	482.73	
MW-151B-25	10/21/2011	486.95	5.83	481.12	
MW-151C-60	3/16/2010	—	9.28	—	
MW-151C-60	4/29/2010	490.92	9.26	481.66	
MW-151C-60	8/4/2010	490.92	8.28	482.64	
MW-151C-60	9/9/2010	490.92	8.60	482.32	
MW-151C-60	10/19/2010	490.92	10.50	480.42	
MW-151C-60	11/11/2010	490.92	9.33	481.59	
MW-151C-60	4/27/2011	490.92	Frozen	—	Frozen w/data logger

Appendix B-1
Historical Groundwater Elevation Data

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-151C-60	5/25/2011	490.92	Frozen	—	Frozen at 8.33 ft BTOC
MW-151C-60	7/14/2011	490.92	8.06	482.86	
MW-151C-60	10/21/2011	490.92	9.67	481.25	
MW-151C-60	2/15/2012	491.02	9.60	481.42	
MW-151C-60	4/19/2012	491.02	8.85	482.17	
MW-151C-60	7/30/2012	491.02	8.02	483.00	
MW-151C-60	11/1/2012	491.02	9.09	481.93	
MW-151C-60	1/24/2013	491.11	8.96	482.15	
MW-151C-60	4/24/2013	491.07	9.18	481.89	
MW-151C-60	8/1/2013	491.14	8.16	482.98	
MW-151C-60	10/1/2013	491.14	9.09	482.05	
MW-152A-15	1/25/2010	488.33	6.78	481.55	
MW-152A-15	2/17/2010	488.33	6.74	481.59	
MW-152A-15	8/3/2010	488.33	5.79	482.54	
MW-152A-15	9/9/2010	488.33	6.09	482.24	
MW-152A-15	10/19/2010	488.33	6.95	481.38	
MW-152A-15	11/11/2010	488.33	6.82	481.51	
MW-152A-15	4/27/2011	488.33	Frozen	—	Frozen at 6.10 ft BTOC
MW-152A-15	5/25/2011	488.33	Frozen	—	Frozen at 6.07 ft BTOC
MW-152A-15	7/14/2011	488.33	6.54	481.79	
MW-152A-15	10/21/2011	488.33	7.04	481.29	
MW-152A-15	2/15/2012	488.40	7.10	481.30	
MW-152A-15	4/19/2012	488.40	Frozen	—	Frozen at 7.07 ft BTOC
MW-152A-15	7/30/2012	488.40	5.54	482.86	
MW-152A-15	11/1/2012	488.40	6.70	481.70	
MW-152A-15	1/24/2013	488.44	6.46	481.98	
MW-152A-15	4/24/2013	488.44	—	—	Well was submerged under surface meltwater and was inaccessible.
MW-152A-15	8/1/2013	488.35	5.46	482.89	
MW-152A-15	10/1/2013	488.35	6.25	482.10	
MW-152A-15	3/18/2014	488.35	6.83	481.52	
MW-152A-15	6/11/2014	488.30	Frozen	—	Frozen at 6.04 feet below measuring point.
MW-152A-15	9/9/2014	488.30	5.31	482.99	
MW-152A-15	11/20/2014	488.30	6.29	482.01	
MW-152A-15	3/18/2015	488.30	Frozen	—	Depth to ice = 6.63 feet
MW-152A-15	6/11/2015	488.30	Frozen	—	Depth to ice is 6.40 feet
MW-152A-15	8/12/2015	488.53	5.53	483.00	
MW-152A-15	11/20/2015	488.53	6.47	482.06	Re-label carbonite marker
MW-152A-15	3/22/2016	488.53	7.03	481.50	
MW-152B-25	1/25/2010	487.97	6.43	481.54	
MW-152B-25	2/17/2010	487.97	6.38	481.59	
MW-152B-25	8/3/2010	487.97	5.44	482.53	
MW-152B-25	9/9/2010	487.97	5.75	482.22	
MW-152B-25	10/19/2010	487.97	7.00	480.97	
MW-152B-25	11/11/2010	487.97	6.47	481.50	
MW-152B-25	4/27/2011	487.97	—	—	Monument full of water
MW-152B-25	5/25/2011	487.97	Frozen	—	Frozen at 8.86 ft BTOC
MW-152B-25	7/14/2011	487.97	5.16	482.81	
MW-152B-25	10/21/2011	487.97	6.70	481.27	
MW-152B-25	2/15/2012	488.00	6.66	481.34	
MW-152B-25	4/19/2012	488.00	—	—	Well was filled with surface water
MW-152B-25	7/30/2012	488.00	5.12	482.88	
MW-152B-25	11/1/2012	488.00	6.28	481.72	
MW-152B-25	1/24/2013	488.02	9.01	479.01	
MW-152B-25	4/24/2013	488.02	—	—	Well was submerged under surface meltwater and was inaccessible.
MW-152B-25	8/1/2013	488.13	5.23	482.90	
MW-152B-25	10/1/2013	488.13	6.04	482.09	
MW-152B-25	3/18/2014	488.13	6.57	481.56	
MW-152B-25	6/11/2014	488.06	6.19	481.87	
MW-152B-25	9/9/2014	488.06	5.07	482.99	

Appendix B-1
Historical Groundwater Elevation Data

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-152B-25	11/20/2014	488.06	6.03	482.03	
MW-152B-25	3/18/2015	488.06	6.46	481.60	
MW-152B-25	6/11/2015	488.06	Frozen	—	Depth to ice is 6.20 feet.
MW-152B-25	8/12/2015	488.28	5.27	483.01	
MW-152B-25	11/20/2015	488.28	6.19	482.09	Re-label carbonite marker
MW-152B-25	3/22/2016	488.28	6.73	481.55	
MW-152C-65	2/15/2012	488.10	6.79	481.31	Installed 9/28/11
MW-152C-65	4/19/2012	488.10	6.72	481.38	
MW-152C-65	7/30/2012	488.10	5.20	482.90	
MW-152C-65	11/1/2012	488.10	6.38	481.72	
MW-152C-65	1/24/2013	488.10	6.10	482.00	
MW-152C-65	4/24/2013	488.10	—	—	Well was submerged under surface meltwater and was inaccessible.
MW-152C-65	8/1/2013	488.17	5.30	482.87	
MW-152C-65	10/1/2013	488.17	6.16	482.01	
MW-152C-65	3/18/2014	488.17	6.63	481.54	
MW-152C-65	6/11/2014	488.10	6.26	481.84	
MW-152C-65	9/9/2014	488.10	5.13	482.97	
MW-152C-65	11/20/2014	488.10	6.08	482.02	
MW-152C-65	3/18/2015	488.10	6.43	481.67	
MW-152C-65	6/11/2015	488.10	6.08	482.02	
MW-152C-65	8/12/2015	488.22	5.24	482.98	
MW-152C-65	11/20/2015	488.22	6.17	482.05	Re-label carbonite marker
MW-152C-65	3/22/2016	488.22	6.70	481.52	
MW-153A-15	2/17/2010	490.09	7.29	482.80	
MW-153A-15	3/18/2010	490.09	7.32	482.77	
MW-153A-15	4/30/2010	490.09	7.41	482.68	
MW-153A-15	5/20/2010	490.09	7.63	482.46	
MW-153A-15	6/25/2010	490.09	6.70	483.39	
MW-153A-15	8/3/2010	490.09	6.11	483.98	
MW-153A-15	9/9/2010	490.09	7.60	482.49	
MW-153A-15	10/19/2010	490.09	7.69	482.40	
MW-153A-15	11/9/2010	490.09	7.48	482.61	
MW-153A-15	4/13/2011	490.09	7.15	482.94	
MW-153A-15	7/14/2011	490.09	5.97	484.12	
MW-153A-15	10/21/2011	490.09	7.91	482.18	
MW-153A-15	2/15/2012	490.17	7.81	482.36	
MW-153A-15	4/19/2012	490.17	7.11	483.06	
MW-153A-15	7/30/2012	490.17	6.05	484.12	
MW-153A-15	11/2/2012	490.17	7.19	482.98	
MW-153A-15	1/24/2013	490.20	6.15	484.05	
MW-153A-15	4/24/2013	490.20	7.41	482.79	
MW-153A-15	8/1/2013	490.11	5.56	484.55	
MW-153A-15	10/1/2013	490.11	7.14	482.97	
MW-153A-15	3/19/2014	490.11	7.64	482.47	
MW-153A-15	6/11/2014	490.11	7.30	482.81	
MW-153A-15	9/9/2014	490.11	6.24	483.87	
MW-153A-15	11/21/2014	490.11	7.07	483.04	
MW-153A-15	3/18/2015	490.11	7.57	482.54	
MW-153A-15	6/11/2015	490.11	7.24	482.87	
MW-153A-15	8/12/2015	490.26	6.19	484.07	
MW-153A-15	11/20/2015	490.26	7.26	483.00	
MW-153A-15	3/22/2016	490.26	8.00	482.26	
MW-153A-15	9/13/2016	490.34	6.64	483.70	
MW-153A-15	2/1/2017	490.34	5.84	484.50	
MW-153A-15	3/14/2017	490.34	7.63	482.71	
MW-153B-55	5/20/2010	—	7.23	—	
MW-153B-55	6/25/2010	—	6.28	—	
MW-153B-55	8/3/2010	—	5.71	—	
MW-153B-55	9/9/2010	—	7.60	—	
MW-153B-55	10/19/2010	489.74	7.33	482.41	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-153B-55	11/9/2010	489.74	7.08	482.66	
MW-153B-55	3/1/2011	489.74	6.69	483.05	
MW-153B-55	4/13/2011	489.74	6.68	483.06	
MW-153B-55	7/14/2011	489.74	5.51	484.23	
MW-153B-55	10/21/2011	489.74	7.45	482.29	
MW-153B-55	2/15/2012	489.73	7.28	482.45	
MW-153B-55	4/19/2012	489.73	Frozen	—	Frozen w/dedicated pump
MW-153B-55	7/30/2012	489.73	5.51	484.22	
MW-153B-55	11/2/2012	489.73	6.65	483.08	
MW-153B-55	1/24/2013	489.72	6.61	483.11	
MW-153B-55	4/24/2013	489.72	6.84	482.88	
MW-153B-55	8/1/2013	489.78	5.50	484.28	
MW-153B-55	10/1/2013	489.78	6.80	482.98	
MW-153B-55	3/19/2014	489.78	7.25	482.53	
MW-153B-55	6/11/2014	489.74	6.90	482.84	
MW-153B-55	9/9/2014	489.74	5.96	483.78	
MW-153B-55	11/21/2014	489.74	6.66	483.08	
MW-153B-55	3/18/2015	489.74	7.13	482.61	
MW-153B-55	6/11/2015	489.74	6.77	482.97	
MW-153B-55	8/12/2015	489.81	5.74	484.07	Soil eroding, needs backfill
MW-153B-55	11/20/2015	489.81	6.79	483.02	
MW-153B-55	3/22/2016	489.81	7.47	482.34	
MW-153B-55	9/13/2016	489.86	6.16	483.70	
MW-153B-55	2/1/2017	489.86	6.52	483.34	
MW-153B-55	3/14/2017	489.86	7.10	482.76	
MW-155A-15	1/21/2010	488.43	7.83	480.60	
MW-155A-15	2/15/2010	488.43	7.86	480.57	
MW-155A-15	3/17/2010	488.43	7.84	480.59	
MW-155A-15	4/30/2010	488.43	7.84	480.59	
MW-155A-15	5/21/2010	488.43	8.12	480.31	
MW-155A-15	6/28/2010	488.43	7.42	481.01	
MW-155A-15	8/3/2010	488.43	7.02	481.41	
MW-155A-15	9/14/2010	488.43	7.30	481.13	
MW-155A-15	10/19/2010	488.43	8.20	480.23	
MW-155A-15	11/12/2010	488.43	7.77	480.66	
MW-155A-15	2/1/2011	488.43	7.27	481.16	
MW-155A-15	4/27/2011	488.43	—	—	Monument full of water
MW-155A-15	5/19/2011	488.43	7.77	480.66	
MW-155A-15	7/14/2011	488.43	6.72	481.71	
MW-155A-15	10/21/2011	488.43	7.89	480.54	
MW-155A-15	2/15/2012	488.16	7.69	480.47	
MW-155A-15	4/19/2012	488.16	7.97	480.19	
MW-155A-15	7/30/2012	488.16	6.33	481.83	
MW-155A-15	11/1/2012	488.16	7.42	480.74	
MW-155A-15	1/24/2013	488.19	6.95	481.24	
MW-155A-15	4/24/2013	488.19	7.25	480.94	
MW-155A-15	8/1/2013	488.19	6.49	481.70	
MW-155A-15	10/1/2013	488.19	7.41	480.78	
MW-155A-15	3/19/2014	488.19	7.61	480.58	
MW-155A-15	6/11/2014	488.50	7.60	480.90	
MW-155A-15	9/9/2014	488.50	6.74	481.76	
MW-155A-15	11/20/2014	488.50	7.37	481.13	
MW-155A-15	3/18/2015	488.50	7.74	480.76	
MW-155A-15	6/11/2015	488.50	7.51	480.99	
MW-155A-15	8/12/2015	488.59	6.70	481.89	
MW-155A-15	11/19/2015	488.59	7.68	480.91	
MW-155A-15	3/22/2016	488.59	8.05	480.54	
MW-155B-65	11/1/2010	488.19	7.96	480.23	
MW-155B-65	1/1/2011	488.19	6.56	481.63	
MW-155B-65	2/1/2011	488.19	6.91	481.28	
MW-155B-65	4/27/2011	488.19	—	—	Monument full of water

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-155B-65	5/19/2011	488.19	13.53	474.66	
MW-155B-65	7/14/2011	488.19	6.35	481.84	
MW-155B-65	10/21/2011	488.19	7.90	480.29	
MW-156A-15	1/21/2010	485.80	7.21	478.59	
MW-156A-15	2/15/2010	485.80	7.17	478.63	
MW-156A-15	3/19/2010	485.80	7.08	478.72	
MW-156A-15	6/25/2010	485.80	6.61	479.19	
MW-156A-15	8/3/2010	485.80	6.20	479.60	
MW-156A-15	9/14/2010	485.80	6.40	479.40	
MW-156A-15	10/19/2010	485.80	7.10	478.70	
MW-156A-15	11/10/2010	485.80	7.27	478.53	
MW-156A-15	3/7/2011	485.80	6.55	479.25	
MW-156A-15	3/25/2011	485.80	6.50	479.30	
MW-156A-15	4/12/2011	485.80	Frozen	—	Frozen w/data logger
MW-156A-15	5/19/2011	485.80	Frozen	—	Frozen w/data logger
MW-156A-15	7/14/2011	485.80	5.82	479.98	
MW-156A-15	10/21/2011	485.80	7.07	478.73	
MW-156A-15	2/15/2012	485.83	7.12	478.71	
MW-156A-15	4/19/2012	485.83	6.02	479.81	
MW-156A-15	7/30/2012	485.83	5.65	480.18	
MW-156A-15	11/1/2012	485.83	6.80	479.03	
MW-156A-15	1/24/2013	485.88	6.37	479.51	
MW-156A-15	4/24/2013	485.78	6.50	479.28	
MW-156A-15	8/2/2013	485.78	5.67	480.11	
MW-156A-15	10/1/2013	485.80	6.02	479.78	
MW-156A-15	3/18/2014	485.80	6.58	479.22	
MW-156A-15	6/11/2014	485.71	6.30	479.41	
MW-156A-15	9/9/2014	485.71	5.21	480.50	
MW-156A-15	11/20/2014	485.71	6.34	479.37	
MW-156A-15	3/18/2015	485.71	6.55	479.16	
MW-156A-15	6/11/2015	485.84	6.19	479.65	
MW-156A-15	8/12/2015	485.84	5.63	480.21	New monument holding up well
MW-156A-15	11/19/2015	485.84	6.51	479.33	
MW-156A-15	3/22/2016	485.84	6.90	478.94	
MW-156A-15	9/13/2016	485.88	5.51	480.37	
MW-156A-15	3/14/2017	485.88	6.60	479.28	
MW-156B-50	3/23/2010	489.25	10.47	478.78	
MW-156B-50	6/25/2010	489.25	9.92	479.33	
MW-156B-50	8/3/2010	489.25	9.59	479.66	
MW-156B-50	9/14/2010	489.25	9.81	479.44	
MW-156B-50	10/19/2010	489.25	10.50	478.75	
MW-156B-50	11/10/2010	489.25	10.63	478.62	
MW-156B-50	3/7/2011	489.25	9.93	479.32	
MW-156B-50	4/12/2011	489.25	Frozen	—	Frozen at 10.19 ft BTOC
MW-156B-50	5/19/2011	489.25	Frozen	—	Frozen at 9.95 ft BTOC
MW-156B-50	7/14/2011	489.25	9.23	480.02	
MW-156B-50	10/21/2011	489.25	10.47	478.78	
MW-156B-50	2/15/2012	489.29	10.57	478.72	
MW-156B-50	4/19/2012	489.29	9.52	479.77	
MW-156B-50	7/30/2012	489.29	9.12	480.17	
MW-156B-50	11/1/2012	489.29	10.19	479.10	
MW-156B-50	1/24/2013	489.36	9.77	479.59	
MW-156B-50	4/24/2013	489.36	Frozen	—	Frozen at 9.64 ft BTOC
MW-156B-50	8/2/2013	489.36	5.31	484.05	
MW-156B-50	10/1/2013	489.36	9.97	479.39	
MW-156B-50	3/18/2014	489.36	10.27	479.09	
MW-156B-50	6/11/2014	489.42	10.00	479.42	
MW-156B-50	9/9/2014	489.42	8.93	480.49	
MW-156B-50	11/20/2014	489.42	10.01	479.41	
MW-156B-50	3/18/2015	489.42	10.28	479.14	
MW-156B-50	6/11/2015	489.42	9.91	479.51	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-156B-50	8/12/2015	489.58	9.33	480.25	Casing will need cutting
MW-156B-50	11/19/2015	489.58	10.20	479.38	
MW-156B-50	3/22/2016	489.58	10.59	478.99	
MW-156B-50	9/13/2016	489.26	8.88	480.38	
MW-156B-50	3/14/2017	489.26	9.98	479.28	
MW-157A-15	1/21/2010	485.05	7.66	477.39	
MW-157A-15	2/16/2010	485.05	7.57	477.48	
MW-157A-15	3/17/2010	485.05	7.49	477.56	
MW-157A-15	4/30/2010	485.05	7.53	477.52	
MW-157A-15	5/20/2010	485.05	7.64	477.41	
MW-157A-15	6/24/2010	485.05	7.00	478.05	
MW-157A-15	8/3/2010	485.05	6.70	478.35	
MW-157A-15	9/9/2010	485.05	6.78	478.27	
MW-157A-15	10/19/2010	485.05	7.40	477.65	
MW-157A-15	11/12/2010	485.05	7.50	477.55	
MW-157A-15	2/18/2011	485.05	7.22	477.83	
MW-157A-15	3/25/2011	485.05	7.05	478.00	
MW-157A-15	4/12/2011	485.05	7.05	478.00	
MW-157A-15	7/14/2011	485.05	5.89	479.16	
MW-157A-15	10/21/2011	485.05	6.95	478.10	
MW-157A-15	2/15/2012	485.00	7.20	477.80	
MW-157A-15	4/19/2012	485.00	6.26	478.74	
MW-157A-15	7/30/2012	485.00	5.82	479.18	
MW-157A-15	11/1/2012	485.00	6.81	478.19	
MW-157A-15	1/24/2013	484.82	6.59	478.23	
MW-157A-15	4/24/2013	484.96	Frozen	—	Frozen w/data logger
MW-157A-15	8/1/2013	485.06	6.15	478.91	
MW-157A-15	10/1/2013	485.06	6.25	478.81	
MW-157A-15	2/22/2017	484.98	6.79	478.19	
MW-157B-30	2/15/2012	484.72	7.49	477.23	
MW-157B-30	4/19/2012	484.72	6.56	478.16	
MW-157B-30	7/30/2012	484.72	6.11	478.61	
MW-157B-30	11/1/2012	484.72	7.10	477.62	
MW-157B-30	1/24/2013	485.08	6.79	478.29	
MW-157B-30	4/24/2013	485.08	6.88	478.20	
MW-157B-30	8/1/2013	484.74	4.94	479.80	
MW-157B-30	10/1/2013	484.74	5.95	478.79	
MW-157B-30	2/22/2017	484.79	6.41	478.38	
MW-158A-15	1/21/2010	487.94	7.68	480.26	
MW-158A-15	2/17/2010	487.94	7.66	480.28	
MW-158A-15	3/17/2010	487.94	7.63	480.31	
MW-158A-15	8/3/2010	487.94	6.73	481.21	
MW-158A-15	9/14/2010	487.94	6.95	480.99	
MW-158A-15	10/19/2010	487.94	7.72	480.22	
MW-158A-15	11/12/2010	487.94	7.69	480.25	
MW-158A-15	1/11/2011	487.94	7.02	480.92	
MW-158A-15	3/8/2011	487.94	7.35	480.59	
MW-158A-15	4/12/2011	487.94	Frozen	—	Frozen w/data logger
MW-158A-15	7/14/2011	487.94	6.23	481.71	
MW-158A-15	10/22/2011	487.94	7.63	480.31	
MW-158A-15	2/15/2012	487.83	7.71	480.12	
MW-158A-15	4/19/2012	487.83	6.91	480.92	
MW-158A-15	7/30/2012	487.83	6.30	481.53	
MW-158A-15	11/1/2012	487.83	7.36	480.47	
MW-158A-15	1/24/2013	487.90	7.08	480.82	
MW-158A-15	4/24/2013	488.04	Frozen	—	Frozen w/data logger
MW-158A-15	8/2/2013	488.07	6.35	481.72	
MW-158A-15	10/1/2013	488.07	6.80	481.27	
MW-158A-15	3/18/2014	487.90	7.53	480.37	
MW-158A-15	6/11/2014	487.92	Frozen	—	Frozen at 3.29 feet below measuring point.
MW-158A-15	9/9/2014	487.92	9.01	478.91	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-158A-15	11/20/2014	487.92	7.10	480.82	
MW-158A-15	3/18/2015	487.92	7.46	480.46	
MW-158A-15	6/11/2015	487.96	7.11	480.85	
MW-158A-15	8/12/2015	487.96	6.41	481.55	Casing will need cutting
MW-158A-15	11/20/2015	487.57	7.34	480.23	
MW-158A-15	3/22/2016	487.70	7.41	480.29	
MW-158A-15	1/31/2017	487.68	7.37	480.31	
MW-158B-60	11/1/2010	487.20	7.25	479.95	
MW-158B-60	1/11/2011	487.20	6.23	480.97	
MW-158B-60	4/12/2011	487.20	6.54	480.66	
MW-158B-60	7/14/2011	487.20	5.77	481.43	
MW-158B-60	10/22/2011	487.20	7.16	480.04	
MW-158B-60	2/15/2012	487.38	7.20	480.18	
MW-158B-60	4/19/2012	487.38	6.87	480.51	
MW-158B-60	7/30/2012	487.38	5.84	481.54	
MW-158B-60	11/1/2012	487.38	6.98	480.40	
MW-158B-60	1/24/2013	487.46	6.65	480.81	
MW-158B-60	4/24/2013	487.46	6.90	480.56	
MW-158B-60	8/2/2013	487.46	6.15	481.31	
MW-158B-60	10/1/2013	487.46	6.71	480.75	
MW-158B-60	3/18/2014	487.46	7.32	480.14	
MW-158B-60	6/11/2014	487.73	7.05	480.68	
MW-158B-60	9/9/2014	487.73	8.94	478.79	
MW-158B-60	11/20/2014	487.73	6.98	480.75	
MW-158B-60	3/18/2015	487.73	7.35	480.38	
MW-158B-60	6/11/2015	487.73	7.00	480.73	
MW-158B-60	8/12/2015	487.41	5.85	481.56	
MW-158B-60	11/20/2015	487.41	6.79	480.62	
MW-158B-60	3/22/2016	487.41	7.30	480.11	
MW-158B-60	1/31/2017	487.53	7.08	480.45	
MW-159A-15	1/21/2010	488.83	8.42	480.41	
MW-159A-15	2/16/2010	488.83	8.33	480.50	
MW-159A-15	3/17/2010	488.83	8.31	480.52	
MW-159A-15	4/30/2010	488.83	8.35	480.48	
MW-159A-15	5/21/2010	488.83	8.30	480.53	
MW-159A-15	6/28/2010	488.83	7.56	481.27	
MW-159A-15	7/9/2010	488.83	7.29	481.54	
MW-159A-15	8/3/2010	488.83	6.99	481.84	
MW-159A-15	9/14/2010	488.83	7.18	481.65	
MW-159A-15	10/19/2010	488.83	7.94	480.89	
MW-159A-15	11/12/2010	488.83	7.88	480.95	
MW-159A-15	4/15/2011	488.83	7.54	481.29	
MW-159A-15	7/14/2011	488.83	6.74	482.09	
MW-159A-15	10/22/2011	488.83	8.06	480.77	
MW-159A-15	2/15/2012	488.42	8.18	480.24	
MW-159A-15	4/20/2012	488.42	7.35	481.07	
MW-159A-15	7/30/2012	488.42	6.78	481.64	
MW-159A-15	11/1/2012	488.42	7.89	480.53	
MW-159A-15	1/24/2013	488.52	7.62	480.90	
MW-159A-15	4/24/2013	488.52	7.78	480.74	
MW-159A-15	8/2/2013	488.52	6.80	481.72	
MW-159A-15	10/1/2013	488.52	7.32	481.20	
MW-159A-15	3/18/2014	488.52	7.95	480.57	
MW-159A-15	6/11/2014	488.44	7.55	480.89	
MW-159A-15	9/9/2014	488.44	6.40	482.04	
MW-159A-15	11/20/2014	488.44	7.47	480.97	
MW-159A-15	3/18/2015	488.44	7.86	480.58	
MW-159A-15	6/11/2015	488.44	7.54	480.90	
MW-159A-15	8/12/2015	487.84	6.60	481.24	
MW-159A-15	11/20/2015	487.84	7.45	480.39	
MW-159A-15	3/22/2016	487.84	7.57	480.27	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-159A-15	9/13/2016	488.42	6.66	481.76	
MW-159A-15	2/7/2017	488.42	7.77	480.65	
MW-159A-15	3/14/2017	488.42	7.80	480.62	
MW-159B-45	2/15/2012	488.20	8.50	479.70	Installed 10/12/11
MW-159B-45	4/20/2012	488.20	7.02	481.18	
MW-159B-45	7/30/2012	488.20	6.42	481.78	
MW-159B-45	11/1/2012	488.20	7.53	480.67	
MW-159B-45	1/24/2013	488.22	7.21	481.01	
MW-159B-45	4/24/2013	488.22	7.34	480.88	
MW-159B-45	8/2/2013	488.22	6.60	481.62	
MW-159B-45	10/1/2013	488.22	7.14	481.08	
MW-159B-45	3/18/2014	488.22	7.73	480.49	
MW-159B-45	6/11/2014	488.26	7.30	480.96	
MW-159B-45	9/9/2014	488.26	6.19	482.07	
MW-159B-45	11/20/2014	488.26	7.24	481.02	
MW-159B-45	3/18/2015	488.26	7.53	480.73	
MW-159B-45	6/11/2015	488.26	7.16	481.10	
MW-159B-45	8/12/2015	487.77	6.47	481.30	
MW-159B-45	11/20/2015	487.77	7.33	480.44	
MW-159B-45	3/22/2016	487.77	7.78	479.99	
MW-159B-45	9/13/2016	488.28	6.46	481.82	
MW-159B-45	3/14/2017	488.28	7.53	480.75	
MW-159C-70	2/15/2012	488.63	8.34	480.29	Installed 9/29/11
MW-159C-70	4/20/2012	488.63	7.51	481.12	
MW-159C-70	7/30/2012	488.63	6.92	481.71	
MW-159C-70	11/1/2012	488.63	8.03	480.60	
MW-159C-70	1/24/2013	488.70	7.75	480.95	
MW-159C-70	4/24/2013	488.70	7.89	480.81	
MW-159C-70	8/2/2013	488.70	Frozen	—	Frozen at 6.60 feet below measuring point.
MW-159C-70	10/1/2013	488.70	7.44	481.26	
MW-159C-70	3/18/2014	488.70	8.04	480.66	
MW-159C-70	6/11/2014	488.56	7.64	480.92	
MW-159C-70	9/9/2014	488.56	6.50	482.06	
MW-159C-70	11/20/2014	488.56	7.56	481.00	
MW-159C-70	3/18/2015	488.56	7.95	480.61	
MW-159C-70	6/11/2015	488.56	7.58	480.98	
MW-159C-70	8/12/2015	488.16	6.90	481.26	
MW-159C-70	11/20/2015	488.16	7.73	480.43	
MW-159C-70	3/22/2016	488.16	8.26	479.90	
MW-159C-70	9/13/2016	488.71	6.92	481.79	
MW-159C-70	3/14/2017	488.71	8.05	480.66	
MW-160A-15	1/21/2010	485.50	7.33	478.17	
MW-160A-15	2/16/2010	485.50	7.25	478.25	
MW-160A-15	4/29/2010	485.50	7.27	478.23	
MW-160A-15	5/21/2010	485.50	7.42	478.08	
MW-160A-15	6/25/2010	485.50	6.74	478.76	
MW-160A-15	7/9/2010	485.50	6.51	478.99	
MW-160AR-15	4/19/2013	485.51	6.74	478.77	
MW-160AR-15	5/20/2013	485.51	6.25	479.26	
MW-160AR-15	6/19/2013	485.51	5.95	479.56	
MW-160AR-15	7/25/2013	485.52	6.09	479.43	
MW-160AR-15	8/20/2013	485.51	6.18	479.33	
MW-160AR-15	1/30/2014	485.53	6.86	478.67	
MW-160AR-15	2/24/2014	485.52	7.01	478.51	
MW-160AR-15	3/19/2014	485.52	7.06	478.46	
MW-160AR-15	4/25/2014	485.52	Frozen	—	Frozen-- depth to ice is 2.27 feet
MW-160AR-15	5/20/2014	485.52	6.35	479.17	
MW-160AR-15	6/9/2014	485.52	6.57	478.95	
MW-160AR-15	7/21/2014	485.52	4.94	480.58	
MW-160AR-15	8/28/2014	485.51	5.51	480.00	
MW-160AR-15	9/26/2014	485.52	5.87	479.65	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-160AR-15	10/27/2014	485.51	6.60	478.91	
MW-160AR-15	11/25/2014	485.55	6.71	478.84	
MW-160AR-15	12/17/2014	485.57	6.77	478.80	
MW-160AR-15	1/28/2015	485.58	6.90	478.68	
MW-160AR-15	2/17/2015	485.57	6.94	478.63	
MW-160AR-15	3/27/2015	485.57	6.88	478.69	
MW-160AR-15	4/14/2015	485.57	6.70	478.87	
MW-160AR-15	5/18/2015	485.56	6.30	479.26	
MW-160AR-15	6/11/2015	485.56	6.55	479.01	
MW-160AR-15	7/22/2015	485.57	6.24	479.33	
MW-160AR-15	8/13/2015	485.56	6.04	479.52	
MW-160AR-15	9/30/2015	485.57	5.82	479.75	
MW-160AR-15	10/22/2015	485.56	6.21	479.35	
MW-160AR-15	11/25/2015	485.58	6.65	478.93	
MW-160AR-15	12/11/2015	485.58	6.69	478.89	
MW-160AR-15	1/26/2016	485.61	7.01	478.60	
MW-160AR-15	2/17/2016	485.61	7.10	478.51	
MW-160AR-15	3/22/2016	485.62	7.15	478.47	
MW-160B-90	3/16/2010	—	7.34	—	
MW-160B-90	4/29/2010	485.77	7.44	478.33	
MW-160B-90	5/21/2010	485.77	7.60	478.17	
MW-160B-90	6/25/2010	485.77	6.90	478.87	
MW-160B-90	7/21/2010	485.77	6.63	479.14	
MW-160B-90	8/12/2010	485.77	6.39	479.38	
MW-160B-90	9/14/2010	485.77	6.64	479.13	
MW-160B-90	10/19/2010	485.77	7.34	478.43	
MW-160B-90	11/12/2010	485.77	7.20	478.57	
MW-160B-90	4/11/2011	485.77	Frozen	—	Frozen w/dedicated pump
MW-160B-90	5/27/2011	485.77	6.74	479.03	
MW-160B-90	7/14/2011	485.77	6.04	479.73	
MW-160B-90	10/21/2011	485.77	7.22	478.55	
MW-160B-90	2/15/2012	485.53	7.24	478.29	
MW-160B-90	4/20/2012	485.53	Frozen	—	Frozen w/dedicated pump
MW-160B-90	7/30/2012	485.53	5.97	479.56	
MW-160B-90	11/1/2012	485.53	6.90	478.63	
MW-160B-90	1/24/2013	485.53	6.62	478.91	
MW-160B-90	4/19/2013	485.58	6.74	478.84	
MW-160B-90	4/24/2013	485.58	Frozen	—	Data logger frozen in well, water sounder measured 2.37 ft to ice.
MW-160B-90	5/20/2013	485.58	6.35	479.23	
MW-160B-90	6/19/2013	485.60	5.96	479.64	
MW-160B-90	7/25/2013	485.47	5.96	479.51	
MW-160B-90	8/1/2013	485.46	6.01	479.45	
MW-160B-90	8/20/2013	485.47	6.02	479.45	
MW-160B-90	10/1/2013	485.46	6.40	479.06	
MW-160B-90	1/30/2014	485.47	6.74	478.73	
MW-160B-90	2/24/2014	485.47	6.89	478.58	
MW-160B-90	3/18/2014	485.47	6.90	478.57	
MW-160B-90	3/19/2014	485.47	6.93	478.54	
MW-160B-90	4/25/2014	485.47	Frozen	—	Frozen-- well cap can't be removed due to dedicated pump
MW-160B-90	5/20/2014	485.47	6.26	479.21	
MW-160B-90	6/9/2014	485.48	6.47	479.01	
MW-160B-90	6/11/2014	485.48	6.54	478.94	
MW-160B-90	7/21/2014	485.47	4.90	480.57	
MW-160B-90	8/28/2014	485.46	5.45	480.01	
MW-160B-90	9/9/2014	485.46	5.36	480.10	
MW-160B-90	9/26/2014	485.48	5.82	479.66	
MW-160B-90	10/27/2014	485.47	6.53	478.94	
MW-160B-90	11/20/2014	485.49	6.49	479.00	
MW-160B-90	11/25/2014	485.49	6.57	478.92	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-160B-90	12/17/2014	485.50	6.64	478.86	
MW-160B-90	1/28/2015	485.51	6.77	478.74	
MW-160B-90	2/17/2015	485.51	6.80	478.71	
MW-160B-90	3/18/2015	485.50	6.72	478.78	
MW-160B-90	3/27/2015	485.50	6.76	478.74	
MW-160B-90	4/14/2015	485.53	Frozen	—	Frozen
MW-160B-90	5/18/2015	485.49	6.20	479.29	
MW-160B-90	6/11/2015	485.49	6.46	479.03	
MW-160B-90	7/22/2015	485.25	5.83	479.42	
MW-160B-90	8/12/2015	485.24	5.62	479.62	
MW-160B-90	8/13/2015	485.24	5.66	479.58	
MW-160B-90	9/30/2015	485.25	5.53	479.72	
MW-160B-90	10/22/2015	485.25	5.88	479.37	
MW-160B-90	11/20/2015	485.25	6.28	478.97	
MW-160B-90	11/25/2015	485.25	6.23	479.02	
MW-160B-90	12/11/2015	485.26	6.30	478.96	
MW-160B-90	1/26/2016	485.27	6.61	478.66	
MW-160B-90	2/17/2016	485.28	6.70	478.58	
MW-160B-90	3/22/2016	485.28	6.74	478.54	
MW-160B-90	3/22/2016	485.28	6.76	478.52	
MW-160B-90	9/13/2016	485.28	5.43	479.85	
MW-160B-90	3/14/2017	485.28	6.51	478.77	
MW-161-30	1/31/2017	479.65	6.84	472.81	
MW-161A-15	1/20/2010	479.66	7.64	472.02	
MW-161A-15	2/15/2010	479.66	7.35	472.31	
MW-161A-15	3/17/2010	479.66	7.28	472.38	
MW-161A-15	4/30/2010	479.66	7.17	472.49	
MW-161A-15	5/19/2010	479.66	7.35	472.31	
MW-161A-15	6/24/2010	479.66	6.41	473.25	
MW-161A-15	7/26/2010	479.66	5.60	474.06	
MW-161A-15	8/2/2010	479.66	5.78	473.88	
MW-161A-15	9/8/2010	479.66	6.15	473.51	
MW-161A-15	10/18/2010	479.66	6.94	472.72	
MW-161A-15	11/9/2010	479.66	6.82	472.84	
MW-161A-15	3/8/2011	479.66	6.23	473.43	
MW-161A-15	3/25/2011	479.66	6.13	473.53	
MW-161A-15	4/12/2011	479.66	Frozen	—	Frozen w/data logger
MW-161A-15	5/25/2011	479.66	6.14	473.52	
MW-161A-15	7/14/2011	479.66	5.54	474.12	
MW-161A-15	10/21/2011	479.66	6.95	472.71	
MW-161A-15	2/15/2012	479.42	6.63	472.79	
MW-161A-15	4/20/2012	479.42	5.47	473.95	
MW-161A-15	7/30/2012	479.42	5.52	473.90	
MW-161A-15	11/1/2012	479.42	6.47	472.95	
MW-161A-15	1/24/2013	479.46	5.95	473.51	
MW-161A-15	4/24/2013	479.51	6.13	473.38	
MW-161A-15	8/1/2013	479.49	5.91	473.58	
MW-161A-15	10/1/2013	479.51	6.18	473.33	
MW-161A-15	3/19/2014	479.53	6.25	473.28	
MW-161A-15	6/11/2014	479.53	Frozen	—	The well was frozen with a data logger installed-- no measurement possible.
MW-161A-15	9/9/2014	479.51	5.18	474.33	
MW-161A-15	11/20/2014	479.51	6.17	473.34	
MW-161A-15	3/18/2015	479.51	6.14	473.37	
MW-161A-15	6/11/2015	479.57	Frozen	—	Datalogger present, no depth to ice possible.
MW-161A-15	8/12/2015	479.54	5.50	474.05	Data logger cap could not tighten
MW-161A-15	11/19/2015	479.55	6.51	473.04	
MW-161A-15	3/22/2016	479.61	6.53	473.08	
MW-161A-15	1/31/2017	479.21	5.84	473.37	
MW-161B-50	11/1/2010	479.87	7.42	472.45	
MW-161B-50	1/1/2011	479.87	6.13	473.74	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-161B-50	3/25/2011	479.87	6.29	473.58	
MW-161B-50	4/12/2011	479.87	6.22	473.65	
MW-161B-50	7/14/2011	479.87	5.68	474.19	
MW-161B-50	10/21/2011	479.87	7.10	472.77	
MW-161B-50	2/15/2012	479.58	6.78	472.80	
MW-161B-50	4/20/2012	479.58	5.59	473.99	
MW-161B-50	7/30/2012	479.58	5.65	473.93	
MW-161B-50	11/1/2012	479.58	6.60	472.98	
MW-161B-50	1/24/2013	479.60	6.12	473.48	
MW-161B-50	4/24/2013	479.60	6.29	473.31	
MW-161B-50	8/1/2013	479.60	5.75	473.85	
MW-161B-50	10/1/2013	479.60	6.37	473.23	
MW-161B-50	3/19/2014	479.70	6.38	473.32	
MW-161B-50	6/11/2014	479.70	6.52	473.18	
MW-161B-50	9/9/2014	479.68	5.34	474.34	
MW-161B-50	11/20/2014	479.68	6.34	473.34	
MW-161B-50	3/18/2015	479.68	6.30	473.38	
MW-161B-50	6/11/2015	479.68	Frozen	—	Depth to ice is 2.21 feet.
MW-161B-50	8/12/2015	479.70	5.65	474.06	
MW-161B-50	11/19/2015	479.70	6.65	473.05	
MW-161B-50	3/22/2016	479.70	6.68	473.02	
MW-161B-50	1/31/2017	479.78	6.57	473.21	
MW-162A-15	1/20/2010	—	8.84	—	
MW-162A-15	2/15/2010	—	8.75	—	
MW-162A-15	3/16/2010	—	8.58	—	
MW-162A-15	7/7/2010	—	7.91	—	
MW-162A-15	8/2/2010	—	7.80	—	
MW-162A-15	9/8/2010	—	7.97	—	
MW-162A-15	10/18/2010	—	8.57	—	
MW-162A-15	11/12/2010	—	8.65	—	
MW-162A-15	2/18/2011	—	8.21	—	
MW-162A-15	4/12/2011	—	Frozen	—	Frozen w/data logger
MW-162A-15	5/19/2011	—	Frozen	—	Frozen w/data logger
MW-162A-15	7/14/2011	—	—	—	DTW measured from ground surface was 7.71 feet.
MW-162A-15	10/21/2011	—	8.43	—	
MW-162A-15	2/15/2012	483.94	8.53	475.41	
MW-162A-15	4/20/2012	483.94	8.13	475.81	
MW-162A-15	7/30/2012	483.94	7.25	476.69	
MW-162A-15	11/1/2012	483.94	8.21	475.73	
MW-162A-15	1/24/2013	483.92	7.79	476.13	
MW-162A-15	3/19/2013	483.89	7.85	476.04	
MW-162A-15	4/19/2013	483.98	Frozen	—	Frozen with datalogger, no measurement possible
MW-162A-15	4/24/2013	483.98	—	—	Well was submerged under surface meltwater and was inaccessible.
MW-162A-15	5/20/2013	483.98	Frozen	—	Frozen with datalogger, no measurement possible
MW-162A-15	6/19/2013	484.03	Frozen	—	Frozen with datalogger, no measurement possible
MW-162A-15	7/25/2013	484.03	Frozen	—	Frozen with datalogger, no measurement possible
MW-162A-15	8/2/2013	484.03	Frozen	—	Well was frozen with a data logger suspended from well plug--the well could not be opened.
MW-162A-15	8/20/2013	484.03	7.61	476.42	
MW-162A-15	10/1/2013	484.02	7.67	476.35	
MW-162A-15	1/30/2014	484.02	8.07	475.95	
MW-162A-15	2/24/2014	484.00	8.19	475.81	
MW-162A-15	3/11/2014	483.99	8.16	475.83	
MW-162A-15	3/18/2014	483.99	8.20	475.79	
MW-162A-15	4/25/2014	484.01	Frozen	—	Frozen
MW-162A-15	5/20/2014	484.02	Frozen	—	Frozen
MW-162A-15	6/9/2014	484.02	Frozen	—	Frozen
MW-162A-15	6/11/2014	484.02	Frozen	—	Frozen at 7.26 feet below measuring point.
MW-162A-15	7/21/2014	484.02	5.94	478.08	
MW-162A-15	8/28/2014	484.03	6.71	477.32	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-162A-15	9/9/2014	484.03	6.49	477.54	
MW-162A-15	9/26/2014	484.02	6.97	477.05	
MW-162A-15	10/27/2014	484.03	7.79	476.24	
MW-162A-15	11/20/2014	484.06	7.90	476.16	
MW-162A-15	11/25/2014	484.06	8.05	476.01	
MW-162A-15	12/17/2014	484.07	8.07	476.00	
MW-162A-15	1/28/2015	484.06	8.16	475.90	
MW-162A-15	2/20/2015	484.05	8.18	475.87	
MW-162A-15	3/18/2015	484.05	8.03	476.02	
MW-162A-15	4/14/2015	484.07	Frozen	—	Frozen
MW-162A-15	5/18/2015	484.06	Frozen	—	Frozen
MW-162A-15	6/11/2015	484.06	7.70	476.36	
MW-162A-15	7/22/2015	484.07	7.52	476.55	
MW-162A-15	8/12/2015	484.05	7.36	476.69	
MW-162A-15	9/30/2015	484.05	6.88	477.17	
MW-162A-15	10/22/2015	484.06	7.26	476.80	
MW-162A-15	11/20/2015	484.06	7.95	476.11	
MW-162A-15	11/25/2015	484.06	7.95	476.11	
MW-162A-15	12/11/2015	484.08	7.96	476.12	
MW-162A-15	1/26/2016	484.08	8.29	475.79	
MW-162A-15	2/17/2016	484.07	8.32	475.75	
MW-162A-15	3/22/2016	484.06	8.32	475.74	
MW-162A-15	3/22/2016	484.06	8.32	475.74	
MW-162B-65	3/16/2010	—	8.82	—	
MW-162B-65	4/29/2010	484.07	8.85	475.22	
MW-162B-65	5/19/2010	484.07	8.93	475.14	
MW-162B-65	6/24/2010	484.07	9.00	475.07	
MW-162B-65	7/7/2010	484.07	8.05	476.02	
MW-162B-65	8/4/2010	484.07	8.02	476.05	
MW-162B-65	9/8/2010	484.07	8.17	475.90	
MW-162B-65	10/18/2010	484.07	8.85	475.22	
MW-162B-65	11/12/2010	484.07	8.85	475.22	
MW-162B-65	2/18/2011	484.07	8.38	475.69	
MW-162B-65	4/12/2011	484.07	Frozen	—	Frozen w/data logger
MW-162B-65	5/19/2011	484.07	Frozen	—	Frozen w/data logger
MW-162B-65	7/14/2011	484.07	—	—	DTW measured from ground surface was 8.91 feet.
MW-162B-65	10/21/2011	484.07	8.67	475.40	
MW-162B-65	2/15/2012	484.12	8.75	475.37	
MW-162B-65	4/20/2012	484.12	7.89	476.23	
MW-162B-65	7/30/2012	484.12	7.48	476.64	
MW-162B-65	11/1/2012	484.12	8.43	475.69	
MW-162B-65	1/24/2013	484.11	8.06	476.05	
MW-162B-65	3/19/2013	484.07	8.09	475.98	
MW-162B-65	4/19/2013	484.16	8.12	476.04	
MW-162B-65	4/24/2013	484.16	Frozen	—	Frozen w/data logger
MW-162B-65	5/20/2013	484.15	Frozen	—	Frozen with datalogger, no measurement possible
MW-162B-65	6/19/2013	484.19	Frozen	—	Frozen at 7.27 feet below measuring point
MW-162B-65	7/25/2013	484.19	Frozen	—	Frozen with datalogger, no measurement possible
MW-162B-65	8/2/2013	484.19	Frozen	—	Well was frozen with a data logger suspended from well plug--the well could not be opened.
MW-162B-65	8/20/2013	484.20	7.82	476.38	
MW-162B-65	10/1/2013	484.20	7.90	476.30	
MW-162B-65	1/30/2014	484.19	8.28	475.91	
MW-162B-65	2/24/2014	484.17	8.40	475.77	
MW-162B-65	3/11/2014	484.17	8.37	475.80	
MW-162B-65	3/18/2014	484.17	8.41	475.76	
MW-162B-65	4/25/2014	484.18	7.19	476.99	
MW-162B-65	5/20/2014	484.19	7.54	476.65	
MW-162B-65	6/9/2014	484.19	7.96	476.23	
MW-162B-65	6/11/2014	484.19	8.00	476.19	
MW-162B-65	7/21/2014	484.19	6.19	478.00	

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

Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-162B-65	8/28/2014	484.20	6.92	477.28	
MW-162B-65	9/9/2014	484.20	6.83	477.37	
MW-162B-65	9/26/2014	484.20	7.22	476.98	
MW-162B-65	10/27/2014	484.21	8.00	476.21	
MW-162B-65	11/20/2014	484.21	8.16	476.05	
MW-162B-65	11/25/2014	484.21	8.24	475.97	
MW-162B-65	12/17/2014	484.22	8.25	475.97	
MW-162B-65	1/28/2015	484.21	8.34	475.87	
MW-162B-65	2/20/2015	484.20	8.39	475.81	
MW-162B-65	3/18/2015	484.20	8.24	475.96	
MW-162B-65	4/14/2015	484.21	8.08	476.13	
MW-162B-65	5/18/2015	484.20	7.57	476.63	
MW-162B-65	6/11/2015	484.20	7.87	476.33	
MW-162B-65	7/22/2015	484.21	7.71	476.50	
MW-162B-65	8/12/2015	484.20	7.55	476.65	
MW-162B-65	9/30/2015	484.19	7.04	477.15	
MW-162B-65	10/22/2015	483.97	7.21	476.76	
MW-162B-65	11/20/2015	483.97	7.89	476.08	
MW-162B-65	11/25/2015	483.97	7.87	476.10	
MW-162B-65	12/11/2015	483.97	7.89	476.08	
MW-162B-65	1/26/2016	483.97	8.22	475.75	
MW-162B-65	2/17/2016	483.97	8.25	475.72	
MW-162B-65	3/22/2016	483.95	8.27	475.68	
MW-162B-65	3/22/2016	483.95	8.27	475.68	
MW-163A-15	1/20/2010	485.00	9.92	475.08	
MW-163A-15	2/15/2010	485.00	9.87	475.13	
MW-163A-15	3/18/2010	485.00	9.78	475.22	
MW-163A-15	4/29/2010	485.00	9.98	475.02	
MW-163A-15	5/18/2010	485.00	10.06	474.94	
MW-163A-15	6/28/2010	485.00	9.42	475.58	
MW-163A-15	7/7/2010	485.00	9.20	475.80	
MW-163A-15	8/2/2010	485.00	9.10	475.90	
MW-163A-15	9/8/2010	485.00	9.29	475.71	
MW-163A-15	10/18/2010	485.00	10.77	474.23	
MW-163A-15	11/12/2010	485.00	9.61	475.39	
MW-163A-15	2/25/2011	485.00	9.59	475.41	
MW-163A-15	3/25/2011	485.00	9.45	475.55	
MW-163A-15	4/12/2011	485.00	9.14	475.86	
MW-163A-15	7/14/2011	485.00	8.54	476.46	
MW-163A-15	10/22/2011	485.00	9.61	475.39	
MW-163A-15	2/15/2012	485.05	9.83	475.22	
MW-163A-15	4/20/2012	485.05	9.30	475.75	
MW-163A-15	7/30/2012	485.05	8.50	476.55	
MW-163A-15	11/1/2012	485.05	9.19	475.86	
MW-163A-15	1/24/2013	485.02	9.11	475.91	
MW-163A-15	4/24/2013	485.02	9.16	475.86	
MW-163A-15	8/1/2013	485.02	8.55	476.47	
MW-163A-15	10/1/2013	485.02	8.79	476.23	
MW-163A-15	3/19/2014	485.15	9.45	475.70	
MW-163A-15	6/11/2014	485.15	9.05	476.10	
MW-163A-15	9/9/2014	485.15	7.96	477.19	
MW-163A-15	11/20/2014	485.15	9.16	475.99	
MW-163A-15	3/18/2015	485.15	9.59	475.56	
MW-163A-15	6/11/2015	485.04	8.86	476.18	
MW-163A-15	8/12/2015	485.04	8.53	476.52	
MW-163A-15	11/19/2015	485.04	8.99	476.05	
MW-163A-15	3/22/2016	485.04	9.66	475.38	
MW-163A-15	9/12/2016	484.89	7.79	477.10	
MW-163A-15	3/14/2017	484.89	9.32	475.57	
MW-163B-40	11/1/2010	484.82	9.74	475.08	
MW-163B-40	2/1/2011	484.82	9.43	475.39	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-163B-40	3/25/2011	484.82	9.29	475.53	
MW-163B-40	4/6/2011	484.82	9.28	475.54	
MW-163B-40	7/14/2011	484.82	8.66	476.16	
MW-163B-40	10/22/2011	484.82	9.73	475.09	
MW-163B-40	2/15/2012	485.16	9.95	475.21	
MW-163B-40	4/20/2012	485.16	9.28	475.88	
MW-163B-40	7/30/2012	485.16	8.52	476.64	
MW-163B-40	11/1/2012	485.16	9.40	475.76	
MW-163B-40	1/24/2013	484.80	9.30	475.50	
MW-163B-40	4/24/2013	484.80	9.36	475.44	
MW-163B-40	8/1/2013	484.80	8.89	475.91	
MW-163B-40	10/2/2013	484.80	9.14	475.66	
MW-163B-40	3/19/2014	485.49	9.84	475.65	
MW-163B-40	6/11/2014	485.49	9.41	476.08	
MW-163B-40	9/9/2014	485.49	8.31	477.18	
MW-163B-40	11/20/2014	485.49	9.53	475.96	
MW-163B-40	3/18/2015	485.49	9.95	475.54	
MW-163B-40	6/11/2015	485.29	9.11	476.18	
MW-163B-40	8/12/2015	485.29	8.76	476.54	
MW-163B-40	11/19/2015	485.29	9.25	476.04	
MW-163B-40	3/22/2016	485.29	9.88	475.41	
MW-163B-40	9/12/2016	485.25	8.13	477.12	
MW-163B-40	3/14/2017	485.25	9.66	475.59	
MW-164A-15	1/20/2010	480.22	7.83	472.39	
MW-164A-15	2/15/2010	480.22	7.75	472.47	
MW-164A-15	3/15/2010	480.22	7.65	472.57	
MW-164A-15	4/29/2010	480.22	8.04	472.18	
MW-164A-15	5/18/2010	480.22	8.22	472.00	
MW-164A-15	6/23/2010	480.22	7.56	472.66	
MW-164A-15	7/6/2010	480.22	7.24	472.98	
MW-164A-15	8/2/2010	480.22	7.25	472.97	
MW-164A-15	9/8/2010	480.22	7.44	472.78	
MW-164A-15	10/18/2010	480.22	7.60	472.62	
MW-164A-15	11/9/2010	480.22	7.77	472.45	
MW-164A-15	2/24/2011	480.22	7.49	472.73	
MW-164A-15	3/25/2011	480.22	4.34	475.88	
MW-164A-15	4/6/2011	480.22	7.37	472.85	
MW-164A-15	7/14/2011	480.22	6.58	473.64	
MW-164A-15	10/21/2011	480.22	7.36	472.86	
MW-164A-15	2/15/2012	480.01	7.68	472.33	
MW-164A-15	4/18/2012	480.01	7.47	472.54	
MW-164A-15	7/30/2012	480.01	6.59	473.42	
MW-164A-15	11/1/2012	480.01	7.40	472.61	
MW-164A-15	1/24/2013	480.22	7.22	473.00	
MW-164A-15	4/24/2013	480.75	7.29	473.46	
MW-164A-15	8/1/2013	480.39	7.00	473.39	
MW-164A-15	10/1/2013	480.09	6.91	473.18	
MW-164A-15	3/19/2014	480.37	7.51	472.86	
MW-164A-15	6/11/2014	480.37	7.12	473.25	
MW-164A-15	9/9/2014	480.40	5.70	474.70	
MW-164A-15	11/20/2014	480.15	7.11	473.04	
MW-164A-15	3/18/2015	480.36	7.68	472.68	
MW-164A-15	6/11/2015	480.26	6.93	473.33	
MW-164A-15	8/12/2015	480.59	6.34	474.26	
MW-164A-15	11/19/2015	480.25	7.07	473.18	
MW-164A-15	3/22/2016	480.25	7.66	472.59	
MW-164A-15	1/25/2017	479.91	7.25	472.66	
MW-164B-50	11/1/2010	479.87	7.40	472.47	
MW-164B-50	1/1/2011	479.87	6.86	473.01	
MW-164B-50	4/6/2011	479.87	6.41	473.46	
MW-164B-50	7/14/2011	479.87	5.96	473.91	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-164B-50	10/21/2011	479.87	6.64	473.23	
MW-164B-50	2/15/2012	479.35	6.76	472.59	
MW-164B-50	4/18/2012	479.35	6.49	472.86	
MW-164B-50	7/30/2012	479.35	5.98	473.37	
MW-164B-50	11/1/2012	479.35	6.59	472.76	
MW-164B-50	1/24/2013	479.47	6.26	473.21	
MW-164B-50	4/24/2013	479.47	6.46	473.01	
MW-164B-50	8/1/2013	479.85	6.44	473.41	
MW-164B-50	10/1/2013	479.63	6.37	473.26	
MW-164B-50	3/19/2014	479.77	6.99	472.78	
MW-164B-50	6/11/2014	479.77	6.50	473.27	
MW-164B-50	9/9/2014	479.77	5.31	474.46	
MW-164B-50	11/20/2014	479.77	6.62	473.15	
MW-164B-50	3/18/2015	479.77	7.11	472.66	
MW-164B-50	6/11/2015	480.21	6.38	473.83	
MW-164B-50	8/12/2015	480.21	6.24	473.98	
MW-164B-50	11/19/2015	480.21	6.53	473.68	
MW-164B-50	3/22/2016	480.21	7.04	473.17	
MW-164C-60	10/21/2011	—	6.78	—	New well
MW-164C-60	2/15/2012	479.50	6.84	472.66	
MW-164C-60	4/18/2012	479.50	6.54	472.96	
MW-164C-60	7/30/2012	479.50	5.96	473.54	
MW-164C-60	11/1/2012	479.50	6.55	472.95	
MW-164C-60	1/24/2013	479.45	6.29	473.16	
MW-164C-60	4/24/2013	479.88	6.44	473.44	
MW-164C-60	8/1/2013	480.03	6.19	473.84	
MW-164C-60	10/1/2013	480.03	6.34	473.69	
MW-164C-60	3/19/2014	479.79	6.86	472.93	
MW-164C-60	6/11/2014	479.79	6.38	473.41	
MW-164C-60	9/9/2014	479.60	5.06	474.54	
MW-164C-60	11/20/2014	479.60	6.39	473.21	
MW-164C-60	3/18/2015	479.64	6.86	472.78	
MW-164C-60	6/11/2015	480.01	Frozen	—	Datalogger present, no depth to ice possible.
MW-164C-60	8/12/2015	480.01	5.71	474.31	Datalogger cap broken; no lock
MW-164C-60	11/19/2015	479.30	5.98	473.32	
MW-164C-60	3/22/2016	479.59	6.52	473.07	
MW-164C-60	1/25/2017	479.59	6.45	473.14	
MW-165A-15	2/16/2010	475.07	7.21	467.86	
MW-165A-15	3/15/2010	475.07	7.17	467.90	
MW-165A-15	4/27/2010	475.07	6.92	468.15	
MW-165A-15	5/25/2010	475.07	7.06	468.01	
MW-165A-15	6/18/2010	475.07	6.00	469.07	
MW-165A-15	7/6/2010	475.07	5.35	469.72	
MW-165A-15	8/2/2010	475.07	5.20	469.87	
MW-165A-15	9/9/2010	475.07	6.00	469.07	
MW-165A-15	10/18/2010	475.07	7.10	467.97	
MW-165A-15	11/9/2010	475.07	6.71	468.36	
MW-165A-15	2/24/2011	475.07	8.50	466.57	
MW-165A-15	3/25/2011	475.07	6.24	468.83	
MW-165A-15	4/6/2011	475.07	Frozen	—	Frozen at 6.0 ft BTOC
MW-165A-15	5/19/2011	475.07	Frozen	—	Frozen at 6.0 ft BTOC
MW-165A-15	7/14/2011	475.07	4.79	470.28	
MW-165A-15	10/21/2011	475.07	7.08	467.99	
MW-165A-15	2/16/2012	474.91	6.74	468.17	
MW-165A-15	4/20/2012	474.91	5.58	469.33	
MW-165A-15	7/30/2012	474.91	4.77	470.14	
MW-165A-15	11/1/2012	474.91	5.99	468.92	
MW-165A-15	1/24/2013	474.79	6.03	468.76	
MW-165A-15	4/24/2013	474.79	Frozen	—	Frozen at 6.21 ft BTOC
MW-165A-15	8/1/2013	474.79	4.67	470.12	
MW-165A-15	10/1/2013	474.79	6.05	468.74	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-165A-15	3/19/2014	474.79	6.10	468.69	
MW-165A-15	6/11/2014	474.75	Frozen	—	Frozen at 2.97 feet below measuring point.
MW-165A-15	9/9/2014	474.75	4.80	469.95	
MW-165A-15	11/20/2014	474.75	5.51	469.24	
MW-165A-15	3/18/2015	474.75	5.86	468.89	
MW-165A-15	6/11/2015	474.75	5.61	469.14	
MW-165A-15	8/12/2015	474.88	4.50	470.39	
MW-165A-15	11/19/2015	474.88	6.29	468.59	
MW-165A-15	3/22/2016	474.88	6.41	468.47	
MW-165A-15	7/11/2017	475.1	4.72	470.38	
MW-165A-15	8/23/2017	475.1	5.12	469.98	
MW-165B-50	11/1/2010	474.78	7.42	467.36	
MW-165B-50	1/1/2011	474.78	5.62	469.16	
MW-165B-50	3/25/2011	474.78	5.84	468.94	
MW-165B-50	4/6/2011	474.78	Frozen	—	Frozen at 5.6 ft BTOC
MW-165B-50	5/19/2011	474.78	6.07	468.71	
MW-165B-50	7/14/2011	474.78	4.41	470.37	
MW-165B-50	10/21/2011	474.78	6.69	468.09	
MW-165B-50	2/16/2012	474.60	6.40	468.20	Monument appears to be frost-jacking
MW-165B-50	4/20/2012	474.60	5.13	469.47	
MW-165B-50	7/30/2012	474.60	4.39	470.21	
MW-165B-50	11/1/2012	474.60	5.73	468.87	
MW-165B-50	1/24/2013	474.64	Frozen	—	The monument cap was missing, and the well filled with ice-- no measurement possible.
MW-165B-50	4/24/2013	474.64	Frozen	—	Frozen at 5.10 ft BTOC
MW-165B-50	8/1/2013	474.64	Frozen	—	Frozen at 5.22 feet below measuring point.
MW-165B-50	10/1/2013	474.64	5.86	468.78	
MW-165B-50	3/19/2014	474.64	5.87	468.77	
MW-165B-50	6/11/2014	474.61	5.88	468.73	
MW-165B-50	9/9/2014	474.61	4.61	470.00	
MW-165B-50	11/20/2014	474.61	5.32	469.29	
MW-165B-50	3/18/2015	474.61	5.51	469.10	
MW-165B-50	6/11/2015	474.61	5.42	469.19	
MW-165B-50	8/12/2015	474.74	4.30	470.45	
MW-165B-50	11/19/2015	474.74	6.10	468.64	
MW-165B-50	3/22/2016	474.74	6.21	468.53	
MW-165B-50	7/11/2017	474.93	4.53	470.40	
MW-165B-50	8/23/2017	474.93	4.93	470.00	
MW-166A-15	2/16/2010	475.29	7.72	467.57	
MW-166A-15	10/18/2010	475.29	9.22	466.07	
MW-166A-15	11/9/2010	475.29	8.51	466.78	
MW-166A-15	4/15/2011	475.29	Frozen	—	Frozen at 6.93 ft BTOC
MW-166A-15	5/19/2011	475.29	Frozen	—	Frozen at 6.92 ft BTOC
MW-166A-15	7/14/2011	475.29	—	—	DTW measured from ground surface was 6.53 feet.
MW-166A-15	10/21/2011	475.29	8.69	466.60	
MW-166A-15	2/16/2012	474.92	7.23	467.69	
MW-166A-15	4/18/2012	474.92	6.37	468.55	
MW-166A-15	7/31/2012	474.92	8.54	466.38	
MW-166A-15	11/1/2012	474.92	7.74	467.18	
MW-166A-15	1/24/2013	474.93	—	—	The well was inaccessible due to weather conditions.
MW-166A-15	4/25/2013	475.43	Frozen	—	Frozen w/data logger
MW-166A-15	8/1/2013	475.63	Frozen	—	Frozen at 6.65 feet below measuring point.
MW-166A-15	10/1/2013	475.08	8.60	466.48	
MW-166A-15	3/18/2014	475.25	Frozen	—	Frozen at 5.91 feet below measuring point
MW-166A-15	6/11/2014	475.25	Frozen	—	The well was frozen with a data logger installed-- no measurement possible.
MW-166A-15	9/9/2014	475.32	9.03	466.29	
MW-166A-15	11/20/2014	475.33	7.26	468.07	
MW-166A-15	3/18/2015	475.33	Frozen	—	Depth to ice = 5.29 feet
MW-166A-15	6/11/2015	475.33	Frozen	—	Depth to ice is 6.19 feet, melt water likely at 6.11 feet, no probe tone.

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-166A-15	8/12/2015	474.99	8.49	466.51	
MW-166A-15	11/20/2015	474.99	8.29	466.70	
MW-166A-15	3/22/2016	474.99	7.06	467.93	
MW-166A-15	9/13/2016	474.84	8.36	466.48	
MW-166A-15	3/14/2017	474.84	6.41	468.43	
MW-166A-15	3/14/2017	474.84	6.41	468.43	
MW-166B-30	4/27/2010	475.80	7.86	467.94	
MW-166B-30	5/18/2010	475.80	8.05	467.75	
MW-166B-30	5/25/2010	475.80	7.11	468.69	
MW-166B-30	7/6/2010	475.80	7.27	468.53	
MW-166B-30	10/18/2010	475.80	9.53	466.27	
MW-166B-30	11/9/2010	475.80	8.78	467.02	
MW-166B-30	4/15/2011	475.80	Frozen	—	Frozen at 7.48 ft BTOC
MW-166B-30	5/19/2011	475.80	Frozen	—	Frozen at 7.23 ft BTOC
MW-166B-30	7/14/2011	475.80	—	—	DTW measured from ground surface is 7.03 feet.
MW-166B-30	10/21/2011	475.80	8.89	466.91	
MW-166B-30	2/16/2012	475.11	7.28	467.83	
MW-166B-30	4/18/2012	475.11	6.38	468.73	
MW-166B-30	7/31/2012	475.11	8.63	466.48	
MW-166B-30	11/1/2012	475.11	8.26	466.85	
MW-166B-30	1/24/2013	475.43	—	—	The well was inaccessible due to weather conditions.
MW-166B-30	4/25/2013	475.43	Frozen	—	Frozen at 7.44 ft BTOC
MW-166B-30	8/1/2013	475.51	Frozen	—	Frozen at 6.21 feet below measuring point.
MW-166B-30	10/1/2013	475.51	8.83	466.68	
MW-166B-30	3/18/2014	475.37	Frozen	—	Frozen at 6.93 feet below measuring point
MW-166B-30	6/11/2014	475.37	Frozen	—	Frozen at 7.01 feet below measuring point.
MW-166B-30	9/9/2014	475.41	9.14	466.27	
MW-166B-30	11/20/2014	475.41	7.48	467.93	
MW-166B-30	3/18/2015	475.41	Frozen	—	Depth to ice = 5.25 feet
MW-166B-30	6/11/2015	475.41	Frozen	—	Depth to ice is 6.30 feet, melt water likely at 6.27 feet.
MW-166B-30	8/12/2015	475.06	8.56	466.51	
MW-166B-30	11/20/2015	475.06	8.37	466.69	
MW-166B-30	3/22/2016	475.06	7.03	468.03	
MW-166B-30	9/13/2016	475.09	8.43	466.66	
MW-166B-30	3/14/2017	475.09	6.74	468.35	
MW-166B-30	3/14/2017	475.09	6.74	468.35	
MW-166B-30	8/4/2017	475.39	8.64	466.75	
MW-166B-30	8/23/2017	475.39	8.70	466.69	
MW-167A-15	2/16/2010	475.91	9.87	466.04	
MW-167A-15	3/15/2010	475.91	9.66	466.25	
MW-167A-15	4/28/2010	475.91	9.74	466.17	
MW-167A-15	5/18/2010	475.91	9.81	466.10	
MW-167A-15	6/23/2010	475.91	7.58	468.33	
MW-167A-15	7/6/2010	475.91	9.51	466.40	
MW-167A-15	8/2/2010	475.91	9.36	466.55	
MW-167A-15	9/7/2010	475.91	9.46	466.45	
MW-167A-15	10/18/2010	475.91	9.82	466.09	
MW-167A-15	11/5/2010	475.91	10.52	465.39	
MW-167A-15	2/24/2011	475.91	9.59	466.32	
MW-167A-15	3/25/2011	475.91	9.40	466.51	
MW-167A-15	4/7/2011	475.91	9.25	466.66	
MW-167A-15	7/14/2011	475.91	9.01	466.90	
MW-167A-15	10/21/2011	475.91	9.60	466.31	
MW-167A-15	2/15/2012	475.68	9.64	466.04	
MW-167A-15	4/18/2012	475.68	9.26	466.42	
MW-167A-15	7/30/2012	475.68	8.85	466.83	
MW-167A-15	11/1/2012	475.68	9.53	466.15	
MW-167A-15	1/24/2013	475.70	9.15	466.55	
MW-167A-15	4/25/2013	475.71	9.09	466.62	
MW-167A-15	8/2/2013	475.70	Frozen	—	Frozen at 9.23 feet below measuring point.
MW-167A-15	10/1/2013	475.70	9.25	466.45	

Appendix B-1
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North Pole Terminal, North Pole, Alaska

Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-167A-15	3/18/2014	475.70	9.60	466.10	
MW-167A-15	6/11/2014	475.70	9.34	466.36	
MW-167A-15	9/9/2014	475.71	7.94	467.77	
MW-167A-15	11/20/2014	475.71	9.14	466.57	
MW-167A-15	3/18/2015	475.71	9.30	466.41	
MW-167A-15	6/11/2015	475.71	9.21	466.50	
MW-167A-15	8/12/2015	475.71	8.98	466.73	
MW-167A-15	11/19/2015	475.71	8.94	466.77	
MW-167A-15	3/23/2016	475.68	9.26	466.42	
MW-167A-15	1/12/2017	475.79	9.22	466.57	
MW-167B-35	4/28/2010	475.84	9.66	466.18	
MW-167B-35	5/18/2010	475.84	9.94	465.90	
MW-167B-35	6/23/2010	475.84	9.71	466.13	
MW-167B-35	7/6/2010	475.84	9.61	466.23	
MW-167B-35	8/2/2010	475.84	9.49	466.35	
MW-167B-35	9/7/2010	475.84	9.59	466.25	
MW-167B-35	10/18/2010	475.84	9.75	466.09	
MW-167B-35	11/5/2010	475.84	10.06	465.78	
MW-167B-35	2/24/2011	475.84	9.68	466.16	
MW-167B-35	3/25/2011	475.84	9.51	466.33	
MW-167B-35	4/7/2011	475.84	9.37	466.47	
MW-167B-35	7/14/2011	475.84	9.12	466.72	
MW-167B-35	10/21/2011	475.84	9.73	466.11	
MW-167B-35	2/15/2012	475.82	9.76	466.06	
MW-167B-35	4/18/2012	475.82	9.38	466.44	
MW-167B-35	7/30/2012	475.82	8.99	466.83	
MW-167B-35	11/1/2012	475.82	9.38	466.44	
MW-167B-35	1/24/2013	475.57	9.10	466.47	
MW-167B-35	4/25/2013	475.57	8.97	466.60	
MW-167B-35	8/2/2013	475.57	9.15	466.42	
MW-167B-35	10/1/2013	475.57	9.11	466.46	
MW-167B-35	3/18/2014	475.57	9.50	466.07	
MW-167B-35	6/11/2014	475.57	9.20	466.37	
MW-167B-35	9/9/2014	475.57	7.87	467.70	
MW-167B-35	11/20/2014	475.57	9.01	466.56	
MW-167B-35	3/18/2015	475.57	9.16	466.41	
MW-167B-35	6/11/2015	475.57	9.06	466.51	
MW-167B-35	8/12/2015	475.57	8.85	466.72	
MW-167B-35	11/19/2015	475.57	8.80	466.77	
MW-167B-35	3/23/2016	475.57	9.11	466.46	
MW-167B-35	1/12/2017	475.66	9.06	466.60	
MW-167B-35	7/21/2017	475.78	8.63	467.15	
MW-167B-35	8/23/2017	475.78	8.86	466.92	
MW-168A-15	2/16/2010	478.21	8.79	469.42	
MW-168A-15	8/12/2010	478.21	9.00	469.21	
MW-168A-15	9/7/2010	478.21	9.15	469.06	
MW-168A-15	10/18/2010	478.21	9.54	468.67	
MW-168A-15	11/5/2010	478.21	9.59	468.62	
MW-168A-15	2/25/2011	478.21	8.58	469.63	
MW-168A-15	4/6/2011	478.21	Frozen	—	Frozen at 8.5 ft BTOC
MW-168A-15	5/17/2011	478.21	Frozen	—	Frozen at 8.18 ft BTOC
MW-168A-15	7/14/2011	478.21	8.26	469.95	
MW-168A-15	10/21/2011	478.21	9.29	468.92	
MW-168A-15	2/15/2012	478.27	8.84	469.43	
MW-168A-15	4/18/2012	478.27	Frozen	—	Frozen at 8.80 ft BTOC
MW-168A-15	7/30/2012	478.27	8.54	469.73	
MW-168A-15	11/1/2012	478.27	9.05	469.22	
MW-168A-15	1/24/2013	478.27	8.31	469.96	
MW-168A-15	4/24/2013	478.25	Frozen	—	Frozen w/data logger
MW-168A-15	8/1/2013	478.25	Frozen	—	Well was frozen with a data logger suspended from well plug--the well could not be opened.

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-168A-15	10/1/2013	478.25	8.93	469.32	
MW-168A-15	3/18/2014	478.26	8.78	469.48	
MW-168A-15	6/11/2014	478.26	Frozen	—	Frozen at 8.34 feet below measuring point.
MW-168A-15	9/9/2014	478.27	7.88	470.39	
MW-168A-15	11/20/2014	478.27	8.68	469.59	
MW-168A-15	3/18/2015	478.27	8.69	469.58	
MW-168A-15	6/11/2015	478.27	8.83	469.44	
MW-168A-15	8/12/2015	477.77	8.55	469.23	Well has ~1-2 inches of water flooding monument
MW-168A-15	11/20/2015	477.77	8.73	469.04	
MW-168A-15	3/22/2016	477.77	8.58	469.19	
MW-168A-15	1/26/2017	478.27	8.80	469.47	
MW-168B-50	2/15/2012	478.34	8.89	469.45	Installed 10/1/11
MW-168B-50	4/18/2012	478.34	Frozen	—	Frozen at 8.86 ft BTOC
MW-168B-50	7/30/2012	478.34	8.62	469.72	
MW-168B-50	11/1/2012	478.34	9.10	469.24	
MW-168B-50	1/24/2013	478.34	8.34	470.00	
MW-168B-50	4/24/2013	478.34	Frozen	—	Frozen at 8.21 ft BTOC
MW-168B-50	8/1/2013	478.34	Frozen	—	Frozen at 4.86 feet below measuring point.
MW-168B-50	10/1/2013	478.34	9.01	469.33	
MW-168B-50	3/18/2014	478.34	Frozen	—	Frozen at 8.53 feet below measuring point
MW-168B-50	6/11/2014	478.34	Frozen	—	Frozen at 8.69 feet below measuring point.
MW-168B-50	9/9/2014	478.34	7.93	470.41	
MW-168B-50	11/20/2014	478.34	8.70	469.64	
MW-168B-50	3/18/2015	478.34	8.75	469.59	
MW-168B-50	6/11/2015	478.34	Frozen	—	Depth to ice is 8.90 feet.
MW-168B-50	8/12/2015	477.84	8.61	469.24	
MW-168B-50	11/20/2015	477.84	8.79	469.05	
MW-168B-50	3/22/2016	477.84	8.91	468.93	
MW-168B-50	1/26/2017	478.34	8.87	469.47	
MW-169A-15	3/17/2010	—	10.13	—	
MW-169A-15	4/27/2010	486.51	9.90	476.61	
MW-169A-15	5/19/2010	486.51	10.11	476.40	
MW-169A-15	6/23/2010	486.51	9.18	477.33	
MW-169A-15	7/26/2010	486.51	8.72	477.79	
MW-169A-15	8/3/2010	486.51	8.83	477.68	
MW-169A-15	9/8/2010	486.51	9.25	477.26	
MW-169A-15	10/18/2010	486.51	9.90	476.61	
MW-169A-15	11/10/2010	486.51	9.98	476.53	
MW-169A-15	1/11/2011	486.51	8.45	478.06	
MW-169A-15	5/27/2011	486.51	9.44	477.07	
MW-169A-15	7/14/2011	486.51	8.94	477.57	
MW-169A-15	10/21/2011	486.51	10.09	476.42	
MW-169A-15	2/16/2012	486.13	9.65	476.48	
MW-169A-15	4/18/2012	486.13	9.00	477.13	
MW-169A-15	7/30/2012	486.13	8.83	477.30	
MW-169A-15	11/1/2012	486.13	8.60	477.53	
MW-169A-15	1/25/2013	485.90	8.59	477.31	
MW-169A-15	4/25/2013	485.92	8.90	477.02	
MW-169A-15	8/1/2013	485.92	Frozen	—	Well was frozen with a data logger suspended from well plug--the well could not be opened.
MW-169A-15	10/1/2013	486.12	9.50	476.62	
MW-169A-15	3/18/2014	486.10	9.23	476.87	
MW-169A-15	6/11/2014	486.11	9.43	476.68	
MW-169A-15	9/9/2014	485.75	9.23	476.52	
MW-169A-15	11/20/2014	485.75	8.74	477.01	
MW-169A-15	3/18/2015	485.96	9.49	476.47	
MW-169A-15	6/11/2015	486.22	9.23	476.99	
MW-169A-15	8/13/2015	486.22	8.85	477.37	
MW-169A-15	11/20/2015	486.05	9.10	476.95	
MW-169A-15	3/22/2016	486.05	9.58	476.47	
MW-169A-15	9/13/2016	486.17	9.13	477.04	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-169A-15	3/13/2017	486.19	9.06	477.13	
MW-169B-50	11/1/2010	486.37	10.06	476.31	
MW-169B-50	3/1/2011	486.37	8.90	477.47	
MW-169B-50	7/14/2011	486.37	8.67	477.70	
MW-169B-50	10/21/2011	486.37	9.87	476.50	
MW-169B-50	2/16/2012	485.95	9.39	476.56	
MW-169B-50	4/24/2013	485.95	8.95	477.00	The casing is suspected to be damaged or broken.
MW-169B-50	8/1/2013	485.95	7.25	478.70	
MW-169B-50	10/1/2013	485.95	9.19	476.76	
MW-169B-50	3/18/2014	485.95	8.84	477.11	
MW-169B-50	6/11/2014	485.74	9.03	476.71	
MW-169B-50	9/9/2014	485.74	8.78	476.96	
MW-169B-50	11/20/2014	485.74	8.23	477.51	
MW-169B-50	3/18/2015	485.74	9.07	476.67	
MW-169B-50	6/11/2015	485.74	9.10	476.64	
MW-169B-50	8/13/2015	485.95	8.68	477.27	
MW-169B-50	11/20/2015	485.95	9.01	476.94	
MW-169B-50	3/22/2016	485.95	9.42	476.53	
MW-169B-50	9/13/2016	486.32	8.86	477.46	
MW-169B-50	3/13/2017	486.32	9.09	477.23	
MW-169C-60	10/22/2011	—	6.45	—	New well
MW-169C-60	2/16/2012	482.57	5.98	476.59	
MW-169C-60	4/18/2012	482.57	5.30	477.27	
MW-169C-60	7/30/2012	482.57	4.99	477.58	
MW-169C-60	11/1/2012	482.57	5.32	477.25	
MW-169C-60	1/25/2013	482.56	5.20	477.36	
MW-169C-60	4/25/2013	482.56	5.52	477.04	
MW-169C-60	8/1/2013	482.52	4.73	477.79	
MW-169C-60	10/1/2013	482.52	6.02	476.50	
MW-169C-60	3/18/2014	482.71	5.81	476.90	
MW-169C-60	6/11/2014	482.71	6.01	476.70	
MW-169C-60	9/9/2014	482.34	5.65	476.69	
MW-169C-60	11/20/2014	482.34	5.24	477.10	
MW-169C-60	3/18/2015	482.48	6.11	476.37	
MW-169C-60	6/11/2015	482.84	6.11	476.73	
MW-169C-60	8/13/2015	482.84	5.61	477.23	
MW-169C-60	11/20/2015	483.01	6.03	476.98	
MW-169C-60	3/22/2016	483.05	6.57	476.48	
MW-169C-60	9/13/2016	483.05	5.59	477.46	
MW-169C-60	3/13/2017	483.05	5.92	477.13	
MW-170A-15	3/18/2010	490.71	8.98	481.73	
MW-170A-15	4/29/2010	490.71	9.06	481.65	
MW-170A-15	5/20/2010	490.71	9.24	481.47	
MW-170A-15	6/16/2010	490.71	8.35	482.36	
MW-170A-15	7/1/2010	490.71	8.25	482.46	
MW-170A-15	8/3/2010	490.71	8.16	482.55	
MW-170A-15	9/8/2010	490.71	8.44	482.27	
MW-170A-15	10/19/2010	490.71	9.23	481.48	
MW-170A-15	11/10/2010	490.71	9.17	481.54	
MW-170A-15	3/6/2011	490.71	8.84	481.87	
MW-170A-15	3/25/2011	490.71	8.82	481.89	
MW-170A-15	4/7/2011	490.71	8.81	481.90	
MW-170A-15	7/14/2011	490.71	7.96	482.75	
MW-170A-15	10/21/2011	490.71	9.34	481.37	
MW-170A-15	2/16/2012	490.82	9.33	481.49	
MW-170A-15	4/19/2012	490.82	8.75	482.07	
MW-170A-15	7/30/2012	490.82	7.92	482.90	
MW-170A-15	11/1/2012	490.82	8.79	482.03	
MW-170A-15	1/24/2013	490.66	8.66	482.00	
MW-170A-15	4/24/2013	490.67	8.74	481.93	
MW-170A-15	8/1/2013	490.69	7.82	482.87	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-170A-15	10/1/2013	490.69	8.48	482.21	
MW-170A-15	3/19/2014	490.69	9.19	481.50	
MW-170A-15	6/11/2014	490.69	8.67	482.02	
MW-170A-15	9/9/2014	490.69	7.35	483.34	
MW-170A-15	11/20/2014	490.69	8.51	482.18	
MW-170A-15	3/18/2015	490.69	8.88	481.81	
MW-170A-15	6/11/2015	490.69	8.59	482.10	
MW-170A-15	8/12/2015	490.69	7.83	482.86	
MW-170A-15	11/19/2015	490.69	8.64	482.05	
MW-170A-15	3/22/2016	490.69	9.16	481.53	
MW-170A-15	9/13/2016	490.70	7.91	482.79	
MW-170A-15	3/14/2017	490.7	8.82	481.88	
MW-170B-75	4/29/2010	490.75	8.91	481.84	
MW-170B-75	5/20/2010	490.75	9.10	481.65	
MW-170B-75	6/16/2010	490.75	8.23	482.52	
MW-170B-75	7/21/2010	490.75	8.14	482.61	
MW-170B-75	8/4/2010	490.75	8.02	482.73	
MW-170B-75	9/8/2010	490.75	8.31	482.44	
MW-170B-75	10/19/2010	490.75	9.10	481.65	
MW-170B-75	11/10/2010	490.75	9.05	481.70	
MW-170B-75	3/6/2011	490.75	8.69	482.06	
MW-170B-75	3/25/2011	490.75	8.63	482.12	
MW-170B-75	4/7/2011	490.75	8.61	482.14	
MW-170B-75	7/14/2011	490.75	7.79	482.96	
MW-170B-75	10/21/2011	490.75	9.19	481.56	
MW-170B-75	2/15/2012	490.72	9.15	481.57	
MW-170B-75	4/19/2012	490.72	8.57	482.15	
MW-170B-75	7/30/2012	490.72	7.73	482.99	
MW-170B-75	11/1/2012	490.72	8.78	481.94	
MW-170B-75	1/24/2013	490.74	8.65	482.09	
MW-170B-75	4/24/2013	490.74	8.70	482.04	
MW-170B-75	8/1/2013	490.74	7.75	482.99	
MW-170B-75	10/1/2013	490.74	8.50	482.24	
MW-170B-75	3/19/2014	490.74	9.15	481.59	
MW-170B-75	6/11/2014	490.71	8.76	481.95	
MW-170B-75	9/9/2014	490.71	7.54	483.17	
MW-170B-75	11/20/2014	490.71	8.48	482.23	
MW-170B-75	3/18/2015	490.71	8.84	481.87	
MW-170B-75	6/11/2015	490.71	8.54	482.17	
MW-170B-75	8/12/2015	490.70	7.78	482.92	
MW-170B-75	11/19/2015	490.70	8.60	482.10	
MW-170B-75	3/22/2016	490.70	9.21	481.49	
MW-170B-75	9/13/2016	490.71	7.87	482.84	
MW-170B-75	3/14/2017	490.71	8.78	481.93	
MW-170C-130	4/29/2010	490.61	9.04	481.57	
MW-170C-130	5/20/2010	490.61	9.22	481.39	
MW-170C-130	6/16/2010	490.61	8.35	482.26	
MW-170C-130	7/1/2010	490.61	8.24	482.37	
MW-170C-130	8/4/2010	490.61	8.09	482.52	
MW-170C-130	9/8/2010	490.61	8.42	482.19	
MW-170C-130	10/19/2010	490.61	9.37	481.24	
MW-170C-130	11/10/2010	490.61	9.07	481.54	
MW-170C-130	3/7/2011	490.61	8.79	481.82	
MW-170C-130	3/25/2011	490.61	8.75	481.86	
MW-170C-130	4/13/2011	490.61	8.76	481.85	
MW-170C-130	7/14/2011	490.61	7.91	482.70	
MW-170C-130	10/21/2011	490.61	9.30	481.31	
MW-170C-130	2/16/2012	490.85	9.27	481.58	
MW-170C-130	4/19/2012	490.85	8.68	482.17	
MW-170C-130	7/30/2012	490.85	7.75	483.10	
MW-170C-130	11/1/2012	490.85	8.87	481.98	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-170C-130	1/24/2013	490.87	8.66	482.21	
MW-170C-130	4/24/2013	490.83	8.81	482.02	
MW-170C-130	8/1/2013	490.83	7.86	482.97	
MW-170C-130	10/1/2013	490.84	8.65	482.19	
MW-170C-130	3/19/2014	490.84	9.25	481.59	
MW-170C-130	6/11/2014	490.83	8.66	482.17	
MW-170C-130	9/9/2014	490.70	7.62	483.08	
MW-170C-130	11/20/2014	490.70	8.51	482.19	
MW-170C-130	3/18/2015	490.82	8.94	481.88	
MW-170C-130	6/11/2015	490.84	8.66	482.18	
MW-170C-130	8/12/2015	490.47	7.54	482.93	
MW-170C-130	11/19/2015	490.84	8.34	482.50	
MW-170C-130	3/22/2016	490.46	8.88	481.58	
MW-170C-130	9/13/2016	490.48	7.62	482.86	
MW-170C-130	3/14/2017	490.48	8.53	481.95	
MW-170D-50	11/1/2010	490.38	8.97	481.41	
MW-170D-50	3/1/2011	490.38	8.30	482.08	
MW-170D-50	3/25/2011	490.38	8.33	482.05	
MW-170D-50	4/7/2011	490.38	8.32	482.06	
MW-170D-50	7/14/2011	490.38	7.48	482.90	
MW-170D-50	10/21/2011	490.38	8.86	481.52	
MW-170D-50	2/16/2012	490.39	8.87	481.52	
MW-170D-50	4/19/2012	490.39	8.28	482.11	
MW-170D-50	7/30/2012	490.39	7.41	482.98	
MW-170D-50	11/1/2012	490.39	8.47	481.92	
MW-170D-50	1/24/2013	490.41	8.25	482.16	
MW-170D-50	4/24/2013	490.41	8.40	482.01	
MW-170D-50	8/1/2013	490.41	7.50	482.91	
MW-170D-50	10/1/2013	490.41	8.25	482.16	
MW-170D-50	3/19/2014	490.41	8.88	481.53	
MW-170D-50	6/11/2014	490.43	8.38	482.05	
MW-170D-50	9/9/2014	490.43	7.26	483.17	
MW-170D-50	11/20/2014	490.43	8.22	482.21	
MW-170D-50	3/18/2015	490.43	8.59	481.84	
MW-170D-50	6/11/2015	490.43	8.26	482.17	
MW-170D-50	8/12/2015	490.43	7.52	482.91	
MW-170D-50	11/19/2015	490.43	8.34	482.09	
MW-170D-50	3/22/2016	490.43	8.86	481.57	
MW-170D-50	9/13/2016	490.44	7.61	482.83	
MW-170D-50	3/14/2017	490.44	8.54	481.90	
MW-171A-15	3/19/2010	485.33	9.35	475.98	
MW-171A-15	4/28/2010	485.33	10.71	474.62	
MW-171A-15	5/20/2010	485.33	9.75	475.58	
MW-171A-15	6/24/2010	485.33	9.20	476.13	
MW-171A-15	7/9/2010	485.33	8.82	476.51	
MW-171A-15	8/2/2010	485.33	8.95	476.38	
MW-171A-15	9/8/2010	485.33	9.02	476.31	
MW-171A-15	10/18/2010	485.33	9.50	475.83	
MW-171A-15	11/12/2010	485.33	9.66	475.67	
MW-171A-15	3/4/2011	485.33	9.47	475.86	
MW-171A-15	3/25/2011	485.33	9.30	476.03	
MW-171A-15	4/7/2011	485.33	9.27	476.06	
MW-171A-15	7/14/2011	485.33	8.47	476.86	
MW-171A-15	10/21/2011	485.33	8.98	476.35	
MW-171A-15	2/15/2012	484.68	9.22	475.46	
MW-171A-15	4/20/2012	484.68	8.41	476.27	
MW-171A-15	7/30/2012	484.68	8.33	476.35	
MW-171A-15	11/1/2012	484.68	9.09	475.59	
MW-171A-15	1/24/2013	484.77	9.07	475.70	
MW-171A-15	4/24/2013	485.28	9.04	476.24	
MW-171A-15	8/1/2013	485.31	8.71	476.60	

Appendix B-1
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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-171A-15	10/1/2013	484.89	8.74	476.15	
MW-171A-15	3/18/2014	484.92	9.29	475.63	
MW-171A-15	6/11/2014	484.92	8.66	476.26	
MW-171A-15	9/9/2014	484.92	7.82	477.10	
MW-171A-15	11/20/2014	484.92	8.97	475.95	
MW-171A-15	3/18/2015	484.94	9.39	475.55	
MW-171A-15	6/11/2015	485.02	—	—	MW-171 nest was destroyed during summer road construction.
MW-171B-40	4/28/2010	485.68	10.10	475.58	
MW-171B-40	5/20/2010	485.68	10.12	475.56	
MW-171B-40	6/24/2010	485.68	9.40	476.28	
MW-171B-40	7/9/2010	485.68	8.72	476.96	
MW-171B-40	8/2/2010	485.68	8.84	476.84	
MW-171B-40	9/8/2010	485.68	8.91	476.77	
MW-171B-40	10/18/2010	485.68	9.75	475.93	
MW-171B-40	11/12/2010	485.68	9.55	476.13	
MW-171B-40	3/4/2011	485.68	9.37	476.31	
MW-171B-40	3/25/2011	485.68	9.22	476.46	
MW-171B-40	4/7/2011	485.68	9.20	476.48	
MW-171B-40	7/14/2011	485.68	8.55	477.13	
MW-171B-40	10/21/2011	485.68	9.90	475.78	
MW-171B-40	2/15/2012	484.69	9.46	475.23	
MW-171B-40	4/20/2012	484.69	8.79	475.90	
MW-171B-40	7/30/2012	484.69	8.71	475.98	
MW-171B-40	11/1/2012	484.69	9.16	475.53	
MW-171B-40	1/24/2013	484.83	9.14	475.69	
MW-171B-40	4/24/2013	484.83	9.14	475.69	
MW-171B-40	8/1/2013	484.83	8.68	476.15	
MW-171B-40	10/1/2013	484.83	8.77	476.06	
MW-171B-40	3/18/2014	485.30	9.62	475.68	
MW-171B-40	6/11/2014	485.30	9.07	476.23	
MW-171B-40	9/9/2014	485.30	7.52	477.78	
MW-171B-40	11/20/2014	484.67	8.68	475.99	
MW-171B-40	3/18/2015	484.67	9.24	475.43	
MW-171B-40	6/11/2015	484.67	—	—	MW-171 nest was destroyed during summer road construction.
MW-171BR-40	8/4/2017	485.1	8.81	476.29	
MW-171BR-40	8/23/2017	485.1	8.66	476.44	
MW-172A-15	4/28/2010	475.82	6.79	469.03	
MW-172A-15	5/19/2010	475.82	7.18	468.64	
MW-172A-15	6/16/2010	475.82	6.97	468.85	
MW-172A-15	7/9/2010	475.82	6.84	468.98	
MW-172A-15	8/2/2010	475.82	6.79	469.03	
MW-172A-15	9/7/2010	475.82	6.95	468.87	
MW-172A-15	10/18/2010	475.82	7.23	468.59	
MW-172A-15	11/5/2010	475.82	7.20	468.62	
MW-172A-15	2/1/2011	475.82	5.97	469.85	
MW-172A-15	3/25/2011	475.82	5.47	470.35	
MW-172A-15	4/5/2011	475.82	5.55	470.27	
MW-172A-15	7/14/2011	475.82	6.38	469.44	
MW-172A-15	10/21/2011	475.82	7.01	468.81	
MW-172A-15	2/15/2012	475.72	6.26	469.46	
MW-172A-15	4/18/2012	475.72	6.29	469.43	
MW-172A-15	7/30/2012	475.72	6.45	469.27	
MW-172A-15	11/1/2012	475.72	6.77	468.95	
MW-172A-15	1/24/2013	475.72	5.54	470.18	
MW-172A-15	4/24/2013	475.67	Frozen	—	Frozen w/data logger
MW-172A-15	8/1/2013	475.67	Frozen	—	Well was frozen with a data logger suspended from well plug--the well could not be opened.
MW-172A-15	10/1/2013	475.74	Frozen	—	Well was frozen with a data logger suspended from well plug--the well could not be opened.

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-172A-15	3/19/2014	475.69	6.25	469.44	
MW-172A-15	6/11/2014	475.69	Frozen	—	The well was frozen with a data logger installed-- no measurement possible.
MW-172A-15	9/9/2014	475.71	5.76	469.95	
MW-172A-15	11/20/2014	475.71	6.36	469.35	
MW-172A-15	3/18/2015	475.70	6.33	469.37	
MW-172A-15	6/11/2015	475.71	Frozen	—	Datalogger present, no depth to ice possible.
MW-172A-15	8/12/2015	475.71	6.43	469.29	
MW-172A-15	11/19/2015	475.72	6.22	469.50	
MW-172A-15	3/22/2016	475.47	5.90	469.57	
MW-172A-15	1/27/2017	475.61	5.92	469.69	
MW-172A-15	8/23/2017	475.68	6.19	469.49	
MW-172B-150	4/28/2010	476.13	7.12	469.01	
MW-172B-150	5/19/2010	476.13	7.49	468.64	
MW-172B-150	6/16/2010	476.13	7.26	468.87	
MW-172B-150	7/21/2010	476.13	7.11	469.02	
MW-172B-150	8/4/2010	476.13	7.07	469.06	
MW-172B-150	9/8/2010	476.13	7.23	468.90	
MW-172B-150	10/18/2010	476.13	7.65	468.48	
MW-172B-150	2/1/2011	476.13	6.29	469.84	
MW-172B-150	2/24/2011	476.13	6.08	470.05	
MW-172B-150	3/25/2011	476.13	5.79	470.34	
MW-172B-150	4/5/2011	476.13	5.60	470.53	
MW-172B-150	7/14/2011	476.13	—	—	DTW measured from ground surface is 5.45 feet.
MW-172B-150	10/21/2011	476.13	7.31	468.82	
MW-172B-150	2/15/2012	476.05	6.61	469.44	
MW-172B-150	4/18/2012	476.05	6.65	469.40	
MW-172B-150	7/30/2012	476.05	6.76	469.29	
MW-172B-150	11/1/2012	476.05	6.78	469.27	
MW-172B-150	1/24/2013	475.73	5.62	470.11	
MW-172B-150	4/24/2013	475.74	Frozen	—	Frozen w/data logger
MW-172B-150	8/1/2013	475.73	Frozen	—	Well was frozen with a data logger suspended from well plug--the well could not be opened.
MW-172B-150	10/1/2013	475.78	Frozen	—	Frozen at 5.32 feet below measuring point.
MW-172B-150	3/19/2014	475.77	6.32	469.45	
MW-172B-150	6/11/2014	475.77	6.86	468.91	
MW-172B-150	9/9/2014	475.77	5.61	470.16	
MW-172B-150	11/20/2014	475.77	6.15	469.62	
MW-172B-150	3/18/2015	475.50	6.14	469.36	
MW-172B-150	6/11/2015	475.49	6.46	469.03	
MW-172B-150	8/12/2015	475.49	6.22	469.28	Datalogger cap could not tighten
MW-172B-150	11/19/2015	475.49	6.24	469.25	
MW-172B-150	3/22/2016	475.52	5.95	469.57	
MW-172B-150	1/27/2017	475.64	5.98	469.66	
MW-172B-150	8/23/2017	475.71	6.24	469.47	
MW-181A-15	11/1/2010	475.87	9.49	466.38	
MW-181A-15	1/1/2011	475.87	8.96	466.91	
MW-181A-15	3/25/2011	475.87	8.80	467.07	
MW-181A-15	2/15/2012	475.91	8.95	466.96	
MW-181A-15	4/18/2012	475.91	8.93	466.98	
MW-181A-15	7/30/2012	475.91	8.76	467.15	
MW-181A-15	11/1/2012	475.91	9.05	466.86	
MW-181A-15	1/24/2013	475.90	8.70	467.20	
MW-181A-15	4/24/2013	475.92	—	—	Well was buried under large snow berm and was inaccessible.
MW-181A-15	8/2/2013	475.92	9.03	466.89	
MW-181A-15	10/1/2013	475.92	9.20	466.72	
MW-181A-15	3/18/2014	475.91	8.98	466.93	
MW-181A-15	6/11/2014	475.91	9.29	466.62	
MW-181A-15	9/9/2014	475.91	8.28	467.63	
MW-181A-15	11/20/2014	475.91	8.63	467.28	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-181A-15	3/18/2015	475.91	7.82	468.09	
MW-181A-15	6/11/2015	475.90	9.06	466.84	
MW-181A-15	8/12/2015	475.90	8.72	467.18	
MW-181A-15	11/19/2015	475.90	8.80	467.10	
MW-181A-15	3/22/2016	475.90	8.68	467.22	
MW-181A-15	9/12/2016	475.92	8.38	467.54	
MW-181A-15	1/27/2017	475.92	8.62	467.30	
MW-181A-15	3/14/2017	475.92	8.65	467.27	
MW-181A-15	7/12/2017	475.97	8.71	467.26	
MW-181A-15	8/23/2017	475.97	8.85	467.12	
MW-181B-50	11/1/2010	475.98	9.84	466.14	
MW-181B-50	1/1/2011	475.98	8.90	467.08	
MW-181B-50	3/25/2011	475.98	8.81	467.17	
MW-181B-50	2/15/2012	476.02	9.00	467.02	
MW-181B-50	4/18/2012	476.02	8.98	467.04	
MW-181B-50	7/30/2012	476.02	8.66	467.36	
MW-181B-50	11/1/2012	476.02	8.94	467.08	
MW-181B-50	1/24/2013	475.83	8.45	467.38	
MW-181B-50	4/24/2013	475.86	—	—	Well was buried under large snow berm and was inaccessible.
MW-181B-50	8/2/2013	475.86	8.93	466.93	
MW-181B-50	10/1/2013	475.86	9.09	466.77	
MW-181B-50	3/18/2014	475.86	8.85	467.01	
MW-181B-50	6/11/2014	475.86	9.13	466.73	
MW-181B-50	9/9/2014	475.86	8.16	467.70	
MW-181B-50	11/20/2014	475.86	8.55	467.31	
MW-181B-50	3/18/2015	475.86	7.75	468.11	
MW-181B-50	6/11/2015	475.84	8.96	466.88	
MW-181B-50	8/12/2015	475.84	8.61	467.23	
MW-181B-50	11/19/2015	475.84	8.69	467.15	
MW-181B-50	3/22/2016	475.84	8.53	467.31	
MW-181B-50	9/12/2016	475.85	8.38	467.47	
MW-181B-50	1/27/2017	475.85	8.49	467.36	
MW-181B-50	3/14/2017	475.85	8.50	467.35	
MW-181B-50	7/12/2017	475.9	8.56	467.34	
MW-181B-50	8/23/2017	475.9	8.73	467.17	
MW-181C-150	2/15/2012	475.96	8.78	467.18	
MW-181C-150	4/18/2012	475.96	8.72	467.24	
MW-181C-150	7/30/2012	475.96	8.61	467.35	
MW-181C-150	11/1/2012	475.96	8.95	467.01	
MW-181C-150	1/24/2013	475.96	8.35	467.61	
MW-181C-150	4/24/2013	475.99	—	—	Well was buried under large snow berm and was inaccessible.
MW-181C-150	8/2/2013	475.99	8.88	467.11	
MW-181C-150	10/1/2013	475.99	9.04	466.95	
MW-181C-150	3/18/2014	475.98	8.80	467.18	
MW-181C-150	6/11/2014	475.98	9.12	466.86	
MW-181C-150	9/9/2014	475.98	8.09	467.89	
MW-181C-150	11/20/2014	475.98	8.53	467.45	
MW-181C-150	3/18/2015	475.98	7.79	468.19	
MW-181C-150	6/11/2015	475.98	8.93	467.05	
MW-181C-150	8/12/2015	475.96	8.56	467.40	
MW-181C-150	11/19/2015	475.96	8.64	467.32	
MW-181C-150	3/22/2016	475.96	8.49	467.47	
MW-181C-150	9/12/2016	475.98	8.20	467.78	
MW-181C-150	1/27/2017	475.98	8.47	467.51	
MW-181C-150	3/14/2017	475.98	8.48	467.50	
MW-181C-150	7/12/2017	476.03	8.52	467.51	
MW-181C-150	8/23/2017	476.03	8.70	467.33	
MW-182A-15	11/1/2010	474.93	6.63	468.30	
MW-182A-15	2/15/2012	475.38	7.05	468.33	

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MW-182A-15	4/19/2012	475.38	6.60	468.78	
MW-182A-15	7/30/2012	475.38	5.61	469.77	
MW-182A-15	11/1/2012	475.38	6.54	468.84	
MW-182A-15	1/24/2013	475.65	6.00	469.65	
MW-182A-15	4/24/2013	476.51	7.07	469.44	
MW-182A-15	8/2/2013	475.88	Frozen	—	Frozen at 5.94 feet below measuring point.
MW-182A-15	10/1/2013	475.54	Frozen	—	Frozen at 5.63 feet below measuring point
MW-182A-15	3/18/2014	476.16	Frozen	—	Frozen at 5.23 feet below measuring point
MW-182A-15	6/11/2014	476.16	Frozen	—	Frozen at 5.59 feet below measuring point.
MW-182A-15	9/9/2014	476.24	5.07	471.17	
MW-182A-15	11/20/2014	476.24	6.62	469.62	
MW-182A-15	3/18/2015	475.89	7.49	468.40	Extremely frostjacked
MW-182A-15	6/11/2015	476.24	6.81	469.43	Casing is frost jacked +0.75 ft. DTW recorded as 7.39 on field sheet. DTW adjusted based on frostjacking.
MW-182A-15	8/12/2015	475.69	5.75	469.94	
MW-182A-15	11/19/2015	475.45	6.02	469.43	
MW-182A-15	3/23/2016	475.45	6.98	468.47	
MW-182A-15	9/12/2016	475.30	4.73	470.57	
MW-182A-15	1/12/2017	475.3	6.20	469.10	
MW-182A-15	3/14/2017	475.3	7.05	468.25	
MW-182B-45	2/15/2012	475.32	7.68	467.64	
MW-182B-45	4/19/2012	475.32	6.79	468.53	
MW-182B-45	7/30/2012	475.32	5.46	469.86	
MW-182B-45	11/1/2012	475.32	6.37	468.95	
MW-182B-45	1/24/2013	475.40	7.05	468.35	
MW-182B-45	4/24/2013	475.40	6.07	469.33	
MW-182B-45	8/2/2013	475.40	Frozen	—	Frozen at 5.88 feet below measuring point.
MW-182B-45	10/1/2013	475.40	6.10	469.30	
MW-182B-45	3/18/2014	475.48	6.20	469.28	
MW-182B-45	6/11/2014	475.48	6.18	469.30	
MW-182B-45	9/9/2014	475.48	4.73	470.75	
MW-182B-45	11/20/2014	475.48	6.10	469.38	
MW-182B-45	3/18/2015	475.48	6.20	469.28	Frostjacked
MW-182B-45	6/11/2015	475.48	6.06	469.42	
MW-182B-45	8/12/2015	475.50	5.60	469.90	
MW-182B-45	11/19/2015	475.26	5.86	469.40	
MW-182B-45	3/23/2016	475.26	6.10	469.16	
MW-182B-45	9/12/2016	475.24	4.67	470.57	
MW-182B-45	1/12/2017	475.24	6.01	469.23	
MW-182B-45	3/14/2017	475.24	6.70	468.54	Casing is very low in monument.
MW-183A-15	11/1/2010	478.05	7.65	470.40	
MW-183A-15	1/1/2011	478.05	6.27	471.78	
MW-183A-15	3/25/2011	478.05	6.06	471.99	
MW-183A-15	10/21/2011	478.05	7.27	470.78	
MW-183A-15	2/16/2012	478.06	Frozen	—	Frozen at 6.86 ft BTOC
MW-183A-15	4/20/2012	478.06	Frozen	—	Frozen at 6.11 ft BTOC
MW-183A-15	7/30/2012	478.06	5.56	472.50	
MW-183A-15	11/1/2012	478.06	6.63	471.43	
MW-183A-15	1/24/2013	478.06	Frozen	—	Frozen w/data logger
MW-183A-15	4/24/2013	478.03	Frozen	—	Frozen w/data logger
MW-183A-15	8/1/2013	478.07	Frozen	—	Well was frozen with a data logger suspended from well plug--the well could not be opened.
MW-183A-15	10/1/2013	478.07	6.76	471.31	
MW-183A-15	3/19/2014	478.02	Frozen	—	Frozen at 5.79 feet below measuring point
MW-183A-15	6/11/2014	478.02	Frozen	—	Frozen at 5.12 feet below measuring point.
MW-183A-15	9/9/2014	478.02	5.30	472.72	
MW-183A-15	11/20/2014	478.02	6.24	471.78	
MW-183A-15	3/18/2015	478.02	Frozen	—	Depth to ice = 6.06 feet
MW-183A-15	6/11/2015	478.02	Frozen	—	Depth to ice is 5.99 feet, melt water at 5.75 feet.
MW-183A-15	8/12/2015	478.07	5.50	472.58	
MW-183A-15	11/19/2015	478.07	6.71	471.36	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-183A-15	3/22/2016	478.07	Frozen	—	Frozen (ice) at 6.27 feet
MW-183A-15	1/31/2017	478.15	Frozen	—	
MW-183B-60	10/21/2011	—	7.31	—	New well
MW-183B-60	2/16/2012	478.05	Frozen	—	Frozen at 6.98 ft BTOC
MW-183B-60	4/20/2012	478.05	Frozen	—	Frozen at 6.97 ft BTOC
MW-183B-60	7/30/2012	478.05	8.38	469.67	
MW-183B-60	11/1/2012	478.05	6.68	471.37	
MW-183B-60	1/24/2013	478.06	Frozen	—	Frozen at 6.23 ft BTOC
MW-183B-60	4/24/2013	478.06	Frozen	—	Frozen at 6.14 ft BTOC
MW-183B-60	8/1/2013	478.06	Frozen	—	Frozen at 8.47 feet below measuring point.
MW-183B-60	10/1/2013	478.06	6.43	471.63	
MW-183B-60	3/19/2014	478.31	Frozen	—	Frozen at 6.36 feet below measuring point
MW-183B-60	6/11/2014	478.31	Frozen	—	Frozen at 6.53 feet below measuring point.
MW-183B-60	9/9/2014	478.31	5.62	472.69	
MW-183B-60	11/20/2014	478.31	6.77	471.54	
MW-183B-60	3/18/2015	478.31	Frozen	—	Depth to ice = 6.73 feet
MW-183B-60	6/11/2015	478.31	Frozen	—	Depth to ice is 6.55 feet, melt water at 6.49 feet.
MW-183B-60	8/12/2015	478.35	5.84	472.52	
MW-183B-60	11/19/2015	478.35	7.03	471.32	
MW-183B-60	3/22/2016	478.35	Frozen	—	Frozen (ice) at 4.90 feet
MW-183B-60	9/13/2016	478.42	5.96	472.46	
MW-183B-60	1/31/2017	478.42	6.67	471.75	
MW-183B-60	3/14/2017	478.42	Frozen	—	Depth to ice = 6.64 feet.
MW-184-45	11/1/2010	486.38	8.16	478.22	
MW-184-45	1/1/2011	486.38	7.60	478.78	
MW-184-45	2/16/2012	486.44	8.22	478.22	
MW-184-45	4/19/2012	486.44	7.63	478.81	
MW-184-45	7/30/2012	486.44	7.15	479.29	
MW-184-45	11/1/2012	486.44	7.99	478.45	
MW-184-45	1/24/2013	486.64	7.84	478.80	
MW-184-45	4/24/2013	486.64	7.92	478.72	
MW-184-45	10/1/2013	486.64	7.65	478.99	
MW-184-45	3/18/2014	486.64	8.27	478.37	
MW-184-45	6/11/2014	486.89	7.75	479.14	
MW-184-45	9/9/2014	486.89	6.69	480.20	
MW-184-45	11/20/2014	486.41	7.29	479.12	
MW-184-45	3/18/2015	486.41	7.72	478.69	
MW-184-45	6/11/2015	486.41	7.55	478.86	
MW-184-45	8/12/2015	486.66	7.07	479.59	
MW-184-45	11/20/2015	486.31	7.18	479.13	
MW-184-45	3/22/2016	486.31	7.75	478.56	
MW-184-45	9/13/2016	486.52	6.67	479.85	
MW-184-45	3/14/2017	486.52	7.86	478.66	
MW-185A-15	11/1/2010	478.04	7.59	470.45	
MW-185A-15	1/1/2011	478.04	6.78	471.26	
MW-185A-15	2/15/2012	478.09	6.56	471.53	
MW-185A-15	4/18/2012	478.09	Frozen	—	Frozen at 6.56 ft BTOC
MW-185A-15	7/30/2012	478.09	6.80	471.29	
MW-185A-15	11/1/2012	478.09	7.18	470.91	
MW-185A-15	1/24/2013	478.08	5.81	472.27	
MW-185A-15	4/25/2013	478.06	Frozen	—	Frozen w/data logger
MW-185A-15	8/1/2013	478.06	6.98	471.08	
MW-185A-15	10/1/2013	478.06	7.12	470.94	
MW-185A-15	3/18/2014	478.09	6.58	471.51	
MW-185A-15	6/11/2014	478.09	7.01	471.08	
MW-185A-15	9/9/2014	478.07	5.97	472.10	
MW-185A-15	11/20/2014	478.07	6.80	471.27	
MW-185A-15	3/18/2015	478.07	6.72	471.35	
MW-185A-15	6/11/2015	478.07	7.01	471.06	
MW-185A-15	8/12/2015	478.07	6.82	471.26	Monument needs new concrete
MW-185A-15	11/19/2015	478.07	6.86	471.21	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-185A-15	3/22/2016	478.07	6.50	471.57	
MW-185A-15	1/27/2017	478.07	6.60	471.47	
MW-185A-15	8/23/2017	478.19	6.76	471.43	
MW-185B-50	11/1/2010	478.05	7.76	470.29	
MW-185B-50	1/1/2011	478.05	6.81	471.24	
MW-185B-50	2/15/2012	478.09	6.63	471.46	
MW-185B-50	4/18/2012	478.09	Frozen	—	Frozen at 6.66 ft BTOC
MW-185B-50	7/30/2012	478.09	6.85	471.24	
MW-185B-50	11/1/2012	478.09	7.22	470.87	
MW-185B-50	1/24/2013	478.09	5.86	472.23	
MW-185B-50	4/25/2013	478.09	Frozen	—	Frozen at 5.74 ft BTOC
MW-185B-50	8/1/2013	478.09	7.03	471.06	
MW-185B-50	10/1/2013	478.09	7.19	470.90	
MW-185B-50	3/18/2014	478.10	6.61	471.49	
MW-185B-50	6/11/2014	478.10	7.18	470.92	
MW-185B-50	9/9/2014	478.10	6.25	471.85	
MW-185B-50	11/20/2014	478.10	6.76	471.34	
MW-185B-50	3/18/2015	478.10	6.78	471.32	
MW-185B-50	6/11/2015	478.10	7.07	471.03	
MW-185B-50	8/12/2015	478.08	6.88	471.21	
MW-185B-50	11/19/2015	478.08	6.92	471.16	
MW-185B-50	3/22/2016	478.08	6.57	471.51	
MW-185B-50	1/27/2017	478.09	6.64	471.45	
MW-185B-50	7/12/2017	478.2	6.74	471.46	
MW-185B-50	8/23/2017	478.2	6.83	471.37	
MW-185C-120	2/15/2012	478.47	6.99	471.48	
MW-185C-120	4/18/2012	478.47	Frozen	—	Frozen at 6.97 ft BTOC
MW-185C-120	7/30/2012	478.47	7.20	471.27	
MW-185C-120	11/1/2012	478.47	7.56	470.91	
MW-185C-120	1/24/2013	478.48	6.23	472.25	
MW-185C-120	4/25/2013	478.48	Frozen	—	Frozen at 6.07 ft BTOC
MW-185C-120	8/1/2013	478.48	7.03	471.45	
MW-185C-120	10/1/2013	478.48	7.53	470.95	
MW-185C-120	3/18/2014	478.48	6.92	471.56	
MW-185C-120	6/11/2014	478.48	7.17	471.31	
MW-185C-120	9/9/2014	478.48	6.23	472.25	
MW-185C-120	11/20/2014	478.48	6.76	471.72	
MW-185C-120	3/18/2015	478.48	6.74	471.74	
MW-185C-120	6/11/2015	478.48	7.05	471.43	
MW-185C-120	8/12/2015	478.10	6.85	471.26	
MW-185C-120	11/19/2015	478.10	6.89	471.21	
MW-185C-120	3/22/2016	478.10	6.54	471.56	
MW-185C-120	9/12/2016	478.11	6.35	471.76	
MW-185C-120	1/27/2017	478.11	6.61	471.50	
MW-185C-120	3/14/2017	478.11	6.63	471.48	
MW-185C-120	7/12/2017	478.23	6.71	471.52	
MW-185C-120	8/23/2017	478.23	6.80	471.43	
MW-187-15	11/1/2010	485.49	13.34	472.15	
MW-187-15	3/1/2011	485.49	12.00	473.49	
MW-187-15	7/14/2011	485.49	11.86	473.63	
MW-187-15	10/21/2011	485.49	13.23	472.26	
MW-187-15	2/16/2012	485.48	12.32	473.16	
MW-187-15	4/18/2012	485.48	11.35	474.13	
MW-187-15	7/30/2012	485.48	11.90	473.58	
MW-187-15	11/1/2012	485.48	12.46	473.02	
MW-187-15	1/24/2013	485.52	—	—	The well was inaccessible due to weather conditions.
MW-187-15	4/25/2013	485.39	Frozen	—	Frozen at 11.29 ft BTOC
MW-187-15	8/1/2013	485.39	11.34	474.05	
MW-187-15	10/1/2013	485.24	12.35	472.89	
MW-187-15	3/18/2014	485.24	11.59	473.65	
MW-187-15	6/11/2014	485.21	12.35	472.86	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-187-15	9/9/2014	485.24	11.66	473.58	
MW-187-15	11/20/2014	485.24	12.03	473.21	
MW-187-15	3/18/2015	485.24	11.47	473.77	
MW-187-15	6/11/2015	485.24	11.88	473.36	
MW-187-15	8/13/2015	485.31	11.71	473.60	
MW-187-15	11/20/2015	485.31	12.30	473.01	
MW-187-15	3/22/2016	485.25	11.93	473.32	
MW-187-15	9/13/2016	485.38	11.89	473.49	
MW-187-15	3/13/2017	485.38	11.72	473.66	
MW-187-15	3/13/2017	485.38	11.72	473.66	
MW-188A-15	7/30/2012	461.19	5.55	455.64	
MW-188A-15	11/1/2012	461.19	5.43	455.76	
MW-188A-15	1/24/2013	461.84	Frozen	—	The well was frozen-- a depth to ice measurement was not taken.
MW-188A-15	4/25/2013	461.84	Frozen	—	Frozen at 5.61 ft BTOC
MW-188A-15	8/2/2013	461.84	4.86	456.98	
MW-188A-15	10/2/2013	461.84	4.13	457.71	
MW-188A-15	3/18/2014	461.25	Frozen	—	Frozen at 5.19 feet below measuring point
MW-188A-15	6/11/2014	461.25	Frozen	—	Frozen at 5.24 feet below measuring point.
MW-188A-15	9/9/2014	461.25	2.27	458.98	
MW-188A-15	11/20/2014	461.25	4.82	456.43	
MW-188A-15	3/18/2015	461.25	Frozen	—	Depth ice = 5.09 feet
MW-188A-15	6/11/2015	461.25	Frozen	—	Depth to ice is 5.03 feet.
MW-188A-15	8/12/2015	461.52	3.91	457.61	Monument is loose
MW-188A-15	11/19/2015	461.52	4.30	457.22	
MW-188A-15	3/22/2016	461.52	5.64	455.88	
MW-188B-40	1/1/2011	462.88	6.33	456.55	
MW-188B-40	3/25/2011	462.88	5.89	456.99	
MW-188B-40	7/14/2011	462.88	—	—	DTW measured from ground surface is 5.58 feet.
MW-188B-40	10/21/2011	462.88	4.88	458.00	
MW-188B-40	2/15/2012	462.88	5.95	456.93	
MW-188B-40	4/19/2012	462.88	Frozen	—	Frozen at 6.97 ft BTOC
MW-188B-40	7/30/2012	462.88	4.14	458.74	Well was previously named MW-188
MW-188B-40	11/1/2012	462.88	5.13	457.75	
MW-188B-40	1/24/2013	461.53	Frozen	—	The well was frozen-- a depth to ice measurement was not taken.
MW-188B-40	4/25/2013	461.53	Frozen	—	Frozen at 6.10 ft BTOC
MW-188B-40	8/2/2013	461.53	5.18	456.35	
MW-188B-40	10/2/2013	461.53	5.15	456.38	
MW-188B-40	3/18/2014	461.04	Frozen	—	Frozen at 4.88 feet below measuring point
MW-188B-40	6/11/2014	461.04	Frozen	—	Frozen at 5.03 feet below measuring point.
MW-188B-40	9/9/2014	461.04	2.06	458.98	
MW-188B-40	11/20/2014	461.04	4.66	456.38	
MW-188B-40	3/18/2015	461.04	5.07	455.97	
MW-188B-40	6/11/2015	461.04	Frozen	—	Depth to ice is 5.02 feet.
MW-188B-40	8/12/2015	461.44	3.85	457.59	Monument is loose
MW-188B-40	11/19/2015	461.44	4.24	457.20	
MW-188B-40	3/22/2016	461.44	5.61	455.83	
MW-189A-15	10/21/2011	—	4.89	—	New well
MW-189A-15	2/15/2012	470.20	4.39	465.81	
MW-189A-15	4/18/2012	470.20	Frozen	—	Frozen at 4.39 ft BTOC
MW-189A-15	7/30/2012	470.20	4.38	465.82	
MW-189A-15	11/1/2012	470.20	4.62	465.58	
MW-189A-15	1/24/2013	470.21	Frozen	—	Frozen w/data logger
MW-189A-15	4/25/2013	470.18	—	—	Lock is frozen shut--unable to open well.
MW-189A-15	8/2/2013	470.19	Frozen	—	Frozen at 4.11 feet below measuring point.
MW-189A-15	10/1/2013	470.19	4.71	465.48	
MW-189A-15	3/18/2014	470.21	Frozen	—	Frozen at 4.19 feet below measuring point
MW-189A-15	6/11/2014	470.21	Frozen	—	Frozen at 4.34 feet below measuring point.
MW-189A-15	9/9/2014	470.21	3.80	466.41	
MW-189A-15	11/20/2014	470.21	4.28	465.93	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-189A-15	3/18/2015	470.21	Frozen	—	Depth ice = 4.21 feet
MW-189A-15	6/11/2015	470.21	Frozen	—	Depth to ice is 4.10 feet.
MW-189A-15	8/12/2015	470.23	4.25	465.98	
MW-189A-15	11/19/2015	470.23	4.35	465.88	
MW-189A-15	3/23/2016	470.23	4.09	466.14	
MW-189A-15	1/27/2017	470.42	4.06	466.36	
MW-189B-60	10/21/2011	—	4.93	—	New well
MW-189B-60	2/15/2012	470.24	4.43	465.81	
MW-189B-60	4/18/2012	470.24	Frozen	—	Frozen at 4.43 ft BTOC
MW-189B-60	7/30/2012	470.24	4.39	465.85	
MW-189B-60	11/1/2012	470.24	4.64	465.60	
MW-189B-60	1/24/2013	470.25	Frozen	—	The well was frozen-- a depth to ice measurement was not taken.
MW-189B-60	4/25/2013	470.25	Frozen	—	Frozen at 3.88 ft BTOC
MW-189B-60	8/2/2013	470.25	Frozen	—	Frozen at 4.42 feet below measuring point.
MW-189B-60	10/1/2013	470.25	Frozen	—	Frozen at 6.33 feet below measuring point
MW-189B-60	3/18/2014	470.55	Frozen	—	Frozen at 4.21 feet below measuring point
MW-189B-60	6/11/2014	470.55	Frozen	—	Frozen at 4.69 feet below measuring point.
MW-189B-60	9/9/2014	470.55	4.14	466.41	
MW-189B-60	11/20/2014	470.55	4.62	465.93	
MW-189B-60	3/18/2015	470.55	Frozen	—	Depth ice = 4.57 feet
MW-189B-60	6/11/2015	470.55	Frozen	—	Depth to ice is 4.51 feet.
MW-189B-60	8/12/2015	470.56	4.58	465.98	
MW-189B-60	11/19/2015	470.56	4.68	465.88	
MW-189B-60	3/23/2016	470.56	4.41	466.15	
MW-189B-60	1/27/2017	470.75	4.42	466.33	
MW-190A-15	10/21/2011	—	8.30	—	New well
MW-190A-15	2/15/2012	481.49	7.94	473.55	
MW-190A-15	4/18/2012	481.49	8.01	473.48	
MW-190A-15	7/30/2012	481.49	7.87	473.62	
MW-190A-15	11/1/2012	481.49	8.32	473.17	
MW-190A-15	1/24/2013	481.67	7.49	474.18	
MW-190A-15	4/25/2013	481.89	7.35	474.54	
MW-190A-15	8/1/2013	481.87	8.22	473.65	
MW-190A-15	10/1/2013	481.64	8.12	473.52	
MW-190A-15	3/19/2014	481.72	8.12	473.60	
MW-190A-15	6/11/2014	481.72	Frozen	—	Frozen at 2.09 feet below measuring point.
MW-190A-15	9/9/2014	481.74	7.23	474.51	
MW-190A-15	11/20/2014	481.74	7.98	473.76	
MW-190A-15	3/18/2015	481.79	8.30	473.49	
MW-190A-15	6/11/2015	481.97	8.39	473.58	
MW-190A-15	8/12/2015	481.97	7.76	474.22	
MW-190A-15	11/19/2015	481.57	7.87	473.70	
MW-190A-15	3/22/2016	481.81	8.03	473.78	
MW-190A-15	9/12/2016	481.81	7.45	474.36	
MW-190A-15	2/6/2017	481.31	7.63	473.68	
MW-190A-15	3/14/2017	481.48	7.65	473.83	Casing is very low in monument.
MW-190A-15	8/23/2017	481.5	7.53	473.97	
MW-190B-60	10/21/2011	—	8.13	—	New well
MW-190B-60	2/15/2012	481.30	7.84	473.46	
MW-190B-60	4/18/2012	481.30	7.92	473.38	
MW-190B-60	7/30/2012	481.30	7.74	473.56	
MW-190B-60	11/1/2012	481.30	8.11	473.19	
MW-190B-60	1/24/2013	481.56	7.39	474.17	
MW-190BR-60	4/25/2013	—	7.48	—	This well was installed to replace MW-190B. It hasn't yet been surveyed.
MW-190BR-60	8/1/2013	—	8.29	—	
MW-190BR-60	10/1/2013	481.91	8.42	473.49	
MW-190BR-60	3/19/2014	481.96	8.34	473.62	
MW-190BR-60	6/11/2014	481.96	8.37	473.59	
MW-190BR-60	9/9/2014	481.96	7.50	474.46	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-190BR-60	11/20/2014	481.96	8.17	473.79	
MW-190BR-60	3/18/2015	481.96	8.36	473.60	
MW-190BR-60	6/11/2015	481.96	8.35	473.61	
MW-190BR-60	8/12/2015	481.94	8.12	473.83	
MW-190BR-60	11/19/2015	481.94	8.22	473.72	
MW-190BR-60	3/22/2016	481.94	8.21	473.73	
MW-190BR-60	9/12/2016	481.97	7.63	474.34	
MW-190BR-60	2/6/2017	481.97	8.18	473.79	
MW-190BR-60	3/14/2017	481.97	8.15	473.82	Casing is very low in monument.
MW-190BR-60	8/16/2017	482	8.01	473.99	
MW-190BR-60	8/23/2017	482	8.02	473.98	
MW-190-150	2/6/2017	482.01	8.21	473.80	
MW-190-150	7/25/2017	482.04	8.05	473.99	
MW-190-150	8/23/2017	482.04	8.08	473.96	
MW-191A-15	10/21/2011	—	6.53	—	New well
MW-191A-15	2/16/2012	475.61	6.02	469.59	
MW-191A-15	4/20/2012	475.61	4.90	470.71	
MW-191A-15	7/30/2012	475.61	4.34	471.27	
MW-191A-15	11/1/2012	475.61	5.58	470.03	
MW-191A-15	1/24/2013	475.62	5.39	470.23	
MW-191A-15	4/24/2013	475.65	5.69	469.96	
MW-191A-15	8/1/2013	475.64	4.28	471.36	
MW-191A-15	10/1/2013	475.64	5.69	469.95	
MW-191A-15	3/19/2014	475.65	5.52	470.13	
MW-191A-15	6/11/2014	475.65	5.76	469.89	
MW-191A-15	9/9/2014	475.65	4.47	471.18	
MW-191A-15	11/20/2014	475.65	5.09	470.56	
MW-191A-15	3/18/2015	475.65	5.20	470.45	
MW-191A-15	6/11/2015	475.65	5.21	470.44	
MW-191A-15	8/12/2015	475.67	4.21	471.47	
MW-191A-15	11/19/2015	475.67	5.87	469.80	
MW-191A-15	3/22/2016	475.67	4.82	470.85	
MW-191A-15	9/13/2016	475.82	4.78	471.04	
MW-191A-15	1/31/2017	475.82	5.55	470.27	
MW-191A-15	3/14/2017	475.82	5.58	470.24	
MW-191A-15	7/12/2017	475.84	4.45	471.39	
MW-191A-15	8/23/2017	475.84	4.78	471.06	
MW-191B-60	10/21/2011	—	6.44	—	New well
MW-191B-60	2/16/2012	475.50	5.94	469.56	
MW-191B-60	4/20/2012	475.50	4.81	470.69	
MW-191B-60	7/30/2012	475.50	4.23	471.27	
MW-191B-60	11/1/2012	475.50	5.45	470.05	
MW-191B-60	1/24/2013	475.51	5.31	470.20	
MW-191B-60	4/24/2013	475.51	5.59	469.92	
MW-191B-60	8/1/2013	475.51	5.06	470.45	
MW-191B-60	10/1/2013	475.51	5.68	469.83	
MW-191B-60	3/19/2014	475.51	5.39	470.12	
MW-191B-60	6/11/2014	475.51	5.89	469.62	
MW-191B-60	9/9/2014	475.51	4.32	471.19	
MW-191B-60	11/20/2014	475.51	4.93	470.58	
MW-191B-60	3/18/2015	475.51	5.06	470.45	
MW-191B-60	6/11/2015	475.51	5.06	470.45	
MW-191B-60	8/12/2015	475.50	4.07	471.44	
MW-191B-60	11/19/2015	475.50	5.71	469.79	
MW-191B-60	3/22/2016	475.50	4.64	470.86	
MW-191B-60	9/13/2016	475.64	4.64	471.00	
MW-191B-60	1/31/2017	475.64	6.19	469.45	
MW-191B-60	3/14/2017	475.64	5.45	470.19	
MW-191B-60	7/12/2017	475.65	4.27	471.38	
MW-191B-60	8/23/2017	475.65	4.63	471.02	
MW-193A-15	10/21/2011	—	9.21	—	New well

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-193A-15	2/16/2012	487.61	8.78	478.83	
MW-193A-15	4/18/2012	487.61	7.20	480.41	
MW-193A-15	7/30/2012	487.61	7.95	479.66	
MW-193A-15	11/1/2012	487.61	8.25	479.36	
MW-193A-15	1/25/2013	487.70	7.92	479.78	
MW-193A-15	4/25/2013	487.70	8.23	479.47	
MW-193A-15	8/1/2013	487.70	7.93	479.77	
MW-193A-15	10/1/2013	487.70	8.79	478.91	
MW-193A-15	3/18/2014	487.70	8.21	479.49	
MW-193A-15	6/11/2014	488.24	8.83	479.41	
MW-193A-15	9/9/2014	488.24	8.32	479.92	
MW-193A-15	11/20/2014	488.24	8.02	480.22	
MW-193A-15	3/18/2015	488.24	8.70	479.54	
MW-193A-15	6/11/2015	488.24	8.71	479.53	
MW-193A-15	8/13/2015	488.34	8.27	480.07	
MW-193A-15	11/20/2015	488.34	8.34	480.00	
MW-193A-15	3/22/2016	488.34	9.01	479.33	
MW-193A-15	9/13/2016	488.36	8.42	479.94	
MW-193A-15	3/13/2017	488.36	8.51	479.85	
MW-193B-60	10/21/2011	—	8.93	—	New well
MW-193B-60	2/16/2012	487.31	8.55	478.76	
MW-193B-60	4/18/2012	487.31	7.91	479.40	
MW-193B-60	7/30/2012	487.31	7.39	479.92	
MW-193B-60	11/1/2012	487.31	7.98	479.33	
MW-193B-60	1/25/2013	487.40	7.09	480.31	
MW-193B-60	4/25/2013	487.40	7.99	479.41	
MW-193B-60	8/1/2013	487.40	7.29	480.11	
MW-193B-60	10/1/2013	487.40	8.39	479.01	
MW-193B-60	3/18/2014	487.40	8.11	479.29	
MW-193B-60	6/11/2014	487.93	8.42	479.51	
MW-193B-60	9/9/2014	487.93	7.72	480.21	
MW-193B-60	11/20/2014	487.93	7.85	480.08	
MW-193B-60	3/18/2015	487.93	8.48	479.45	
MW-193B-60	6/11/2015	487.93	8.34	479.59	
MW-193B-60	8/13/2015	488.04	7.78	480.26	
MW-193B-60	11/20/2015	488.04	8.19	479.85	
MW-193B-60	3/22/2016	488.04	8.77	479.27	
MW-193B-60	9/13/2016	488.04	7.95	480.09	
MW-193B-60	3/13/2017	488.04	8.60	479.44	
MW-194A-15	10/21/2011	—	8.19	—	
MW-194A-15	2/16/2012	475.49	5.93	469.56	
MW-194A-15	4/18/2012	475.49	4.44	471.05	
MW-194A-15	7/30/2012	475.49	7.35	468.14	
MW-194A-15	11/1/2012	475.49	7.38	468.11	
MW-194A-15	1/24/2013	475.68	—	—	The well was inaccessible due to weather conditions.
MW-194A-15	4/25/2013	475.57	Frozen	—	Frozen at 5.58 ft BTOC
MW-194A-15	8/1/2013	475.58	6.78	468.80	
MW-194A-15	10/1/2013	475.58	9.11	466.47	
MW-194A-15	3/18/2014	475.58	5.74	469.84	
MW-194A-15	6/11/2014	475.72	8.10	467.62	
MW-194A-15	9/9/2014	475.84	8.01	467.83	
MW-194A-15	11/20/2014	475.84	7.03	468.81	
MW-194A-15	3/18/2015	475.84	6.31	469.53	
MW-194A-15	6/11/2015	475.84	8.31	467.53	
MW-194A-15	8/12/2015	475.85	7.93	467.93	
MW-194A-15	11/20/2015	475.85	7.93	467.92	
MW-194A-15	3/22/2016	475.74	6.08	469.66	
MW-194A-15	3/14/2017	475.33	5.57	469.76	
MW-194B-40	10/21/2011	—	8.39	—	
MW-194B-40	2/16/2012	475.72	6.14	469.58	
MW-194B-40	4/18/2012	475.72	4.65	471.07	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-194B-40	7/30/2012	475.72	7.47	468.25	
MW-194B-40	11/1/2012	475.72	7.55	468.17	
MW-194B-40	1/24/2013	475.88	—	—	The well was inaccessible due to weather conditions.
MW-194B-40	4/25/2013	475.88	Frozen	—	Frozen at 5.74 ft BTOC
MW-194B-40	8/1/2013	475.58	6.95	468.63	
MW-194B-40	10/1/2013	475.58	8.87	466.71	
MW-194B-40	3/18/2014	475.58	5.65	469.93	
MW-194B-40	6/11/2014	475.63	7.99	467.64	
MW-194B-40	9/9/2014	475.76	7.87	467.89	
MW-194B-40	11/20/2014	475.76	6.94	468.82	
MW-194B-40	3/18/2015	475.76	6.23	469.53	
MW-194B-40	6/11/2015	475.76	8.21	467.55	
MW-194B-40	8/12/2015	475.76	7.79	467.98	
MW-194B-40	11/20/2015	475.76	7.84	467.92	
MW-194B-40	3/22/2016	475.76	5.98	469.78	
MW-194B-40	9/13/2016	475.98	7.86	468.12	
MW-194B-40	3/14/2017	475.98	5.90	470.08	
MW-194B-40	3/14/2017	475.98	5.90	470.08	
MW-308-15	3/14/2017	476.12	11.02	465.10	
MW-311-15	7/30/2012	467.01	3.27	463.74	
MW-311-15	11/1/2012	467.01	5.01	462.00	
MW-311-15	1/24/2013	467.00	5.60	461.40	
MW-311-15	4/24/2013	467.00	—	—	Well was submerged under surface meltwater and was inaccessible.
MW-311-15	8/2/2013	466.78	4.30	462.48	
MW-311-15	10/1/2013	466.78	3.60	463.18	
MW-311-15	3/18/2014	467.00	5.60	461.40	
MW-311-15	6/11/2014	467.00	3.44	463.56	
MW-311-15	9/9/2014	467.00	1.78	465.22	
MW-311-15	11/20/2014	467.00	4.85	462.15	
MW-311-15	3/18/2015	467.00	5.44	461.56	
MW-311-15	6/11/2015	467.00	3.82	463.18	
MW-311-15	8/12/2015	467.02	3.80	463.22	
MW-311-15	11/19/2015	467.02	4.37	462.65	
MW-311-15	3/22/2016	467.02	6.10	460.92	
MW-311-15	9/12/2016	466.87	1.85	465.02	
MW-311-15	3/14/2017	466.87	5.91	460.96	Casing is very low in monument.
MW-311-15	7/12/2017	466.87	2.61	464.26	
MW-311-15	8/23/2017	466.87	3.03	463.84	
MW-311-46	7/30/2012	467.06	3.35	463.71	
MW-311-46	11/1/2012	467.06	5.10	461.96	
MW-311-46	1/24/2013	467.06	5.85	461.21	
MW-311-46	4/24/2013	466.86	—	—	Well was submerged under surface meltwater and was inaccessible.
MW-311-46	8/2/2013	466.96	4.47	462.49	
MW-311-46	10/1/2013	466.96	3.77	463.19	
MW-311-46	3/18/2014	466.86	5.72	461.14	
MW-311-46	6/11/2014	466.86	3.63	463.23	
MW-311-46	9/9/2014	466.86	1.91	464.95	
MW-311-46	11/20/2014	466.86	5.00	461.86	
MW-311-46	3/18/2015	466.86	5.63	461.23	
MW-311-46	6/11/2015	466.86	4.07	462.79	
MW-311-46	8/12/2015	466.90	3.68	463.22	
MW-311-46	11/19/2015	466.90	4.23	462.67	
MW-311-46	3/22/2016	466.90	5.98	460.92	
MW-311-46	9/12/2016	466.85	1.82	465.03	
MW-311-46	3/14/2017	466.85	5.68	461.17	Casing is very low in monument.
MW-311-46	7/12/2017	466.77	2.51	464.26	
MW-311-46	8/23/2017	466.77	2.89	463.88	
MW-312-15	11/1/2012	464.18	5.45	458.73	
MW-312-15	1/24/2013	464.12	5.80	458.32	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-312-15	4/25/2013	464.12	Frozen	—	Frozen at 5.48 ft BTOC
MW-312-15	8/2/2013	464.12	Frozen	—	Frozen at 4.59 feet below measuring point.
MW-312-15	10/2/2013	464.30	5.11	459.19	
MW-312-15	3/18/2014	464.32	5.76	458.56	
MW-312-15	6/11/2014	464.32	5.13	459.19	
MW-312-15	9/9/2014	464.32	3.64	460.68	
MW-312-15	11/20/2014	464.32	5.31	459.01	
MW-312-15	3/18/2015	464.32	5.44	458.88	
MW-312-15	6/11/2015	464.32	5.12	459.20	
MW-312-15	8/12/2015	464.19	4.79	459.40	
MW-312-15	11/19/2015	464.19	5.06	459.13	
MW-312-15	3/22/2016	464.19	5.58	458.61	
MW-312-15	9/12/2016	464.17	3.90	460.27	
MW-312-15	3/14/2017	464.17	5.65	458.52	
MW-312-50	7/30/2012	464.25	4.84	459.41	
MW-312-50	11/1/2012	464.25	5.61	458.64	
MW-312-50	1/24/2013	464.30	6.85	457.45	
MW-312-50	4/25/2013	464.30	Frozen	—	Frozen at 5.73 ft BTOC
MW-312-50	8/2/2013	464.30	Frozen	—	Frozen at 5.66 feet below measuring point.
MW-312-50	10/2/2013	464.25	5.08	459.17	
MW-312-50	3/18/2014	464.36	5.80	458.56	
MW-312-50	6/11/2014	464.36	5.20	459.16	
MW-312-50	9/9/2014	464.36	3.70	460.66	
MW-312-50	11/20/2014	464.36	5.36	459.00	
MW-312-50	3/18/2015	464.36	5.56	458.80	
MW-312-50	6/11/2015	464.36	5.24	459.12	
MW-312-50	8/12/2015	464.18	4.79	459.39	
MW-312-50	11/19/2015	464.18	4.98	459.20	
MW-312-50	3/22/2016	464.18	5.61	458.57	
MW-312-50	9/12/2016	464.19	3.50	460.69	
MW-312-50	3/14/2017	464.19	Frozen	—	Depth to ice = 3.79 feet.
MW-313-15	7/30/2012	465.77	4.05	461.72	
MW-313-15	11/1/2012	465.77	4.32	461.45	
MW-313-15	1/24/2013	465.79	Frozen	—	The well was frozen-- a depth to ice measurement was not taken.
MW-313-15	4/24/2013	465.79	Frozen	—	Frozen at 3.99 ft BTOC
MW-313-15	8/2/2013	465.79	4.29	461.50	
MW-313-15	10/1/2013	465.79	4.41	461.38	
MW-313-15	3/18/2014	465.81	Frozen	—	Frozen at 4.21 feet below measuring point
MW-313-15	6/11/2014	465.81	4.47	461.34	
MW-313-15	9/9/2014	465.81	3.63	462.18	
MW-313-15	11/20/2014	465.81	4.11	461.70	
MW-313-15	3/18/2015	465.81	Frozen	—	Depth to ice = 4.00 feet
MW-313-15	6/11/2015	465.81	4.40	461.41	
MW-313-15	8/12/2015	465.80	4.09	461.71	
MW-313-15	11/19/2015	465.80	4.12	461.68	
MW-313-15	3/22/2016	465.80	Frozen	—	Ice at 3.77 feet
MW-313-15	7/12/2017	465.86	4.17	461.69	
MW-313-15	8/23/2017	465.86	3.28	462.58	
MW-313-150	11/1/2012	465.87	4.31	461.56	
MW-313-150	7/21/2017	465.72	4.56	461.16	
MW-313-150	8/23/2017	465.72	2.97	462.75	
MW-314-15	1/31/2017	476.07	7.75	468.32	
MW-314-15	7/12/2017	476.22	7.75	468.47	
MW-314-15	8/23/2017	476.22	7.94	468.28	
MW-314-150	1/31/2017	476.05	7.72	468.33	
MW-314-150	7/20/2017	476.12	7.60	468.52	
MW-314-150	8/23/2017	476.12	7.74	468.38	
MW-315-15	7/30/2012	458.45	4.42	454.03	
MW-315-15	11/1/2012	458.45	5.67	452.78	
MW-315-15	1/24/2013	458.44	6.10	452.34	

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MW-315-15	4/24/2013	458.44	Frozen	—	Frozen. A measurement to ice was not taken.
MW-315-15	8/2/2013	458.44	4.97	453.47	
MW-315-15	10/2/2013	458.44	4.96	453.48	
MW-315-15	3/18/2014	458.44	5.40	453.04	
MW-315-15	6/11/2014	458.17	5.05	453.12	
MW-315-15	9/9/2014	458.17	3.84	454.33	
MW-315-15	11/20/2014	458.17	5.30	452.87	
MW-315-15	3/18/2015	458.17	5.08	453.09	
MW-315-15	6/11/2015	458.17	Frozen	—	Depth to ice is 4.84 feet, melt water at 4.72 feet.
MW-315-15	8/12/2015	458.17	4.37	453.80	
MW-315-15	11/19/2015	458.17	5.35	452.82	
MW-315-15	3/22/2016	458.17	5.90	452.27	
MW-315-150	7/30/2012	458.95	4.95	454.00	
MW-315-150	11/1/2012	458.95	6.14	452.81	
MW-315-150	1/24/2013	458.96	6.60	452.36	
MW-315-150	4/24/2013	458.96	Frozen	—	Frozen at 6.54 ft BTOC
MW-315-150	8/2/2013	458.96	5.44	453.52	
MW-315-150	10/2/2013	458.96	5.47	453.49	
MW-315-150	3/18/2014	458.96	5.91	453.05	
MW-315-150	6/11/2014	458.67	Frozen	—	Frozen at 4.37 feet below measuring point.
MW-315-150	9/9/2014	458.67	4.13	454.54	
MW-315-150	11/20/2014	458.67	5.78	452.89	
MW-315-150	3/18/2015	458.67	5.55	453.12	
MW-315-150	6/11/2015	458.67	Frozen	—	Depth to ice is 5.32 feet, melt water at 5.29 feet.
MW-315-150	8/12/2015	458.66	4.83	453.83	
MW-315-150	11/19/2015	458.66	5.81	452.85	
MW-315-150	3/22/2016	458.66	6.33	452.33	
MW-316-15	1/12/2017	486.27	7.87	478.40	
MW-317-71	7/30/2012	488.79	6.02	482.77	
MW-317-71	11/1/2012	488.79	7.10	481.69	
MW-317-71	1/24/2013	488.79	6.85	481.94	
MW-317-71	4/24/2013	488.79	Frozen	—	Frozen at 6.58 ft BTOC
MW-317-71	8/1/2013	488.79	9.10	479.69	
MW-317-71	10/1/2013	488.79	6.80	481.99	
MW-318-20	7/30/2012	493.15	9.65	483.50	
MW-318-20	11/1/2012	493.15	10.44	482.71	
MW-318-20	1/25/2013	492.86	10.76	482.10	
MW-318-20	3/18/2013	492.93	11.19	481.74	
MW-318-20	4/19/2013	492.93	11.27	481.66	
MW-318-20	4/25/2013	492.93	11.14	481.79	
MW-318-20	5/20/2013	492.92	11.39	481.53	
MW-318-20	6/19/2013	492.98	Frozen	—	Frozen at 9.76 feet below measuring point
MW-318-20	7/25/2013	493.08	Frozen	—	Frozen at 9.53 feet below measuring point
MW-318-20	8/1/2013	493.08	Frozen	—	Frozen at 9.22 feet below measuring point.
MW-318-20	8/20/2013	493.05	Frozen	—	Frozen at 10.15 feet below measuring point
MW-318-20	10/1/2013	493.05	11.60	481.45	
MW-318-20	1/30/2014	493.15	11.27	481.88	
MW-318-20	2/24/2014	493.15	11.64	481.51	
MW-318-20	3/11/2014	493.15	11.69	481.46	
MW-318-20	3/18/2014	493.15	11.68	481.47	
MW-318-20	4/25/2014	493.15	10.57	482.58	
MW-318-20	5/20/2014	493.15	11.59	481.56	
MW-318-20	6/9/2014	493.18	11.69	481.49	
MW-318-20	6/11/2014	493.18	11.58	481.60	
MW-318-20	7/21/2014	492.96	9.54	483.42	
MW-318-20	8/28/2014	492.95	10.36	482.59	
MW-318-20	9/9/2014	492.95	10.92	482.03	
MW-318-20	9/26/2014	492.96	11.20	481.76	
MW-318-20	10/27/2014	492.96	12.17	480.79	
MW-318-20	11/20/2014	492.96	11.27	481.69	
MW-318-20	11/25/2014	492.96	11.75	481.21	

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MW-318-20	12/17/2014	493.02	11.70	481.32	
MW-318-20	1/28/2015	493.05	12.11	480.94	
MW-318-20	2/17/2015	493.04	12.12	480.92	
MW-318-20	3/18/2015	493.04	12.10	480.94	
MW-318-20	4/14/2015	493.04	12.02	481.02	
MW-318-20	5/18/2015	493.05	11.51	481.54	
MW-318-20	6/11/2015	493.13	11.76	481.37	
MW-318-20	7/22/2015	492.73	9.87	482.86	
MW-318-20	8/13/2015	492.74	10.08	482.66	
MW-318-20	9/30/2015	492.74	11.19	481.55	
MW-318-20	10/22/2015	492.74	11.66	481.08	
MW-318-20	11/20/2015	492.73	11.13	481.60	
MW-318-20	11/25/2015	492.73	10.83	481.90	
MW-318-20	12/11/2015	492.73	11.41	481.32	
MW-318-20	1/26/2016	492.83	11.88	480.95	
MW-318-20	2/17/2016	492.83	12.01	480.82	
MW-318-20	3/22/2016	492.82	12.10	480.72	
MW-318-20	3/22/2016	492.82	12.10	480.72	
MW-318-135	7/30/2012	493.08	9.86	483.22	
MW-318-135	11/1/2012	493.08	10.74	482.34	
MW-318-135	1/25/2013	493.10	10.96	482.14	
MW-318-135	3/18/2013	493.01	11.37	481.64	
MW-318-135	4/19/2013	493.00	11.43	481.57	
MW-318-135	4/25/2013	493.00	11.30	481.70	
MW-318-135	5/20/2013	492.96	11.57	481.39	
MW-318-135	6/19/2013	493.01	10.07	482.94	
MW-318-135	7/25/2013	493.11	9.82	483.29	
MW-318-135	8/1/2013	493.11	9.56	483.55	
MW-318-135	8/20/2013	493.10	9.65	483.45	
MW-318-135	10/1/2013	493.10	11.75	481.35	
MW-318-135	1/30/2014	493.09	11.31	481.78	
MW-318-135	2/24/2014	493.07	11.67	481.40	
MW-318-135	3/11/2014	493.05	11.69	481.36	
MW-318-135	3/18/2014	493.05	11.69	481.36	
MW-318-135	4/25/2014	493.03	10.55	482.48	
MW-318-135	5/20/2014	493.03	11.59	481.44	
MW-318-135	6/9/2014	493.08	11.68	481.40	
MW-318-135	6/11/2014	493.08	11.64	481.44	
MW-318-135	7/21/2014	493.10	9.81	483.29	
MW-318-135	8/28/2014	493.10	10.63	482.47	
MW-318-135	9/9/2014	493.10	11.19	481.91	
MW-318-135	9/26/2014	493.11	11.47	481.64	
MW-318-135	10/27/2014	493.11	12.43	480.68	
MW-318-135	11/20/2014	493.10	11.53	481.57	
MW-318-135	11/25/2014	493.10	11.50	481.60	
MW-318-135	12/17/2014	493.10	11.89	481.21	
MW-318-135	1/28/2015	493.08	12.25	480.83	
MW-318-135	2/17/2015	493.07	12.25	480.82	
MW-318-135	3/18/2015	493.04	12.21	480.83	
MW-318-135	4/14/2015	493.02	12.13	480.89	
MW-318-135	5/18/2015	492.98	11.61	481.37	
MW-318-135	6/11/2015	493.08	11.88	481.20	
MW-318-135	7/22/2015	493.12	10.38	482.74	
MW-318-135	8/13/2015	493.12	10.58	482.54	
MW-318-135	9/30/2015	492.98	11.59	481.39	
MW-318-135	10/22/2015	492.98	12.04	480.94	
MW-318-135	11/20/2015	492.98	11.49	481.49	
MW-318-135	11/25/2015	492.98	11.19	481.79	
MW-318-135	12/11/2015	492.97	11.73	481.24	
MW-318-135	1/26/2016	492.98	12.13	480.85	
MW-318-135	2/17/2016	492.95	12.23	480.72	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-318-135	3/22/2016	492.92	12.31	480.61	
MW-318-135	3/22/2016	492.92	12.31	480.61	
MW-318-135	9/13/2016	492.92	11.26	481.66	
MW-318-135	3/13/2017	492.87	12.03	480.84	
MW-319-15	7/30/2012	456.11	4.01	452.10	
MW-319-15	11/1/2012	456.11	4.97	451.14	
MW-319-15	1/24/2013	456.10	6.50	449.60	
MW-319-15	4/24/2013	456.10	Frozen	—	Frozen. A measurement to ice was not taken.
MW-319-15	8/2/2013	456.10	4.65	451.45	
MW-319-15	10/2/2013	456.10	4.28	451.82	
MW-319-15	3/18/2014	456.03	4.96	451.07	
MW-319-15	6/11/2014	456.03	4.32	451.71	
MW-319-15	9/9/2014	456.03	2.77	453.26	
MW-319-15	11/20/2014	456.03	4.73	451.30	
MW-319-15	3/18/2015	456.03	4.52	451.51	
MW-319-15	6/11/2015	456.03	Frozen	—	Depth to ice is 4.43 feet, melt water at 4.24 feet.
MW-319-15	8/12/2015	456.11	3.92	452.19	
MW-319-15	11/19/2015	456.11	4.57	451.54	
MW-319-15	3/22/2016	456.11	5.30	450.81	
MW-319-15	9/12/2016	456.12	3.17	452.95	
MW-319-15	3/14/2017	456.12	5.41	450.71	
MW-319-45	7/30/2012	455.95	3.82	452.13	
MW-319-45	11/1/2012	455.95	4.79	451.16	
MW-319-45	1/24/2013	455.96	6.35	449.61	
MW-319-45	4/24/2013	455.96	Frozen	—	Frozen. A measurement to ice was not taken.
MW-319-45	8/2/2013	455.96	Frozen	—	Frozen at 7.60 feet below measuring point.
MW-319-45	10/1/2013	455.96	4.08	451.88	
MW-319-45	3/18/2014	455.87	4.76	451.11	
MW-319-45	6/11/2014	455.87	Frozen	—	Frozen at 3.35 feet below measuring point.
MW-319-45	9/9/2014	455.87	2.56	453.31	
MW-319-45	11/20/2014	455.87	4.52	451.35	
MW-319-45	3/18/2015	455.87	Frozen	—	Depth to ice = 4.28 feet
MW-319-45	6/11/2015	455.87	Frozen	—	Depth to ice is 4.26 feet.
MW-319-45	8/12/2015	455.94	3.72	452.22	
MW-319-45	11/19/2015	455.94	4.34	451.60	
MW-319-45	3/22/2016	455.94	5.07	450.87	
MW-319-45	9/12/2016	455.94	2.95	452.99	
MW-319-45	3/14/2017	455.94	Frozen	—	Depth to ice = 5.13 feet.
MW-322-15	7/30/2012	472.01	7.40	464.61	
MW-322-15	11/1/2012	472.01	8.66	463.35	
MW-322-15	1/24/2013	472.01	9.90	462.11	
MW-322-15	4/24/2013	472.47	10.47	462.00	
MW-322-15	8/1/2013	472.14	7.24	464.90	
MW-322-15	10/1/2013	472.14	9.45	462.69	
MW-322-15	3/19/2014	472.30	9.49	462.81	
MW-322-15	6/11/2014	472.30	9.26	463.04	
MW-322-15	9/9/2014	472.36	8.36	464.00	
MW-322-15	11/20/2014	472.27	8.37	463.90	
MW-322-15	3/18/2015	472.35	9.01	463.34	
MW-322-15	6/11/2015	472.09	8.81	463.28	
MW-322-15	8/12/2015	472.09	7.23	464.87	
MW-322-15	11/19/2015	472.50	9.17	463.33	
MW-322-15	3/22/2016	472.09	10.04	462.05	
MW-322-150	7/30/2012	471.99	8.83	463.16	
MW-322-150	11/1/2012	471.99	8.71	463.28	
MW-322-150	1/24/2013	472.12	9.63	462.49	
MW-322-150	4/24/2013	472.11	9.99	462.12	
MW-322-150	8/1/2013	472.04	7.17	464.87	
MW-322-150	10/1/2013	472.04	9.38	462.66	
MW-322-150	3/19/2014	472.11	9.24	462.87	
MW-322-150	6/11/2014	472.11	9.08	463.03	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-322-150	9/9/2014	472.13	8.22	463.91	
MW-322-150	11/20/2014	472.13	8.19	463.94	
MW-322-150	3/18/2015	472.12	8.94	463.18	
MW-322-150	6/11/2015	472.12	7.57	464.55	
MW-322-150	8/12/2015	472.12	7.21	464.92	
MW-322-150	11/19/2015	472.12	9.14	462.98	
MW-322-150	3/22/2016	472.14	9.76	462.38	
MW-322-150	9/13/2016	472.15	7.87	464.28	
MW-322-150	3/14/2017	471.67	9.23	462.44	
MW-322-150	8/23/2017	471.67	8.82	462.85	
MW-324-15	7/30/2012	463.40	6.03	457.37	
MW-324-15	11/1/2012	463.40	7.33	456.07	
MW-324-15	1/24/2013	463.41	7.95	455.46	
MW-324-15	4/25/2013	463.41	8.44	454.97	
MW-324-15	8/2/2013	463.41	6.31	457.10	
MW-324-15	10/1/2013	463.41	6.85	456.56	
MW-324-15	3/18/2014	463.41	7.40	456.01	
MW-324-15	6/11/2014	463.73	7.21	456.52	
MW-324-15	9/9/2014	463.73	6.03	457.70	
MW-324-15	11/20/2014	463.73	7.15	456.58	
MW-324-15	3/18/2015	463.73	7.33	456.40	
MW-324-15	6/11/2015	463.73	7.17	456.56	
MW-324-15	8/12/2015	463.49	5.91	457.58	
MW-324-15	11/19/2015	463.49	7.18	456.31	
MW-324-15	3/23/2016	463.49	7.88	455.61	
MW-324-15	9/12/2016	463.68	5.93	457.75	
MW-324-15	3/14/2017	463.68	8.25	455.43	
MW-324-151	7/30/2012	—	5.43	—	
MW-324-151	11/1/2012	—	6.74	—	
MW-324-151	1/24/2013	462.90	7.15	455.75	
MW-324-151	4/25/2013	462.90	7.58	455.32	
MW-324-151	8/2/2013	462.90	5.72	457.18	
MW-324-151	10/1/2013	462.90	6.28	456.62	
MW-324-151	3/18/2014	462.90	6.60	456.30	
MW-324-151	6/11/2014	462.99	7.32	455.67	
MW-324-151	9/9/2014	462.99	5.18	457.81	
MW-324-151	11/20/2014	462.99	6.34	456.65	
MW-324-151	3/18/2015	462.99	6.06	456.93	
MW-324-151	6/11/2015	462.99	6.02	456.97	
MW-324-151	8/12/2015	462.95	5.28	457.67	
MW-324-151	11/19/2015	462.95	6.54	456.41	
MW-324-151	3/23/2016	462.95	6.90	456.05	
MW-324-151	9/12/2016	462.84	5.17	457.67	
MW-324-151	3/14/2017	462.84	7.15	455.69	
MW-325-18	8/23/2017	486.47	11.32	475.15	
MW-325-150	8/23/2017	486.86	11.59	475.27	
MW-326-20	7/31/2012	500.53	7.36	493.17	
MW-326-20	11/1/2012	500.53	8.41	492.12	
MW-326-20	1/24/2013	500.55	—	—	The well was inaccessible due to weather conditions.
MW-326-20	4/25/2013	500.53	10.01	490.52	
MW-326-20	8/1/2013	500.57	7.06	493.51	
MW-326-20	10/1/2013	500.57	10.35	490.22	
MW-326-20	3/18/2014	500.59	10.71	489.88	
MW-326-20	4/25/2014	500.58	9.89	490.69	
MW-326-20	5/20/2014	500.59	10.01	490.58	
MW-326-20	6/4/2014	500.60	10.23	490.37	
MW-326-20	6/11/2014	500.60	9.91	490.69	
MW-326-20	9/9/2014	500.60	8.62	491.98	
MW-326-20	11/21/2014	500.60	8.65	491.95	
MW-326-20	3/18/2015	500.59	9.07	491.52	
MW-326-20	6/11/2015	500.62	9.05	491.57	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-326-20	8/13/2015	500.62	7.34	493.28	
MW-326-20	11/20/2015	500.62	8.64	491.98	
MW-326-20	3/22/2016	500.60	9.97	490.63	
MW-326-20	9/13/2016	500.63	7.87	492.76	
MW-326-20	3/13/2017	500.59	8.44	492.15	
MW-326-150	7/31/2012	500.44	7.23	493.21	
MW-326-150	11/1/2012	500.44	8.23	492.21	
MW-326-150	1/24/2013	500.47	—	—	The well was inaccessible due to weather conditions.
MW-326-150	4/25/2013	500.49	9.85	490.64	
MW-326-150	8/1/2013	500.48	6.91	493.57	
MW-326-150	10/1/2013	500.48	10.06	490.42	
MW-326-150	3/18/2014	500.52	10.46	490.06	
MW-326-150	4/25/2014	500.49	9.55	490.94	
MW-326-150	5/20/2014	500.50	9.80	490.70	
MW-326-150	6/4/2014	500.50	10.02	490.48	
MW-326-150	6/11/2014	500.50	9.70	490.80	
MW-326-150	9/9/2014	500.50	8.50	492.00	
MW-326-150	11/21/2014	500.50	8.57	491.93	
MW-326-150	3/18/2015	500.50	8.93	491.57	
MW-326-150	6/11/2015	500.50	8.92	491.58	
MW-326-150	8/13/2015	500.50	7.24	493.26	
MW-326-150	11/20/2015	500.50	8.48	492.02	
MW-326-150	3/22/2016	500.51	9.86	490.65	
MW-326-150	9/13/2016	500.51	7.77	492.74	
MW-326-150	3/13/2017	500.51	8.39	492.12	
MW-327-15	7/30/2012	467.82	6.73	461.09	
MW-327-15	11/1/2012	467.82	7.22	460.60	
MW-327-15	1/24/2013	467.82	6.55	461.27	
MW-327-15	4/25/2013	467.82	—	—	Well was submerged under surface meltwater and was inaccessible.
MW-327-15	8/2/2013	467.82	7.01	460.81	
MW-327-15	10/1/2013	467.82	7.12	460.70	
MW-327-15	3/18/2014	467.82	Frozen	—	Frozen at 6.82 feet below measuring point
MW-327-15	6/11/2014	467.82	Frozen	—	Frozen at 6.92 feet below measuring point.
MW-327-15	9/9/2014	467.82	6.02	461.80	
MW-327-15	11/20/2014	467.82	6.93	460.89	
MW-327-15	6/11/2015	467.82	Frozen	—	Depth to ice is 6.81 feet.
MW-327-15	8/12/2015	467.83	6.75	461.08	
MW-327-15	11/19/2015	467.83	6.91	460.92	
MW-327-15	3/22/2016	467.83	6.96	460.87	
MW-327-15	7/20/2017	467.42	6.36	461.06	
MW-327-15	8/23/2017	467.42	6.50	460.92	
MW-327-150	7/30/2012	467.60	6.39	461.21	
MW-327-150	11/1/2012	467.60	6.84	460.76	
MW-327-150	1/24/2013	467.61	6.95	460.66	
MW-327-150	4/25/2013	467.61	—	—	Well was submerged under surface meltwater and was inaccessible.
MW-327-150	8/2/2013	467.61	6.65	460.96	
MW-327-150	10/1/2013	467.61	6.74	460.87	
MW-327-150	3/18/2014	467.59	Frozen	—	Frozen at 6.46 feet below measuring point
MW-327-150	6/11/2014	467.59	Frozen	—	Water measured at 6.07 feet, frozen at 6.09 feet below the measuring point.
MW-327-150	9/9/2014	467.59	5.64	461.95	
MW-327-150	11/20/2014	467.59	6.53	461.06	
MW-327-150	6/11/2015	467.59	Frozen	—	Depth to ice is 5.84 feet.
MW-327-150	8/12/2015	467.59	6.35	461.24	
MW-327-150	11/19/2015	467.59	6.52	461.07	
MW-327-150	3/23/2016	467.59	6.56	461.03	
MW-327-150	7/20/2017	467.49	6.32	461.17	
MW-327-150	8/23/2017	467.49	6.42	461.07	
MW-328-15	7/30/2012	472.35	7.04	465.31	

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MW-328-15	11/1/2012	472.35	7.45	464.90	
MW-328-15	1/24/2013	472.36	7.10	465.26	
MW-328-15	4/24/2013	472.35	Frozen	—	Frozen w/data logger
MW-328-15	8/2/2013	472.35	7.34	465.01	
MW-328-15	10/1/2013	472.35	7.50	464.85	
MW-328-15	3/18/2014	472.36	7.35	465.01	
MW-328-15	6/11/2014	472.36	7.69	464.67	
MW-328-15	9/9/2014	472.35	6.67	465.68	
MW-328-15	11/20/2014	472.35	7.19	465.16	
MW-328-15	3/18/2015	472.36	7.00	465.36	
MW-328-15	6/11/2015	472.35	7.25	465.10	
MW-328-15	8/12/2015	472.35	7.03	465.32	
MW-328-15	11/19/2015	472.35	7.23	465.12	
MW-328-15	3/23/2016	472.34	6.90	465.44	
MW-328-15	9/12/2016	472.26	6.73	465.53	
MW-328-15	1/31/2017	472.26	6.99	465.27	
MW-328-15	3/14/2017	472.26	7.20	465.06	
MW-328-15	7/21/2017	472.3	7.04	465.26	
MW-328-15	8/23/2017	472.3	7.13	465.17	
MW-328-151	7/30/2012	472.68	7.35	465.33	
MW-328-151	11/1/2012	472.68	7.74	464.94	
MW-328-151	1/24/2013	472.68	7.40	465.28	
MW-328-151	4/24/2013	472.67	Frozen	—	Frozen w/data logger
MW-328-151	8/2/2013	472.67	7.63	465.04	
MW-328-151	10/1/2013	472.67	7.83	464.84	
MW-328-151	3/18/2014	472.67	7.61	465.06	
MW-328-151	6/11/2014	472.67	7.96	464.71	
MW-328-151	9/9/2014	472.67	6.97	465.70	
MW-328-151	11/20/2014	472.67	7.38	465.29	
MW-328-151	3/18/2015	472.67	7.29	465.38	
MW-328-151	6/11/2015	472.67	Frozen	—	Datalogger present and frozen obstructing access to casing, no depth to ice possible.
MW-328-151	8/12/2015	472.67	7.34	465.33	
MW-328-151	11/19/2015	472.67	7.51	465.16	
MW-328-151	3/23/2016	472.66	7.22	465.44	
MW-328-151	9/12/2016	472.57	7.02	465.55	
MW-328-151	1/31/2017	472.57	7.28	465.29	
MW-328-151	3/14/2017	472.57	6.92	465.65	
MW-328-151	7/21/2017	472.61	7.28	465.33	
MW-328-151	8/23/2017	472.61	7.44	465.17	
MW-332-15	7/30/2012	481.79	7.15	474.64	
MW-332-15	11/1/2012	481.79	7.67	474.12	
MW-332-15	1/24/2013	481.80	7.72	474.08	
MW-332-15	4/25/2013	481.80	7.79	474.01	
MW-332-15	8/1/2013	481.63	7.38	474.25	
MW-332-15	10/1/2013	481.63	7.49	474.14	
MW-332-15	3/19/2014	481.74	8.00	473.74	
MW-332-15	6/11/2014	481.74	7.63	474.11	
MW-332-15	9/9/2014	481.74	6.47	475.27	
MW-332-15	11/20/2014	481.68	7.29	474.39	
MW-332-15	3/18/2015	481.68	8.15	473.53	
MW-332-15	6/11/2015	481.68	8.81	472.87	
MW-332-15	8/12/2015	481.57	7.03	474.55	
MW-332-15	11/19/2015	481.57	7.20	474.37	
MW-332-15	3/22/2016	481.57	7.73	473.84	
MW-332-15	9/12/2016	481.93	6.67	475.26	
MW-332-15	1/31/2017	481.93	7.94	473.99	
MW-332-15	3/14/2017	481.93	8.10	473.83	
MW-332-15	8/23/2017	481.64	6.85	474.79	
MW-332-41	9/13/2016	481.85	6.62	475.23	
MW-332-41	1/31/2017	481.85	7.90	473.95	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-332-41	3/14/2017	481.85	8.05	473.80	
MW-332-41	7/12/2017	481.64	6.85	474.79	
MW-332-41	8/23/2017	481.64	6.86	474.78	
MW-332-75	9/13/2016	481.34	6.13	475.21	
MW-332-75	1/31/2017	481.34	6.86	474.48	
MW-332-75	3/14/2017	481.34	6.90	474.44	Casing is very low in monument.
MW-332-75	8/23/2017	481.34	6.56	474.78	
MW-332-110	9/13/2016	481.26	6.10	475.16	
MW-332-110	1/31/2017	481.26	6.82	474.44	
MW-332-110	3/14/2017	481.26	Frozen	—	Depth to ice = 6.94 feet. Casing is very low in monument.
MW-332-110	7/25/2017	481.25	6.54	474.71	
MW-332-110	8/23/2017	481.25	6.54	474.71	
MW-332-150	7/30/2012	481.32	6.72	474.60	
MW-332-150	11/1/2012	481.32	7.24	474.08	
MW-332-150	1/24/2013	481.35	—	—	The well casing sunk and was inaccessible. Depth to water from monument was 8.17 ft
MW-332-150	4/25/2013	481.35	—	—	The well casing has sunk below the ground surface. Depth to water from top of monument is 9.16 ft
MW-332-150	8/1/2013	481.14	6.96	474.18	
MW-332-150	10/1/2013	481.14	7.08	474.06	
MW-332-150	3/19/2014	481.49	7.71	473.78	
MW-332-150	6/11/2014	481.49	7.59	473.90	
MW-332-150	9/9/2014	481.49	6.67	474.82	
MW-332-150	11/20/2014	481.49	7.44	474.05	
MW-332-150	3/18/2015	481.49	7.62	473.87	
MW-332-150	6/11/2015	481.49	8.83	472.66	
MW-332-150	8/12/2015	481.51	6.90	474.62	
MW-332-150	11/19/2015	481.51	7.09	474.42	
MW-332-150	3/22/2016	481.51	7.25	474.26	
MW-332-150	9/12/2016	481.57	6.38	475.19	
MW-332-150	1/31/2017	481.57	7.13	474.44	
MW-332-150	3/14/2017	481.57	7.10	474.47	Casing is very low in monument.
MW-332-150	7/25/2017	481.55	6.98	474.57	
MW-332-150	8/23/2017	481.55	6.83	474.72	
MW-333-150	7/31/2012	497.84	7.09	490.75	
MW-333-150	11/1/2012	497.84	8.39	489.45	
MW-333-150	1/24/2013	497.62	—	—	The well was inaccessible due to weather conditions.
MW-333-150	4/25/2013	497.10	9.01	488.09	
MW-333-150	8/1/2013	497.17	6.69	490.48	
MW-333-150	10/1/2013	497.17	8.95	488.22	
MW-333-150	3/18/2014	497.21	9.48	487.73	
MW-333-150	6/11/2014	497.21	8.90	488.31	
MW-333-150	9/9/2014	497.55	7.68	489.87	
MW-333-150	11/20/2014	497.55	8.22	489.33	
MW-333-150	3/18/2015	497.47	8.50	488.97	
MW-333-150	6/11/2015	497.31	8.27	489.04	
MW-333-150	8/13/2015	497.31	6.84	490.47	
MW-333-150	11/20/2015	497.59	8.07	489.52	
MW-333-150	3/22/2016	497.17	9.20	487.97	
MW-333-150	9/13/2016	497.17	7.24	489.93	
MW-333-150	3/13/2017	497.17	8.01	489.16	
MW-333-16	7/31/2012	497.68	7.02	490.66	
MW-333-16	11/1/2012	497.68	8.68	489.00	
MW-333-16	1/24/2013	497.67	—	—	The well was inaccessible due to weather conditions.
MW-333-16	4/25/2013	497.16	9.16	488.00	
MW-333-16	8/1/2013	497.23	6.87	490.36	
MW-333-16	10/1/2013	497.23	9.01	488.22	
MW-333-16	3/18/2014	497.29	9.64	487.65	
MW-333-16	6/11/2014	497.29	9.06	488.23	
MW-333-16	9/9/2014	497.63	7.75	489.88	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-333-16	11/20/2014	497.63	8.05	489.58	
MW-333-16	3/18/2015	497.56	8.83	488.73	
MW-333-16	6/11/2015	497.57	8.56	489.01	
MW-333-16	8/13/2015	497.57	7.15	490.42	Severe monument frostjacking
MW-333-16	11/20/2015	497.84	8.42	489.42	
MW-333-16	3/22/2016	497.66	9.75	487.91	
MW-333-16	9/13/2016	497.66	7.78	489.88	
MW-333-16	3/13/2017	497.66	8.81	488.85	
MW-335-41	3/18/2014	469.73	5.35	464.38	
MW-335-41	6/11/2014	469.73	5.18	464.55	
MW-335-41	9/9/2014	469.73	3.55	466.18	
MW-335-41	11/20/2014	469.73	5.48	464.25	
MW-335-41	3/18/2015	469.73	5.51	464.22	
MW-335-41	6/11/2015	469.73	5.25	464.48	
MW-335-41	8/12/2015	469.88	5.00	464.88	
MW-335-41	11/19/2015	469.88	5.47	464.41	
MW-335-41	3/22/2016	469.88	5.83	464.05	
MW-335-41	9/12/2016	469.62	3.69	465.93	
MW-335-41	2/1/2017	469.62	5.69	463.93	
MW-335-41	3/14/2017	469.62	5.56	464.06	
MW-338-50	2/6/2017	483.28	6.92	476.36	
MW-339-15	3/19/2014	479.53	8.85	470.68	
MW-339-15	6/11/2014	479.53	9.03	470.50	
MW-339-15	9/9/2014	479.53	7.22	472.31	
MW-339-15	11/20/2014	479.28	8.36	470.92	
MW-339-15	3/18/2015	479.28	8.73	470.55	
MW-339-15	6/11/2015	479.28	8.73	470.55	
MW-339-15	8/12/2015	479.53	8.45	471.09	
MW-339-15	11/19/2015	479.53	8.64	470.89	
MW-339-15	3/22/2016	479.53	8.90	470.63	
MW-339-15	9/12/2016	479.53	7.83	471.70	
MW-339-15	1/25/2017	479.53	8.93	470.60	
MW-339-15	3/14/2017	479.53	9.02	470.51	
MW-339-50	3/19/2014	479.64	8.99	470.65	
MW-339-50	6/11/2014	479.64	9.00	470.64	
MW-339-50	9/9/2014	479.64	7.30	472.34	
MW-339-50	11/20/2014	479.28	8.34	470.94	
MW-339-50	3/18/2015	479.28	8.70	470.58	
MW-339-50	6/11/2015	479.28	8.72	470.56	
MW-339-50	8/12/2015	479.56	8.45	471.12	
MW-339-50	11/19/2015	479.56	8.62	470.94	
MW-339-50	3/22/2016	479.56	8.89	470.67	
MW-339-50	9/12/2016	479.38	7.64	471.74	
MW-339-50	1/25/2017	479.38	8.71	470.67	
MW-339-50	3/14/2017	479.38	8.79	470.59	
MW-340-18	3/19/2014	478.55	Frozen	—	Frozen at 4.42 feet below measuring point
MW-340-18	6/11/2014	478.55	4.60	473.95	
MW-340-18	9/9/2014	478.55	3.89	474.66	
MW-340-18	11/20/2014	478.55	4.47	474.08	
MW-340-18	3/18/2015	478.55	Frozen	—	Depth to ice = 4.48 feet
MW-340-18	6/11/2015	478.55	Frozen	—	Depth to ice is 6.63 feet.
MW-340-18	8/12/2015	478.51	4.41	474.11	
MW-340-18	11/19/2015	478.51	4.50	474.01	
MW-340-18	3/22/2016	478.51	Frozen	—	Frozen (ice) at 4.31 feet
MW-340-18	8/23/2017	478.68	4.12	474.56	
MW-340-65	3/19/2014	478.74	Frozen	—	Frozen at 4.92 feet below measuring point
MW-340-65	6/11/2014	478.74	4.96	473.78	
MW-340-65	9/9/2014	478.74	4.07	474.67	
MW-340-65	11/20/2014	478.91	4.70	474.21	
MW-340-65	3/18/2015	478.91	Frozen	—	Depth to ice = 4.77 feet
MW-340-65	6/11/2015	478.91	8.16	470.75	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-340-65	8/12/2015	478.91	4.65	474.27	
MW-340-65	11/19/2015	478.91	4.73	474.18	
MW-340-65	3/22/2016	478.91	Frozen	—	Frozen (ice) at 4.62 feet
MW-340-65	8/23/2017	479.29	4.57	474.72	
MW-340-150	8/23/2017	479.01	4.21	474.80	
MW-341-15	2/1/2017	480.2	7.05	473.15	
MW-341-40	2/1/2017	479.98	6.76	473.22	
MW-342-15	3/18/2014	482.29	7.12	475.17	
MW-342-15	6/11/2014	482.29	7.07	475.22	
MW-342-15	9/9/2014	482.29	6.05	476.24	
MW-342-15	11/21/2014	482.29	7.10	475.19	
MW-342-15	3/18/2015	482.29	7.03	475.26	
MW-342-15	6/11/2015	482.29	6.83	475.46	
MW-342-15	8/12/2015	482.32	6.59	475.74	
MW-342-15	11/20/2015	482.32	7.20	475.12	
MW-342-15	3/22/2016	482.32	7.40	474.92	
MW-342-15	9/13/2016	482.35	6.26	476.09	
MW-342-15	3/13/2017	482.35	7.08	475.27	
MW-342-15	3/13/2017	482.35	7.08	475.27	
MW-342-65	3/18/2014	482.48	7.31	475.17	
MW-342-65	6/11/2014	482.48	7.29	475.19	
MW-342-65	9/9/2014	482.48	6.31	476.17	
MW-342-65	11/21/2014	482.48	7.30	475.18	
MW-342-65	3/18/2015	482.48	7.19	475.29	
MW-342-65	6/11/2015	482.48	7.05	475.43	
MW-342-65	8/12/2015	482.49	6.80	475.70	
MW-342-65	11/20/2015	482.49	7.39	475.10	
MW-342-65	3/22/2016	482.49	7.57	474.92	
MW-342-65	9/13/2016	482.50	6.46	476.04	
MW-342-65	3/13/2017	482.5	7.26	475.24	
MW-342-65	3/13/2017	482.5	7.26	475.24	
MW-346-15	1/27/2017	473.04	5.17	467.87	
MW-346-15	8/1/2017	472.73	5.23	467.50	
MW-346-15	8/23/2017	472.73	5.23	467.50	
MW-346-65	3/19/2014	472.69	4.95	467.74	
MW-346-65	6/11/2014	472.69	5.31	467.38	
MW-346-65	9/9/2014	472.69	4.30	468.39	
MW-346-65	11/20/2014	472.69	4.78	467.91	
MW-346-65	3/18/2015	472.69	4.81	467.88	
MW-346-65	6/11/2015	472.69	5.10	467.59	
MW-346-65	8/12/2015	472.71	4.79	467.93	
MW-346-65	11/19/2015	472.71	4.85	467.86	
MW-346-65	3/22/2016	472.71	4.67	468.04	
MW-346-65	1/27/2017	472.61	4.65	467.96	
MW-346-65	8/1/2017	473	4.88	468.12	
MW-346-65	8/23/2017	473	4.86	468.14	
MW-346-150	3/19/2014	472.68	4.85	467.83	
MW-346-150	6/11/2014	472.68	5.18	467.50	
MW-346-150	9/9/2014	472.68	4.23	468.45	
MW-346-150	11/20/2014	472.68	4.69	467.99	
MW-346-150	3/18/2015	472.68	4.71	467.97	
MW-346-150	6/11/2015	472.68	4.99	467.69	
MW-346-150	8/12/2015	472.70	4.70	468.01	
MW-346-150	11/19/2015	472.70	4.75	467.95	
MW-346-150	3/22/2016	472.70	4.59	468.11	
MW-346-150	1/27/2017	472.6	4.56	468.04	
MW-346-150	8/1/2017	472.52	4.55	467.97	
MW-346-150	8/23/2017	472.52	4.56	467.96	
MW-347-20	1/26/2017	482.85	10.65	472.20	
MW-347-20	8/23/2017	482.86	10.61	472.25	
MW-347-65	1/26/2017	481.71	9.47	472.24	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-347-65	8/1/2017	481.71	9.47	472.24	
MW-347-65	8/23/2017	481.71	9.45	472.26	
MW-347-150	1/26/2017	482.5	10.30	472.20	
MW-347-150	8/1/2017	482.51	10.30	472.21	
MW-347-150	8/23/2017	482.51	10.26	472.25	
MW-349-15	1/30/2014	484.59	7.53	477.06	
MW-349-15	2/24/2014	484.60	7.67	476.93	
MW-349-15	3/11/2014	484.62	7.65	476.97	
MW-349-15	4/25/2014	484.62	6.54	478.08	
MW-349-15	5/20/2014	484.62	6.85	477.77	
MW-349-15	6/9/2014	484.62	7.20	477.42	
MW-349-15	7/21/2014	484.61	5.49	479.12	
MW-349-15	8/28/2014	484.61	6.17	478.44	
MW-349-15	9/26/2014	484.61	6.46	478.15	
MW-349-15	10/27/2014	484.61	7.22	477.39	
MW-349-15	11/25/2014	484.62	7.46	477.16	
MW-349-15	12/17/2014	484.63	7.52	477.11	
MW-349-15	1/28/2015	484.66	7.62	477.04	
MW-349-15	2/17/2015	484.68	7.68	477.00	
MW-349-15	3/27/2015	484.68	7.59	477.09	
MW-349-15	4/14/2015	484.68	7.41	477.27	
MW-349-15	5/18/2015	484.69	6.92	477.77	
MW-349-15	6/5/2015	484.69	7.04	477.65	
MW-349-15	7/22/2015	484.36	6.67	477.69	
MW-349-15	8/13/2015	484.36	6.52	477.84	
MW-349-15	9/30/2015	484.36	6.08	478.28	
MW-349-15	10/22/2015	484.36	6.45	477.91	
MW-349-15	11/25/2015	484.35	7.08	477.27	
MW-349-15	12/11/2015	484.37	7.09	477.28	
MW-349-15	1/26/2016	484.38	7.43	476.95	
MW-349-15	2/17/2016	484.39	7.50	476.89	
MW-349-15	3/17/2016	484.40	7.55	476.85	
MW-349-15	4/28/2016	484.41	7.00	477.41	
MW-349-15	5/25/2016	484.42	6.92	477.50	
MW-349-15	6/9/2016	484.41	6.91	477.50	
MW-349-15	7/11/2016	484.41	6.29	478.12	
MW-349-15	8/18/2016	484.43	5.86	478.57	
MW-349-15	10/26/2016	484.42	7.23	477.19	
MW-349-15	11/21/2016	484.41	7.23	477.18	
MW-349-15	12/6/2016	484.43	7.36	477.07	
MW-349-15	1/26/2017	484.44	7.30	477.14	
MW-349-15	2/15/2017	484.45	7.35	477.15	
MW-349-15	3/20/2017	484.47	7.36	477.11	
MW-349-15	4/18/2017	484.5	7.09	477.41	
MW-349-15	5/23/2017	484.51	6.58	477.93	
MW-349-45	1/30/2014	484.48	7.47	477.01	
MW-349-45	2/24/2014	484.48	7.62	476.86	
MW-349-45	3/11/2014	484.50	7.59	476.91	
MW-349-45	4/25/2014	484.50	6.48	478.02	
MW-349-45	5/20/2014	484.50	6.78	477.72	
MW-349-45	6/9/2014	484.48	7.13	477.35	
MW-349-45	7/21/2014	484.49	5.42	479.07	
MW-349-45	8/28/2014	484.49	6.11	478.38	
MW-349-45	9/26/2014	484.49	6.40	478.09	
MW-349-45	10/27/2014	484.49	7.17	477.32	
MW-349-45	11/25/2014	484.52	7.42	477.10	
MW-349-45	12/17/2014	484.50	7.45	477.05	
MW-349-45	1/28/2015	484.53	7.55	476.98	
MW-349-45	2/17/2015	484.54	7.61	476.93	
MW-349-45	3/27/2015	484.56	7.52	477.04	
MW-349-45	4/14/2015	484.56	7.35	477.21	

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MW-349-45	5/18/2015	484.56	6.85	477.71	
MW-349-45	6/5/2015	484.56	6.96	477.60	
MW-349-45	7/22/2015	484.56	6.94	477.62	
MW-349-45	8/13/2015	484.57	6.78	477.79	
MW-349-45	9/30/2015	484.56	6.33	478.23	
MW-349-45	10/22/2015	484.56	6.71	477.85	
MW-349-45	11/25/2015	484.55	7.34	477.21	
MW-349-45	12/11/2015	484.57	7.35	477.22	
MW-349-45	1/26/2016	484.58	7.68	476.90	
MW-349-45	2/17/2016	484.60	7.75	476.85	
MW-349-45	3/17/2016	484.61	7.77	476.84	
MW-349-45	4/28/2016	484.63	7.21	477.42	
MW-349-45	5/25/2016	484.63	7.12	477.51	
MW-349-45	6/9/2016	484.62	7.11	477.51	
MW-349-45	7/11/2016	484.62	6.50	478.12	
MW-349-45	8/18/2016	484.63	6.06	478.57	
MW-349-45	10/26/2016	484.63	7.45	477.18	
MW-349-45	11/21/2016	484.64	7.44	477.20	
MW-349-45	12/6/2016	484.65	7.57	477.08	
MW-349-45	1/26/2017	484.67	7.52	477.15	
MW-349-45	2/15/2017	484.68	7.56	477.17	
MW-349-45	3/20/2017	484.7	7.58	477.12	
MW-349-45	4/18/2017	484.72	7.29	477.43	
MW-349-45	5/23/2017	484.72	6.79	477.93	
MW-349-45	7/12/2017	484.73	6.75	477.98	
MW-349-45	8/23/2017	484.73	6.73	478.00	
MW-350-15	1/25/2017	484.12	9.03	475.09	
MW-352-15	1/26/2017	474.66	8.07	466.59	
MW-352-40	1/26/2017	475.01	8.37	466.64	
MW-352-40	8/4/2017	475.2	8.80	466.40	
MW-352-40	8/23/2017	475.2	8.80	466.40	
MW-353-15	3/18/2014	480.24	6.10	474.14	
MW-353-15	6/11/2014	480.24	5.91	474.33	
MW-353-15	9/9/2014	480.24	4.70	475.54	
MW-353-15	11/20/2014	480.24	6.01	474.23	
MW-353-15	3/18/2015	480.24	6.11	474.13	
MW-353-15	6/11/2015	480.24	5.77	474.47	
MW-353-15	8/12/2015	480.27	5.08	475.19	
MW-353-15	11/20/2015	480.27	5.91	474.36	
MW-353-15	3/22/2016	480.27	6.24	474.03	
MW-353-15	9/13/2016	480.26	4.86	475.40	
MW-353-15	3/14/2017	480.26	6.09	474.17	
MW-353-15	8/4/2017	480.2	5.24	474.96	
MW-353-15	8/23/2017	480.2	5.09	475.11	
MW-353-65	3/18/2014	480.41	6.32	474.09	
MW-353-65	6/11/2014	480.41	6.13	474.28	
MW-353-65	9/9/2014	480.41	4.93	475.48	
MW-353-65	11/20/2014	480.41	6.20	474.21	
MW-353-65	3/18/2015	480.41	6.29	474.12	
MW-353-65	6/11/2015	480.41	5.97	474.44	
MW-353-65	8/12/2015	480.66	5.53	475.13	
MW-353-65	11/20/2015	480.66	6.37	474.29	
MW-353-65	3/22/2016	480.66	6.88	473.78	
MW-353-65	9/13/2016	480.62	5.30	475.32	
MW-353-65	3/14/2017	480.62	6.39	474.23	
MW-353-65	8/4/2017	480.43	5.55	474.88	
MW-353-65	8/23/2017	480.43	5.40	475.03	
MW-353-100	3/18/2014	480.58	6.52	474.06	
MW-353-100	6/11/2014	480.58	6.38	474.20	
MW-353-100	9/9/2014	480.58	5.16	475.42	
MW-353-100	11/20/2014	480.58	6.40	474.18	

Appendix B-1
Historical Groundwater Elevation Data

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

Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-353-100	3/18/2015	480.58	6.46	474.12	
MW-353-100	6/11/2015	480.58	6.12	474.46	
MW-353-100	8/12/2015	480.71	5.62	475.09	
MW-353-100	11/20/2015	480.71	6.50	474.21	
MW-353-100	3/22/2016	480.71	6.80	473.91	
MW-353-100	9/13/2016	480.61	5.37	475.24	
MW-353-100	3/14/2017	480.61	6.53	474.08	
MW-353-100	8/4/2017	480.63	6.81	473.82	
MW-353-100	8/23/2017	480.63	5.68	474.95	
MW-356-20	3/19/2014	478.67	7.13	471.54	
MW-356-20	6/11/2014	478.67	7.72	470.95	
MW-356-20	9/9/2014	478.67	6.84	471.83	
MW-356-20	11/20/2014	478.67	7.32	471.35	
MW-356-20	3/18/2015	478.67	7.30	471.37	
MW-356-20	6/11/2015	478.67	7.66	471.01	
MW-356-20	8/12/2015	478.72	7.50	471.23	
MW-356-20	11/19/2015	478.72	7.48	471.24	
MW-356-20	3/22/2016	478.72	7.08	471.64	
MW-356-20	9/12/2016	478.72	6.99	471.73	
MW-356-20	3/14/2017	478.72	7.19	471.53	
MW-356-20	8/23/2017	478.91	7.49	471.42	
MW-356-65	3/19/2014	478.75	7.26	471.49	
MW-356-65	6/11/2014	478.75	7.81	470.94	
MW-356-65	9/9/2014	478.75	6.86	471.89	
MW-356-65	11/20/2014	478.75	7.39	471.36	
MW-356-65	3/18/2015	478.75	7.37	471.38	
MW-356-65	6/11/2015	478.75	7.78	470.97	
MW-356-65	8/12/2015	478.79	7.53	471.27	
MW-356-65	11/19/2015	478.79	7.51	471.28	
MW-356-65	3/22/2016	478.79	7.14	471.65	
MW-356-65	7/20/2017	478.83	7.24	471.59	
MW-356-65	8/23/2017	478.83	7.36	471.47	
MW-356-90	3/19/2014	478.74	7.23	471.51	
MW-356-90	6/11/2014	478.74	7.77	470.97	
MW-356-90	9/9/2014	478.74	6.79	471.95	
MW-356-90	11/20/2014	478.74	7.35	471.39	
MW-356-90	3/18/2015	478.74	7.36	471.38	
MW-356-90	6/11/2015	478.74	7.69	471.05	
MW-356-90	8/12/2015	478.78	7.49	471.30	
MW-356-90	11/19/2015	478.78	7.46	471.32	
MW-356-90	3/22/2016	478.78	7.16	471.62	
MW-356-90	7/20/2017	478.94	7.30	471.64	
MW-356-90	8/23/2017	478.94	7.45	471.49	
MW-357-15	3/19/2014	487.73	12.30	475.43	
MW-357-15	6/11/2014	487.73	11.86	475.87	
MW-357-15	9/9/2014	487.73	11.36	476.37	
MW-357-15	11/20/2014	487.73	11.91	475.82	
MW-357-15	3/18/2015	487.73	12.21	475.52	
MW-357-15	6/11/2015	487.73	12.11	475.62	
MW-357-15	8/12/2015	487.76	11.81	475.96	
MW-357-15	11/19/2015	487.76	11.96	475.80	
MW-357-15	3/22/2016	487.76	12.22	475.54	
MW-357-15	9/12/2016	487.76	11.36	476.40	
MW-357-15	3/14/2017	487.76	12.14	475.62	
MW-357-15	8/23/2017	487.81	11.84	475.97	
MW-357-65	3/19/2014	487.90	12.28	475.62	
MW-357-65	6/11/2014	487.90	11.89	476.01	
MW-357-65	9/9/2014	487.90	11.34	476.56	
MW-357-65	11/20/2014	487.90	11.98	475.92	
MW-357-65	3/18/2015	487.90	12.19	475.71	
MW-357-65	6/11/2015	487.90	12.15	475.75	

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Historical Groundwater Elevation Data

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

Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
MW-357-65	8/12/2015	487.92	11.79	476.14	
MW-357-65	11/19/2015	487.92	11.94	475.98	
MW-357-65	3/22/2016	487.92	12.20	475.72	
MW-357-65	9/12/2016	487.89	11.31	476.58	
MW-357-65	3/14/2017	487.89	12.09	475.80	
MW-357-65	7/25/2017	487.9	11.78	476.12	
MW-357-65	8/23/2017	487.9	11.76	476.14	
MW-357-150	3/19/2014	488.01	12.38	475.63	
MW-357-150	6/11/2014	488.01	11.89	476.12	
MW-357-150	9/9/2014	488.01	11.34	476.67	
MW-357-150	11/20/2014	488.01	11.98	476.03	
MW-357-150	3/18/2015	488.01	12.22	475.79	
MW-357-150	6/11/2015	488.01	12.12	475.89	
MW-357-150	8/12/2015	488.02	11.82	476.21	
MW-357-150	11/19/2015	488.02	11.98	476.04	
MW-357-150	3/22/2016	488.02	12.21	475.81	
MW-357-150	9/12/2016	487.99	11.33	476.66	
MW-357-150	3/14/2017	487.99	12.10	475.89	
MW-357-150	7/25/2017	488	11.80	476.20	
MW-357-150	8/23/2017	488	11.78	476.22	
PW-1230	1/30/2014	486.06	8.86	477.20	
PW-1230	2/24/2014	486.04	9.02	477.02	
PW-1230	3/11/2014	486.05	8.98	477.07	
PW-1230	4/25/2014	486.05	8.06	477.99	
PW-1230	5/20/2014	486.05	8.60	477.45	
PW-1230	6/9/2014	486.06	8.81	477.25	
PW-1230	7/21/2014	486.06	7.18	478.88	
PW-1230	8/28/2014	486.05	7.75	478.30	
PW-1230	9/26/2014	486.06	8.19	477.87	
PW-1230	10/27/2014	486.05	8.99	477.06	
PW-1230	11/25/2014	486.05	8.80	477.25	
PW-1230	12/17/2014	486.05	8.84	477.21	
PW-1230	1/28/2015	486.04	9.02	477.02	
PW-1230	2/17/2015	486.05	9.03	477.02	
PW-1230	3/27/2015	486.06	8.95	477.11	
PW-1230	4/14/2015	486.04	8.84	477.20	
PW-1230	5/18/2015	486.06	8.45	477.61	
PW-1230	6/5/2015	486.05	8.53	477.52	
PW-1230	7/22/2015	486.06	8.17	477.89	
PW-1230	8/13/2015	486.06	8.10	477.96	
PW-1230	9/30/2015	486.06	8.19	477.87	
PW-1230	10/22/2015	486.06	8.56	477.50	
PW-1230	11/25/2015	486.05	8.59	477.46	
PW-1230	12/11/2015	486.07	8.75	477.32	
PW-1230	1/26/2016	486.06	9.06	477.00	
PW-1230	2/17/2016	486.05	9.13	476.92	
PW-1230	3/17/2016	486.05	9.19	476.86	
PW-1230	4/28/2016	486.07	8.94	477.13	Well was sampled 4-27-16 at approximately 15:00.
PW-1230	5/25/2016	486.07	8.68	477.39	
PW-1230	6/9/2016	486.05	8.64	477.41	
PW-1230	7/11/2016	486.06	7.81	478.25	
PW-1230	8/18/2016	486.08	7.58	478.50	
PW-1230	10/26/2016	486.07	9.20	476.87	
PW-1230	11/21/2016	486.07	8.81	477.26	
PW-1230	12/6/2016	486.06	8.88	477.18	
PW-1230	1/26/2017	486.05	8.65	477.40	
PW-1230	2/15/2017	486.05	8.96	477.14	
PW-1230	3/20/2017	486.05	9.01	477.04	

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Well ID	Date	Top of Riser Elevation (MSL feet)	Depth to Water (feet)	Water Table Elevation (MSL feet)	Comments
PW-1230	4/18/2017	486.05	8.78	477.27	
PW-1230	5/23/2017	486.06	8.49	477.57	

Acronyms and Abbreviations:
— = not measured or incalculable
BTOC = below top of casing
DTW = depth to water
ft = feet
MSL = mean sea level

Appendix B-2
Historical Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-150A-10	Water Table	10/12/2009	229
MW-150A-10	Water Table	1/22/2010	133
MW-150A-10	Water Table	2/17/2010	156
MW-150A-10	Water Table	3/17/2010	191
MW-150A-10	Water Table	4/29/2010	181
MW-150A-10	Water Table	5/25/2010	113
MW-150A-10	Water Table	6/25/2010	150
MW-150A-10	Water Table	7/7/2010	158
MW-150A-10	Water Table	8/3/2010	120
MW-150A-10	Water Table	9/9/2010	136
MW-150A-10	Water Table	10/19/2010	97.1
MW-150A-10	Water Table	11/12/2010	155
MW-150A-10	Water Table	1/24/2011	134
MW-150A-10	Water Table	8/3/2011	96.0
MW-150A-10	Water Table	10/14/2011	105
MW-150A-10	Water Table	2/11/2012	112
MW-150A-10	Water Table	4/30/2012	98.4
MW-150A-10	Water Table	7/23/2012	82.2J*
MW-150A-10	Water Table	10/31/2012	77.8
MW-150A-10	Water Table	1/10/2013	82.9
MW-150A-10	Water Table	4/9/2013	61.2
MW-150A-10	Water Table	9/7/2013	45.8
MW-150A-10	Water Table	10/8/2013	49.8
MW-150A-10	Water Table	1/29/2014	90.2
MW-150A-10	Water Table	7/9/2014	128
MW-150A-10	Water Table	2/13/2015	55.9J*
MW-150A-10	Water Table	7/13/2015	71.5
MW-150A-10	Water Table	1/27/2016	86.1
MW-150A-10	Water Table	7/11/2016	87.7
MW-150A-10	Water Table	2/22/2017	53.5
MW-150A-10	Water Table	7/11/2017	46.2
MW-150B-25	10-55	10/12/2009	152
MW-150B-25	10-55	1/22/2010	126
MW-150B-25	10-55	2/17/2010	121
MW-150B-25	10-55	3/17/2010	109
MW-150B-25	10-55	4/29/2010	146
MW-150B-25	10-55	5/25/2010	114
MW-150B-25	10-55	6/25/2010	113
MW-150B-25	10-55	7/7/2010	112
MW-150B-25	10-55	8/3/2010	91.3
MW-150B-25	10-55	9/9/2010	76.4
MW-150B-25	10-55	10/19/2010	60.2
MW-150B-25	10-55	11/12/2010	79.2
MW-150B-25	10-55	2/2/2011	81.8
MW-150B-25	10-55	4/27/2011	70.8
MW-150B-25	10-55	8/3/2011	77.4
MW-150B-25	10-55	10/14/2011	84.9
MW-150B-25	10-55	2/11/2012	71.5
MW-150B-25	10-55	4/30/2012	65.1
MW-150B-25	10-55	7/23/2012	59.5
MW-150B-25	10-55	10/31/2012	54.0
MW-150B-25	10-55	2/13/2013	46.9

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Historical Sulfolane Results Summary

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-150B-25	10-55	4/12/2013	39.7
MW-150B-25	10-55	7/10/2013	44.3
MW-150B-25	10-55	10/8/2013	41.0
MW-150B-25	10-55	1/29/2014	34.9
MW-150B-25	10-55	7/9/2014	32.3
MW-150B-25	10-55	2/13/2015	30.7J*
MW-150B-25	10-55	7/13/2015	27.4
MW-150B-25	10-55	1/27/2016	29.2
MW-150B-25	10-55	7/11/2016	22.9
MW-150B-25	10-55	2/22/2017	18.0
MW-150B-25	10-55	7/11/2017	14.6
MW-150C-60	10-55	6/4/2012	16.9
MW-150C-60	10-55	7/23/2012	18.0
MW-150C-60	10-55	2/13/2013	12.9
MW-150C-60	10-55	4/12/2013	11.5
MW-150C-60	10-55	7/10/2013	13.0
MW-150C-60	10-55	10/8/2013	12.7
MW-150C-60	10-55	1/29/2014	10.2
MW-150C-60	10-55	4/9/2014	10.3J
MW-150C-60	10-55	7/9/2014	10.8
MW-150C-60	10-55	10/13/2014	10.3
MW-150C-60	10-55	2/13/2015	9.06J*
MW-150C-60	10-55	7/13/2015	7.61J
MW-150C-60	10-55	10/12/2015	8.08J
MW-150C-60	10-55	1/27/2016	6.85J
MW-150C-60	10-55	7/11/2016	5.81J
MW-150C-60	10-55	2/22/2017	4.41J
MW-151A-15	Water Table	10/9/2009	214
MW-151A-15	Water Table	1/25/2010	150
MW-151A-15	Water Table	2/17/2010	128
MW-151A-15	Water Table	3/16/2010	116
MW-151A-15	Water Table	4/29/2010	171
MW-151A-15	Water Table	5/25/2010	122
MW-151A-15	Water Table	6/25/2010	161
MW-151A-15	Water Table	7/8/2010	112
MW-151A-15	Water Table	7/26/2010	103
MW-151A-15	Water Table	8/3/2010	109
MW-151A-15	Water Table	9/9/2010	121
MW-151A-15	Water Table	10/19/2010	106
MW-151A-15	Water Table	11/11/2010	113
MW-151A-15	Water Table	12/4/2010	91.1
MW-151A-15	Water Table	2/10/2011	60.3
MW-151A-15	Water Table	5/25/2011	95.4
MW-151A-15	Water Table	8/9/2011	94.6
MW-151A-15	Water Table	10/13/2011	109
MW-151A-15	Water Table	2/11/2012	85.2
MW-151A-15	Water Table	4/30/2012	75.9
MW-151A-15	Water Table	7/20/2012	72.6
MW-151A-15	Water Table	11/10/2012	66.0
MW-151A-15	Water Table	1/10/2013	57.0
MW-151A-15	Water Table	3/7/2013	54.9
MW-151A-15	Water Table	9/7/2013	51.3

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Flint Hills Resources Alaska, LLC
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Well ID	Zone	Date	Sulfolane (µg/L)
MW-151A-15	Water Table	10/7/2013	57.0
MW-151A-15	Water Table	1/21/2014	40.9
MW-151A-15	Water Table	4/5/2014	41.5
MW-151A-15	Water Table	7/9/2014	47.1
MW-151A-15	Water Table	10/13/2014	34.0
MW-151A-15	Water Table	1/16/2015	40.2
MW-151A-15	Water Table	4/11/2015	39.5
MW-151A-15	Water Table	7/13/2015	29.4
MW-151A-15	Water Table	10/13/2015	27.2
MW-151A-15	Water Table	1/25/2016	34.6
MW-151A-15	Water Table	7/11/2016	23.9
MW-151B-25	10-55	10/9/2009	111
MW-151B-25	10-55	1/25/2010	108
MW-151B-25	10-55	2/17/2010	118
MW-151B-25	10-55	3/16/2010	115
MW-151B-25	10-55	4/29/2010	119
MW-151B-25	10-55	5/25/2010	93.2
MW-151B-25	10-55	6/28/2010	90.6
MW-151B-25	10-55	7/8/2010	108
MW-151B-25	10-55	8/3/2010	74.7
MW-151B-25	10-55	9/9/2010	73.7
MW-151B-25	10-55	10/19/2010	77.7
MW-151B-25	10-55	11/11/2010	77.4
MW-151B-25	10-55	12/4/2010	53.6
MW-151B-25	10-55	2/18/2011	66.1
MW-151B-25	10-55	5/25/2011	69.1
MW-151B-25	10-55	8/9/2011	62.3
MW-151B-25	10-55	10/13/2011	63.2
MW-151B-25	10-55	2/11/2012	63.1
MW-151B-25	10-55	4/30/2012	55.4
MW-151B-25	10-55	7/20/2012	51.5
MW-151B-25	10-55	11/10/2012	48.8
MW-151B-25	10-55	1/10/2013	45.1
MW-151B-25	10-55	4/15/2013	37.1
MW-151B-25	10-55	7/13/2013	37.3
MW-151B-25	10-55	10/8/2013	34.4
MW-151B-25	10-55	1/21/2014	30.8
MW-151B-25	10-55	4/5/2014	32.3
MW-151B-25	10-55	7/9/2014	29.8
MW-151B-25	10-55	10/13/2014	29.7
MW-151B-25	10-55	1/16/2015	26.9
MW-151B-25	10-55	4/11/2015	24.0
MW-151B-25	10-55	7/13/2015	20.3
MW-151B-25	10-55	10/13/2015	21.2
MW-151B-25	10-55	1/25/2016	19.6
MW-151B-25	10-55	7/11/2016	14.8
MW-151C-60	10-55	2/23/2010	17.4
MW-151C-60	10-55	3/16/2010	40.9
MW-151C-60	10-55	4/30/2010	71.3
MW-151C-60	10-55	8/4/2010	51.1
MW-151C-60	10-55	9/9/2010	48.9
MW-151C-60	10-55	10/19/2010	38.5

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Well ID	Zone	Date	Sulfolane (µg/L)
MW-151C-60	10-55	11/11/2010	76.4
MW-151C-60	10-55	8/9/2011	39.3
MW-151C-60	10-55	10/14/2011	39.6
MW-151C-60	10-55	2/11/2012	36.9
MW-151C-60	10-55	7/20/2012	32.9
MW-151C-60	10-55	11/10/2012	31.1
MW-151C-60	10-55	1/10/2013	27.7
MW-151C-60	10-55	3/7/2013	23.2
MW-151C-60	10-55	9/7/2013	21.5
MW-151C-60	10-55	10/7/2013	21.3
MW-151C-60	10-55	1/21/2014	18.8
MW-151C-60	10-55	4/5/2014	16.4
MW-151C-60	10-55	7/9/2014	16.8
MW-151C-60	10-55	10/13/2014	15.8
MW-151C-60	10-55	1/16/2015	14.7
MW-151C-60	10-55	4/11/2015	11.1
MW-151C-60	10-55	7/13/2015	11.5
MW-151C-60	10-55	10/13/2015	9.50J
MW-151C-60	10-55	1/25/2016	7.97J
MW-151C-60	10-55	7/11/2016	5.89J
MW-152A-15	Water Table	10/9/2009	97.1
MW-152A-15	Water Table	1/25/2010	86.9
MW-152A-15	Water Table	2/17/2010	115
MW-152A-15	Water Table	7/8/2010	109
MW-152A-15	Water Table	8/3/2010	111
MW-152A-15	Water Table	9/9/2010	122
MW-152A-15	Water Table	10/19/2010	72.5
MW-152A-15	Water Table	11/11/2010	78.7
MW-152A-15	Water Table	8/8/2011	109
MW-152A-15	Water Table	10/7/2011	119
MW-152A-15	Water Table	2/11/2012	113
MW-152A-15	Water Table	7/31/2012	96.8
MW-152A-15	Water Table	11/9/2012	95.8
MW-152A-15	Water Table	8/27/2013	85.3
MW-152A-15	Water Table	10/8/2013	70.0
MW-152A-15	Water Table	1/30/2014	62.5
MW-152A-15	Water Table	4/9/2014	62.9
MW-152A-15	Water Table	7/11/2014	34.5
MW-152A-15	Water Table	10/13/2014	44.6
MW-152A-15	Water Table	2/18/2015	41.3
MW-152A-15	Water Table	7/13/2015	25.6
MW-152A-15	Water Table	10/13/2015	23.7
MW-152A-15	Water Table	1/19/2016	26.4
MW-152A-15	Water Table	7/11/2016	17.2
MW-152B-25	10-55	10/9/2009	89.9
MW-152B-25	10-55	1/25/2010	103
MW-152B-25	10-55	2/17/2010	110
MW-152B-25	10-55	7/8/2010	83.3
MW-152B-25	10-55	8/3/2010	127
MW-152B-25	10-55	9/9/2010	113
MW-152B-25	10-55	10/19/2010	88.5
MW-152B-25	10-55	11/11/2010	68.7

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Historical Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-152B-25	10-55	8/8/2011	113
MW-152B-25	10-55	10/7/2011	114
MW-152B-25	10-55	2/11/2012	113
MW-152B-25	10-55	7/23/2012	96.2
MW-152B-25	10-55	11/9/2012	89.6
MW-152B-25	10-55	2/14/2013	78.0
MW-152B-25	10-55	8/27/2013	72.9
MW-152B-25	10-55	10/8/2013	71.2
MW-152B-25	10-55	1/30/2014	57.3
MW-152B-25	10-55	4/9/2014	54.8
MW-152B-25	10-55	7/11/2014	54.7
MW-152B-25	10-55	10/13/2014	46.6
MW-152B-25	10-55	2/18/2015	36.3
MW-152B-25	10-55	7/13/2015	28.4
MW-152B-25	10-55	10/13/2015	25.0
MW-152B-25	10-55	1/19/2016	21.7
MW-152B-25	10-55	7/11/2016	13.8
MW-152C-65	10-55	10/5/2011	60.0
MW-152C-65	10-55	2/11/2012	54.6
MW-152C-65	10-55	7/23/2012	42.3
MW-152C-65	10-55	11/9/2012	30.8
MW-152C-65	10-55	2/14/2013	31.5
MW-152C-65	10-55	7/10/2013	26.8
MW-152C-65	10-55	10/8/2013	21.7
MW-152C-65	10-55	1/30/2014	18.5
MW-152C-65	10-55	4/9/2014	16.9
MW-152C-65	10-55	7/11/2014	15.5
MW-152C-65	10-55	10/13/2014	13.7
MW-152C-65	10-55	2/18/2015	9.13J
MW-152C-65	10-55	4/10/2015	8.10J
MW-152C-65	10-55	7/13/2015	6.58J
MW-152C-65	10-55	10/13/2015	5.97J
MW-152C-65	10-55	1/19/2016	4.37J
MW-152C-65	10-55	7/11/2016	3.36J
MW-153A-15	Water Table	10/9/2009	101
MW-153A-15	Water Table	1/22/2010	82.7
MW-153A-15	Water Table	2/17/2010	102
MW-153A-15	Water Table	3/18/2010	87.2
MW-153A-15	Water Table	4/30/2010	153
MW-153A-15	Water Table	5/20/2010	119
MW-153A-15	Water Table	6/25/2010	102
MW-153A-15	Water Table	7/21/2010	57.8
MW-153A-15	Water Table	7/26/2010	45.8
MW-153A-15	Water Table	8/3/2010	88.1
MW-153A-15	Water Table	9/9/2010	56.3
MW-153A-15	Water Table	10/19/2010	75.4
MW-153A-15	Water Table	11/9/2010	104
MW-153A-15	Water Table	4/13/2011	43.7
MW-153A-15	Water Table	8/18/2011	55.3
MW-153A-15	Water Table	10/12/2011	66.2
MW-153A-15	Water Table	2/13/2012	60.6
MW-153A-15	Water Table	5/10/2012	59.3

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Historical Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-153A-15	Water Table	8/8/2012	27.9
MW-153A-15	Water Table	11/14/2012	18.4
MW-153A-15	Water Table	1/10/2013	30.8
MW-153A-15	Water Table	4/9/2013	35.2
MW-153A-15	Water Table	7/15/2013	33.7
MW-153A-15	Water Table	10/11/2013	37.0
MW-153A-15	Water Table	1/27/2014	20.6
MW-153A-15	Water Table	4/10/2014	24.7
MW-153A-15	Water Table	8/8/2014	6.60J
MW-153A-15	Water Table	10/10/2014	24.5
MW-153A-15	Water Table	1/15/2015	27.1
MW-153A-15	Water Table	4/13/2015	28.0
MW-153A-15	Water Table	7/17/2015	15.4
MW-153A-15	Water Table	10/13/2015	16.5
MW-153A-15	Water Table	1/28/2016	19.2
MW-153A-15	Water Table	4/22/2016	17.6
MW-153A-15	Water Table	7/13/2016	8.26J
MW-153A-15	Water Table	10/11/2016	14.9
MW-153A-15	Water Table	2/1/2017	11.2
MW-153B-55	10-55	5/20/2010	<10.0
MW-153B-55	10-55	6/25/2010	<10.7
MW-153B-55	10-55	7/21/2010	<10.0
MW-153B-55	10-55	8/3/2010	14.0
MW-153B-55	10-55	9/9/2010	19.6
MW-153B-55	10-55	10/19/2010	11.3
MW-153B-55	10-55	11/9/2010	<10.1
MW-153B-55	10-55	3/7/2011	14.4
MW-153B-55	10-55	4/13/2011	21.8
MW-153B-55	10-55	8/18/2011	33.7
MW-153B-55	10-55	10/12/2011	33.3
MW-153B-55	10-55	2/13/2012	35.9
MW-153B-55	10-55	7/23/2012	32.7
MW-153B-55	10-55	11/14/2012	28.0
MW-153B-55	10-55	1/3/2013	28.5
MW-153B-55	10-55	3/1/2013	29.4
MW-153B-55	10-55	5/9/2013	23.5
MW-153B-55	10-55	7/15/2013	25.8
MW-153B-55	10-55	10/11/2013	24.5
MW-153B-55	10-55	1/27/2014	19.5
MW-153B-55	10-55	4/10/2014	18.4
MW-153B-55	10-55	7/14/2014	15.3
MW-153B-55	10-55	10/10/2014	10.9
MW-153B-55	10-55	1/15/2015	10.4
MW-153B-55	10-55	4/13/2015	8.28J
MW-153B-55	10-55	7/17/2015	6.16J
MW-153B-55	10-55	10/13/2015	5.56J
MW-153B-55	10-55	1/28/2016	4.21J
MW-153B-55	10-55	4/5/2016	<5.10
MW-153B-55	10-55	7/13/2016	3.69J
MW-153B-55	10-55	10/11/2016	<5.15
MW-153B-55	10-55	2/1/2017	<5.15
MW-155A-15	Water Table	11/14/2009	31.6

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-155A-15	Water Table	11/12/2009	41.3
MW-155A-15	Water Table	1/21/2010	23.1
MW-155A-15	Water Table	2/15/2010	23.7
MW-155A-15	Water Table	3/17/2010	22.6
MW-155A-15	Water Table	4/30/2010	19.1
MW-155A-15	Water Table	5/21/2010	21.6
MW-155A-15	Water Table	6/28/2010	16.6
MW-155A-15	Water Table	7/8/2010	18.8
MW-155A-15	Water Table	8/3/2010	20.1
MW-155A-15	Water Table	9/14/2010	22.7
MW-155A-15	Water Table	10/19/2010	15.6
MW-155A-15	Water Table	11/12/2010	15.5
MW-155A-15	Water Table	2/1/2011	11.6
MW-155A-15	Water Table	5/19/2011	18.3
MW-155A-15	Water Table	8/3/2011	22.2
MW-155A-15	Water Table	10/14/2011	22.2
MW-155A-15	Water Table	2/10/2012	20.1
MW-155A-15	Water Table	7/20/2012	20.8
MW-155A-15	Water Table	11/10/2012	17.5
MW-155A-15	Water Table	1/10/2013	13.2
MW-155A-15	Water Table	4/11/2013	9.86J
MW-155A-15	Water Table	7/11/2013	11.0
MW-155A-15	Water Table	10/9/2013	11.3
MW-155A-15	Water Table	1/30/2014	9.54J
MW-155A-15	Water Table	7/14/2014	34.8
MW-155A-15	Water Table	2/26/2015	10.0
MW-155A-15	Water Table	7/14/2015	12.8
MW-155A-15	Water Table	1/27/2016	10.2
MW-155A-15	Water Table	7/11/2016	11.9
MW-155B-65	10-55	11/3/2010	<10.0
MW-155B-65	10-55	1/10/2011	<10.8
MW-155B-65	10-55	2/1/2011	<11.0
MW-155B-65	10-55	5/27/2011	<3.10
MW-155B-65	10-55	8/3/2011	<6.20
MW-155B-65	10-55	10/14/2011	<6.52
MW-155B-65	10-55	2/10/2012	<6.66
MW-155B-65	10-55	4/30/2012	<6.40
MW-155B-65	10-55	7/20/2012	<6.20
MW-155B-65	10-55	11/10/2012	<6.60
MW-155B-65	10-55	1/10/2013	<6.20
MW-155B-65	10-55	4/11/2013	<6.32
MW-155B-65	10-55	7/11/2013	<6.20
MW-155B-65	10-55	10/9/2013	<6.20
MW-155B-65	10-55	1/30/2014	<5.10
MW-155B-65	10-55	7/14/2014	<5.00
MW-155B-65	10-55	2/13/2015	<5.15
MW-155B-65	10-55	7/14/2015	<5.10
MW-155B-65	10-55	1/27/2016	<5.10
MW-155B-65	10-55	7/11/2016	<5.10
MW-156A-15	Water Table	11/14/2009	128
MW-156A-15	Water Table	11/12/2009	188
MW-156A-15	Water Table	1/21/2010	152

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Flint Hills Resources Alaska, LLC
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Well ID	Zone	Date	Sulfolane (µg/L)
MW-156A-15	Water Table	2/15/2010	158
MW-156A-15	Water Table	3/19/2010	148
MW-156A-15	Water Table	6/25/2010	67.1
MW-156A-15	Water Table	7/8/2010	138
MW-156A-15	Water Table	8/3/2010	103
MW-156A-15	Water Table	9/14/2010	152
MW-156A-15	Water Table	10/19/2010	121
MW-156A-15	Water Table	11/10/2010	77.8
MW-156A-15	Water Table	3/7/2011	92.6
MW-156A-15	Water Table	8/9/2011	97.9
MW-156A-15	Water Table	10/6/2011	106
MW-156A-15	Water Table	2/9/2012	84.2
MW-156A-15	Water Table	4/27/2012	72.5
MW-156A-15	Water Table	7/19/2012	68.3
MW-156A-15	Water Table	10/31/2012	62.2
MW-156A-15	Water Table	1/10/2013	51.4
MW-156A-15	Water Table	3/9/2013	43.3
MW-156A-15	Water Table	7/12/2013	35.7
MW-156A-15	Water Table	10/7/2013	36.6
MW-156A-15	Water Table	1/29/2014	30.0
MW-156A-15	Water Table	8/4/2014	20.4
MW-156A-15	Water Table	2/18/2015	21.2
MW-156A-15	Water Table	7/14/2015	17.0
MW-156A-15	Water Table	1/27/2016	16.7
MW-156A-15	Water Table	7/11/2016	15.0
MW-156B-50	10-55	2/23/2010	113
MW-156B-50	10-55	3/23/2010	119
MW-156B-50	10-55	6/25/2010	105
MW-156B-50	10-55	7/8/2010	115
MW-156B-50	10-55	8/3/2010	92.4
MW-156B-50	10-55	9/14/2010	89.3
MW-156B-50	10-55	10/19/2010	80.6
MW-156B-50	10-55	11/10/2010	33.2
MW-156B-50	10-55	3/7/2011	72.7
MW-156B-50	10-55	8/10/2011	65.1
MW-156B-50	10-55	10/6/2011	55.0
MW-156B-50	10-55	2/9/2012	52.6
MW-156B-50	10-55	7/19/2012	42.6
MW-156B-50	10-55	10/31/2012	35.7
MW-156B-50	10-55	1/10/2013	34.7
MW-156B-50	10-55	3/9/2013	30.4
MW-156B-50	10-55	7/12/2013	27.8
MW-156B-50	10-55	10/7/2013	25.1
MW-156B-50	10-55	1/29/2014	21.9
MW-156B-50	10-55	7/8/2014	19.8
MW-156B-50	10-55	2/18/2015	17.3
MW-156B-50	10-55	7/14/2015	14.9
MW-156B-50	10-55	1/27/2016	16.4
MW-156B-50	10-55	7/11/2016	13.8
MW-157A-15	Water Table	11/14/2009	89.8
MW-157A-15	Water Table	11/14/2009	89.8
MW-157A-15	Water Table	1/21/2010	122

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-157A-15	Water Table	2/16/2010	111
MW-157A-15	Water Table	3/17/2010	108
MW-157A-15	Water Table	4/30/2010	71.3
MW-157A-15	Water Table	5/20/2010	82.4
MW-157A-15	Water Table	6/24/2010	78.6
MW-157A-15	Water Table	7/8/2010	89.9
MW-157A-15	Water Table	7/26/2010	61.9
MW-157A-15	Water Table	8/3/2010	79.8
MW-157A-15	Water Table	9/9/2010	85.6
MW-157A-15	Water Table	10/19/2010	96.0
MW-157A-15	Water Table	11/12/2010	70.9
MW-157A-15	Water Table	2/18/2011	85.1
MW-157A-15	Water Table	4/12/2011	49.3
MW-157A-15	Water Table	8/8/2011	82.2
MW-157A-15	Water Table	10/12/2011	91.3
MW-157A-15	Water Table	2/9/2012	75.8JH*
MW-157A-15	Water Table	4/27/2012	63.7
MW-157A-15	Water Table	7/19/2012	44.0
MW-157A-15	Water Table	10/31/2012	68.6
MW-157A-15	Water Table	2/12/2013	68.8
MW-157A-15	Water Table	4/12/2013	56.8
MW-157A-15	Water Table	8/27/2013	51.6
MW-157A-15	Water Table	10/8/2013	66.5
MW-157A-15	Water Table	1/21/2014	60.8
MW-157A-15	Water Table	4/3/2014	54.5
MW-157A-15	Water Table	7/8/2014	20.7
MW-157A-15	Water Table	10/9/2014	33.4
MW-157A-15	Water Table	1/22/2015	35.6
MW-157A-15	Water Table	4/9/2015	31.4
MW-157A-15	Water Table	7/14/2015	21.3
MW-157A-15	Water Table	10/13/2015	23.5
MW-157A-15	Water Table	1/25/2016	24.8
MW-157A-15	Water Table	7/11/2016	12.9
MW-157A-15	Water Table	2/22/2017	13.3
MW-157B-30	10-55	10/18/2011	87.3
MW-157B-30	10-55	2/9/2012	57.6
MW-157B-30	10-55	4/27/2012	75.3
MW-157B-30	10-55	7/19/2012	71.6J*
MW-157B-30	10-55	10/31/2012	64.7
MW-157B-30	10-55	2/12/2013	65.5
MW-157B-30	10-55	4/12/2013	56.5
MW-157B-30	10-55	8/27/2013	69.8
MW-157B-30	10-55	10/8/2013	74.0
MW-157B-30	10-55	1/21/2014	58.7
MW-157B-30	10-55	4/3/2014	52.0
MW-157B-30	10-55	7/8/2014	49.5
MW-157B-30	10-55	10/9/2014	37.5J*
MW-157B-30	10-55	1/22/2015	37.6
MW-157B-30	10-55	4/9/2015	36.3
MW-157B-30	10-55	7/14/2015	33.3
MW-157B-30	10-55	10/13/2015	30.3
MW-157B-30	10-55	1/25/2016	25.3

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-157B-30	10-55	7/11/2016	19.7
MW-157B-30	10-55	2/22/2017	15.5
MW-158A-15	Water Table	11/14/2009	192
MW-158A-15	Water Table	11/14/2009	192
MW-158A-15	Water Table	1/21/2010	259
MW-158A-15	Water Table	2/17/2010	199
MW-158A-15	Water Table	3/17/2010	260
MW-158A-15	Water Table	7/9/2010	206
MW-158A-15	Water Table	8/3/2010	182
MW-158A-15	Water Table	9/14/2010	245
MW-158A-15	Water Table	10/19/2010	118
MW-158A-15	Water Table	11/12/2010	152
MW-158A-15	Water Table	1/11/2011	113
MW-158A-15	Water Table	8/10/2011	33.1
MW-158A-15	Water Table	10/12/2011	13.7
MW-158A-15	Water Table	2/9/2012	83.4
MW-158A-15	Water Table	4/28/2012	68.7
MW-158A-15	Water Table	7/31/2012	63.0
MW-158A-15	Water Table	11/9/2012	71.1
MW-158A-15	Water Table	2/12/2013	87.4
MW-158A-15	Water Table	7/16/2013	83.9
MW-158A-15	Water Table	10/8/2013	70.3
MW-158A-15	Water Table	1/26/2014	65.4
MW-158A-15	Water Table	7/11/2014	24.4
MW-158A-15	Water Table	2/13/2015	42.8J*
MW-158A-15	Water Table	7/14/2015	21.6
MW-158A-15	Water Table	1/26/2016	23.5
MW-158A-15	Water Table	7/12/2016	22.1
MW-158A-15	Water Table	1/31/2017	29.6
MW-158B-60	10-55	11/2/2010	153
MW-158B-60	10-55	1/11/2011	102
MW-158B-60	10-55	4/13/2011	103
MW-158B-60	10-55	8/10/2011	125
MW-158B-60	10-55	10/12/2011	132
MW-158B-60	10-55	2/9/2012	122
MW-158B-60	10-55	4/28/2012	113
MW-158B-60	10-55	7/31/2012	102
MW-158B-60	10-55	11/9/2012	96.0
MW-158B-60	10-55	1/10/2013	86.3
MW-158B-60	10-55	4/16/2013	70.1
MW-158B-60	10-55	7/16/2013	70.1
MW-158B-60	10-55	10/8/2013	68.1
MW-158B-60	10-55	1/26/2014	55.6
MW-158B-60	10-55	7/11/2014	51.2
MW-158B-60	10-55	2/13/2015	42.1J*
MW-158B-60	10-55	7/14/2015	30.2
MW-158B-60	10-55	1/26/2016	30.7
MW-158B-60	10-55	7/12/2016	24.8
MW-158B-60	10-55	1/31/2017	19.2
MW-159A-15	Water Table	11/14/2009	<10.0
MW-159A-15	Water Table	11/14/2009	<10.0
MW-159A-15	Water Table	1/21/2010	<10.0

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-159A-15	Water Table	2/16/2010	<10.0
MW-159A-15	Water Table	3/17/2010	58.9
MW-159A-15	Water Table	4/30/2010	159
MW-159A-15	Water Table	5/21/2010	182
MW-159A-15	Water Table	6/28/2010	136
MW-159A-15	Water Table	7/9/2010	115
MW-159A-15	Water Table	8/3/2010	106
MW-159A-15	Water Table	9/14/2010	<10.5
MW-159A-15	Water Table	10/19/2010	<10.3
MW-159A-15	Water Table	11/12/2010	<10.4
MW-159A-15	Water Table	4/15/2011	103
MW-159A-15	Water Table	8/10/2011	82.2
MW-159A-15	Water Table	10/11/2011	27.2
MW-159A-15	Water Table	2/10/2012	20.7
MW-159A-15	Water Table	4/28/2012	107
MW-159A-15	Water Table	7/19/2012	38.4
MW-159A-15	Water Table	10/31/2012	<6.20
MW-159A-15	Water Table	2/12/2013	29.3
MW-159A-15	Water Table	4/12/2013	106
MW-159A-15	Water Table	7/17/2013	74.9
MW-159A-15	Water Table	10/9/2013	13.2
MW-159A-15	Water Table	2/6/2014	15.5
MW-159A-15	Water Table	4/4/2014	72.9
MW-159A-15	Water Table	7/15/2014	58.7
MW-159A-15	Water Table	10/10/2014	<5.00
MW-159A-15	Water Table	2/13/2015	<5.00
MW-159A-15	Water Table	7/14/2015	24.9
MW-159A-15	Water Table	10/13/2015	<5.40
MW-159A-15	Water Table	1/28/2016	<5.15
MW-159A-15	Water Table	7/11/2016	<5.15
MW-159A-15	Water Table	2/7/2017	6.03J*
MW-159B-45	10-55	10/18/2011	117
MW-159B-45	10-55	2/10/2012	105
MW-159B-45	10-55	7/19/2012	89.0
MW-159B-45	10-55	10/31/2012	77.7
MW-159B-45	10-55	2/12/2013	71.5
MW-159B-45	10-55	4/12/2013	61.3
MW-159B-45	10-55	8/28/2013	61.4
MW-159B-45	10-55	10/9/2013	61.8
MW-159B-45	10-55	2/6/2014	47.9
MW-159B-45	10-55	4/4/2014	44.2
MW-159B-45	10-55	7/15/2014	43.0
MW-159B-45	10-55	10/10/2014	37.8
MW-159B-45	10-55	2/13/2015	27.6
MW-159B-45	10-55	4/10/2015	23.6
MW-159B-45	10-55	7/14/2015	17.9
MW-159B-45	10-55	10/13/2015	18.4J*
MW-159B-45	10-55	1/28/2016	15.2
MW-159B-45	10-55	7/11/2016	9.43J
MW-159C-70	55-90	10/18/2011	106
MW-159C-70	55-90	2/10/2012	99.1
MW-159C-70	55-90	4/28/2012	92.2

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Historical Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-159C-70	55-90	7/19/2012	87.8
MW-159C-70	55-90	10/31/2012	75.2
MW-159C-70	55-90	2/12/2013	70.6
MW-159C-70	55-90	4/12/2013	59.4
MW-159C-70	55-90	9/10/2013	53.4
MW-159C-70	55-90	10/9/2013	51.9
MW-159C-70	55-90	2/6/2014	42.3
MW-159C-70	55-90	4/4/2014	41.3
MW-159C-70	55-90	7/15/2014	38.7
MW-159C-70	55-90	10/10/2014	30.8
MW-159C-70	55-90	2/13/2015	20.7J*
MW-159C-70	55-90	4/10/2015	17.4
MW-159C-70	55-90	7/14/2015	14.5
MW-159C-70	55-90	10/13/2015	11.9
MW-159C-70	55-90	1/28/2016	7.27J
MW-159C-70	55-90	7/11/2016	5.73J
MW-160AR-15	Water Table	11/14/2009	<10.3
MW-160AR-15	Water Table	11/14/2009	<10.3
MW-160AR-15	Water Table	1/21/2010	<10.3
MW-160AR-15	Water Table	2/16/2010	<10.0
MW-160AR-15	Water Table	3/16/2010	<10.3
MW-160AR-15	Water Table	4/29/2010	<10.5
MW-160AR-15	Water Table	5/21/2010	<10.4
MW-160AR-15	Water Table	6/25/2010	<10.8
MW-160AR-15	Water Table	7/9/2010	<10.4
MW-160AR-15	Water Table	5/14/2013	<6.20
MW-160AR-15	Water Table	7/11/2013	<6.20
MW-160AR-15	Water Table	10/8/2013	<6.20
MW-160AR-15	Water Table	1/22/2014	<5.00
MW-160AR-15	Water Table	6/5/2014	<5.10
MW-160AR-15	Water Table	7/11/2014	<5.15
MW-160AR-15	Water Table	10/9/2014	<5.15
MW-160AR-15	Water Table	2/18/2015	<5.00
MW-160AR-15	Water Table	4/10/2015	<5.20
MW-160AR-15	Water Table	7/14/2015	<5.30
MW-160AR-15	Water Table	10/13/2015	<5.00
MW-160AR-15	Water Table	1/26/2016	<5.30
MW-160AR-15	Water Table	7/12/2016	<5.05
MW-160B-90	55-90	2/23/2010	20.2
MW-160B-90	55-90	3/16/2010	101
MW-160B-90	55-90	4/29/2010	160
MW-160B-90	55-90	5/21/2010	129
MW-160B-90	55-90	6/25/2010	115
MW-160B-90	55-90	7/21/2010	108
MW-160B-90	55-90	8/12/2010	120
MW-160B-90	55-90	9/14/2010	134
MW-160B-90	55-90	10/19/2010	115
MW-160B-90	55-90	11/12/2010	92.8
MW-160B-90	55-90	5/27/2011	127
MW-160B-90	55-90	8/10/2011	125
MW-160B-90	55-90	10/12/2011	118
MW-160B-90	55-90	2/11/2012	114

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Historical Sulfolane Results Summary

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-160B-90	55-90	7/31/2012	89.2
MW-160B-90	55-90	11/11/2012	84.3
MW-160B-90	55-90	1/4/2013	82.0
MW-160B-90	55-90	4/5/2013	67.0
MW-160B-90	55-90	7/11/2013	67.8
MW-160B-90	55-90	10/8/2013	62.9
MW-160B-90	55-90	1/21/2014	51.5
MW-160B-90	55-90	4/9/2014	47.4
MW-160B-90	55-90	7/11/2014	44.8
MW-160B-90	55-90	10/9/2014	42.6
MW-160B-90	55-90	2/18/2015	30.3
MW-160B-90	55-90	7/14/2015	19.3
MW-160B-90	55-90	10/13/2015	18.5
MW-160B-90	55-90	1/26/2016	14.9
MW-160B-90	55-90	7/12/2016	8.67J
MW-161A-15	Water Table	12/11/2009	91.4
MW-161A-15	Water Table	12/11/2009	91.4
MW-161A-15	Water Table	1/20/2010	70.5
MW-161A-15	Water Table	2/15/2010	62.1
MW-161A-15	Water Table	3/17/2010	78.8
MW-161A-15	Water Table	4/30/2010	86.5
MW-161A-15	Water Table	5/19/2010	75.2
MW-161A-15	Water Table	6/24/2010	78.4
MW-161A-15	Water Table	7/7/2010	74.8
MW-161A-15	Water Table	7/26/2010	64.7
MW-161A-15	Water Table	8/2/2010	102
MW-161A-15	Water Table	9/8/2010	117
MW-161A-15	Water Table	10/18/2010	96.5
MW-161A-15	Water Table	11/9/2010	116
MW-161A-15	Water Table	3/8/2011	101
MW-161A-15	Water Table	5/25/2011	116
MW-161A-15	Water Table	8/6/2011	179
MW-161A-15	Water Table	10/7/2011	151
MW-161A-15	Water Table	2/5/2012	196
MW-161A-15	Water Table	5/3/2012	205J*
MW-161A-15	Water Table	7/23/2012	155
MW-161A-15	Water Table	10/22/2012	231
MW-161A-15	Water Table	10/25/2012	212
MW-161A-15	Water Table	1/2/2013	224
MW-161A-15	Water Table	3/2/2013	225
MW-161A-15	Water Table	5/3/2013	201
MW-161A-15	Water Table	7/2/2013	226
MW-161A-15	Water Table	10/15/2013	137
MW-161A-15	Water Table	1/20/2014	236
MW-161A-15	Water Table	4/8/2014	234
MW-161A-15	Water Table	8/4/2014	57.9
MW-161A-15	Water Table	10/8/2014	64.6
MW-161A-15	Water Table	1/9/2015	117
MW-161A-15	Water Table	7/11/2015	122
MW-161A-15	Water Table	10/8/2015	31.2
MW-161A-15	Water Table	1/11/2016	72.9
MW-161A-15	Water Table	4/4/2016	63.0

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Historical Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-161A-15	Water Table	7/8/2016	40.8
MW-161A-15	Water Table	10/11/2016	23.9
MW-161A-15	Water Table	1/31/2017	66.7
MW-161-30	10-55	5/13/2013	210
MW-161-30	10-55	7/2/2013	229
MW-161-30	10-55	10/15/2013	170
MW-161-30	10-55	10/15/2013	161
MW-161-30	10-55	1/20/2014	169
MW-161-30	10-55	4/8/2014	184
MW-161-30	10-55	7/9/2014	145
MW-161-30	10-55	10/8/2014	103
MW-161-30	10-55	1/9/2015	99.8
MW-161-30	10-55	4/8/2015	73.6
MW-161-30	10-55	7/11/2015	94.9
MW-161-30	10-55	10/8/2015	31.6
MW-161-30	10-55	1/11/2016	71.3
MW-161-30	10-55	7/8/2016	60.1
MW-161-30	10-55	1/31/2017	38.0
MW-161B-50	10-55	11/3/2010	243
MW-161B-50	10-55	1/4/2011	269
MW-161B-50	10-55	4/13/2011	167
MW-161B-50	10-55	8/6/2011	302
MW-161B-50	10-55	10/7/2011	316
MW-161B-50	10-55	2/5/2012	319
MW-161B-50	10-55	5/1/2012	262
MW-161B-50	10-55	7/23/2012	286
MW-161B-50	10-55	10/25/2012	297
MW-161B-50	10-55	1/2/2013	276
MW-161B-50	10-55	3/2/2013	282
MW-161B-50	10-55	5/3/2013	234
MW-161B-50	10-55	7/30/2013	263
MW-161B-50	10-55	10/15/2013	230
MW-161B-50	10-55	1/20/2014	197
MW-161B-50	10-55	8/4/2014	180
MW-161B-50	10-55	10/8/2014	160
MW-161B-50	10-55	1/9/2015	142
MW-161B-50	10-55	4/9/2015	121
MW-161B-50	10-55	7/11/2015	118
MW-161B-50	10-55	10/8/2015	104
MW-161B-50	10-55	1/11/2016	93.4
MW-161B-50	10-55	7/8/2016	71.8
MW-161B-50	10-55	1/31/2017	48.7
MW-162A-15	Water Table	12/11/2009	77.8
MW-162A-15	Water Table	12/11/2009	77.8
MW-162A-15	Water Table	1/20/2010	75.3
MW-162A-15	Water Table	2/15/2010	71.0
MW-162A-15	Water Table	3/16/2010	66.7
MW-162A-15	Water Table	8/2/2010	96.2
MW-162A-15	Water Table	9/8/2010	43.8
MW-162A-15	Water Table	10/18/2010	75.2
MW-162A-15	Water Table	11/12/2010	69.6
MW-162A-15	Water Table	2/18/2011	72.4

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Historical Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-162A-15	Water Table	8/6/2011	73.5
MW-162A-15	Water Table	10/6/2011	63.6
MW-162A-15	Water Table	2/9/2012	83.9
MW-162A-15	Water Table	10/31/2012	48.1
MW-162A-15	Water Table	1/4/2013	56.9
MW-162A-15	Water Table	3/1/2013	44.2
MW-162A-15	Water Table	9/11/2013	46.2
MW-162A-15	Water Table	10/9/2013	28.8
MW-162A-15	Water Table	1/30/2014	35.9
MW-162A-15	Water Table	7/7/2014	25.1
MW-162A-15	Water Table	2/17/2015	23.5
MW-162A-15	Water Table	7/16/2015	9.77J
MW-162A-15	Water Table	1/29/2016	22.5
MW-162A-15	Water Table	7/13/2016	15.8
MW-162B-65	10-55	2/23/2010	15.4
MW-162B-65	10-55	3/16/2010	110
MW-162B-65	10-55	4/29/2010	135
MW-162B-65	10-55	5/19/2010	75.5
MW-162B-65	10-55	6/24/2010	118
MW-162B-65	10-55	8/4/2010	89.3
MW-162B-65	10-55	9/8/2010	62.2
MW-162B-65	10-55	10/18/2010	93.4
MW-162B-65	10-55	11/12/2010	63.9
MW-162B-65	10-55	2/18/2011	72.0
MW-162B-65	10-55	8/6/2011	80.6
MW-162B-65	10-55	10/6/2011	85.4
MW-162B-65	10-55	2/9/2012	84.1
MW-162B-65	10-55	10/31/2012	72.7
MW-162B-65	10-55	1/4/2013	74.1
MW-162B-65	10-55	3/1/2013	70.8
MW-162B-65	10-55	9/11/2013	63.4
MW-162B-65	10-55	10/9/2013	63.9
MW-162B-65	10-55	1/30/2014	57.1
MW-162B-65	10-55	4/7/2014	57.6
MW-162B-65	10-55	7/11/2014	54.5
MW-162B-65	10-55	10/14/2014	50.6
MW-162B-65	10-55	2/17/2015	44.6
MW-162B-65	10-55	4/13/2015	42.1
MW-162B-65	10-55	7/16/2015	36.7
MW-162B-65	10-55	10/14/2015	32.9
MW-162B-65	10-55	1/29/2016	28.5
MW-162B-65	10-55	7/13/2016	22.7
MW-163A-15	Water Table	12/11/2009	33.4
MW-163A-15	Water Table	12/11/2009	33.4
MW-163A-15	Water Table	1/20/2010	21.5
MW-163A-15	Water Table	2/15/2010	28.9
MW-163A-15	Water Table	3/18/2010	26.1
MW-163A-15	Water Table	4/29/2010	33.0
MW-163A-15	Water Table	5/18/2010	27.3
MW-163A-15	Water Table	6/28/2010	24.5
MW-163A-15	Water Table	7/7/2010	20.8
MW-163A-15	Water Table	8/2/2010	17.4

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Historical Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-163A-15	Water Table	9/8/2010	23.2
MW-163A-15	Water Table	10/18/2010	35.5
MW-163A-15	Water Table	11/12/2010	65.4
MW-163A-15	Water Table	2/25/2011	20.3
MW-163A-15	Water Table	4/12/2011	19.5
MW-163A-15	Water Table	8/5/2011	16.7
MW-163A-15	Water Table	10/6/2011	39.2
MW-163A-15	Water Table	2/8/2012	47.1
MW-163A-15	Water Table	4/26/2012	28.1
MW-163A-15	Water Table	7/19/2012	23.0
MW-163A-15	Water Table	10/30/2012	40.9
MW-163A-15	Water Table	1/4/2013	36.5
MW-163A-15	Water Table	3/5/2013	19.9
MW-163A-15	Water Table	5/3/2013	19.7
MW-163A-15	Water Table	8/28/2013	10.4J
MW-163A-15	Water Table	10/9/2013	33.6
MW-163A-15	Water Table	1/28/2014	15.8
MW-163A-15	Water Table	4/23/2014	13.6
MW-163A-15	Water Table	7/27/2014	7.95J
MW-163A-15	Water Table	10/14/2014	10.3
MW-163A-15	Water Table	2/16/2015	13.4
MW-163A-15	Water Table	4/13/2015	9.37J
MW-163A-15	Water Table	7/17/2015	8.56J
MW-163A-15	Water Table	10/14/2015	11.3
MW-163A-15	Water Table	1/25/2016	13.0
MW-163A-15	Water Table	7/13/2016	<5.05
MW-163B-40	10-55	11/3/2010	68.6
MW-163B-40	10-55	2/25/2011	42.8
MW-163B-40	10-55	4/6/2011	56.6
MW-163B-40	10-55	8/5/2011	65.5
MW-163B-40	10-55	10/6/2011	64.5
MW-163B-40	10-55	2/8/2012	52.7JL*
MW-163B-40	10-55	4/26/2012	47.2
MW-163B-40	10-55	7/19/2012	40.4
MW-163B-40	10-55	10/30/2012	34.9
MW-163B-40	10-55	1/4/2013	32.8
MW-163B-40	10-55	3/5/2013	27.4
MW-163B-40	10-55	5/3/2013	27.8
MW-163B-40	10-55	7/12/2013	27.7
MW-163B-40	10-55	10/9/2013	25.6
MW-163B-40	10-55	1/28/2014	22.4
MW-163B-40	10-55	7/27/2014	22.8
MW-163B-40	10-55	2/16/2015	15.9
MW-163B-40	10-55	7/17/2015	13.7
MW-163B-40	10-55	1/25/2016	11.5
MW-163B-40	10-55	7/13/2016	8.47J
MW-164A-15	Water Table	12/11/2009	98.7
MW-164A-15	Water Table	12/11/2009	98.7
MW-164A-15	Water Table	1/20/2010	60.4
MW-164A-15	Water Table	2/15/2010	72.8
MW-164A-15	Water Table	3/15/2010	84.4
MW-164A-15	Water Table	4/29/2010	79.1

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Historical Sulfolane Results Summary

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-164A-15	Water Table	5/18/2010	63.8
MW-164A-15	Water Table	6/23/2010	16.5
MW-164A-15	Water Table	7/6/2010	51.7
MW-164A-15	Water Table	8/2/2010	73.9
MW-164A-15	Water Table	9/8/2010	54.7
MW-164A-15	Water Table	10/18/2010	93.4
MW-164A-15	Water Table	11/9/2010	59.9
MW-164A-15	Water Table	2/24/2011	67.8
MW-164A-15	Water Table	4/6/2011	77.4
MW-164A-15	Water Table	8/4/2011	60.7
MW-164A-15	Water Table	10/3/2011	106
MW-164A-15	Water Table	2/7/2012	94.7
MW-164A-15	Water Table	4/26/2012	114
MW-164A-15	Water Table	7/18/2012	68.5
MW-164A-15	Water Table	10/25/2012	75.5J*
MW-164A-15	Water Table	1/2/2013	78.2
MW-164A-15	Water Table	3/1/2013	88.8
MW-164A-15	Water Table	5/2/2013	84.9
MW-164A-15	Water Table	7/8/2013	24.6
MW-164A-15	Water Table	10/12/2013	68.3
MW-164A-15	Water Table	1/9/2014	72.3
MW-164A-15	Water Table	4/19/2014	81.4
MW-164A-15	Water Table	8/6/2014	53.4
MW-164A-15	Water Table	10/13/2014	47.0
MW-164A-15	Water Table	2/16/2015	61.5
MW-164A-15	Water Table	4/14/2015	62.9
MW-164A-15	Water Table	7/16/2015	46.3
MW-164A-15	Water Table	10/13/2015	33.3
MW-164A-15	Water Table	1/25/2016	50.6
MW-164A-15	Water Table	7/13/2016	23.0
MW-164A-15	Water Table	1/25/2017	38.7JL*
MW-164B-50	10-55	11/1/2010	113
MW-164B-50	10-55	1/6/2011	104
MW-164B-50	10-55	4/6/2011	91.4
MW-164B-50	10-55	8/4/2011	121
MW-164B-50	10-55	10/3/2011	134
MW-164B-50	10-55	2/7/2012	131
MW-164B-50	10-55	4/25/2012	113
MW-164B-50	10-55	7/18/2012	113
MW-164B-50	10-55	10/25/2012	122J*
MW-164B-50	10-55	1/2/2013	98.1
MW-164B-50	10-55	3/1/2013	93.1
MW-164B-50	10-55	5/2/2013	85.9
MW-164B-50	10-55	7/8/2013	89.0
MW-164B-50	10-55	10/21/2013	85.2
MW-164B-50	10-55	1/9/2014	81.7
MW-164B-50	10-55	5/14/2014	70.7
MW-164B-50	10-55	8/11/2014	78.2
MW-164B-50	10-55	10/13/2014	74.5
MW-164B-50	10-55	2/16/2015	60.0
MW-164B-50	10-55	4/14/2015	57.2
MW-164B-50	10-55	7/16/2015	53.4

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Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-164B-50	10-55	10/13/2015	48.8
MW-164B-50	10-55	1/25/2016	50.4
MW-164B-50	10-55	7/13/2016	41.3
MW-164C-60	10-55	8/23/2011	114
MW-164C-60	10-55	10/3/2011	133
MW-164C-60	10-55	2/9/2012	121
MW-164C-60	10-55	4/28/2012	112
MW-164C-60	10-55	7/18/2012	107J*
MW-164C-60	10-55	10/25/2012	118J*
MW-164C-60	10-55	1/2/2013	101
MW-164C-60	10-55	3/1/2013	94.3
MW-164C-60	10-55	5/2/2013	83.3
MW-164C-60	10-55	7/8/2013	86.5
MW-164C-60	10-55	10/21/2013	83.7
MW-164C-60	10-55	1/9/2014	85.4
MW-164C-60	10-55	4/19/2014	78.9
MW-164C-60	10-55	8/6/2014	78.3
MW-164C-60	10-55	10/13/2014	69.9
MW-164C-60	10-55	2/16/2015	64.1
MW-164C-60	10-55	7/16/2015	51.6
MW-164C-60	10-55	10/13/2015	51.0
MW-164C-60	10-55	1/25/2016	52.7
MW-164C-60	10-55	7/13/2016	41.9
MW-164C-60	10-55	1/25/2017	34.1
MW-165A-15	Water Table	1/19/2010	<10.4
MW-165A-15	Water Table	2/16/2010	<10.0
MW-165A-15	Water Table	3/15/2010	<10.0
MW-165A-15	Water Table	4/27/2010	<10.3
MW-165A-15	Water Table	5/25/2010	<20.0
MW-165A-15	Water Table	6/18/2010	<10.0
MW-165A-15	Water Table	7/6/2010	<10.0
MW-165A-15	Water Table	8/2/2010	<10.0
MW-165A-15	Water Table	9/9/2010	<10.5
MW-165A-15	Water Table	10/18/2010	<10.6
MW-165A-15	Water Table	11/9/2010	<10.4
MW-165A-15	Water Table	2/24/2011	<11.0
MW-165A-15	Water Table	8/3/2011	<6.60
MW-165A-15	Water Table	10/5/2011	<6.20
MW-165A-15	Water Table	2/5/2012	<6.20
MW-165A-15	Water Table	4/26/2012	<6.46
MW-165A-15	Water Table	7/16/2012	<6.46
MW-165A-15	Water Table	10/26/2012	<6.20
MW-165A-15	Water Table	2/13/2013	<6.60
MW-165A-15	Water Table	9/11/2013	<6.32
MW-165A-15	Water Table	10/2/2013	<6.32
MW-165A-15	Water Table	1/25/2014	<5.00
MW-165A-15	Water Table	8/6/2014	<5.00
MW-165A-15	Water Table	10/8/2014	<5.00
MW-165A-15	Water Table	1/22/2015	<5.00
MW-165A-15	Water Table	4/8/2015	<5.20
MW-165A-15	Water Table	7/11/2015	<5.10
MW-165A-15	Water Table	10/5/2015	<5.10

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Historical Sulfolane Results Summary

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-165A-15	Water Table	1/11/2016	<5.15
MW-165A-15	Water Table	7/8/2016	<5.10
MW-165A-15	Water Table	7/11/2017	<5.20
MW-165B-50	10-55	11/2/2010	<10.0
MW-165B-50	10-55	1/5/2011	<13.2
MW-165B-50	10-55	5/19/2011	<3.10
MW-165B-50	10-55	8/4/2011	<6.60
MW-165B-50	10-55	10/5/2011	<6.20
MW-165B-50	10-55	2/5/2012	<6.52
MW-165B-50	10-55	4/26/2012	<6.52
MW-165B-50	10-55	7/16/2012	<6.52
MW-165B-50	10-55	10/26/2012	<6.20J*
MW-165B-50	10-55	9/11/2013	<6.20
MW-165B-50	10-55	10/2/2013	<6.46
MW-165B-50	10-55	1/25/2014	<5.15
MW-165B-50	10-55	4/7/2014	<5.00
MW-165B-50	10-55	8/6/2014	<5.20
MW-165B-50	10-55	10/8/2014	<5.00
MW-165B-50	10-55	1/22/2015	<5.00
MW-165B-50	10-55	4/8/2015	<5.00
MW-165B-50	10-55	7/11/2015	<5.10
MW-165B-50	10-55	10/5/2015	<5.00
MW-165B-50	10-55	1/11/2016	<5.05
MW-165B-50	10-55	7/8/2016	<5.10
MW-165B-50	10-55	7/11/2017	<5.60
MW-166A-15	Water Table	1/19/2010	<10.6
MW-166A-15	Water Table	2/16/2010	<10.0
MW-166A-15	Water Table	10/18/2010	<10.0
MW-166A-15	Water Table	11/9/2010	11.9
MW-166A-15	Water Table	10/4/2011	16.5
MW-166A-15	Water Table	3/9/2012	30.7
MW-166A-15	Water Table	10/8/2012	22.5
MW-166A-15	Water Table	9/11/2013	35.3
MW-166A-15	Water Table	10/2/2013	34.1
MW-166A-15	Water Table	2/6/2014	43.3
MW-166A-15	Water Table	7/15/2014	31.5
MW-166A-15	Water Table	10/1/2014	21.4
MW-166A-15	Water Table	7/15/2015	40.3
MW-166A-15	Water Table	10/9/2015	13.9
MW-166A-15	Water Table	1/25/2016	31.7
MW-166A-15	Water Table	4/22/2016	32.5
MW-166A-15	Water Table	7/12/2016	12.6
MW-166A-15	Water Table	10/12/2016	4.44J
MW-166A-15	Water Table	3/14/2017	26.9
MW-166B-30	10-55	3/17/2010	14.9
MW-166B-30	10-55	4/27/2010	12.4
MW-166B-30	10-55	5/18/2010	11.4
MW-166B-30	10-55	10/18/2010	18.1
MW-166B-30	10-55	11/9/2010	15.9
MW-166B-30	10-55	10/4/2011	37.4
MW-166B-30	10-55	3/9/2012	33.5
MW-166B-30	10-55	10/23/2012	52.8J*

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Historical Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-166B-30	10-55	1/31/2013	35.5
MW-166B-30	10-55	9/11/2013	55.8
MW-166B-30	10-55	10/2/2013	61.6
MW-166B-30	10-55	2/6/2014	51.0
MW-166B-30	10-55	7/15/2014	70.5
MW-166B-30	10-55	10/1/2014	77.9
MW-166B-30	10-55	7/15/2015	63.4
MW-166B-30	10-55	10/9/2015	71.7
MW-166B-30	10-55	1/25/2016	29.4
MW-166B-30	10-55	4/22/2016	38.7
MW-166B-30	10-55	7/12/2016	51.8
MW-166B-30	10-55	10/12/2016	75.5
MW-166B-30	10-55	3/14/2017	26.7
MW-166B-30	10-55	8/4/2017	59.7
MW-167A-15	Water Table	1/19/2010	<10.3
MW-167A-15	Water Table	2/16/2010	<10.0
MW-167A-15	Water Table	3/15/2010	<10.0
MW-167A-15	Water Table	4/28/2010	<11.8
MW-167A-15	Water Table	5/18/2010	<10.0
MW-167A-15	Water Table	6/23/2010	<10.6
MW-167A-15	Water Table	7/6/2010	<10.0
MW-167A-15	Water Table	8/2/2010	<10.0
MW-167A-15	Water Table	9/7/2010	<10.3
MW-167A-15	Water Table	10/18/2010	<10.2
MW-167A-15	Water Table	11/5/2010	<10.3
MW-167A-15	Water Table	2/24/2011	<11.1
MW-167A-15	Water Table	4/7/2011	<11.2
MW-167A-15	Water Table	8/5/2011	<6.82
MW-167A-15	Water Table	10/3/2011	3.25J
MW-167A-15	Water Table	2/6/2012	4.25J
MW-167A-15	Water Table	4/25/2012	4.22J
MW-167A-15	Water Table	7/17/2012	3.84J
MW-167A-15	Water Table	10/25/2012	5.56J*
MW-167A-15	Water Table	1/2/2013	4.24J
MW-167A-15	Water Table	3/1/2013	5.87J
MW-167A-15	Water Table	5/2/2013	3.61J
MW-167A-15	Water Table	9/11/2013	<6.60
MW-167A-15	Water Table	10/4/2013	3.97J
MW-167A-15	Water Table	1/7/2014	3.64J
MW-167A-15	Water Table	4/1/2014	5.17J
MW-167A-15	Water Table	8/8/2014	6.73J
MW-167A-15	Water Table	10/3/2014	<5.00
MW-167A-15	Water Table	1/12/2015	5.30J
MW-167A-15	Water Table	4/7/2015	5.17J
MW-167A-15	Water Table	7/9/2015	3.27J
MW-167A-15	Water Table	10/6/2015	5.30J
MW-167A-15	Water Table	1/12/2016	4.35J
MW-167A-15	Water Table	4/4/2016	5.58J
MW-167A-15	Water Table	7/7/2016	3.32J
MW-167A-15	Water Table	10/10/2016	<5.10
MW-167A-15	Water Table	1/12/2017	6.07J*
MW-167B-35	10-55	3/29/2010	<10.0

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Historical Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-167B-35	10-55	4/28/2010	<10.0
MW-167B-35	10-55	5/18/2010	<10.2
MW-167B-35	10-55	6/23/2010	<10.6
MW-167B-35	10-55	7/6/2010	<10.0
MW-167B-35	10-55	8/2/2010	<10.4
MW-167B-35	10-55	9/7/2010	<10.3
MW-167B-35	10-55	10/18/2010	<10.3
MW-167B-35	10-55	11/5/2010	<10.6
MW-167B-35	10-55	2/24/2011	<11.0
MW-167B-35	10-55	4/7/2011	<11.4
MW-167B-35	10-55	8/5/2011	5.75J
MW-167B-35	10-55	10/3/2011	7.35J
MW-167B-35	10-55	2/6/2012	9.65J
MW-167B-35	10-55	4/25/2012	8.47J
MW-167B-35	10-55	7/17/2012	8.35J
MW-167B-35	10-55	10/25/2012	9.93J*
MW-167B-35	10-55	1/2/2013	10.5
MW-167B-35	10-55	3/1/2013	11.1
MW-167B-35	10-55	5/2/2013	9.37J
MW-167B-35	10-55	7/1/2013	10.1J
MW-167B-35	10-55	10/4/2013	12.3
MW-167B-35	10-55	1/7/2014	12.8
MW-167B-35	10-55	4/1/2014	12.6
MW-167B-35	10-55	8/8/2014	12.3
MW-167B-35	10-55	10/3/2014	13.5
MW-167B-35	10-55	1/12/2015	14.1
MW-167B-35	10-55	4/7/2015	15.1
MW-167B-35	10-55	7/9/2015	14.8
MW-167B-35	10-55	10/6/2015	14.8
MW-167B-35	10-55	1/12/2016	16.1
MW-167B-35	10-55	4/4/2016	15.2
MW-167B-35	10-55	7/7/2016	15.5
MW-167B-35	10-55	10/10/2016	14.9
MW-167B-35	10-55	1/12/2017	14.1
MW-167B-35	10-55	7/21/2017	14.9
MW-168A-15	Water Table	1/19/2010	<10.3
MW-168A-15	Water Table	2/16/2010	<10.0
MW-168A-15	Water Table	8/12/2010	<10.5
MW-168A-15	Water Table	9/7/2010	<10.0
MW-168A-15	Water Table	10/18/2010	<10.0
MW-168A-15	Water Table	11/5/2010	<11.4
MW-168A-15	Water Table	2/25/2011	<10.8
MW-168A-15	Water Table	10/3/2011	8.59J
MW-168A-15	Water Table	2/10/2012	10.5J
MW-168A-15	Water Table	10/26/2012	9.11J
MW-168A-15	Water Table	1/2/2013	11.1
MW-168A-15	Water Table	9/5/2013	13.1
MW-168A-15	Water Table	10/5/2013	14.3
MW-168A-15	Water Table	1/20/2014	16.7
MW-168A-15	Water Table	7/19/2014	12.2
MW-168A-15	Water Table	10/11/2014	12.3
MW-168A-15	Water Table	2/16/2015	16.9

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Historical Sulfolane Results Summary

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-168A-15	Water Table	4/13/2015	15.0
MW-168A-15	Water Table	7/15/2015	11.9
MW-168A-15	Water Table	10/10/2015	15.5
MW-168A-15	Water Table	1/27/2016	24.9
MW-168A-15	Water Table	4/5/2016	22.6
MW-168A-15	Water Table	7/13/2016	16.7
MW-168A-15	Water Table	10/12/2016	18.7
MW-168A-15	Water Table	1/26/2017	7.55J
MW-168B-50	10-55	10/18/2011	11.7
MW-168B-50	10-55	2/10/2012	11.0J
MW-168B-50	10-55	10/26/2012	13.8
MW-168B-50	10-55	1/2/2013	14.8
MW-168B-50	10-55	9/5/2013	20.5
MW-168B-50	10-55	10/5/2013	19.5
MW-168B-50	10-55	1/20/2014	19.4
MW-168B-50	10-55	7/19/2014	22.0
MW-168B-50	10-55	10/11/2014	24.3
MW-168B-50	10-55	2/16/2015	29.4
MW-168B-50	10-55	4/13/2015	26.9
MW-168B-50	10-55	7/15/2015	31.0
MW-168B-50	10-55	10/10/2015	33.9
MW-168B-50	10-55	1/27/2016	38.0
MW-168B-50	10-55	4/5/2016	37.6
MW-168B-50	10-55	7/13/2016	42.5
MW-168B-50	10-55	10/12/2016	41.4
MW-168B-50	10-55	1/26/2017	44.3
MW-169A-15	Water Table	2/26/2010	<11.0
MW-169A-15	Water Table	3/17/2010	<10.0
MW-169A-15	Water Table	4/27/2010	<10.0
MW-169A-15	Water Table	5/19/2010	<10.0
MW-169A-15	Water Table	6/23/2010	<10.6
MW-169A-15	Water Table	7/7/2010	<10.0
MW-169A-15	Water Table	8/3/2010	16.4
MW-169A-15	Water Table	9/8/2010	13.9
MW-169A-15	Water Table	10/18/2010	14.7
MW-169A-15	Water Table	11/10/2010	<10.8
MW-169A-15	Water Table	1/11/2011	<11.2
MW-169A-15	Water Table	5/27/2011	<3.10
MW-169A-15	Water Table	8/10/2011	10.5J
MW-169A-15	Water Table	10/4/2011	9.64J
MW-169A-15	Water Table	3/12/2012	<6.20
MW-169A-15	Water Table	4/27/2012	<6.32
MW-169A-15	Water Table	7/19/2012	<6.32
MW-169A-15	Water Table	10/23/2012	5.65J
MW-169A-15	Water Table	2/1/2013	<6.40
MW-169A-15	Water Table	3/22/2013	<6.52
MW-169A-15	Water Table	10/3/2013	<6.32
MW-169A-15	Water Table	2/28/2014	<5.00
MW-169A-15	Water Table	4/7/2014	<5.30
MW-169A-15	Water Table	7/26/2014	<5.30
MW-169A-15	Water Table	10/1/2014	<5.35
MW-169A-15	Water Table	3/3/2015	<5.00

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Historical Sulfolane Results Summary

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-169A-15	Water Table	4/15/2015	<5.00
MW-169A-15	Water Table	7/16/2015	<5.15
MW-169A-15	Water Table	10/9/2015	<5.10
MW-169A-15	Water Table	1/26/2016	<5.10
MW-169A-15	Water Table	7/13/2016	<4.76
MW-169B-50	10-55	11/1/2010	<10.0
MW-169B-50	10-55	3/2/2011	<10.4
MW-169C-60	10-55	9/6/2011	<6.20
MW-169C-60	10-55	10/4/2011	<6.20
MW-169C-60	10-55	3/12/2012	6.89J
MW-169C-60	10-55	4/27/2012	4.98J
MW-169C-60	10-55	7/24/2012	<6.20
MW-169C-60	10-55	10/23/2012	<6.20J*
MW-169C-60	10-55	2/1/2013	3.64J
MW-169C-60	10-55	3/22/2013	3.66J
MW-169C-60	10-55	10/3/2013	<6.20
MW-169C-60	10-55	2/28/2014	<5.00
MW-169C-60	10-55	4/7/2014	<5.00
MW-169C-60	10-55	7/26/2014	<5.00
MW-169C-60	10-55	10/1/2014	<5.00
MW-169C-60	10-55	3/3/2015	<5.20
MW-169C-60	10-55	4/15/2015	<5.00
MW-169C-60	10-55	7/16/2015	<5.40
MW-169C-60	10-55	10/9/2015	<5.25
MW-169C-60	10-55	1/26/2016	<5.05
MW-169C-60	10-55	7/13/2016	<5.10
MW-170A-15	Water Table	2/26/2010	<10.6
MW-170A-15	Water Table	3/18/2010	<10.0
MW-170A-15	Water Table	4/29/2010	<10.3
MW-170A-15	Water Table	5/20/2010	<10.0
MW-170A-15	Water Table	6/16/2010	<10.0
MW-170A-15	Water Table	7/1/2010	<10.0
MW-170A-15	Water Table	8/3/2010	<10.3
MW-170A-15	Water Table	9/8/2010	<10.8
MW-170A-15	Water Table	10/19/2010	<10.6
MW-170A-15	Water Table	11/10/2010	<10.3
MW-170A-15	Water Table	3/6/2011	<10.9
MW-170A-15	Water Table	4/7/2011	<10.6
MW-170A-15	Water Table	8/8/2011	<6.20
MW-170A-15	Water Table	10/8/2011	<6.20
MW-170A-15	Water Table	2/11/2012	<7.12
MW-170A-15	Water Table	4/30/2012	<6.32
MW-170A-15	Water Table	7/20/2012	<6.52
MW-170A-15	Water Table	10/31/2012	<6.20
MW-170A-15	Water Table	2/14/2013	<6.20
MW-170A-15	Water Table	5/6/2013	<6.20
MW-170A-15	Water Table	5/6/2013	<6.20
MW-170A-15	Water Table	7/9/2013	<6.52
MW-170A-15	Water Table	10/9/2013	<6.20
MW-170A-15	Water Table	2/6/2014	<5.30
MW-170A-15	Water Table	7/12/2014	<5.30
MW-170A-15	Water Table	2/18/2015	<5.00

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-170A-15	Water Table	7/13/2015	<5.00
MW-170A-15	Water Table	1/28/2016	<5.00
MW-170A-15	Water Table	7/11/2016	<5.10
MW-170B-75	55-90	3/9/2010	<10.0
MW-170B-75	55-90	4/29/2010	<10.8
MW-170B-75	55-90	5/20/2010	<10.0
MW-170B-75	55-90	6/16/2010	<10.0
MW-170B-75	55-90	7/21/2010	<10.0
MW-170B-75	55-90	8/4/2010	<10.2
MW-170B-75	55-90	9/8/2010	<10.4
MW-170B-75	55-90	10/19/2010	<10.2
MW-170B-75	55-90	11/10/2010	<10.5
MW-170B-75	55-90	3/6/2011	<11.0
MW-170B-75	55-90	4/13/2011	<10.9
MW-170B-75	55-90	8/8/2011	<6.74
MW-170B-75	55-90	10/8/2011	<6.20
MW-170B-75	55-90	2/11/2012	<6.88
MW-170B-75	55-90	4/30/2012	<6.32
MW-170B-75	55-90	7/20/2012	<6.20
MW-170B-75	55-90	11/3/2012	<6.20
MW-170B-75	55-90	2/13/2013	<6.52
MW-170B-75	55-90	4/11/2013	<6.46
MW-170B-75	55-90	7/9/2013	<6.46
MW-170B-75	55-90	10/9/2013	<6.36
MW-170B-75	55-90	2/6/2014	<5.20
MW-170B-75	55-90	7/12/2014	<5.00
MW-170B-75	55-90	2/18/2015	<5.00J*
MW-170B-75	55-90	7/13/2015	<5.10
MW-170B-75	55-90	1/28/2016	<5.00
MW-170B-75	55-90	7/11/2016	<5.00
MW-170C-130	90-160	3/9/2010	<10.6
MW-170C-130	90-160	4/29/2010	<10.4
MW-170C-130	90-160	5/20/2010	<10.0
MW-170C-130	90-160	6/16/2010	<10.0
MW-170C-130	90-160	7/1/2010	<10.3
MW-170C-130	90-160	8/4/2010	<10.5
MW-170C-130	90-160	9/8/2010	<10.2
MW-170C-130	90-160	10/19/2010	<10.4
MW-170C-130	90-160	11/10/2010	<10.6
MW-170C-130	90-160	3/7/2011	<10.9
MW-170C-130	90-160	4/13/2011	<11.1
MW-170C-130	90-160	8/8/2011	<6.60
MW-170C-130	90-160	10/8/2011	<6.20
MW-170C-130	90-160	2/11/2012	<7.12
MW-170C-130	90-160	4/30/2012	<6.26
MW-170C-130	90-160	7/23/2012	<6.20
MW-170C-130	90-160	10/31/2012	<6.20
MW-170C-130	90-160	2/14/2013	<6.46
MW-170C-130	90-160	3/21/2013	<6.88
MW-170C-130	90-160	7/9/2013	<6.20
MW-170C-130	90-160	10/9/2013	<6.32
MW-170C-130	90-160	2/6/2014	<5.20

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North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-170C-130	90-160	7/12/2014	<5.00J*
MW-170C-130	90-160	2/18/2015	<5.00
MW-170C-130	90-160	7/13/2015	<5.00
MW-170C-130	90-160	1/28/2016	<5.00
MW-170C-130	90-160	7/11/2016	<5.20
MW-170D-50	10-55	11/2/2010	<10.0
MW-170D-50	10-55	3/6/2011	<11.0
MW-170D-50	10-55	4/13/2011	<11.0
MW-170D-50	10-55	8/8/2011	<6.82
MW-170D-50	10-55	10/8/2011	<6.20
MW-170D-50	10-55	2/11/2012	<7.04
MW-170D-50	10-55	4/30/2012	<6.32
MW-170D-50	10-55	7/20/2012	<6.20
MW-170D-50	10-55	11/3/2012	<6.40
MW-170D-50	10-55	2/13/2013	<6.20
MW-170D-50	10-55	4/11/2013	<6.46
MW-170D-50	10-55	7/9/2013	<6.20
MW-170D-50	10-55	10/9/2013	<6.20
MW-170D-50	10-55	2/6/2014	<5.20
MW-170D-50	10-55	7/12/2014	<5.15
MW-170D-50	10-55	2/18/2015	<5.00
MW-170D-50	10-55	7/13/2015	<5.00
MW-170D-50	10-55	1/28/2016	<5.10
MW-170D-50	10-55	7/11/2016	<5.10
MW-171A-15	Water Table	2/26/2010	<11.1
MW-171A-15	Water Table	3/19/2010	<10.0
MW-171A-15	Water Table	4/28/2010	<10.0
MW-171A-15	Water Table	5/20/2010	<10.0
MW-171A-15	Water Table	6/24/2010	<10.5
MW-171A-15	Water Table	7/9/2010	<10.6
MW-171A-15	Water Table	8/2/2010	<10.3
MW-171A-15	Water Table	9/8/2010	<10.2
MW-171A-15	Water Table	10/18/2010	<10.4
MW-171A-15	Water Table	11/12/2010	<11.6
MW-171A-15	Water Table	3/4/2011	<10.5
MW-171A-15	Water Table	4/7/2011	<11.2
MW-171A-15	Water Table	8/5/2011	<6.60
MW-171A-15	Water Table	10/6/2011	<6.20
MW-171A-15	Water Table	2/8/2012	<6.88
MW-171A-15	Water Table	4/26/2012	<6.26
MW-171A-15	Water Table	7/18/2012	<6.52
MW-171A-15	Water Table	10/30/2012	<6.52
MW-171A-15	Water Table	2/13/2013	<6.74
MW-171A-15	Water Table	4/1/2013	<6.52
MW-171A-15	Water Table	7/16/2013	<6.20
MW-171A-15	Water Table	10/11/2013	<6.36
MW-171A-15	Water Table	3/24/2014	<5.00
MW-171A-15	Water Table	7/27/2014	<5.20
MW-171A-15	Water Table	2/18/2015	<5.00
MW-171B-40	10-55	3/17/2010	<10.8
MW-171B-40	10-55	4/28/2010	<10.0
MW-171B-40	10-55	5/20/2010	<10.0

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-171B-40	10-55	6/24/2010	<10.4
MW-171B-40	10-55	7/9/2010	<10.0
MW-171B-40	10-55	8/2/2010	<10.4
MW-171B-40	10-55	9/8/2010	<10.2
MW-171B-40	10-55	10/18/2010	<10.2
MW-171B-40	10-55	11/12/2010	<10.8
MW-171B-40	10-55	3/4/2011	<10.6
MW-171B-40	10-55	4/7/2011	<11.0
MW-171B-40	10-55	8/5/2011	<6.52
MW-171B-40	10-55	10/6/2011	<6.52
MW-171B-40	10-55	2/8/2012	<6.88
MW-171B-40	10-55	4/26/2012	<6.46
MW-171B-40	10-55	7/18/2012	<6.40
MW-171B-40	10-55	10/30/2012	<6.96
MW-171B-40	10-55	2/13/2013	<6.66
MW-171B-40	10-55	4/2/2013	<6.20
MW-171B-40	10-55	7/16/2013	<6.20
MW-171B-40	10-55	10/11/2013	<6.40
MW-171B-40	10-55	3/24/2014	3.13J
MW-171B-40	10-55	7/27/2014	3.90J
MW-171B-40	10-55	2/18/2015	<5.00
MW-171BR-40	10-55	8/4/2017	<5.10
MW-172A-15	Water Table	3/29/2010	<10.5
MW-172A-15	Water Table	4/28/2010	<10.3
MW-172A-15	Water Table	5/19/2010	<10.0
MW-172A-15	Water Table	6/16/2010	<10.0
MW-172A-15	Water Table	7/9/2010	<10.0
MW-172A-15	Water Table	8/2/2010	<10.3
MW-172A-15	Water Table	9/7/2010	<10.5
MW-172A-15	Water Table	10/18/2010	<10.5
MW-172A-15	Water Table	11/5/2010	<10.9
MW-172A-15	Water Table	2/1/2011	<10.1
MW-172A-15	Water Table	4/5/2011	<10.5
MW-172A-15	Water Table	8/3/2011	<6.20
MW-172A-15	Water Table	10/1/2011	<6.32
MW-172A-15	Water Table	2/7/2012	<6.20
MW-172A-15	Water Table	4/24/2012	<6.32
MW-172A-15	Water Table	7/18/2012	<6.32
MW-172A-15	Water Table	10/20/2012	<6.32
MW-172A-15	Water Table	2/15/2013	<6.20
MW-172A-15	Water Table	4/2/2014	<5.00
MW-172A-15	Water Table	9/4/2014	<5.00
MW-172A-15	Water Table	10/2/2014	<5.00
MW-172A-15	Water Table	2/12/2015	<5.00
MW-172A-15	Water Table	4/21/2015	<5.10
MW-172A-15	Water Table	8/13/2015	<5.10
MW-172A-15	Water Table	10/7/2015	<5.30
MW-172A-15	Water Table	1/12/2016	<5.05
MW-172A-15	Water Table	7/7/2016	<5.00
MW-172A-15	Water Table	10/27/2016	<5.10
MW-172A-15	Water Table	1/27/2017	<5.15J*
MW-172B-150	90-160	3/29/2010	<10.9

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Well ID	Zone	Date	Sulfolane (µg/L)
MW-172B-150	90-160	4/29/2010	<10.0
MW-172B-150	90-160	5/19/2010	<10.0
MW-172B-150	90-160	6/16/2010	<10.0
MW-172B-150	90-160	7/21/2010	<10.0
MW-172B-150	90-160	8/4/2010	<10.4
MW-172B-150	90-160	9/8/2010	<10.2
MW-172B-150	90-160	10/18/2010	<10.6
MW-172B-150	90-160	2/24/2011	<10.8
MW-172B-150	90-160	4/5/2011	<10.3
MW-172B-150	90-160	8/3/2011	<6.20
MW-172B-150	90-160	10/1/2011	<6.46
MW-172B-150	90-160	2/7/2012	<6.52
MW-172B-150	90-160	5/2/2012	<6.20
MW-172B-150	90-160	7/23/2012	<6.66
MW-172B-150	90-160	10/30/2012	<6.20
MW-172B-150	90-160	2/15/2013	<6.20
MW-172B-150	90-160	6/3/2014	<5.45
MW-172B-150	90-160	7/12/2014	<5.00
MW-172B-150	90-160	10/2/2014	<5.00
MW-172B-150	90-160	2/12/2015	<5.00
MW-172B-150	90-160	4/21/2015	<5.00
MW-172B-150	90-160	7/8/2015	<5.10
MW-172B-150	90-160	10/7/2015	<5.00
MW-172B-150	90-160	1/12/2016	<5.00
MW-172B-150	90-160	7/7/2016	<5.10
MW-172B-150	90-160	1/27/2017	<5.10
MW-181A-15	Water Table	10/29/2010	<11.4
MW-181A-15	Water Table	1/6/2011	<11.1
MW-181A-15	Water Table	4/5/2011	<10.5
MW-181A-15	Water Table	7/26/2011	<6.88
MW-181A-15	Water Table	10/1/2011	<6.46
MW-181A-15	Water Table	2/6/2012	<6.66
MW-181A-15	Water Table	4/24/2012	<6.32
MW-181A-15	Water Table	7/16/2012	<6.52
MW-181A-15	Water Table	10/10/2012	<6.20
MW-181A-15	Water Table	2/14/2013	<6.40
MW-181A-15	Water Table	3/2/2013	<6.52
MW-181A-15	Water Table	7/1/2013	<6.20
MW-181A-15	Water Table	10/4/2013	<6.20
MW-181A-15	Water Table	1/22/2014	<5.10
MW-181A-15	Water Table	4/19/2014	<5.00
MW-181A-15	Water Table	7/17/2014	<5.00
MW-181A-15	Water Table	10/11/2014	<5.15
MW-181A-15	Water Table	2/17/2015	<5.00
MW-181A-15	Water Table	4/17/2015	<5.10
MW-181A-15	Water Table	7/15/2015	<5.10
MW-181A-15	Water Table	10/13/2015	<5.05
MW-181A-15	Water Table	1/27/2016	<5.15
MW-181A-15	Water Table	7/12/2016	<5.10
MW-181A-15	Water Table	1/27/2017	<5.05
MW-181A-15	Water Table	7/12/2017	<5.40
MW-181B-50	10-55	10/29/2010	<10.6

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Well ID	Zone	Date	Sulfolane (µg/L)
MW-181B-50	10-55	1/6/2011	<12.3
MW-181B-50	10-55	4/5/2011	<10.6
MW-181B-50	10-55	7/26/2011	<6.74
MW-181B-50	10-55	10/1/2011	<6.46
MW-181B-50	10-55	2/6/2012	<6.82
MW-181B-50	10-55	4/24/2012	<6.60
MW-181B-50	10-55	7/16/2012	<6.42
MW-181B-50	10-55	10/10/2012	<6.20
MW-181B-50	10-55	2/14/2013	<6.20
MW-181B-50	10-55	4/13/2013	<6.20
MW-181B-50	10-55	7/1/2013	<6.20
MW-181B-50	10-55	10/4/2013	<6.20
MW-181B-50	10-55	1/22/2014	<5.00
MW-181B-50	10-55	6/5/2014	<5.00
MW-181B-50	10-55	7/17/2014	<5.00
MW-181B-50	10-55	10/11/2014	<5.20
MW-181B-50	10-55	2/17/2015	<5.00
MW-181B-50	10-55	4/17/2015	<5.00
MW-181B-50	10-55	7/15/2015	<5.00
MW-181B-50	10-55	10/13/2015	<5.15
MW-181B-50	10-55	1/27/2016	<5.10
MW-181B-50	10-55	7/12/2016	<5.00
MW-181B-50	10-55	10/27/2016	<5.00
MW-181B-50	10-55	1/27/2017	<5.40
MW-181B-50	10-55	7/12/2017	<5.45
MW-181C-150	90-160	10/18/2011	<6.60
MW-181C-150	90-160	2/9/2012	<6.52
MW-181C-150	90-160	5/2/2012	<6.20
MW-181C-150	90-160	7/23/2012	<6.88
MW-181C-150	90-160	10/11/2012	<6.20
MW-181C-150	90-160	3/2/2013	<6.74
MW-181C-150	90-160	4/13/2013	<6.20
MW-181C-150	90-160	7/3/2013	<6.20
MW-181C-150	90-160	10/3/2013	<6.20
MW-181C-150	90-160	1/22/2014	<5.10
MW-181C-150	90-160	4/19/2014	<5.00
MW-181C-150	90-160	7/17/2014	<5.00
MW-181C-150	90-160	10/11/2014	<5.20J*
MW-181C-150	90-160	2/17/2015	<5.00
MW-181C-150	90-160	4/17/2015	<5.00
MW-181C-150	90-160	7/15/2015	<5.10
MW-181C-150	90-160	10/13/2015	<5.10
MW-181C-150	90-160	1/27/2016	<5.10
MW-181C-150	90-160	7/12/2016	<5.05
MW-181C-150	90-160	10/27/2016	<5.05
MW-181C-150	90-160	1/27/2017	<5.50
MW-181C-150	90-160	7/12/2017	<5.55
MW-182A-15	Water Table	11/1/2010	14.9
MW-182A-15	Water Table	7/26/2011	19.5
MW-182A-15	Water Table	10/3/2011	24.1
MW-182A-15	Water Table	2/6/2012	25.3
MW-182A-15	Water Table	4/25/2012	22.9

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Well ID	Zone	Date	Sulfolane (µg/L)
MW-182A-15	Water Table	7/18/2012	23.3
MW-182A-15	Water Table	10/19/2012	21.3
MW-182A-15	Water Table	1/2/2013	22.3
MW-182A-15	Water Table	3/4/2013	25.5
MW-182A-15	Water Table	5/2/2013	21.4
MW-182A-15	Water Table	9/4/2014	15.8
MW-182A-15	Water Table	10/3/2014	19.5
MW-182A-15	Water Table	1/12/2015	26.8
MW-182A-15	Water Table	4/21/2015	24.4
MW-182A-15	Water Table	7/9/2015	15.5
MW-182A-15	Water Table	10/12/2015	15.7
MW-182A-15	Water Table	1/19/2016	27.1
MW-182A-15	Water Table	4/4/2016	23.4
MW-182A-15	Water Table	7/7/2016	4.74J
MW-182A-15	Water Table	10/11/2016	19.8
MW-182A-15	Water Table	1/12/2017	24.5
MW-182B-45	10-55	10/25/2011	26.0
MW-182B-45	10-55	10/3/2011	19.5
MW-182B-45	10-55	2/7/2012	24.9
MW-182B-45	10-55	7/18/2012	17.5J*
MW-182B-45	10-55	10/19/2012	24.7
MW-182B-45	10-55	1/2/2013	25.5
MW-182B-45	10-55	3/4/2013	24.1
MW-182B-45	10-55	10/5/2013	23.3
MW-182B-45	10-55	1/8/2014	27.1
MW-182B-45	10-55	4/1/2014	24.3
MW-182B-45	10-55	7/7/2014	25.9
MW-182B-45	10-55	10/3/2014	27.5
MW-182B-45	10-55	1/12/2015	30.7
MW-182B-45	10-55	4/21/2015	28.9
MW-182B-45	10-55	7/9/2015	30.2
MW-182B-45	10-55	10/12/2015	28.6
MW-182B-45	10-55	1/19/2016	31.1
MW-182B-45	10-55	4/4/2016	26.0
MW-182B-45	10-55	7/7/2016	29.5
MW-182B-45	10-55	10/11/2016	32.2
MW-182B-45	10-55	1/12/2017	32.2J*
MW-183A-15	Water Table	11/2/2010	68.6
MW-183A-15	Water Table	1/4/2011	87.7
MW-183A-15	Water Table	8/10/2011	4.86J
MW-183A-15	Water Table	10/14/2011	87.1
MW-183A-15	Water Table	10/30/2012	95.3
MW-183A-15	Water Table	10/3/2013	75.2
MW-183A-15	Water Table	1/21/2014	88.5
MW-183A-15	Water Table	7/7/2014	<5.20
MW-183A-15	Water Table	10/7/2014	54.6
MW-183A-15	Water Table	1/12/2015	62.2
MW-183A-15	Water Table	8/13/2015	54.4
MW-183A-15	Water Table	10/14/2015	32.8
MW-183A-15	Water Table	1/11/2016	43.5
MW-183A-15	Water Table	7/9/2016	4.63J
MW-183B-60	10-55	9/2/2011	136

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Well ID	Zone	Date	Sulfolane (µg/L)
MW-183B-60	10-55	10/14/2011	145
MW-183B-60	10-55	10/31/2012	141
MW-183B-60	10-55	9/11/2013	123
MW-183B-60	10-55	10/3/2013	129
MW-183B-60	10-55	1/21/2014	118
MW-183B-60	10-55	7/7/2014	112
MW-183B-60	10-55	10/7/2014	92.3
MW-183B-60	10-55	1/12/2015	88.9
MW-183B-60	10-55	8/13/2015	71.5
MW-183B-60	10-55	10/14/2015	72.7
MW-183B-60	10-55	1/11/2016	63.8
MW-183B-60	10-55	7/9/2016	56.2
MW-183B-60	10-55	1/31/2017	40.8
MW-184-45	10-55	11/1/2010	<10.2
MW-184-45	10-55	1/6/2011	<11.0
MW-184-45	10-55	4/13/2011	<11.0
MW-184-45	10-55	8/3/2011	<6.20
MW-184-45	10-55	10/14/2011	<6.20
MW-184-45	10-55	2/11/2012	<6.88
MW-184-45	10-55	4/28/2012	<6.46
MW-184-45	10-55	7/19/2012	<6.46
MW-184-45	10-55	10/22/2012	<6.20
MW-184-45	10-55	2/28/2013	<6.52
MW-184-45	10-55	4/15/2013	<6.40
MW-184-45	10-55	7/15/2013	<6.52
MW-184-45	10-55	10/11/2013	<6.32
MW-184-45	10-55	2/3/2014	<5.20
MW-184-45	10-55	4/10/2014	<5.45
MW-184-45	10-55	7/8/2014	<5.25
MW-184-45	10-55	10/10/2014	<5.00
MW-184-45	10-55	2/13/2015	<5.00J*
MW-184-45	10-55	4/9/2015	<5.15
MW-184-45	10-55	7/14/2015	<5.10
MW-184-45	10-55	10/12/2015	<5.30
MW-184-45	10-55	1/28/2016	<5.10
MW-184-45	10-55	7/13/2016	<5.05
MW-185A-15	Water Table	10/29/2010	<11.0
MW-185A-15	Water Table	1/12/2011	<11.8
MW-185A-15	Water Table	7/26/2011	<6.74
MW-185A-15	Water Table	10/1/2011	3.63J
MW-185A-15	Water Table	2/7/2012	5.57J
MW-185A-15	Water Table	7/19/2012	3.35J
MW-185A-15	Water Table	10/19/2012	<6.20
MW-185A-15	Water Table	1/3/2013	3.37J
MW-185A-15	Water Table	8/29/2013	<6.32
MW-185A-15	Water Table	10/5/2013	<6.20
MW-185A-15	Water Table	1/26/2014	<5.00
MW-185A-15	Water Table	4/2/2014	3.15J
MW-185A-15	Water Table	7/8/2014	3.17J
MW-185A-15	Water Table	10/3/2014	<5.00
MW-185A-15	Water Table	1/16/2015	<5.00
MW-185A-15	Water Table	4/6/2015	<5.10

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Well ID	Zone	Date	Sulfolane (µg/L)
MW-185A-15	Water Table	7/9/2015	<5.00
MW-185A-15	Water Table	10/6/2015	<5.10
MW-185A-15	Water Table	1/11/2016	<5.10
MW-185A-15	Water Table	4/21/2016	<5.25
MW-185A-15	Water Table	7/7/2016	<5.15
MW-185A-15	Water Table	10/10/2016	<5.05
MW-185A-15	Water Table	1/27/2017	<5.20
MW-185B-50	10-55	10/29/2010	<10.7
MW-185B-50	10-55	1/12/2011	<10.5
MW-185B-50	10-55	7/26/2011	10.1J
MW-185B-50	10-55	10/1/2011	10.9
MW-185B-50	10-55	2/7/2012	10.7J
MW-185B-50	10-55	7/19/2012	9.03J
MW-185B-50	10-55	10/20/2012	9.48J
MW-185B-50	10-55	1/3/2013	8.89J
MW-185B-50	10-55	8/29/2013	7.06J
MW-185B-50	10-55	10/5/2013	6.69J
MW-185B-50	10-55	1/26/2014	6.78J
MW-185B-50	10-55	4/2/2014	6.28J
MW-185B-50	10-55	7/8/2014	6.40J
MW-185B-50	10-55	10/3/2014	6.97J
MW-185B-50	10-55	1/16/2015	7.23J
MW-185B-50	10-55	4/6/2015	7.08J
MW-185B-50	10-55	7/9/2015	7.38J
MW-185B-50	10-55	10/6/2015	6.37J
MW-185B-50	10-55	1/11/2016	7.03J
MW-185B-50	10-55	4/21/2016	6.34J
MW-185B-50	10-55	7/7/2016	6.55J
MW-185B-50	10-55	10/10/2016	6.73J
MW-185B-50	10-55	1/27/2017	6.02J
MW-185B-50	10-55	7/12/2017	6.60J
MW-185C-120	90-160	10/25/2011	3.65J
MW-185C-120	90-160	2/9/2012	<7.12
MW-185C-120	90-160	7/23/2012	<6.74
MW-185C-120	90-160	10/20/2012	4.22J
MW-185C-120	90-160	1/3/2013	<6.46
MW-185C-120	90-160	8/29/2013	<6.32
MW-185C-120	90-160	10/5/2013	3.57J
MW-185C-120	90-160	1/26/2014	3.28J
MW-185C-120	90-160	4/2/2014	<5.00
MW-185C-120	90-160	7/8/2014	4.00J
MW-185C-120	90-160	10/3/2014	6.14J
MW-185C-120	90-160	1/16/2015	4.49J
MW-185C-120	90-160	4/6/2015	3.36J
MW-185C-120	90-160	7/9/2015	5.16J
MW-185C-120	90-160	10/6/2015	6.11J
MW-185C-120	90-160	1/11/2016	6.44J
MW-185C-120	90-160	4/5/2016	3.87J
MW-185C-120	90-160	7/7/2016	5.09J
MW-185C-120	90-160	10/10/2016	6.91J
MW-185C-120	90-160	1/27/2017	6.06J*
MW-185C-120	90-160	7/12/2017	6.75J

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Historical Sulfolane Results Summary

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-187-15	Water Table	11/1/2010	<10.0
MW-187-15	Water Table	3/2/2011	<10.2
MW-187-15	Water Table	5/27/2011	<3.41
MW-187-15	Water Table	8/10/2011	3.74J
MW-187-15	Water Table	10/4/2011	4.67J
MW-187-15	Water Table	3/12/2012	3.74J
MW-187-15	Water Table	4/27/2012	3.41J
MW-187-15	Water Table	7/19/2012	4.62J
MW-187-15	Water Table	10/23/2012	5.65J
MW-187-15	Water Table	2/1/2013	5.11J
MW-187-15	Water Table	3/21/2013	4.95J
MW-187-15	Water Table	5/7/2013	5.36J
MW-187-15	Water Table	7/8/2013	7.07J
MW-187-15	Water Table	10/4/2013	4.54J
MW-187-15	Water Table	2/27/2014	5.35J
MW-187-15	Water Table	4/8/2014	5.89J
MW-187-15	Water Table	7/26/2014	3.51J
MW-187-15	Water Table	10/1/2014	4.28J
MW-187-15	Water Table	3/3/2015	3.59J
MW-187-15	Water Table	4/14/2015	3.95J
MW-187-15	Water Table	7/16/2015	5.24J
MW-187-15	Water Table	10/9/2015	3.45J
MW-187-15	Water Table	1/26/2016	4.73J
MW-187-15	Water Table	4/21/2016	3.72J
MW-187-15	Water Table	7/13/2016	5.83J
MW-187-15	Water Table	10/12/2016	3.93J
MW-187-15	Water Table	3/13/2017	5.61J
MW-188A-15	Water Table	5/4/2012	<6.20
MW-188B-40	10-55	1/6/2011	<11.2
MW-188B-40	10-55	10/1/2011	<6.40
MW-188B-40	10-55	2/13/2012	<6.88
MW-189A-15	Water Table	8/23/2011	<6.20
MW-189A-15	Water Table	10/11/2011	<6.20
MW-189A-15	Water Table	2/6/2012	<6.74
MW-189A-15	Water Table	10/10/2012	<6.20
MW-189A-15	Water Table	9/4/2014	<5.45
MW-189A-15	Water Table	10/3/2014	<5.00
MW-189A-15	Water Table	2/12/2015	<5.00
MW-189A-15	Water Table	8/13/2015	<5.10
MW-189A-15	Water Table	10/5/2015	<5.25
MW-189A-15	Water Table	1/11/2016	<5.05
MW-189A-15	Water Table	7/6/2016	<5.10
MW-189A-15	Water Table	1/27/2017	<5.60
MW-189B-60	10-55	8/23/2011	<6.20
MW-189B-60	10-55	10/11/2011	<6.52
MW-189B-60	10-55	2/6/2012	<6.66
MW-189B-60	10-55	10/10/2012	<6.20
MW-189B-60	10-55	9/4/2014	<5.20
MW-189B-60	10-55	10/3/2014	<5.00
MW-189B-60	10-55	2/12/2015	<5.00
MW-189B-60	10-55	8/13/2015	<5.00
MW-189B-60	10-55	10/5/2015	<5.10

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Well ID	Zone	Date	Sulfolane (µg/L)
MW-189B-60	10-55	1/11/2016	<5.10
MW-189B-60	10-55	7/6/2016	<5.10
MW-189B-60	10-55	1/27/2017	<5.60
MW-190A-15	Water Table	9/2/2011	<6.20
MW-190A-15	Water Table	10/14/2011	<6.20
MW-190A-15	Water Table	2/8/2012	<6.88
MW-190A-15	Water Table	5/1/2012	<6.46
MW-190A-15	Water Table	7/18/2012	<6.20
MW-190A-15	Water Table	10/22/2012	<6.32
MW-190A-15	Water Table	2/14/2013	<6.52
MW-190A-15	Water Table	4/2/2013	<6.20
MW-190A-15	Water Table	8/30/2013	<6.20
MW-190A-15	Water Table	10/5/2013	<6.20
MW-190A-15	Water Table	1/27/2014	<5.20
MW-190A-15	Water Table	4/3/2014	<5.00
MW-190A-15	Water Table	7/8/2014	<5.20
MW-190A-15	Water Table	10/7/2014	<5.00
MW-190A-15	Water Table	1/15/2015	<5.00
MW-190A-15	Water Table	4/6/2015	<5.25
MW-190A-15	Water Table	7/9/2015	<5.00
MW-190A-15	Water Table	10/7/2015	<5.25
MW-190A-15	Water Table	1/14/2016	<5.20
MW-190A-15	Water Table	7/8/2016	<5.05
MW-190A-15	Water Table	2/6/2017	<5.10
MW-190BR-60	10-55	9/2/2011	<6.20
MW-190BR-60	10-55	10/14/2011	<6.20
MW-190BR-60	10-55	2/8/2012	<7.04
MW-190BR-60	10-55	5/24/2013	<6.20
MW-190BR-60	10-55	7/15/2013	<6.20
MW-190BR-60	10-55	10/8/2013	<6.20
MW-190BR-60	10-55	1/27/2014	<5.00
MW-190BR-60	10-55	4/3/2014	<5.00
MW-190BR-60	10-55	7/8/2014	<5.00
MW-190BR-60	10-55	10/7/2014	<5.00
MW-190BR-60	10-55	1/15/2015	<5.00
MW-190BR-60	10-55	4/6/2015	<5.15
MW-190BR-60	10-55	7/9/2015	<5.15
MW-190BR-60	10-55	10/7/2015	<5.25
MW-190BR-60	10-55	1/14/2016	<5.15
MW-190BR-60	10-55	7/8/2016	<5.20
MW-190BR-60	10-55	2/6/2017	<5.10
MW-190BR-60	10-55	7/25/2017	<5.05
MW-190-150	90-160	6/4/2013	<6.20
MW-190-150	90-160	7/15/2013	<6.20
MW-190-150	90-160	10/5/2013	<6.20
MW-190-150	90-160	1/26/2014	<5.00
MW-190-150	90-160	4/3/2014	<5.00
MW-190-150	90-160	7/12/2014	<5.20
MW-190-150	90-160	10/7/2014	<5.00
MW-190-150	90-160	1/15/2015	<5.00
MW-190-150	90-160	4/6/2015	<5.00
MW-190-150	90-160	7/9/2015	<5.00

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-190-150	90-160	10/7/2015	<5.10
MW-190-150	90-160	1/14/2016	<5.05
MW-190-150	90-160	7/8/2016	<5.15
MW-190-150	90-160	2/6/2017	<5.10
MW-190-150	90-160	7/25/2017	<5.05
MW-191A-15	Water Table	9/2/2011	<6.20
MW-191A-15	Water Table	10/10/2011	<6.20
MW-191A-15	Water Table	2/12/2012	<6.66
MW-191A-15	Water Table	4/26/2012	<6.60
MW-191A-15	Water Table	7/13/2012	<6.32
MW-191A-15	Water Table	10/10/2012	<6.52
MW-191A-15	Water Table	2/14/2013	<6.46
MW-191A-15	Water Table	3/6/2013	<6.60
MW-191A-15	Water Table	8/30/2013	<6.20
MW-191A-15	Water Table	10/2/2013	<6.20
MW-191A-15	Water Table	2/3/2014	<5.45
MW-191A-15	Water Table	4/7/2014	<5.00
MW-191A-15	Water Table	7/16/2014	<5.00
MW-191A-15	Water Table	10/8/2014	<5.00
MW-191A-15	Water Table	1/22/2015	<5.20
MW-191A-15	Water Table	7/11/2015	<5.25
MW-191A-15	Water Table	10/5/2015	<5.10
MW-191A-15	Water Table	1/11/2016	<5.05
MW-191A-15	Water Table	7/8/2016	<5.10
MW-191A-15	Water Table	1/31/2017	<5.60
MW-191A-15	Water Table	7/12/2017	<5.10
MW-191B-60	10-55	9/2/2011	<6.20
MW-191B-60	10-55	10/10/2011	<6.20
MW-191B-60	10-55	2/12/2012	<6.74
MW-191B-60	10-55	4/26/2012	<6.82
MW-191B-60	10-55	7/13/2012	3.56J
MW-191B-60	10-55	10/10/2012	<6.20
MW-191B-60	10-55	2/14/2013	<6.20
MW-191B-60	10-55	3/6/2013	<6.82
MW-191B-60	10-55	8/30/2013	<6.20
MW-191B-60	10-55	10/2/2013	<6.40
MW-191B-60	10-55	2/3/2014	<5.30
MW-191B-60	10-55	4/7/2014	<5.00
MW-191B-60	10-55	7/16/2014	<5.00
MW-191B-60	10-55	10/8/2014	<5.00
MW-191B-60	10-55	1/22/2015	<5.00
MW-191B-60	10-55	4/8/2015	<5.00
MW-191B-60	10-55	7/11/2015	<5.00
MW-191B-60	10-55	10/5/2015	<5.10
MW-191B-60	10-55	1/11/2016	<5.10
MW-191B-60	10-55	7/8/2016	<4.95
MW-191B-60	10-55	1/31/2017	<5.75
MW-191B-60	10-55	7/12/2017	<5.70
MW-193A-15	Water Table	9/7/2011	6.60J
MW-193A-15	Water Table	10/4/2011	5.26J
MW-193A-15	Water Table	3/12/2012	7.80J
MW-193A-15	Water Table	4/27/2012	7.11J

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Well ID	Zone	Date	Sulfolane (µg/L)
MW-193A-15	Water Table	7/19/2012	5.85J
MW-193A-15	Water Table	10/18/2012	4.85J
MW-193A-15	Water Table	2/1/2013	5.30J
MW-193A-15	Water Table	5/7/2013	6.17J
MW-193A-15	Water Table	7/3/2013	5.27J
MW-193A-15	Water Table	10/4/2013	<6.40
MW-193A-15	Water Table	2/28/2014	4.70J
MW-193A-15	Water Table	4/7/2014	4.88J
MW-193A-15	Water Table	7/26/2014	<5.25
MW-193A-15	Water Table	10/1/2014	<5.00
MW-193A-15	Water Table	3/3/2015	<5.00
MW-193A-15	Water Table	4/15/2015	<5.00
MW-193A-15	Water Table	7/16/2015	<5.15
MW-193A-15	Water Table	10/12/2015	<5.10
MW-193A-15	Water Table	1/27/2016	<5.05
MW-193A-15	Water Table	7/13/2016	<5.10
MW-193B-60	10-55	9/6/2011	3.67J
MW-193B-60	10-55	10/4/2011	3.91J
MW-193B-60	10-55	3/12/2012	<6.20
MW-193B-60	10-55	4/27/2012	<6.40
MW-193B-60	10-55	7/19/2012	3.29J
MW-193B-60	10-55	10/18/2012	<6.52
MW-193B-60	10-55	2/1/2013	<6.20
MW-193B-60	10-55	5/7/2013	<6.20
MW-193B-60	10-55	7/3/2013	<6.52
MW-193B-60	10-55	10/4/2013	<6.32
MW-193B-60	10-55	2/28/2014	<5.00
MW-193B-60	10-55	4/7/2014	<5.00
MW-193B-60	10-55	7/26/2014	<5.00
MW-193B-60	10-55	10/1/2014	<5.00
MW-193B-60	10-55	3/3/2015	<5.00
MW-193B-60	10-55	4/15/2015	<5.00
MW-193B-60	10-55	7/16/2015	<5.20
MW-193B-60	10-55	10/12/2015	<5.15
MW-193B-60	10-55	1/27/2016	<5.05
MW-193B-60	10-55	7/13/2016	<5.05
MW-194A-15	Water Table	9/6/2011	26.3
MW-194A-15	Water Table	10/10/2011	20.0
MW-194A-15	Water Table	3/9/2012	32.2
MW-194A-15	Water Table	4/26/2012	41.3
MW-194A-15	Water Table	7/17/2012	37.9
MW-194A-15	Water Table	10/10/2012	15.0
MW-194A-15	Water Table	1/31/2013	16.0
MW-194A-15	Water Table	3/20/2013	25.3
MW-194A-15	Water Table	9/3/2013	43.3
MW-194A-15	Water Table	10/2/2013	38.3
MW-194A-15	Water Table	2/6/2014	13.8
MW-194A-15	Water Table	4/7/2014	18.6
MW-194A-15	Water Table	7/15/2014	16.1
MW-194A-15	Water Table	10/1/2014	12.3
MW-194A-15	Water Table	3/2/2015	39.4
MW-194A-15	Water Table	4/15/2015	27.1

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Flint Hills Resources Alaska, LLC
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Well ID	Zone	Date	Sulfolane (µg/L)
MW-194A-15	Water Table	7/15/2015	20.5
MW-194A-15	Water Table	10/9/2015	10.5
MW-194A-15	Water Table	1/27/2016	5.27J
MW-194A-15	Water Table	4/22/2016	7.94J
MW-194A-15	Water Table	7/12/2016	14.9
MW-194A-15	Water Table	10/12/2016	9.84J
MW-194A-15	Water Table	3/14/2017	19.3
MW-194B-40	10-55	9/6/2011	43.1
MW-194B-40	10-55	10/10/2011	45.4
MW-194B-40	10-55	3/9/2012	75.4
MW-194B-40	10-55	7/17/2012	66.0
MW-194B-40	10-55	10/10/2012	37.1
MW-194B-40	10-55	1/31/2013	68.4
MW-194B-40	10-55	3/20/2013	79.0
MW-194B-40	10-55	9/3/2013	74.2
MW-194B-40	10-55	10/2/2013	59.1
MW-194B-40	10-55	2/6/2014	76.5
MW-194B-40	10-55	4/7/2014	107
MW-194B-40	10-55	7/15/2014	53.8
MW-194B-40	10-55	10/1/2014	20.7J*
MW-194B-40	10-55	3/2/2015	88.6
MW-194B-40	10-55	4/15/2015	88.2
MW-194B-40	10-55	7/15/2015	88.9
MW-194B-40	10-55	10/9/2015	14.0
MW-194B-40	10-55	1/27/2016	54.8
MW-194B-40	10-55	4/22/2016	67.1
MW-194B-40	10-55	7/12/2016	35.1
MW-194B-40	10-55	10/12/2016	16.0
MW-194B-40	10-55	3/14/2017	54.8
MW-308-15	Water Table	6/8/2012	5.53J*
MW-308-15	Water Table	8/2/2012	6.64J
MW-308-15	Water Table	10/10/2012	7.39J
MW-308-15	Water Table	1/31/2013	9.61J
MW-308-15	Water Table	3/21/2013	8.23J
MW-308-15	Water Table	5/7/2013	9.54J
MW-308-15	Water Table	7/1/2013	8.34J
MW-308-15	Water Table	10/2/2013	9.86J
MW-308-15	Water Table	2/6/2014	14.0
MW-308-15	Water Table	4/7/2014	16.7
MW-308-15	Water Table	7/16/2014	4.90J
MW-308-15	Water Table	10/1/2014	10.1J
MW-308-15	Water Table	3/2/2015	10.2
MW-308-15	Water Table	4/15/2015	9.24J
MW-308-15	Water Table	7/13/2015	4.97J*
MW-308-15	Water Table	10/9/2015	3.34J
MW-308-15	Water Table	1/25/2016	9.04J
MW-308-15	Water Table	4/21/2016	10.2
MW-308-15	Water Table	7/12/2016	4.02J
MW-308-15	Water Table	10/12/2016	6.91J
MW-308-15	Water Table	3/14/2017	5.87J
MW-308-30	10-55	6/8/2012	11.4
MW-311-15	Water Table	5/4/2012	<6.20

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North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-311-15	Water Table	7/16/2012	<6.52
MW-311-15	Water Table	10/10/2012	<6.20
MW-311-15	Water Table	2/28/2013	<6.46
MW-311-15	Water Table	7/1/2013	<6.46
MW-311-15	Water Table	10/2/2013	<6.20
MW-311-15	Water Table	2/3/2014	<5.00
MW-311-15	Water Table	7/12/2014	<5.10
MW-311-15	Water Table	2/12/2015	<5.00
MW-311-15	Water Table	7/8/2015	<5.00
MW-311-15	Water Table	1/11/2016	<5.05
MW-311-15	Water Table	7/6/2016	<5.10
MW-311-15	Water Table	7/12/2017	<5.45
MW-311-46	10-55	5/4/2012	<6.20
MW-311-46	10-55	7/16/2012	<6.42
MW-311-46	10-55	10/10/2012	<6.20
MW-311-46	10-55	4/9/2013	<6.20
MW-311-46	10-55	9/3/2013	<6.46
MW-311-46	10-55	10/2/2013	<6.32
MW-311-46	10-55	2/3/2014	<5.00
MW-311-46	10-55	7/12/2014	<5.10
MW-311-46	10-55	2/12/2015	<5.00
MW-311-46	10-55	7/8/2015	<5.00
MW-311-46	10-55	1/11/2016	<5.05
MW-311-46	10-55	7/6/2016	<5.05
MW-311-46	10-55	7/12/2017	<5.20
MW-312-15	Water Table	5/4/2012	<6.20
MW-312-50	10-55	5/5/2012	<6.20
MW-313-15	Water Table	5/5/2012	<6.20
MW-313-15	Water Table	7/12/2017	<5.40
MW-313-150	90-160	5/16/2012	<6.20
MW-313-150	90-160	7/21/2017	<5.30
MW-314-15	Water Table	5/5/2012	<6.20
MW-314-15	Water Table	7/16/2012	<6.20
MW-314-15	Water Table	10/10/2012	<6.20
MW-314-15	Water Table	2/15/2013	<6.20
MW-314-15	Water Table	4/13/2013	<6.46
MW-314-15	Water Table	7/3/2013	<6.20
MW-314-15	Water Table	10/3/2013	<6.20
MW-314-15	Water Table	2/3/2014	<5.00
MW-314-15	Water Table	4/9/2014	<5.00
MW-314-15	Water Table	7/2/2014	<5.00
MW-314-15	Water Table	10/2/2014	<5.00
MW-314-15	Water Table	2/12/2015	<5.00
MW-314-15	Water Table	4/21/2015	<5.00
MW-314-15	Water Table	7/8/2015	<5.15
MW-314-15	Water Table	10/7/2015	<5.25
MW-314-15	Water Table	1/12/2016	<5.10
MW-314-15	Water Table	7/7/2016	<5.00
MW-314-15	Water Table	10/27/2016	<5.05
MW-314-15	Water Table	1/31/2017	<5.00
MW-314-15	Water Table	7/12/2017	<6.15
MW-314-150	90-160	6/4/2012	<6.20

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North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-314-150	90-160	7/25/2012	<6.74
MW-314-150	90-160	10/11/2012	<6.20
MW-314-150	90-160	2/15/2013	<6.52
MW-314-150	90-160	4/13/2013	<6.20
MW-314-150	90-160	7/3/2013	<6.20
MW-314-150	90-160	10/3/2013	<6.20
MW-314-150	90-160	2/3/2014	<5.00
MW-314-150	90-160	4/9/2014	<5.00
MW-314-150	90-160	7/2/2014	<5.15
MW-314-150	90-160	10/2/2014	<5.20
MW-314-150	90-160	2/12/2015	<5.15
MW-314-150	90-160	4/21/2015	<5.00
MW-314-150	90-160	7/8/2015	<5.00
MW-314-150	90-160	10/7/2015	<5.05
MW-314-150	90-160	1/12/2016	<5.10
MW-314-150	90-160	7/7/2016	<5.05
MW-314-150	90-160	10/27/2016	<5.00
MW-314-150	90-160	1/31/2017	<5.05
MW-314-150	90-160	7/20/2017	<5.15
MW-315-15	Water Table	5/9/2012	<6.20
MW-315-150	90-160	5/9/2012	<6.20
MW-316-15	Water Table	5/14/2012	3.36J*
MW-316-15	Water Table	7/17/2012	4.47J
MW-316-15	Water Table	10/22/2012	4.06J
MW-316-15	Water Table	2/14/2013	4.39J
MW-316-15	Water Table	4/12/2013	3.59J
MW-316-15	Water Table	7/17/2013	<6.32
MW-316-15	Water Table	10/7/2013	3.38J
MW-316-15	Water Table	2/3/2014	<5.25
MW-316-15	Water Table	7/8/2014	<5.00
MW-316-15	Water Table	10/9/2014	<5.20
MW-316-15	Water Table	2/13/2015	<5.00J*
MW-316-15	Water Table	4/9/2015	<5.00
MW-316-15	Water Table	7/14/2015	<5.10
MW-316-15	Water Table	10/8/2015	<5.10
MW-316-15	Water Table	1/26/2016	<5.10
MW-316-15	Water Table	4/5/2016	<5.10
MW-316-15	Water Table	7/12/2016	<5.05
MW-316-15	Water Table	10/11/2016	<5.05
MW-316-15	Water Table	1/12/2017	<5.10J*
MW-316-56	10-55	6/4/2012	<6.20
MW-316-56	10-55	7/17/2012	<6.52
MW-316-56	10-55	10/22/2012	<6.20
MW-316-56	10-55	2/14/2013	<6.20
MW-316-56	10-55	4/12/2013	<6.46
MW-316-56	10-55	7/17/2013	<6.52
MW-316-56	10-55	10/7/2013	<6.20
MW-316-56	10-55	2/3/2014	<5.40
MW-316-56	10-55	4/10/2014	<5.25
MW-316-56	10-55	7/8/2014	<5.00
MW-316-56	10-55	10/9/2014	<5.00
MW-316-56	10-55	2/13/2015	<5.00J*

Appendix B-2
Historical Sulfolane Results Summary

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-316-56	10-55	4/9/2015	<5.45
MW-316-56	10-55	7/14/2015	<5.30
MW-316-56	10-55	10/8/2015	<5.10
MW-316-56	10-55	1/26/2016	<5.15
MW-316-56	10-55	7/12/2016	<5.05
MW-317-15	Water Table	5/10/2012	14.0
MW-317-15	Water Table	7/18/2012	11.4
MW-317-15	Water Table	11/10/2012	8.07J
MW-317-15	Water Table	8/27/2013	5.29J
MW-317-15	Water Table	10/11/2013	4.84J
MW-317-15	Water Table	2/3/2014	5.08J
MW-317-15	Water Table	7/14/2014	<5.15
MW-317-15	Water Table	10/9/2014	<5.15
MW-317-15	Water Table	7/14/2015	3.24JL*
MW-317-15	Water Table	10/8/2015	<5.30
MW-317-15	Water Table	1/27/2016	<5.00
MW-317-15	Water Table	7/12/2016	<4.94
MW-317-71	55-90	6/5/2012	19.1
MW-317-71	55-90	8/8/2012	21.0
MW-317-71	55-90	11/10/2012	19.1
MW-317-71	55-90	8/27/2013	9.65J
MW-317-71	55-90	10/9/2013	8.99J
MW-317-71	55-90	2/3/2014	4.18J
MW-317-71	55-90	7/15/2014	4.27J
MW-317-71	55-90	10/9/2014	<5.20
MW-317-71	55-90	2/18/2015	<5.00
MW-317-71	55-90	7/14/2015	<5.25
MW-317-71	55-90	10/8/2015	<5.15
MW-317-71	55-90	1/27/2016	<5.05
MW-317-71	55-90	7/12/2016	<5.10
MW-318-20	Water Table	5/14/2012	<6.20
MW-318-20	Water Table	7/23/2012	<6.20
MW-318-20	Water Table	10/30/2012	<6.20
MW-318-20	Water Table	2/15/2013	<6.66
MW-318-20	Water Table	4/12/2013	<6.46
MW-318-20	Water Table	9/7/2013	<6.40
MW-318-20	Water Table	10/3/2013	<6.20
MW-318-20	Water Table	7/26/2014	<5.00
MW-318-20	Water Table	7/15/2015	<5.20
MW-318-20	Water Table	7/13/2016	<5.10
MW-318-135	90-160	5/14/2012	<6.46
MW-318-135	90-160	7/24/2012	<6.52
MW-318-135	90-160	10/30/2012	<6.20
MW-318-135	90-160	2/15/2013	<6.20
MW-318-135	90-160	4/12/2013	<6.46
MW-318-135	90-160	7/15/2013	<6.20
MW-318-135	90-160	10/3/2013	<6.32
MW-318-135	90-160	7/26/2014	<5.00J*
MW-318-135	90-160	7/15/2015	<5.15
MW-318-135	90-160	7/13/2016	<5.05
MW-319-15	Water Table	5/10/2012	<6.20
MW-319-45	10-55	5/10/2012	<6.20

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Historical Sulfolane Results Summary

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Flint Hills Resources Alaska, LLC
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Well ID	Zone	Date	Sulfolane (µg/L)
MW-320-20	Water Table	5/10/2012	<6.20
MW-320-130	90-160	5/16/2012	<6.20
MW-322-15	Water Table	5/10/2012	<6.20
MW-322-15	Water Table	7/17/2012	<6.20
MW-322-15	Water Table	10/10/2012	<6.20
MW-322-15	Water Table	2/28/2013	<6.52
MW-322-15	Water Table	4/15/2013	<6.52
MW-322-15	Water Table	7/16/2013	<6.20
MW-322-15	Water Table	10/3/2013	<6.32
MW-322-15	Water Table	7/14/2014	<5.20
MW-322-15	Water Table	7/15/2015	<5.20
MW-322-15	Water Table	8/19/2016	<5.05
MW-322-150	90-160	6/5/2012	<6.46
MW-322-150	90-160	7/24/2012	<6.66
MW-322-150	90-160	12/12/2012	<6.88
MW-322-150	90-160	3/1/2013	<6.20
MW-322-150	90-160	4/15/2013	<6.20
MW-322-150	90-160	7/16/2013	<6.20
MW-322-150	90-160	10/3/2013	<6.32
MW-322-150	90-160	7/14/2014	<5.00
MW-322-150	90-160	7/15/2015	<5.20
MW-322-150	90-160	8/19/2016	<5.10J*
MW-323-15	Water Table	5/16/2012	<6.20
MW-323-15	Water Table	7/24/2012	<6.20
MW-323-15	Water Table	11/12/2012	<6.20
MW-323-15	Water Table	2/1/2013	<6.40
MW-323-15	Water Table	5/14/2013	<6.20
MW-323-15	Water Table	7/16/2013	<6.46
MW-323-15	Water Table	10/4/2013	<6.46
MW-323-15	Water Table	2/28/2014	<5.00
MW-323-15	Water Table	7/26/2014	<5.20
MW-323-15	Water Table	3/4/2015	<5.00
MW-323-15	Water Table	7/15/2015	<5.15
MW-323-15	Water Table	1/27/2016	<5.00
MW-323-15	Water Table	8/19/2016	<5.20
MW-323-50	10-55	6/5/2012	<6.20
MW-323-50	10-55	7/24/2012	<6.20
MW-323-50	10-55	11/12/2012	<6.20
MW-323-50	10-55	2/1/2013	<6.20
MW-323-50	10-55	9/7/2013	<6.20
MW-323-50	10-55	10/4/2013	<6.46
MW-323-50	10-55	2/28/2014	<5.00
MW-323-50	10-55	7/26/2014	<5.20
MW-323-50	10-55	3/4/2015	<5.00
MW-323-50	10-55	7/15/2015	<5.20
MW-323-50	10-55	1/27/2016	<5.05
MW-323-50	10-55	8/19/2016	<5.10
MW-324-15	Water Table	5/16/2012	<6.20
MW-324-151	90-160	6/4/2012	<6.20
MW-325-18	Water Table	5/17/2012	<6.20
MW-325-18	Water Table	7/17/2012	<6.20
MW-325-18	Water Table	10/30/2012	<6.20

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North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-325-18	Water Table	2/28/2013	<6.20
MW-325-18	Water Table	3/10/2013	<6.40
MW-325-18	Water Table	7/9/2013	<6.20
MW-325-18	Water Table	10/12/2013	<6.36
MW-325-18	Water Table	3/25/2014	<5.25
MW-325-18	Water Table	4/25/2014	<5.00
MW-325-18	Water Table	7/8/2014	<5.00
MW-325-18	Water Table	10/6/2014	<5.30
MW-325-18	Water Table	1/22/2015	<5.40
MW-325-18	Water Table	4/6/2015	<5.25
MW-325-18	Water Table	7/10/2015	<5.05
MW-325-18	Water Table	10/5/2015	<5.10
MW-325-18	Water Table	1/14/2016	<5.05
MW-325-18	Water Table	7/7/2016	<5.00
MW-325-150	90-160	5/17/2012	<6.20
MW-325-150	90-160	7/23/2012	<6.66
MW-325-150	90-160	10/30/2012	<6.20
MW-325-150	90-160	2/28/2013	<6.20
MW-325-150	90-160	3/10/2013	<6.20
MW-325-150	90-160	7/9/2013	<6.20
MW-325-150	90-160	10/12/2013	<6.36
MW-325-150	90-160	3/25/2014	<5.25
MW-325-150	90-160	4/25/2014	<5.00J*
MW-325-150	90-160	7/23/2014	<5.00J*
MW-325-150	90-160	10/6/2014	<5.00
MW-325-150	90-160	1/22/2015	<5.00
MW-325-150	90-160	4/6/2015	<5.15
MW-325-150	90-160	7/10/2015	<5.00J*
MW-325-150	90-160	10/5/2015	<5.10
MW-325-150	90-160	1/14/2016	<5.05
MW-325-150	90-160	7/7/2016	<5.10
MW-326-20	Water Table	6/15/2012	<6.20
MW-326-20	Water Table	11/12/2013	<5.50
MW-326-150	90-160	6/15/2012	<6.20
MW-326-150	90-160	11/12/2013	<5.80
MW-327-15	Water Table	6/2/2012	<6.20
MW-327-15	Water Table	7/20/2017	<5.15
MW-327-150	90-160	6/2/2012	<6.20
MW-327-150	90-160	7/20/2017	<5.30
MW-328-15	Water Table	6/2/2012	<6.20
MW-328-15	Water Table	7/16/2012	<6.46
MW-328-15	Water Table	10/10/2012	<6.20
MW-328-15	Water Table	2/28/2013	<6.20
MW-328-15	Water Table	4/13/2013	<6.20
MW-328-15	Water Table	7/1/2013	<6.20
MW-328-15	Water Table	10/3/2013	<6.20
MW-328-15	Water Table	1/25/2014	<5.00
MW-328-15	Water Table	4/1/2014	<5.60
MW-328-15	Water Table	7/12/2014	<5.10
MW-328-15	Water Table	10/6/2014	<5.00
MW-328-15	Water Table	1/12/2015	<5.20
MW-328-15	Water Table	4/7/2015	<5.00

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Well ID	Zone	Date	Sulfolane (µg/L)
MW-328-15	Water Table	7/9/2015	<5.15
MW-328-15	Water Table	10/5/2015	<5.00
MW-328-15	Water Table	1/6/2016	<5.10
MW-328-15	Water Table	7/6/2016	<5.10
MW-328-15	Water Table	1/31/2017	<5.10
MW-328-15	Water Table	7/21/2017	<5.30J*
MW-328-151	90-160	6/2/2012	<6.20
MW-328-151	90-160	7/24/2012	<6.88
MW-328-151	90-160	11/11/2012	<6.20
MW-328-151	90-160	3/1/2013	<6.20
MW-328-151	90-160	4/13/2013	<6.20
MW-328-151	90-160	8/30/2013	<6.32
MW-328-151	90-160	10/3/2013	<6.20
MW-328-151	90-160	1/26/2014	<5.00
MW-328-151	90-160	4/1/2014	<5.00
MW-328-151	90-160	7/12/2014	<5.00
MW-328-151	90-160	10/6/2014	<5.00
MW-328-151	90-160	1/12/2015	<5.00
MW-328-151	90-160	4/7/2015	<5.00
MW-328-151	90-160	7/9/2015	<5.00
MW-328-151	90-160	10/5/2015	<5.10
MW-328-151	90-160	1/6/2016	<5.05
MW-328-151	90-160	7/6/2016	<5.05
MW-328-151	90-160	10/27/2016	<5.05
MW-328-151	90-160	1/31/2017	<5.15
MW-328-151	90-160	7/21/2017	<5.15
MW-329-15	Water Table	6/2/2012	87.9
MW-329-15	Water Table	7/18/2012	102
MW-329-15	Water Table	11/3/2012	92.1
MW-329-15	Water Table	1/6/2013	86.2
MW-329-15	Water Table	3/4/2013	89.1
MW-329-15	Water Table	5/6/2013	82.0
MW-329-15	Water Table	7/3/2013	83.5
MW-329-15	Water Table	10/4/2013	75.3
MW-329-15	Water Table	1/28/2014	74.2
MW-329-15	Water Table	4/19/2014	73.1
MW-329-15	Water Table	7/7/2014	39.2
MW-329-15	Water Table	10/7/2014	42.1
MW-329-15	Water Table	1/22/2015	41.8
MW-329-15	Water Table	4/7/2015	46.8
MW-329-15	Water Table	7/14/2015	47.4
MW-329-15	Water Table	10/5/2015	25.5
MW-329-15	Water Table	1/12/2016	24.8
MW-329-15	Water Table	7/9/2016	33.6
MW-329-66	10-55	6/2/2012	108
MW-329-66	10-55	8/2/2012	105
MW-329-66	10-55	11/3/2012	106
MW-329-66	10-55	1/6/2013	102
MW-329-66	10-55	3/4/2013	94.0
MW-329-66	10-55	5/6/2013	91.5
MW-329-66	10-55	7/3/2013	96.6
MW-329-66	10-55	10/4/2013	89.8

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Flint Hills Resources Alaska, LLC
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Well ID	Zone	Date	Sulfolane (µg/L)
MW-329-66	10-55	1/28/2014	74.4
MW-329-66	10-55	4/19/2014	83.3
MW-329-66	10-55	7/9/2014	76.0
MW-329-66	10-55	10/7/2014	68.2
MW-329-66	10-55	1/22/2015	62.2
MW-329-66	10-55	4/7/2015	57.8
MW-329-66	10-55	7/14/2015	53.3
MW-329-66	10-55	10/5/2015	48.3
MW-329-66	10-55	1/12/2016	33.2
MW-329-66	10-55	7/9/2016	37.6
MW-332-15	Water Table	6/12/2012	<6.74
MW-332-15	Water Table	7/18/2012	<6.20
MW-332-15	Water Table	10/31/2012	<6.20
MW-332-15	Water Table	1/2/2013	<6.60
MW-332-15	Water Table	3/5/2013	<6.20
MW-332-15	Water Table	4/2/2013	<6.20
MW-332-15	Water Table	7/16/2013	<6.20
MW-332-15	Water Table	10/4/2013	<6.20
MW-332-15	Water Table	1/21/2014	<5.35
MW-332-15	Water Table	4/2/2014	<5.00
MW-332-15	Water Table	7/3/2014	<5.00
MW-332-15	Water Table	10/3/2014	<5.00
MW-332-15	Water Table	1/9/2015	<5.25
MW-332-15	Water Table	4/6/2015	<5.25
MW-332-15	Water Table	7/10/2015	<5.00
MW-332-15	Water Table	10/5/2015	<5.10
MW-332-15	Water Table	1/13/2016	<5.00
MW-332-15	Water Table	7/8/2016	<5.10
MW-332-15	Water Table	1/31/2017	<5.15
MW-332-41	10-55	5/17/2013	<6.20
MW-332-41	10-55	7/16/2013	<6.60
MW-332-41	10-55	10/8/2013	<6.20
MW-332-41	10-55	1/20/2014	<5.20
MW-332-41	10-55	4/2/2014	<5.00
MW-332-41	10-55	7/3/2014	<5.15
MW-332-41	10-55	10/3/2014	<5.00
MW-332-41	10-55	1/9/2015	<5.00J*
MW-332-41	10-55	4/6/2015	<5.15
MW-332-41	10-55	7/10/2015	<5.00
MW-332-41	10-55	10/5/2015	<5.10
MW-332-41	10-55	1/13/2016	<5.05
MW-332-41	10-55	7/8/2016	<5.10
MW-332-41	10-55	1/31/2017	<5.20
MW-332-41	10-55	7/12/2017	<5.40
MW-332-75	55-90	5/17/2013	<6.20
MW-332-75	55-90	7/16/2013	<6.46
MW-332-75	55-90	10/8/2013	<6.20
MW-332-75	55-90	1/20/2014	<5.40
MW-332-75	55-90	4/2/2014	<5.20
MW-332-75	55-90	7/7/2014	<5.15
MW-332-75	55-90	10/4/2014	<5.00
MW-332-75	55-90	1/9/2015	<5.00

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Well ID	Zone	Date	Sulfolane (µg/L)
MW-332-75	55-90	4/6/2015	<5.40
MW-332-75	55-90	7/10/2015	<5.00
MW-332-75	55-90	10/5/2015	<5.10
MW-332-75	55-90	1/7/2016	<5.30
MW-332-75	55-90	7/8/2016	<5.15
MW-332-75	55-90	1/31/2017	<5.05
MW-332-110	90-160	5/17/2013	25.7
MW-332-110	90-160	7/16/2013	28.8
MW-332-110	90-160	10/8/2013	25.7
MW-332-110	90-160	1/20/2014	25.9
MW-332-110	90-160	4/8/2014	23.6
MW-332-110	90-160	7/7/2014	13.7
MW-332-110	90-160	10/4/2014	22.0
MW-332-110	90-160	1/9/2015	20.4J*
MW-332-110	90-160	4/6/2015	18.0
MW-332-110	90-160	7/10/2015	17.4
MW-332-110	90-160	10/5/2015	16.1
MW-332-110	90-160	1/7/2016	16.3
MW-332-110	90-160	7/8/2016	13.5
MW-332-110	90-160	1/31/2017	12.5
MW-332-110	90-160	7/25/2017	11.7
MW-332-150	90-160	6/12/2012	23.4
MW-332-150	90-160	7/25/2012	194J*
MW-332-150	90-160	10/30/2012	186
MW-332-150	90-160	1/2/2013	208
MW-332-150	90-160	3/6/2013	202
MW-332-150	90-160	6/25/2013	223
MW-332-150	90-160	7/16/2013	236
MW-332-150	90-160	10/4/2013	230
MW-332-150	90-160	1/21/2014	223
MW-332-150	90-160	4/8/2014	223
MW-332-150	90-160	7/7/2014	223
MW-332-150	90-160	10/4/2014	239
MW-332-150	90-160	1/9/2015	225
MW-332-150	90-160	4/6/2015	230
MW-332-150	90-160	7/10/2015	222
MW-332-150	90-160	10/5/2015	209
MW-332-150	90-160	1/13/2016	232
MW-332-150	90-160	5/17/2016	158
MW-332-150	90-160	7/8/2016	128
MW-332-150	90-160	10/12/2016	159
MW-332-150	90-160	1/31/2017	184
MW-332-150	90-160	7/25/2017	153
MW-333-16	Water Table	6/15/2012	<6.20
MW-333-150	90-160	6/15/2012	<6.20
MW-335-41	10-55	10/3/2012	<6.20
MW-335-41	10-55	1/2/2013	<6.74
MW-335-41	10-55	3/9/2013	<6.66
MW-335-41	10-55	8/8/2014	<5.20
MW-335-41	10-55	10/3/2014	<5.00
MW-335-41	10-55	1/12/2015	<5.00
MW-335-41	10-55	4/6/2015	<5.00

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Well ID	Zone	Date	Sulfolane (µg/L)
MW-335-41	10-55	7/8/2015	<5.10
MW-335-41	10-55	10/6/2015	<5.10
MW-335-41	10-55	1/11/2016	<5.05
MW-335-41	10-55	7/7/2016	<5.10
MW-335-41	10-55	2/1/2017	<5.10
MW-338-15	Water Table	5/13/2013	56.2
MW-338-15	Water Table	7/11/2013	<6.20
MW-338-15	Water Table	10/7/2013	31.2
MW-338-15	Water Table	1/20/2014	40.9
MW-338-15	Water Table	4/2/2014	40.8
MW-338-15	Water Table	7/3/2014	<5.00
MW-338-15	Water Table	10/9/2014	3.16J
MW-338-15	Water Table	1/22/2015	17.3
MW-338-15	Water Table	4/10/2015	14.1
MW-338-15	Water Table	7/14/2015	<5.15
MW-338-15	Water Table	10/8/2015	<5.05
MW-338-15	Water Table	1/26/2016	4.31J
MW-338-15	Water Table	7/12/2016	<5.05
MW-338-50	10-55	5/13/2013	46.1
MW-338-50	10-55	9/16/2013	45.1
MW-338-50	10-55	10/7/2013	46.0
MW-338-50	10-55	1/20/2014	38.8
MW-338-50	10-55	4/2/2014	35.2
MW-338-50	10-55	7/3/2014	33.0
MW-338-50	10-55	10/9/2014	26.9
MW-338-50	10-55	1/22/2015	25.9
MW-338-50	10-55	4/10/2015	19.4
MW-338-50	10-55	7/14/2015	23.6
MW-338-50	10-55	10/8/2015	22.9
MW-338-50	10-55	1/26/2016	21.6
MW-338-50	10-55	7/12/2016	19.3
MW-338-50	10-55	2/6/2017	16.5
MW-339-15	Water Table	5/14/2013	57.0
MW-339-15	Water Table	7/9/2013	66.7
MW-339-15	Water Table	10/5/2013	44.2
MW-339-15	Water Table	1/9/2014	63.8
MW-339-15	Water Table	4/23/2014	59.1
MW-339-15	Water Table	7/23/2014	12.5
MW-339-15	Water Table	10/11/2014	37.0
MW-339-15	Water Table	2/16/2015	55.0
MW-339-15	Water Table	4/10/2015	50.1
MW-339-15	Water Table	7/15/2015	45.4
MW-339-15	Water Table	10/10/2015	15.8
MW-339-15	Water Table	1/25/2016	49.1
MW-339-15	Water Table	7/13/2016	23.6
MW-339-15	Water Table	1/25/2017	33.0
MW-339-50	10-55	5/14/2013	35.4
MW-339-50	10-55	9/11/2013	39.3
MW-339-50	10-55	10/5/2013	39.5
MW-339-50	10-55	1/9/2014	40.4
MW-339-50	10-55	6/3/2014	38.7
MW-339-50	10-55	7/23/2014	48.3

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Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-339-50	10-55	10/11/2014	41.4
MW-339-50	10-55	2/16/2015	35.8
MW-339-50	10-55	4/10/2015	32.7
MW-339-50	10-55	8/13/2015	30.2
MW-339-50	10-55	10/10/2015	32.8J*
MW-339-50	10-55	1/25/2016	9.15J
MW-339-50	10-55	7/13/2016	26.6
MW-339-50	10-55	1/25/2017	18.1
MW-340-18	Water Table	5/16/2013	<6.20
MW-340-18	Water Table	7/9/2013	<6.20
MW-340-18	Water Table	10/5/2013	<6.32
MW-340-18	Water Table	1/25/2014	<5.10
MW-340-18	Water Table	7/8/2014	<5.40
MW-340-18	Water Table	10/7/2014	<5.00
MW-340-18	Water Table	7/9/2015	<5.00
MW-340-18	Water Table	10/7/2015	<5.20
MW-340-18	Water Table	1/14/2016	<5.05
MW-340-18	Water Table	7/8/2016	<5.10
MW-340-65	10-55	5/16/2013	<6.20
MW-340-65	10-55	7/9/2013	<6.20
MW-340-65	10-55	10/5/2013	<6.20
MW-340-65	10-55	1/25/2014	<5.00
MW-340-65	10-55	6/3/2014	<5.00
MW-340-65	10-55	7/18/2014	<5.00
MW-340-65	10-55	10/7/2014	<5.00
MW-340-65	10-55	7/9/2015	<5.10
MW-340-65	10-55	10/7/2015	<5.00
MW-340-65	10-55	1/14/2016	<5.00
MW-340-65	10-55	7/8/2016	<5.10
MW-340-150	90-160	5/16/2013	<6.20
MW-340-150	90-160	7/9/2013	<6.20
MW-340-150	90-160	10/5/2013	<6.46
MW-340-150	90-160	1/25/2014	<5.00
MW-340-150	90-160	7/18/2014	<5.00
MW-340-150	90-160	10/7/2014	<5.00
MW-340-150	90-160	7/9/2015	<5.10
MW-340-150	90-160	10/7/2015	<5.30
MW-340-150	90-160	1/14/2016	<5.10
MW-340-150	90-160	7/8/2016	<5.10
MW-341-15	Water Table	5/24/2013	121
MW-341-15	Water Table	9/11/2013	113
MW-341-15	Water Table	10/4/2013	96.7
MW-341-15	Water Table	1/26/2014	87.0
MW-341-15	Water Table	4/9/2014	90.3
MW-341-15	Water Table	7/7/2014	68.2
MW-341-15	Water Table	10/8/2014	13.1
MW-341-15	Water Table	1/22/2015	52.1
MW-341-15	Water Table	4/8/2015	3.97J
MW-341-15	Water Table	7/14/2015	56.4
MW-341-15	Water Table	10/8/2015	36.2
MW-341-15	Water Table	1/12/2016	25.0
MW-341-15	Water Table	7/8/2016	23.6

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-341-15	Water Table	2/1/2017	32.6
MW-341-40	10-55	5/24/2013	93.6
MW-341-40	10-55	7/3/2013	98.2
MW-341-40	10-55	10/4/2013	87.1
MW-341-40	10-55	1/26/2014	80.5
MW-341-40	10-55	4/9/2014	70.6
MW-341-40	10-55	7/7/2014	62.4
MW-341-40	10-55	10/8/2014	53.1
MW-341-40	10-55	1/22/2015	51.0
MW-341-40	10-55	8/13/2015	38.3
MW-341-40	10-55	10/8/2015	35.9
MW-341-40	10-55	1/12/2016	33.6
MW-341-40	10-55	7/8/2016	28.0
MW-341-40	10-55	2/1/2017	25.4
MW-342-15	Water Table	6/4/2013	158
MW-342-15	Water Table	7/8/2013	122
MW-342-15	Water Table	10/4/2013	100
MW-342-15	Water Table	2/27/2014	95.9
MW-342-15	Water Table	4/8/2014	98.0
MW-342-15	Water Table	8/8/2014	30.9
MW-342-15	Water Table	10/2/2014	20.0
MW-342-15	Water Table	3/2/2015	27.0
MW-342-15	Water Table	4/17/2015	23.5
MW-342-15	Water Table	7/16/2015	23.2
MW-342-15	Water Table	10/9/2015	9.43J
MW-342-15	Water Table	1/26/2016	15.7
MW-342-15	Water Table	7/13/2016	12.7
MW-342-15	Water Table	3/13/2017	8.36J
MW-342-65	10-55	6/4/2013	168
MW-342-65	10-55	7/17/2013	183
MW-342-65	10-55	10/4/2013	169
MW-342-65	10-55	2/27/2014	144
MW-342-65	10-55	4/8/2014	129
MW-342-65	10-55	8/8/2014	117
MW-342-65	10-55	10/2/2014	86.8
MW-342-65	10-55	3/2/2015	47.3
MW-342-65	10-55	4/17/2015	44.0
MW-342-65	10-55	7/16/2015	38.8
MW-342-65	10-55	10/9/2015	31.8
MW-342-65	10-55	1/26/2016	23.0
MW-342-65	10-55	7/13/2016	18.0
MW-342-65	10-55	3/13/2017	13.1
MW-343-15	Water Table	9/26/2013	<6.32
MW-343-15	Water Table	2/27/2014	<5.00
MW-343-15	Water Table	4/8/2014	<5.00
MW-343-15	Water Table	8/8/2014	<5.30
MW-343-15	Water Table	10/2/2014	<5.00
MW-343-15	Water Table	3/4/2015	<5.20
MW-343-15	Water Table	4/17/2015	<5.00
MW-343-15	Water Table	7/15/2015	<5.00J*
MW-343-15	Water Table	10/9/2015	<5.10
MW-343-15	Water Table	1/25/2016	<5.05

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Historical Sulfolane Results Summary

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-343-15	Water Table	7/12/2016	<4.73
MW-343-50	10-55	6/25/2013	<6.42
MW-343-50	10-55	7/15/2013	<6.20
MW-343-50	10-55	10/8/2013	<6.20
MW-343-50	10-55	2/27/2014	<5.15
MW-343-50	10-55	4/8/2014	<5.00
MW-343-50	10-55	8/8/2014	<5.40
MW-343-50	10-55	10/2/2014	<5.00
MW-343-50	10-55	3/4/2015	<5.00
MW-343-50	10-55	4/17/2015	<5.10
MW-343-50	10-55	7/15/2015	<5.15
MW-343-50	10-55	10/9/2015	<5.10
MW-343-50	10-55	1/25/2016	<5.15
MW-343-50	10-55	7/12/2016	<4.70
MW-346-15	Water Table	9/26/2013	7.19J
MW-346-15	Water Table	1/8/2014	9.38J
MW-346-15	Water Table	4/30/2014	11.2
MW-346-15	Water Table	7/19/2014	11.2
MW-346-15	Water Table	10/14/2014	6.86J
MW-346-15	Water Table	2/16/2015	8.60J
MW-346-15	Water Table	5/11/2015	11.6
MW-346-15	Water Table	7/14/2015	11.0
MW-346-15	Water Table	10/10/2015	5.15J
MW-346-15	Water Table	1/27/2016	9.97J
MW-346-15	Water Table	7/12/2016	14.0
MW-346-15	Water Table	1/27/2017	14.2
MW-346-15	Water Table	8/1/2017	20.8
MW-346-65	10-55	9/26/2013	22.7
MW-346-65	10-55	1/8/2014	23.6
MW-346-65	10-55	4/30/2014	24.6
MW-346-65	10-55	7/19/2014	24.0
MW-346-65	10-55	10/14/2014	26.5
MW-346-65	10-55	2/16/2015	24.7
MW-346-65	10-55	5/11/2015	27.9
MW-346-65	10-55	7/14/2015	28.3
MW-346-65	10-55	10/10/2015	29.4
MW-346-65	10-55	1/27/2016	34.8
MW-346-65	10-55	4/21/2016	36.0
MW-346-65	10-55	7/12/2016	36.9
MW-346-65	10-55	10/13/2016	40.4
MW-346-65	10-55	1/27/2017	38.5
MW-346-65	10-55	8/1/2017	49.3
MW-346-150	90-160	9/26/2013	<6.20
MW-346-150	90-160	1/28/2014	3.61J
MW-346-150	90-160	4/30/2014	<5.25
MW-346-150	90-160	7/19/2014	<5.00
MW-346-150	90-160	10/14/2014	<5.00
MW-346-150	90-160	2/16/2015	<5.20
MW-346-150	90-160	5/11/2015	<5.00
MW-346-150	90-160	7/14/2015	<5.00
MW-346-150	90-160	10/10/2015	<5.20
MW-346-150	90-160	1/27/2016	<5.10

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-346-150	90-160	7/12/2016	3.22J
MW-346-150	90-160	1/27/2017	3.54J
MW-346-150	90-160	8/1/2017	<5.10
MW-347-20	Water Table	9/27/2013	12.9
MW-347-20	Water Table	3/24/2014	13.9
MW-347-20	Water Table	4/23/2014	8.20J
MW-347-20	Water Table	7/23/2014	4.50J*
MW-347-20	Water Table	10/14/2014	6.84J
MW-347-20	Water Table	2/18/2015	12.2
MW-347-20	Water Table	4/13/2015	12.2
MW-347-20	Water Table	7/16/2015	12.1
MW-347-20	Water Table	10/12/2015	<5.00
MW-347-20	Water Table	2/4/2016	10.8
MW-347-20	Water Table	7/12/2016	9.33J
MW-347-20	Water Table	1/26/2017	9.44J
MW-347-65	10-55	9/27/2013	27.4
MW-347-65	10-55	3/24/2014	24.5
MW-347-65	10-55	4/23/2014	24.9
MW-347-65	10-55	7/23/2014	25.3
MW-347-65	10-55	10/14/2014	24.0
MW-347-65	10-55	2/18/2015	25.3
MW-347-65	10-55	4/14/2015	23.2
MW-347-65	10-55	7/16/2015	23.3
MW-347-65	10-55	10/12/2015	21.8
MW-347-65	10-55	2/4/2016	23.1
MW-347-65	10-55	4/5/2016	20.7
MW-347-65	10-55	7/12/2016	18.8
MW-347-65	10-55	10/13/2016	19.5
MW-347-65	10-55	1/26/2017	18.2
MW-347-65	10-55	8/1/2017	17.9
MW-347-150	90-160	9/27/2013	9.57J
MW-347-150	90-160	3/24/2014	10.3
MW-347-150	90-160	4/23/2014	10.9
MW-347-150	90-160	7/23/2014	10.8J*
MW-347-150	90-160	10/14/2014	13.4
MW-347-150	90-160	2/18/2015	16.4
MW-347-150	90-160	4/14/2015	15.5
MW-347-150	90-160	7/16/2015	16.5
MW-347-150	90-160	10/13/2015	18.9
MW-347-150	90-160	2/4/2016	20.5
MW-347-150	90-160	4/5/2016	21.2
MW-347-150	90-160	7/12/2016	20.6
MW-347-150	90-160	10/13/2016	21.1
MW-347-150	90-160	1/26/2017	23.9
MW-347-150	90-160	8/1/2017	24.0
MW-349-15	Water Table	8/16/2013	59.3
MW-349-15	Water Table	10/11/2013	55.0
MW-349-15	Water Table	1/27/2014	53.2
MW-349-15	Water Table	2/5/2016	20.9
MW-349-15	Water Table	8/18/2016	21.5
MW-349-45	10-55	8/16/2013	58.4
MW-349-45	10-55	10/11/2013	56.8

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-349-45	10-55	1/27/2014	53.1
MW-349-45	10-55	2/5/2016	24.0
MW-349-45	10-55	8/18/2016	17.1
MW-349-45	10-55	7/12/2017	12.2
MW-350-15	Water Table	9/27/2013	30.3
MW-350-15	Water Table	1/22/2014	39.9
MW-350-15	Water Table	4/24/2014	39.0
MW-350-15	Water Table	7/19/2014	<5.00
MW-350-15	Water Table	10/13/2014	12.0
MW-350-15	Water Table	2/16/2015	31.9
MW-350-15	Water Table	4/14/2015	29.1
MW-350-15	Water Table	7/16/2015	12.1
MW-350-15	Water Table	10/10/2015	<5.05
MW-350-15	Water Table	1/29/2016	22.4
MW-350-15	Water Table	7/13/2016	<5.00
MW-350-15	Water Table	1/25/2017	14.7
MW-350-50	10-55	9/27/2013	47.7
MW-350-50	10-55	1/22/2014	41.9
MW-350-50	10-55	4/24/2014	40.3
MW-350-50	10-55	7/19/2014	36.5
MW-350-50	10-55	10/13/2014	29.4
MW-350-50	10-55	2/16/2015	32.6
MW-350-50	10-55	4/14/2015	30.3
MW-350-50	10-55	7/16/2015	27.7
MW-350-50	10-55	10/10/2015	25.6
MW-350-50	10-55	1/29/2016	25.0
MW-350-50	10-55	7/13/2016	17.8
MW-352-15	Water Table	9/30/2013	5.10J
MW-352-15	Water Table	1/7/2014	6.96J
MW-352-15	Water Table	4/19/2014	7.18J
MW-352-15	Water Table	7/17/2014	<5.10
MW-352-15	Water Table	10/11/2014	<5.00
MW-352-15	Water Table	2/16/2015	6.10J
MW-352-15	Water Table	4/13/2015	4.88J
MW-352-15	Water Table	7/15/2015	3.75J
MW-352-15	Water Table	10/14/2015	<5.30
MW-352-15	Water Table	2/4/2016	4.70J
MW-352-15	Water Table	4/5/2016	5.20J
MW-352-15	Water Table	7/13/2016	<5.15
MW-352-15	Water Table	10/13/2016	3.44J
MW-352-15	Water Table	1/26/2017	5.64J
MW-352-40	10-55	9/30/2013	8.73J
MW-352-40	10-55	1/7/2014	9.39J
MW-352-40	10-55	4/19/2014	9.66J
MW-352-40	10-55	7/17/2014	9.73J
MW-352-40	10-55	10/11/2014	10.0
MW-352-40	10-55	2/16/2015	11.8
MW-352-40	10-55	4/13/2015	11.2
MW-352-40	10-55	7/15/2015	12.2
MW-352-40	10-55	10/14/2015	11.7
MW-352-40	10-55	2/4/2016	12.7
MW-352-40	10-55	4/28/2016	12.5

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-352-40	10-55	7/13/2016	13.9
MW-352-40	10-55	10/13/2016	14.3
MW-352-40	10-55	1/26/2017	13.5
MW-352-40	10-55	8/4/2017	15.0
MW-353-15	Water Table	9/25/2013	157
MW-353-15	Water Table	1/27/2014	161
MW-353-15	Water Table	4/25/2014	127
MW-353-15	Water Table	7/27/2014	116
MW-353-15	Water Table	10/15/2014	122
MW-353-15	Water Table	2/17/2015	137
MW-353-15	Water Table	4/13/2015	141
MW-353-15	Water Table	7/16/2015	129
MW-353-15	Water Table	10/14/2015	97.6
MW-353-15	Water Table	1/29/2016	115
MW-353-15	Water Table	7/13/2016	104
MW-353-15	Water Table	8/4/2017	86.4
MW-353-65	10-55	9/25/2013	204
MW-353-65	10-55	1/27/2014	213
MW-353-65	10-55	4/25/2014	208
MW-353-65	10-55	7/27/2014	200
MW-353-65	10-55	10/15/2014	205
MW-353-65	10-55	2/17/2015	191
MW-353-65	10-55	4/13/2015	185
MW-353-65	10-55	7/16/2015	182
MW-353-65	10-55	10/14/2015	163
MW-353-65	10-55	1/29/2016	163
MW-353-65	10-55	7/13/2016	136
MW-353-65	10-55	8/4/2017	90.0
MW-353-100	55-90	9/25/2013	198
MW-353-100	55-90	1/27/2014	193
MW-353-100	55-90	4/25/2014	203
MW-353-100	55-90	7/27/2014	220
MW-353-100	55-90	10/15/2014	210
MW-353-100	55-90	2/17/2015	187
MW-353-100	55-90	4/13/2015	176
MW-353-100	55-90	7/16/2015	177
MW-353-100	55-90	10/14/2015	164
MW-353-100	55-90	1/29/2016	157
MW-353-100	55-90	7/13/2016	139
MW-353-100	55-90	8/4/2017	90.9
MW-356-20	Water Table	10/21/2013	<6.20
MW-356-20	Water Table	1/27/2014	<5.15
MW-356-20	Water Table	4/1/2014	<5.00
MW-356-20	Water Table	7/2/2014	<5.25
MW-356-20	Water Table	10/2/2014	<5.00
MW-356-20	Water Table	1/16/2015	<5.00
MW-356-20	Water Table	4/6/2015	<5.15
MW-356-20	Water Table	7/7/2015	<5.20
MW-356-20	Water Table	10/7/2015	<5.10
MW-356-20	Water Table	1/7/2016	<5.15
MW-356-20	Water Table	7/6/2016	<5.00
MW-356-65	10-55	10/21/2013	<6.66

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

Well ID	Zone	Date	Sulfolane (µg/L)
MW-356-65	10-55	1/27/2014	<5.00
MW-356-65	10-55	4/1/2014	<5.00
MW-356-65	10-55	7/2/2014	<5.00
MW-356-65	10-55	10/2/2014	<5.00
MW-356-65	10-55	1/16/2015	<5.00
MW-356-65	10-55	4/6/2015	<5.00
MW-356-65	10-55	7/7/2015	<5.05
MW-356-65	10-55	10/7/2015	<5.25
MW-356-65	10-55	1/7/2016	<5.05
MW-356-65	10-55	7/6/2016	<5.10
MW-356-65	10-55	7/20/2017	<5.20
MW-356-90	55-90	10/21/2013	<6.88
MW-356-90	55-90	1/27/2014	<5.00
MW-356-90	55-90	4/1/2014	<5.00
MW-356-90	55-90	9/4/2014	<5.30
MW-356-90	55-90	10/2/2014	<5.00
MW-356-90	55-90	1/16/2015	<5.00
MW-356-90	55-90	4/6/2015	<5.00
MW-356-90	55-90	7/7/2015	<5.00
MW-356-90	55-90	10/7/2015	<5.10
MW-356-90	55-90	1/7/2016	<5.10
MW-356-90	55-90	7/6/2016	<5.05
MW-356-90	55-90	7/20/2017	<5.20
MW-357-15	Water Table	10/31/2013	<6.74
MW-357-15	Water Table	2/3/2014	<5.00
MW-357-15	Water Table	4/3/2014	<5.00
MW-357-15	Water Table	7/8/2014	<5.20
MW-357-15	Water Table	10/6/2014	<5.00
MW-357-15	Water Table	1/16/2015	<5.25
MW-357-15	Water Table	4/8/2015	<5.25
MW-357-15	Water Table	7/10/2015	<5.00
MW-357-15	Water Table	10/8/2015	<5.05
MW-357-15	Water Table	2/1/2016	<5.05
MW-357-15	Water Table	7/9/2016	<5.05
MW-357-65	10-55	10/31/2013	<6.74
MW-357-65	10-55	2/3/2014	<5.10
MW-357-65	10-55	4/3/2014	<5.00
MW-357-65	10-55	7/8/2014	<5.00
MW-357-65	10-55	10/6/2014	<5.00
MW-357-65	10-55	1/16/2015	<5.00
MW-357-65	10-55	4/8/2015	<5.25
MW-357-65	10-55	7/10/2015	<5.00
MW-357-65	10-55	10/8/2015	<5.00
MW-357-65	10-55	2/1/2016	<5.50
MW-357-65	10-55	7/9/2016	<5.15
MW-357-65	10-55	7/25/2017	<5.15
MW-357-150	90-160	10/31/2013	<6.66
MW-357-150	90-160	2/3/2014	<5.15
MW-357-150	90-160	4/3/2014	<5.00
MW-357-150	90-160	7/8/2014	<5.00
MW-357-150	90-160	10/6/2014	<5.00
MW-357-150	90-160	1/16/2015	<5.00

Appendix B-2
Historical Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Well ID	Zone	Date	Sulfolane (µg/L)
MW-357-150	90-160	4/8/2015	<5.30
MW-357-150	90-160	7/10/2015	<5.00
MW-357-150	90-160	10/8/2015	<5.10
MW-357-150	90-160	1/18/2016	<5.00
MW-357-150	90-160	7/9/2016	<5.10
MW-357-150	90-160	7/25/2017	<5.05

General Notes:
Higher result of a field-duplicate pair is reported.
Acronyms and Abbreviations:
< = Not detected; limit of detection (LOD) or limit of quantitation (LOQ; for older data) listed. Flag applied by laboratory.
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.
JL* = Result is considered estimated, biased low. Flag applied by Shannon & Wilson, Inc.
JH* = Result is considered estimated, biased high. Flag applied by Shannon & Wilson, Inc.
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.
µg/L = micrograms per liter

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0001	64.7886, -147.3664			9/16/2011	<7.20
PW-0001	64.7886, -147.3664			5/22/2015	<5.25
PW-0002	64.7494, -147.3474			6/14/2010	<10.0
PW-0003	64.7424, -147.3415			2/2/2010	<10.3
PW-0003	64.7424, -147.3415			2/4/2010	<10.6
PW-0029	64.7456, -147.3327			12/2/2009	<10.0
PW-0033	64.7447, -147.3364	30	10-55	3/13/2010	<11.6
PW-0037	64.7450, -147.3416	30	10-55	1/6/2010	<10.5
PW-0048	64.7456, -147.3192			3/1/2010	<10.8
PW-0078	64.7406, -147.3237	40	10-55	4/6/2011	<10.0
PW-0096	64.7340, -147.3133	32	10-55	8/2/2010	<10.3
PW-0097	64.7353, -147.3154			1/9/2010	<10.2
PW-0101	64.7348, -147.3244			2/12/2013	<6.74
PW-0102	64.7362, -147.3222			7/12/2012	<6.20
PW-0103	64.7367, -147.3182			7/12/2012	<6.20
PW-0104	64.7313, -147.2833			12/9/2009	<10.4
PW-0105	64.7347, -147.2688			3/30/2012	<6.46
PW-0106	64.7758, -147.2455			12/14/2012	<6.40
PW-0107	64.7342, -147.3239			3/30/2011	<11.2
PW-0108	64.7346, -147.3275			12/4/2009	<10.6
PW-0109	64.7346, -147.3259			12/5/2009	<10.4
PW-0110	64.7296, -147.3445			5/12/2010	<10.2
PW-0111	64.7289, -147.3430			5/12/2010	<10.0
PW-0111	64.7289, -147.3430			5/15/2013	<6.40
PW-0112	64.7330, -147.3206			12/9/2009	<10.3
PW-0113	64.7314, -147.2899			3/18/2013	<6.52
PW-0114	64.7327, -147.2935			2/23/2010	<11.0
PW-0115	64.7301, -147.2946			1/13/2010	<10.8
PW-0117	64.7536, -147.3253	30	10-55	4/27/2012	<6.82
PW-0121	64.7541, -147.3237	60	55-90	1/20/2010	<10.3
PW-0126	64.7619, -147.3273	40	10-55	4/10/2012	<6.60
PW-0127	64.7631, -147.3248	30	10-55	11/30/2010	<10.4
PW-0129	64.7621, -147.3243	35	10-55	5/5/2010	<10.3
PW-0131	64.7620, -147.3218			6/14/2010	<10.0
PW-0135	64.7603, -147.3303	30.5	10-55	1/9/2010	<10.4
PW-0140	64.7791, -147.3098			9/2/2011	<6.52
PW-0141	64.7773, -147.3012			3/20/2010	<10.3
PW-0142	64.7619, -147.3393	33	10-55	11/20/2012	<6.46
PW-0152	64.7477, -147.3059			4/25/2011	<10.3
PW-0157	64.7622, -147.3941			1/4/2010	95.4
PW-0157	64.7622, -147.3941			9/8/2010	146
PW-0157	64.7622, -147.3941			9/14/2010	167
PW-0157	64.7622, -147.3941			10/13/2010	158
PW-0157	64.7622, -147.3941			11/17/2010	161
PW-0157	64.7622, -147.3941			12/1/2010	164
PW-0157	64.7622, -147.3941			12/8/2010	142
PW-0157	64.7622, -147.3941			12/15/2010	154
PW-0157	64.7622, -147.3941			12/21/2010	157
PW-0157	64.7622, -147.3941			12/28/2010	164
PW-0157	64.7622, -147.3941			1/5/2011	137JH*

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0157	64.7622, -147.3941			1/12/2011	136
PW-0157	64.7622, -147.3941			1/19/2011	138
PW-0157	64.7622, -147.3941			1/26/2011	127
PW-0157	64.7622, -147.3941			2/2/2011	111
PW-0157	64.7622, -147.3941			2/9/2011	180JH*
PW-0157	64.7622, -147.3941			2/16/2011	171JH*
PW-0157	64.7622, -147.3941			2/23/2011	174
PW-0157	64.7622, -147.3941			3/2/2011	128
PW-0157	64.7622, -147.3941			3/9/2011	183
PW-0157	64.7622, -147.3941			3/16/2011	162
PW-0157	64.7622, -147.3941			3/23/2011	172
PW-0157	64.7622, -147.3941			3/30/2011	180
PW-0157	64.7622, -147.3941			4/6/2011	171
PW-0157	64.7622, -147.3941			4/14/2011	155
PW-0157	64.7622, -147.3941			4/20/2011	161
PW-0157	64.7622, -147.3941			4/27/2011	154
PW-0157	64.7622, -147.3941			5/4/2011	159
PW-0157	64.7622, -147.3941			5/11/2011	139
PW-0157	64.7622, -147.3941			7/11/2011	161
PW-0157	64.7622, -147.3941			8/9/2011	141J*
PW-0157	64.7622, -147.3941			8/17/2011	129J*
PW-0157	64.7622, -147.3941			9/12/2011	124
PW-0157	64.7622, -147.3941			10/12/2011	109
PW-0157	64.7622, -147.3941			11/14/2011	114J*
PW-0157	64.7622, -147.3941			12/12/2011	115J*
PW-0157	64.7622, -147.3941			1/25/2012	114J*
PW-0157	64.7622, -147.3941			7/2/2012	110JL*
PW-0157	64.7622, -147.3941			12/19/2012	103JH*
PW-0157	64.7622, -147.3941			4/5/2013	78.5J*
PW-0157	64.7622, -147.3941			8/30/2013	68.9J*
PW-0157	64.7622, -147.3941			11/26/2013	53.6
PW-0157	64.7622, -147.3941			3/3/2014	54.1
PW-0157	64.7622, -147.3941			5/23/2014	52.9
PW-0157	64.7622, -147.3941			8/18/2014	47.8
PW-0157	64.7622, -147.3941			11/17/2014	37.1
PW-0157	64.7622, -147.3941			12/29/2014	29.8
PW-0157	64.7622, -147.3941			6/16/2015	28.8
PW-0157	64.7622, -147.3941			10/19/2015	27.5
PW-0157	64.7622, -147.3941			2/1/2016	22.0
PW-0157	64.7622, -147.3941			5/16/2016	20.9
PW-0157	64.7622, -147.3941			3/3/2017	18.2
PW-0157	64.7622, -147.3941			4/11/2017	17.3
PW-0158	64.7613, -147.3941	23	10-55	1/20/2010	217
PW-0158	64.7613, -147.3941	23	10-55	7/28/2011	213J*
PW-0158	64.7613, -147.3941	23	10-55	12/9/2011	202J*
PW-0158	64.7613, -147.3941	23	10-55	7/30/2013	94.2J*
PW-0158	64.7613, -147.3941	23	10-55	9/15/2014	51.0
PW-0158	64.7613, -147.3941	23	10-55	11/14/2014	52.6
PW-0158	64.7613, -147.3941	23	10-55	3/27/2015	36.3
PW-0158	64.7613, -147.3941	23	10-55	12/21/2015	37.1

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0158	64.7613, -147.3941	23	10-55	8/12/2016	26.4
PW-0158	64.7613, -147.3941	23	10-55	7/18/2017	23.1
PW-0159	64.7608, -147.3941	38	10-55	1/9/2010	255
PW-0159	64.7608, -147.3941	38	10-55	7/27/2011	233J*
PW-0159	64.7608, -147.3941	38	10-55	2/3/2012	167J*
PW-0159	64.7608, -147.3941	38	10-55	5/25/2012	152J*
PW-0159	64.7608, -147.3941	38	10-55	8/6/2012	141J*
PW-0159	64.7608, -147.3941	38	10-55	10/22/2012	115J*
PW-0159	64.7608, -147.3941	38	10-55	12/18/2012	124JH*
PW-0159	64.7608, -147.3941	38	10-55	3/12/2013	119J*
PW-0159	64.7608, -147.3941	38	10-55	5/28/2013	96.1J*
PW-0159	64.7608, -147.3941	38	10-55	8/20/2013	77.5J*
PW-0159	64.7608, -147.3941	38	10-55	9/27/2013	71.6
PW-0159	64.7608, -147.3941	38	10-55	11/19/2013	71.6
PW-0159	64.7608, -147.3941	38	10-55	1/17/2014	81.3
PW-0159	64.7608, -147.3941	38	10-55	3/14/2014	65.3
PW-0159	64.7608, -147.3941	38	10-55	6/2/2014	71.3
PW-0159	64.7608, -147.3941	38	10-55	8/26/2014	50.7
PW-0159	64.7608, -147.3941	38	10-55	9/30/2014	44.9
PW-0159	64.7608, -147.3941	38	10-55	12/2/2014	46.4
PW-0159	64.7608, -147.3941	38	10-55	2/2/2015	40.5
PW-0159	64.7608, -147.3941	38	10-55	3/30/2015	35.3
PW-0159	64.7608, -147.3941	38	10-55	6/1/2015	32.6
PW-0159	64.7608, -147.3941	38	10-55	7/28/2015	32.9
PW-0159	64.7608, -147.3941	38	10-55	9/28/2015	30.8
PW-0159	64.7608, -147.3941	38	10-55	11/9/2015	28.5
PW-0159	64.7608, -147.3941	38	10-55	1/11/2016	28.8
PW-0159	64.7608, -147.3941	38	10-55	3/28/2016	25.8
PW-0159	64.7608, -147.3941	38	10-55	6/20/2016	21.8
PW-0159	64.7608, -147.3941	38	10-55	10/3/2016	15.5
PW-0159	64.7608, -147.3941	38	10-55	12/12/2016	18.3
PW-0159	64.7608, -147.3941	38	10-55	2/27/2017	17.6
PW-0159	64.7608, -147.3941	38	10-55	5/15/2017	16.5
PW-0159	64.7608, -147.3941	38	10-55	7/31/2017	15.9
PW-0160	64.7599, -147.3961			3/12/2011	21.2
PW-0160	64.7599, -147.3961			8/17/2011	326J*
PW-0160	64.7599, -147.3961			1/25/2012	360J*
PW-0160	64.7599, -147.3961			4/12/2013	255J*
PW-0160	64.7599, -147.3961			2/3/2014	164
PW-0160	64.7599, -147.3961			7/1/2014	157
PW-0160	64.7599, -147.3961			12/8/2014	78.7
PW-0160	64.7599, -147.3961			4/13/2015	70.3
PW-0160	64.7599, -147.3961			8/28/2015	48.8
PW-0160	64.7599, -147.3961			3/7/2016	35.6
PW-0160	64.7599, -147.3961			9/9/2016	20.1
PW-0160	64.7599, -147.3961			2/3/2017	16.6
PW-0160	64.7599, -147.3961			2/28/2017	17.8
PW-0160	64.7599, -147.3961			8/8/2017	13.1
PW-0161	64.7609, -147.3961	40	10-55	1/23/2010	303
PW-0161	64.7609, -147.3961	40	10-55	6/21/2011	254J*

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0161	64.7609, -147.3961	40	10-55	11/2/2011	190J*
PW-0161	64.7609, -147.3961	40	10-55	3/15/2012	236J*
PW-0161	64.7609, -147.3961	40	10-55	6/28/2012	223J*
PW-0161	64.7609, -147.3961	40	10-55	10/16/2012	186J*
PW-0161	64.7609, -147.3961	40	10-55	1/8/2013	155J*
PW-0161	64.7609, -147.3961	40	10-55	3/29/2013	191J*
PW-0161	64.7609, -147.3961	40	10-55	6/14/2013	159J*
PW-0161	64.7609, -147.3961	40	10-55	9/13/2013	110
PW-0161	64.7609, -147.3961	40	10-55	11/22/2013	110
PW-0161	64.7609, -147.3961	40	10-55	2/17/2014	129
PW-0161	64.7609, -147.3961	40	10-55	5/30/2014	118
PW-0161	64.7609, -147.3961	40	10-55	8/29/2014	88.1
PW-0161	64.7609, -147.3961	40	10-55	11/4/2014	80.3
PW-0161	64.7609, -147.3961	40	10-55	2/16/2015	67.2
PW-0161	64.7609, -147.3961	40	10-55	5/15/2015	51.9
PW-0161	64.7609, -147.3961	40	10-55	8/11/2015	50.2
PW-0161	64.7609, -147.3961	40	10-55	12/4/2015	43.6
PW-0161	64.7609, -147.3961	40	10-55	2/16/2016	39.1
PW-0161	64.7609, -147.3961	40	10-55	5/31/2016	26.7
PW-0161	64.7609, -147.3961	40	10-55	10/11/2016	24.2
PW-0161	64.7609, -147.3961	40	10-55	2/13/2017	17.3
PW-0161	64.7609, -147.3961	40	10-55	5/8/2017	18.3J*
PW-0161	64.7609, -147.3961	40	10-55	8/8/2017	17.4
PW-0162	64.7611, -147.3958	40	10-55	2/1/2010	248
PW-0162	64.7611, -147.3958	40	10-55	7/18/2011	210J*
PW-0162	64.7611, -147.3958	40	10-55	12/13/2011	166J*
PW-0162	64.7611, -147.3958	40	10-55	4/2/2013	102J*
PW-0162	64.7611, -147.3958	40	10-55	3/10/2014	71.2
PW-0162	64.7611, -147.3958	40	10-55	10/21/2014	53.2
PW-0162	64.7611, -147.3958	40	10-55	12/8/2014	50.5
PW-0162	64.7611, -147.3958	40	10-55	12/19/2014	44.5
PW-0162	64.7611, -147.3958	40	10-55	9/4/2015	34.1
PW-0162	64.7611, -147.3958	40	10-55	5/2/2016	26.3
PW-0162	64.7611, -147.3958	40	10-55	7/15/2016	23.4
PW-0162	64.7611, -147.3958	40	10-55	1/30/2017	17.9
PW-0163	64.7611, -147.3962			2/1/2010	326
PW-0164	64.7617, -147.3961			2/11/2010	255
PW-0164	64.7617, -147.3961			8/10/2011	220J*
PW-0164	64.7617, -147.3961			1/14/2013	143J*
PW-0164	64.7617, -147.3961			7/26/2013	114J*
PW-0164	64.7617, -147.3961			12/27/2013	97.7
PW-0164	64.7617, -147.3961			8/12/2014	75.0
PW-0164	64.7617, -147.3961			2/27/2015	60.0
PW-0164	64.7617, -147.3961			7/31/2015	46.0
PW-0164	64.7617, -147.3961			2/26/2016	44.3
PW-0164	64.7617, -147.3961			8/23/2016	30.2
PW-0164	64.7617, -147.3961			1/13/2017	29.7
PW-0164	64.7617, -147.3961			7/24/2017	26.4
PW-0165	64.7712, -147.3384			10/13/2011	<6.82
PW-0165	64.7712, -147.3384			7/17/2013	<6.46

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0167	64.7731, -147.3384	40	10-55	9/1/2013	<6.40
PW-0201	64.7593, -147.3417	30	10-55	3/13/2010	<10.5
PW-0204	64.7582, -147.3417			12/4/2009	<10.3
PW-0205	64.7579, -147.3417			12/21/2009	<10.8
PW-0213	64.7573, -147.3372			10/18/2011	<6.20
PW-0215	64.7529, -147.3308	60	55-90	1/20/2010	<10.6
PW-0215	64.7529, -147.3308	60	55-90	6/16/2015	<5.30
PW-0216	64.7535, -147.3304			1/20/2010	<10.3
PW-0216	64.7535, -147.3304			6/16/2015	<5.40
PW-0217	64.7647, -147.3880	238	>160	1/6/2010	108
PW-0217	64.7647, -147.3880	238	>160	3/10/2011	154
PW-0217	64.7647, -147.3880	238	>160	4/14/2011	217JL*
PW-0217	64.7647, -147.3880	238	>160	9/22/2011	211J*
PW-0217	64.7647, -147.3880	238	>160	7/18/2012	169J*
PW-0217	64.7647, -147.3880	238	>160	3/11/2013	173
PW-0217	64.7647, -147.3880	238	>160	5/17/2013	164J*
PW-0217	64.7647, -147.3880	238	>160	6/5/2013	164
PW-0217	64.7647, -147.3880	238	>160	9/5/2013	152
PW-0217	64.7647, -147.3880	238	>160	11/19/2013	153
PW-0217	64.7647, -147.3880	238	>160	3/7/2014	150
PW-0217	64.7647, -147.3880	238	>160	3/10/2014	156
PW-0217	64.7647, -147.3880	238	>160	5/27/2014	147
PW-0217	64.7647, -147.3880	238	>160	8/26/2014	147
PW-0217	64.7647, -147.3880	238	>160	11/12/2014	148
PW-0217	64.7647, -147.3880	238	>160	1/23/2015	146
PW-0217	64.7647, -147.3880	238	>160	3/9/2015	151
PW-0217	64.7647, -147.3880	238	>160	5/13/2015	148
PW-0217	64.7647, -147.3880	238	>160	8/18/2015	136
PW-0217	64.7647, -147.3880	238	>160	10/19/2015	146
PW-0217	64.7647, -147.3880	238	>160	12/15/2015	164
PW-0217	64.7647, -147.3880	238	>160	9/27/2016	137JL*
PW-0217	64.7647, -147.3880	238	>160	8/15/2017	166
PW-0218	64.7640, -147.3861	40	10-55	1/6/2010	85.5
PW-0219	64.7638, -147.3858	40	10-55	1/6/2010	89.8
PW-0219	64.7638, -147.3858	40	10-55	6/28/2012	65.1J*
PW-0219	64.7638, -147.3858	40	10-55	7/26/2013	131J*
PW-0219	64.7638, -147.3858	40	10-55	7/18/2014	136
PW-0219	64.7638, -147.3858	40	10-55	6/23/2015	96.4
PW-0219	64.7638, -147.3858	40	10-55	4/5/2016	88.7
PW-0219	64.7638, -147.3858	40	10-55	11/1/2016	62.7
PW-0219	64.7638, -147.3858	40	10-55	8/11/2017	57.4
PW-0220	64.7637, -147.3854	20	10-55	1/6/2010	69.9
PW-0221	64.7636, -147.3850			2/4/2010	152
PW-0221	64.7636, -147.3850			11/4/2011	162J*
PW-0221	64.7636, -147.3850			7/19/2012	149J*
PW-0221	64.7636, -147.3850			3/15/2013	155J*
PW-0221	64.7636, -147.3850			8/13/2013	115J*
PW-0221	64.7636, -147.3850			3/31/2014	126
PW-0221	64.7636, -147.3850			9/11/2014	133
PW-0221	64.7636, -147.3850			5/18/2015	106

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0221	64.7636, -147.3850			11/3/2015	110
PW-0221	64.7636, -147.3850			4/22/2016	85.2
PW-0221	64.7636, -147.3850			3/20/2017	58.3
PW-0222	64.7634, -147.3842			2/5/2010	149
PW-0223	64.7633, -147.3838			2/10/2010	188
PW-0224	64.7629, -147.3820			6/21/2010	153
PW-0225	64.7555, -147.3795	40	10-55	11/14/2009	156
PW-0225	64.7555, -147.3795	40	10-55	9/14/2010	152
PW-0225	64.7555, -147.3795	40	10-55	10/13/2010	138
PW-0225	64.7555, -147.3795	40	10-55	11/17/2010	141
PW-0225	64.7555, -147.3795	40	10-55	12/1/2010	135
PW-0225	64.7555, -147.3795	40	10-55	12/8/2010	127
PW-0225	64.7555, -147.3795	40	10-55	12/15/2010	130
PW-0225	64.7555, -147.3795	40	10-55	12/21/2010	123
PW-0225	64.7555, -147.3795	40	10-55	12/28/2010	124
PW-0225	64.7555, -147.3795	40	10-55	1/5/2011	108JH*
PW-0225	64.7555, -147.3795	40	10-55	1/12/2011	108
PW-0225	64.7555, -147.3795	40	10-55	1/19/2011	100
PW-0225	64.7555, -147.3795	40	10-55	1/26/2011	93.7
PW-0225	64.7555, -147.3795	40	10-55	2/2/2011	85.4
PW-0225	64.7555, -147.3795	40	10-55	2/9/2011	131JH*
PW-0225	64.7555, -147.3795	40	10-55	2/16/2011	131JH*
PW-0225	64.7555, -147.3795	40	10-55	2/23/2011	123
PW-0225	64.7555, -147.3795	40	10-55	3/2/2011	83.1
PW-0225	64.7555, -147.3795	40	10-55	3/9/2011	122
PW-0225	64.7555, -147.3795	40	10-55	3/16/2011	113
PW-0225	64.7555, -147.3795	40	10-55	3/23/2011	111
PW-0225	64.7555, -147.3795	40	10-55	3/30/2011	110
PW-0225	64.7555, -147.3795	40	10-55	4/6/2011	105
PW-0225	64.7555, -147.3795	40	10-55	4/14/2011	85.2
PW-0225	64.7555, -147.3795	40	10-55	4/20/2011	105
PW-0225	64.7555, -147.3795	40	10-55	4/27/2011	98.7
PW-0225	64.7555, -147.3795	40	10-55	5/4/2011	94.6
PW-0225	64.7555, -147.3795	40	10-55	5/11/2011	85.3
PW-0225	64.7555, -147.3795	40	10-55	5/23/2011	109J*
PW-0225	64.7555, -147.3795	40	10-55	6/8/2011	141
PW-0225	64.7555, -147.3795	40	10-55	11/14/2011	64.9J*
PW-0225	64.7555, -147.3795	40	10-55	1/25/2012	62.4J*
PW-0225	64.7555, -147.3795	40	10-55	4/23/2012	59.4J*
PW-0225	64.7555, -147.3795	40	10-55	7/12/2012	51.8J*
PW-0225	64.7555, -147.3795	40	10-55	10/8/2012	45.8J*
PW-0225	64.7555, -147.3795	40	10-55	12/17/2012	47.3J*
PW-0225	64.7555, -147.3795	40	10-55	3/8/2013	36.2J*
PW-0225	64.7555, -147.3795	40	10-55	6/14/2013	30.9J*
PW-0225	64.7555, -147.3795	40	10-55	9/17/2013	28.3
PW-0225	64.7555, -147.3795	40	10-55	1/14/2014	27.9
PW-0225	64.7555, -147.3795	40	10-55	4/14/2014	26.8
PW-0225	64.7555, -147.3795	40	10-55	7/22/2014	24.2
PW-0225	64.7555, -147.3795	40	10-55	1/27/2015	19.4
PW-0225	64.7555, -147.3795	40	10-55	12/28/2015	17.8

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0225	64.7555, -147.3795	40	10-55	12/2/2016	12.7
PW-0226	64.7556, -147.3815	40	10-55	11/14/2009	132
PW-0227	64.7555, -147.3829	35	10-55	11/13/2009	282
PW-0228	64.7556, -147.3855			11/28/2009	443
PW-0231	64.7450, -147.2907			8/8/2012	<6.20
PW-0232	64.7651, -147.4133	36	10-55	2/12/2010	43.7
PW-0232	64.7651, -147.4133	36	10-55	9/14/2010	50.1
PW-0232	64.7651, -147.4133	36	10-55	10/13/2010	50.4
PW-0232	64.7651, -147.4133	36	10-55	11/17/2010	57.1
PW-0232	64.7651, -147.4133	36	10-55	12/1/2010	55.6
PW-0232	64.7651, -147.4133	36	10-55	12/8/2010	49.5
PW-0232	64.7651, -147.4133	36	10-55	12/15/2010	50.4
PW-0232	64.7651, -147.4133	36	10-55	12/21/2010	49.3
PW-0232	64.7651, -147.4133	36	10-55	12/28/2010	51.8
PW-0232	64.7651, -147.4133	36	10-55	1/5/2011	44.6JH*
PW-0232	64.7651, -147.4133	36	10-55	1/12/2011	46.2JL*
PW-0232	64.7651, -147.4133	36	10-55	1/19/2011	51.8
PW-0232	64.7651, -147.4133	36	10-55	1/26/2011	45.2
PW-0232	64.7651, -147.4133	36	10-55	2/2/2011	40.7
PW-0232	64.7651, -147.4133	36	10-55	2/9/2011	58.6JH*
PW-0232	64.7651, -147.4133	36	10-55	2/16/2011	54.3JH*
PW-0232	64.7651, -147.4133	36	10-55	2/23/2011	49.1
PW-0232	64.7651, -147.4133	36	10-55	3/2/2011	38.6
PW-0232	64.7651, -147.4133	36	10-55	3/9/2011	57.6
PW-0232	64.7651, -147.4133	36	10-55	3/16/2011	49.2
PW-0232	64.7651, -147.4133	36	10-55	3/23/2011	49.9
PW-0232	64.7651, -147.4133	36	10-55	3/30/2011	51.6
PW-0232	64.7651, -147.4133	36	10-55	4/6/2011	47.7
PW-0232	64.7651, -147.4133	36	10-55	4/14/2011	36.3
PW-0232	64.7651, -147.4133	36	10-55	4/20/2011	48.0
PW-0232	64.7651, -147.4133	36	10-55	4/27/2011	45.2
PW-0232	64.7651, -147.4133	36	10-55	5/4/2011	46.0
PW-0232	64.7651, -147.4133	36	10-55	5/11/2011	40.3
PW-0232	64.7651, -147.4133	36	10-55	6/8/2011	45.2
PW-0232	64.7651, -147.4133	36	10-55	6/24/2011	41.0J*
PW-0232	64.7651, -147.4133	36	10-55	12/2/2011	48.4J*
PW-0232	64.7651, -147.4133	36	10-55	8/30/2012	55.9J*
PW-0232	64.7651, -147.4133	36	10-55	4/29/2013	49.4J*
PW-0232	64.7651, -147.4133	36	10-55	4/18/2014	48.3
PW-0232	64.7651, -147.4133	36	10-55	1/27/2015	90.7
PW-0232	64.7651, -147.4133	36	10-55	1/22/2016	100
PW-0232	64.7651, -147.4133	36	10-55	1/10/2017	100
PW-0233	64.7652, -147.2880			6/24/2011	<6.52
PW-0234	64.7935, -147.3917	35	10-55	11/2/2011	<6.52
PW-0239	64.7947, -147.4055	42	10-55	12/6/2013	<5.25
PW-0245	64.7925, -147.3941	230	>160	7/2/2014	<5.15
PW-0246	64.7931, -147.4011	40	10-55	1/27/2012	<6.20
PW-0250	64.7932, -147.4060	80	55-90	5/20/2017	<5.10
PW-0254	64.7916, -147.4040			12/3/2009	<10.4
PW-0256	64.7910, -147.4072	160	>160	4/18/2014	<5.15

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Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0258	64.7905, -147.4058	40	10-55	5/1/2014	<5.00
PW-0259	64.7908, -147.4043	278	>160	4/4/2013	<6.74
PW-0259	64.7908, -147.4043	278	>160	6/19/2013	<6.20
PW-0259	64.7908, -147.4043	278	>160	5/15/2014	<5.25
PW-0259	64.7908, -147.4043	278	>160	8/14/2014	<5.40
PW-0260	64.7909, -147.4028	80	55-90	5/10/2014	<5.25
PW-0261	64.7909, -147.4014	60	55-90	4/28/2014	<5.15
PW-0262	64.7909, -147.3986	200	>160	4/9/2010	<10.9
PW-0262	64.7909, -147.3986	200	>160	4/21/2014	<5.20
PW-0262	64.7909, -147.3986	200	>160	9/19/2017	<5.10
PW-0263	64.7909, -147.3973	40	10-55	4/25/2014	<5.00
PW-0264	64.7909, -147.3958	40	10-55	6/19/2014	<5.00
PW-0265	64.7900, -147.3958	35	10-55	8/2/2013	<6.32
PW-0265	64.7900, -147.3958	35	10-55	6/18/2014	<5.10
PW-0265	64.7900, -147.3958	35	10-55	8/22/2015	<5.20
PW-0265	64.7900, -147.3958	35	10-55	7/1/2016	<5.10
PW-0265	64.7900, -147.3958	35	10-55	7/26/2017	<5.10J*
PW-0266	64.7900, -147.3972	40	10-55	4/30/2014	<5.40
PW-0266	64.7900, -147.3972	40	10-55	7/29/2015	<5.50
PW-0266	64.7900, -147.3972	40	10-55	4/11/2016	<5.05
PW-0266	64.7900, -147.3972	40	10-55	8/8/2017	<5.10
PW-0267	64.7900, -147.4000	60	55-90	8/15/2014	<5.30
PW-0267	64.7900, -147.4000	60	55-90	7/29/2015	<5.30J*
PW-0267	64.7900, -147.4000	60	55-90	7/1/2016	<5.20
PW-0267	64.7900, -147.4000	60	55-90	7/14/2017	<5.40
PW-0268	64.7900, -147.4015			8/16/2012	<6.52
PW-0268	64.7900, -147.4015			7/28/2015	<5.40
PW-0268	64.7900, -147.4015			8/26/2016	<5.00
PW-0268	64.7900, -147.4015			9/7/2017	<5.90
PW-0269	64.7898, -147.4045	180	>160	4/18/2014	<5.15
PW-0269	64.7898, -147.4045	180	>160	7/23/2015	<5.25J*
PW-0270	64.7889, -147.4074			11/1/2011	<6.20
PW-0270	64.7889, -147.4074			10/16/2015	<5.40
PW-0270	64.7889, -147.4074			7/1/2016	<5.10J*
PW-0270	64.7889, -147.4074			8/31/2017	<5.15
PW-0271	64.7889, -147.4054	48	10-55	11/21/2011	<6.20
PW-0271	64.7889, -147.4054	48	10-55	11/30/2012	<6.52
PW-0271	64.7889, -147.4054	48	10-55	7/10/2013	<6.20
PW-0271	64.7889, -147.4054	48	10-55	7/14/2014	<5.15
PW-0271	64.7889, -147.4054	48	10-55	6/30/2015	<5.30
PW-0271	64.7889, -147.4054	48	10-55	7/1/2016	<5.20
PW-0271	64.7889, -147.4054	48	10-55	7/11/2017	<5.25
PW-0272	64.7891, -147.4043	220	>160	11/5/2011	<6.40
PW-0272	64.7891, -147.4043	220	>160	6/11/2012	<6.20
PW-0272	64.7891, -147.4043	220	>160	9/15/2017	<5.15
PW-0273	64.7893, -147.4029	170	>160	11/1/2011	<6.60
PW-0273	64.7893, -147.4029	170	>160	6/13/2012	<6.46
PW-0273	64.7893, -147.4029	170	>160	6/14/2013	<6.66
PW-0273	64.7893, -147.4029	170	>160	5/14/2014	<5.80
PW-0273	64.7893, -147.4029	170	>160	8/4/2015	<5.25

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Historical Private Well Sulfolane Results Summary

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0273	64.7893, -147.4029	170	>160	7/8/2016	<5.05
PW-0273	64.7893, -147.4029	170	>160	7/28/2017	<5.10
PW-0274	64.7893, -147.4015	158	90-160	11/2/2011	<6.52
PW-0274	64.7893, -147.4015	158	90-160	6/21/2012	<6.20J*
PW-0274	64.7893, -147.4015	158	90-160	7/9/2013	<6.20
PW-0274	64.7893, -147.4015	158	90-160	5/16/2014	<5.10
PW-0274	64.7893, -147.4015	158	90-160	6/18/2015	<5.10
PW-0274	64.7893, -147.4015	158	90-160	8/26/2016	<5.10
PW-0274	64.7893, -147.4015	158	90-160	8/24/2017	<5.10
PW-0275	64.7893, -147.3986	57	55-90	11/1/2011	<6.46
PW-0275	64.7893, -147.3986	57	55-90	6/12/2012	<6.20
PW-0275	64.7893, -147.3986	57	55-90	6/14/2013	<7.20
PW-0275	64.7893, -147.3986	57	55-90	4/19/2014	<5.00
PW-0275	64.7893, -147.3986	57	55-90	5/28/2015	<5.30
PW-0275	64.7893, -147.3986	57	55-90	7/14/2016	<5.10
PW-0275	64.7893, -147.3986	57	55-90	8/3/2017	<5.35
PW-0276	64.7893, -147.3972	49	10-55	11/2/2011	<6.20
PW-0276	64.7893, -147.3972	49	10-55	7/13/2012	<6.20
PW-0276	64.7893, -147.3972	49	10-55	8/8/2013	<6.36
PW-0276	64.7893, -147.3972	49	10-55	8/22/2015	<5.15J*
PW-0276	64.7893, -147.3972	49	10-55	7/15/2016	<5.05
PW-0276	64.7893, -147.3972	49	10-55	8/31/2017	<5.40
PW-0277	64.7893, -147.3958	45	10-55	10/21/2011	<6.40
PW-0277	64.7893, -147.3958	45	10-55	6/12/2012	<7.38
PW-0277	64.7893, -147.3958	45	10-55	6/26/2013	<6.46
PW-0277	64.7893, -147.3958	45	10-55	4/18/2014	<5.00
PW-0277	64.7893, -147.3958	45	10-55	5/26/2015	<5.25
PW-0277	64.7893, -147.3958	45	10-55	7/1/2016	<5.20
PW-0277	64.7893, -147.3958	45	10-55	7/26/2017	3.46J*
PW-0279	64.7905, -147.3940	40	10-55	5/2/2014	<5.30
PW-0280	64.7899, -147.3940	40	10-55	11/16/2011	<6.40
PW-0280	64.7899, -147.3940	40	10-55	6/11/2012	<6.74
PW-0280	64.7899, -147.3940	40	10-55	5/15/2014	<5.20
PW-0280	64.7899, -147.3940	40	10-55	6/19/2015	<5.70
PW-0280	64.7899, -147.3940	40	10-55	7/21/2016	<5.05
PW-0280	64.7899, -147.3940	40	10-55	7/26/2017	<5.15
PW-0281	64.7893, -147.3939	40	10-55	11/14/2011	<6.20
PW-0281	64.7893, -147.3939	40	10-55	6/12/2012	<6.20
PW-0281	64.7893, -147.3939	40	10-55	6/26/2013	<6.52
PW-0281	64.7893, -147.3939	40	10-55	5/8/2014	<5.30
PW-0281	64.7893, -147.3939	40	10-55	5/28/2015	<5.25
PW-0281	64.7893, -147.3939	40	10-55	7/21/2016	<5.20
PW-0281	64.7893, -147.3939	40	10-55	7/26/2017	<5.15
PW-0282	64.7886, -147.3941	41	10-55	12/8/2011	<6.52
PW-0282	64.7886, -147.3941	41	10-55	6/5/2012	<6.20
PW-0282	64.7886, -147.3941	41	10-55	6/14/2013	<6.60
PW-0282	64.7886, -147.3941	41	10-55	4/21/2014	<5.00
PW-0282	64.7886, -147.3941	41	10-55	6/30/2015	<5.25
PW-0282	64.7886, -147.3941	41	10-55	5/26/2016	<5.15
PW-0282	64.7886, -147.3941	41	10-55	8/31/2017	<5.15

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Historical Private Well Sulfolane Results Summary

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0283	64.7884, -147.3954	230	>160	11/4/2011	<6.60
PW-0283	64.7884, -147.3954	230	>160	6/1/2012	<6.20
PW-0283	64.7884, -147.3954	230	>160	6/14/2013	<6.88
PW-0283	64.7884, -147.3954	230	>160	4/10/2014	<5.00
PW-0283	64.7884, -147.3954	230	>160	5/28/2015	6.28J
PW-0284	64.7885, -147.3968	63	55-90	11/5/2011	<6.52
PW-0284	64.7885, -147.3968	63	55-90	6/21/2012	<6.46
PW-0284	64.7885, -147.3968	63	55-90	6/14/2013	<6.20
PW-0284	64.7885, -147.3968	63	55-90	4/21/2014	<5.00
PW-0284	64.7885, -147.3968	63	55-90	5/28/2015	<5.25
PW-0284	64.7885, -147.3968	63	55-90	7/7/2016	3.49J
PW-0284	64.7885, -147.3968	63	55-90	8/14/2017	<5.15
PW-0285	64.7885, -147.3982	63	55-90	11/2/2011	<6.60
PW-0285	64.7885, -147.3982	63	55-90	6/4/2012	<6.46
PW-0285	64.7885, -147.3982	63	55-90	6/13/2013	<6.66
PW-0285	64.7885, -147.3982	63	55-90	7/2/2014	<5.25
PW-0285	64.7885, -147.3982	63	55-90	6/30/2015	<5.30
PW-0285	64.7885, -147.3982	63	55-90	5/24/2016	<5.10
PW-0285	64.7885, -147.3982	63	55-90	8/14/2017	<5.15
PW-0286	64.7885, -147.3996	160	>160	11/19/2011	<6.20
PW-0286	64.7885, -147.3996	160	>160	6/1/2012	<6.20
PW-0286	64.7885, -147.3996	160	>160	7/30/2013	<6.32
PW-0286	64.7885, -147.3996	160	>160	5/16/2014	<5.00
PW-0286	64.7885, -147.3996	160	>160	5/29/2015	<5.20
PW-0286	64.7885, -147.3996	160	>160	5/24/2016	<5.05
PW-0286	64.7885, -147.3996	160	>160	7/27/2017	<5.20
PW-0287	64.7885, -147.4010	186	>160	11/12/2011	<6.40
PW-0287	64.7885, -147.4010	186	>160	6/7/2012	<6.20
PW-0287	64.7885, -147.4010	186	>160	6/13/2013	<6.66
PW-0287	64.7885, -147.4010	186	>160	5/1/2014	<5.40
PW-0287	64.7885, -147.4010	186	>160	5/29/2015	<5.30
PW-0287	64.7885, -147.4010	186	>160	5/6/2016	<5.30
PW-0287	64.7885, -147.4010	186	>160	7/27/2017	<5.10
PW-0288	64.7882, -147.4038	200	>160	11/1/2011	<6.20
PW-0288	64.7882, -147.4038	200	>160	7/11/2012	<6.40
PW-0288	64.7882, -147.4038	200	>160	6/19/2013	<6.60
PW-0288	64.7882, -147.4038	200	>160	5/14/2014	<5.25
PW-0288	64.7882, -147.4038	200	>160	7/6/2015	<5.45
PW-0288	64.7882, -147.4038	200	>160	5/7/2016	<5.25
PW-0288	64.7882, -147.4038	200	>160	9/15/2017	<5.25
PW-0289	64.7881, -147.4052	40	10-55	1/27/2012	<6.52
PW-0289	64.7881, -147.4052	40	10-55	6/6/2012	<6.52
PW-0289	64.7881, -147.4052	40	10-55	6/13/2013	<6.52
PW-0289	64.7881, -147.4052	40	10-55	4/25/2014	<5.00
PW-0289	64.7881, -147.4052	40	10-55	5/28/2015	<5.15
PW-0289	64.7881, -147.4052	40	10-55	5/31/2016	<5.05
PW-0289	64.7881, -147.4052	40	10-55	9/8/2017	<5.15
PW-0290	64.7880, -147.4080	205	>160	12/3/2011	<6.20
PW-0290	64.7880, -147.4080	205	>160	6/19/2012	<6.52
PW-0290	64.7880, -147.4080	205	>160	7/30/2013	<6.52

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0290	64.7880, -147.4080	205	>160	4/12/2014	<5.00
PW-0290	64.7880, -147.4080	205	>160	5/29/2015	<5.30
PW-0290	64.7880, -147.4080	205	>160	8/14/2017	<5.05J*
PW-0291	64.7889, -147.4090	218	>160	11/19/2011	<6.74
PW-0291	64.7889, -147.4090	218	>160	8/23/2012	<6.20
PW-0291	64.7889, -147.4090	218	>160	6/16/2014	<5.20
PW-0291	64.7889, -147.4090	218	>160	8/7/2015	<5.40
PW-0292	64.7895, -147.4090	200	>160	8/7/2014	<5.45
PW-0292	64.7895, -147.4090	200	>160	8/14/2015	<5.20J*
PW-0294	64.7846, -147.3777			4/16/2010	13.0
PW-0295	64.7808, -147.3829	34	10-55	4/15/2010	<10.0
PW-0295	64.7808, -147.3829	34	10-55	8/26/2011	7.89J
PW-0295	64.7808, -147.3829	34	10-55	10/21/2011	8.70J*
PW-0295	64.7808, -147.3829	34	10-55	9/21/2012	9.60J*
PW-0295	64.7808, -147.3829	34	10-55	4/3/2013	9.80J*
PW-0295	64.7808, -147.3829	34	10-55	1/20/2014	9.60J
PW-0295	64.7808, -147.3829	34	10-55	11/11/2014	10.1
PW-0295	64.7808, -147.3829	34	10-55	7/14/2015	11.1
PW-0295	64.7808, -147.3829	34	10-55	7/8/2016	15.6
PW-0295	64.7808, -147.3829	34	10-55	2/20/2017	14.2
PW-0295	64.7808, -147.3829	34	10-55	4/7/2017	16.3
PW-0296	64.7810, -147.3818	220	>160	3/27/2010	<10.6
PW-0296	64.7810, -147.3818	220	>160	8/5/2011	7.17J
PW-0296	64.7810, -147.3818	220	>160	9/8/2011	6.90J*
PW-0296	64.7810, -147.3818	220	>160	2/13/2012	9.50J*
PW-0296	64.7810, -147.3818	220	>160	5/21/2012	10.6J*
PW-0296	64.7810, -147.3818	220	>160	8/14/2012	12.5J*
PW-0296	64.7810, -147.3818	220	>160	1/2/2013	9.60J*
PW-0296	64.7810, -147.3818	220	>160	3/21/2013	11.9
PW-0296	64.7810, -147.3818	220	>160	6/13/2013	13.4
PW-0296	64.7810, -147.3818	220	>160	7/16/2013	11.6J*
PW-0296	64.7810, -147.3818	220	>160	9/12/2013	11.2
PW-0296	64.7810, -147.3818	220	>160	11/15/2013	10.6J*
PW-0296	64.7810, -147.3818	220	>160	12/4/2013	11.5
PW-0296	64.7810, -147.3818	220	>160	3/17/2014	11.2
PW-0296	64.7810, -147.3818	220	>160	3/24/2014	11.6
PW-0296	64.7810, -147.3818	220	>160	6/4/2014	10.4
PW-0296	64.7810, -147.3818	220	>160	11/18/2014	11.3
PW-0296	64.7810, -147.3818	220	>160	11/19/2014	10.4
PW-0296	64.7810, -147.3818	220	>160	2/17/2015	10.3J
PW-0296	64.7810, -147.3818	220	>160	5/7/2015	9.54J
PW-0296	64.7810, -147.3818	220	>160	5/15/2015	11.1
PW-0296	64.7810, -147.3818	220	>160	8/18/2015	<5.05J*
PW-0296	64.7810, -147.3818	220	>160	10/12/2015	9.80J
PW-0296	64.7810, -147.3818	220	>160	10/19/2015	10.1J
PW-0296	64.7810, -147.3818	220	>160	4/8/2016	12.4
PW-0296	64.7810, -147.3818	220	>160	8/19/2016	11.9
PW-0296	64.7810, -147.3818	220	>160	11/18/2016	9.30J
PW-0296	64.7810, -147.3818	220	>160	2/24/2017	11.1
PW-0296	64.7810, -147.3818	220	>160	4/21/2017	12.1

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0296	64.7810, -147.3818	220	>160	8/11/2017	11.5
PW-0297	64.7807, -147.3818	24	10-55	8/5/2011	8.79J
PW-0297	64.7807, -147.3818	24	10-55	3/21/2013	9.12J
PW-0297	64.7807, -147.3818	24	10-55	6/13/2013	10.5
PW-0297	64.7807, -147.3818	24	10-55	9/12/2013	10.0J
PW-0297	64.7807, -147.3818	24	10-55	12/4/2013	11.1
PW-0297	64.7807, -147.3818	24	10-55	3/24/2014	12.8
PW-0297	64.7807, -147.3818	24	10-55	6/4/2014	12.2
PW-0298	64.7808, -147.3806	40	10-55	3/23/2010	<10.3
PW-0298	64.7808, -147.3806	40	10-55	3/7/2011	<10.2
PW-0298	64.7808, -147.3806	40	10-55	7/26/2011	8.64J
PW-0298	64.7808, -147.3806	40	10-55	9/13/2011	8.20J*
PW-0298	64.7808, -147.3806	40	10-55	4/19/2012	7.60J*
PW-0298	64.7808, -147.3806	40	10-55	10/26/2012	8.80J*
PW-0298	64.7808, -147.3806	40	10-55	4/16/2013	10.2J*
PW-0298	64.7808, -147.3806	40	10-55	12/23/2013	11.1
PW-0298	64.7808, -147.3806	40	10-55	9/16/2014	14.8
PW-0298	64.7808, -147.3806	40	10-55	6/29/2015	15.8
PW-0298	64.7808, -147.3806	40	10-55	4/11/2016	21.4
PW-0298	64.7808, -147.3806	40	10-55	12/23/2016	26.0
PW-0298	64.7808, -147.3806	40	10-55	8/8/2017	31.8
PW-0299	64.7808, -147.3795	31	10-55	4/15/2010	<10.3
PW-0299	64.7808, -147.3795	31	10-55	7/17/2011	7.00J
PW-0299	64.7808, -147.3795	31	10-55	8/3/2011	<3.10J*
PW-0299	64.7808, -147.3795	31	10-55	2/6/2012	7.90J*
PW-0299	64.7808, -147.3795	31	10-55	6/16/2012	8.00J*
PW-0299	64.7808, -147.3795	31	10-55	8/20/2013	8.40J*
PW-0299	64.7808, -147.3795	31	10-55	9/2/2014	16.4
PW-0299	64.7808, -147.3795	31	10-55	1/28/2015	15.9
PW-0299	64.7808, -147.3795	31	10-55	12/28/2015	22.2
PW-0299	64.7808, -147.3795	31	10-55	9/19/2016	25.4
PW-0299	64.7808, -147.3795	31	10-55	11/22/2016	22.8
PW-0300	64.7808, -147.3770	40	10-55	2/23/2010	<10.9
PW-0300	64.7808, -147.3770	40	10-55	7/21/2011	8.26J
PW-0300	64.7808, -147.3770	40	10-55	7/28/2011	9.80J*
PW-0300	64.7808, -147.3770	40	10-55	2/6/2012	8.70J*
PW-0300	64.7808, -147.3770	40	10-55	10/8/2012	9.80J*
PW-0300	64.7808, -147.3770	40	10-55	4/22/2013	10.3J*
PW-0300	64.7808, -147.3770	40	10-55	9/23/2013	12.6
PW-0300	64.7808, -147.3770	40	10-55	2/3/2014	14.2
PW-0300	64.7808, -147.3770	40	10-55	9/22/2014	17.4
PW-0300	64.7808, -147.3770	40	10-55	8/14/2015	23.0
PW-0300	64.7808, -147.3770	40	10-55	3/29/2016	27.7
PW-0300	64.7808, -147.3770	40	10-55	7/22/2016	31.2
PW-0300	64.7808, -147.3770	40	10-55	9/12/2016	27.8
PW-0300	64.7808, -147.3770	40	10-55	5/12/2017	40.8
PW-0301	64.7815, -147.3820	42.5	10-55	5/12/2010	<10.4
PW-0301	64.7815, -147.3820	42.5	10-55	8/4/2011	8.64J
PW-0301	64.7815, -147.3820	42.5	10-55	9/26/2012	9.30J*
PW-0301	64.7815, -147.3820	42.5	10-55	8/26/2013	8.20J*

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0301	64.7815, -147.3820	42.5	10-55	8/1/2014	14.1
PW-0301	64.7815, -147.3820	42.5	10-55	7/31/2015	16.3
PW-0301	64.7815, -147.3820	42.5	10-55	4/18/2016	19.4
PW-0301	64.7815, -147.3820	42.5	10-55	7/22/2016	17.7
PW-0301	64.7815, -147.3820	42.5	10-55	6/16/2017	25.9JH*
PW-0302	64.7816, -147.3802	32	10-55	4/15/2010	<10.9
PW-0302	64.7816, -147.3802	32	10-55	8/1/2011	6.77J
PW-0302	64.7816, -147.3802	32	10-55	9/22/2011	6.90J*
PW-0302	64.7816, -147.3802	32	10-55	10/26/2011	6.90J*
PW-0302	64.7816, -147.3802	32	10-55	9/18/2012	7.30J*
PW-0302	64.7816, -147.3802	32	10-55	8/27/2013	11.4J*
PW-0302	64.7816, -147.3802	32	10-55	8/12/2014	14.3
PW-0302	64.7816, -147.3802	32	10-55	7/20/2015	16.8
PW-0302	64.7816, -147.3802	32	10-55	7/1/2016	22.6
PW-0302	64.7816, -147.3802	32	10-55	12/6/2016	24.2
PW-0302	64.7816, -147.3802	32	10-55	6/23/2017	28.4
PW-0303	64.7825, -147.3771	26.5	10-55	12/21/2009	<10.3
PW-0303	64.7825, -147.3771	26.5	10-55	3/16/2010	<10.3
PW-0303	64.7825, -147.3771	26.5	10-55	7/12/2011	12.6
PW-0303	64.7825, -147.3771	26.5	10-55	8/26/2011	10.8J*
PW-0303	64.7825, -147.3771	26.5	10-55	2/15/2012	11.2J*
PW-0303	64.7825, -147.3771	26.5	10-55	5/25/2012	12.2J*
PW-0303	64.7825, -147.3771	26.5	10-55	1/15/2013	11.4J*
PW-0303	64.7825, -147.3771	26.5	10-55	6/24/2013	14.1J*
PW-0303	64.7825, -147.3771	26.5	10-55	2/11/2014	15.0
PW-0303	64.7825, -147.3771	26.5	10-55	9/30/2014	15.2
PW-0303	64.7825, -147.3771	26.5	10-55	6/19/2015	15.2
PW-0303	64.7825, -147.3771	26.5	10-55	9/21/2015	15.6
PW-0303	64.7825, -147.3771	26.5	10-55	4/12/2016	18.6
PW-0303	64.7825, -147.3771	26.5	10-55	1/20/2017	20.7
PW-0303	64.7825, -147.3771	26.5	10-55	8/14/2017	26.1
PW-0304	64.7834, -147.3770	20	10-55	2/26/2010	13.9
PW-0304	64.7834, -147.3770	20	10-55	4/18/2012	19.7J*
PW-0304	64.7834, -147.3770	20	10-55	11/26/2012	23.4J*
PW-0304	64.7834, -147.3770	20	10-55	8/23/2013	19.6J*
PW-0304	64.7834, -147.3770	20	10-55	3/10/2014	24.6
PW-0304	64.7834, -147.3770	20	10-55	10/10/2014	26.1
PW-0304	64.7834, -147.3770	20	10-55	4/17/2015	24.9
PW-0304	64.7834, -147.3770	20	10-55	12/4/2015	33.2
PW-0304	64.7834, -147.3770	20	10-55	6/13/2016	33.0
PW-0304	64.7834, -147.3770	20	10-55	11/28/2016	34.8
PW-0304	64.7834, -147.3770	20	10-55	1/20/2017	40.5
PW-0304	64.7834, -147.3770	20	10-55	8/28/2017	48.6
PW-0305	64.7828, -147.3781	40	10-55	5/1/2010	<10.0
PW-0305	64.7828, -147.3781	40	10-55	8/19/2011	16.2
PW-0305	64.7828, -147.3781	40	10-55	10/5/2011	14.5J*
PW-0305	64.7828, -147.3781	40	10-55	7/13/2012	16.5J*
PW-0305	64.7828, -147.3781	40	10-55	10/26/2012	15.2J*
PW-0305	64.7828, -147.3781	40	10-55	2/1/2013	13.7J*
PW-0305	64.7828, -147.3781	40	10-55	7/16/2013	16.5J*

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0305	64.7828, -147.3781	40	10-55	2/3/2014	19.1
PW-0305	64.7828, -147.3781	40	10-55	6/27/2014	22.4
PW-0305	64.7828, -147.3781	40	10-55	1/5/2015	18.7
PW-0305	64.7828, -147.3781	40	10-55	5/1/2015	18.9
PW-0305	64.7828, -147.3781	40	10-55	8/10/2015	22.0
PW-0305	64.7828, -147.3781	40	10-55	11/6/2015	21.8
PW-0305	64.7828, -147.3781	40	10-55	4/25/2016	27.4
PW-0305	64.7828, -147.3781	40	10-55	10/4/2016	21.7
PW-0305	64.7828, -147.3781	40	10-55	2/24/2017	30.1
PW-0305	64.7828, -147.3781	40	10-55	8/28/2017	39.6
PW-0306	64.7822, -147.3805	40	10-55	3/18/2010	<10.6
PW-0306	64.7822, -147.3805	40	10-55	7/27/2011	8.33J
PW-0307	64.7820, -147.3821	30	10-55	5/5/2010	<10.5
PW-0307	64.7820, -147.3821	30	10-55	7/26/2011	12.3
PW-0307	64.7820, -147.3821	30	10-55	9/20/2011	11.4J*
PW-0307	64.7820, -147.3821	30	10-55	3/19/2012	13.7J*
PW-0307	64.7820, -147.3821	30	10-55	8/29/2012	13.7J*
PW-0307	64.7820, -147.3821	30	10-55	12/11/2012	16.5J*
PW-0307	64.7820, -147.3821	30	10-55	3/29/2013	16.8J*
PW-0307	64.7820, -147.3821	30	10-55	7/8/2013	13.5J*
PW-0307	64.7820, -147.3821	30	10-55	10/14/2013	12.3
PW-0307	64.7820, -147.3821	30	10-55	1/31/2014	16.7
PW-0307	64.7820, -147.3821	30	10-55	5/9/2014	17.4
PW-0307	64.7820, -147.3821	30	10-55	8/8/2014	18.4
PW-0307	64.7820, -147.3821	30	10-55	11/10/2014	17.8
PW-0307	64.7820, -147.3821	30	10-55	2/16/2015	18.6
PW-0307	64.7820, -147.3821	30	10-55	5/12/2015	19.9
PW-0307	64.7820, -147.3821	30	10-55	8/10/2015	23.1
PW-0307	64.7820, -147.3821	30	10-55	10/30/2015	25.8
PW-0307	64.7820, -147.3821	30	10-55	2/19/2016	29.3
PW-0307	64.7820, -147.3821	30	10-55	5/6/2016	29.9
PW-0307	64.7820, -147.3821	30	10-55	10/31/2016	26.3
PW-0307	64.7820, -147.3821	30	10-55	12/6/2016	23.9
PW-0307	64.7820, -147.3821	30	10-55	3/21/2017	38.2
PW-0307	64.7820, -147.3821	30	10-55	7/21/2017	38.7
PW-0308	64.7816, -147.3841	35	10-55	4/16/2010	<10.0
PW-0308	64.7816, -147.3841	35	10-55	9/16/2011	7.19J
PW-0308	64.7816, -147.3841	35	10-55	5/24/2012	7.10J*
PW-0308	64.7816, -147.3841	35	10-55	9/10/2012	7.20J*
PW-0308	64.7816, -147.3841	35	10-55	3/8/2013	7.20J*
PW-0308	64.7816, -147.3841	35	10-55	8/23/2013	5.50J*
PW-0308	64.7816, -147.3841	35	10-55	5/16/2014	3.10J
PW-0308	64.7816, -147.3841	35	10-55	9/26/2014	4.90J
PW-0308	64.7816, -147.3841	35	10-55	3/14/2015	4.90J
PW-0308	64.7816, -147.3841	35	10-55	12/8/2015	5.30J
PW-0308	64.7816, -147.3841	35	10-55	5/6/2016	5.70J
PW-0308	64.7816, -147.3841	35	10-55	10/14/2016	3.90J
PW-0308	64.7816, -147.3841	35	10-55	3/13/2017	5.70J
PW-0309	64.7828, -147.3836	39	10-55	4/19/2010	<10.0
PW-0309	64.7828, -147.3836	39	10-55	8/29/2011	7.28J

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0309	64.7828, -147.3836	39	10-55	10/18/2011	7.70J*
PW-0309	64.7828, -147.3836	39	10-55	4/23/2012	8.70J*
PW-0309	64.7828, -147.3836	39	10-55	6/11/2012	8.40J*
PW-0309	64.7828, -147.3836	39	10-55	11/16/2012	9.90J*
PW-0309	64.7828, -147.3836	39	10-55	1/29/2013	7.60J*
PW-0309	64.7828, -147.3836	39	10-55	4/22/2013	9.00J*
PW-0309	64.7828, -147.3836	39	10-55	6/25/2013	10.2JL*
PW-0309	64.7828, -147.3836	39	10-55	9/24/2013	8.80J
PW-0309	64.7828, -147.3836	39	10-55	11/15/2013	9.70J
PW-0309	64.7828, -147.3836	39	10-55	1/31/2014	9.70J*
PW-0309	64.7828, -147.3836	39	10-55	6/9/2014	10.5
PW-0309	64.7828, -147.3836	39	10-55	3/23/2015	11.4
PW-0309	64.7828, -147.3836	39	10-55	1/11/2016	14.8
PW-0309	64.7828, -147.3836	39	10-55	11/7/2016	17.2
PW-0309	64.7828, -147.3836	39	10-55	7/17/2017	25.3
PW-0310	64.7829, -147.3822			4/15/2010	<10.4
PW-0310	64.7829, -147.3822			8/23/2011	6.64J
PW-0311	64.7829, -147.3810	27.5	10-55	4/19/2010	<10.0
PW-0311	64.7829, -147.3810	27.5	10-55	7/25/2011	7.55J
PW-0311	64.7829, -147.3810	27.5	10-55	9/9/2011	7.80J*
PW-0311	64.7829, -147.3810	27.5	10-55	7/11/2012	10.0J*
PW-0311	64.7829, -147.3810	27.5	10-55	3/4/2013	10.0J*
PW-0311	64.7829, -147.3810	27.5	10-55	10/7/2013	10.0
PW-0311	64.7829, -147.3810	27.5	10-55	2/28/2014	12.4
PW-0311	64.7829, -147.3810	27.5	10-55	7/28/2014	12.5
PW-0311	64.7829, -147.3810	27.5	10-55	1/19/2015	13.6
PW-0311	64.7829, -147.3810	27.5	10-55	9/11/2015	15.4
PW-0311	64.7829, -147.3810	27.5	10-55	6/28/2016	18.4
PW-0311	64.7829, -147.3810	27.5	10-55	11/8/2016	17.9
PW-0311	64.7829, -147.3810	27.5	10-55	4/4/2017	23.1
PW-0311	64.7829, -147.3810	27.5	10-55	8/1/2017	28.4
PW-0312	64.7832, -147.3797	40	10-55	3/27/2010	<10.8
PW-0312	64.7832, -147.3797	40	10-55	8/31/2011	10.9
PW-0312	64.7832, -147.3797	40	10-55	8/30/2012	12.5J*
PW-0312	64.7832, -147.3797	40	10-55	6/14/2013	12.7J*
PW-0312	64.7832, -147.3797	40	10-55	2/7/2014	15.2
PW-0312	64.7832, -147.3797	40	10-55	6/27/2014	17.1
PW-0312	64.7832, -147.3797	40	10-55	1/12/2015	16.6
PW-0312	64.7832, -147.3797	40	10-55	1/15/2016	19.1
PW-0313	64.7837, -147.3786	32	10-55	4/15/2010	<10.3
PW-0313	64.7837, -147.3786	32	10-55	8/2/2011	13.2
PW-0321	64.7572, -147.3671			11/17/2009	55.5
PW-0322	64.7561, -147.3651	40	10-55	11/18/2009	16.7
PW-0323	64.7578, -147.3708			6/7/2010	86.7
PW-0324	64.7575, -147.3706			2/4/2010	102
PW-0324	64.7575, -147.3706			7/19/2013	57.8
PW-0325	64.7592, -147.3728			5/24/2010	74.0
PW-0326	64.7591, -147.3736			1/13/2010	109JL*
PW-0327	64.7561, -147.3736			10/15/2010	172JL*
PW-0332	64.7802, -147.3359	266	>160	4/19/2013	<6.66J§*

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0332	64.7802, -147.3359	266	>160	6/20/2013	<6.20
PW-0332	64.7802, -147.3359	266	>160	9/24/2013	<6.20
PW-0332	64.7802, -147.3359	266	>160	12/16/2013	<5.00
PW-0332	64.7802, -147.3359	266	>160	3/17/2014	<5.10
PW-0332	64.7802, -147.3359	266	>160	6/24/2014	<5.45
PW-0332	64.7802, -147.3359	266	>160	8/20/2014	<5.00
PW-0332	64.7802, -147.3359	266	>160	11/19/2014	<5.25
PW-0336	64.7774, -147.3373	70	55-90	10/16/2012	<6.20
PW-0342	64.7792, -147.3364	80	55-90	11/11/2013	<6.32
PW-0343	64.7792, -147.3399	40	10-55	5/9/2013	<6.20
PW-0345	64.7675, -147.3484	100	90-160	2/12/2010	<10.4
PW-0345	64.7675, -147.3484	100	90-160	7/22/2011	<6.20
PW-0345	64.7675, -147.3484	100	90-160	5/30/2012	<6.20
PW-0346	64.7672, -147.3486	40	10-55	2/13/2010	<10.4
PW-0346	64.7672, -147.3486	40	10-55	8/29/2011	3.63J
PW-0347	64.7672, -147.3498			2/13/2010	<10.3
PW-0347	64.7672, -147.3498			10/28/2011	5.16J
PW-0347	64.7672, -147.3498			1/31/2012	6.10J*
PW-0347	64.7672, -147.3498			12/3/2012	5.10JH*
PW-0347	64.7672, -147.3498			7/30/2013	<3.10J*
PW-0347	64.7672, -147.3498			4/21/2014	<2.00
PW-0347	64.7672, -147.3498			1/19/2015	2.90J
PW-0347	64.7672, -147.3498			9/14/2015	<2.50
PW-0347	64.7672, -147.3498			4/19/2016	<2.50
PW-0347	64.7672, -147.3498			9/9/2016	<2.50
PW-0347	64.7672, -147.3498			12/6/2016	<2.50
PW-0347	64.7672, -147.3498			7/18/2017	<2.50
PW-0348	64.7671, -147.3517	30	10-55	2/22/2010	<10.9
PW-0348	64.7671, -147.3517	30	10-55	8/19/2011	3.98J
PW-0348	64.7671, -147.3517	30	10-55	11/3/2011	<3.10J*
PW-0348	64.7671, -147.3517	30	10-55	7/16/2012	<3.10J*
PW-0348	64.7671, -147.3517	30	10-55	2/26/2013	<3.10J*
PW-0348	64.7671, -147.3517	30	10-55	9/23/2013	<3.10
PW-0348	64.7671, -147.3517	30	10-55	1/14/2014	<3.00
PW-0348	64.7671, -147.3517	30	10-55	6/9/2014	<2.40
PW-0348	64.7671, -147.3517	30	10-55	9/22/2014	<2.40
PW-0348	64.7671, -147.3517	30	10-55	2/27/2015	<2.40
PW-0348	64.7671, -147.3517	30	10-55	2/5/2016	<2.50
PW-0348	64.7671, -147.3517	30	10-55	9/23/2016	<2.50
PW-0348	64.7671, -147.3517	30	10-55	2/3/2017	<2.50
PW-0348	64.7671, -147.3517	30	10-55	9/11/2017	<2.50
PW-0349	64.7674, -147.3533			2/17/2010	<10.6
PW-0349	64.7674, -147.3533			8/4/2011	<6.26
PW-0349	64.7674, -147.3533			5/20/2013	<6.20
PW-0349	64.7674, -147.3533			5/1/2014	<5.00
PW-0349	64.7674, -147.3533			5/12/2015	<5.15
PW-0349	64.7674, -147.3533			5/16/2016	<5.10
PW-0350	64.7678, -147.3535			2/16/2010	<10.5
PW-0350	64.7678, -147.3535			8/26/2011	<6.20
PW-0350	64.7678, -147.3535			6/25/2012	<6.20

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0350	64.7678, -147.3535			7/18/2013	<6.46
PW-0350	64.7678, -147.3535			4/6/2014	<5.00
PW-0350	64.7678, -147.3535			5/22/2015	<5.20
PW-0350	64.7678, -147.3535			5/12/2016	<5.25
PW-0351	64.7678, -147.3551	30	10-55	2/16/2010	<10.0
PW-0351	64.7678, -147.3551	30	10-55	10/7/2011	<6.52
PW-0351	64.7678, -147.3551	30	10-55	7/11/2013	<6.46
PW-0351	64.7678, -147.3551	30	10-55	4/23/2014	<5.00
PW-0351	64.7678, -147.3551	30	10-55	5/22/2015	<5.00
PW-0351	64.7678, -147.3551	30	10-55	8/25/2016	<5.05
PW-0352	64.7678, -147.3568	40	10-55	2/16/2010	<10.4
PW-0352	64.7678, -147.3568	40	10-55	8/25/2011	<6.52
PW-0352	64.7678, -147.3568	40	10-55	5/17/2012	<6.20
PW-0352	64.7678, -147.3568	40	10-55	5/20/2013	<6.52
PW-0352	64.7678, -147.3568	40	10-55	5/16/2014	<5.25
PW-0352	64.7678, -147.3568	40	10-55	5/14/2015	<5.30
PW-0352	64.7678, -147.3568	40	10-55	8/25/2016	<5.00
PW-0353	64.7673, -147.3568	40	10-55	2/16/2010	<10.7
PW-0353	64.7673, -147.3568	40	10-55	8/25/2011	<6.88
PW-0353	64.7673, -147.3568	40	10-55	5/29/2012	<6.66
PW-0353	64.7673, -147.3568	40	10-55	8/2/2013	<6.46
PW-0353	64.7673, -147.3568	40	10-55	5/13/2014	<5.25
PW-0353	64.7673, -147.3568	40	10-55	5/12/2015	<5.25
PW-0353	64.7673, -147.3568	40	10-55	5/16/2016	<5.20
PW-0354	64.7668, -147.3552			2/17/2010	<10.3
PW-0354	64.7668, -147.3552			6/10/2011	<6.20
PW-0354	64.7668, -147.3552			7/11/2012	<6.32
PW-0354	64.7668, -147.3552			5/29/2013	<6.20
PW-0354	64.7668, -147.3552			5/6/2014	<5.30
PW-0354	64.7668, -147.3552			5/14/2015	<5.00
PW-0354	64.7668, -147.3552			5/26/2016	<5.20
PW-0355	64.7668, -147.3568	30	10-55	2/17/2010	<10.4
PW-0355	64.7668, -147.3568	30	10-55	3/11/2011	<10.3
PW-0355	64.7668, -147.3568	30	10-55	7/15/2011	<6.26
PW-0355	64.7668, -147.3568	30	10-55	5/16/2012	<6.20
PW-0355	64.7668, -147.3568	30	10-55	7/18/2013	<6.88
PW-0355	64.7668, -147.3568	30	10-55	4/4/2014	<5.25
PW-0355	64.7668, -147.3568	30	10-55	5/22/2015	<5.55
PW-0355	64.7668, -147.3568	30	10-55	5/3/2016	<5.05
PW-0356	64.7668, -147.3586	30	10-55	2/2/2012	<6.82
PW-0356	64.7668, -147.3586	30	10-55	6/11/2012	<6.20
PW-0356	64.7668, -147.3586	30	10-55	7/31/2013	<6.32
PW-0356	64.7668, -147.3586	30	10-55	6/6/2014	<5.30
PW-0356	64.7668, -147.3586	30	10-55	7/29/2015	<5.25
PW-0356	64.7668, -147.3586	30	10-55	8/25/2016	<5.00
PW-0357	64.7663, -147.3584	40	10-55	3/7/2010	<10.0
PW-0357	64.7663, -147.3584	40	10-55	8/26/2011	<6.32
PW-0357	64.7663, -147.3584	40	10-55	5/16/2012	<6.20
PW-0357	64.7663, -147.3584	40	10-55	7/23/2013	<6.40
PW-0357	64.7663, -147.3584	40	10-55	5/10/2014	<5.00

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0357	64.7663, -147.3584	40	10-55	5/15/2015	<5.20
PW-0358	64.7662, -147.3569	105	90-160	2/28/2010	77.4
PW-0358	64.7662, -147.3569	105	90-160	3/13/2010	97.9
PW-0358	64.7662, -147.3569	105	90-160	3/10/2011	82.9
PW-0358	64.7662, -147.3569	105	90-160	3/25/2013	73.8
PW-0358	64.7662, -147.3569	105	90-160	6/12/2013	80.2
PW-0358	64.7662, -147.3569	105	90-160	9/10/2013	88.7
PW-0358	64.7662, -147.3569	105	90-160	12/9/2013	86.7
PW-0358	64.7662, -147.3569	105	90-160	9/9/2014	80.0
PW-0358	64.7662, -147.3569	105	90-160	11/10/2014	74.5
PW-0358	64.7662, -147.3569	105	90-160	3/9/2015	69.3
PW-0358	64.7662, -147.3569	105	90-160	5/6/2015	65.3
PW-0358	64.7662, -147.3569	105	90-160	8/20/2015	64.4
PW-0358	64.7662, -147.3569	105	90-160	10/23/2015	65.2
PW-0358	64.7662, -147.3569	105	90-160	3/3/2016	58.1
PW-0358	64.7662, -147.3569	105	90-160	4/27/2016	61.8
PW-0358	64.7662, -147.3569	105	90-160	8/18/2016	49.9
PW-0358	64.7662, -147.3569	105	90-160	11/11/2016	50.9
PW-0358	64.7662, -147.3569	105	90-160	2/18/2017	43.9
PW-0359	64.7663, -147.3551	40	10-55	3/1/2010	<10.4
PW-0359	64.7663, -147.3551	40	10-55	3/11/2011	<11.1
PW-0359	64.7663, -147.3551	40	10-55	8/2/2011	<6.60
PW-0359	64.7663, -147.3551	40	10-55	5/23/2012	<6.20
PW-0359	64.7663, -147.3551	40	10-55	8/5/2013	<6.40
PW-0359	64.7663, -147.3551	40	10-55	4/15/2014	<5.00
PW-0359	64.7663, -147.3551	40	10-55	5/15/2015	<5.25
PW-0359	64.7663, -147.3551	40	10-55	5/3/2016	<5.15
PW-0360	64.7663, -147.3534	40	10-55	2/28/2010	<10.2
PW-0360	64.7663, -147.3534	40	10-55	8/19/2011	<6.40
PW-0360	64.7663, -147.3534	40	10-55	5/23/2012	<6.74
PW-0360	64.7663, -147.3534	40	10-55	5/13/2013	<6.52
PW-0360	64.7663, -147.3534	40	10-55	4/7/2014	<5.00
PW-0360	64.7663, -147.3534	40	10-55	8/12/2015	4.54J
PW-0361	64.7664, -147.3520	35	10-55	2/13/2010	<10.4
PW-0361	64.7664, -147.3520	35	10-55	8/25/2011	<6.60
PW-0361	64.7664, -147.3520	35	10-55	5/25/2012	<6.32
PW-0361	64.7664, -147.3520	35	10-55	7/1/2013	<6.66
PW-0361	64.7664, -147.3520	35	10-55	4/8/2014	<5.00
PW-0361	64.7664, -147.3520	35	10-55	5/12/2015	<5.15
PW-0361	64.7664, -147.3520	35	10-55	5/17/2016	<5.20
PW-0362	64.7664, -147.3500	42	10-55	2/18/2010	<10.4
PW-0362	64.7664, -147.3500	42	10-55	9/19/2011	3.29J
PW-0363	64.7664, -147.3490	42	10-55	2/13/2010	<10.5
PW-0363	64.7664, -147.3490	42	10-55	7/22/2011	5.03J
PW-0364	64.7664, -147.3480	90	90-160	2/13/2010	<10.4
PW-0364	64.7664, -147.3480	90	90-160	7/22/2011	4.19J
PW-0364	64.7664, -147.3480	90	90-160	8/30/2011	4.60J*
PW-0364	64.7664, -147.3480	90	90-160	5/7/2012	<3.10J*
PW-0364	64.7664, -147.3480	90	90-160	1/7/2013	<3.10J*
PW-0364	64.7664, -147.3480	90	90-160	9/9/2013	<3.10J*

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0364	64.7664, -147.3480	90	90-160	1/3/2014	<3.00
PW-0364	64.7664, -147.3480	90	90-160	5/21/2014	<2.00
PW-0364	64.7664, -147.3480	90	90-160	10/17/2014	<2.40
PW-0364	64.7664, -147.3480	90	90-160	4/7/2015	<2.40
PW-0364	64.7664, -147.3480	90	90-160	10/5/2015	<2.50
PW-0364	64.7664, -147.3480	90	90-160	3/7/2016	<2.50
PW-0364	64.7664, -147.3480	90	90-160	5/27/2016	<2.50
PW-0364	64.7664, -147.3480	90	90-160	8/1/2016	<2.50
PW-0364	64.7664, -147.3480	90	90-160	2/17/2017	<2.50
PW-0364	64.7664, -147.3480	90	90-160	8/18/2017	<2.50
PW-0365	64.7664, -147.3459			2/23/2010	<11.0
PW-0365	64.7664, -147.3459			8/9/2011	<6.20
PW-0365	64.7664, -147.3459			10/23/2012	<3.10J*
PW-0365	64.7664, -147.3459			1/18/2013	<3.10J*
PW-0365	64.7664, -147.3459			4/16/2013	<3.10J*
PW-0365	64.7664, -147.3459			7/2/2013	<3.10J*
PW-0365	64.7664, -147.3459			9/20/2013	<3.10
PW-0365	64.7664, -147.3459			12/20/2013	<3.00J*
PW-0365	64.7664, -147.3459			4/11/2014	<2.00
PW-0365	64.7664, -147.3459			7/11/2014	<2.40
PW-0365	64.7664, -147.3459			9/22/2014	<2.40
PW-0365	64.7664, -147.3459			12/12/2014	<2.40
PW-0365	64.7664, -147.3459			3/6/2015	<2.40
PW-0365	64.7664, -147.3459			5/22/2015	<1.00
PW-0365	64.7664, -147.3459			9/11/2015	<2.50
PW-0365	64.7664, -147.3459			12/4/2015	<2.50
PW-0365	64.7664, -147.3459			2/12/2016	<2.50
PW-0365	64.7664, -147.3459			5/27/2016	<2.50
PW-0365	64.7664, -147.3459			9/9/2016	<2.50
PW-0365	64.7664, -147.3459			12/9/2016	<2.50
PW-0365	64.7664, -147.3459			1/13/2017	<2.50J*
PW-0365	64.7664, -147.3459			4/21/2017	<2.50
PW-0365	64.7664, -147.3459			8/25/2017	<2.50
PW-0366	64.7672, -147.3428			12/1/2011	<6.60
PW-0366	64.7672, -147.3428			6/27/2012	<6.52
PW-0366	64.7672, -147.3428			6/19/2013	<6.60
PW-0366	64.7672, -147.3428			7/11/2014	<5.30
PW-0366	64.7672, -147.3428			8/11/2015	<5.40
PW-0366	64.7672, -147.3428			7/21/2016	<5.25
PW-0366	64.7672, -147.3428			6/10/2017	R*
PW-0366	64.7672, -147.3428			7/18/2017	<5.25
PW-0367	64.7684, -147.3435			3/11/2010	<10.4
PW-0367	64.7684, -147.3435			9/9/2011	<6.20
PW-0367	64.7684, -147.3435			6/26/2012	<6.20
PW-0367	64.7684, -147.3435			10/11/2016	<5.25
PW-0367	64.7684, -147.3435			5/24/2017	<5.00
PW-0368	64.7682, -147.3431			3/11/2010	<10.8
PW-0368	64.7682, -147.3431			11/2/2011	<6.32
PW-0368	64.7682, -147.3431			5/24/2012	<6.20
PW-0368	64.7682, -147.3431			7/23/2013	<6.20

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0368	64.7682, -147.3431			11/14/2015	<5.20
PW-0368	64.7682, -147.3431			10/11/2016	<5.40
PW-0368	64.7682, -147.3431			5/24/2017	<5.05
PW-0369	64.7690, -147.3445			12/3/2011	<6.46
PW-0369	64.7690, -147.3445			5/15/2012	<6.52
PW-0369	64.7690, -147.3445			6/6/2013	<6.20
PW-0369	64.7690, -147.3445			4/23/2014	<5.00
PW-0369	64.7690, -147.3445			6/2/2015	<5.15
PW-0369	64.7690, -147.3445			7/15/2016	<5.05
PW-0369	64.7690, -147.3445			8/8/2017	<5.15
PW-0370	64.7704, -147.3466			4/13/2010	<10.0
PW-0370	64.7704, -147.3466			9/9/2011	<6.32
PW-0370	64.7704, -147.3466			6/5/2012	<6.20
PW-0370	64.7704, -147.3466			6/11/2013	<6.40
PW-0370	64.7704, -147.3466			5/24/2014	<5.40
PW-0370	64.7704, -147.3466			6/9/2015	<5.10
PW-0370	64.7704, -147.3466			5/6/2016	<5.20
PW-0370	64.7704, -147.3466			5/22/2017	<5.10
PW-0371	64.7708, -147.3475			7/12/2012	<6.20
PW-0371	64.7708, -147.3475			6/11/2013	<6.46
PW-0371	64.7708, -147.3475			4/23/2014	<5.00
PW-0371	64.7708, -147.3475			6/2/2015	<5.30
PW-0371	64.7708, -147.3475			5/6/2016	<5.05
PW-0371	64.7708, -147.3475			5/20/2017	<5.20
PW-0372	64.7714, -147.3498			4/21/2010	<10.4
PW-0372	64.7714, -147.3498			8/26/2011	<6.20
PW-0372	64.7714, -147.3498			5/30/2012	<6.20
PW-0372	64.7714, -147.3498			7/11/2013	<6.20
PW-0372	64.7714, -147.3498			4/14/2014	<5.00
PW-0372	64.7714, -147.3498			6/15/2015	<5.50
PW-0372	64.7714, -147.3498			5/6/2016	<5.15
PW-0372	64.7714, -147.3498			5/22/2017	<5.05
PW-0373	64.7717, -147.3507			5/25/2012	<6.52
PW-0373	64.7717, -147.3507			4/25/2013	<6.52
PW-0373	64.7717, -147.3507			4/24/2014	<5.00
PW-0373	64.7717, -147.3507			7/27/2015	<5.15
PW-0373	64.7717, -147.3507			5/5/2016	<5.10
PW-0373	64.7717, -147.3507			5/22/2017	<5.10
PW-0374	64.7720, -147.3514			5/24/2011	<6.20
PW-0374	64.7720, -147.3514			5/25/2012	<6.66
PW-0374	64.7720, -147.3514			4/25/2013	<6.20
PW-0374	64.7720, -147.3514			4/23/2014	<5.00
PW-0374	64.7720, -147.3514			7/24/2015	<5.30
PW-0374	64.7720, -147.3514			5/20/2016	<5.10
PW-0374	64.7720, -147.3514			5/22/2017	<5.20
PW-0375	64.7730, -147.3536			4/17/2010	<10.6
PW-0375	64.7730, -147.3536			7/21/2011	5.66J
PW-0376	64.7694, -147.3583			2/16/2010	<10.3
PW-0376	64.7694, -147.3583			5/26/2011	4.49J
PW-0376	64.7694, -147.3583			10/5/2011	<3.10J*

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0376	64.7694, -147.3583			4/10/2012	<3.10J*
PW-0376	64.7694, -147.3583			7/9/2012	<3.10J*
PW-0376	64.7694, -147.3583			11/16/2012	<3.10J*
PW-0376	64.7694, -147.3583			1/25/2013	<3.10J*
PW-0376	64.7694, -147.3583			3/18/2013	<3.10J*
PW-0376	64.7694, -147.3583			5/6/2013	<3.10J*
PW-0376	64.7694, -147.3583			7/18/2013	<3.10J*
PW-0376	64.7694, -147.3583			9/3/2013	<3.10J*
PW-0376	64.7694, -147.3583			11/18/2013	<3.10
PW-0376	64.7694, -147.3583			1/7/2014	3.40JH*
PW-0376	64.7694, -147.3583			2/18/2014	<3.00
PW-0376	64.7694, -147.3583			5/2/2014	<2.00
PW-0376	64.7694, -147.3583			8/15/2014	2.50J
PW-0376	64.7694, -147.3583			10/13/2014	<2.40
PW-0376	64.7694, -147.3583			12/16/2014	<2.40
PW-0376	64.7694, -147.3583			3/31/2015	<2.40
PW-0376	64.7694, -147.3583			5/5/2015	2.80J
PW-0376	64.7694, -147.3583			7/27/2015	<2.50
PW-0376	64.7694, -147.3583			11/17/2015	<2.50
PW-0376	64.7694, -147.3583			3/21/2016	<2.50J*
PW-0376	64.7694, -147.3583			6/21/2016	2.70J
PW-0376	64.7694, -147.3583			9/26/2016	<2.50J*
PW-0376	64.7694, -147.3583			1/9/2017	<2.50
PW-0376	64.7694, -147.3583			3/10/2017	<2.50
PW-0376	64.7694, -147.3583			5/30/2017	<2.50
PW-0377	64.7697, -147.3531	40	10-55	2/16/2010	11.9
PW-0377	64.7697, -147.3531	40	10-55	8/12/2011	12.5J*
PW-0377	64.7697, -147.3531	40	10-55	12/20/2011	10.3J*
PW-0377	64.7697, -147.3531	40	10-55	4/2/2012	10.8J*
PW-0377	64.7697, -147.3531	40	10-55	8/30/2012	9.10J*
PW-0377	64.7697, -147.3531	40	10-55	12/18/2012	16.8JH*
PW-0377	64.7697, -147.3531	40	10-55	5/6/2013	8.70J*
PW-0377	64.7697, -147.3531	40	10-55	9/3/2013	9.00JL*
PW-0377	64.7697, -147.3531	40	10-55	11/18/2013	6.60J
PW-0377	64.7697, -147.3531	40	10-55	3/17/2014	7.10J
PW-0377	64.7697, -147.3531	40	10-55	5/2/2014	6.90J
PW-0377	64.7697, -147.3531	40	10-55	6/9/2014	6.40J
PW-0377	64.7697, -147.3531	40	10-55	10/13/2014	5.20J
PW-0377	64.7697, -147.3531	40	10-55	1/30/2015	6.00J
PW-0377	64.7697, -147.3531	40	10-55	5/5/2015	5.70J
PW-0377	64.7697, -147.3531	40	10-55	7/27/2015	4.20J
PW-0377	64.7697, -147.3531	40	10-55	1/22/2016	5.00J
PW-0377	64.7697, -147.3531	40	10-55	5/24/2016	4.00J
PW-0377	64.7697, -147.3531	40	10-55	9/26/2016	3.90JL*
PW-0377	64.7697, -147.3531	40	10-55	3/10/2017	4.30J
PW-0377	64.7697, -147.3531	40	10-55	8/21/2017	5.30J
PW-0378	64.7697, -147.3548			6/16/2011	7.65J
PW-0378	64.7697, -147.3548			12/19/2011	7.00J*
PW-0378	64.7697, -147.3548			7/9/2012	6.40J*
PW-0378	64.7697, -147.3548			12/3/2012	6.40JH*

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Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0378	64.7697, -147.3548			4/5/2013	5.60J*
PW-0378	64.7697, -147.3548			7/18/2013	4.50J*
PW-0378	64.7697, -147.3548			9/3/2013	<3.10J*
PW-0378	64.7697, -147.3548			11/18/2013	4.00J
PW-0378	64.7697, -147.3548			2/18/2014	<3.00
PW-0378	64.7697, -147.3548			5/2/2014	4.00J
PW-0378	64.7697, -147.3548			6/10/2014	<2.40
PW-0378	64.7697, -147.3548			8/29/2014	4.10J
PW-0378	64.7697, -147.3548			12/16/2014	3.80J
PW-0378	64.7697, -147.3548			3/3/2015	3.60J
PW-0378	64.7697, -147.3548			5/5/2015	<2.40
PW-0378	64.7697, -147.3548			7/27/2015	3.40J
PW-0378	64.7697, -147.3548			9/22/2015	3.20J
PW-0378	64.7697, -147.3548			1/22/2016	3.20J
PW-0378	64.7697, -147.3548			5/24/2016	3.60J
PW-0378	64.7697, -147.3548			9/26/2016	3.70J*
PW-0378	64.7697, -147.3548			1/9/2017	2.50J
PW-0378	64.7697, -147.3548			4/11/2017	3.00J
PW-0378	64.7697, -147.3548			5/30/2017	3.40J
PW-0378	64.7697, -147.3548			8/21/2017	<2.50
PW-0379	64.7697, -147.3485			2/24/2010	<10.2
PW-0379	64.7697, -147.3485			9/1/2011	<6.52
PW-0379	64.7697, -147.3485			5/24/2012	<6.20
PW-0379	64.7697, -147.3485			6/11/2013	<6.32
PW-0379	64.7697, -147.3485			4/29/2014	<5.20
PW-0379	64.7697, -147.3485			6/9/2015	<5.40
PW-0379	64.7697, -147.3485			5/16/2016	<5.15
PW-0379	64.7697, -147.3485			5/22/2017	<5.00
PW-0380	64.8265, -147.4625			7/11/2012	<6.20
PW-0381	64.7497, -147.3217	60	55-90	10/4/2012	<6.20
PW-0382	64.7867, -147.3919			11/4/2011	<3.37
PW-0382	64.7867, -147.3919			5/23/2012	<6.20
PW-0382	64.7867, -147.3919			5/22/2013	<6.82
PW-0382	64.7867, -147.3919			5/16/2014	<5.40
PW-0382	64.7867, -147.3919			7/1/2015	7.16J*
PW-0383	64.7860, -147.3919	300	>160	11/2/2011	<6.52
PW-0383	64.7860, -147.3919	300	>160	6/6/2012	<6.52
PW-0383	64.7860, -147.3919	300	>160	5/22/2013	<6.20
PW-0383	64.7860, -147.3919	300	>160	5/15/2014	<5.25
PW-0383	64.7860, -147.3919	300	>160	7/1/2015	<5.55
PW-0383	64.7860, -147.3919	300	>160	5/5/2016	<5.20
PW-0384	64.7854, -147.3919	30	10-55	11/4/2011	<6.52
PW-0384	64.7854, -147.3919	30	10-55	5/24/2012	<6.46
PW-0384	64.7854, -147.3919	30	10-55	5/24/2013	<6.32
PW-0384	64.7854, -147.3919	30	10-55	4/14/2014	<5.00
PW-0384	64.7854, -147.3919	30	10-55	7/16/2015	<5.30
PW-0384	64.7854, -147.3919	30	10-55	5/6/2016	<5.00J*
PW-0386	64.7848, -147.3923			11/12/2011	<6.82
PW-0386	64.7848, -147.3923			5/22/2013	4.72J
PW-0387	64.7836, -147.3898	25	10-55	2/25/2010	<10.0

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Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0387	64.7836, -147.3898	25	10-55	10/19/2011	<6.46
PW-0387	64.7836, -147.3898	25	10-55	5/24/2012	<6.20
PW-0387	64.7836, -147.3898	25	10-55	5/17/2013	3.14J
PW-0388	64.7836, -147.3910			11/4/2011	<6.60
PW-0388	64.7836, -147.3910			6/5/2012	<6.46
PW-0388	64.7836, -147.3910			5/20/2013	<6.32
PW-0388	64.7836, -147.3910			4/4/2014	<5.20
PW-0388	64.7836, -147.3910			5/12/2015	<5.40
PW-0388	64.7836, -147.3910			5/6/2016	<5.15J*
PW-0389	64.7828, -147.3923	223	>160	2/27/2010	<11.0
PW-0389	64.7828, -147.3923	223	>160	11/11/2011	<6.52
PW-0389	64.7828, -147.3923	223	>160	5/30/2012	<6.46
PW-0389	64.7828, -147.3923	223	>160	5/17/2013	<6.42
PW-0389	64.7828, -147.3923	223	>160	4/9/2014	<5.20
PW-0389	64.7828, -147.3923	223	>160	5/15/2015	<5.40
PW-0389	64.7828, -147.3923	223	>160	5/5/2016	<5.10
PW-0390	64.7828, -147.3896			2/25/2010	<10.9
PW-0390	64.7828, -147.3896			10/15/2011	7.25J
PW-0390	64.7828, -147.3896			12/9/2011	6.30J*
PW-0390	64.7828, -147.3896			7/13/2012	8.60J*
PW-0390	64.7828, -147.3896			1/22/2013	7.20J*
PW-0390	64.7828, -147.3896			3/11/2013	9.00J*
PW-0390	64.7828, -147.3896			6/5/2013	9.70J*
PW-0390	64.7828, -147.3896			9/17/2013	8.30J
PW-0390	64.7828, -147.3896			7/25/2014	7.30J
PW-0390	64.7828, -147.3896			5/22/2015	9.10J
PW-0390	64.7828, -147.3896			12/29/2015	7.40J
PW-0390	64.7828, -147.3896			5/31/2016	7.30J
PW-0390	64.7828, -147.3896			8/8/2016	5.40J
PW-0390	64.7828, -147.3896			11/29/2016	7.20J
PW-0390	64.7828, -147.3896			4/10/2017	9.90J
PW-0390	64.7828, -147.3896			7/14/2017	9.20J
PW-0391	64.7810, -147.3883	200	>160	2/27/2010	<10.9
PW-0391	64.7810, -147.3883	200	>160	7/22/2011	<6.20
PW-0391	64.7810, -147.3883	200	>160	5/29/2012	<6.20
PW-0391	64.7810, -147.3883	200	>160	7/25/2013	3.80J*
PW-0391	64.7810, -147.3883	200	>160	2/28/2014	<3.00
PW-0391	64.7810, -147.3883	200	>160	1/30/2015	4.50J
PW-0391	64.7810, -147.3883	200	>160	12/15/2015	8.60J
PW-0391	64.7810, -147.3883	200	>160	12/5/2016	6.40J*
PW-0391	64.7810, -147.3883	200	>160	2/14/2017	4.40J
PW-0392	64.7810, -147.3874			5/26/2011	<6.20
PW-0392	64.7810, -147.3874			5/14/2013	3.71J
PW-0393	64.7810, -147.3910	42	10-55	2/17/2010	<10.4
PW-0393	64.7810, -147.3910	42	10-55	9/8/2011	14.9
PW-0393	64.7810, -147.3910	42	10-55	11/4/2011	14.2J*
PW-0393	64.7810, -147.3910	42	10-55	6/7/2012	16.6J*
PW-0393	64.7810, -147.3910	42	10-55	11/13/2012	19.0J*
PW-0393	64.7810, -147.3910	42	10-55	4/15/2013	19.5J*
PW-0393	64.7810, -147.3910	42	10-55	9/13/2013	19.9J*

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Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0393	64.7810, -147.3910	42	10-55	8/25/2014	27.0
PW-0393	64.7810, -147.3910	42	10-55	4/18/2016	26.1
PW-0393	64.7810, -147.3910	42	10-55	10/18/2016	23.5
PW-0393	64.7810, -147.3910	42	10-55	6/5/2017	24.2
PW-0394	64.7837, -147.3940	54	10-55	4/21/2010	<10.4
PW-0394	64.7837, -147.3940	54	10-55	11/4/2011	9.88J
PW-0394	64.7837, -147.3940	54	10-55	12/27/2011	9.10J*
PW-0394	64.7837, -147.3940	54	10-55	8/7/2012	12.3J*
PW-0394	64.7837, -147.3940	54	10-55	8/6/2013	11.8J*
PW-0394	64.7837, -147.3940	54	10-55	9/16/2014	15.4
PW-0394	64.7837, -147.3940	54	10-55	8/21/2015	15.8
PW-0394	64.7837, -147.3940	54	10-55	5/3/2016	17.4
PW-0394	64.7837, -147.3940	54	10-55	8/15/2016	15.7
PW-0394	64.7837, -147.3940	54	10-55	8/1/2017	15.3
PW-0395	64.7827, -147.3940			4/17/2010	<10.9
PW-0395	64.7827, -147.3940			10/15/2011	17.5
PW-0404	64.8096, -147.3919	60	55-90	3/14/2012	<7.04
PW-0408	64.7556, -147.3231	60	55-90	1/20/2010	<10.9
PW-0409	64.7667, -147.2945			9/8/2010	<10.0
PW-0410	64.7428, -147.2941			1/3/2010	<11.7
PW-0411	64.7763, -147.3462	40	10-55	7/29/2013	<6.32
PW-0412	64.7764, -147.3484			6/27/2012	<6.20
PW-0412	64.7764, -147.3484			8/5/2013	<6.32
PW-0413	64.7764, -147.3505			12/8/2011	<6.40
PW-0413	64.7764, -147.3505			6/7/2012	<6.60
PW-0413	64.7764, -147.3505			8/16/2013	<6.20
PW-0413	64.7764, -147.3505			6/19/2014	<5.15
PW-0413	64.7764, -147.3505			7/22/2015	<5.25
PW-0434	64.7719, -147.3274	29	10-55	2/27/2010	<10.4
PW-0437	64.7765, -147.3200	95	90-160	6/14/2010	<10.0
PW-0437	64.7765, -147.3200	95	90-160	5/23/2016	<5.25
PW-0439	64.7761, -147.3770			2/11/2010	<10.3
PW-0439	64.7761, -147.3770			6/8/2011	10.6
PW-0439	64.7761, -147.3770			9/20/2011	14.3J*
PW-0439	64.7761, -147.3770			6/11/2012	14.6J*
PW-0439	64.7761, -147.3770			10/16/2012	14.7J*
PW-0439	64.7761, -147.3770			1/29/2013	11.9J*
PW-0439	64.7761, -147.3770			6/5/2013	13.6J*
PW-0439	64.7761, -147.3770			9/30/2013	14.9
PW-0439	64.7761, -147.3770			2/10/2014	14.3JL*
PW-0439	64.7761, -147.3770			8/8/2014	22.1
PW-0439	64.7761, -147.3770			1/12/2015	16.9
PW-0439	64.7761, -147.3770			7/14/2015	20.2
PW-0439	64.7761, -147.3770			10/5/2015	21.6
PW-0439	64.7761, -147.3770			5/6/2016	18.5
PW-0439	64.7761, -147.3770			8/26/2016	15.5J*
PW-0439	64.7761, -147.3770			11/14/2016	11.7
PW-0439	64.7761, -147.3770			6/13/2017	15.7JH*
PW-0440	64.7764, -147.3770			6/8/2011	10.8J
PW-0441	64.7767, -147.3770			6/8/2011	7.41J

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0442	64.7764, -147.3794			2/13/2010	14.3
PW-0442	64.7764, -147.3794			6/16/2011	19.2J*
PW-0442	64.7764, -147.3794			9/12/2012	27.3J*
PW-0442	64.7764, -147.3794			6/25/2013	31.5J*
PW-0442	64.7764, -147.3794			7/9/2013	27.4J*
PW-0442	64.7764, -147.3794			2/7/2014	34.8
PW-0442	64.7764, -147.3794			11/24/2014	39.3
PW-0442	64.7764, -147.3794			8/3/2015	36.7
PW-0443	64.7764, -147.3805			2/13/2010	17.5
PW-0444	64.7765, -147.3821			2/8/2010	19.8
PW-0445	64.7754, -147.3837			3/6/2010	30.9
PW-0446	64.7739, -147.3835			3/23/2010	34.8
PW-0447	64.7735, -147.3814			2/8/2010	41.7
PW-0448	64.7735, -147.3825			2/8/2010	35.4
PW-0449	64.7737, -147.3785			2/10/2010	16.6
PW-0450	64.7737, -147.3779			6/8/2011	18.6
PW-0451	64.7754, -147.3817			2/8/2010	23.0
PW-0452	64.7747, -147.3805			8/31/2011	51.3
PW-0453	64.7747, -147.3794	115	90-160	2/8/2010	12.2
PW-0453	64.7747, -147.3794	115	90-160	4/27/2011	38.0J*
PW-0453	64.7747, -147.3794	115	90-160	11/15/2011	37.1J*
PW-0453	64.7747, -147.3794	115	90-160	4/23/2012	50.0J*
PW-0453	64.7747, -147.3794	115	90-160	10/22/2012	47.7J*
PW-0453	64.7747, -147.3794	115	90-160	5/13/2013	55.8J*
PW-0453	64.7747, -147.3794	115	90-160	1/7/2014	74.2
PW-0453	64.7747, -147.3794	115	90-160	10/20/2014	62.8
PW-0453	64.7747, -147.3794	115	90-160	4/3/2015	56.1
PW-0453	64.7747, -147.3794	115	90-160	10/19/2015	59.4JH*
PW-0453	64.7747, -147.3794	115	90-160	7/25/2016	49.8
PW-0454	64.7747, -147.3782			2/8/2010	21.9
PW-0454	64.7747, -147.3782			4/29/2011	43.2J*
PW-0454	64.7747, -147.3782			11/15/2011	38.8J*
PW-0454	64.7747, -147.3782			8/9/2013	38.9J*
PW-0454	64.7747, -147.3782			7/25/2014	52.7JL*
PW-0454	64.7747, -147.3782			6/15/2015	50.3
PW-0454	64.7747, -147.3782			5/20/2016	43.6
PW-0455	64.7747, -147.3770			2/10/2010	20.8
PW-0456	64.7764, -147.3753			2/10/2010	<10.6
PW-0456	64.7764, -147.3753			7/18/2011	9.17J
PW-0456	64.7764, -147.3753			5/14/2013	15.5J*
PW-0456	64.7764, -147.3753			9/2/2013	11.4JL*
PW-0456	64.7764, -147.3753			1/3/2014	12.4
PW-0456	64.7764, -147.3753			3/17/2014	14.9
PW-0456	64.7764, -147.3753			6/30/2014	6.10J
PW-0456	64.7764, -147.3753			10/3/2014	3.60J
PW-0456	64.7764, -147.3753			2/3/2015	13.2
PW-0456	64.7764, -147.3753			6/12/2015	9.20J
PW-0456	64.7764, -147.3753			10/16/2015	3.70J
PW-0456	64.7764, -147.3753			2/29/2016	19.4
PW-0456	64.7764, -147.3753			7/15/2016	3.70J

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0456	64.7764, -147.3753			11/21/2016	7.00J
PW-0456	64.7764, -147.3753			1/3/2017	15.0
PW-0456	64.7764, -147.3753			7/11/2017	3.90J
PW-0457	64.7760, -147.3753			7/18/2011	6.62J
PW-0458	64.7764, -147.3741	40	10-55	2/12/2010	<12.3
PW-0458	64.7764, -147.3741	40	10-55	9/9/2011	17.1
PW-0459	64.7764, -147.3730			2/17/2010	<10.5
PW-0459	64.7764, -147.3730			7/11/2011	10.2J
PW-0460	64.7764, -147.3718	45	10-55	2/13/2010	<10.4
PW-0460	64.7764, -147.3718	45	10-55	6/8/2011	<6.20
PW-0460	64.7764, -147.3718	45	10-55	5/23/2012	<6.20
PW-0460	64.7764, -147.3718	45	10-55	6/7/2013	<6.20
PW-0460	64.7764, -147.3718	45	10-55	7/1/2014	<5.30
PW-0460	64.7764, -147.3718	45	10-55	8/10/2015	<5.20
PW-0460	64.7764, -147.3718	45	10-55	8/25/2016	<5.30
PW-0461	64.7767, -147.3718			6/8/2011	8.09J
PW-0462	64.7764, -147.3703	120	90-160	2/10/2010	<10.4
PW-0462	64.7764, -147.3703	120	90-160	8/2/2011	<6.52
PW-0462	64.7764, -147.3703	120	90-160	6/26/2012	<6.20
PW-0462	64.7764, -147.3703	120	90-160	8/5/2013	8.97J
PW-0463	64.7762, -147.3687	89	55-90	2/10/2010	25.1
PW-0463	64.7762, -147.3687	89	55-90	5/18/2011	25.8J*
PW-0463	64.7762, -147.3687	89	55-90	11/28/2011	26.7J*
PW-0463	64.7762, -147.3687	89	55-90	3/15/2012	27.1J*
PW-0463	64.7762, -147.3687	89	55-90	8/17/2012	29.4J*
PW-0463	64.7762, -147.3687	89	55-90	12/14/2012	35.1J*
PW-0463	64.7762, -147.3687	89	55-90	4/4/2013	27.9
PW-0463	64.7762, -147.3687	89	55-90	4/8/2013	29.0J*
PW-0463	64.7762, -147.3687	89	55-90	6/27/2013	33.3
PW-0463	64.7762, -147.3687	89	55-90	8/16/2013	26.6J*
PW-0463	64.7762, -147.3687	89	55-90	9/12/2013	34.7
PW-0463	64.7762, -147.3687	89	55-90	11/25/2013	39.4
PW-0463	64.7762, -147.3687	89	55-90	12/16/2013	33.0
PW-0463	64.7762, -147.3687	89	55-90	3/11/2014	36.2
PW-0463	64.7762, -147.3687	89	55-90	3/28/2014	39.9
PW-0463	64.7762, -147.3687	89	55-90	5/29/2014	40.4
PW-0463	64.7762, -147.3687	89	55-90	8/15/2014	44.2
PW-0463	64.7762, -147.3687	89	55-90	9/9/2014	45.0
PW-0463	64.7762, -147.3687	89	55-90	11/11/2014	49.2
PW-0463	64.7762, -147.3687	89	55-90	1/9/2015	47.6
PW-0463	64.7762, -147.3687	89	55-90	2/25/2015	48.7
PW-0463	64.7762, -147.3687	89	55-90	5/4/2015	50.8
PW-0463	64.7762, -147.3687	89	55-90	5/13/2015	55.9
PW-0463	64.7762, -147.3687	89	55-90	9/1/2015	62.7
PW-0463	64.7762, -147.3687	89	55-90	9/15/2015	67.0
PW-0463	64.7762, -147.3687	89	55-90	10/31/2015	65.5
PW-0463	64.7762, -147.3687	89	55-90	12/18/2015	71.7
PW-0463	64.7762, -147.3687	89	55-90	4/22/2016	76.0
PW-0463	64.7762, -147.3687	89	55-90	9/20/2016	81.0
PW-0463	64.7762, -147.3687	89	55-90	2/3/2017	95.9

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0463	64.7762, -147.3687	89	55-90	5/16/2017	104
PW-0463	64.7762, -147.3687	89	55-90	9/5/2017	104
PW-0464	64.7754, -147.3686	98	90-160	10/4/2011	38.2
PW-0464	64.7754, -147.3686	98	90-160	3/28/2013	40.3
PW-0464	64.7754, -147.3686	98	90-160	6/27/2013	44.2
PW-0464	64.7754, -147.3686	98	90-160	9/25/2013	45.3
PW-0464	64.7754, -147.3686	98	90-160	12/3/2013	46.5
PW-0464	64.7754, -147.3686	98	90-160	3/19/2014	57.4
PW-0464	64.7754, -147.3686	98	90-160	5/29/2014	57.0
PW-0464	64.7754, -147.3686	98	90-160	8/18/2014	63.6
PW-0464	64.7754, -147.3686	98	90-160	11/11/2014	70.7
PW-0464	64.7754, -147.3686	98	90-160	2/19/2015	77.1
PW-0464	64.7754, -147.3686	98	90-160	5/13/2015	79.0
PW-0464	64.7754, -147.3686	98	90-160	8/20/2015	78.5
PW-0464	64.7754, -147.3686	98	90-160	10/15/2015	89.2
PW-0464	64.7754, -147.3686	98	90-160	3/3/2016	91.6
PW-0464	64.7754, -147.3686	98	90-160	4/27/2016	98.6
PW-0464	64.7754, -147.3686	98	90-160	8/18/2016	103
PW-0464	64.7754, -147.3686	98	90-160	11/18/2016	104
PW-0464	64.7754, -147.3686	98	90-160	2/23/2017	96.5
PW-0465	64.7754, -147.3741	40	10-55	2/10/2010	<10.0
PW-0465	64.7754, -147.3741	40	10-55	8/25/2011	4.11J
PW-0466	64.7746, -147.3733	122	90-160	2/9/2010	<10.7
PW-0466	64.7746, -147.3733	122	90-160	9/7/2011	14.4
PW-0466	64.7746, -147.3733	122	90-160	10/17/2012	20.6J*
PW-0466	64.7746, -147.3733	122	90-160	4/18/2013	23.9
PW-0466	64.7746, -147.3733	122	90-160	6/12/2013	26.6
PW-0466	64.7746, -147.3733	122	90-160	9/9/2013	29.5
PW-0466	64.7746, -147.3733	122	90-160	11/1/2013	26.8
PW-0466	64.7746, -147.3733	122	90-160	12/16/2013	31.4
PW-0466	64.7746, -147.3733	122	90-160	3/11/2014	33.0
PW-0466	64.7746, -147.3733	122	90-160	6/19/2014	31.4
PW-0466	64.7746, -147.3733	122	90-160	9/10/2014	31.1
PW-0466	64.7746, -147.3733	122	90-160	9/11/2014	33.3
PW-0466	64.7746, -147.3733	122	90-160	11/12/2014	32.8
PW-0466	64.7746, -147.3733	122	90-160	2/17/2015	37.6
PW-0466	64.7746, -147.3733	122	90-160	5/7/2015	31.4
PW-0466	64.7746, -147.3733	122	90-160	6/12/2015	28.4
PW-0466	64.7746, -147.3733	122	90-160	8/13/2015	30.4
PW-0466	64.7746, -147.3733	122	90-160	10/29/2015	30.5
PW-0466	64.7746, -147.3733	122	90-160	3/22/2016	46.7
PW-0466	64.7746, -147.3733	122	90-160	1/20/2017	34.1
PW-0467	64.7746, -147.3725			9/19/2011	<6.60
PW-0468	64.7746, -147.3750			2/9/2010	<10.9
PW-0468	64.7746, -147.3750			9/7/2011	7.84J
PW-0469	64.7737, -147.3749			2/8/2010	<10.6
PW-0469	64.7737, -147.3749			6/6/2011	4.98J
PW-0470	64.7737, -147.3730	127	90-160	8/25/2010	<11.6
PW-0470	64.7737, -147.3730	127	90-160	9/2/2011	21.1
PW-0473	64.8176, -147.4473	45	10-55	2/10/2011	<11.2

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0478	64.7654, -147.3996			6/10/2011	95.5
PW-0479	64.7654, -147.3999	35	10-55	1/20/2010	80.5
PW-0480	64.7654, -147.4002			2/3/2010	78.7
PW-0480	64.7654, -147.4002			9/26/2011	115J*
PW-0480	64.7654, -147.4002			3/19/2012	111J*
PW-0480	64.7654, -147.4002			7/10/2012	116J*
PW-0480	64.7654, -147.4002			7/23/2013	83.5J*
PW-0480	64.7654, -147.4002			8/29/2014	63.9
PW-0480	64.7654, -147.4002			9/28/2015	44.9
PW-0480	64.7654, -147.4002			9/2/2016	31.1
PW-0480	64.7654, -147.4002			4/14/2017	29.8
PW-0480	64.7654, -147.4002			8/7/2017	28.2
PW-0481	64.7654, -147.4006			3/6/2010	106
PW-0482	64.7651, -147.4009			8/16/2012	48.3
PW-0483	64.7651, -147.4002	42	10-55	1/23/2010	114
PW-0483	64.7651, -147.4002	42	10-55	4/5/2011	159
PW-0483	64.7651, -147.4002	42	10-55	9/22/2011	118J*
PW-0483	64.7651, -147.4002	42	10-55	7/10/2012	122J*
PW-0483	64.7651, -147.4002	42	10-55	8/16/2013	69.7J*
PW-0483	64.7651, -147.4002	42	10-55	5/19/2014	61.7
PW-0483	64.7651, -147.4002	42	10-55	10/26/2015	35.1
PW-0483	64.7651, -147.4002	42	10-55	2/5/2016	34.0
PW-0483	64.7651, -147.4002	42	10-55	10/14/2016	23.2
PW-0483	64.7651, -147.4002	42	10-55	1/31/2017	22.6
PW-0484	64.7651, -147.3995			2/3/2010	85.8
PW-0484	64.7651, -147.3995			8/24/2011	110J*
PW-0484	64.7651, -147.3995			12/21/2011	106J*
PW-0484	64.7651, -147.3995			7/12/2012	108J*
PW-0484	64.7651, -147.3995			12/11/2012	106J*
PW-0484	64.7651, -147.3995			5/10/2013	75.2J*
PW-0484	64.7651, -147.3995			8/5/2013	56.7J*
PW-0484	64.7651, -147.3995			11/4/2013	62.4
PW-0484	64.7651, -147.3995			2/17/2014	66.1
PW-0484	64.7651, -147.3995			6/13/2014	59.0
PW-0484	64.7651, -147.3995			9/12/2014	50.4
PW-0484	64.7651, -147.3995			1/6/2015	37.6
PW-0484	64.7651, -147.3995			4/27/2015	29.7
PW-0484	64.7651, -147.3995			8/7/2015	34.0
PW-0484	64.7651, -147.3995			10/6/2015	32.7
PW-0484	64.7651, -147.3995			1/19/2016	26.3JH*
PW-0484	64.7651, -147.3995			7/1/2016	25.2
PW-0484	64.7651, -147.3995			11/22/2016	19.7
PW-0484	64.7651, -147.3995			3/31/2017	23.1
PW-0484	64.7651, -147.3995			6/30/2017	20.7
PW-0485	64.7660, -147.3977	35	10-55	1/13/2010	93.7
PW-0486	64.7646, -147.4019			2/10/2010	105
PW-0487	64.7646, -147.4023			1/27/2010	138
PW-0487	64.7646, -147.4023			4/5/2011	187
PW-0487	64.7646, -147.4023			11/16/2011	153J*
PW-0487	64.7646, -147.4023			9/21/2012	139J*

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0487	64.7646, -147.4023			6/25/2013	112JL*
PW-0487	64.7646, -147.4023			1/20/2014	97.0
PW-0487	64.7646, -147.4023			7/7/2014	87.7
PW-0487	64.7646, -147.4023			1/16/2015	62.4
PW-0487	64.7646, -147.4023			7/10/2015	53.9
PW-0487	64.7646, -147.4023			10/27/2015	47.6
PW-0487	64.7646, -147.4023			3/18/2016	44.3
PW-0487	64.7646, -147.4023			9/30/2016	28.8
PW-0487	64.7646, -147.4023			12/27/2016	31.5
PW-0487	64.7646, -147.4023			3/6/2017	28.0
PW-0488	64.7646, -147.4036			1/27/2010	96.2
PW-0488	64.7646, -147.4036			4/15/2011	178J*
PW-0488	64.7646, -147.4036			9/23/2011	103J*
PW-0488	64.7646, -147.4036			6/14/2012	102J*
PW-0488	64.7646, -147.4036			9/15/2014	96.1
PW-0488	64.7646, -147.4036			8/25/2015	48.9
PW-0488	64.7646, -147.4036			4/8/2016	41.3
PW-0488	64.7646, -147.4036			1/13/2017	20.9J*
PW-0489	64.7646, -147.4044			1/27/2010	113
PW-0489	64.7646, -147.4044			7/8/2011	177J*
PW-0489	64.7646, -147.4044			12/14/2011	167J*
PW-0489	64.7646, -147.4044			7/30/2013	122J*
PW-0489	64.7646, -147.4044			8/1/2014	93.8
PW-0489	64.7646, -147.4044			7/17/2015	63.4
PW-0489	64.7646, -147.4044			3/11/2016	46.8
PW-0489	64.7646, -147.4044			6/24/2016	39.9
PW-0489	64.7646, -147.4044			5/16/2017	33.3
PW-0490	64.7660, -147.4017			5/17/2011	155
PW-0491	64.7660, -147.4025	40	10-55	2/2/2010	134
PW-0492	64.7660, -147.4030	48	10-55	10/22/2010	115
PW-0493	64.7660, -147.4038			3/13/2010	114
PW-0494	64.7660, -147.4046			5/10/2010	90.4JL*
PW-0495	64.7660, -147.4055			2/2/2010	122
PW-0496	64.7655, -147.4018			3/6/2010	119
PW-0497	64.7655, -147.4030			2/3/2010	85.1
PW-0498	64.7651, -147.4046			1/27/2010	108
PW-0498	64.7651, -147.4046			7/8/2011	157J*
PW-0498	64.7651, -147.4046			12/15/2011	160J*
PW-0498	64.7651, -147.4046			6/14/2013	128J*
PW-0498	64.7651, -147.4046			5/27/2014	100
PW-0498	64.7651, -147.4046			8/1/2014	99.1
PW-0498	64.7651, -147.4046			4/24/2015	71.1
PW-0498	64.7651, -147.4046			3/11/2016	61.1
PW-0498	64.7651, -147.4046			2/17/2017	36.3
PW-0499	64.7660, -147.3999			12/17/2009	72.6JL*
PW-0500	64.7660, -147.4002			12/17/2009	56.1JL*
PW-0501	64.7660, -147.4005			12/17/2009	62.6JL*
PW-0502	64.7646, -147.3992			11/14/2011	96.3J*
PW-0502	64.7646, -147.3992			9/28/2012	101J*
PW-0502	64.7646, -147.3992			9/6/2013	60.6J*

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0502	64.7646, -147.3992			8/4/2014	52.5
PW-0502	64.7646, -147.3992			8/7/2015	34.9
PW-0502	64.7646, -147.3992			8/12/2016	28.3
PW-0502	64.7646, -147.3992			7/21/2017	21.9
PW-0503	64.7648, -147.3957	62	55-90	3/9/2010	56.1
PW-0503	64.7648, -147.3957	62	55-90	9/12/2011	82.8J*
PW-0503	64.7648, -147.3957	62	55-90	9/12/2012	110J*
PW-0503	64.7648, -147.3957	62	55-90	9/27/2013	80.3
PW-0503	64.7648, -147.3957	62	55-90	12/30/2013	89.2
PW-0503	64.7648, -147.3957	62	55-90	6/6/2014	97.3
PW-0503	64.7648, -147.3957	62	55-90	9/12/2014	86.4
PW-0503	64.7648, -147.3957	62	55-90	2/2/2015	75.5
PW-0503	64.7648, -147.3957	62	55-90	6/8/2015	66.0
PW-0503	64.7648, -147.3957	62	55-90	9/22/2015	78.0
PW-0503	64.7648, -147.3957	62	55-90	1/8/2016	73.7
PW-0503	64.7648, -147.3957	62	55-90	5/20/2016	76.6
PW-0503	64.7648, -147.3957	62	55-90	11/21/2016	48.5
PW-0503	64.7648, -147.3957	62	55-90	4/28/2017	73.9
PW-0503	64.7648, -147.3957	62	55-90	7/14/2017	64.3
PW-0503	64.7648, -147.3957	62	55-90	9/1/2017	73.4
PW-0504	64.7653, -147.3981			1/7/2010	65.3
PW-0504	64.7653, -147.3981			6/16/2011	103J*
PW-0504	64.7653, -147.3981			12/30/2011	94.6J*
PW-0504	64.7653, -147.3981			9/5/2012	76.2J*
PW-0504	64.7653, -147.3981			9/20/2013	54.9
PW-0504	64.7653, -147.3981			5/9/2014	55.2
PW-0504	64.7653, -147.3981			12/8/2014	48.5J*
PW-0504	64.7653, -147.3981			11/13/2015	38.5
PW-0504	64.7653, -147.3981			11/15/2016	27.9
PW-0505	64.7657, -147.3969			5/14/2012	93.5
PW-0506	64.7653, -147.3941			3/21/2011	94.2
PW-0506	64.7653, -147.3941			8/2/2011	124J*
PW-0506	64.7653, -147.3941			2/1/2012	116J*
PW-0506	64.7653, -147.3941			10/3/2014	97.9
PW-0506	64.7653, -147.3941			9/15/2015	107
PW-0506	64.7653, -147.3941			8/26/2016	80.0J*
PW-0506	64.7653, -147.3941			6/2/2017	81.1JH*
PW-0507	64.7646, -147.3941			2/3/2010	85.1
PW-0508	64.7764, -147.3553	80	55-90	4/17/2010	<10.4
PW-0508	64.7764, -147.3553	80	55-90	8/20/2011	<6.20
PW-0508	64.7764, -147.3553	80	55-90	6/2/2012	<6.20
PW-0508	64.7764, -147.3553	80	55-90	5/10/2013	<6.52
PW-0508	64.7764, -147.3553	80	55-90	4/12/2014	<5.00
PW-0508	64.7764, -147.3553	80	55-90	7/15/2015	<5.35
PW-0508	64.7764, -147.3553	80	55-90	5/12/2016	<5.20
PW-0508	64.7764, -147.3553	80	55-90	7/11/2017	<5.10J*
PW-0509	64.7760, -147.3554	44	10-55	4/17/2010	<10.3
PW-0509	64.7760, -147.3554	44	10-55	7/15/2011	<6.66
PW-0509	64.7760, -147.3554	44	10-55	6/2/2012	<6.20
PW-0510	64.7756, -147.3552	34	10-55	4/14/2010	<10.0

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0510	64.7756, -147.3552	34	10-55	7/18/2011	<6.66
PW-0510	64.7756, -147.3552	34	10-55	6/1/2012	<6.52
PW-0510	64.7756, -147.3552	34	10-55	7/1/2013	<6.52
PW-0510	64.7756, -147.3552	34	10-55	4/9/2014	<5.00
PW-0510	64.7756, -147.3552	34	10-55	8/6/2015	<5.20
PW-0510	64.7756, -147.3552	34	10-55	6/27/2016	<5.15
PW-0511	64.7753, -147.3550			2/23/2010	<10.6
PW-0511	64.7753, -147.3550			8/11/2011	4.27J
PW-0511	64.7753, -147.3550			10/22/2012	3.90J*
PW-0511	64.7753, -147.3550			12/10/2012	<3.10J*
PW-0511	64.7753, -147.3550			1/18/2013	<3.10J*
PW-0511	64.7753, -147.3550			2/15/2013	<3.10J*
PW-0511	64.7753, -147.3550			3/15/2013	<3.10J*
PW-0511	64.7753, -147.3550			4/12/2013	<3.10J*
PW-0511	64.7753, -147.3550			5/7/2013	<3.10J*
PW-0511	64.7753, -147.3550			6/10/2013	<3.10J*
PW-0511	64.7753, -147.3550			7/2/2013	<3.10J*
PW-0511	64.7753, -147.3550			7/26/2013	<3.10J*
PW-0511	64.7753, -147.3550			8/2/2013	<3.10J*
PW-0511	64.7753, -147.3550			11/1/2013	<3.10
PW-0511	64.7753, -147.3550			5/30/2014	<2.00
PW-0511	64.7753, -147.3550			9/29/2014	4.40J
PW-0511	64.7753, -147.3550			4/7/2015	4.20J
PW-0511	64.7753, -147.3550			7/24/2015	4.00J
PW-0511	64.7753, -147.3550			9/29/2015	4.80J
PW-0511	64.7753, -147.3550			3/15/2016	4.70J
PW-0511	64.7753, -147.3550			4/26/2016	3.90J
PW-0511	64.7753, -147.3550			6/10/2016	2.90J
PW-0511	64.7753, -147.3550			9/6/2016	3.70J
PW-0511	64.7753, -147.3550			2/7/2017	3.60J
PW-0511	64.7753, -147.3550			8/18/2017	<2.50
PW-0512	64.7744, -147.3534	300	>160	5/1/2010	<10.0
PW-0512	64.7744, -147.3534	300	>160	1/20/2012	<3.10
PW-0512	64.7744, -147.3534	300	>160	5/23/2012	<6.20
PW-0512	64.7744, -147.3534	300	>160	8/24/2013	<6.46
PW-0512	64.7744, -147.3534	300	>160	6/13/2014	<5.00
PW-0512	64.7744, -147.3534	300	>160	7/17/2015	<5.40
PW-0512	64.7744, -147.3534	300	>160	8/26/2016	<5.00
PW-0512	64.7744, -147.3534	300	>160	7/7/2017	<5.05
PW-0513	64.7738, -147.3530	45.6	10-55	4/17/2010	<10.8
PW-0513	64.7738, -147.3530	45.6	10-55	7/15/2011	<6.66
PW-0513	64.7738, -147.3530	45.6	10-55	5/29/2012	<6.20
PW-0513	64.7738, -147.3530	45.6	10-55	5/29/2013	<6.66
PW-0513	64.7738, -147.3530	45.6	10-55	4/18/2014	<5.00
PW-0513	64.7738, -147.3530	45.6	10-55	6/23/2015	<5.50
PW-0513	64.7738, -147.3530	45.6	10-55	7/15/2016	<5.15
PW-0513	64.7738, -147.3530	45.6	10-55	7/11/2017	<5.15
PW-0514	64.7734, -147.3550	80	55-90	4/15/2010	<10.4
PW-0514	64.7734, -147.3550	80	55-90	7/21/2011	7.42J
PW-0514	64.7734, -147.3550	80	55-90	8/19/2011	6.60J*

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Historical Private Well Sulfolane Results Summary

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0514	64.7734, -147.3550	80	55-90	4/9/2012	5.40J*
PW-0514	64.7734, -147.3550	80	55-90	7/18/2012	6.60J*
PW-0514	64.7734, -147.3550	80	55-90	10/23/2012	6.80J*
PW-0514	64.7734, -147.3550	80	55-90	1/15/2013	6.50J*
PW-0514	64.7734, -147.3550	80	55-90	4/12/2013	<3.10J*
PW-0514	64.7734, -147.3550	80	55-90	6/21/2013	3.90J*
PW-0514	64.7734, -147.3550	80	55-90	7/30/2013	4.90J*
PW-0514	64.7734, -147.3550	80	55-90	10/22/2013	5.20J
PW-0514	64.7734, -147.3550	80	55-90	1/20/2014	6.50J
PW-0514	64.7734, -147.3550	80	55-90	5/6/2014	6.80J*
PW-0514	64.7734, -147.3550	80	55-90	8/19/2014	10.3JL*
PW-0514	64.7734, -147.3550	80	55-90	12/30/2014	5.50J
PW-0514	64.7734, -147.3550	80	55-90	4/13/2015	8.20J
PW-0514	64.7734, -147.3550	80	55-90	6/26/2015	10.5
PW-0514	64.7734, -147.3550	80	55-90	11/30/2015	5.50J
PW-0514	64.7734, -147.3550	80	55-90	4/11/2016	5.40J
PW-0514	64.7734, -147.3550	80	55-90	7/29/2016	9.90J
PW-0514	64.7734, -147.3550	80	55-90	10/10/2016	9.20J
PW-0514	64.7734, -147.3550	80	55-90	3/27/2017	7.20J
PW-0515	64.7734, -147.3558	40	10-55	4/13/2010	<10.0
PW-0515	64.7734, -147.3558	40	10-55	7/18/2011	6.74J
PW-0515	64.7734, -147.3558	40	10-55	8/19/2011	7.80J*
PW-0515	64.7734, -147.3558	40	10-55	2/1/2012	8.10J*
PW-0515	64.7734, -147.3558	40	10-55	8/8/2012	6.60J*
PW-0515	64.7734, -147.3558	40	10-55	4/8/2013	<3.10J*
PW-0515	64.7734, -147.3558	40	10-55	10/21/2013	4.00J
PW-0515	64.7734, -147.3558	40	10-55	6/2/2014	3.80J
PW-0515	64.7734, -147.3558	40	10-55	2/13/2015	5.90J
PW-0515	64.7734, -147.3558	40	10-55	1/15/2016	6.00J
PW-0515	64.7734, -147.3558	40	10-55	12/19/2016	4.10J
PW-0516	64.7763, -147.3578			4/17/2010	<10.4
PW-0516	64.7763, -147.3578			7/15/2011	8.32J
PW-0517	64.7756, -147.3569			9/16/2011	4.80J
PW-0518	64.7753, -147.3569	64	55-90	3/6/2010	10.7
PW-0519	64.7742, -147.3558			4/14/2010	<10.7
PW-0519	64.7742, -147.3558			8/31/2011	7.63J
PW-0521	64.7887, -147.3604	40	10-55	5/1/2010	<10.4
PW-0524	64.7808, -147.3532	30	10-55	11/2/2010	<11.1
PW-0524	64.7808, -147.3532	30	10-55	8/28/2013	<6.74
PW-0524	64.7808, -147.3532	30	10-55	8/10/2015	<5.25
PW-0525	64.7818, -147.3534			11/9/2010	<10.5
PW-0525	64.7818, -147.3534			10/28/2011	<6.20
PW-0525	64.7818, -147.3534			6/6/2012	<6.40
PW-0525	64.7818, -147.3534			7/30/2013	<6.20
PW-0525	64.7818, -147.3534			6/27/2014	<5.15
PW-0525	64.7818, -147.3534			7/20/2015	<5.35
PW-0527	64.7822, -147.3538	40	10-55	11/1/2010	<11.0J*
PW-0527	64.7822, -147.3538	40	10-55	7/28/2012	<6.40
PW-0527	64.7822, -147.3538	40	10-55	6/18/2013	<6.40
PW-0527	64.7822, -147.3538	40	10-55	6/17/2014	<5.00

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0528	64.7830, -147.3537	40	10-55	4/24/2010	<10.4
PW-0528	64.7830, -147.3537	40	10-55	12/21/2010	<10.0
PW-0528	64.7830, -147.3537	40	10-55	6/5/2012	<6.52
PW-0528	64.7830, -147.3537	40	10-55	11/12/2013	<6.56
PW-0528	64.7830, -147.3537	40	10-55	6/27/2014	<5.00
PW-0528	64.7830, -147.3537	40	10-55	7/16/2015	<5.30
PW-0529	64.7834, -147.3536	40	10-55	11/2/2010	<10.0
PW-0529	64.7834, -147.3536	40	10-55	6/18/2012	<6.20
PW-0529	64.7834, -147.3536	40	10-55	7/19/2013	<6.40
PW-0529	64.7834, -147.3536	40	10-55	8/22/2015	<5.20
PW-0530	64.7842, -147.3536			1/3/2011	<10.5
PW-0530	64.7842, -147.3536			7/25/2012	<6.20
PW-0530	64.7842, -147.3536			6/25/2013	<6.60
PW-0530	64.7842, -147.3536			7/14/2014	<5.30
PW-0530	64.7842, -147.3536			7/27/2015	<5.20
PW-0531	64.7850, -147.3641			12/21/2010	<12.4J*
PW-0531	64.7850, -147.3641			5/24/2012	<6.20
PW-0531	64.7850, -147.3641			6/13/2013	<6.60
PW-0531	64.7850, -147.3641			5/16/2014	<5.00
PW-0531	64.7850, -147.3641			6/9/2015	<5.30
PW-0531	64.7850, -147.3641			5/10/2016	<5.10
PW-0531	64.7850, -147.3641			5/31/2017	<5.20J*
PW-0532	64.7848, -147.3579			11/1/2010	<11.0J*
PW-0532	64.7848, -147.3579			5/24/2012	<6.66
PW-0532	64.7848, -147.3579			6/11/2013	<6.82
PW-0532	64.7848, -147.3579			6/9/2014	<5.25
PW-0532	64.7848, -147.3579			7/13/2015	<5.40
PW-0533	64.7842, -147.3569			1/3/2011	<10.6
PW-0533	64.7842, -147.3569			5/29/2012	<6.20
PW-0533	64.7842, -147.3569			7/16/2013	<6.20
PW-0533	64.7842, -147.3569			5/2/2014	<5.40
PW-0533	64.7842, -147.3569			7/10/2015	<5.30
PW-0534	64.7834, -147.3568			11/2/2010	<10.0
PW-0534	64.7834, -147.3568			5/30/2012	<6.96
PW-0534	64.7834, -147.3568			7/25/2013	<6.52
PW-0534	64.7834, -147.3568			5/5/2014	<5.00J*
PW-0534	64.7834, -147.3568			7/16/2015	<5.30
PW-0535	64.7826, -147.3567			11/4/2010	<11.1J*
PW-0535	64.7826, -147.3567			5/23/2012	<6.32
PW-0535	64.7826, -147.3567			6/12/2013	<6.66
PW-0535	64.7826, -147.3567			4/19/2014	<5.00
PW-0535	64.7826, -147.3567			6/22/2015	<5.50
PW-0536	64.7817, -147.3565			11/3/2010	<11.2
PW-0536	64.7817, -147.3565			6/27/2012	<6.40
PW-0536	64.7817, -147.3565			7/19/2013	<6.50
PW-0536	64.7817, -147.3565			6/12/2014	<5.20
PW-0536	64.7817, -147.3565			6/16/2015	<5.25J*
PW-0537	64.7809, -147.3563			11/19/2010	<10.2
PW-0537	64.7809, -147.3563			5/26/2012	<6.46
PW-0537	64.7809, -147.3563			6/18/2013	<6.46

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North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0537	64.7809, -147.3563			4/14/2014	<5.00
PW-0537	64.7809, -147.3563			6/19/2015	<5.45
PW-0538	64.7797, -147.3558	40	10-55	11/9/2010	<10.8
PW-0538	64.7797, -147.3558	40	10-55	5/24/2012	<6.32
PW-0538	64.7797, -147.3558	40	10-55	6/12/2013	<6.52
PW-0538	64.7797, -147.3558	40	10-55	4/11/2014	<5.00
PW-0538	64.7797, -147.3558	40	10-55	6/19/2015	<5.30
PW-0539	64.7793, -147.3553	40	10-55	11/2/2010	<10.2
PW-0539	64.7793, -147.3553	40	10-55	6/19/2013	<6.60
PW-0539	64.7793, -147.3553	40	10-55	4/11/2014	<5.00
PW-0539	64.7793, -147.3553	40	10-55	7/23/2015	<5.25
PW-0540	64.7785, -147.3550	40	10-55	1/3/2011	<11.6
PW-0540	64.7785, -147.3550	40	10-55	6/26/2012	<6.20
PW-0540	64.7785, -147.3550	40	10-55	6/19/2013	<6.40
PW-0540	64.7785, -147.3550	40	10-55	4/19/2014	<5.00
PW-0540	64.7785, -147.3550	40	10-55	6/19/2015	<5.40
PW-0541	64.7778, -147.3538			11/9/2010	<10.9
PW-0541	64.7778, -147.3538			6/13/2013	<6.46
PW-0541	64.7778, -147.3538			5/15/2014	<5.20
PW-0541	64.7778, -147.3538			7/10/2015	<5.40
PW-0542	64.7843, -147.3731			4/9/2010	11.3
PW-0542	64.7843, -147.3731			8/1/2011	15.7J*
PW-0542	64.7843, -147.3731			2/15/2012	14.7J*
PW-0542	64.7843, -147.3731			8/30/2012	16.5J*
PW-0542	64.7843, -147.3731			2/5/2013	17.1J*
PW-0542	64.7843, -147.3731			7/29/2013	18.1J*
PW-0542	64.7843, -147.3731			1/27/2014	17.0
PW-0542	64.7843, -147.3731			7/14/2014	20.7
PW-0542	64.7843, -147.3731			2/10/2015	18.1
PW-0542	64.7843, -147.3731			7/21/2015	20.3
PW-0542	64.7843, -147.3731			12/8/2015	20.2
PW-0542	64.7843, -147.3731			5/10/2016	19.5
PW-0542	64.7843, -147.3731			10/25/2016	17.8
PW-0542	64.7843, -147.3731			3/7/2017	19.3
PW-0543	64.7837, -147.3717			4/15/2010	11.5
PW-0544	64.7833, -147.3702	40	10-55	4/18/2010	<10.0
PW-0544	64.7833, -147.3702	40	10-55	6/6/2011	8.65J
PW-0544	64.7833, -147.3702	40	10-55	12/2/2011	11.5J*
PW-0544	64.7833, -147.3702	40	10-55	4/30/2012	12.0J*
PW-0544	64.7833, -147.3702	40	10-55	5/22/2012	12.1J*
PW-0544	64.7833, -147.3702	40	10-55	10/19/2012	13.6J*
PW-0544	64.7833, -147.3702	40	10-55	4/1/2013	15.4J*
PW-0544	64.7833, -147.3702	40	10-55	8/19/2013	20.2J*
PW-0544	64.7833, -147.3702	40	10-55	1/17/2014	16.2
PW-0544	64.7833, -147.3702	40	10-55	5/19/2014	15.1
PW-0544	64.7833, -147.3702	40	10-55	9/19/2014	15.4
PW-0544	64.7833, -147.3702	40	10-55	1/23/2015	16.3
PW-0544	64.7833, -147.3702	40	10-55	6/2/2015	14.2
PW-0544	64.7833, -147.3702	40	10-55	9/14/2015	15.5
PW-0544	64.7833, -147.3702	40	10-55	12/11/2015	15.0

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0544	64.7833, -147.3702	40	10-55	5/13/2016	18.3
PW-0544	64.7833, -147.3702	40	10-55	7/8/2016	17.4
PW-0544	64.7833, -147.3702	40	10-55	12/23/2016	15.3
PW-0544	64.7833, -147.3702	40	10-55	5/5/2017	16.6
PW-0545	64.7828, -147.3686			1/3/2011	<10.0
PW-0545	64.7828, -147.3686			8/12/2011	8.61J
PW-0546	64.7808, -147.3604			4/18/2010	<10.5
PW-0546	64.7808, -147.3604			9/7/2011	<6.40
PW-0546	64.7808, -147.3604			5/26/2012	<6.20
PW-0546	64.7808, -147.3604			5/6/2013	<6.32
PW-0546	64.7808, -147.3604			7/23/2014	<5.30
PW-0546	64.7808, -147.3604			8/22/2015	<5.15
PW-0546	64.7808, -147.3604			5/20/2017	<5.25
PW-0547	64.7801, -147.3605	40	10-55	4/17/2010	<10.0
PW-0547	64.7801, -147.3605	40	10-55	8/30/2011	<6.32
PW-0547	64.7801, -147.3605	40	10-55	5/23/2012	<6.20
PW-0547	64.7801, -147.3605	40	10-55	5/13/2013	<6.20
PW-0547	64.7801, -147.3605	40	10-55	5/10/2014	<5.00
PW-0547	64.7801, -147.3605	40	10-55	6/26/2015	<5.40
PW-0547	64.7801, -147.3605	40	10-55	5/19/2016	<5.15
PW-0547	64.7801, -147.3605	40	10-55	7/28/2017	4.99J
PW-0548	64.7793, -147.3595	40	10-55	4/14/2010	<10.0
PW-0548	64.7793, -147.3595	40	10-55	7/27/2011	<6.96
PW-0548	64.7793, -147.3595	40	10-55	5/23/2012	<6.20
PW-0548	64.7793, -147.3595	40	10-55	7/10/2013	<6.20
PW-0548	64.7793, -147.3595	40	10-55	5/7/2014	<5.75
PW-0548	64.7793, -147.3595	40	10-55	8/22/2015	<5.15
PW-0548	64.7793, -147.3595	40	10-55	10/11/2016	<5.30
PW-0548	64.7793, -147.3595	40	10-55	7/13/2017	<5.20
PW-0549	64.7774, -147.3570			4/18/2010	<10.0
PW-0549	64.7774, -147.3570			7/27/2011	8.35J
PW-0550	64.7829, -147.3750	40	10-55	4/10/2010	13.4
PW-0550	64.7829, -147.3750	40	10-55	9/6/2011	13.8J*
PW-0550	64.7829, -147.3750	40	10-55	4/3/2012	14.9J*
PW-0550	64.7829, -147.3750	40	10-55	1/16/2013	12.8J*
PW-0550	64.7829, -147.3750	40	10-55	7/9/2013	17.4J*
PW-0550	64.7829, -147.3750	40	10-55	12/20/2013	14.1
PW-0550	64.7829, -147.3750	40	10-55	10/10/2014	18.5
PW-0550	64.7829, -147.3750	40	10-55	5/8/2015	19.6
PW-0550	64.7829, -147.3750	40	10-55	10/27/2015	25.3
PW-0550	64.7829, -147.3750	40	10-55	5/20/2016	26.4
PW-0550	64.7829, -147.3750	40	10-55	11/15/2016	27.3
PW-0550	64.7829, -147.3750	40	10-55	4/21/2017	35.4
PW-0550	64.7829, -147.3750	40	10-55	6/23/2017	29.3
PW-0551	64.7824, -147.3736			4/7/2010	<10.3
PW-0551	64.7824, -147.3736			5/24/2011	13.4
PW-0552	64.7821, -147.3720			3/9/2010	12.7
PW-0553	64.7816, -147.3702			4/10/2010	<10.4
PW-0553	64.7816, -147.3702			6/10/2011	18.3
PW-0553	64.7816, -147.3702			8/2/2011	18.6J*

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Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0553	64.7816, -147.3702			1/23/2012	18.6J*
PW-0553	64.7816, -147.3702			5/4/2012	18.0J*
PW-0553	64.7816, -147.3702			7/24/2012	20.2J*
PW-0553	64.7816, -147.3702			10/12/2012	19.6J*
PW-0553	64.7816, -147.3702			1/3/2013	16.2J*
PW-0553	64.7816, -147.3702			6/10/2013	17.9J*
PW-0553	64.7816, -147.3702			11/5/2013	18.3
PW-0553	64.7816, -147.3702			2/25/2014	19.2
PW-0553	64.7816, -147.3702			6/20/2014	21.5
PW-0553	64.7816, -147.3702			9/23/2014	19.7
PW-0553	64.7816, -147.3702			2/10/2015	19.0
PW-0553	64.7816, -147.3702			7/10/2015	21.2
PW-0553	64.7816, -147.3702			10/13/2015	18.3
PW-0553	64.7816, -147.3702			1/12/2016	19.6
PW-0553	64.7816, -147.3702			6/3/2016	15.9
PW-0553	64.7816, -147.3702			9/20/2016	17.9
PW-0553	64.7816, -147.3702			2/7/2017	17.9
PW-0553	64.7816, -147.3702			6/16/2017	21.5JH*
PW-0554	64.7814, -147.3680	50	10-55	4/17/2010	<10.0
PW-0554	64.7814, -147.3680	50	10-55	7/8/2011	14.0
PW-0554	64.7814, -147.3680	50	10-55	6/19/2012	16.5J*
PW-0554	64.7814, -147.3680	50	10-55	5/31/2013	14.2J*
PW-0554	64.7814, -147.3680	50	10-55	4/15/2014	17.9
PW-0554	64.7814, -147.3680	50	10-55	2/24/2015	16.6
PW-0554	64.7814, -147.3680	50	10-55	12/21/2015	18.9
PW-0554	64.7814, -147.3680	50	10-55	10/25/2016	13.7
PW-0554	64.7814, -147.3680	50	10-55	11/29/2016	13.7
PW-0555	64.7816, -147.3635	36	10-55	4/14/2010	<10.8
PW-0555	64.7816, -147.3635	36	10-55	9/2/2011	<6.40
PW-0555	64.7816, -147.3635	36	10-55	6/29/2012	<6.20
PW-0555	64.7816, -147.3635	36	10-55	12/16/2016	3.55J
PW-0555	64.7816, -147.3635	36	10-55	6/22/2017	3.32J
PW-0556	64.7800, -147.3636	40	10-55	4/15/2010	<10.4
PW-0556	64.7800, -147.3636	40	10-55	9/2/2011	8.02J
PW-0556	64.7800, -147.3636	40	10-55	3/15/2012	7.50J*
PW-0556	64.7800, -147.3636	40	10-55	7/16/2012	8.10J*
PW-0556	64.7800, -147.3636	40	10-55	10/19/2012	7.40J*
PW-0556	64.7800, -147.3636	40	10-55	1/7/2013	5.80J*
PW-0556	64.7800, -147.3636	40	10-55	4/16/2013	5.00J*
PW-0556	64.7800, -147.3636	40	10-55	7/26/2013	5.00J*
PW-0556	64.7800, -147.3636	40	10-55	11/19/2013	5.80J
PW-0556	64.7800, -147.3636	40	10-55	3/7/2014	6.80J
PW-0556	64.7800, -147.3636	40	10-55	5/6/2014	5.00J
PW-0556	64.7800, -147.3636	40	10-55	12/2/2014	8.00J
PW-0556	64.7800, -147.3636	40	10-55	2/20/2015	6.80J
PW-0556	64.7800, -147.3636	40	10-55	4/14/2015	6.70J
PW-0556	64.7800, -147.3636	40	10-55	6/26/2015	6.40J
PW-0556	64.7800, -147.3636	40	10-55	9/18/2015	7.90J
PW-0556	64.7800, -147.3636	40	10-55	2/12/2016	8.30J
PW-0556	64.7800, -147.3636	40	10-55	8/8/2016	9.60J

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0556	64.7800, -147.3636	40	10-55	1/9/2017	7.70J
PW-0556	64.7800, -147.3636	40	10-55	7/10/2017	9.20J
PW-0557	64.7803, -147.3658			9/29/2010	<11.1
PW-0557	64.7803, -147.3658			7/8/2011	12.9
PW-0557	64.7803, -147.3658			8/5/2011	14.9JL*
PW-0557	64.7803, -147.3658			2/22/2012	13.1J*
PW-0557	64.7803, -147.3658			11/27/2012	17.8J*
PW-0557	64.7803, -147.3658			5/31/2013	11.1J*
PW-0557	64.7803, -147.3658			12/30/2013	12.2
PW-0557	64.7803, -147.3658			6/10/2014	15.4
PW-0557	64.7803, -147.3658			11/11/2014	17.0
PW-0557	64.7803, -147.3658			4/20/2015	14.9
PW-0557	64.7803, -147.3658			8/17/2015	17.9
PW-0557	64.7803, -147.3658			11/30/2015	19.2
PW-0557	64.7803, -147.3658			2/29/2016	16.7
PW-0557	64.7803, -147.3658			5/17/2016	17.7
PW-0557	64.7803, -147.3658			8/30/2016	16.3J*
PW-0557	64.7803, -147.3658			11/11/2016	16.2
PW-0557	64.7803, -147.3658			3/20/2017	15.2
PW-0557	64.7803, -147.3658			9/12/2017	18.0
PW-0558	64.7803, -147.3681			4/14/2010	11.5
PW-0558	64.7803, -147.3681			8/8/2011	19.5J*
PW-0558	64.7803, -147.3681			2/20/2012	16.5J*
PW-0558	64.7803, -147.3681			1/14/2013	17.2J*
PW-0558	64.7803, -147.3681			7/29/2013	18.6J*
PW-0558	64.7803, -147.3681			5/9/2014	20.5
PW-0558	64.7803, -147.3681			12/1/2014	20.7
PW-0558	64.7803, -147.3681			5/29/2015	17.2
PW-0558	64.7803, -147.3681			12/7/2015	19.4
PW-0558	64.7803, -147.3681			6/7/2016	15.3
PW-0558	64.7803, -147.3681			7/29/2016	15.1
PW-0558	64.7803, -147.3681			10/11/2016	14.6
PW-0558	64.7803, -147.3681			2/21/2017	16.6
PW-0558	64.7803, -147.3681			6/12/2017	18.6JH*
PW-0558	64.7803, -147.3681			8/25/2017	16.4
PW-0559	64.7805, -147.3706			4/15/2010	13.4
PW-0559	64.7805, -147.3706			6/6/2011	13.0J*
PW-0559	64.7805, -147.3706			11/28/2011	13.4J*
PW-0559	64.7805, -147.3706			3/15/2012	14.0J*
PW-0559	64.7805, -147.3706			8/8/2012	15.4J*
PW-0559	64.7805, -147.3706			12/17/2012	16.7J*
PW-0559	64.7805, -147.3706			4/29/2013	16.1J*
PW-0559	64.7805, -147.3706			8/26/2013	12.5J*
PW-0559	64.7805, -147.3706			1/13/2014	15.3
PW-0559	64.7805, -147.3706			5/23/2014	16.0
PW-0559	64.7805, -147.3706			9/5/2014	18.8
PW-0559	64.7805, -147.3706			12/15/2014	19.3
PW-0559	64.7805, -147.3706			3/20/2015	16.7
PW-0559	64.7805, -147.3706			8/11/2015	19.7
PW-0559	64.7805, -147.3706			10/19/2015	19.5

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Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0559	64.7805, -147.3706			1/25/2016	20.7
PW-0559	64.7805, -147.3706			12/13/2016	19.9
PW-0559	64.7805, -147.3706			4/3/2017	23.4
PW-0559	64.7805, -147.3706			9/8/2017	24.2
PW-0560	64.7811, -147.3749			4/14/2010	12.4
PW-0560	64.7811, -147.3749			4/25/2011	20.5J*
PW-0560	64.7811, -147.3749			11/14/2011	13.7J*
PW-0560	64.7811, -147.3749			4/24/2012	19.8J*
PW-0560	64.7811, -147.3749			10/5/2012	15.8J*
PW-0560	64.7811, -147.3749			3/8/2013	18.6J*
PW-0560	64.7811, -147.3749			8/20/2013	18.4J*
PW-0560	64.7811, -147.3749			1/27/2014	18.5
PW-0560	64.7811, -147.3749			7/7/2014	23.0
PW-0560	64.7811, -147.3749			12/15/2014	24.5
PW-0560	64.7811, -147.3749			5/29/2015	28.0
PW-0560	64.7811, -147.3749			11/6/2015	32.7
PW-0560	64.7811, -147.3749			3/25/2016	42.8
PW-0560	64.7811, -147.3749			7/29/2016	40.9
PW-0560	64.7811, -147.3749			12/20/2016	45.7
PW-0560	64.7811, -147.3749			5/9/2017	59.4
PW-0561	64.7793, -147.3731			4/24/2010	17.8
PW-0561	64.7793, -147.3731			5/11/2011	20.0J*
PW-0561	64.7793, -147.3731			10/31/2011	<3.10J*
PW-0561	64.7793, -147.3731			5/16/2012	24.0J*
PW-0561	64.7793, -147.3731			10/30/2012	24.3J*
PW-0561	64.7793, -147.3731			1/30/2013	21.3J*
PW-0561	64.7793, -147.3731			5/24/2013	23.1J*
PW-0561	64.7793, -147.3731			9/2/2013	25.1JL*
PW-0561	64.7793, -147.3731			12/27/2013	27.1
PW-0561	64.7793, -147.3731			4/4/2014	28.1
PW-0561	64.7793, -147.3731			1/26/2015	36.6
PW-0561	64.7793, -147.3731			6/26/2015	36.2
PW-0561	64.7793, -147.3731			11/20/2015	45.4JL*
PW-0561	64.7793, -147.3731			4/26/2016	56.6J*
PW-0561	64.7793, -147.3731			8/30/2016	49.1J*
PW-0561	64.7793, -147.3731			1/24/2017	59.2
PW-0561	64.7793, -147.3731			6/16/2017	80.3
PW-0562	64.7791, -147.3685			4/14/2010	11.1
PW-0562	64.7791, -147.3685			6/7/2011	14.1J*
PW-0562	64.7791, -147.3685			5/3/2013	18.7J*
PW-0562	64.7791, -147.3685			5/12/2014	16.7
PW-0562	64.7791, -147.3685			4/21/2015	14.9
PW-0562	64.7791, -147.3685			2/15/2016	16.2
PW-0562	64.7791, -147.3685			10/28/2016	13.3
PW-0562	64.7791, -147.3685			9/12/2017	14.5
PW-0563	64.7790, -147.3661	36.5	10-55	4/18/2010	<10.6
PW-0563	64.7790, -147.3661	36.5	10-55	9/1/2011	17.9
PW-0563	64.7790, -147.3661	36.5	10-55	5/28/2013	18.7J*
PW-0563	64.7790, -147.3661	36.5	10-55	12/9/2013	15.4
PW-0563	64.7790, -147.3661	36.5	10-55	6/3/2014	18.3

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North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0563	64.7790, -147.3661	36.5	10-55	10/28/2014	17.5
PW-0563	64.7790, -147.3661	36.5	10-55	2/24/2015	16.4
PW-0563	64.7790, -147.3661	36.5	10-55	6/29/2015	16.2
PW-0563	64.7790, -147.3661	36.5	10-55	10/5/2015	14.8
PW-0563	64.7790, -147.3661	36.5	10-55	5/10/2016	13.9
PW-0563	64.7790, -147.3661	36.5	10-55	9/16/2016	11.7
PW-0563	64.7790, -147.3661	36.5	10-55	10/28/2016	11.2
PW-0563	64.7790, -147.3661	36.5	10-55	6/20/2017	12.0
PW-0564	64.7789, -147.3641	70	55-90	4/14/2010	11.4
PW-0564	64.7789, -147.3641	70	55-90	6/7/2011	14.1J*
PW-0564	64.7789, -147.3641	70	55-90	11/28/2011	15.6J*
PW-0564	64.7789, -147.3641	70	55-90	8/20/2012	18.4J*
PW-0564	64.7789, -147.3641	70	55-90	4/1/2013	14.6J*
PW-0564	64.7789, -147.3641	70	55-90	11/15/2013	12.1
PW-0564	64.7789, -147.3641	70	55-90	5/16/2014	9.00J
PW-0564	64.7789, -147.3641	70	55-90	10/31/2014	21.7
PW-0564	64.7789, -147.3641	70	55-90	4/6/2015	14.8
PW-0564	64.7789, -147.3641	70	55-90	9/8/2015	21.2
PW-0564	64.7789, -147.3641	70	55-90	3/29/2016	17.2
PW-0564	64.7789, -147.3641	70	55-90	8/1/2016	20.0
PW-0564	64.7789, -147.3641	70	55-90	2/10/2017	17.6
PW-0564	64.7789, -147.3641	70	55-90	7/14/2017	18.7
PW-0565	64.7790, -147.3623			4/16/2010	<10.4
PW-0565	64.7790, -147.3623			7/9/2011	7.49J
PW-0565	64.7790, -147.3623			8/12/2011	7.90J*
PW-0565	64.7790, -147.3623			2/17/2012	5.50J*
PW-0565	64.7790, -147.3623			11/30/2012	9.30JH*
PW-0565	64.7790, -147.3623			8/12/2013	4.70J*
PW-0565	64.7790, -147.3623			4/28/2014	2.90JH*
PW-0565	64.7790, -147.3623			10/27/2014	8.30J
PW-0565	64.7790, -147.3623			9/21/2015	8.90J
PW-0565	64.7790, -147.3623			1/29/2016	8.60J
PW-0565	64.7790, -147.3623			6/17/2016	7.60J
PW-0565	64.7790, -147.3623			7/18/2016	8.00J
PW-0565	64.7790, -147.3623			12/20/2016	7.10J
PW-0566	64.7782, -147.3619	70	55-90	4/7/2010	<10.5
PW-0566	64.7782, -147.3619	70	55-90	7/8/2011	12.3
PW-0566	64.7782, -147.3619	70	55-90	8/31/2011	16.7J*
PW-0566	64.7782, -147.3619	70	55-90	12/20/2011	12.4J*
PW-0566	64.7782, -147.3619	70	55-90	3/16/2012	10.3J*
PW-0566	64.7782, -147.3619	70	55-90	6/7/2012	10.7J*
PW-0566	64.7782, -147.3619	70	55-90	8/6/2012	14.9J*
PW-0566	64.7782, -147.3619	70	55-90	12/18/2012	16.4JH*
PW-0566	64.7782, -147.3619	70	55-90	4/23/2013	7.40J*
PW-0566	64.7782, -147.3619	70	55-90	9/2/2013	13.3JL*
PW-0566	64.7782, -147.3619	70	55-90	1/28/2014	12.5
PW-0566	64.7782, -147.3619	70	55-90	6/23/2014	12.6
PW-0566	64.7782, -147.3619	70	55-90	10/3/2014	20.0
PW-0566	64.7782, -147.3619	70	55-90	1/23/2015	12.5
PW-0566	64.7782, -147.3619	70	55-90	5/1/2015	11.0

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0566	64.7782, -147.3619	70	55-90	7/21/2015	16.5
PW-0566	64.7782, -147.3619	70	55-90	12/28/2015	18.9
PW-0566	64.7782, -147.3619	70	55-90	5/24/2016	12.7
PW-0566	64.7782, -147.3619	70	55-90	8/22/2016	17.6
PW-0566	64.7782, -147.3619	70	55-90	12/16/2016	16.3
PW-0566	64.7782, -147.3619	70	55-90	4/7/2017	12.3
PW-0566	64.7782, -147.3619	70	55-90	7/17/2017	15.6
PW-0567	64.7775, -147.3613	80	55-90	4/7/2010	<10.6
PW-0567	64.7775, -147.3613	80	55-90	7/8/2011	8.09J
PW-0567	64.7775, -147.3613	80	55-90	8/18/2011	8.90J*
PW-0567	64.7775, -147.3613	80	55-90	2/20/2012	7.50J*
PW-0567	64.7775, -147.3613	80	55-90	9/10/2012	9.40J*
PW-0567	64.7775, -147.3613	80	55-90	4/2/2013	4.40J*
PW-0567	64.7775, -147.3613	80	55-90	8/6/2013	5.10J*
PW-0567	64.7775, -147.3613	80	55-90	1/6/2014	8.00J
PW-0567	64.7775, -147.3613	80	55-90	7/29/2014	9.80J
PW-0567	64.7775, -147.3613	80	55-90	1/6/2015	7.90J
PW-0567	64.7775, -147.3613	80	55-90	6/22/2015	8.20J
PW-0567	64.7775, -147.3613	80	55-90	12/14/2015	10.2
PW-0567	64.7775, -147.3613	80	55-90	7/8/2016	9.50J
PW-0567	64.7775, -147.3613	80	55-90	11/28/2016	8.10J
PW-0567	64.7775, -147.3613	80	55-90	2/6/2017	7.20J
PW-0567	64.7775, -147.3613	80	55-90	7/17/2017	7.50J
PW-0568	64.7778, -147.3641	40	10-55	4/24/2010	16.1
PW-0568	64.7778, -147.3641	40	10-55	7/29/2011	20.1J*
PW-0568	64.7778, -147.3641	40	10-55	2/2/2012	17.0J*
PW-0568	64.7778, -147.3641	40	10-55	6/14/2012	19.6J*
PW-0568	64.7778, -147.3641	40	10-55	4/19/2013	14.6J*
PW-0568	64.7778, -147.3641	40	10-55	4/14/2014	15.9
PW-0568	64.7778, -147.3641	40	10-55	6/20/2014	18.8
PW-0568	64.7778, -147.3641	40	10-55	9/5/2014	17.6
PW-0568	64.7778, -147.3641	40	10-55	11/18/2014	15.5
PW-0568	64.7778, -147.3641	40	10-55	4/27/2015	13.7
PW-0568	64.7778, -147.3641	40	10-55	10/6/2015	13.1
PW-0568	64.7778, -147.3641	40	10-55	3/22/2016	11.4JL*
PW-0568	64.7778, -147.3641	40	10-55	6/28/2016	12.1
PW-0568	64.7778, -147.3641	40	10-55	9/13/2016	11.2
PW-0568	64.7778, -147.3641	40	10-55	1/17/2017	10.5
PW-0568	64.7778, -147.3641	40	10-55	6/20/2017	13.0
PW-0569	64.7779, -147.3663	40	10-55	3/8/2010	11.7
PW-0570	64.7782, -147.3686			1/23/2010	10.6
PW-0570	64.7782, -147.3686			5/18/2011	14.4J*
PW-0570	64.7782, -147.3686			5/31/2011	14.8J*
PW-0570	64.7782, -147.3686			12/7/2011	11.7J*
PW-0570	64.7782, -147.3686			9/12/2012	13.8J*
PW-0570	64.7782, -147.3686			5/14/2013	13.6J*
PW-0570	64.7782, -147.3686			5/2/2014	15.0
PW-0570	64.7782, -147.3686			8/22/2014	19.1
PW-0570	64.7782, -147.3686			8/10/2015	17.8
PW-0570	64.7782, -147.3686			7/19/2016	18.3

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0570	64.7782, -147.3686			3/24/2017	18.3
PW-0570	64.7782, -147.3686			7/7/2017	20.2
PW-0575	64.7958, -147.4450	200	>160	12/6/2011	<6.20
PW-0584	64.7929, -147.4196			7/28/2011	<6.20
PW-0584	64.7929, -147.4196			10/6/2014	<5.30
PW-0585	64.7857, -147.4083			4/19/2013	<6.66
PW-0585	64.7857, -147.4083			6/25/2014	6.30J
PW-0586	64.7837, -147.3830			4/17/2010	<10.0
PW-0586	64.7837, -147.3830			8/19/2011	7.97J
PW-0586	64.7837, -147.3830			10/11/2011	6.40J*
PW-0586	64.7837, -147.3830			3/16/2012	8.20J*
PW-0586	64.7837, -147.3830			8/14/2012	8.40J*
PW-0586	64.7837, -147.3830			1/28/2013	7.30J*
PW-0586	64.7837, -147.3830			5/20/2013	9.10J*
PW-0586	64.7837, -147.3830			10/22/2013	8.20J
PW-0586	64.7837, -147.3830			1/28/2014	<3.00
PW-0586	64.7837, -147.3830			5/23/2014	11.1
PW-0586	64.7837, -147.3830			8/19/2014	12.6JL*
PW-0586	64.7837, -147.3830			12/30/2014	9.70J
PW-0586	64.7837, -147.3830			5/22/2015	13.8
PW-0586	64.7837, -147.3830			9/14/2015	16.1
PW-0586	64.7837, -147.3830			2/16/2016	17.5
PW-0586	64.7837, -147.3830			8/9/2016	19.4
PW-0586	64.7837, -147.3830			11/29/2016	19.6
PW-0586	64.7837, -147.3830			3/14/2017	25.8
PW-0586	64.7837, -147.3830			9/8/2017	28.3
PW-0587	64.7890, -147.3881			11/11/2011	<6.60
PW-0587	64.7890, -147.3881			6/8/2012	<6.20
PW-0587	64.7890, -147.3881			8/6/2013	<6.46
PW-0587	64.7890, -147.3881			7/8/2014	<5.30
PW-0587	64.7890, -147.3881			6/16/2015	<5.60
PW-0587	64.7890, -147.3881			5/5/2016	<5.10
PW-0587	64.7890, -147.3881			5/22/2017	<5.10
PW-0588	64.7902, -147.3905	85	55-90	11/12/2011	<6.52
PW-0588	64.7902, -147.3905	85	55-90	6/1/2012	<6.20
PW-0588	64.7902, -147.3905	85	55-90	7/10/2014	<5.25
PW-0588	64.7902, -147.3905	85	55-90	8/7/2015	<5.30
PW-0589	64.7893, -147.3904			11/11/2011	<6.52
PW-0589	64.7893, -147.3904			6/5/2012	<6.20
PW-0589	64.7893, -147.3904			6/20/2013	<6.52
PW-0589	64.7893, -147.3904			5/2/2014	<5.25
PW-0589	64.7893, -147.3904			6/16/2015	<5.55J*
PW-0589	64.7893, -147.3904			5/24/2016	<5.10J*
PW-0589	64.7893, -147.3904			5/24/2017	<5.05
PW-0590	64.7808, -147.3841			10/4/2011	7.76J
PW-0591	64.7874, -147.3925			9/18/2012	<6.82
PW-0591	64.7874, -147.3925			9/1/2013	<6.32
PW-0591	64.7874, -147.3925			9/17/2014	<5.15
PW-0591	64.7874, -147.3925			8/21/2015	<5.15
PW-0591	64.7874, -147.3925			5/31/2016	<5.15

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Flint Hills Resources Alaska, LLC
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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0591	64.7874, -147.3925			7/27/2017	<5.25
PW-0592	64.7809, -147.3849			4/19/2010	<10.6
PW-0592	64.7809, -147.3849			7/26/2011	14.4
PW-0593	64.7808, -147.3852			7/26/2011	12.8
PW-0594	64.7896, -147.3905			11/5/2011	<6.20
PW-0594	64.7896, -147.3905			6/6/2012	<6.20
PW-0594	64.7896, -147.3905			7/12/2013	<6.20
PW-0594	64.7896, -147.3905			4/12/2014	<5.00
PW-0594	64.7896, -147.3905			9/16/2015	<5.20
PW-0594	64.7896, -147.3905			7/21/2016	<5.25
PW-0594	64.7896, -147.3905			5/31/2017	<5.10J*
PW-0597	64.7666, -147.4002			12/30/2009	49.7
PW-0597	64.7666, -147.4002			10/26/2011	95.5J*
PW-0597	64.7666, -147.4002			7/16/2012	111J*
PW-0597	64.7666, -147.4002			12/7/2012	123J*
PW-0597	64.7666, -147.4002			6/6/2013	88.3J*
PW-0597	64.7666, -147.4002			6/27/2013	96.5JL*
PW-0597	64.7666, -147.4002			8/6/2013	70.7J*
PW-0597	64.7666, -147.4002			12/31/2013	89.4
PW-0597	64.7666, -147.4002			1/21/2014	91.6
PW-0597	64.7666, -147.4002			6/6/2014	89.7
PW-0597	64.7666, -147.4002			7/22/2014	90.5
PW-0597	64.7666, -147.4002			9/19/2014	82.8
PW-0597	64.7666, -147.4002			1/13/2015	72.5
PW-0597	64.7666, -147.4002			4/13/2015	55.6
PW-0597	64.7666, -147.4002			6/8/2015	57.6
PW-0597	64.7666, -147.4002			7/24/2015	68.5
PW-0597	64.7666, -147.4002			7/30/2015	67.6
PW-0597	64.7666, -147.4002			9/4/2015	72.6
PW-0597	64.7666, -147.4002			12/7/2015	72.2
PW-0597	64.7666, -147.4002			4/5/2016	57.6
PW-0597	64.7666, -147.4002			5/31/2016	56.0
PW-0597	64.7666, -147.4002			7/22/2016	60.6
PW-0597	64.7666, -147.4002			10/17/2016	56.2
PW-0597	64.7666, -147.4002			3/10/2017	53.7
PW-0597	64.7666, -147.4002			6/5/2017	48.9JH*
PW-0597	64.7666, -147.4002			7/28/2017	49.1
PW-0598	64.7629, -147.3891	25	10-55	1/7/2010	140
PW-0598	64.7629, -147.3891	25	10-55	4/15/2011	206J*
PW-0598	64.7629, -147.3891	25	10-55	10/5/2011	183J*
PW-0598	64.7629, -147.3891	25	10-55	4/10/2012	182J*
PW-0598	64.7629, -147.3891	25	10-55	6/8/2012	241
PW-0598	64.7629, -147.3891	25	10-55	11/27/2012	192J*
PW-0598	64.7629, -147.3891	25	10-55	8/12/2013	135J*
PW-0598	64.7629, -147.3891	25	10-55	8/4/2014	149
PW-0598	64.7629, -147.3891	25	10-55	2/23/2015	139
PW-0598	64.7629, -147.3891	25	10-55	10/5/2015	122
PW-0598	64.7629, -147.3891	25	10-55	5/3/2016	131
PW-0598	64.7629, -147.3891	25	10-55	9/23/2016	91.9
PW-0598	64.7629, -147.3891	25	10-55	11/7/2016	85.8

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0598	64.7629, -147.3891	25	10-55	4/11/2017	102
PW-0598	64.7629, -147.3891	25	10-55	8/25/2017	97.9
PW-0599	64.7626, -147.3883			7/3/2012	241JL*
PW-0599	64.7626, -147.3883			6/10/2013	148J*
PW-0599	64.7626, -147.3883			10/25/2013	140
PW-0599	64.7626, -147.3883			3/14/2014	153
PW-0599	64.7626, -147.3883			8/18/2014	116
PW-0599	64.7626, -147.3883			7/28/2015	125
PW-0599	64.7626, -147.3883			7/19/2016	95.7
PW-0599	64.7626, -147.3883			6/13/2017	95.7
PW-0600	64.7658, -147.4090			2/12/2010	54.4
PW-0601	64.7656, -147.4091			3/2/2010	38.4
PW-0602	64.7659, -147.4065			3/2/2010	75.5
PW-0603	64.7652, -147.4092			3/7/2010	106
PW-0604	64.7765, -147.3868			8/16/2011	31.2
PW-0605	64.7668, -147.4022			11/23/2009	84.2
PW-0606	64.7741, -147.3859	50	10-55	2/28/2010	27.3
PW-0606	64.7741, -147.3859	50	10-55	7/13/2011	55.8J*
PW-0606	64.7741, -147.3859	50	10-55	12/13/2011	58.0J*
PW-0606	64.7741, -147.3859	50	10-55	7/10/2012	70.6J*
PW-0606	64.7741, -147.3859	50	10-55	12/26/2012	58.9J*
PW-0606	64.7741, -147.3859	50	10-55	8/20/2013	70.1J*
PW-0606	64.7741, -147.3859	50	10-55	12/3/2013	62.5
PW-0606	64.7741, -147.3859	50	10-55	8/18/2014	70.7
PW-0606	64.7741, -147.3859	50	10-55	9/15/2014	66.4
PW-0606	64.7741, -147.3859	50	10-55	5/19/2015	59.8
PW-0606	64.7741, -147.3859	50	10-55	11/9/2015	66.6
PW-0606	64.7741, -147.3859	50	10-55	12/11/2015	68.2
PW-0606	64.7741, -147.3859	50	10-55	10/24/2016	56.7
PW-0606	64.7741, -147.3859	50	10-55	6/9/2017	70.7
PW-0607	64.7639, -147.4036	30	10-55	2/1/2010	169
PW-0607	64.7639, -147.4036	30	10-55	3/27/2012	249J*
PW-0607	64.7639, -147.4036	30	10-55	9/15/2012	221J*
PW-0607	64.7639, -147.4036	30	10-55	3/11/2013	225J*
PW-0607	64.7639, -147.4036	30	10-55	12/13/2013	158
PW-0607	64.7639, -147.4036	30	10-55	2/18/2014	216
PW-0607	64.7639, -147.4036	30	10-55	5/15/2014	191
PW-0607	64.7639, -147.4036	30	10-55	7/14/2014	147
PW-0607	64.7639, -147.4036	30	10-55	9/23/2014	116
PW-0607	64.7639, -147.4036	30	10-55	11/4/2014	110
PW-0607	64.7639, -147.4036	30	10-55	1/13/2015	103
PW-0608	64.7695, -147.4105			3/7/2010	57.8
PW-0608	64.7695, -147.4105			8/16/2011	87.6J*
PW-0608	64.7695, -147.4105			3/7/2012	97.2J*
PW-0608	64.7695, -147.4105			5/21/2012	108J*
PW-0608	64.7695, -147.4105			1/14/2013	91.7J*
PW-0608	64.7695, -147.4105			6/19/2013	104J*
PW-0608	64.7695, -147.4105			10/21/2013	88.5
PW-0608	64.7695, -147.4105			3/14/2014	100
PW-0608	64.7695, -147.4105			7/8/2014	96.0

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North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0608	64.7695, -147.4105			10/31/2014	86.1
PW-0608	64.7695, -147.4105			3/6/2015	79.6
PW-0608	64.7695, -147.4105			4/7/2015	79.8JL*
PW-0608	64.7695, -147.4105			8/28/2015	86.8
PW-0608	64.7695, -147.4105			2/9/2016	81.3
PW-0608	64.7695, -147.4105			6/7/2016	69.3
PW-0608	64.7695, -147.4105			11/1/2016	64.5
PW-0609	64.7694, -147.4110			9/16/2011	71.1J*
PW-0609	64.7694, -147.4110			3/12/2012	104J*
PW-0609	64.7694, -147.4110			6/11/2012	94.0J*
PW-0609	64.7694, -147.4110			9/5/2012	99.5J*
PW-0609	64.7694, -147.4110			8/19/2013	82.7JL*
PW-0609	64.7694, -147.4110			7/21/2014	84.3
PW-0609	64.7694, -147.4110			6/19/2015	66.2
PW-0609	64.7694, -147.4110			3/22/2016	54.4
PW-0609	64.7694, -147.4110			2/20/2017	43.0
PW-0609	64.7694, -147.4110			3/27/2017	31.7
PW-0609	64.7694, -147.4110			5/1/2017	47.2
PW-0610	64.7637, -147.4125			3/7/2010	24.3
PW-0610	64.7637, -147.4125			6/1/2011	30.0J*
PW-0610	64.7637, -147.4125			11/28/2011	31.8J*
PW-0610	64.7637, -147.4125			11/30/2012	37.0JH*
PW-0610	64.7637, -147.4125			8/16/2013	28.4J*
PW-0610	64.7637, -147.4125			8/25/2014	32.8
PW-0610	64.7637, -147.4125			8/11/2015	29.0
PW-0610	64.7637, -147.4125			6/13/2016	43.0
PW-0610	64.7637, -147.4125			10/18/2016	42.8
PW-0610	64.7637, -147.4125			3/31/2017	50.5
PW-0610	64.7637, -147.4125			5/12/2017	52.6J*
PW-0611	64.7712, -147.4244			5/10/2010	<10.6
PW-0611	64.7712, -147.4244			8/31/2011	19.5
PW-0612	64.7710, -147.4243			10/5/2011	19.0
PW-0612	64.7710, -147.4243			10/4/2017	14.5
PW-0613	64.7677, -147.4135	55	55-90	3/8/2010	60.7
PW-0614	64.7653, -147.4289			3/8/2011	<10.4
PW-0614	64.7653, -147.4289			8/25/2011	<6.66
PW-0614	64.7653, -147.4289			6/12/2012	<6.20
PW-0614	64.7653, -147.4289			7/19/2013	<6.20
PW-0614	64.7653, -147.4289			7/17/2015	<5.40
PW-0615	64.7673, -147.4115	33	10-55	3/4/2010	65.3
PW-0615	64.7673, -147.4115	33	10-55	3/29/2011	120J*
PW-0615	64.7673, -147.4115	33	10-55	4/28/2011	116J*
PW-0615	64.7673, -147.4115	33	10-55	9/30/2011	121J*
PW-0615	64.7673, -147.4115	33	10-55	3/16/2012	126J*
PW-0615	64.7673, -147.4115	33	10-55	8/17/2012	143J*
PW-0615	64.7673, -147.4115	33	10-55	12/19/2012	176JH*
PW-0615	64.7673, -147.4115	33	10-55	5/3/2013	142J*
PW-0615	64.7673, -147.4115	33	10-55	10/14/2013	115
PW-0615	64.7673, -147.4115	33	10-55	2/14/2014	148
PW-0615	64.7673, -147.4115	33	10-55	7/11/2014	122

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0615	64.7673, -147.4115	33	10-55	1/2/2015	105
PW-0615	64.7673, -147.4115	33	10-55	8/10/2015	91.1
PW-0615	64.7673, -147.4115	33	10-55	2/22/2016	80.3
PW-0615	64.7673, -147.4115	33	10-55	8/1/2016	56.5
PW-0615	64.7673, -147.4115	33	10-55	1/23/2017	52.9
PW-0615	64.7673, -147.4115	33	10-55	7/7/2017	42.1
PW-0616	64.7673, -147.4104			3/6/2010	72.1
PW-0617	64.7664, -147.4104			3/4/2010	56.4
PW-0617	64.7664, -147.4104			7/20/2011	144J*
PW-0617	64.7664, -147.4104			2/7/2012	145J*
PW-0617	64.7664, -147.4104			11/9/2012	168J*
PW-0617	64.7664, -147.4104			10/15/2013	143
PW-0617	64.7664, -147.4104			8/22/2014	146
PW-0617	64.7664, -147.4104			6/2/2015	118
PW-0617	64.7664, -147.4104			3/18/2016	105
PW-0617	64.7664, -147.4104			11/4/2016	68.1
PW-0617	64.7664, -147.4104			2/24/2017	62.0
PW-0618	64.7648, -147.4117	110	90-160	2/22/2010	29.5
PW-0618	64.7648, -147.4117	110	90-160	5/19/2011	43.8J*
PW-0618	64.7648, -147.4117	110	90-160	11/17/2011	16.0J*
PW-0618	64.7648, -147.4117	110	90-160	4/27/2012	39.0J*
PW-0618	64.7648, -147.4117	110	90-160	5/21/2012	48.2J*
PW-0618	64.7648, -147.4117	110	90-160	11/2/2012	25.6J*
PW-0618	64.7648, -147.4117	110	90-160	5/3/2013	36.6J*
PW-0618	64.7648, -147.4117	110	90-160	9/16/2013	33.7
PW-0618	64.7648, -147.4117	110	90-160	2/14/2014	10.2
PW-0618	64.7648, -147.4117	110	90-160	7/21/2014	56.7
PW-0618	64.7648, -147.4117	110	90-160	11/17/2014	40.9
PW-0618	64.7648, -147.4117	110	90-160	3/9/2015	14.9
PW-0618	64.7648, -147.4117	110	90-160	7/13/2015	50.6
PW-0618	64.7648, -147.4117	110	90-160	12/8/2015	54.1
PW-0618	64.7648, -147.4117	110	90-160	6/3/2016	97.9
PW-0618	64.7648, -147.4117	110	90-160	11/28/2016	30.4
PW-0618	64.7648, -147.4117	110	90-160	5/16/2017	87.3
PW-0619	64.7671, -147.4104			3/6/2010	57.1
PW-0620	64.7646, -147.4106	40	10-55	3/8/2010	33.3
PW-0620	64.7646, -147.4106	40	10-55	6/13/2011	46.0J*
PW-0620	64.7646, -147.4106	40	10-55	12/13/2011	49.2J*
PW-0620	64.7646, -147.4106	40	10-55	4/30/2012	56.8J*
PW-0620	64.7646, -147.4106	40	10-55	5/25/2012	58.5J*
PW-0620	64.7646, -147.4106	40	10-55	8/20/2012	66.4J*
PW-0620	64.7646, -147.4106	40	10-55	3/29/2013	94.8J*
PW-0620	64.7646, -147.4106	40	10-55	9/9/2013	89.5J*
PW-0620	64.7646, -147.4106	40	10-55	12/13/2013	99.8
PW-0620	64.7646, -147.4106	40	10-55	4/7/2014	93.0
PW-0620	64.7646, -147.4106	40	10-55	12/19/2014	86.4
PW-0620	64.7646, -147.4106	40	10-55	6/22/2015	76.0
PW-0620	64.7646, -147.4106	40	10-55	11/3/2015	111
PW-0620	64.7646, -147.4106	40	10-55	7/11/2016	82.9
PW-0620	64.7646, -147.4106	40	10-55	9/30/2016	73.0

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Historical Private Well Sulfolane Results Summary

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0620	64.7646, -147.4106	40	10-55	8/29/2017	73.8
PW-0621	64.7633, -147.4134			4/3/2010	11.1
PW-0622	64.7627, -147.4134	40	10-55	1/4/2010	<10.5
PW-0622	64.7627, -147.4134	40	10-55	1/14/2010	<10.6J*
PW-0622	64.7627, -147.4134	40	10-55	8/19/2011	11.4
PW-0622	64.7627, -147.4134	40	10-55	10/13/2011	9.40J*
PW-0622	64.7627, -147.4134	40	10-55	2/20/2012	6.40J*
PW-0622	64.7627, -147.4134	40	10-55	6/7/2012	9.60J*
PW-0622	64.7627, -147.4134	40	10-55	9/4/2012	11.2J*
PW-0622	64.7627, -147.4134	40	10-55	11/16/2012	8.80J*
PW-0622	64.7627, -147.4134	40	10-55	1/8/2013	<3.10J*
PW-0622	64.7627, -147.4134	40	10-55	4/29/2013	6.30J*
PW-0622	64.7627, -147.4134	40	10-55	7/15/2013	8.20J*
PW-0622	64.7627, -147.4134	40	10-55	9/23/2013	8.30J
PW-0622	64.7627, -147.4134	40	10-55	11/25/2013	6.80J
PW-0622	64.7627, -147.4134	40	10-55	2/4/2014	<3.00
PW-0622	64.7627, -147.4134	40	10-55	4/18/2014	<2.00
PW-0622	64.7627, -147.4134	40	10-55	7/1/2014	7.20J
PW-0622	64.7627, -147.4134	40	10-55	8/22/2014	8.00J
PW-0622	64.7627, -147.4134	40	10-55	10/20/2014	7.40J
PW-0622	64.7627, -147.4134	40	10-55	12/22/2014	7.20J
PW-0622	64.7627, -147.4134	40	10-55	3/2/2015	3.00J
PW-0622	64.7627, -147.4134	40	10-55	5/11/2015	5.20J
PW-0622	64.7627, -147.4134	40	10-55	7/13/2015	5.40J
PW-0622	64.7627, -147.4134	40	10-55	10/5/2015	7.10J
PW-0622	64.7627, -147.4134	40	10-55	1/12/2016	8.10J
PW-0622	64.7627, -147.4134	40	10-55	4/12/2016	6.10J
PW-0622	64.7627, -147.4134	40	10-55	10/10/2016	7.60J
PW-0622	64.7627, -147.4134	40	10-55	1/3/2017	6.00J
PW-0622	64.7627, -147.4134	40	10-55	3/21/2017	5.70J
PW-0622	64.7627, -147.4134	40	10-55	7/10/2017	7.50JH*
PW-0622	64.7627, -147.4134	40	10-55	9/1/2017	7.40J
PW-0623	64.7671, -147.4167			3/11/2010	17.9
PW-0623	64.7671, -147.4167			9/7/2017	65.1
PW-0624	64.7651, -147.4163	27	10-55	3/5/2010	16.2
PW-0624	64.7651, -147.4163	27	10-55	5/5/2011	29.0J*
PW-0624	64.7651, -147.4163	27	10-55	10/25/2011	28.9J*
PW-0624	64.7651, -147.4163	27	10-55	4/27/2012	35.1J*
PW-0624	64.7651, -147.4163	27	10-55	5/16/2012	32.6J*
PW-0624	64.7651, -147.4163	27	10-55	9/28/2012	35.7J*
PW-0624	64.7651, -147.4163	27	10-55	7/8/2013	31.3J*
PW-0624	64.7651, -147.4163	27	10-55	4/22/2014	26.1
PW-0624	64.7651, -147.4163	27	10-55	11/18/2014	38.1
PW-0625	64.7627, -147.4106			3/6/2010	20.1
PW-0625	64.7627, -147.4106			5/10/2011	23.0J*
PW-0625	64.7627, -147.4106			12/14/2012	32.5J*
PW-0625	64.7627, -147.4106			3/28/2014	23.0
PW-0626	64.7638, -147.4106			6/3/2011	26.0
PW-0627	64.7627, -147.4147			3/31/2010	<12.7
PW-0627	64.7627, -147.4147			8/12/2011	<6.66

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Flint Hills Resources Alaska, LLC
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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0627	64.7627, -147.4147			8/28/2012	<6.40
PW-0627	64.7627, -147.4147			5/2/2013	<6.40
PW-0627	64.7627, -147.4147			4/15/2014	<5.00
PW-0627	64.7627, -147.4147			7/17/2015	<5.40
PW-0627	64.7627, -147.4147			5/18/2016	<5.45
PW-0627	64.7627, -147.4147			6/30/2017	<5.05
PW-0628	64.7634, -147.4157	30	10-55	3/5/2010	<10.5
PW-0628	64.7634, -147.4157	30	10-55	6/10/2011	<6.20
PW-0628	64.7634, -147.4157	30	10-55	6/6/2012	<6.20
PW-0628	64.7634, -147.4157	30	10-55	6/28/2013	<6.46
PW-0628	64.7634, -147.4157	30	10-55	4/24/2014	<5.00
PW-0628	64.7634, -147.4157	30	10-55	6/23/2015	<5.60
PW-0628	64.7634, -147.4157	30	10-55	5/18/2016	<5.45
PW-0628	64.7634, -147.4157	30	10-55	7/28/2017	<5.00
PW-0629	64.7627, -147.4157			3/31/2010	<10.5
PW-0629	64.7627, -147.4157			8/12/2011	<6.52
PW-0629	64.7627, -147.4157			8/28/2012	<6.40
PW-0629	64.7627, -147.4157			5/2/2013	<6.46
PW-0629	64.7627, -147.4157			4/15/2014	<5.00
PW-0630	64.7638, -147.4173			3/7/2010	<10.8
PW-0630	64.7638, -147.4173			8/20/2011	<6.26
PW-0630	64.7638, -147.4173			6/11/2012	<6.20
PW-0630	64.7638, -147.4173			9/6/2013	<6.74
PW-0630	64.7638, -147.4173			6/10/2014	<5.10
PW-0630	64.7638, -147.4173			7/14/2015	<5.55
PW-0630	64.7638, -147.4173			5/18/2016	<5.05
PW-0630	64.7638, -147.4173			6/30/2017	3.10J
PW-0631	64.7634, -147.4147			3/11/2010	<10.3
PW-0631	64.7634, -147.4147			8/26/2011	6.52J
PW-0632	64.7627, -147.4119			3/4/2010	14.6
PW-0633	64.7623, -147.4096			2/11/2010	26.7
PW-0634	64.7623, -147.4079			2/6/2010	30.2
PW-0635	64.7623, -147.3797			1/9/2010	133
PW-0636	64.7618, -147.3855			12/17/2009	153JL*
PW-0636	64.7618, -147.3855			4/21/2011	180J*
PW-0636	64.7618, -147.3855			4/26/2011	190J*
PW-0636	64.7618, -147.3855			10/11/2011	158J*
PW-0636	64.7618, -147.3855			4/24/2012	181J*
PW-0636	64.7618, -147.3855			11/26/2012	198J*
PW-0636	64.7618, -147.3855			8/12/2013	153J*
PW-0636	64.7618, -147.3855			6/3/2014	186
PW-0636	64.7618, -147.3855			10/14/2014	147
PW-0636	64.7618, -147.3855			5/8/2015	124
PW-0636	64.7618, -147.3855			9/18/2015	112
PW-0636	64.7618, -147.3855			5/13/2016	88.7
PW-0636	64.7618, -147.3855			11/22/2016	52.5
PW-0636	64.7618, -147.3855			7/11/2017	55.9
PW-0637	64.7545, -147.3770			12/14/2011	93.1
PW-0638	64.7614, -147.3902			12/17/2009	15.8JL*
PW-0639	64.7584, -147.3779			8/26/2010	249

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0640	64.7562, -147.3768	40	10-55	2/5/2010	233
PW-0641	64.7620, -147.3429			4/24/2012	<6.52
PW-0641	64.7620, -147.3429			6/28/2013	<6.46
PW-0641	64.7620, -147.3429			5/22/2014	<5.20
PW-0641	64.7620, -147.3429			7/6/2015	<5.45
PW-0642	64.7609, -147.3410			5/5/2012	<6.66
PW-0642	64.7609, -147.3410			6/24/2014	<5.25
PW-0642	64.7609, -147.3410			8/21/2015	<5.20
PW-0643	64.7619, -147.3416			4/30/2012	<6.60
PW-0643	64.7619, -147.3416			7/1/2013	<6.74
PW-0643	64.7619, -147.3416			6/20/2014	<5.30
PW-0643	64.7619, -147.3416			7/30/2015	<5.25
PW-0644	64.7503, -147.2947			12/8/2009	<10.5
PW-0645	64.7413, -147.2941			9/18/2012	<6.52
PW-0646	64.7729, -147.3789	16	Water Table	2/13/2010	49.9
PW-0646	64.7729, -147.3789	16	Water Table	5/3/2011	84.0J*
PW-0646	64.7729, -147.3789	16	Water Table	1/27/2012	81.5J*
PW-0646	64.7729, -147.3789	16	Water Table	5/29/2012	87.6J*
PW-0646	64.7729, -147.3789	16	Water Table	12/19/2012	87.2JH*
PW-0646	64.7729, -147.3789	16	Water Table	8/19/2013	65.0J*
PW-0646	64.7729, -147.3789	16	Water Table	5/16/2014	31.7
PW-0646	64.7729, -147.3789	16	Water Table	1/30/2015	24.9
PW-0646	64.7729, -147.3789	16	Water Table	8/4/2015	20.2
PW-0646	64.7729, -147.3789	16	Water Table	7/26/2016	12.6
PW-0646	64.7729, -147.3789	16	Water Table	6/26/2017	12.5
PW-0647	64.7729, -147.3804	46	10-55	2/7/2010	22.4
PW-0647	64.7729, -147.3804	46	10-55	5/12/2011	28.1J*
PW-0647	64.7729, -147.3804	46	10-55	12/7/2011	35.7J*
PW-0647	64.7729, -147.3804	46	10-55	8/6/2012	43.1J*
PW-0647	64.7729, -147.3804	46	10-55	2/1/2013	43.8J*
PW-0647	64.7729, -147.3804	46	10-55	6/21/2013	53.9J*
PW-0647	64.7729, -147.3804	46	10-55	11/12/2013	61.0
PW-0647	64.7729, -147.3804	46	10-55	4/4/2014	69.7
PW-0647	64.7729, -147.3804	46	10-55	9/8/2014	92.3
PW-0647	64.7729, -147.3804	46	10-55	1/12/2015	91.9
PW-0647	64.7729, -147.3804	46	10-55	5/19/2015	78.0
PW-0647	64.7729, -147.3804	46	10-55	8/21/2015	97.2
PW-0647	64.7729, -147.3804	46	10-55	10/16/2015	104
PW-0647	64.7729, -147.3804	46	10-55	2/8/2016	104
PW-0647	64.7729, -147.3804	46	10-55	4/15/2016	110
PW-0647	64.7729, -147.3804	46	10-55	8/2/2016	105
PW-0647	64.7729, -147.3804	46	10-55	11/14/2016	71.2
PW-0647	64.7729, -147.3804	46	10-55	1/24/2017	91.5
PW-0647	64.7729, -147.3804	46	10-55	3/6/2017	110
PW-0647	64.7729, -147.3804	46	10-55	4/18/2017	116
PW-0647	64.7729, -147.3804	46	10-55	5/9/2017	114
PW-0647	64.7729, -147.3804	46	10-55	6/20/2017	130
PW-0647	64.7729, -147.3804	46	10-55	7/24/2017	134
PW-0648	64.7719, -147.3839			2/9/2010	42.4
PW-0648	64.7719, -147.3839			7/12/2011	63.7J*

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0648	64.7719, -147.3839			12/8/2011	62.7J*
PW-0648	64.7719, -147.3839			4/24/2012	76.7J*
PW-0648	64.7719, -147.3839			8/29/2012	93.9J*
PW-0648	64.7719, -147.3839			12/11/2012	97.6J*
PW-0648	64.7719, -147.3839			4/19/2013	87.4J*
PW-0648	64.7719, -147.3839			11/22/2013	87.3
PW-0648	64.7719, -147.3839			6/30/2014	116
PW-0648	64.7719, -147.3839			12/9/2014	108
PW-0648	64.7719, -147.3839			4/13/2015	90.7
PW-0648	64.7719, -147.3839			6/23/2015	97.2
PW-0648	64.7719, -147.3839			9/8/2015	99.7
PW-0648	64.7719, -147.3839			10/13/2015	106
PW-0648	64.7719, -147.3839			12/4/2015	99.5
PW-0648	64.7719, -147.3839			1/19/2016	96.3
PW-0648	64.7719, -147.3839			2/26/2016	98.0
PW-0648	64.7719, -147.3839			4/12/2016	89.0
PW-0648	64.7719, -147.3839			6/24/2016	81.7
PW-0648	64.7719, -147.3839			9/27/2016	73.2JL*
PW-0648	64.7719, -147.3839			12/9/2016	64.7J*
PW-0648	64.7719, -147.3839			4/21/2017	78.2J*
PW-0649	64.7711, -147.3839	236	>160	2/7/2010	<10.9
PW-0649	64.7711, -147.3839	236	>160	3/12/2011	11.8
PW-0649	64.7711, -147.3839	236	>160	8/11/2011	23.4J*
PW-0649	64.7711, -147.3839	236	>160	3/14/2012	30.5J*
PW-0649	64.7711, -147.3839	236	>160	1/21/2013	31.4J*
PW-0649	64.7711, -147.3839	236	>160	11/11/2013	42.6
PW-0649	64.7711, -147.3839	236	>160	9/11/2014	55.6
PW-0649	64.7711, -147.3839	236	>160	8/25/2015	60.5
PW-0649	64.7711, -147.3839	236	>160	5/17/2016	73.6
PW-0649	64.7711, -147.3839	236	>160	8/16/2016	65.5
PW-0649	64.7711, -147.3839	236	>160	7/24/2017	81.0
PW-0650	64.7702, -147.3837	42	10-55	3/2/2010	40.5
PW-0651	64.7701, -147.3821	40	10-55	1/14/2010	36.9JL*
PW-0651	64.7701, -147.3821	40	10-55	11/15/2011	68.4J*
PW-0651	64.7701, -147.3821	40	10-55	6/10/2013	52.1J*
PW-0651	64.7701, -147.3821	40	10-55	6/17/2014	107
PW-0651	64.7701, -147.3821	40	10-55	12/2/2014	93.9
PW-0651	64.7701, -147.3821	40	10-55	9/14/2015	97.8
PW-0651	64.7701, -147.3821	40	10-55	7/8/2016	85.7J*
PW-0651	64.7701, -147.3821	40	10-55	1/23/2017	62.1
PW-0651	64.7701, -147.3821	40	10-55	2/27/2017	69.1
PW-0652	64.7701, -147.3789			6/9/2010	71.3
PW-0653	64.7701, -147.3772	48	10-55	1/16/2010	33.9
PW-0653	64.7701, -147.3772	48	10-55	12/16/2013	87.0
PW-0653	64.7701, -147.3772	48	10-55	8/22/2014	106
PW-0653	64.7701, -147.3772	48	10-55	2/17/2015	97.7
PW-0653	64.7701, -147.3772	48	10-55	9/21/2015	102
PW-0653	64.7701, -147.3772	48	10-55	3/28/2016	90.9
PW-0653	64.7701, -147.3772	48	10-55	10/31/2016	76.0
PW-0653	64.7701, -147.3772	48	10-55	6/30/2017	83.7

Appendix B-3
Historical Private Well Sulfolane Results Summary

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0653	64.7701, -147.3772	48	10-55	8/15/2017	79.9
PW-0654	64.7711, -147.3789	51	10-55	1/23/2010	27.8
PW-0656	64.7711, -147.3819	50	10-55	2/7/2010	47.0
PW-0656	64.7711, -147.3819	50	10-55	11/28/2011	82.5J*
PW-0656	64.7711, -147.3819	50	10-55	11/11/2013	97.8
PW-0656	64.7711, -147.3819	50	10-55	11/25/2014	103
PW-0656	64.7711, -147.3819	50	10-55	11/13/2015	96.8
PW-0656	64.7711, -147.3819	50	10-55	12/23/2016	72.4
PW-0657	64.7719, -147.3819	50	10-55	11/22/2009	39.4
PW-0657	64.7719, -147.3819	50	10-55	9/2/2010	53.1JL*
PW-0657	64.7719, -147.3819	50	10-55	9/8/2010	47.2
PW-0657	64.7719, -147.3819	50	10-55	9/14/2010	49.7
PW-0657	64.7719, -147.3819	50	10-55	9/29/2010	53.0
PW-0657	64.7719, -147.3819	50	10-55	10/27/2010	53.1
PW-0657	64.7719, -147.3819	50	10-55	11/17/2010	56.0
PW-0657	64.7719, -147.3819	50	10-55	12/1/2010	55.9
PW-0657	64.7719, -147.3819	50	10-55	12/8/2010	51.6
PW-0657	64.7719, -147.3819	50	10-55	12/15/2010	50.6
PW-0657	64.7719, -147.3819	50	10-55	12/21/2010	52.4
PW-0657	64.7719, -147.3819	50	10-55	12/28/2010	55.0
PW-0657	64.7719, -147.3819	50	10-55	1/5/2011	46.3JH*
PW-0657	64.7719, -147.3819	50	10-55	1/12/2011	53.2
PW-0657	64.7719, -147.3819	50	10-55	1/19/2011	54.3
PW-0657	64.7719, -147.3819	50	10-55	1/26/2011	51.3
PW-0657	64.7719, -147.3819	50	10-55	2/2/2011	44.6
PW-0657	64.7719, -147.3819	50	10-55	2/9/2011	61.5JH*
PW-0657	64.7719, -147.3819	50	10-55	2/16/2011	58.6JH*
PW-0657	64.7719, -147.3819	50	10-55	2/23/2011	56.0
PW-0657	64.7719, -147.3819	50	10-55	3/2/2011	44.5
PW-0657	64.7719, -147.3819	50	10-55	3/9/2011	62.7
PW-0657	64.7719, -147.3819	50	10-55	3/16/2011	56.8
PW-0657	64.7719, -147.3819	50	10-55	3/23/2011	58.0
PW-0657	64.7719, -147.3819	50	10-55	3/30/2011	60.5
PW-0657	64.7719, -147.3819	50	10-55	4/6/2011	60.0
PW-0657	64.7719, -147.3819	50	10-55	4/14/2011	50.0
PW-0657	64.7719, -147.3819	50	10-55	4/20/2011	58.1
PW-0657	64.7719, -147.3819	50	10-55	4/27/2011	53.3
PW-0657	64.7719, -147.3819	50	10-55	5/4/2011	51.4
PW-0657	64.7719, -147.3819	50	10-55	5/11/2011	47.2
PW-0657	64.7719, -147.3819	50	10-55	6/8/2011	56.1
PW-0657	64.7719, -147.3819	50	10-55	7/11/2011	52.1
PW-0657	64.7719, -147.3819	50	10-55	8/9/2011	61.8J*
PW-0657	64.7719, -147.3819	50	10-55	9/12/2011	57.7
PW-0657	64.7719, -147.3819	50	10-55	10/12/2011	51.2
PW-0657	64.7719, -147.3819	50	10-55	11/14/2011	62.6J*
PW-0657	64.7719, -147.3819	50	10-55	12/12/2011	59.0
PW-0657	64.7719, -147.3819	50	10-55	1/18/2012	61.0
PW-0657	64.7719, -147.3819	50	10-55	2/17/2012	56.0J*
PW-0657	64.7719, -147.3819	50	10-55	7/9/2012	74.8J*
PW-0657	64.7719, -147.3819	50	10-55	10/12/2012	73.8J*

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Historical Private Well Sulfolane Results Summary

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0657	64.7719, -147.3819	50	10-55	1/2/2013	70.0J*
PW-0657	64.7719, -147.3819	50	10-55	4/19/2013	81.1J*
PW-0657	64.7719, -147.3819	50	10-55	7/15/2013	81.2J*
PW-0657	64.7719, -147.3819	50	10-55	10/18/2013	74.6
PW-0657	64.7719, -147.3819	50	10-55	12/9/2013	73.9
PW-0657	64.7719, -147.3819	50	10-55	3/4/2014	86.7
PW-0657	64.7719, -147.3819	50	10-55	6/13/2014	102
PW-0657	64.7719, -147.3819	50	10-55	9/12/2014	100
PW-0657	64.7719, -147.3819	50	10-55	1/9/2015	100
PW-0657	64.7719, -147.3819	50	10-55	5/12/2015	75.1
PW-0657	64.7719, -147.3819	50	10-55	8/4/2015	96.0
PW-0657	64.7719, -147.3819	50	10-55	11/2/2015	94.6
PW-0657	64.7719, -147.3819	50	10-55	3/11/2016	93.9
PW-0657	64.7719, -147.3819	50	10-55	6/17/2016	89.5
PW-0657	64.7719, -147.3819	50	10-55	12/9/2016	69.2
PW-0657	64.7719, -147.3819	50	10-55	6/12/2017	91.6JH*
PW-0658	64.7719, -147.3804	196	>160	2/7/2010	39.0
PW-0658	64.7719, -147.3804	196	>160	6/14/2011	51.8J*
PW-0658	64.7719, -147.3804	196	>160	12/6/2011	58.3J*
PW-0658	64.7719, -147.3804	196	>160	9/18/2012	61.6J*
PW-0658	64.7719, -147.3804	196	>160	3/18/2013	48.4
PW-0658	64.7719, -147.3804	196	>160	6/12/2013	54.0
PW-0658	64.7719, -147.3804	196	>160	6/21/2013	62.0J*
PW-0658	64.7719, -147.3804	196	>160	9/11/2013	63.7
PW-0658	64.7719, -147.3804	196	>160	12/3/2013	57.0
PW-0658	64.7719, -147.3804	196	>160	3/19/2014	58.4
PW-0658	64.7719, -147.3804	196	>160	5/28/2014	59.4
PW-0658	64.7719, -147.3804	196	>160	6/6/2014	65.1
PW-0658	64.7719, -147.3804	196	>160	8/19/2014	63.4
PW-0658	64.7719, -147.3804	196	>160	11/11/2014	60.8
PW-0658	64.7719, -147.3804	196	>160	2/12/2015	56.3
PW-0658	64.7719, -147.3804	196	>160	3/17/2015	53.1
PW-0658	64.7719, -147.3804	196	>160	5/5/2015	61.3
PW-0658	64.7719, -147.3804	196	>160	8/18/2015	61.0JL*
PW-0658	64.7719, -147.3804	196	>160	10/29/2015	55.8
PW-0658	64.7719, -147.3804	196	>160	2/26/2016	76.9
PW-0658	64.7719, -147.3804	196	>160	11/8/2016	65.9
PW-0658	64.7719, -147.3804	196	>160	2/10/2017	70.7
PW-0658	64.7719, -147.3804	196	>160	5/9/2017	84.2
PW-0658	64.7719, -147.3804	196	>160	8/14/2017	90.1
PW-0659	64.7719, -147.3789	140	90-160	2/7/2010	19.0
PW-0659	64.7719, -147.3789	140	90-160	3/11/2011	19.9
PW-0660	64.7719, -147.3772	60	55-90	12/3/2009	45.5
PW-0660	64.7719, -147.3772	60	55-90	5/18/2011	107J*
PW-0660	64.7719, -147.3772	60	55-90	11/1/2011	107J*
PW-0660	64.7719, -147.3772	60	55-90	4/20/2012	115J*
PW-0660	64.7719, -147.3772	60	55-90	9/4/2012	121J*
PW-0660	64.7719, -147.3772	60	55-90	2/26/2013	95.0J*
PW-0660	64.7719, -147.3772	60	55-90	7/9/2013	92.5J*
PW-0660	64.7719, -147.3772	60	55-90	11/26/2013	86.4

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Flint Hills Resources Alaska, LLC
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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0660	64.7719, -147.3772	60	55-90	5/27/2014	88.5
PW-0660	64.7719, -147.3772	60	55-90	7/29/2014	88.7
PW-0660	64.7719, -147.3772	60	55-90	2/6/2015	74.5
PW-0660	64.7719, -147.3772	60	55-90	5/1/2015	70.6
PW-0660	64.7719, -147.3772	60	55-90	7/31/2015	75.7
PW-0660	64.7719, -147.3772	60	55-90	9/22/2015	71.0
PW-0660	64.7719, -147.3772	60	55-90	2/29/2016	68.7
PW-0660	64.7719, -147.3772	60	55-90	6/24/2016	53.7
PW-0660	64.7719, -147.3772	60	55-90	10/14/2016	48.3
PW-0660	64.7719, -147.3772	60	55-90	1/27/2017	48.9
PW-0660	64.7719, -147.3772	60	55-90	4/14/2017	50.1
PW-0660	64.7719, -147.3772	60	55-90	6/26/2017	42.4
PW-0660	64.7719, -147.3772	60	55-90	9/12/2017	44.4
PW-0663	64.7809, -147.3391	40	10-55	6/11/2014	<5.15
PW-0668	64.7757, -147.3404	32	10-55	5/1/2010	<10.4
PW-0669	64.7764, -147.3404	35.5	10-55	11/5/2013	<6.32
PW-0684	64.7950, -147.3797	33	10-55	11/29/2011	<6.96
PW-0688	64.7941, -147.3797	40	10-55	4/24/2015	<5.30
PW-0690	64.7933, -147.3798	30	10-55	10/5/2013	<6.20
PW-0696	64.7934, -147.3848	35	10-55	3/30/2011	<11.5
PW-0705	64.7957, -147.3832	44	10-55	10/22/2012	<6.32
PW-0714	64.7999, -147.3867			5/11/2011	<3.44
PW-0717	64.7994, -147.3924			11/28/2011	<6.52
PW-0722	64.7980, -147.3890	70	55-90	11/6/2012	<6.96
PW-0731	64.7976, -147.3799	40	10-55	11/2/2011	<6.46
PW-0744	64.7900, -147.3845	40	10-55	11/11/2011	<6.32
PW-0745	64.7898, -147.3839			8/29/2012	<6.20
PW-0746	64.7895, -147.3845			8/29/2012	<6.82
PW-0747	64.7890, -147.3845	40	10-55	11/2/2011	<6.40
PW-0748	64.7885, -147.3845	36	10-55	11/2/2011	<7.30
PW-0748	64.7885, -147.3845	36	10-55	8/12/2013	<6.20
PW-0748	64.7885, -147.3845	36	10-55	3/30/2015	<5.20
PW-0749	64.7881, -147.3846	32	10-55	4/9/2010	<10.5
PW-0749	64.7881, -147.3846	32	10-55	7/22/2011	<6.88
PW-0749	64.7881, -147.3846	32	10-55	12/8/2011	<6.20
PW-0749	64.7881, -147.3846	32	10-55	7/31/2012	<6.20
PW-0749	64.7881, -147.3846	32	10-55	6/25/2013	<6.46
PW-0749	64.7881, -147.3846	32	10-55	5/5/2014	<5.20J*
PW-0749	64.7881, -147.3846	32	10-55	6/1/2015	<5.10J*
PW-0749	64.7881, -147.3846	32	10-55	5/10/2016	<5.10
PW-0749	64.7881, -147.3846	32	10-55	5/27/2017	<5.10
PW-0750	64.7876, -147.3847			11/4/2011	<6.46
PW-0750	64.7876, -147.3847			10/4/2012	<6.20
PW-0750	64.7876, -147.3847			6/19/2013	<6.74
PW-0750	64.7876, -147.3847			4/21/2014	<5.00
PW-0750	64.7876, -147.3847			6/15/2015	<5.30J*
PW-0750	64.7876, -147.3847			8/26/2016	<4.95
PW-0750	64.7876, -147.3847			8/31/2017	<5.60
PW-0751	64.7872, -147.3850	60	55-90	2/16/2011	<10.9
PW-0751	64.7872, -147.3850	60	55-90	9/1/2011	<6.52

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0751	64.7872, -147.3850	60	55-90	5/21/2014	<5.00
PW-0751	64.7872, -147.3850	60	55-90	7/7/2015	<5.15J*
PW-0751	64.7872, -147.3850	60	55-90	8/3/2017	<5.20
PW-0752	64.7867, -147.3853			12/7/2010	<10.6
PW-0752	64.7867, -147.3853			9/1/2011	<6.20
PW-0752	64.7867, -147.3853			6/4/2012	<6.88
PW-0752	64.7867, -147.3853			6/27/2013	<6.46
PW-0752	64.7867, -147.3853			5/21/2014	<5.00
PW-0752	64.7867, -147.3853			6/2/2015	<5.40
PW-0752	64.7867, -147.3853			5/10/2016	<5.05
PW-0752	64.7867, -147.3853			6/10/2017	R*
PW-0752	64.7867, -147.3853			7/13/2017	<5.25
PW-0753	64.7862, -147.3856	55	55-90	12/21/2010	<11.4J*
PW-0753	64.7862, -147.3856	55	55-90	9/9/2011	<6.40
PW-0753	64.7862, -147.3856	55	55-90	6/3/2012	<6.40
PW-0753	64.7862, -147.3856	55	55-90	4/24/2014	<5.00
PW-0753	64.7862, -147.3856	55	55-90	8/21/2015	<5.20
PW-0753	64.7862, -147.3856	55	55-90	5/16/2016	<5.20
PW-0753	64.7862, -147.3856	55	55-90	5/29/2017	<5.30
PW-0754	64.7858, -147.3862	55	55-90	11/19/2010	<10.6
PW-0754	64.7858, -147.3862	55	55-90	7/25/2011	<6.20
PW-0754	64.7858, -147.3862	55	55-90	5/31/2012	3.55J
PW-0755	64.7852, -147.3859	33	10-55	2/10/2011	<11.2
PW-0755	64.7852, -147.3859	33	10-55	9/6/2011	5.56J
PW-0755	64.7852, -147.3859	33	10-55	1/24/2012	6.00J*
PW-0755	64.7852, -147.3859	33	10-55	10/15/2012	5.70J*
PW-0755	64.7852, -147.3859	33	10-55	12/3/2012	7.70JH*
PW-0755	64.7852, -147.3859	33	10-55	6/7/2013	6.20J*
PW-0755	64.7852, -147.3859	33	10-55	10/7/2013	6.50J
PW-0755	64.7852, -147.3859	33	10-55	4/21/2014	4.80J
PW-0755	64.7852, -147.3859	33	10-55	9/8/2014	5.80J
PW-0755	64.7852, -147.3859	33	10-55	2/9/2015	7.10J
PW-0755	64.7852, -147.3859	33	10-55	8/31/2015	8.00J
PW-0755	64.7852, -147.3859	33	10-55	2/1/2016	9.20J
PW-0755	64.7852, -147.3859	33	10-55	6/27/2016	10.4
PW-0755	64.7852, -147.3859	33	10-55	10/31/2016	7.20J
PW-0755	64.7852, -147.3859	33	10-55	12/12/2016	7.30J
PW-0755	64.7852, -147.3859	33	10-55	5/5/2017	9.10J
PW-0756	64.7849, -147.3846	40	10-55	1/6/2011	<11.1
PW-0756	64.7849, -147.3846	40	10-55	7/21/2011	5.11J
PW-0757	64.7847, -147.3823	60	55-90	1/6/2011	<14.1
PW-0757	64.7847, -147.3823	60	55-90	8/19/2011	10.7
PW-0757	64.7847, -147.3823	60	55-90	4/24/2012	9.30J*
PW-0757	64.7847, -147.3823	60	55-90	11/30/2012	12.7J*
PW-0757	64.7847, -147.3823	60	55-90	8/30/2013	13.0J*
PW-0757	64.7847, -147.3823	60	55-90	6/23/2014	12.4
PW-0757	64.7847, -147.3823	60	55-90	2/6/2015	14.1
PW-0757	64.7847, -147.3823	60	55-90	8/24/2015	13.1
PW-0757	64.7847, -147.3823	60	55-90	2/8/2016	16.1
PW-0757	64.7847, -147.3823	60	55-90	7/25/2016	14.7

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0757	64.7847, -147.3823	60	55-90	11/29/2016	13.7
PW-0757	64.7847, -147.3823	60	55-90	5/30/2017	19.9
PW-0758	64.7850, -147.3814	34	10-55	1/6/2011	11.6
PW-0758	64.7850, -147.3814	34	10-55	6/24/2011	13.6J*
PW-0758	64.7850, -147.3814	34	10-55	12/7/2011	13.8J*
PW-0758	64.7850, -147.3814	34	10-55	7/24/2012	17.0J*
PW-0758	64.7850, -147.3814	34	10-55	4/19/2013	17.4J*
PW-0758	64.7850, -147.3814	34	10-55	12/3/2013	15.7
PW-0758	64.7850, -147.3814	34	10-55	7/8/2014	21.3
PW-0758	64.7850, -147.3814	34	10-55	3/6/2015	18.2
PW-0758	64.7850, -147.3814	34	10-55	10/2/2015	21.9
PW-0758	64.7850, -147.3814	34	10-55	4/18/2016	26.2
PW-0758	64.7850, -147.3814	34	10-55	9/30/2016	19.8
PW-0758	64.7850, -147.3814	34	10-55	11/4/2016	20.6
PW-0758	64.7850, -147.3814	34	10-55	5/8/2017	32.5J*
PW-0759	64.7858, -147.3784	42	10-55	10/30/2010	<11.2
PW-0759	64.7858, -147.3784	42	10-55	8/6/2011	6.16J
PW-0759	64.7858, -147.3784	42	10-55	6/5/2017	8.82J
PW-0760	64.7866, -147.3773	35	10-55	11/2/2010	<11.4
PW-0760	64.7866, -147.3773	35	10-55	7/17/2011	<6.66
PW-0760	64.7866, -147.3773	35	10-55	6/2/2012	<6.20
PW-0760	64.7866, -147.3773	35	10-55	5/3/2013	<6.52
PW-0760	64.7866, -147.3773	35	10-55	5/5/2014	<5.30J*
PW-0761	64.7871, -147.3773	30	10-55	11/16/2011	<6.40
PW-0761	64.7871, -147.3773	30	10-55	5/30/2012	<6.46
PW-0761	64.7871, -147.3773	30	10-55	5/1/2013	<6.52
PW-0761	64.7871, -147.3773	30	10-55	5/7/2014	<5.45
PW-0761	64.7871, -147.3773	30	10-55	6/23/2015	<5.45
PW-0761	64.7871, -147.3773	30	10-55	5/19/2016	<5.20
PW-0761	64.7871, -147.3773	30	10-55	6/24/2017	<5.25
PW-0762	64.7877, -147.3775	40	10-55	11/11/2011	<6.46
PW-0762	64.7877, -147.3775	40	10-55	6/21/2012	<6.52
PW-0762	64.7877, -147.3775	40	10-55	8/2/2013	<6.46
PW-0762	64.7877, -147.3775	40	10-55	4/18/2014	<5.00
PW-0762	64.7877, -147.3775	40	10-55	8/7/2015	<5.25
PW-0762	64.7877, -147.3775	40	10-55	6/3/2016	<5.00
PW-0762	64.7877, -147.3775	40	10-55	7/28/2017	<5.10
PW-0763	64.7882, -147.3783	70	55-90	12/12/2011	<6.52
PW-0763	64.7882, -147.3783	70	55-90	5/14/2014	<5.00
PW-0763	64.7882, -147.3783	70	55-90	7/17/2015	<5.25
PW-0764	64.7902, -147.3808	40	10-55	9/19/2011	<6.82
PW-0765	64.7901, -147.3823	40	10-55	11/2/2011	<6.40
PW-0766	64.7907, -147.3824	40	10-55	11/4/2011	<6.40
PW-0766	64.7907, -147.3824	40	10-55	7/11/2016	<5.15
PW-0767	64.7892, -147.3823			11/2/2011	<6.20
PW-0768	64.7886, -147.3823			11/29/2011	<6.32
PW-0768	64.7886, -147.3823			6/24/2013	<6.52
PW-0769	64.7880, -147.3822			11/4/2011	<6.66
PW-0769	64.7880, -147.3822			6/11/2012	<6.46
PW-0769	64.7880, -147.3822			7/24/2013	<6.52

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0769	64.7880, -147.3822			5/13/2014	<5.25
PW-0769	64.7880, -147.3822			7/7/2015	<5.55
PW-0769	64.7880, -147.3822			5/24/2016	<5.10
PW-0769	64.7880, -147.3822			8/8/2017	<5.15
PW-0770	64.7875, -147.3821			11/12/2011	<6.52
PW-0770	64.7875, -147.3821			6/18/2012	<6.20J*
PW-0770	64.7875, -147.3821			6/19/2013	<6.52
PW-0770	64.7875, -147.3821			4/12/2014	<5.00
PW-0770	64.7875, -147.3821			6/17/2015	<5.20
PW-0770	64.7875, -147.3821			5/10/2016	<5.05
PW-0770	64.7875, -147.3821			6/19/2017	<5.00
PW-0771	64.7870, -147.3824			11/1/2010	<10.7J*
PW-0771	64.7870, -147.3824			7/26/2011	<6.66
PW-0771	64.7870, -147.3824			5/30/2012	<6.20
PW-0771	64.7870, -147.3824			4/25/2013	<6.52
PW-0771	64.7870, -147.3824			4/21/2014	<5.00
PW-0771	64.7870, -147.3824			6/15/2015	<5.50
PW-0771	64.7870, -147.3824			5/10/2016	<5.20
PW-0771	64.7870, -147.3824			8/8/2017	<5.10
PW-0772	64.7865, -147.3830			12/21/2010	<11.2
PW-0772	64.7865, -147.3830			9/9/2011	<6.20
PW-0772	64.7865, -147.3830			5/29/2012	<6.20
PW-0772	64.7865, -147.3830			8/2/2013	<6.20
PW-0772	64.7865, -147.3830			6/13/2014	<5.15
PW-0772	64.7865, -147.3830			7/7/2015	<5.40
PW-0772	64.7865, -147.3830			5/10/2016	<5.10
PW-0772	64.7865, -147.3830			5/31/2017	<5.10
PW-0773	64.7857, -147.3828			10/30/2010	<10.8
PW-0773	64.7857, -147.3828			9/3/2011	3.92J
PW-0773	64.7857, -147.3828			12/7/2011	3.40J*
PW-0773	64.7857, -147.3828			10/23/2012	3.20J*
PW-0773	64.7857, -147.3828			8/27/2013	5.00J*
PW-0773	64.7857, -147.3828			2/6/2014	7.80J
PW-0773	64.7857, -147.3828			6/10/2014	3.20J
PW-0773	64.7857, -147.3828			2/16/2015	7.00J
PW-0773	64.7857, -147.3828			6/5/2015	7.60J
PW-0773	64.7857, -147.3828			11/3/2015	5.50J
PW-0773	64.7857, -147.3828			4/5/2016	10.3
PW-0773	64.7857, -147.3828			9/23/2016	4.20J
PW-0773	64.7857, -147.3828			3/20/2017	15.3
PW-0773	64.7857, -147.3828			5/30/2017	12.5
PW-0774	64.7861, -147.3817			11/2/2010	<11.5
PW-0774	64.7861, -147.3817			7/12/2011	<6.20
PW-0774	64.7861, -147.3817			6/14/2012	<6.66
PW-0774	64.7861, -147.3817			6/27/2013	<6.20
PW-0774	64.7861, -147.3817			6/10/2014	<5.15
PW-0774	64.7861, -147.3817			7/9/2015	<5.25
PW-0774	64.7861, -147.3817			5/24/2016	<5.30
PW-0774	64.7861, -147.3817			7/11/2017	<5.20
PW-0775	64.7865, -147.3808	55	55-90	10/30/2010	<11.8

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0775	64.7865, -147.3808	55	55-90	7/12/2011	<6.96
PW-0775	64.7865, -147.3808	55	55-90	6/14/2012	<6.20
PW-0775	64.7865, -147.3808	55	55-90	7/17/2013	<6.46
PW-0775	64.7865, -147.3808	55	55-90	5/21/2014	<5.20
PW-0775	64.7865, -147.3808	55	55-90	7/6/2015	<5.45
PW-0775	64.7865, -147.3808	55	55-90	5/12/2016	<5.10
PW-0775	64.7865, -147.3808	55	55-90	6/19/2017	<5.15
PW-0776	64.7868, -147.3797	40	10-55	11/2/2010	<10.6
PW-0776	64.7868, -147.3797	40	10-55	7/12/2011	<6.60
PW-0776	64.7868, -147.3797	40	10-55	6/2/2012	<6.32
PW-0776	64.7868, -147.3797	40	10-55	4/26/2013	<6.52
PW-0776	64.7868, -147.3797	40	10-55	5/5/2014	<5.30
PW-0776	64.7868, -147.3797	40	10-55	6/17/2015	<5.30
PW-0776	64.7868, -147.3797	40	10-55	5/24/2016	<5.00
PW-0776	64.7868, -147.3797	40	10-55	5/29/2017	<5.00
PW-0777	64.7875, -147.3801			11/21/2011	<6.52
PW-0777	64.7875, -147.3801			6/15/2012	<6.82
PW-0777	64.7875, -147.3801			6/19/2013	<6.74
PW-0777	64.7875, -147.3801			5/12/2014	<5.00
PW-0777	64.7875, -147.3801			6/22/2015	<5.50
PW-0777	64.7875, -147.3801			5/12/2016	<5.20
PW-0777	64.7875, -147.3801			6/30/2017	<5.15
PW-0778	64.7881, -147.3805			11/16/2011	<6.40
PW-0778	64.7881, -147.3805			6/29/2012	<6.20
PW-0778	64.7881, -147.3805			7/31/2013	<6.46
PW-0778	64.7881, -147.3805			7/14/2014	<5.15
PW-0778	64.7881, -147.3805			8/4/2015	<5.25
PW-0779	64.7886, -147.3808			8/25/2011	<6.46
PW-0779	64.7886, -147.3808			7/16/2013	<6.46
PW-0780	64.7892, -147.3808	40	10-55	11/11/2011	<6.52
PW-0781	64.7391, -147.2898			5/24/2010	<10.0
PW-0782	64.7595, -147.2965			1/6/2010	<10.3
PW-0783	64.7754, -147.3473			9/18/2012	<6.46
PW-0783	64.7754, -147.3473			6/28/2013	<6.20
PW-0784	64.7754, -147.3484			6/27/2012	<6.40J*
PW-0784	64.7754, -147.3484			4/29/2014	<5.45
PW-0784	64.7754, -147.3484			7/22/2015	<5.40
PW-0785	64.7755, -147.3497			12/19/2011	<6.40
PW-0785	64.7755, -147.3497			6/29/2012	<6.20
PW-0785	64.7755, -147.3497			6/12/2014	<5.15
PW-0785	64.7755, -147.3497			7/10/2015	<5.45
PW-0785	64.7755, -147.3497			1/31/2017	<5.15
PW-0786	64.7269, -147.2892	86	55-90	11/8/2010	<10.8
PW-0787	64.7265, -147.2797			7/27/2012	<6.20
PW-0788	64.7231, -147.2854			12/7/2009	<10.4
PW-0788	64.7231, -147.2854			5/15/2012	<6.52
PW-0790	64.8047, -147.4145	120	90-160	8/24/2017	<5.10
PW-0792	64.7547, -147.3016			6/3/2011	<6.20
PW-0801	64.7667, -147.2928			8/8/2012	<6.88
PW-0802	64.7799, -147.3794	51	10-55	3/12/2011	<10.5

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Historical Private Well Sulfolane Results Summary

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0802	64.7799, -147.3794	51	10-55	7/12/2011	8.63J
PW-0810	64.7333, -147.3119	20	10-55	12/14/2009	<10.8
PW-0812	64.7306, -147.3118			12/7/2009	<10.4
PW-0819	64.7308, -147.3091			12/21/2009	<10.4
PW-0828	64.7266, -147.3119	35	10-55	10/9/2013	<6.40
PW-0831	64.7290, -147.3106			9/16/2010	<10.3
PW-0852	64.7894, -147.3743	53	10-55	12/3/2011	<6.46
PW-0853	64.7894, -147.3732	48	10-55	12/9/2011	<6.20
PW-0854	64.7894, -147.3721	42	10-55	11/21/2011	<6.20
PW-0855	64.7886, -147.3721	63	55-90	11/5/2011	<6.52
PW-0855	64.7886, -147.3721	63	55-90	9/11/2015	<5.20
PW-0856	64.7886, -147.3732	76	55-90	11/16/2011	<6.20
PW-0857	64.7886, -147.3743	53	10-55	11/3/2011	<6.40
PW-0858	64.7886, -147.3754	42	10-55	11/3/2011	<6.96
PW-0859	64.7880, -147.3754			11/5/2011	<6.66
PW-0859	64.7880, -147.3754			6/2/2012	<6.40
PW-0859	64.7880, -147.3754			6/20/2013	<6.46
PW-0859	64.7880, -147.3754			5/10/2016	<5.15
PW-0859	64.7880, -147.3754			5/24/2017	<5.05
PW-0860	64.7880, -147.3743	40	10-55	11/4/2011	<6.20
PW-0860	64.7880, -147.3743	40	10-55	6/23/2012	<6.52J*
PW-0860	64.7880, -147.3743	40	10-55	7/17/2013	<6.20
PW-0860	64.7880, -147.3743	40	10-55	5/24/2016	<5.15
PW-0860	64.7880, -147.3743	40	10-55	6/22/2017	<5.20
PW-0861	64.7880, -147.3732	42	10-55	11/5/2011	<6.20
PW-0861	64.7880, -147.3732	42	10-55	6/4/2012	<6.20
PW-0861	64.7880, -147.3732	42	10-55	6/25/2013	<6.74
PW-0862	64.7880, -147.3721	42	10-55	11/3/2011	<6.60
PW-0862	64.7880, -147.3721	42	10-55	6/5/2012	<6.52
PW-0862	64.7880, -147.3721	42	10-55	6/20/2013	<6.56
PW-0862	64.7880, -147.3721	42	10-55	12/19/2015	<5.30
PW-0863	64.7872, -147.3721	65	55-90	11/19/2011	<6.20
PW-0863	64.7872, -147.3721	65	55-90	6/20/2012	<6.60
PW-0863	64.7872, -147.3721	65	55-90	6/20/2013	<6.46
PW-0863	64.7872, -147.3721	65	55-90	4/15/2014	<5.00
PW-0863	64.7872, -147.3721	65	55-90	6/8/2015	<5.30
PW-0863	64.7872, -147.3721	65	55-90	5/16/2016	<5.10
PW-0863	64.7872, -147.3721	65	55-90	5/24/2017	<5.20
PW-0864	64.7872, -147.3732	42	10-55	11/5/2011	<6.74
PW-0864	64.7872, -147.3732	42	10-55	6/23/2012	<6.20J*
PW-0864	64.7872, -147.3732	42	10-55	7/17/2013	<6.52
PW-0864	64.7872, -147.3732	42	10-55	5/22/2014	<5.30
PW-0864	64.7872, -147.3732	42	10-55	8/12/2015	<5.35
PW-0864	64.7872, -147.3732	42	10-55	5/24/2016	<5.10
PW-0864	64.7872, -147.3732	42	10-55	5/29/2017	<5.10J*
PW-0865	64.7872, -147.3743	40	10-55	11/21/2011	<6.52
PW-0865	64.7872, -147.3743	40	10-55	7/15/2013	<6.40
PW-0865	64.7872, -147.3743	40	10-55	4/25/2014	<5.00
PW-0865	64.7872, -147.3743	40	10-55	6/8/2015	<5.20
PW-0865	64.7872, -147.3743	40	10-55	5/24/2016	<5.30

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Flint Hills Resources Alaska, LLC
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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0865	64.7872, -147.3743	40	10-55	5/29/2017	<5.00
PW-0866	64.7872, -147.3754	42	10-55	11/4/2011	<6.60
PW-0866	64.7872, -147.3754	42	10-55	6/2/2012	<6.20
PW-0866	64.7872, -147.3754	42	10-55	7/29/2013	<6.70
PW-0866	64.7872, -147.3754	42	10-55	4/24/2014	<5.00
PW-0866	64.7872, -147.3754	42	10-55	6/8/2015	<5.25
PW-0866	64.7872, -147.3754	42	10-55	7/8/2016	<5.00
PW-0866	64.7872, -147.3754	42	10-55	6/19/2017	<5.10
PW-0867	64.7865, -147.3754			10/26/2010	<11.0
PW-0867	64.7865, -147.3754			8/6/2011	<6.52
PW-0867	64.7865, -147.3754			8/29/2012	<6.20
PW-0867	64.7865, -147.3754			5/10/2013	<6.66
PW-0867	64.7865, -147.3754			4/18/2014	<5.00
PW-0867	64.7865, -147.3754			6/24/2015	<5.50
PW-0867	64.7865, -147.3754			5/19/2016	<5.15
PW-0868	64.7865, -147.3743	57	55-90	8/2/2013	<6.20
PW-0868	64.7865, -147.3743	57	55-90	5/14/2014	<5.20
PW-0868	64.7865, -147.3743	57	55-90	7/10/2015	<5.45
PW-0868	64.7865, -147.3743	57	55-90	5/20/2016	<5.05
PW-0868	64.7865, -147.3743	57	55-90	7/11/2017	<5.25
PW-0869	64.7865, -147.3721	42	10-55	10/28/2010	<11.0
PW-0869	64.7865, -147.3721	42	10-55	8/30/2011	<6.66
PW-0869	64.7865, -147.3721	42	10-55	6/28/2013	<6.60
PW-0869	64.7865, -147.3721	42	10-55	5/6/2014	<5.25
PW-0869	64.7865, -147.3721	42	10-55	7/13/2015	<5.40
PW-0869	64.7865, -147.3721	42	10-55	6/1/2016	<5.20
PW-0869	64.7865, -147.3721	42	10-55	7/10/2017	<5.15
PW-0870	64.7856, -147.3721	42	10-55	11/30/2010	<10.8
PW-0870	64.7856, -147.3721	42	10-55	7/25/2011	<6.60
PW-0870	64.7856, -147.3721	42	10-55	6/13/2012	<6.20
PW-0870	64.7856, -147.3721	42	10-55	5/9/2013	<6.52
PW-0870	64.7856, -147.3721	42	10-55	5/19/2014	<5.15
PW-0870	64.7856, -147.3721	42	10-55	7/13/2015	<5.35
PW-0870	64.7856, -147.3721	42	10-55	7/6/2016	<5.15
PW-0870	64.7856, -147.3721	42	10-55	7/7/2017	<5.15
PW-0871	64.7857, -147.3732	50	10-55	10/26/2010	<11.0
PW-0871	64.7857, -147.3732	50	10-55	8/5/2011	<6.82
PW-0871	64.7857, -147.3732	50	10-55	5/25/2012	<6.32
PW-0871	64.7857, -147.3732	50	10-55	5/9/2013	<6.20
PW-0871	64.7857, -147.3732	50	10-55	4/19/2014	<5.00
PW-0871	64.7857, -147.3732	50	10-55	9/16/2015	<5.30
PW-0871	64.7857, -147.3732	50	10-55	5/24/2016	3.82J
PW-0871	64.7857, -147.3732	50	10-55	5/17/2017	3.47J
PW-0872	64.7858, -147.3749			1/6/2011	<12.3
PW-0872	64.7858, -147.3749			7/15/2011	<6.52
PW-0872	64.7858, -147.3749			8/23/2012	<6.20
PW-0872	64.7858, -147.3749			7/1/2013	<6.82
PW-0872	64.7858, -147.3749			6/10/2014	<5.20
PW-0872	64.7858, -147.3749			6/30/2015	<5.25
PW-0872	64.7858, -147.3749			5/20/2016	<5.25

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0872	64.7858, -147.3749			8/24/2017	4.07J*
PW-0882	64.8095, -147.4218	33	10-55	7/13/2011	<7.04
PW-0891	64.7924, -147.4011	42	10-55	5/1/2010	<10.6
PW-0896	64.7901, -147.3697	51	10-55	10/28/2011	<6.88
PW-0902	64.7880, -147.3684	62	55-90	11/5/2011	<6.20
PW-0902	64.7880, -147.3684	62	55-90	6/29/2012	<6.20
PW-0902	64.7880, -147.3684	62	55-90	7/22/2013	<6.20
PW-0903	64.7880, -147.3697	40	10-55	12/6/2011	<6.46
PW-0903	64.7880, -147.3697	40	10-55	6/6/2012	<6.88
PW-0903	64.7880, -147.3697	40	10-55	9/3/2013	<6.40
PW-0904	64.7880, -147.3710	40	10-55	2/7/2012	<6.46
PW-0904	64.7880, -147.3710	40	10-55	7/28/2012	<6.52
PW-0904	64.7880, -147.3710	40	10-55	7/22/2013	<6.46
PW-0905	64.7872, -147.3709	40	10-55	11/4/2011	<6.20
PW-0905	64.7872, -147.3709	40	10-55	6/25/2012	<6.60
PW-0905	64.7872, -147.3709	40	10-55	7/1/2013	<6.66
PW-0905	64.7872, -147.3709	40	10-55	4/14/2014	<5.00
PW-0905	64.7872, -147.3709	40	10-55	7/15/2015	<5.15
PW-0905	64.7872, -147.3709	40	10-55	7/15/2016	<5.15
PW-0905	64.7872, -147.3709	40	10-55	8/31/2017	<5.15
PW-0906	64.7872, -147.3697	34	10-55	11/12/2011	<6.52
PW-0906	64.7872, -147.3697	34	10-55	6/20/2012	<6.20
PW-0906	64.7872, -147.3697	34	10-55	7/1/2013	<6.96
PW-0906	64.7872, -147.3697	34	10-55	5/1/2014	<5.55
PW-0906	64.7872, -147.3697	34	10-55	7/1/2015	<5.50
PW-0906	64.7872, -147.3697	34	10-55	5/24/2016	<5.20
PW-0906	64.7872, -147.3697	34	10-55	7/27/2017	<5.15
PW-0907	64.7873, -147.3684	45	10-55	11/5/2011	<6.46
PW-0907	64.7873, -147.3684	45	10-55	6/8/2012	<6.46
PW-0907	64.7873, -147.3684	45	10-55	6/18/2013	<6.20
PW-0907	64.7873, -147.3684	45	10-55	4/14/2014	<5.00
PW-0907	64.7873, -147.3684	45	10-55	6/19/2015	<5.30
PW-0907	64.7873, -147.3684	45	10-55	5/10/2016	<5.25
PW-0907	64.7873, -147.3684	45	10-55	6/19/2017	<5.15
PW-0908	64.7866, -147.3684	50	10-55	11/8/2010	<10.5
PW-0908	64.7866, -147.3684	50	10-55	7/27/2011	<6.20
PW-0908	64.7866, -147.3684	50	10-55	5/25/2012	<6.20
PW-0908	64.7866, -147.3684	50	10-55	5/20/2013	<6.20
PW-0908	64.7866, -147.3684	50	10-55	5/10/2014	<5.15
PW-0908	64.7866, -147.3684	50	10-55	7/8/2015	<5.45
PW-0908	64.7866, -147.3684	50	10-55	6/19/2017	<5.30
PW-0909	64.7865, -147.3697	50	10-55	10/28/2010	<11.0
PW-0909	64.7865, -147.3697	50	10-55	8/19/2011	<6.60
PW-0909	64.7865, -147.3697	50	10-55	5/31/2012	<6.20
PW-0909	64.7865, -147.3697	50	10-55	5/29/2013	<6.60
PW-0909	64.7865, -147.3697	50	10-55	5/15/2014	<5.40
PW-0909	64.7865, -147.3697	50	10-55	6/29/2015	<5.30
PW-0909	64.7865, -147.3697	50	10-55	5/20/2016	<5.15
PW-0909	64.7865, -147.3697	50	10-55	7/14/2017	<5.10
PW-0910	64.7865, -147.3709	80	55-90	12/7/2010	<10.4

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Flint Hills Resources Alaska, LLC
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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0910	64.7865, -147.3709	80	55-90	8/20/2011	<6.26
PW-0910	64.7865, -147.3709	80	55-90	8/8/2012	<6.20
PW-0910	64.7865, -147.3709	80	55-90	5/31/2013	<6.52
PW-0910	64.7865, -147.3709	80	55-90	5/19/2014	<5.20
PW-0910	64.7865, -147.3709	80	55-90	6/29/2015	<5.35
PW-0910	64.7865, -147.3709	80	55-90	5/24/2016	<5.15
PW-0910	64.7865, -147.3709	80	55-90	7/13/2017	<5.15
PW-0911	64.7858, -147.3684			10/28/2010	<11.0
PW-0911	64.7858, -147.3684			7/27/2011	<6.66
PW-0911	64.7858, -147.3684			5/30/2012	<6.20
PW-0911	64.7858, -147.3684			5/28/2013	<6.20
PW-0911	64.7858, -147.3684			5/14/2014	<5.20
PW-0911	64.7858, -147.3684			6/29/2015	<5.40
PW-0911	64.7858, -147.3684			5/20/2016	<5.10
PW-0911	64.7858, -147.3684			7/10/2017	<5.15
PW-0912	64.7851, -147.3710	42	10-55	10/26/2010	<11.6
PW-0912	64.7851, -147.3710	42	10-55	7/17/2011	<6.74
PW-0912	64.7851, -147.3710	42	10-55	6/6/2012	<6.20
PW-0912	64.7851, -147.3710	42	10-55	6/28/2013	<6.88
PW-0912	64.7851, -147.3710	42	10-55	6/11/2014	<5.25
PW-0912	64.7851, -147.3710	42	10-55	7/13/2015	<5.25J*
PW-0912	64.7851, -147.3710	42	10-55	6/23/2016	4.79J
PW-0912	64.7851, -147.3710	42	10-55	8/14/2017	6.16J
PW-0914	64.7843, -147.3683			10/28/2010	<10.4
PW-0914	64.7843, -147.3683			7/12/2011	<6.74
PW-0914	64.7843, -147.3683			5/25/2012	<6.66
PW-0914	64.7843, -147.3683			5/15/2013	<6.42
PW-0914	64.7843, -147.3683			6/26/2015	4.29J
PW-0914	64.7843, -147.3683			6/24/2017	7.15J
PW-0924	64.7619, -147.3403			4/30/2012	<6.20
PW-0924	64.7619, -147.3403			6/20/2014	<5.00
PW-0924	64.7619, -147.3403			7/30/2015	<5.30
PW-0925	64.7902, -147.3795			10/22/2011	<6.60
PW-0927	64.7792, -147.3839	320	>160	2/25/2010	<10.4
PW-0927	64.7792, -147.3839	320	>160	9/2/2011	<6.66
PW-0927	64.7792, -147.3839	320	>160	5/30/2012	<6.40
PW-0927	64.7792, -147.3839	320	>160	5/29/2013	<6.20
PW-0927	64.7792, -147.3839	320	>160	4/11/2014	3.52J
PW-0928	64.7791, -147.3825	202	>160	2/25/2010	<10.3
PW-0928	64.7791, -147.3825	202	>160	8/5/2011	15.7
PW-0929	64.7790, -147.3811	133	90-160	2/27/2010	14.4
PW-0929	64.7790, -147.3811	133	90-160	5/11/2011	11.8J*
PW-0929	64.7790, -147.3811	133	90-160	5/24/2011	15.7J*
PW-0929	64.7790, -147.3811	133	90-160	11/8/2011	14.0J*
PW-0929	64.7790, -147.3811	133	90-160	3/13/2012	15.0J*
PW-0929	64.7790, -147.3811	133	90-160	7/20/2012	16.5J*
PW-0929	64.7790, -147.3811	133	90-160	11/2/2012	16.3J*
PW-0929	64.7790, -147.3811	133	90-160	1/28/2013	15.2J*
PW-0929	64.7790, -147.3811	133	90-160	6/18/2013	17.2J*
PW-0929	64.7790, -147.3811	133	90-160	10/15/2013	16.3

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Flint Hills Resources Alaska, LLC
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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0929	64.7790, -147.3811	133	90-160	2/7/2014	21.3
PW-0929	64.7790, -147.3811	133	90-160	4/14/2014	20.0
PW-0929	64.7790, -147.3811	133	90-160	9/26/2014	20.9
PW-0929	64.7790, -147.3811	133	90-160	1/9/2015	20.3
PW-0929	64.7790, -147.3811	133	90-160	4/6/2015	19.0
PW-0929	64.7790, -147.3811	133	90-160	8/31/2015	24.7
PW-0929	64.7790, -147.3811	133	90-160	1/4/2016	23.9
PW-0929	64.7790, -147.3811	133	90-160	9/12/2016	24.9
PW-0929	64.7790, -147.3811	133	90-160	11/7/2016	23.9
PW-0929	64.7790, -147.3811	133	90-160	1/17/2017	24.0
PW-0929	64.7790, -147.3811	133	90-160	3/20/2017	26.6
PW-0929	64.7790, -147.3811	133	90-160	5/2/2017	24.3
PW-0929	64.7790, -147.3811	133	90-160	6/16/2017	26.6
PW-0930	64.7785, -147.3812	15	Water Table	4/19/2010	13.7
PW-0931	64.7785, -147.3826	70	55-90	2/26/2010	14.7
PW-0931	64.7785, -147.3826	70	55-90	4/15/2011	21.6J*
PW-0931	64.7785, -147.3826	70	55-90	11/9/2011	20.3J*
PW-0931	64.7785, -147.3826	70	55-90	11/9/2012	21.5J*
PW-0931	64.7785, -147.3826	70	55-90	8/13/2013	20.0J*
PW-0931	64.7785, -147.3826	70	55-90	7/7/2014	26.8
PW-0931	64.7785, -147.3826	70	55-90	6/30/2015	25.5
PW-0931	64.7785, -147.3826	70	55-90	5/6/2016	31.5
PW-0931	64.7785, -147.3826	70	55-90	2/13/2017	30.2
PW-0932	64.7785, -147.3839	316	>160	2/25/2010	<10.4
PW-0932	64.7785, -147.3839	316	>160	7/14/2011	<6.66
PW-0932	64.7785, -147.3839	316	>160	5/24/2012	3.37J
PW-0932	64.7785, -147.3839	316	>160	7/27/2012	4.60J*
PW-0932	64.7785, -147.3839	316	>160	12/26/2012	<3.10J*
PW-0932	64.7785, -147.3839	316	>160	3/20/2013	5.09J
PW-0932	64.7785, -147.3839	316	>160	6/18/2013	7.00J*
PW-0932	64.7785, -147.3839	316	>160	6/19/2013	6.80J
PW-0932	64.7785, -147.3839	316	>160	8/6/2013	5.80J*
PW-0932	64.7785, -147.3839	316	>160	9/16/2013	8.05J
PW-0932	64.7785, -147.3839	316	>160	11/26/2013	9.00J
PW-0932	64.7785, -147.3839	316	>160	2/24/2014	10.2
PW-0932	64.7785, -147.3839	316	>160	4/3/2014	9.89J
PW-0932	64.7785, -147.3839	316	>160	5/29/2014	11.7
PW-0932	64.7785, -147.3839	316	>160	9/11/2014	12.7
PW-0932	64.7785, -147.3839	316	>160	9/23/2014	13.8
PW-0932	64.7785, -147.3839	316	>160	11/18/2014	14.2
PW-0932	64.7785, -147.3839	316	>160	3/11/2015	14.6
PW-0932	64.7785, -147.3839	316	>160	4/28/2015	15.6
PW-0932	64.7785, -147.3839	316	>160	5/19/2015	16.1
PW-0932	64.7785, -147.3839	316	>160	8/18/2015	18.0
PW-0932	64.7785, -147.3839	316	>160	10/19/2015	19.5
PW-0932	64.7785, -147.3839	316	>160	11/17/2015	21.1
PW-0932	64.7785, -147.3839	316	>160	6/14/2016	22.9
PW-0932	64.7785, -147.3839	316	>160	10/11/2016	24.1
PW-0932	64.7785, -147.3839	316	>160	12/20/2016	26.9
PW-0932	64.7785, -147.3839	316	>160	6/19/2017	27.7JH*

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0933	64.7779, -147.3840	140	90-160	2/27/2010	<11.4
PW-0933	64.7779, -147.3840	140	90-160	7/9/2011	10.8
PW-0933	64.7779, -147.3840	140	90-160	8/23/2011	13.4J*
PW-0933	64.7779, -147.3840	140	90-160	3/13/2012	10.9J*
PW-0933	64.7779, -147.3840	140	90-160	10/23/2012	14.1J*
PW-0933	64.7779, -147.3840	140	90-160	5/6/2013	14.6J*
PW-0933	64.7779, -147.3840	140	90-160	1/10/2014	18.0
PW-0933	64.7779, -147.3840	140	90-160	8/12/2014	21.8
PW-0933	64.7779, -147.3840	140	90-160	3/9/2015	20.9
PW-0933	64.7779, -147.3840	140	90-160	11/2/2015	20.6
PW-0933	64.7779, -147.3840	140	90-160	6/13/2016	20.3
PW-0933	64.7779, -147.3840	140	90-160	12/6/2016	17.7
PW-0933	64.7779, -147.3840	140	90-160	1/27/2017	24.4
PW-0934	64.7779, -147.3828			3/9/2010	15.1
PW-0935	64.7779, -147.3817	30	10-55	1/25/2012	17.0JL*
PW-0936	64.7779, -147.3805	120	90-160	2/28/2010	14.7
PW-0936	64.7779, -147.3805	120	90-160	6/8/2011	18.2J*
PW-0936	64.7779, -147.3805	120	90-160	6/14/2012	21.2J*
PW-0936	64.7779, -147.3805	120	90-160	6/18/2013	33.5J*
PW-0936	64.7779, -147.3805	120	90-160	10/15/2013	30.2
PW-0936	64.7779, -147.3805	120	90-160	6/30/2014	47.0
PW-0936	64.7779, -147.3805	120	90-160	1/26/2015	47.7
PW-0936	64.7779, -147.3805	120	90-160	8/4/2015	56.2
PW-0936	64.7779, -147.3805	120	90-160	3/25/2016	66.5J*
PW-0936	64.7779, -147.3805	120	90-160	6/23/2017	62.1
PW-0937	64.7779, -147.3793	100	90-160	2/26/2010	<10.5
PW-0937	64.7779, -147.3793	100	90-160	7/8/2011	14.6
PW-0937	64.7779, -147.3793	100	90-160	9/7/2011	14.2J*
PW-0937	64.7779, -147.3793	100	90-160	2/8/2012	15.3J*
PW-0937	64.7779, -147.3793	100	90-160	5/22/2012	15.5J*
PW-0937	64.7779, -147.3793	100	90-160	10/8/2012	16.6J*
PW-0937	64.7779, -147.3793	100	90-160	4/15/2013	17.3J*
PW-0937	64.7779, -147.3793	100	90-160	9/19/2013	19.3
PW-0937	64.7779, -147.3793	100	90-160	2/25/2014	21.7
PW-0937	64.7779, -147.3793	100	90-160	9/2/2014	26.0
PW-0937	64.7779, -147.3793	100	90-160	3/9/2015	28.1
PW-0937	64.7779, -147.3793	100	90-160	9/8/2015	37.4
PW-0937	64.7779, -147.3793	100	90-160	2/22/2016	42.2
PW-0937	64.7779, -147.3793	100	90-160	8/29/2016	39.5
PW-0937	64.7779, -147.3793	100	90-160	12/20/2016	43.0
PW-0937	64.7779, -147.3793	100	90-160	2/28/2017	44.0
PW-0937	64.7779, -147.3793	100	90-160	8/7/2017	56.5
PW-0938	64.7779, -147.3781	22	10-55	3/2/2010	<10.3
PW-0938	64.7779, -147.3781	22	10-55	7/11/2011	9.02J
PW-0938	64.7779, -147.3781	22	10-55	11/18/2011	8.40J*
PW-0938	64.7779, -147.3781	22	10-55	6/4/2012	8.20J*
PW-0938	64.7779, -147.3781	22	10-55	2/7/2013	9.00J*
PW-0938	64.7779, -147.3781	22	10-55	3/18/2013	8.90J*
PW-0938	64.7779, -147.3781	22	10-55	11/5/2013	10.2
PW-0938	64.7779, -147.3781	22	10-55	3/4/2014	10.5

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0938	64.7779, -147.3781	22	10-55	7/22/2014	12.4
PW-0938	64.7779, -147.3781	22	10-55	4/6/2015	13.9
PW-0938	64.7779, -147.3781	22	10-55	10/26/2015	14.4
PW-0938	64.7779, -147.3781	22	10-55	2/19/2016	14.2
PW-0938	64.7779, -147.3781	22	10-55	5/9/2016	13.7
PW-0938	64.7779, -147.3781	22	10-55	8/19/2016	12.0
PW-0938	64.7779, -147.3781	22	10-55	11/1/2016	13.7
PW-0940	64.7772, -147.3829	205	>160	2/26/2010	15.6
PW-0940	64.7772, -147.3829	205	>160	10/11/2011	19.5J*
PW-0940	64.7772, -147.3829	205	>160	1/28/2013	20.6J*
PW-0940	64.7772, -147.3829	205	>160	4/3/2014	30.3
PW-0940	64.7772, -147.3829	205	>160	5/8/2015	27.9
PW-0940	64.7772, -147.3829	205	>160	5/6/2016	38.8
PW-0940	64.7772, -147.3829	205	>160	2/17/2017	40.5
PW-0940	64.7772, -147.3829	205	>160	4/17/2017	42.4
PW-0941	64.7772, -147.3817	24	10-55	2/27/2010	11.5
PW-0941	64.7772, -147.3817	24	10-55	6/23/2011	17.4
PW-0942	64.7772, -147.3805	160	>160	2/26/2010	17.0
PW-0942	64.7772, -147.3805	160	>160	5/6/2011	26.3J*
PW-0942	64.7772, -147.3805	160	>160	10/5/2011	24.7J*
PW-0942	64.7772, -147.3805	160	>160	4/20/2012	30.2J*
PW-0942	64.7772, -147.3805	160	>160	5/13/2013	40.5J*
PW-0942	64.7772, -147.3805	160	>160	10/8/2013	39.5
PW-0942	64.7772, -147.3805	160	>160	2/24/2014	44.0
PW-0942	64.7772, -147.3805	160	>160	7/14/2014	50.0
PW-0942	64.7772, -147.3805	160	>160	1/5/2015	48.2
PW-0942	64.7772, -147.3805	160	>160	7/13/2015	51.3
PW-0942	64.7772, -147.3805	160	>160	6/3/2016	62.7
PW-0942	64.7772, -147.3805	160	>160	11/15/2016	48.1
PW-0943	64.7772, -147.3793	120	90-160	3/7/2010	<10.0
PW-0943	64.7772, -147.3793	120	90-160	10/3/2011	21.4
PW-0943	64.7772, -147.3793	120	90-160	4/11/2012	21.4J*
PW-0943	64.7772, -147.3793	120	90-160	9/21/2012	25.0J*
PW-0943	64.7772, -147.3793	120	90-160	1/2/2013	23.8J*
PW-0943	64.7772, -147.3793	120	90-160	3/12/2013	25.7
PW-0943	64.7772, -147.3793	120	90-160	4/19/2013	25.1J*
PW-0943	64.7772, -147.3793	120	90-160	6/6/2013	25.6
PW-0943	64.7772, -147.3793	120	90-160	9/11/2013	30.3
PW-0943	64.7772, -147.3793	120	90-160	10/12/2013	26.5
PW-0943	64.7772, -147.3793	120	90-160	11/26/2013	29.6
PW-0943	64.7772, -147.3793	120	90-160	3/3/2014	32.9
PW-0943	64.7772, -147.3793	120	90-160	5/13/2014	37.5
PW-0943	64.7772, -147.3793	120	90-160	6/4/2014	33.9
PW-0943	64.7772, -147.3793	120	90-160	8/19/2014	35.3
PW-0943	64.7772, -147.3793	120	90-160	11/4/2014	40.6
PW-0943	64.7772, -147.3793	120	90-160	1/16/2015	43.7
PW-0943	64.7772, -147.3793	120	90-160	5/19/2015	40.0
PW-0943	64.7772, -147.3793	120	90-160	8/14/2015	54.7
PW-0943	64.7772, -147.3793	120	90-160	8/19/2015	49.6
PW-0943	64.7772, -147.3793	120	90-160	10/23/2015	51.2

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0943	64.7772, -147.3793	120	90-160	2/29/2016	58.5
PW-0943	64.7772, -147.3793	120	90-160	9/16/2016	49.8
PW-0943	64.7772, -147.3793	120	90-160	1/24/2017	58.3
PW-0943	64.7772, -147.3793	120	90-160	7/11/2017	63.5
PW-0944	64.7772, -147.3782	31	10-55	3/5/2010	<10.5
PW-0944	64.7772, -147.3782	31	10-55	9/7/2011	18.4
PW-0944	64.7772, -147.3782	31	10-55	10/27/2011	17.8J*
PW-0944	64.7772, -147.3782	31	10-55	4/5/2012	15.5J*
PW-0944	64.7772, -147.3782	31	10-55	8/17/2012	19.7J*
PW-0944	64.7772, -147.3782	31	10-55	2/18/2013	14.3J*
PW-0944	64.7772, -147.3782	31	10-55	6/5/2013	15.8J*
PW-0944	64.7772, -147.3782	31	10-55	7/23/2013	18.4J*
PW-0944	64.7772, -147.3782	31	10-55	12/13/2013	19.7
PW-0944	64.7772, -147.3782	31	10-55	5/12/2014	19.7
PW-0944	64.7772, -147.3782	31	10-55	11/17/2014	26.2
PW-0944	64.7772, -147.3782	31	10-55	6/1/2015	24.3
PW-0944	64.7772, -147.3782	31	10-55	11/10/2015	24.8
PW-0944	64.7772, -147.3782	31	10-55	1/4/2016	25.2
PW-0944	64.7772, -147.3782	31	10-55	7/12/2016	21.8
PW-0944	64.7772, -147.3782	31	10-55	12/27/2016	20.5
PW-0944	64.7772, -147.3782	31	10-55	4/10/2017	19.1
PW-0945	64.7772, -147.3770	48	10-55	2/26/2010	<10.6
PW-0945	64.7772, -147.3770	48	10-55	7/25/2011	7.01J
PW-0945	64.7772, -147.3770	48	10-55	10/21/2011	8.70J*
PW-0945	64.7772, -147.3770	48	10-55	10/19/2012	9.40J*
PW-0945	64.7772, -147.3770	48	10-55	11/22/2013	10.1
PW-0945	64.7772, -147.3770	48	10-55	6/17/2014	14.3
PW-0945	64.7772, -147.3770	48	10-55	8/4/2014	15.9
PW-0945	64.7772, -147.3770	48	10-55	9/22/2015	13.2
PW-0945	64.7772, -147.3770	48	10-55	10/31/2016	9.80J
PW-0945	64.7772, -147.3770	48	10-55	5/15/2017	12.8
PW-0945	64.7772, -147.3770	48	10-55	8/14/2017	9.90J
PW-0946	64.7796, -147.3837	250	>160	3/19/2010	18.3
PW-0946	64.7796, -147.3837	250	>160	6/20/2011	18.7J*
PW-0946	64.7796, -147.3837	250	>160	12/10/2011	17.5J*
PW-0946	64.7796, -147.3837	250	>160	9/21/2013	24.0
PW-0946	64.7796, -147.3837	250	>160	10/4/2014	30.8
PW-0946	64.7796, -147.3837	250	>160	7/7/2015	34.2
PW-0946	64.7796, -147.3837	250	>160	1/23/2016	38.6
PW-0946	64.7796, -147.3837	250	>160	12/27/2016	36.8
PW-0947	64.7785, -147.3787			2/11/2010	<10.4
PW-0947	64.7785, -147.3787			5/26/2011	9.08J
PW-0947	64.7785, -147.3787			10/5/2011	9.90J*
PW-0947	64.7785, -147.3787			6/12/2012	10.4J*
PW-0947	64.7785, -147.3787			1/25/2013	10.2J*
PW-0947	64.7785, -147.3787			9/17/2013	12.1
PW-0947	64.7785, -147.3787			4/21/2014	13.4
PW-0947	64.7785, -147.3787			12/1/2014	18.7
PW-0947	64.7785, -147.3787			7/27/2015	17.1
PW-0947	64.7785, -147.3787			3/8/2016	19.3

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0947	64.7785, -147.3787			7/11/2016	17.8
PW-0947	64.7785, -147.3787			9/26/2016	17.0
PW-0947	64.7785, -147.3787			3/28/2017	18.8
PW-0948	64.7785, -147.3773			2/11/2010	<10.0
PW-0948	64.7785, -147.3773			5/26/2011	9.44J
PW-0948	64.7785, -147.3773			10/19/2011	9.00J*
PW-0948	64.7785, -147.3773			9/17/2013	11.2
PW-0948	64.7785, -147.3773			9/22/2014	14.3
PW-0948	64.7785, -147.3773			8/31/2015	17.4
PW-0948	64.7785, -147.3773			7/11/2016	19.2
PW-0948	64.7785, -147.3773			10/24/2016	15.1
PW-0948	64.7785, -147.3773			3/13/2017	19.5
PW-0949	64.7292, -147.3010			12/7/2009	<10.5
PW-0950	64.7256, -147.3012			12/15/2009	<10.4
PW-0951	64.7249, -147.3017			12/14/2009	<10.3
PW-0952	64.7471, -147.2436	51	10-55	5/8/2012	<6.52
PW-0966	64.8171, -147.3900	74	55-90	7/30/2010	<10.3
PW-0970	64.7697, -147.4344			4/11/2013	<6.32
PW-0970	64.7697, -147.4344			5/9/2014	<5.45
PW-0970	64.7697, -147.4344			10/10/2015	<5.15
PW-0971	64.7695, -147.4331	295	>160	4/16/2010	<10.8
PW-0971	64.7695, -147.4331	295	>160	10/15/2011	<6.20
PW-0971	64.7695, -147.4331	295	>160	6/16/2012	<6.20
PW-0971	64.7695, -147.4331	295	>160	9/7/2013	<6.40
PW-0971	64.7695, -147.4331	295	>160	5/17/2014	<5.15
PW-0971	64.7695, -147.4331	295	>160	6/17/2015	<5.20
PW-0972	64.7696, -147.4319	236	>160	4/16/2010	<10.8
PW-0972	64.7696, -147.4319	236	>160	10/18/2011	<6.52
PW-0972	64.7696, -147.4319	236	>160	6/7/2012	<6.20
PW-0972	64.7696, -147.4319	236	>160	3/17/2013	<6.74
PW-0972	64.7696, -147.4319	236	>160	6/20/2013	<6.50
PW-0972	64.7696, -147.4319	236	>160	9/5/2013	<6.32
PW-0972	64.7696, -147.4319	236	>160	11/21/2013	<5.00J*
PW-0972	64.7696, -147.4319	236	>160	3/3/2014	<5.00
PW-0972	64.7696, -147.4319	236	>160	6/5/2014	<5.20
PW-0972	64.7696, -147.4319	236	>160	8/20/2014	<5.15
PW-0972	64.7696, -147.4319	236	>160	11/11/2014	<5.00
PW-0972	64.7696, -147.4319	236	>160	2/18/2015	<5.00
PW-0972	64.7696, -147.4319	236	>160	5/11/2015	<5.20
PW-0972	64.7696, -147.4319	236	>160	8/26/2015	<5.20J*
PW-0972	64.7696, -147.4319	236	>160	10/16/2015	<5.20
PW-0972	64.7696, -147.4319	236	>160	5/18/2016	<5.10
PW-0972	64.7696, -147.4319	236	>160	6/20/2017	<5.20
PW-0973	64.7695, -147.4305	70	55-90	4/10/2010	<10.6
PW-0973	64.7695, -147.4305	70	55-90	10/22/2011	<6.60
PW-0973	64.7695, -147.4305	70	55-90	6/16/2012	<6.60
PW-0973	64.7695, -147.4305	70	55-90	5/11/2013	<6.20
PW-0973	64.7695, -147.4305	70	55-90	6/20/2014	<5.25
PW-0973	64.7695, -147.4305	70	55-90	7/6/2015	<5.25
PW-0973	64.7695, -147.4305	70	55-90	7/8/2016	<5.25

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Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0973	64.7695, -147.4305	70	55-90	7/13/2017	<5.10
PW-0974	64.7692, -147.4293	40	10-55	1/26/2010	<10.5
PW-0974	64.7692, -147.4293	40	10-55	10/13/2011	<6.40
PW-0974	64.7692, -147.4293	40	10-55	5/22/2012	<6.32
PW-0974	64.7692, -147.4293	40	10-55	4/29/2013	<6.20
PW-0974	64.7692, -147.4293	40	10-55	5/8/2014	<5.50
PW-0974	64.7692, -147.4293	40	10-55	6/17/2015	<5.50
PW-0974	64.7692, -147.4293	40	10-55	5/20/2016	<5.20
PW-0974	64.7692, -147.4293	40	10-55	7/10/2017	<5.50
PW-0975	64.7696, -147.4278			5/13/2010	<10.3
PW-0975	64.7696, -147.4278			10/22/2011	<6.74
PW-0975	64.7696, -147.4278			6/19/2012	3.38J
PW-0976	64.7698, -147.4291	38	10-55	5/12/2010	<10.0
PW-0976	64.7698, -147.4291	38	10-55	10/25/2011	<6.60
PW-0976	64.7698, -147.4291	38	10-55	6/1/2012	<6.40
PW-0976	64.7698, -147.4291	38	10-55	5/7/2013	<6.52
PW-0976	64.7698, -147.4291	38	10-55	4/10/2014	<5.00
PW-0976	64.7698, -147.4291	38	10-55	6/26/2015	<5.40J*
PW-0976	64.7698, -147.4291	38	10-55	6/30/2016	<5.25
PW-0976	64.7698, -147.4291	38	10-55	7/14/2017	<5.10
PW-0977	64.7702, -147.4319			4/23/2010	<11.6
PW-0977	64.7702, -147.4319			10/15/2011	<7.04
PW-0977	64.7702, -147.4319			6/8/2012	<6.20
PW-0977	64.7702, -147.4319			6/27/2013	<6.46
PW-0977	64.7702, -147.4319			5/22/2014	<5.40
PW-0977	64.7702, -147.4319			7/10/2015	<5.50
PW-0977	64.7702, -147.4319			7/8/2016	<5.30
PW-0977	64.7702, -147.4319			8/31/2017	<5.30
PW-0978	64.7684, -147.4307	218	>160	3/12/2011	<10.3
PW-0978	64.7684, -147.4307			10/13/2011	<6.46
PW-0978	64.7684, -147.4307			6/6/2012	<6.40
PW-0978	64.7684, -147.4307			7/15/2013	<6.40J*
PW-0978	64.7684, -147.4307			4/23/2014	<5.00
PW-0978	64.7684, -147.4307			7/17/2015	<5.25
PW-0978	64.7684, -147.4307			5/18/2016	<5.30
PW-0978	64.7684, -147.4307			6/20/2017	<5.05
PW-0979	64.7683, -147.4294			4/16/2010	<10.0
PW-0979	64.7683, -147.4294			10/21/2011	<6.88
PW-0979	64.7683, -147.4294			5/22/2012	<6.32
PW-0979	64.7683, -147.4294			8/6/2013	<6.46
PW-0979	64.7683, -147.4294			5/22/2014	<5.20
PW-0979	64.7683, -147.4294			8/6/2015	<5.20
PW-0979	64.7683, -147.4294			8/27/2016	<4.95
PW-0979	64.7683, -147.4294			9/7/2017	<5.10
PW-0980	64.7684, -147.4344			4/19/2010	<10.0
PW-0980	64.7684, -147.4344			10/15/2011	<6.20
PW-0980	64.7684, -147.4344			6/6/2012	<6.52
PW-0980	64.7684, -147.4344			6/26/2013	<6.46
PW-0980	64.7684, -147.4344			5/7/2014	<5.35
PW-0980	64.7684, -147.4344			6/17/2015	<5.45

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Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0986	64.7628, -147.2783			2/5/2013	<6.60
PW-0988	64.7629, -147.3966	36	10-55	2/7/2010	157
PW-0988	64.7629, -147.3966	36	10-55	7/12/2011	164J*
PW-0988	64.7629, -147.3966	36	10-55	12/9/2011	146J*
PW-0988	64.7629, -147.3966	36	10-55	4/20/2012	145J*
PW-0988	64.7629, -147.3966	36	10-55	9/10/2012	125J*
PW-0988	64.7629, -147.3966	36	10-55	1/22/2013	86.8J*
PW-0988	64.7629, -147.3966	36	10-55	6/24/2013	101J*
PW-0988	64.7629, -147.3966	36	10-55	11/11/2013	72.5
PW-0988	64.7629, -147.3966	36	10-55	5/27/2014	65.6
PW-0988	64.7629, -147.3966	36	10-55	12/5/2014	50.0
PW-0988	64.7629, -147.3966	36	10-55	6/30/2015	41.3
PW-0988	64.7629, -147.3966	36	10-55	3/14/2016	33.5
PW-0988	64.7629, -147.3966	36	10-55	10/7/2016	22.5
PW-0988	64.7629, -147.3966	36	10-55	3/24/2017	23.2
PW-0988	64.7629, -147.3966	36	10-55	9/11/2017	19.2
PW-0989	64.7641, -147.3966			4/20/2011	63.5
PW-0990	64.7635, -147.3951			8/16/2011	107
PW-0991	64.7629, -147.3951			2/3/2010	129
PW-0992	64.7629, -147.3939			2/9/2010	117
PW-0993	64.7640, -147.3939	40	10-55	8/4/2011	86.0
PW-0996	64.7710, -147.3565			3/11/2010	16.7
PW-0996	64.7710, -147.3565			6/15/2011	15.0J*
PW-0996	64.7710, -147.3565			12/2/2011	14.2J*
PW-0996	64.7710, -147.3565			7/11/2012	14.2J*
PW-0996	64.7710, -147.3565			1/7/2013	12.1J*
PW-0996	64.7710, -147.3565			7/9/2013	10.9J*
PW-0996	64.7710, -147.3565			11/12/2013	9.80J
PW-0996	64.7710, -147.3565			5/19/2014	9.40J
PW-0996	64.7710, -147.3565			9/26/2014	7.80J
PW-0996	64.7710, -147.3565			4/21/2015	6.90J
PW-0996	64.7710, -147.3565			9/25/2015	8.10J
PW-0996	64.7710, -147.3565			6/17/2016	7.20J
PW-0996	64.7710, -147.3565			3/7/2017	7.10J
PW-0997	64.7709, -147.3531	65	55-90	2/26/2010	<10.4
PW-0997	64.7709, -147.3531	65	55-90	7/8/2011	4.06J
PW-0997	64.7709, -147.3531	65	55-90	11/1/2011	4.80J*
PW-0997	64.7709, -147.3531	65	55-90	8/12/2013	<3.10J*
PW-0997	64.7709, -147.3531	65	55-90	7/28/2014	4.10J
PW-0997	64.7709, -147.3531	65	55-90	6/29/2015	3.30J*
PW-0997	64.7709, -147.3531	65	55-90	5/17/2016	<2.50
PW-0997	64.7709, -147.3531	65	55-90	4/3/2017	<2.50
PW-0997	64.7709, -147.3531	65	55-90	4/18/2017	<2.50
PW-0998	64.7710, -147.3517			2/24/2010	<11.0
PW-0998	64.7710, -147.3517			8/2/2011	<6.26
PW-0998	64.7710, -147.3517			5/8/2012	<6.20
PW-0998	64.7710, -147.3517			5/6/2013	<6.32
PW-0998	64.7710, -147.3517			5/22/2014	<5.20
PW-0998	64.7710, -147.3517			7/8/2015	<5.35
PW-0998	64.7710, -147.3517			6/17/2016	<5.10

Appendix B-3
Historical Private Well Sulfolane Results Summary

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-0998	64.7710, -147.3517			6/20/2017	<5.10
PW-0999	64.7783, -147.2525			8/16/2012	<6.40
PW-1007	64.7707, -147.3338			3/5/2012	<6.96
PW-1009	64.7574, -147.3429	36	10-55	4/10/2012	<6.96
PW-1010	64.7579, -147.3429			4/19/2012	<6.60
PW-1011	64.7584, -147.3429	35	10-55	8/5/2013	<6.40
PW-1012	64.7590, -147.3429	32	10-55	8/5/2013	<6.20
PW-1013	64.7595, -147.3429	35	10-55	4/18/2012	<6.66
PW-1014	64.7600, -147.3433	35	10-55	4/13/2012	<6.74
PW-1015	64.7603, -147.3443	36	10-55	4/18/2012	<6.20
PW-1015	64.7603, -147.3443	36	10-55	6/24/2014	<5.00
PW-1015	64.7603, -147.3443	36	10-55	8/12/2015	<5.25
PW-1016	64.7609, -147.3455	30	10-55	5/17/2011	<6.88
PW-1016	64.7609, -147.3455	30	10-55	4/2/2012	<6.74
PW-1016	64.7609, -147.3455	30	10-55	6/12/2013	<7.12
PW-1016	64.7609, -147.3455	30	10-55	5/15/2014	<5.20
PW-1016	64.7609, -147.3455	30	10-55	8/7/2015	<5.20
PW-1017	64.7579, -147.3444	35	10-55	4/18/2012	<6.20
PW-1018	64.7586, -147.3446			4/11/2012	<6.82
PW-1019	64.7591, -147.3447	30	10-55	4/30/2012	<6.52
PW-1020	64.7596, -147.3448	30	10-55	4/10/2012	<6.88
PW-1021	64.7600, -147.3460	32	10-55	4/25/2012	<6.66
PW-1021	64.7600, -147.3460	32	10-55	8/2/2013	<6.52
PW-1021	64.7600, -147.3460	32	10-55	6/19/2014	<5.00
PW-1021	64.7600, -147.3460	32	10-55	7/22/2015	<5.40
PW-1022	64.7596, -147.3462			4/5/2012	<6.52
PW-1022	64.7596, -147.3462			7/18/2013	<6.20
PW-1022	64.7596, -147.3462			6/18/2014	<5.20
PW-1022	64.7596, -147.3462			7/20/2015	<5.45
PW-1023	64.7591, -147.3463	35	10-55	2/25/2010	<10.4
PW-1023	64.7591, -147.3463	35	10-55	5/5/2012	<6.20
PW-1023	64.7591, -147.3463	35	10-55	8/12/2013	<6.40
PW-1023	64.7591, -147.3463	35	10-55	6/18/2014	<5.00
PW-1023	64.7591, -147.3463	35	10-55	7/24/2015	<5.40
PW-1024	64.7586, -147.3463	40	10-55	4/10/2012	<6.40
PW-1024	64.7586, -147.3463	40	10-55	7/12/2013	<6.46
PW-1024	64.7586, -147.3463	40	10-55	6/18/2014	<5.00
PW-1024	64.7586, -147.3463	40	10-55	8/14/2015	<5.20
PW-1025	64.7582, -147.3454	33	10-55	4/11/2012	<6.66
PW-1026	64.7564, -147.3426	31.5	10-55	4/9/2012	<6.20
PW-1027	64.7566, -147.3436	42	10-55	4/18/2012	<6.40
PW-1028	64.7570, -147.3446	32	10-55	4/20/2012	<6.46
PW-1029	64.7574, -147.3456	35	10-55	4/27/2012	<6.46
PW-1030	64.7577, -147.3466	31	10-55	4/6/2012	<6.52
PW-1030	64.7577, -147.3466	31	10-55	6/24/2013	<6.74
PW-1030	64.7577, -147.3466	31	10-55	6/18/2014	<5.00
PW-1030	64.7577, -147.3466	31	10-55	7/24/2015	<5.35
PW-1031	64.7593, -147.3482	36	10-55	5/17/2012	<6.20
PW-1031	64.7593, -147.3482	36	10-55	11/8/2013	<6.36
PW-1031	64.7593, -147.3482	36	10-55	5/21/2014	<5.30

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Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1031	64.7593, -147.3482	36	10-55	7/29/2015	<5.25
PW-1032	64.7598, -147.3481	33	10-55	5/5/2012	<6.20
PW-1032	64.7598, -147.3481	33	10-55	7/25/2013	<6.20
PW-1032	64.7598, -147.3481	33	10-55	5/10/2014	<5.00
PW-1032	64.7598, -147.3481	33	10-55	8/22/2015	<5.15
PW-1033	64.7634, -147.3457	40		10/19/2011	3.48J
PW-1034	64.7628, -147.3463			2/22/2010	<10.9
PW-1034	64.7628, -147.3463			10/12/2011	<6.96
PW-1034	64.7628, -147.3463			5/14/2012	<6.20
PW-1034	64.7628, -147.3463			4/25/2013	<6.66
PW-1037	64.7509, -147.3018			4/29/2011	<10.9
PW-1038	64.7712, -147.3354	100	90-160	11/8/2013	<6.32
PW-1039	64.7719, -147.3354	35	10-55	5/24/2010	<10.0
PW-1045	64.7909, -147.3801			10/6/2011	<6.66
PW-1046	64.7897, -147.3772			6/14/2012	<6.20
PW-1047	64.7891, -147.3772			10/28/2011	<6.66
PW-1048	64.7885, -147.3771			11/5/2011	<6.20
PW-1049	64.7784, -147.3855	33.5	10-55	4/24/2012	16.2
PW-1050	64.7779, -147.3856			5/10/2010	<10.5
PW-1051	64.7784, -147.3869			9/29/2010	<10.1
PW-1051	64.7784, -147.3869			10/28/2011	<6.20
PW-1051	64.7784, -147.3869			8/24/2012	<6.32
PW-1051	64.7784, -147.3869			9/17/2014	<5.30
PW-1051	64.7784, -147.3869			5/19/2015	4.81J
PW-1052	64.7790, -147.3869	21	10-55	2/28/2010	<10.8
PW-1052	64.7790, -147.3869	21	10-55	7/11/2011	<6.82
PW-1052	64.7790, -147.3869	21	10-55	5/25/2012	<6.32
PW-1052	64.7790, -147.3869	21	10-55	5/16/2013	<6.32
PW-1052	64.7790, -147.3869	21	10-55	4/5/2014	<5.00
PW-1052	64.7790, -147.3869	21	10-55	8/25/2015	<5.20
PW-1052	64.7790, -147.3869	21	10-55	5/16/2016	<5.15
PW-1053	64.7803, -147.3875	353	>160	2/25/2010	<11.2
PW-1053	64.7803, -147.3875	353	>160	7/14/2011	<6.26
PW-1053	64.7803, -147.3875	353	>160	7/18/2012	<6.20
PW-1053	64.7803, -147.3875	353	>160	5/10/2013	<6.20
PW-1053	64.7803, -147.3875	353	>160	4/5/2014	<5.25
PW-1053	64.7803, -147.3875	353	>160	5/15/2015	<5.30
PW-1053	64.7803, -147.3875	353	>160	5/3/2016	<5.20
PW-1054	64.7803, -147.3898	293	>160	5/7/2012	<6.20
PW-1055	64.7799, -147.3899			8/17/2011	<6.60
PW-1055	64.7799, -147.3899			7/12/2012	<6.20
PW-1055	64.7799, -147.3899			6/10/2013	<6.20
PW-1056	64.7796, -147.3887			7/12/2012	17.9
PW-1057	64.7789, -147.3888	30	10-55	3/5/2010	<10.0
PW-1057	64.7789, -147.3888	30	10-55	10/5/2011	<6.20
PW-1057	64.7789, -147.3888	30	10-55	8/8/2012	<6.20
PW-1057	64.7789, -147.3888	30	10-55	7/9/2013	<6.46
PW-1057	64.7789, -147.3888	30	10-55	6/10/2014	4.28J
PW-1058	64.7772, -147.3867	80	55-90	3/1/2010	14.1
PW-1059	64.8024, -147.4441			12/15/2012	<6.20

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1060	64.8032, -147.4428			4/13/2011	<10.3
PW-1061	64.7447, -147.2417			10/25/2012	<6.46
PW-1066	64.7765, -147.2701			12/9/2009	<10.4
PW-1080	64.8076, -147.4473	193	>160	4/24/2010	<10.3
PW-1086	64.7703, -147.4089			3/6/2010	46.8
PW-1086	64.7703, -147.4089			8/9/2011	87.6J*
PW-1086	64.7703, -147.4089			2/17/2012	83.6J*
PW-1086	64.7703, -147.4089			10/5/2012	89.0J*
PW-1086	64.7703, -147.4089			4/2/2013	92.5J*
PW-1086	64.7703, -147.4089			10/7/2013	88.8
PW-1086	64.7703, -147.4089			5/13/2014	97.3
PW-1086	64.7703, -147.4089			1/5/2015	80.3
PW-1086	64.7703, -147.4089			8/11/2015	87.7
PW-1086	64.7703, -147.4089			12/14/2015	80.3
PW-1086	64.7703, -147.4089			4/12/2016	73.9
PW-1086	64.7703, -147.4089			11/18/2016	45.5
PW-1086	64.7703, -147.4089			1/27/2017	65.1
PW-1087	64.7686, -147.3502			2/24/2010	<11.0
PW-1087	64.7686, -147.3502			7/12/2011	<6.88
PW-1087	64.7686, -147.3502			5/17/2012	<6.20
PW-1087	64.7686, -147.3502			7/9/2013	<6.20
PW-1087	64.7686, -147.3502			5/21/2014	<5.30
PW-1087	64.7686, -147.3502			7/20/2015	<5.45
PW-1087	64.7686, -147.3502			5/19/2016	<5.10
PW-1087	64.7686, -147.3502			6/30/2017	<5.15
PW-1088	64.7874, -147.3886	60	55-90	11/19/2011	<6.40
PW-1088	64.7874, -147.3886	60	55-90	5/26/2012	<6.66
PW-1088	64.7874, -147.3886	60	55-90	5/30/2013	<6.20
PW-1088	64.7874, -147.3886	60	55-90	6/11/2014	<5.00
PW-1088	64.7874, -147.3886	60	55-90	6/15/2015	<5.45
PW-1088	64.7874, -147.3886	60	55-90	5/7/2016	<5.00
PW-1088	64.7874, -147.3886	60	55-90	6/19/2017	<5.10
PW-1092	64.7909, -147.4055	140	90-160	8/7/2014	<5.40
PW-1093	64.7889, -147.4064	220	>160	11/1/2011	<6.20
PW-1093	64.7889, -147.4064	220	>160	6/20/2012	<6.20
PW-1093	64.7889, -147.4064	220	>160	8/12/2013	<6.32
PW-1093	64.7889, -147.4064	220	>160	4/22/2014	<5.00
PW-1093	64.7889, -147.4064	220	>160	7/9/2015	<5.30
PW-1093	64.7889, -147.4064	220	>160	7/15/2016	<5.00
PW-1093	64.7889, -147.4064	220	>160	8/3/2017	<5.10
PW-1094	64.7618, -147.3984			6/29/2011	320
PW-1095	64.7593, -147.3980			1/4/2010	117
PW-1095	64.7593, -147.3980			7/21/2011	402J*
PW-1095	64.7593, -147.3980			7/11/2012	421J*
PW-1095	64.7593, -147.3980			11/27/2012	463J*
PW-1095	64.7593, -147.3980			5/21/2013	346J*
PW-1095	64.7593, -147.3980			9/30/2013	288
PW-1095	64.7593, -147.3980			5/15/2014	282
PW-1095	64.7593, -147.3980			9/29/2014	204
PW-1095	64.7593, -147.3980			3/24/2015	179

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Flint Hills Resources Alaska, LLC
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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1095	64.7593, -147.3980			8/31/2015	161
PW-1095	64.7593, -147.3980			7/25/2016	87.3
PW-1095	64.7593, -147.3980			6/2/2017	50.1JH*
PW-1096	64.7593, -147.3988			6/6/2011	327
PW-1096	64.7593, -147.3988			7/20/2011	440J*
PW-1096	64.7593, -147.3988			12/15/2011	348J*
PW-1096	64.7593, -147.3988			7/29/2013	296J*
PW-1096	64.7593, -147.3988			9/25/2015	121
PW-1096	64.7593, -147.3988			6/2/2017	40.9JH*
PW-1097	64.7593, -147.4005			1/7/2010	98.9
PW-1097	64.7593, -147.4005			11/2/2012	358J*
PW-1097	64.7593, -147.4005			5/20/2013	353J*
PW-1097	64.7593, -147.4005			12/20/2013	278
PW-1097	64.7593, -147.4005			7/11/2014	245
PW-1097	64.7593, -147.4005			2/13/2015	183
PW-1097	64.7593, -147.4005			9/11/2015	165
PW-1097	64.7593, -147.4005			4/19/2016	113
PW-1097	64.7593, -147.4005			8/2/2016	80.4
PW-1097	64.7593, -147.4005			11/14/2016	47.4
PW-1097	64.7593, -147.4005			6/19/2017	58.0JH*
PW-1098	64.7604, -147.4008	20	10-55	1/9/2010	194
PW-1098	64.7604, -147.4008	20	10-55	9/8/2010	297
PW-1098	64.7604, -147.4008	20	10-55	9/14/2010	320
PW-1098	64.7604, -147.4008	20	10-55	9/29/2010	318
PW-1098	64.7604, -147.4008	20	10-55	10/27/2010	332
PW-1098	64.7604, -147.4008	20	10-55	11/17/2010	353
PW-1098	64.7604, -147.4008	20	10-55	12/1/2010	364
PW-1098	64.7604, -147.4008	20	10-55	12/7/2010	370
PW-1098	64.7604, -147.4008	20	10-55	12/15/2010	339
PW-1098	64.7604, -147.4008	20	10-55	12/21/2010	376
PW-1098	64.7604, -147.4008	20	10-55	12/28/2010	356
PW-1098	64.7604, -147.4008	20	10-55	1/5/2011	307JH*
PW-1098	64.7604, -147.4008	20	10-55	1/12/2011	312
PW-1098	64.7604, -147.4008	20	10-55	1/19/2011	317
PW-1098	64.7604, -147.4008	20	10-55	1/26/2011	282
PW-1098	64.7604, -147.4008	20	10-55	2/2/2011	248
PW-1098	64.7604, -147.4008	20	10-55	2/9/2011	403JH*
PW-1098	64.7604, -147.4008	20	10-55	2/16/2011	382JH*
PW-1098	64.7604, -147.4008	20	10-55	2/23/2011	401
PW-1098	64.7604, -147.4008	20	10-55	3/2/2011	280
PW-1098	64.7604, -147.4008	20	10-55	3/9/2011	415
PW-1098	64.7604, -147.4008	20	10-55	3/16/2011	395
PW-1098	64.7604, -147.4008	20	10-55	3/23/2011	396
PW-1098	64.7604, -147.4008	20	10-55	3/30/2011	401
PW-1098	64.7604, -147.4008	20	10-55	4/6/2011	375
PW-1098	64.7604, -147.4008	20	10-55	4/14/2011	334
PW-1098	64.7604, -147.4008	20	10-55	4/20/2011	353
PW-1098	64.7604, -147.4008	20	10-55	4/27/2011	335
PW-1098	64.7604, -147.4008	20	10-55	5/4/2011	352
PW-1098	64.7604, -147.4008	20	10-55	5/11/2011	318

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1098	64.7604, -147.4008	20	10-55	6/8/2011	342
PW-1098	64.7604, -147.4008	20	10-55	7/11/2011	378
PW-1098	64.7604, -147.4008	20	10-55	8/9/2011	353J*
PW-1098	64.7604, -147.4008	20	10-55	9/12/2011	309
PW-1098	64.7604, -147.4008	20	10-55	10/12/2011	302
PW-1098	64.7604, -147.4008	20	10-55	11/14/2011	322
PW-1098	64.7604, -147.4008	20	10-55	12/12/2011	336
PW-1098	64.7604, -147.4008	20	10-55	1/18/2012	349
PW-1098	64.7604, -147.4008	20	10-55	1/25/2012	340J*
PW-1098	64.7604, -147.4008	20	10-55	8/14/2012	367J*
PW-1099	64.7604, -147.4001	140	90-160	9/10/2012	96.8J*
PW-1099	64.7604, -147.4001	140	90-160	3/1/2013	98.9J*
PW-1099	64.7604, -147.4001	140	90-160	3/12/2013	107
PW-1099	64.7604, -147.4001	140	90-160	6/4/2013	97.4
PW-1099	64.7604, -147.4001	140	90-160	9/24/2013	91.5
PW-1099	64.7604, -147.4001	140	90-160	9/26/2013	104
PW-1099	64.7604, -147.4001	140	90-160	12/2/2013	113
PW-1099	64.7604, -147.4001	140	90-160	3/3/2014	99.5
PW-1099	64.7604, -147.4001	140	90-160	3/24/2014	94.9
PW-1099	64.7604, -147.4001	140	90-160	6/2/2014	96.8
PW-1099	64.7604, -147.4001	140	90-160	8/18/2014	94.4
PW-1099	64.7604, -147.4001	140	90-160	8/26/2014	101
PW-1099	64.7604, -147.4001	140	90-160	11/18/2014	91.5
PW-1099	64.7604, -147.4001	140	90-160	2/3/2015	85.7
PW-1099	64.7604, -147.4001	140	90-160	3/10/2015	86.9
PW-1099	64.7604, -147.4001	140	90-160	5/18/2015	81.2
PW-1099	64.7604, -147.4001	140	90-160	8/3/2015	89.3
PW-1099	64.7604, -147.4001	140	90-160	8/13/2015	81.2
PW-1099	64.7604, -147.4001	140	90-160	10/16/2015	75.4
PW-1099	64.7604, -147.4001	140	90-160	1/12/2016	79.0
PW-1099	64.7604, -147.4001	140	90-160	7/12/2016	66.4
PW-1099	64.7604, -147.4001	140	90-160	12/27/2016	60.6
PW-1099	64.7604, -147.4001	140	90-160	5/2/2017	58.2
PW-1100	64.7618, -147.4005			5/24/2010	185
PW-1100	64.7618, -147.4005			8/23/2012	313J*
PW-1100	64.7618, -147.4005			2/4/2013	267J*
PW-1100	64.7618, -147.4005			9/6/2013	238J*
PW-1100	64.7618, -147.4005			5/15/2014	210
PW-1100	64.7618, -147.4005			4/3/2015	113
PW-1100	64.7618, -147.4005			10/30/2015	101
PW-1100	64.7618, -147.4005			3/28/2016	73.6
PW-1100	64.7618, -147.4005			8/29/2016	42.6J*
PW-1100	64.7618, -147.4005			4/4/2017	35.9
PW-1101	64.7755, -147.3649	75	55-90	2/27/2010	<11.4
PW-1101	64.7755, -147.3649	75	55-90	9/2/2011	15.1
PW-1101	64.7755, -147.3649	75	55-90	5/2/2012	13.2J*
PW-1101	64.7755, -147.3649	75	55-90	10/15/2012	16.1J*
PW-1101	64.7755, -147.3649	75	55-90	5/1/2013	<3.10J*
PW-1101	64.7755, -147.3649	75	55-90	8/26/2013	16.7J*
PW-1101	64.7755, -147.3649	75	55-90	6/30/2014	25.9

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1101	64.7755, -147.3649	75	55-90	7/20/2015	26.6
PW-1101	64.7755, -147.3649	75	55-90	6/6/2016	29.2
PW-1101	64.7755, -147.3649	75	55-90	1/16/2017	37.3
PW-1101	64.7755, -147.3649	75	55-90	4/4/2017	34.0
PW-1102	64.7754, -147.3644	40	10-55	3/27/2010	<10.6
PW-1102	64.7754, -147.3644	40	10-55	9/2/2011	7.44J
PW-1103	64.7752, -147.3653			8/7/2012	28.8J*
PW-1103	64.7752, -147.3653			4/9/2013	26.0J*
PW-1103	64.7752, -147.3653			8/26/2013	30.3J*
PW-1103	64.7752, -147.3653			1/10/2014	41.3
PW-1103	64.7752, -147.3653			6/23/2014	44.1
PW-1103	64.7752, -147.3653			4/20/2015	43.5
PW-1103	64.7752, -147.3653			11/2/2015	62.4
PW-1103	64.7752, -147.3653			4/11/2016	54.9
PW-1103	64.7752, -147.3653			9/19/2016	63.3
PW-1103	64.7752, -147.3653			12/19/2016	74.5
PW-1103	64.7752, -147.3653			3/10/2017	77.2
PW-1103	64.7752, -147.3653			8/22/2017	82.0J*
PW-1104	64.7742, -147.3648	75	55-90	2/27/2010	27.3
PW-1104	64.7742, -147.3648	75	55-90	5/8/2012	40.9J*
PW-1104	64.7742, -147.3648	75	55-90	11/25/2013	52.7
PW-1104	64.7742, -147.3648	75	55-90	11/10/2014	63.9
PW-1104	64.7742, -147.3648	75	55-90	1/26/2016	87.2
PW-1104	64.7742, -147.3648	75	55-90	1/16/2017	103
PW-1105	64.7748, -147.3637	40	10-55	3/27/2010	<10.3
PW-1105	64.7748, -147.3637	40	10-55	9/2/2011	6.72J
PW-1105	64.7748, -147.3637	40	10-55	5/11/2012	7.30J*
PW-1105	64.7748, -147.3637	40	10-55	11/14/2012	6.20J*
PW-1105	64.7748, -147.3637	40	10-55	5/10/2013	7.90J*
PW-1105	64.7748, -147.3637	40	10-55	8/1/2013	6.10J*
PW-1105	64.7748, -147.3637	40	10-55	11/12/2013	7.90J
PW-1105	64.7748, -147.3637	40	10-55	9/8/2014	7.40J
PW-1105	64.7748, -147.3637	40	10-55	8/21/2015	5.70J
PW-1105	64.7748, -147.3637	40	10-55	6/6/2016	6.00J
PW-1105	64.7748, -147.3637	40	10-55	2/10/2017	5.40J
PW-1105	64.7748, -147.3637	40	10-55	9/11/2017	6.90J
PW-1106	64.7736, -147.3599	40	10-55	2/24/2010	10.6
PW-1106	64.7736, -147.3599	40	10-55	1/6/2014	10.4
PW-1106	64.7736, -147.3599	40	10-55	6/16/2014	9.20J
PW-1106	64.7736, -147.3599	40	10-55	12/12/2014	6.70J
PW-1106	64.7736, -147.3599	40	10-55	3/17/2015	6.90J
PW-1106	64.7736, -147.3599	40	10-55	5/11/2015	5.80J
PW-1106	64.7736, -147.3599	40	10-55	9/29/2015	6.80J
PW-1106	64.7736, -147.3599	40	10-55	1/29/2016	6.00J
PW-1106	64.7736, -147.3599	40	10-55	6/7/2016	5.80J
PW-1106	64.7736, -147.3599	40	10-55	7/1/2016	6.00J
PW-1106	64.7736, -147.3599	40	10-55	10/17/2016	4.50J
PW-1106	64.7736, -147.3599	40	10-55	1/6/2017	4.60J
PW-1106	64.7736, -147.3599	40	10-55	7/7/2017	5.10J
PW-1107	64.7741, -147.3607	40	10-55	2/24/2010	<10.4

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1107	64.7741, -147.3607	40	10-55	8/24/2011	13.4
PW-1107	64.7741, -147.3607	40	10-55	12/20/2013	24.3
PW-1107	64.7741, -147.3607	40	10-55	2/28/2014	27.1
PW-1107	64.7741, -147.3607	40	10-55	6/16/2014	26.5
PW-1107	64.7741, -147.3607	40	10-55	8/26/2014	22.0
PW-1107	64.7741, -147.3607	40	10-55	12/12/2014	20.2
PW-1107	64.7741, -147.3607	40	10-55	2/17/2015	22.9
PW-1107	64.7741, -147.3607	40	10-55	5/4/2015	20.9
PW-1107	64.7741, -147.3607	40	10-55	7/7/2015	19.7
PW-1107	64.7741, -147.3607	40	10-55	8/25/2015	21.2
PW-1107	64.7741, -147.3607	40	10-55	10/9/2015	22.1
PW-1107	64.7741, -147.3607	40	10-55	12/7/2015	20.6
PW-1107	64.7741, -147.3607	40	10-55	1/25/2016	23.4
PW-1107	64.7741, -147.3607	40	10-55	2/16/2016	22.2
PW-1107	64.7741, -147.3607	40	10-55	4/5/2016	22.2
PW-1107	64.7741, -147.3607	40	10-55	8/5/2016	18.9
PW-1107	64.7741, -147.3607	40	10-55	10/28/2016	10.8
PW-1107	64.7741, -147.3607	40	10-55	12/19/2016	16.4
PW-1107	64.7741, -147.3607	40	10-55	2/21/2017	17.5
PW-1107	64.7741, -147.3607	40	10-55	5/5/2017	20.0
PW-1107	64.7741, -147.3607	40	10-55	7/31/2017	19.8
PW-1108	64.7736, -147.3626	115	90-160	2/25/2010	19.3
PW-1108	64.7736, -147.3626	115	90-160	1/22/2014	59.1
PW-1108	64.7736, -147.3626	115	90-160	4/21/2014	54.4
PW-1108	64.7736, -147.3626	115	90-160	8/15/2014	63.8
PW-1108	64.7736, -147.3626	115	90-160	11/11/2014	58.7
PW-1108	64.7736, -147.3626	115	90-160	12/30/2014	43.5
PW-1108	64.7736, -147.3626	115	90-160	3/10/2015	53.0JL*
PW-1108	64.7736, -147.3626	115	90-160	5/19/2015	54.6
PW-1108	64.7736, -147.3626	115	90-160	7/7/2015	57.6
PW-1108	64.7736, -147.3626	115	90-160	9/8/2015	66.1
PW-1108	64.7736, -147.3626	115	90-160	10/9/2015	67.3
PW-1108	64.7736, -147.3626	115	90-160	1/25/2016	80.7
PW-1108	64.7736, -147.3626	115	90-160	4/22/2016	70.2
PW-1108	64.7736, -147.3626	115	90-160	9/2/2016	68.7
PW-1108	64.7736, -147.3626	115	90-160	12/13/2016	66.5
PW-1108	64.7736, -147.3626	115	90-160	3/17/2017	80.5
PW-1108	64.7736, -147.3626	115	90-160	5/1/2017	72.5
PW-1108	64.7736, -147.3626	115	90-160	6/30/2017	44.3
PW-1109	64.7802, -147.3923	305	>160	2/27/2010	<11.4
PW-1109	64.7802, -147.3923	305	>160	8/29/2011	18.3
PW-1109	64.7802, -147.3923	305	>160	6/1/2012	20.6J*
PW-1109	64.7802, -147.3923	305	>160	3/13/2013	24.6
PW-1109	64.7802, -147.3923	305	>160	6/5/2013	25.6
PW-1109	64.7802, -147.3923	305	>160	6/5/2013	26.5
PW-1109	64.7802, -147.3923	305	>160	8/9/2013	23.2J*
PW-1109	64.7802, -147.3923	305	>160	9/9/2013	26.2
PW-1109	64.7802, -147.3923	305	>160	12/17/2013	27.3
PW-1109	64.7802, -147.3923	305	>160	3/18/2014	28.2
PW-1109	64.7802, -147.3923	305	>160	6/3/2014	25.5

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Historical Private Well Sulfolane Results Summary

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1109	64.7802, -147.3923	305	>160	8/21/2014	25.7
PW-1109	64.7802, -147.3923	305	>160	9/16/2014	28.9
PW-1109	64.7802, -147.3923	305	>160	11/25/2014	22.6
PW-1109	64.7802, -147.3923	305	>160	5/18/2015	22.0
PW-1109	64.7802, -147.3923	305	>160	8/5/2016	28.1
PW-1109	64.7802, -147.3923	305	>160	5/26/2017	33.2
PW-1110	64.7802, -147.3913	40	10-55	1/27/2012	4.31J
PW-1110	64.7802, -147.3913	40	10-55	8/15/2012	5.20J*
PW-1110	64.7802, -147.3913	40	10-55	8/19/2013	4.70J*
PW-1110	64.7802, -147.3913	40	10-55	9/5/2014	5.70J
PW-1110	64.7802, -147.3913	40	10-55	8/18/2015	7.50J
PW-1111	64.7786, -147.3901			8/23/2012	28.9
PW-1112	64.7786, -147.3923			2/28/2010	19.7
PW-1113	64.7780, -147.3923	40	10-55	2/27/2010	22.1
PW-1114	64.7780, -147.3899	40	10-55	2/25/2010	22.2
PW-1114	64.7780, -147.3899	40	10-55	7/27/2011	40.7J*
PW-1114	64.7780, -147.3899	40	10-55	12/1/2011	35.4J*
PW-1114	64.7780, -147.3899	40	10-55	8/7/2012	40.1J*
PW-1114	64.7780, -147.3899	40	10-55	3/5/2013	39.4J*
PW-1114	64.7780, -147.3899	40	10-55	9/16/2013	42.4
PW-1114	64.7780, -147.3899	40	10-55	2/10/2014	50.0JL*
PW-1114	64.7780, -147.3899	40	10-55	7/18/2014	51.7
PW-1114	64.7780, -147.3899	40	10-55	12/15/2014	48.9
PW-1114	64.7780, -147.3899	40	10-55	4/6/2015	49.9
PW-1114	64.7780, -147.3899	40	10-55	1/18/2016	52.7JH*
PW-1114	64.7780, -147.3899	40	10-55	5/16/2016	61.5
PW-1115	64.7772, -147.3921			5/1/2010	17.5
PW-1116	64.7782, -147.3938			6/21/2010	23.2
PW-1116	64.7782, -147.3938			6/12/2012	26.1J*
PW-1116	64.7782, -147.3938			4/8/2013	27.3J*
PW-1116	64.7782, -147.3938			12/16/2013	26.5
PW-1116	64.7782, -147.3938			6/17/2014	33.4
PW-1116	64.7782, -147.3938			11/14/2014	30.8
PW-1116	64.7782, -147.3938			2/17/2015	32.2
PW-1116	64.7782, -147.3938			3/13/2015	32.0
PW-1116	64.7782, -147.3938			8/3/2015	33.9
PW-1116	64.7782, -147.3938			10/30/2015	34.5
PW-1116	64.7782, -147.3938			4/25/2016	40.6
PW-1116	64.7782, -147.3938			10/4/2016	28.7
PW-1116	64.7782, -147.3938			1/31/2017	44.0
PW-1116	64.7782, -147.3938			5/22/2017	46.1J*
PW-1116	64.7782, -147.3938			9/1/2017	43.2
PW-1117	64.7783, -147.3969			10/13/2011	8.80J
PW-1118	64.7773, -147.3969	185	>160	3/9/2010	<10.0
PW-1118	64.7773, -147.3969	185	>160	7/8/2011	8.63J
PW-1118	64.7773, -147.3969	185	>160	9/28/2011	7.80J*
PW-1118	64.7773, -147.3969	185	>160	4/13/2012	8.70J*
PW-1118	64.7773, -147.3969	185	>160	8/7/2012	8.20J*
PW-1118	64.7773, -147.3969	185	>160	11/13/2012	7.40J*
PW-1118	64.7773, -147.3969	185	>160	3/12/2013	12.0J*

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Historical Private Well Sulfolane Results Summary

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1118	64.7773, -147.3969	185	>160	1/31/2014	10.5
PW-1118	64.7773, -147.3969	185	>160	4/15/2014	9.90J
PW-1118	64.7773, -147.3969	185	>160	6/30/2014	12.3
PW-1118	64.7773, -147.3969	185	>160	1/20/2015	12.6
PW-1118	64.7773, -147.3969	185	>160	3/24/2015	11.6
PW-1118	64.7773, -147.3969	185	>160	7/17/2015	15.2
PW-1118	64.7773, -147.3969	185	>160	8/21/2015	14.8
PW-1118	64.7773, -147.3969	185	>160	10/9/2015	14.9
PW-1118	64.7773, -147.3969	185	>160	11/9/2015	15.3
PW-1118	64.7773, -147.3969	185	>160	2/19/2016	20.1
PW-1118	64.7773, -147.3969	185	>160	6/13/2016	20.6
PW-1118	64.7773, -147.3969	185	>160	11/4/2016	18.9
PW-1118	64.7773, -147.3969	185	>160	11/21/2016	13.8
PW-1118	64.7773, -147.3969	185	>160	1/9/2017	22.5
PW-1118	64.7773, -147.3969	185	>160	1/31/2017	24.9
PW-1118	64.7773, -147.3969	185	>160	2/21/2017	23.1
PW-1118	64.7773, -147.3969	185	>160	3/14/2017	26.0
PW-1118	64.7773, -147.3969	185	>160	4/17/2017	28.6
PW-1118	64.7773, -147.3969	185	>160	8/4/2017	27.2
PW-1119	64.7550, -147.2696			2/26/2013	<6.46
PW-1126	64.7573, -147.3616	60	55-90	2/18/2010	37.9
PW-1127	64.7574, -147.3622	40	10-55	3/16/2010	28.0
PW-1150	64.7763, -147.3175			4/10/2010	<10.4
PW-1151	64.7503, -147.2988			12/2/2009	<10.0
PW-1152	64.7327, -147.3262			12/21/2009	<10.0
PW-1154	64.7708, -147.4370	28	10-55	7/16/2013	<6.46
PW-1155	64.7665, -147.3739	215	>160	2/13/2010	55.4
PW-1155	64.7665, -147.3739	215	>160	10/20/2011	118J*
PW-1155	64.7665, -147.3739	215	>160	4/9/2012	143J*
PW-1155	64.7665, -147.3739	215	>160	7/10/2012	146J*
PW-1155	64.7665, -147.3739	215	>160	9/12/2012	151J*
PW-1155	64.7665, -147.3739	215	>160	3/1/2013	143J*
PW-1155	64.7665, -147.3739	215	>160	3/18/2013	162
PW-1155	64.7665, -147.3739	215	>160	4/26/2013	155J*
PW-1155	64.7665, -147.3739	215	>160	6/5/2013	159
PW-1155	64.7665, -147.3739	215	>160	6/5/2013	166
PW-1155	64.7665, -147.3739	215	>160	6/10/2013	163J*
PW-1155	64.7665, -147.3739	215	>160	9/2/2013	144JL*
PW-1155	64.7665, -147.3739	215	>160	9/11/2013	172
PW-1155	64.7665, -147.3739	215	>160	11/25/2013	173
PW-1155	64.7665, -147.3739	215	>160	12/13/2013	156
PW-1155	64.7665, -147.3739	215	>160	3/7/2014	184
PW-1155	64.7665, -147.3739	215	>160	3/10/2014	173
PW-1155	64.7665, -147.3739	215	>160	4/11/2014	190
PW-1155	64.7665, -147.3739	215	>160	5/28/2014	181
PW-1155	64.7665, -147.3739	215	>160	8/18/2014	180
PW-1155	64.7665, -147.3739	215	>160	8/25/2014	193
PW-1155	64.7665, -147.3739	215	>160	11/3/2014	174
PW-1155	64.7665, -147.3739	215	>160	11/4/2014	169
PW-1155	64.7665, -147.3739	215	>160	2/12/2015	170

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1155	64.7665, -147.3739	215	>160	2/17/2015	166
PW-1155	64.7665, -147.3739	215	>160	5/5/2015	171
PW-1155	64.7665, -147.3739	215	>160	5/18/2015	159
PW-1155	64.7665, -147.3739	215	>160	8/17/2015	177
PW-1155	64.7665, -147.3739	215	>160	8/20/2015	176
PW-1155	64.7665, -147.3739	215	>160	10/16/2015	172
PW-1155	64.7665, -147.3739	215	>160	12/4/2015	179
PW-1155	64.7665, -147.3739	215	>160	12/18/2015	184
PW-1155	64.7665, -147.3739	215	>160	1/4/2016	179
PW-1155	64.7665, -147.3739	215	>160	6/20/2016	156
PW-1155	64.7665, -147.3739	215	>160	7/25/2016	147
PW-1155	64.7665, -147.3739	215	>160	10/17/2016	120
PW-1155	64.7665, -147.3739	215	>160	12/2/2016	112
PW-1155	64.7665, -147.3739	215	>160	3/17/2017	150
PW-1155	64.7665, -147.3739	215	>160	4/14/2017	149
PW-1155	64.7665, -147.3739	215	>160	5/8/2017	144
PW-1155	64.7665, -147.3739	215	>160	6/6/2017	148
PW-1155	64.7665, -147.3739	215	>160	7/25/2017	135
PW-1157	64.7606, -147.2826			3/6/2012	<6.46
PW-1160	64.7281, -147.2949			4/19/2012	<6.66
PW-1165	64.8198, -147.4334	32	10-55	4/10/2012	<6.40
PW-1170	64.7837, -147.3957			5/5/2010	<10.3
PW-1170	64.7837, -147.3957			10/25/2011	8.13J
PW-1172	64.7777, -147.3514			11/9/2010	<10.6
PW-1172	64.7777, -147.3514			6/7/2012	<6.20
PW-1172	64.7777, -147.3514			7/23/2013	<6.20
PW-1172	64.7777, -147.3514			6/17/2014	<5.00
PW-1172	64.7777, -147.3514			8/7/2015	<5.30
PW-1173	64.7782, -147.3514			11/9/2010	<10.9
PW-1173	64.7782, -147.3514			6/7/2012	<6.20
PW-1173	64.7782, -147.3514			7/22/2013	<6.20
PW-1173	64.7782, -147.3514			6/16/2014	<5.30
PW-1173	64.7782, -147.3514			7/24/2015	<5.25
PW-1174	64.7786, -147.3524			2/7/2011	<10.5
PW-1174	64.7786, -147.3524			6/22/2012	<6.40
PW-1174	64.7786, -147.3524			6/18/2013	<6.74
PW-1174	64.7786, -147.3524			6/17/2014	<5.00
PW-1174	64.7786, -147.3524			8/6/2015	<5.30
PW-1175	64.7787, -147.3515	40	10-55	11/2/2010	<10.2
PW-1175	64.7787, -147.3515	40	10-55	5/7/2012	<6.20
PW-1175	64.7787, -147.3515	40	10-55	7/18/2013	<6.20
PW-1175	64.7787, -147.3515	40	10-55	6/16/2014	<5.00
PW-1175	64.7787, -147.3515	40	10-55	7/20/2015	<5.30
PW-1176	64.7792, -147.3516	40	10-55	1/26/2011	<11.5
PW-1176	64.7792, -147.3516	40	10-55	7/12/2013	<6.20
PW-1176	64.7792, -147.3516	40	10-55	6/16/2014	<5.00
PW-1176	64.7792, -147.3516	40	10-55	7/20/2015	<5.40
PW-1177	64.7792, -147.3529	30	10-55	11/2/2010	<10.0
PW-1177	64.7792, -147.3529	30	10-55	8/17/2013	<6.74
PW-1177	64.7792, -147.3529	30	10-55	6/16/2014	<5.25

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North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1177	64.7792, -147.3529	30	10-55	7/20/2015	<5.30
PW-1178	64.7797, -147.3531	40	10-55	1/6/2011	<11.2
PW-1178	64.7797, -147.3531	40	10-55	6/18/2012	<6.46
PW-1178	64.7797, -147.3531	40	10-55	7/11/2014	<5.30
PW-1178	64.7797, -147.3531	40	10-55	7/27/2015	<5.20
PW-1179	64.7802, -147.3532	40	10-55	1/6/2011	<10.8
PW-1179	64.7802, -147.3532	40	10-55	6/29/2012	<6.20
PW-1179	64.7802, -147.3532	40	10-55	6/24/2013	<6.52
PW-1179	64.7802, -147.3532	40	10-55	7/11/2014	<5.35
PW-1179	64.7802, -147.3532	40	10-55	7/23/2015	<5.25
PW-1180	64.7791, -147.3500	40	10-55	1/6/2010	<11.0
PW-1180	64.7791, -147.3500	40	10-55	9/29/2010	<10.8
PW-1181	64.7873, -147.4052			1/25/2012	<6.20
PW-1181	64.7873, -147.4052			6/21/2012	<6.20J*
PW-1181	64.7873, -147.4052			11/9/2013	<6.46
PW-1182	64.7980, -147.4432	40	10-55	7/23/2013	<6.20
PW-1183	64.7683, -147.3515			2/23/2010	12.2
PW-1184	64.7918, -147.3857			11/2/2011	<6.46
PW-1185	64.7617, -147.3566			7/21/2010	<10.5
PW-1185	64.7617, -147.3566			7/8/2011	<6.60
PW-1185	64.7617, -147.3566			5/25/2012	<6.20
PW-1185	64.7617, -147.3566			5/29/2013	<6.46
PW-1185	64.7617, -147.3566			5/12/2014	<5.25
PW-1185	64.7617, -147.3566			5/4/2015	<5.10
PW-1185	64.7617, -147.3566			5/3/2016	<5.05
PW-1185	64.7617, -147.3566			5/11/2017	<5.05
PW-1186	64.7765, -147.3618			4/18/2010	<10.0J*
PW-1186	64.7765, -147.3618			5/10/2010	<10.5
PW-1186	64.7765, -147.3618			8/31/2011	16.3
PW-1186	64.7765, -147.3618			12/14/2011	15.7J*
PW-1186	64.7765, -147.3618			4/13/2012	15.2J*
PW-1186	64.7765, -147.3618			8/20/2012	15.9J*
PW-1186	64.7765, -147.3618			12/4/2012	20.8JH*
PW-1186	64.7765, -147.3618			2/5/2013	13.0J*
PW-1186	64.7765, -147.3618			4/19/2013	7.60J*
PW-1186	64.7765, -147.3618			7/16/2013	10.9J*
PW-1186	64.7765, -147.3618			9/20/2013	13.3
PW-1186	64.7765, -147.3618			2/4/2014	18.3
PW-1186	64.7765, -147.3618			5/13/2014	15.1
PW-1186	64.7765, -147.3618			7/21/2014	15.9
PW-1186	64.7765, -147.3618			9/8/2014	16.6
PW-1186	64.7765, -147.3618			10/31/2014	15.1
PW-1186	64.7765, -147.3618			12/16/2014	14.5
PW-1186	64.7765, -147.3618			1/20/2015	14.3
PW-1186	64.7765, -147.3618			2/20/2015	14.6
PW-1186	64.7765, -147.3618			3/23/2015	12.7
PW-1186	64.7765, -147.3618			5/4/2015	13.0
PW-1186	64.7765, -147.3618			6/12/2015	13.5
PW-1186	64.7765, -147.3618			7/20/2015	13.8
PW-1186	64.7765, -147.3618			8/28/2015	13.6

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1186	64.7765, -147.3618			11/6/2015	14.3
PW-1186	64.7765, -147.3618			1/8/2016	12.4
PW-1186	64.7765, -147.3618			2/19/2016	13.7
PW-1186	64.7765, -147.3618			5/9/2016	12.4
PW-1186	64.7765, -147.3618			8/27/2016	10.1J*
PW-1186	64.7765, -147.3618			12/23/2016	10.9
PW-1186	64.7765, -147.3618			2/14/2017	11.3
PW-1186	64.7765, -147.3618			3/21/2017	13.7
PW-1186	64.7765, -147.3618			4/18/2017	12.2J*
PW-1186	64.7765, -147.3618			8/25/2017	11.6
PW-1187	64.7666, -147.3782			1/4/2010	57.9
PW-1190	64.7824, -147.3863			4/15/2010	<10.0
PW-1190	64.7824, -147.3863			8/29/2011	5.92J
PW-1190	64.7824, -147.3863			10/27/2011	6.00J*
PW-1190	64.7824, -147.3863			6/26/2012	7.10J*
PW-1190	64.7824, -147.3863			1/30/2013	6.20J*
PW-1190	64.7824, -147.3863			9/16/2013	6.60J
PW-1190	64.7824, -147.3863			4/7/2014	8.50J
PW-1190	64.7824, -147.3863			12/29/2014	9.50J
PW-1190	64.7824, -147.3863			3/28/2016	11.6
PW-1190	64.7824, -147.3863			10/24/2016	10.6
PW-1190	64.7824, -147.3863			4/3/2017	14.2
PW-1194	64.7862, -147.3617			2/19/2011	<10.5
PW-1194	64.7862, -147.3617			8/29/2012	<6.20
PW-1194	64.7862, -147.3617			7/25/2013	<6.60
PW-1194	64.7862, -147.3617			7/14/2014	<5.15
PW-1194	64.7862, -147.3617			8/21/2015	<5.20
PW-1195	64.7862, -147.3640	40	10-55	11/6/2010	<10.3
PW-1195	64.7862, -147.3640	40	10-55	6/7/2012	<6.52
PW-1195	64.7862, -147.3640	40	10-55	8/1/2013	<6.20
PW-1195	64.7862, -147.3640	40	10-55	6/24/2014	<5.00
PW-1195	64.7862, -147.3640	40	10-55	7/14/2015	<5.30
PW-1197	64.7629, -147.3385	49	10-55	4/10/2012	<6.66
PW-1197	64.7629, -147.3385	49	10-55	6/27/2014	<5.00
PW-1197	64.7629, -147.3385	49	10-55	7/23/2015	<5.30
PW-1198	64.7629, -147.3395			4/18/2012	<6.40
PW-1198	64.7629, -147.3395			7/31/2013	<6.46
PW-1198	64.7629, -147.3395			7/23/2014	<5.00
PW-1198	64.7629, -147.3395			7/24/2015	<5.25
PW-1199	64.7638, -147.3396			4/19/2012	<6.74
PW-1199	64.7638, -147.3396			9/4/2013	<6.40
PW-1199	64.7638, -147.3396			7/30/2015	<5.25
PW-1200	64.7638, -147.3386			4/30/2012	<6.40
PW-1200	64.7638, -147.3386			6/24/2014	<5.00
PW-1200	64.7638, -147.3386			8/4/2015	<5.30
PW-1201	64.7644, -147.3397	30	10-55	4/27/2012	<6.88
PW-1201	64.7644, -147.3397	30	10-55	8/13/2013	<6.46
PW-1201	64.7644, -147.3397	30	10-55	5/24/2014	<5.20
PW-1201	64.7644, -147.3397	30	10-55	6/26/2015	<5.40
PW-1202	64.7648, -147.3397			4/20/2012	<6.82

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1202	64.7648, -147.3397			8/6/2013	<6.46
PW-1202	64.7648, -147.3397			4/24/2014	<5.00
PW-1202	64.7648, -147.3397			6/26/2015	<5.50
PW-1203	64.7659, -147.3397			4/24/2012	<6.40
PW-1203	64.7659, -147.3397			7/12/2013	<6.20
PW-1203	64.7659, -147.3397			5/21/2014	<5.30
PW-1203	64.7659, -147.3397			6/23/2015	<5.10
PW-1204	64.7664, -147.3397			7/11/2012	<6.20
PW-1204	64.7664, -147.3397			6/25/2013	<6.66
PW-1204	64.7664, -147.3397			4/22/2014	<5.00
PW-1204	64.7664, -147.3397			6/23/2015	<5.50
PW-1205	64.7668, -147.3398	40	10-55	4/16/2012	<6.52
PW-1205	64.7668, -147.3398	40	10-55	7/23/2013	<6.20
PW-1205	64.7668, -147.3398	40	10-55	5/7/2014	<5.55
PW-1205	64.7668, -147.3398	40	10-55	7/10/2015	<5.35
PW-1206	64.7673, -147.3397	40	10-55	4/20/2012	<6.88
PW-1206	64.7673, -147.3397	40	10-55	6/24/2013	<6.52
PW-1206	64.7673, -147.3397	40	10-55	6/18/2014	<5.15
PW-1206	64.7673, -147.3397	40	10-55	8/5/2015	<5.30
PW-1207	64.7677, -147.3396			5/8/2012	<6.20
PW-1207	64.7677, -147.3396			8/12/2013	<6.20
PW-1207	64.7677, -147.3396			7/29/2015	<5.45
PW-1208	64.7683, -147.3382	40	10-55	4/18/2012	<6.46
PW-1209	64.7681, -147.3404			4/16/2012	<6.60
PW-1209	64.7681, -147.3404			9/4/2013	<6.46
PW-1209	64.7681, -147.3404			8/8/2014	<5.45
PW-1209	64.7681, -147.3404			7/28/2015	<5.35
PW-1210	64.7687, -147.3409			4/9/2010	<10.7
PW-1210	64.7687, -147.3409			4/2/2012	<7.04
PW-1210	64.7687, -147.3409			6/25/2013	<6.52
PW-1210	64.7687, -147.3409			6/24/2014	<5.00
PW-1210	64.7687, -147.3409			7/23/2015	<5.20
PW-1216	64.7674, -147.3367	40	10-55	6/1/2012	<6.20
PW-1219	64.7646, -147.3654			1/4/2010	24.9
PW-1221	64.7713, -147.3533	40	10-55	3/1/2010	<10.9
PW-1221	64.7713, -147.3533	40	10-55	7/9/2011	6.64J
PW-1221	64.7713, -147.3533	40	10-55	3/22/2014	<5.20
PW-1221	64.7713, -147.3533	40	10-55	5/12/2015	<5.30
PW-1222	64.7716, -147.3542			2/25/2010	<10.9
PW-1222	64.7716, -147.3542			7/9/2011	8.62J
PW-1223	64.7716, -147.3553	40	10-55	2/25/2010	12.7
PW-1224	64.7716, -147.3561			3/7/2010	13.8
PW-1225	64.7716, -147.3570	32	10-55	3/3/2010	16.3
PW-1226	64.7716, -147.3588	42	10-55	2/25/2010	12.2JL*
PW-1226	64.7716, -147.3588	42	10-55	3/2/2010	11.1
PW-1227	64.7448, -147.3444			1/6/2010	<10.0
PW-1227	64.7448, -147.3444			12/11/2014	<5.25
PW-1228	64.8079, -147.5272	40	10-55	7/28/2011	<6.66
PW-1229	64.7831, -147.2723			5/10/2010	<10.0
PW-1230	64.7579, -147.3716	231	>160	3/11/2013	558

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1230	64.7579, -147.3716	231	>160	3/28/2013	517
PW-1230	64.7579, -147.3716	231	>160	6/27/2013	603
PW-1230	64.7579, -147.3716	231	>160	9/12/2013	652
PW-1230	64.7579, -147.3716	231	>160	12/2/2013	657
PW-1230	64.7579, -147.3716	231	>160	3/27/2014	708
PW-1230	64.7579, -147.3716	231	>160	5/27/2014	681
PW-1230	64.7579, -147.3716	231	>160	9/10/2014	666
PW-1230	64.7579, -147.3716	231	>160	11/5/2014	716
PW-1230	64.7579, -147.3716	231	>160	3/3/2015	695
PW-1230	64.7579, -147.3716	231	>160	5/11/2015	724
PW-1230	64.7579, -147.3716	231	>160	8/12/2015	813
PW-1230	64.7579, -147.3716	231	>160	10/16/2015	799
PW-1230	64.7579, -147.3716	231	>160	2/5/2016	816
PW-1230	64.7579, -147.3716	231	>160	4/27/2016	946J*
PW-1230	64.7579, -147.3716	231	>160	5/26/2016	733
PW-1230	64.7579, -147.3716	231	>160	8/18/2016	768
PW-1230	64.7579, -147.3716	231	>160	11/18/2016	915
PW-1230	64.7579, -147.3716	231	>160	2/24/2017	650
PW-1231	64.7427, -147.3015	40	10-55	11/30/2010	<10.3
PW-1232	64.7538, -147.2641			8/11/2010	<10.0
PW-1233	64.7550, -147.2655			6/21/2010	<10.8
PW-1253	64.7536, -147.2712			8/17/2011	<6.20
PW-1254	64.7809, -147.3456	45	10-55	8/3/2010	<10.0
PW-1255	64.7817, -147.3436	26.5	10-55	4/24/2010	<10.2
PW-1256	64.7332, -147.2973			3/4/2013	<6.60
PW-1257	64.8250, -147.4307			6/17/2011	<6.20
PW-1258	64.7457, -147.2765			12/22/2009	<10.5
PW-1258	64.7457, -147.2765			7/25/2012	<6.20
PW-1259	64.7864, -147.3539	40	10-55	6/14/2011	<6.20
PW-1261	64.7855, -147.3546	40	10-55	11/2/2010	<10.9
PW-1261	64.7855, -147.3546	40	10-55	6/7/2012	<6.20
PW-1261	64.7855, -147.3546	40	10-55	6/18/2013	<6.50
PW-1261	64.7855, -147.3546	40	10-55	6/19/2014	<5.25
PW-1262	64.7859, -147.3564			11/6/2010	<11.1
PW-1262	64.7859, -147.3564			7/9/2012	<6.40
PW-1262	64.7859, -147.3564			7/19/2013	<6.52
PW-1262	64.7859, -147.3564			7/23/2014	<5.30
PW-1262	64.7859, -147.3564			8/22/2015	<5.25
PW-1263	64.7862, -147.3581			11/1/2010	<11.4J*
PW-1263	64.7862, -147.3581			6/19/2012	<6.20
PW-1263	64.7862, -147.3581			8/16/2013	<6.52
PW-1263	64.7862, -147.3581			6/13/2014	<5.15
PW-1263	64.7862, -147.3581			8/6/2015	<5.30
PW-1272	64.7581, -147.3475			4/9/2012	<6.82
PW-1272	64.7581, -147.3475			11/8/2013	<6.36
PW-1272	64.7581, -147.3475			5/21/2014	<5.50
PW-1272	64.7581, -147.3475			7/30/2015	<5.30
PW-1273	64.7586, -147.3484			4/30/2012	<6.52
PW-1273	64.7586, -147.3484			6/12/2013	<7.04
PW-1273	64.7586, -147.3484			5/6/2014	<5.00

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1273	64.7586, -147.3484			6/26/2015	<5.30
PW-1276	64.7760, -147.3589	41	10-55	4/13/2010	<10.0
PW-1276	64.7760, -147.3589	41	10-55	8/29/2011	5.47J
PW-1276	64.7760, -147.3589	41	10-55	7/17/2012	6.50J*
PW-1276	64.7760, -147.3589	41	10-55	2/28/2013	<3.10J*
PW-1276	64.7760, -147.3589	41	10-55	8/27/2013	4.60J*
PW-1276	64.7760, -147.3589	41	10-55	2/10/2014	<3.00J*
PW-1276	64.7760, -147.3589	41	10-55	7/28/2014	4.10J
PW-1276	64.7760, -147.3589	41	10-55	3/2/2015	6.60J
PW-1276	64.7760, -147.3589	41	10-55	6/22/2015	3.60J
PW-1276	64.7760, -147.3589	41	10-55	12/14/2015	2.70J
PW-1276	64.7760, -147.3589	41	10-55	5/10/2016	3.10J
PW-1276	64.7760, -147.3589	41	10-55	10/10/2016	<2.50
PW-1276	64.7760, -147.3589	41	10-55	8/28/2017	2.60J
PW-1277	64.7750, -147.3569	80	55-90	1/27/2012	9.73J
PW-1280	64.7666, -147.3262			11/29/2011	<6.40
PW-1282	64.7671, -147.3265			10/25/2012	<6.60
PW-1284	64.7631, -147.3310			12/14/2009	<10.3
PW-1287	64.7673, -147.3310			2/8/2012	<6.82
PW-1288	64.7569, -147.3646	40	10-55	7/9/2010	24.7
PW-1289	64.8034, -147.4724			10/15/2012	<6.20
PW-1290	64.8317, -147.4177			9/8/2010	<11.0
PW-1308	64.7990, -147.4107			11/20/2012	<6.52
PW-1314	64.7657, -147.4124			3/9/2010	69.7
PW-1314	64.7657, -147.4124			4/19/2011	101JL*
PW-1314	64.7657, -147.4124			5/12/2011	94.8J*
PW-1314	64.7657, -147.4124			11/7/2011	119J*
PW-1314	64.7657, -147.4124			5/4/2012	141J*
PW-1314	64.7657, -147.4124			12/7/2012	188J*
PW-1314	64.7657, -147.4124			7/2/2013	168J*
PW-1314	64.7657, -147.4124			12/9/2013	174
PW-1314	64.7657, -147.4124			10/27/2014	162
PW-1314	64.7657, -147.4124			2/24/2015	188
PW-1314	64.7657, -147.4124			10/2/2015	145
PW-1314	64.7657, -147.4124			5/9/2016	143
PW-1314	64.7657, -147.4124			2/14/2017	105
PW-1315	64.7654, -147.4112			3/6/2010	72.0
PW-1315	64.7654, -147.4112			4/5/2011	110
PW-1315	64.7654, -147.4112			9/15/2011	49.8J*
PW-1315	64.7654, -147.4112			2/28/2012	118J*
PW-1315	64.7654, -147.4112			7/18/2012	129J*
PW-1315	64.7654, -147.4112			11/9/2012	78.0J*
PW-1315	64.7654, -147.4112			4/1/2013	189J*
PW-1315	64.7654, -147.4112			7/15/2013	147J*
PW-1315	64.7654, -147.4112			11/8/2013	174
PW-1315	64.7654, -147.4112			3/10/2014	164
PW-1315	64.7654, -147.4112			8/8/2014	157
PW-1315	64.7654, -147.4112			10/21/2014	191
PW-1315	64.7654, -147.4112			1/13/2015	85.6
PW-1315	64.7654, -147.4112			4/14/2015	178

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1315	64.7654, -147.4112			7/14/2015	162
PW-1315	64.7654, -147.4112			10/19/2015	191
PW-1315	64.7654, -147.4112			2/8/2016	138
PW-1315	64.7654, -147.4112			6/10/2016	135
PW-1315	64.7654, -147.4112			9/19/2016	57.8
PW-1315	64.7654, -147.4112			1/17/2017	74.7
PW-1315	64.7654, -147.4112			4/7/2017	109
PW-1315	64.7654, -147.4112			6/13/2017	124JH*
PW-1315	64.7654, -147.4112			8/7/2017	104
PW-1329	64.7852, -147.3974			3/11/2010	<10.5
PW-1329	64.7852, -147.3974			10/18/2011	13.9
PW-1330	64.7870, -147.3974			11/22/2011	<6.52
PW-1330	64.7870, -147.3974			6/5/2012	<6.52
PW-1330	64.7870, -147.3974			5/16/2013	3.73J
PW-1333	64.7831, -147.3648			4/14/2010	<10.7
PW-1333	64.7831, -147.3648			8/30/2011	<6.40
PW-1333	64.7831, -147.3648			5/17/2012	<6.20
PW-1333	64.7831, -147.3648			7/30/2013	<6.20
PW-1333	64.7831, -147.3648			4/30/2014	<5.25
PW-1333	64.7831, -147.3648			6/29/2015	<5.30
PW-1333	64.7831, -147.3648			5/19/2016	<5.05
PW-1333	64.7831, -147.3648			6/20/2017	<5.10
PW-1340	64.7746, -147.3234	108	90-160	11/12/2013	<6.20
PW-1341	64.7719, -147.3227			11/5/2011	<6.60
PW-1342	64.7633, -147.2596			4/9/2010	<10.2
PW-1343	64.7738, -147.3283	94	90-160	3/20/2013	<6.66
PW-1343	64.7738, -147.3283	94	90-160	6/13/2013	<6.20J§*
PW-1343	64.7738, -147.3283	94	90-160	9/10/2013	<6.40
PW-1343	64.7738, -147.3283	94	90-160	11/21/2013	<5.00J*
PW-1343	64.7738, -147.3283	94	90-160	3/13/2014	<5.20
PW-1343	64.7738, -147.3283	94	90-160	5/28/2014	<5.40
PW-1343	64.7738, -147.3283	94	90-160	9/11/2014	<5.30
PW-1343	64.7738, -147.3283	94	90-160	11/13/2014	<5.25
PW-1343	64.7738, -147.3283	94	90-160	3/23/2015	<5.30
PW-1343	64.7738, -147.3283	94	90-160	5/11/2015	<5.20
PW-1343	64.7738, -147.3283	94	90-160	8/19/2015	<5.15
PW-1343	64.7738, -147.3283	94	90-160	10/31/2015	<5.25
PW-1344	64.7613, -147.3794			11/28/2009	146
PW-1345	64.7609, -147.3784			11/28/2009	143
PW-1348	64.7514, -147.3663			11/12/2009	244
PW-1349	64.7514, -147.3644	50	10-55	11/12/2009	145
PW-1350	64.7514, -147.3626	50	10-55	11/12/2009	178
PW-1351	64.7497, -147.3611	40	10-55	11/14/2009	85.5
PW-1352	64.7492, -147.3611	40	10-55	11/14/2009	158J*
PW-1353	64.7483, -147.3630			11/12/2009	225
PW-1353	64.7483, -147.3630			6/11/2013	174
PW-1354	64.7483, -147.3651	60	55-90	11/11/2009	122
PW-1355	64.7483, -147.3671	40	10-55	11/11/2009	96.5
PW-1356	64.7493, -147.3666	40	10-55	11/14/2009	129
PW-1356	64.7493, -147.3666	40	10-55	6/25/2013	45.2

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1357	64.7493, -147.3649	40	10-55	11/13/2009	238
PW-1358	64.7493, -147.3632	50	10-55	11/13/2009	137
PW-1358	64.7493, -147.3632	50	10-55	6/11/2013	103
PW-1359	64.7489, -147.3632	40	10-55	11/11/2009	219
PW-1360	64.7489, -147.3649	50	10-55	11/11/2009	155
PW-1361	64.7489, -147.3666	40	10-55	11/11/2009	112
PW-1361	64.7489, -147.3666	40	10-55	6/11/2013	33.7
PW-1362	64.7499, -147.3631	40	10-55	11/11/2009	157
PW-1363	64.7499, -147.3648	40	10-55	1/6/2010	80.6
PW-1363	64.7499, -147.3648	40	10-55	7/11/2013	132
PW-1364	64.7499, -147.3664	40	10-55	11/12/2009	128
PW-1365	64.7729, -147.3440			6/29/2012	<6.32
PW-1365	64.7729, -147.3440			6/26/2013	<6.52
PW-1365	64.7729, -147.3440			7/8/2014	<5.40
PW-1365	64.7729, -147.3440			6/24/2015	<5.60
PW-1366	64.7740, -147.3501			11/19/2011	<6.20
PW-1366	64.7740, -147.3501			6/23/2012	<6.20
PW-1366	64.7740, -147.3501			5/17/2013	<6.30
PW-1366	64.7740, -147.3501			5/7/2014	<5.05
PW-1366	64.7740, -147.3501			7/13/2015	<5.35
PW-1369	64.7602, -147.3617			2/3/2010	10.7
PW-1370	64.7469, -147.3281			4/9/2012	<6.32
PW-1371	64.7469, -147.3298			12/3/2009	<10.4
PW-1373	64.7657, -147.3741	220	>160	2/13/2010	70.3
PW-1374	64.7674, -147.4143	55	55-90	3/4/2010	51.0
PW-1374	64.7674, -147.4143	55	55-90	5/18/2011	76.3J*
PW-1374	64.7674, -147.4143	55	55-90	9/14/2011	66.8J*
PW-1374	64.7674, -147.4143	55	55-90	1/23/2012	96.1J*
PW-1374	64.7674, -147.4143	55	55-90	6/28/2012	107J*
PW-1374	64.7674, -147.4143	55	55-90	12/17/2012	120J*
PW-1374	64.7674, -147.4143	55	55-90	5/20/2013	118J*
PW-1374	64.7674, -147.4143	55	55-90	5/21/2014	143
PW-1374	64.7674, -147.4143	55	55-90	2/9/2015	152
PW-1374	64.7674, -147.4143	55	55-90	8/14/2015	167
PW-1374	64.7674, -147.4143	55	55-90	12/21/2015	171
PW-1374	64.7674, -147.4143	55	55-90	4/15/2016	184
PW-1374	64.7674, -147.4143	55	55-90	6/14/2016	155
PW-1374	64.7674, -147.4143	55	55-90	8/16/2016	165
PW-1374	64.7674, -147.4143	55	55-90	10/3/2016	137
PW-1374	64.7674, -147.4143	55	55-90	1/6/2017	153
PW-1374	64.7674, -147.4143	55	55-90	5/1/2017	151
PW-1374	64.7674, -147.4143	55	55-90	6/6/2017	156
PW-1374	64.7674, -147.4143	55	55-90	7/18/2017	145
PW-1374	64.7674, -147.4143	55	55-90	8/28/2017	145
PW-1375	64.7669, -147.4143			3/6/2010	42.7
PW-1375	64.7669, -147.4143			5/18/2011	60.7J*
PW-1375	64.7669, -147.4143			9/22/2011	63.8J*
PW-1375	64.7669, -147.4143			1/23/2012	79.7J*
PW-1375	64.7669, -147.4143			6/26/2012	83.6J*
PW-1375	64.7669, -147.4143			5/10/2013	92.1J*

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1375	64.7669, -147.4143			2/11/2014	105
PW-1375	64.7669, -147.4143			10/17/2014	124
PW-1375	64.7669, -147.4143			4/14/2015	130
PW-1375	64.7669, -147.4143			11/10/2015	142
PW-1375	64.7669, -147.4143			3/15/2016	157
PW-1375	64.7669, -147.4143			8/23/2016	137
PW-1375	64.7669, -147.4143			12/16/2016	137
PW-1375	64.7669, -147.4143			7/28/2017	123
PW-1376	64.7666, -147.4125	30	10-55	3/11/2010	68.9
PW-1378	64.7544, -147.3620			11/13/2009	84.1
PW-1378	64.7544, -147.3620			7/15/2013	43.6
PW-1379	64.7546, -147.3609			11/14/2009	16.1
PW-1380	64.8013, -147.4092	40	10-55	6/25/2013	<6.52
PW-1382	64.7999, -147.4093	40	10-55	1/20/2010	<10.8
PW-1389	64.7982, -147.4089	40	10-55	1/26/2011	<10.5
PW-1394	64.7750, -147.3599			4/18/2010	<10.0J*
PW-1394	64.7750, -147.3599			9/7/2011	23.9
PW-1394	64.7750, -147.3599			11/9/2011	22.1J*
PW-1394	64.7750, -147.3599			4/19/2012	22.7J*
PW-1394	64.7750, -147.3599			9/28/2012	22.6J*
PW-1394	64.7750, -147.3599			2/18/2013	20.6J*
PW-1394	64.7750, -147.3599			8/22/2016	14.3
PW-1394	64.7750, -147.3599			7/25/2017	15.4
PW-1395	64.7761, -147.3631			4/9/2010	<10.6
PW-1395	64.7761, -147.3631			5/10/2010	20.0
PW-1395	64.7761, -147.3631			3/15/2013	29.4J*
PW-1395	64.7761, -147.3631			5/14/2013	25.7J*
PW-1395	64.7761, -147.3631			6/10/2013	24.0J*
PW-1395	64.7761, -147.3631			9/3/2013	28.0JL*
PW-1395	64.7761, -147.3631			12/13/2013	24.2
PW-1395	64.7761, -147.3631			2/14/2014	27.0
PW-1395	64.7761, -147.3631			5/21/2014	25.8
PW-1395	64.7761, -147.3631			9/19/2014	28.4
PW-1395	64.7761, -147.3631			12/9/2014	25.1J*
PW-1395	64.7761, -147.3631			12/22/2014	23.2
PW-1395	64.7761, -147.3631			2/27/2015	20.2
PW-1395	64.7761, -147.3631			5/11/2015	21.2
PW-1395	64.7761, -147.3631			9/11/2015	23.7
PW-1395	64.7761, -147.3631			10/16/2015	23.7
PW-1395	64.7761, -147.3631			2/9/2016	23.7
PW-1395	64.7761, -147.3631			5/17/2016	23.1
PW-1395	64.7761, -147.3631			9/6/2016	27.6
PW-1395	64.7761, -147.3631			12/5/2016	16.6
PW-1395	64.7761, -147.3631			1/30/2017	18.7
PW-1395	64.7761, -147.3631			3/28/2017	21.8
PW-1395	64.7761, -147.3631			5/2/2017	20.8
PW-1395	64.7761, -147.3631			8/29/2017	17.6
PW-1396	64.7843, -147.3490			9/16/2010	<10.3
PW-1397	64.7694, -147.4364			1/16/2010	<10.4
PW-1397	64.7694, -147.4364			10/19/2011	<6.40

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

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1397	64.7694, -147.4364			6/11/2012	<6.20
PW-1397	64.7694, -147.4364			5/22/2014	<5.30
PW-1401	64.7976, -147.4074			11/27/2012	<6.20
PW-1402	64.7580, -147.3904			11/30/2009	241
PW-1403	64.7616, -147.3887	100	90-160	2/2/2010	<10.8
PW-1403	64.7616, -147.3887	100	90-160	8/20/2011	<6.32
PW-1403	64.7616, -147.3887	100	90-160	5/15/2012	<6.52
PW-1403	64.7616, -147.3887	100	90-160	4/28/2014	<5.25
PW-1403	64.7616, -147.3887	100	90-160	5/27/2015	<5.30
PW-1403	64.7616, -147.3887	100	90-160	5/12/2016	<5.30
PW-1404	64.7515, -147.3820			11/14/2009	4.00J
PW-1404	64.7515, -147.3820			6/29/2011	<0.790J*
PW-1404	64.7515, -147.3820			7/13/2012	<3.10J*
PW-1404	64.7515, -147.3820			3/5/2013	<3.10J*
PW-1404	64.7515, -147.3820			11/5/2013	<3.10
PW-1404	64.7515, -147.3820			7/25/2014	<2.40
PW-1404	64.7515, -147.3820			3/16/2015	<2.40
PW-1404	64.7515, -147.3820			10/9/2015	<2.50
PW-1404	64.7515, -147.3820			8/9/2016	<2.50
PW-1404	64.7515, -147.3820			4/14/2017	<2.50
PW-1405	64.7513, -147.3835			11/15/2009	3.72J
PW-1406	64.7510, -147.3837			2/27/2010	<10.5
PW-1406	64.7510, -147.3837			7/26/2011	3.44J
PW-1406	64.7510, -147.3837			9/7/2011	3.50J*
PW-1406	64.7510, -147.3837			5/22/2012	<3.10J*
PW-1406	64.7510, -147.3837			3/12/2013	<3.10J*
PW-1406	64.7510, -147.3837			11/25/2013	<3.10
PW-1406	64.7510, -147.3837			9/15/2014	<2.40
PW-1406	64.7510, -147.3837			7/6/2015	<1.00
PW-1406	64.7510, -147.3837			1/18/2016	<2.50
PW-1406	64.7510, -147.3837			7/22/2016	<2.50
PW-1406	64.7510, -147.3837			6/19/2017	<2.50
PW-1407	64.7504, -147.3840			11/13/2009	9.04J
PW-1407	64.7504, -147.3840			6/28/2011	<0.790J*
PW-1407	64.7504, -147.3840			12/27/2011	<3.10J*
PW-1407	64.7504, -147.3840			10/19/2012	<3.10J*
PW-1407	64.7504, -147.3840			8/5/2013	<3.10J*
PW-1407	64.7504, -147.3840			1/14/2014	<3.00
PW-1407	64.7504, -147.3840			11/25/2014	<2.40J*
PW-1407	64.7504, -147.3840			6/9/2015	<1.00
PW-1407	64.7504, -147.3840			4/19/2016	<2.50
PW-1407	64.7504, -147.3840			10/4/2016	<2.50
PW-1407	64.7504, -147.3840			3/3/2017	<2.50
PW-1407	64.7504, -147.3840			9/5/2017	<2.50
PW-1408	64.7499, -147.3835			11/14/2009	4.46J
PW-1408	64.7499, -147.3835			5/25/2011	<5.00J*
PW-1408	64.7499, -147.3835			11/18/2011	<3.10J*
PW-1408	64.7499, -147.3835			10/16/2012	<3.10J*
PW-1408	64.7499, -147.3835			8/16/2013	<3.10J*
PW-1408	64.7499, -147.3835			6/10/2014	<2.40

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1408	64.7499, -147.3835			12/5/2014	<2.40
PW-1408	64.7499, -147.3835			3/16/2015	<2.40
PW-1408	64.7499, -147.3835			6/15/2015	1.30J
PW-1408	64.7499, -147.3835			10/12/2015	<2.50
PW-1408	64.7499, -147.3835			1/5/2016	<2.50
PW-1408	64.7499, -147.3835			4/18/2016	<2.50
PW-1408	64.7499, -147.3835			8/8/2016	<2.50
PW-1408	64.7499, -147.3835			11/8/2016	<2.50
PW-1408	64.7499, -147.3835			3/3/2017	<2.50
PW-1408	64.7499, -147.3835			6/12/2017	<2.50
PW-1409	64.7501, -147.3822			11/14/2009	<10.4
PW-1409	64.7501, -147.3822			7/14/2011	<6.60
PW-1409	64.7501, -147.3822			6/3/2012	<6.32
PW-1409	64.7501, -147.3822			8/15/2013	<6.20
PW-1409	64.7501, -147.3822			5/14/2014	<5.15
PW-1409	64.7501, -147.3822			7/30/2015	<5.25
PW-1409	64.7501, -147.3822			9/13/2016	<5.30
PW-1410	64.7507, -147.3810			9/18/2012	<6.52
PW-1410	64.7507, -147.3810			4/26/2013	<6.40
PW-1410	64.7507, -147.3810			4/25/2014	<5.00
PW-1410	64.7507, -147.3810			5/7/2016	<5.05
PW-1411	64.7509, -147.3793			6/17/2010	19.8
PW-1411	64.7509, -147.3793			3/30/2012	28.6
PW-1433	64.7670, -147.4222			3/18/2010	22.9
PW-1433	64.7670, -147.4222			8/31/2017	17.5
PW-1434	64.7761, -147.3667			3/16/2011	<10.8
PW-1434	64.7761, -147.3667			8/17/2011	5.90J
PW-1435	64.7753, -147.3668			2/12/2010	26.8
PW-1435	64.7753, -147.3668			3/20/2012	27.9J*
PW-1435	64.7753, -147.3668			4/2/2013	27.3J*
PW-1435	64.7753, -147.3668			1/13/2014	28.6
PW-1435	64.7753, -147.3668			8/29/2014	30.3
PW-1435	64.7753, -147.3668			4/21/2015	28.0
PW-1435	64.7753, -147.3668			12/11/2015	30.4J*
PW-1435	64.7753, -147.3668			7/26/2016	29.9
PW-1435	64.7753, -147.3668			10/18/2016	24.9
PW-1435	64.7753, -147.3668			2/27/2017	33.0
PW-1436	64.7815, -147.3862			4/17/2010	<10.0
PW-1436	64.7815, -147.3862			8/23/2011	12.4
PW-1436	64.7815, -147.3862			10/4/2011	12.5J*
PW-1436	64.7815, -147.3862			1/31/2012	11.2J*
PW-1436	64.7815, -147.3862			4/30/2012	11.8J*
PW-1436	64.7815, -147.3862			5/21/2012	11.6J*
PW-1436	64.7815, -147.3862			9/5/2012	14.0J*
PW-1436	64.7815, -147.3862			12/26/2012	9.50J*
PW-1436	64.7815, -147.3862			4/23/2013	11.6J*
PW-1436	64.7815, -147.3862			9/3/2013	13.5JL*
PW-1436	64.7815, -147.3862			1/21/2014	15.3
PW-1436	64.7815, -147.3862			6/9/2014	15.9
PW-1436	64.7815, -147.3862			12/9/2014	18.0

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Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1436	64.7815, -147.3862			3/17/2015	16.0
PW-1436	64.7815, -147.3862			9/14/2015	18.8
PW-1436	64.7815, -147.3862			3/22/2016	24.5
PW-1436	64.7815, -147.3862			8/22/2016	18.6
PW-1436	64.7815, -147.3862			2/20/2017	28.2
PW-1437	64.7817, -147.3853			4/16/2010	<10.9
PW-1437	64.7817, -147.3853			8/29/2011	10.9
PW-1437	64.7817, -147.3853			11/14/2011	10.3J*
PW-1437	64.7817, -147.3853			6/26/2012	11.9J*
PW-1437	64.7817, -147.3853			9/2/2014	22.6
PW-1437	64.7817, -147.3853			7/28/2015	23.1
PW-1437	64.7817, -147.3853			7/26/2016	28.0
PW-1437	64.7817, -147.3853			6/9/2017	31.6
PW-1438	64.7856, -147.3473			9/18/2012	<6.60
PW-1441	64.7764, -147.3522			5/5/2010	<10.6
PW-1441	64.7764, -147.3522			8/24/2011	<6.20
PW-1441	64.7764, -147.3522			6/7/2012	<6.20
PW-1441	64.7764, -147.3522			8/16/2013	<6.74
PW-1441	64.7764, -147.3522			5/14/2014	<5.40
PW-1441	64.7764, -147.3522			6/26/2015	<5.40
PW-1442	64.8363, -147.4642			3/30/2012	<6.46
PW-1443	64.7873, -147.3328			2/1/2013	<6.66
PW-1444	64.7715, -147.3448			5/27/2010	<10.0
PW-1444	64.7715, -147.3448			12/1/2011	<6.46
PW-1444	64.7715, -147.3448			6/13/2012	<6.40
PW-1445	64.7716, -147.3434			12/1/2011	<6.32
PW-1445	64.7716, -147.3434			6/13/2012	<6.40
PW-1445	64.7716, -147.3434			6/26/2013	<6.46
PW-1445	64.7716, -147.3434			7/8/2014	<5.25
PW-1445	64.7716, -147.3434			6/24/2015	<5.35
PW-1446	64.7708, -147.3432			12/1/2011	<6.32
PW-1446	64.7708, -147.3432			6/13/2012	<6.20
PW-1446	64.7708, -147.3432			6/26/2013	<6.46
PW-1446	64.7708, -147.3432			7/8/2014	<5.15
PW-1446	64.7708, -147.3432			6/24/2015	<5.40
PW-1447	64.8174, -147.3880			5/7/2013	<6.46
PW-1448	64.7575, -147.2779			5/28/2013	<6.20
PW-1449	64.7873, -147.3009			5/29/2013	<6.20
PW-1450	64.7678, -147.3484			5/15/2013	<6.20
PW-1450	64.7678, -147.3484			4/24/2014	<5.00
PW-1450	64.7678, -147.3484			7/9/2015	<5.50
PW-1450	64.7678, -147.3484			6/8/2016	<5.60
PW-1450	64.7678, -147.3484			6/30/2017	<5.05
PW-1451	64.7573, -147.3736	34	10-55	6/10/2013	288
PW-1452	64.7577, -147.3783			6/18/2013	181
PW-1453	64.7596, -147.3748			6/18/2013	<6.74†*
PW-1453	64.7596, -147.3748			8/12/2013	16.6
PW-1454	64.7787, -147.3588			6/19/2013	<6.60
PW-1454	64.7787, -147.3588			5/7/2014	<5.45
PW-1454	64.7787, -147.3588			7/6/2015	<5.50J*

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1454	64.7787, -147.3588			6/17/2016	<5.20
PW-1454	64.7787, -147.3588			6/24/2017	<5.10
PW-1455	64.7737, -147.3440			6/21/2013	<6.20
PW-1456	64.8282, -147.5430			6/26/2013	<6.20
PW-1457	64.7746, -147.3473			6/26/2013	<6.60
PW-1457	64.7746, -147.3473			7/24/2014	<5.40
PW-1457	64.7746, -147.3473			8/22/2015	<5.25
PW-1458	64.7696, -147.4314	30	10-55	6/20/2013	<6.66
PW-1458	64.7696, -147.4314	30	10-55	9/5/2013	<6.40
PW-1458	64.7696, -147.4314	30	10-55	6/5/2014	<5.20
PW-1458	64.7696, -147.4314	30	10-55	8/20/2014	<5.10
PW-1459	64.7808, -147.3728			6/28/2013	15.7
PW-1459	64.7808, -147.3728			5/22/2014	18.0
PW-1459	64.7808, -147.3728			1/26/2015	24.5
PW-1459	64.7808, -147.3728			11/30/2015	28.5
PW-1459	64.7808, -147.3728			8/29/2016	27.9J*
PW-1459	64.7808, -147.3728			5/26/2017	31.3J*
PW-1460	64.7932, -147.3869			6/28/2013	<6.20
PW-1461	64.7650, -147.3494			7/9/2013	<6.20
PW-1461	64.7650, -147.3494			7/11/2014	<5.30
PW-1461	64.7650, -147.3494			5/27/2015	<5.15
PW-1461	64.7650, -147.3494			7/15/2016	<5.00
PW-1462	64.7867, -147.3896			7/9/2013	3.96J
PW-1462	64.7867, -147.3896			7/7/2014	4.01J
PW-1463	64.7821, -147.3891			7/10/2013	4.79J
PW-1464	64.7754, -147.3753			7/10/2013	<6.46
PW-1464	64.7754, -147.3753			10/3/2015	4.73J
PW-1465	64.7584, -147.3688			7/8/2013	12.4
PW-1466	64.7711, -147.4382			7/16/2013	<6.46
PW-1467	64.7700, -147.3383			7/17/2013	<6.46
PW-1468	64.7706, -147.3383			7/17/2013	<6.20
PW-1469	64.7718, -147.3417			7/17/2013	<6.52
PW-1470	64.7763, -147.3452			7/19/2013	<6.40
PW-1471	64.7764, -147.3473			7/22/2013	<6.40
PW-1472	64.7365, -147.2855	40	10-55	7/29/2013	<6.52
PW-1473	64.7865, -147.3732	42	10-55	7/29/2013	<6.32
PW-1473	64.7865, -147.3732	42	10-55	6/10/2014	<5.05
PW-1473	64.7865, -147.3732	42	10-55	6/24/2015	<5.50
PW-1473	64.7865, -147.3732	42	10-55	5/19/2016	<5.10
PW-1473	64.7865, -147.3732	42	10-55	7/17/2017	<4.95
PW-1474	64.7774, -147.3534			7/29/2013	<6.60
PW-1474	64.7774, -147.3534			5/5/2014	<5.45J*
PW-1474	64.7774, -147.3534			6/22/2015	<5.50
PW-1475	64.7905, -147.3846			7/31/2013	<6.46
PW-1476	64.7733, -147.3417			7/31/2013	<6.40
PW-1477	64.7719, -147.3384			8/6/2013	<6.40
PW-1478	64.7705, -147.3417			8/7/2013	<6.52
PW-1479	64.7754, -147.3452			8/7/2013	<6.40
PW-1480	64.7737, -147.3430			8/7/2013	<6.50
PW-1481	64.7746, -147.3462			8/8/2013	<6.20

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1482	64.7692, -147.3413			8/8/2013	<6.40
PW-1482	64.7692, -147.3413			7/1/2014	<5.00
PW-1482	64.7692, -147.3413			8/6/2015	<5.30J*
PW-1483	64.7664, -147.3510	37	10-55	8/8/2013	<6.20
PW-1483	64.7664, -147.3510	37	10-55	4/8/2014	<5.00
PW-1483	64.7664, -147.3510	37	10-55	5/12/2015	<5.20
PW-1483	64.7664, -147.3510	37	10-55	7/1/2016	<5.10
PW-1484	64.7808, -147.3783	31	10-55	8/12/2013	<6.66
PW-1484	64.7808, -147.3783	31	10-55	8/23/2013	<6.56
PW-1484	64.7808, -147.3783	31	10-55	5/30/2014	5.73J
PW-1485	64.7729, -147.3430			8/15/2013	<6.52
PW-1486	64.7613, -147.4005			8/20/2013	267
PW-1487	64.7817, -147.3772			8/24/2013	12.8
PW-1488	64.7861, -147.3355			8/28/2013	<6.40
PW-1489	64.7693, -147.2879			9/3/2013	<6.40
PW-1490	64.7754, -147.3462			9/4/2013	<6.40
PW-1491	64.7551, -147.3516	145	90-160	7/25/2012	4.37J
PW-1491	64.7551, -147.3516	145	90-160	9/13/2012	3.88J
PW-1491	64.7551, -147.3516	145	90-160	9/24/2013	4.66J
PW-1491	64.7551, -147.3516	145	90-160	9/17/2014	<5.20
PW-1492	64.7478, -147.3498	176	>160	7/25/2012	<6.52
PW-1492	64.7478, -147.3498	176	>160	9/24/2013	<6.20
PW-1492	64.7478, -147.3498	176	>160	9/17/2014	<5.00
PW-1493	64.7783, -147.3979	180	>160	9/24/2013	12.8
PW-1494	64.7651, -147.4012			10/2/2013	100
PW-1608	64.7900, -147.3986	60	55-90	4/21/2014	<5.20
PW-1608	64.7900, -147.3986	60	55-90	8/11/2015	<5.30
PW-1608	64.7900, -147.3986	60	55-90	6/23/2016	<5.00
PW-1608	64.7900, -147.3986	60	55-90	7/13/2017	<5.10
PW-1626	64.7565, -147.3728	305	>160	10/16/2013	307
PW-1761	64.7771, -147.3840	50	10-55	5/4/2015	18.1
PW-1812	64.8052, -147.4541	150	90-160	6/5/2017	<5.25
PW-1891	64.7899, -147.3786			11/9/2013	<6.46
PW-1892	64.7638, -147.3407			11/11/2013	<6.46
PW-1892	64.7638, -147.3407			6/29/2015	<5.25
PW-1893	64.7749, -147.2568			11/15/2013	<6.46
PW-1894	64.8135, -147.3944			12/5/2013	<5.00
PW-1921	64.7815, -147.3603			7/14/2016	<5.20
PW-1930	64.7735, -147.3528			12/13/2013	<5.30
PW-1930	64.7735, -147.3528			5/6/2014	<5.70
PW-1930	64.7735, -147.3528			6/19/2015	<5.40
PW-1930	64.7735, -147.3528			7/22/2016	<5.10
PW-1930	64.7735, -147.3528			6/19/2017	<5.45
PW-1931	64.7826, -147.3241			12/19/2013	<5.00
PW-1932	64.8025, -147.4170			3/7/2014	<5.30
PW-1933	64.7746, -147.3452			4/1/2014	<5.20
PW-1934	64.8180, -147.5226			4/1/2014	<5.00
PW-1936	64.7909, -147.3892			4/21/2014	<5.30
PW-1937	64.7896, -147.4073			4/25/2014	<5.00
PW-1937	64.7896, -147.4073			8/5/2015	<5.25

Appendix B-3
Historical Private Well Sulfolane Results Summary

Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-1938	64.7900, -147.4030			4/28/2014	<5.00
PW-1938	64.7900, -147.4030			7/22/2015	<5.30
PW-2063	64.7727, -147.3584			7/24/2017	35.3
PW-2068	64.7810, -147.3922			9/18/2015	20.5
PW-2146	64.7766, -147.3638			6/5/2017	<5.25
PW-2146	64.7766, -147.3638			7/17/2017	7.41J
PW-2198	64.7428, -147.3042			5/8/2014	<5.15
PW-2199	64.7858, -147.3856			6/2/2014	<5.15
PW-2199	64.7858, -147.3856			7/10/2014	<2.40
PW-2199	64.7858, -147.3856			10/28/2014	<2.40
PW-2199	64.7858, -147.3856			1/20/2015	<2.40
PW-2199	64.7858, -147.3856			2/23/2015	<2.40
PW-2199	64.7858, -147.3856			4/10/2015	<2.40
PW-2199	64.7858, -147.3856			6/2/2015	1.10J
PW-2199	64.7858, -147.3856			7/17/2015	<2.50J*
PW-2199	64.7858, -147.3856			8/24/2015	<2.50
PW-2199	64.7858, -147.3856			10/12/2015	<2.50
PW-2199	64.7858, -147.3856			11/20/2015	<2.50J*
PW-2199	64.7858, -147.3856			1/4/2016	<2.50
PW-2199	64.7858, -147.3856			3/4/2016	<2.50
PW-2199	64.7858, -147.3856			4/25/2016	2.90J
PW-2199	64.7858, -147.3856			9/19/2016	<2.50
PW-2199	64.7858, -147.3856			1/13/2017	<2.50
PW-2199	64.7858, -147.3856			4/3/2017	3.90J
PW-2199	64.7858, -147.3856			6/5/2017	<2.50
PW-2199	64.7858, -147.3856			8/22/2017	<2.50
PW-2200	64.7527, -147.2489			6/12/2014	<5.00
PW-2201	64.7909, -147.4000			6/12/2014	<5.25
PW-2203	64.8076, -147.5208			7/21/2014	<5.30
PW-2205	64.7873, -147.3930			9/17/2014	<5.00
PW-2205	64.7873, -147.3930			5/31/2016	<5.10
PW-2205	64.7873, -147.3930			9/8/2017	<5.15
PW-2206	64.7935, -147.4217			9/18/2014	<5.30
PW-2207	64.7928, -147.4410			9/18/2014	<5.20
PW-2208	64.7917, -147.4410			9/18/2014	<5.40
PW-2209	64.7917, -147.4461			9/18/2014	<5.15
PW-2210	64.7924, -147.4196			9/18/2014	<5.00
PW-2211	64.7945, -147.4407	180	>160	9/19/2014	<5.30
PW-2211	64.7945, -147.4407	180	>160	7/17/2017	<5.30
PW-2212	64.7934, -147.4407			9/19/2014	<5.00
PW-2213	64.7508, -147.3801			10/2/2014	5.14J
PW-2214	64.7928, -147.4410			10/1/2014	<5.30
PW-2215	64.7625, -147.4107	40	10-55	11/18/2014	12.4
PW-2215	64.7625, -147.4107	40	10-55	11/20/2014	14.2
PW-2215	64.7625, -147.4107	40	10-55	6/9/2015	10.6
PW-2215	64.7625, -147.4107	40	10-55	1/11/2016	15.4
PW-2215	64.7625, -147.4107	40	10-55	7/5/2016	18.4
PW-2215	64.7625, -147.4107	40	10-55	5/12/2017	15.9J*
PW-2217	64.7331, -147.2813			2/20/2015	<5.00
PW-2218	64.7952, -147.4048			3/4/2015	<5.00

Appendix B-3
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Annual 2017 Offsite Plume Monitoring Report
Flint Hills Resources Alaska, LLC
North Pole Terminal, North Pole, Alaska

Private Well Identifier	Latitude, Longitude	Well Depth (feet)	Zone	Date	Sulfolane (µg/L)
PW-2219	64.7645, -147.4148	60	55-90	6/15/2015	22.9
PW-2219	64.7645, -147.4148	60	55-90	8/17/2015	31.4
PW-2219	64.7645, -147.4148	60	55-90	1/18/2016	53.1
PW-2219	64.7645, -147.4148	60	55-90	5/16/2016	42.7
PW-2219	64.7645, -147.4148	60	55-90	9/16/2016	82.6
PW-2219	64.7645, -147.4148	60	55-90	11/18/2016	55.3
PW-2219	64.7645, -147.4148	60	55-90	3/17/2017	46.2
PW-2219	64.7645, -147.4148	60	55-90	5/26/2017	48.4
PW-2219	64.7645, -147.4148	60	55-90	7/21/2017	57.8
PW-2219	64.7645, -147.4148	60	55-90	9/8/2017	60.0
PW-2220	64.7425, -147.3206			8/4/2015	<5.45
PW-2221	64.7510, -147.3782			8/25/2015	14.1
PW-2222	64.7458, -147.3382			10/13/2015	<5.15
PW-2223	64.7754, -147.3805			1/9/2016	56.4
PW-2224	64.8063, -147.4027			1/8/2016	<5.25
PW-2226	64.7923, -147.3988			5/23/2016	<5.20
PW-2227	64.7779, -147.3898			7/19/2016	64.2
PW-2227	64.7779, -147.3898			9/12/2016	56.0
PW-2227	64.7779, -147.3898			11/18/2016	42.5
PW-2227	64.7779, -147.3898			3/14/2017	66.7
PW-2227	64.7779, -147.3898			6/26/2017	61.6
PW-2229	64.7755, -147.3801			4/6/2017	55.9
PW-2233	64.7865, -147.3754			7/10/2017	<5.25
PW-2234	64.7885, -147.3951			7/26/2017	<5.15J*

General Notes:
Higher result of a field-duplicate pair is reported.
Well depth and zone information noted when available.
Acronyms and Abbreviations:
< = not detected; limit of detection (LOD) or limit of quantitation (LOQ; for older or QC-affected data) listed. Flag applied by laboratory.
J = estimated concentration detected below the laboratory limit of quantitation (LOQ) if flag applied by laboratory
J* = estimated concentration due to quality control (QC) failures or lack of field QC samples; flag applied by Shannon & Wilson, Inc.
JL* = estimated concentration, biased low, due to quality control failures; flag applied by Shannon & Wilson, Inc.
JH* = estimated concentration, biased high, due to quality control failures; flag applied by Shannon & Wilson, Inc.
J§* = estimated concentration due to sampling location downgradient of a standard home treatment system (water softener and non-carbon filter). Flag applied by Shannon & Wilson, Inc.
R* = result is rejected due to compounding QC failures; flag applied by Shannon & Wilson, Inc.
†* = sample result likely biased low due to a city-water leak near the shallow private well. Flag applied by Shannon & Wilson, Inc.
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.
µg/L = micrograms per liter

APPENDIX C

Analytical Laboratory Reports